BONE, ANTLER, TOOTH AND SHELL:

A STUDY IN IROQUOIAN TECHNOLOGY

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Abstract

Osseous artifacts have not been given the attention they deserve by most Iroquoian researchers. While a general system for their classification has evolved over the past one hundred plus years, labels have been assigned to artifacts based on very general characteristics. This dissertation addresses this shortcoming by undertaking a much more detailed analysis of their morphological and metric attributes. It refines the existing classificatory terminology and provides the foundation for a much more standardized typology which can be used and further refined by Iroquoian researchers in the future. The analysis also tests the hypothesis that the sites exhibit significant differences. For example, while all five sites are roughly contemporaneous they are located in two different micro-environments and are related to two different cultural traditions; one site is a special purpose fishing camp. This dissertation explores the similarities and differences between the five sites' osseous artifact assemblages and identifies variations that may be attributable to special site functions, differences in environment, subsistence patterns or cultural affiliation.

Résumé

Les artéfacts osseux n'ont pas reçu l'attention qu'ils méritent par la plupart des spécialistes de la culture iroquoïenne. Bien que les chercheurs aient élaboré un système de classification sur plus de cent ans de recherches, il reste que les catégories sont basées sur des caractéristiques très générales. Cette thèse aborde cette lacune en procédant à une analyse beaucoup plus détaillée des attributs morphologiques et métriques des artéfacts. Elle affine la terminologie classificatoire existante et fournit la base pour une typologie beaucoup plus standardisée qui peut être utilisée et affinée par les chercheurs, à l'avenir. L'analyse teste également l'hypothèse que les sites archéologiques dont proviennent les artéfacts, présentent des différences significatives. Par exemple, bien que les cinq sites à l'étude soient à peu près contemporains, ils sont situés dans deux micro- environnements différents et sont liés à deux traditions culturelles différentes; un seul site, un camp de pêche, a été identifié selon cette fonction spécifique. Cette thèse explore les similitudes et les différences entre les assemblages d'artéfacts osseux provenant des cinq sites à l'étude et identifie les variations attribuables à la fonction spécifique du site ou à des facteurs environnementaux ou qui sont liés au mode de subsistance ou à l'appartenance culturelle.

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All errors and omissions are my own.

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CHAPTER 1

Introduction

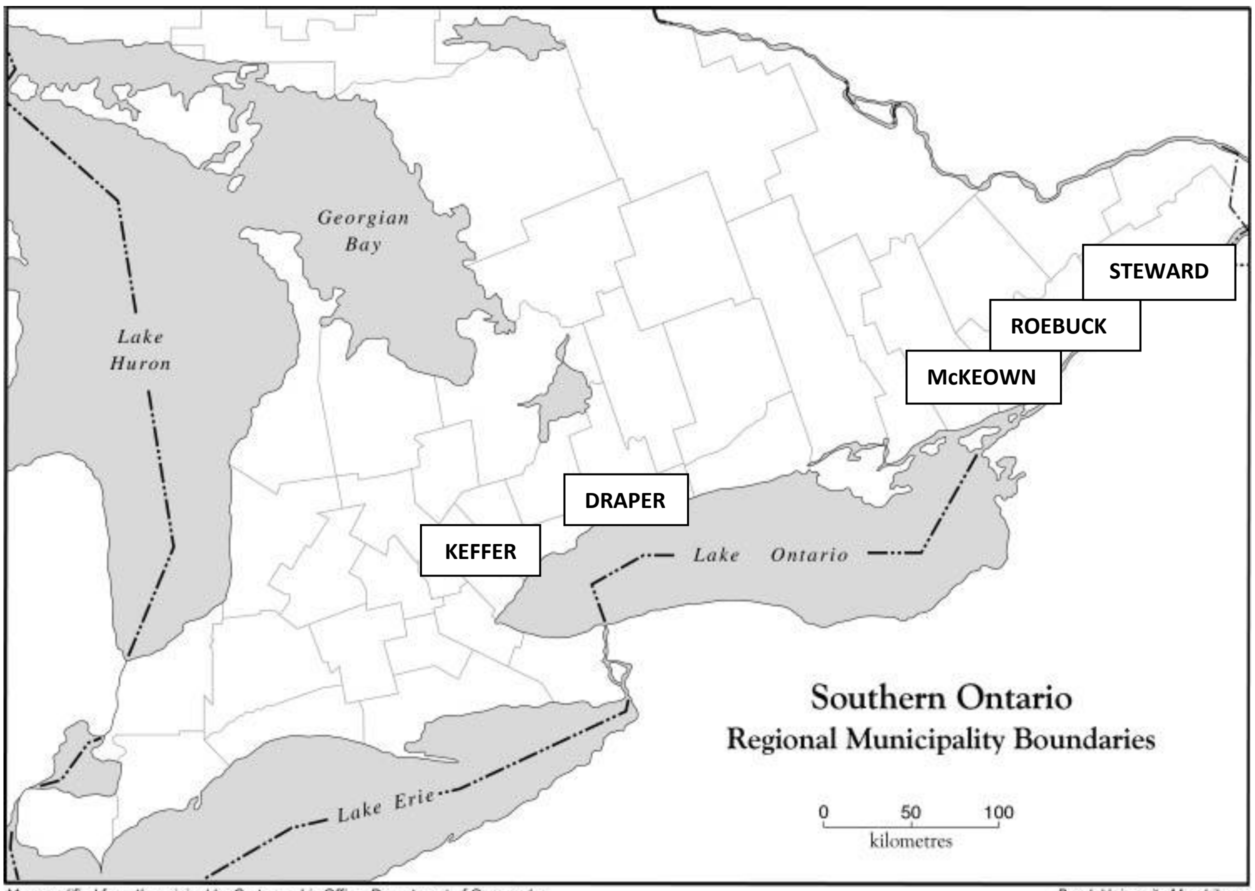
Given the extensive, rich and varied Iroquoian bone, antler, tooth and shell artifact assemblages available for study and the important role these artifacts must have played in Iroquoian life ways, it is surprising that they have not received more attention from scholars. In fact, with a few notable exceptions, Iroquoian archaeology has focussed almost exclusively on the study of ceramic and lithic artifacts, settlement and subsistence patterns. While this research has made a significant contribution to our understanding of Iroquoian chronology, social organization, population dynamics, and subsistence, it has not contributed very much to our knowledge of the full range of Iroquoian technology. We have much less detailed knowledge of many of the implements and objects they used in their daily lives. In this respect our understanding of Pre-Contact Iroquoian societies, their life ways and adaptation to their environment is incomplete.

The purpose of this dissertation is to examine the bone, antler, tooth and shell artifacts (for the sake of brevity collectively referred to as 'osseous' hereafter unless otherwise specified) from five geographically and ethnically separate but related sites, three St. Lawrence Iroquoian[1] and two ancestral Wendat[2] archaeological assemblages; to refine the existing artifact typology for them and to offer some observations regarding

1 This term refers to several widely distributed groups of Iroquoian-speaking peoples who occupied parts of northeastern New York State, eastern Ontario and southern Québèc. They are defined as culturally distinct from other neighbouring Iroquoian groups based on both linguistic and material cultural evidence (Pendergast and Trigger 1972). The McKeown, Roebuck and Steward sites are located in eastern Ontario.
2 This term refers to the ancestors of the historic Wendat, also known as the Huron. The Keffer and Draper sites have been classified by Wright as Southern Divison Huron (1966) and are located in the greater Toronto region.

functional, regional and ethnic variations reflected in them. These sites are: McKeown (BeFv-1)[3], Roebuck (BeFv-4) and Steward (BfFt-3), three late Pre-Contact, St. Lawrence Iroquoian sites located in eastern Ontario and Keffer (AkGv-14) and Draper (AlGt-2), two late Pre-Contact, ancestral Wendat sites located in south central Ontario (see Figure 1.1). They will be described in greater detail later.

Figure 1.1 Location of Sites.



Map modified from the original by Cartographic Office, Department of Geography. Brock University Map Library

3 This site is also referred to in the literature as the Maynard site or the Maynard-McKeown site.

As mentioned, I feel that osseous artifacts have not been given the attention they deserve from Iroquoian scholars. Over the past one hundred plus years, a general system for their classification has evolved. Labels have been assigned to artifacts based on very general characteristics. This dissertation seeks to address this shortcoming by undertaking a much more detailed analysis of their morphological and metric attributes. It seeks to refine the existing classificatory terminology and it is hoped that this will provide the foundation for a much more standardized typology that will be used and further refined by Iroquoian researchers in the future.

The analysis will also test the hypothesis that the site assemblages exhibit significant differences. For example, while all five sites are roughly contemporaneous they are located in two different micro-environments and are related to two different cultural traditions; one site is a special purpose fishing camp.[4] Analysis of the faunal remains from these sites suggests differences in their subsistence patterns. This dissertation will explore the similarities and differences between the five sites' osseous artifact assemblages in order to identify any variations that may be attributable to special site functions, differences in environment, subsistence patterns or cultural affiliation. Issues will be addressed in the following order:

- Chapter 1 will outline the objectives of the study and will then provide an overview of past research on bone technology, with specific reference to relevant research in Europe and the Near East, the Arctic and Sub-Arctic, and Northeastern North America;

4 The McKeown site is probably the latest of the five sites and the Roebuck site the earliest based on ceramic seriation and the presence of tubular marine shell beads and an iron awl at McKeown. The Steward site is a stratified site which was seasonally occupied over a long period of time however most of the osseous artifacts come from the Late Iroquoian levels.

- Chapter 2 will describe the research strategy, the concepts, methodologies and techniques that will be employed to analyse and interpret these data;
- Chapter 3 will summarize ethno-historic evidence related to the manufacture and use of bone tools among Aboriginal peoples of the Northeast, describe the physical properties of the raw materials used to manufacture these tools, the ethnic, spatial and temporal characteristics of the sites, their micro environments and subsistence patterns;
- Chapter 4 will outline a typology based on the attributes characteristic of each of the artifact type based on samples drawn from four of the five sites and will discuss these types in the context of other research elsewhere in the Northeast;
- Chapter 5 will draw inter-site comparisons of artifact frequencies and discuss their implications for the defining functional, regional and ethnic variation;
- Chapter 6 will provide conclusions, pose unresolved questions and outline areas for future research.

However, before turning to this discussion, it will be useful to review some of the past research on Iroquoian bone technology as well as research on these types of artifacts that has been undertaken elsewhere.

Past Research

In writing the introduction to a collection of articles, *Bones as Tools: Current Methods and Interpretations in Worked Bone Studies,* Genevieve LeMoine notes that an internet search of the terms “bone implements” and “bone technology” turned up over 900 references, dating from 1860 to 2003, the majority dating from the last two decades (2007: 9). It would be impossible to review and reference all of them here or all of the research undertaken since 2003. Therefore, the following brief overview will highlight only those studies that provide the most relevant research to the current study.

Europe and the Near East

To begin a review of research on bone technology we need to return to the beginnings of the discipline of archaeology itself. Scholars recognized the importance of the bone and antler tools in European assemblages from the very first discovery of European Palaeolithic sites in the 19th century. Specialized bone tools first appeared in Africa[5] and became widespread with the arrival of modern humans in Europe (although recent research suggests that Neanderthals may also have been producing specialized tools).[6] Indeed, elaborate bone and antler tools were one of the characteristics first used to define the Magdalenian sites of Western Europe by Édouard Lartet and Henri Christy (1875). A number of short articles and studies dealing with Palaeolithic bone tools first began to appear in the Bulletin de la Société préhistorique de France beginning in the early 1900s and intermittently thereafter, continuing through to the

5 Bone harpoons have been discovered at the Katanda site in Zaire dating to 90,000 B.P. (Yellen, et al 1995).

6 According to Marie Soressi, et al, Neanderthals made first specialized bone tools in Europe, hide working ‘lissoirs’, based on findings from the Abri Perony and Pech-de-l’Aze sites in the Dordogne region of southern France (2013).

1960s. Beginning in the 1970s, European researchers again renewed efforts to refine the classification of formal, standardized bone artifact types from Palaeolithic, Neolithic, Iron Age and Medieval sites in Europe. Their efforts produced a number of collections of papers from colloquiums on the general topic of "L'industrie de l'os dans la préhistoire", published by the Centre nationale des recherches scientifique, under the editorship of Henriette Camps-Fabrer (1974, 1977 and 1982). These included contributions by scholars from all over Southern and Western Europe. Other studies, such as those of Danielle Stordeur-Yedid, took the form of descriptive classifications of complete artifact assemblages such as "Les aiguilles à chasse au Paléolithique" in Gallia Préhistoire (1979), or Christiane Leroy-Prost's "L'industrie osseuse aurignacienne, essai régional de classification: Poitou, Charente, Périgord" (1975). Randall White's article *Bone, Antler and Tooth Objects from Abri Blanchard, Commune de Sergac (Dordogne*)(1992) and Luc Doyon's recent University of Montréal, Master's Thesis, *L'apport du réaffûtage a la variabilité morphométrique des pointes de projectile aurignaciennes en bois de cervidé* (2013) are more recent examples of the effort to define early Western European osseous technology.

These reports helped standardize terminology for bone and antler artifact assemblages, while they also concentrated on the spatial and temporal contextualization of regional sequences as well as the wider distribution of specific artifact types in Europe. This work was heavily influenced by lithic studies, particularly as they related to the definition and refinement of technological reduction sequences (chaînes opératoires) and use wear analysis. Particularly noteworthy is Mark H. Newcomers "Study and Replication on Bone Tools from Ksar Akil (Lebanon)," (1974).

Newcomer analysed bone awls and bone points from this Early Upper Palaeolithic site and attempted to reproduce them using replicas of the chipped flint and ground stone tools found on the site. This enabled him to identify different types of use wear on the tools using both unaided eye and low powered magnification (Ibid: 138-153).

Other European literature deals more specifically with British Iron Age and Medieval bone and antler industries, for instance, J.G.D. Clark and N.W. Thompson's examination of the groove and splinter technique for working antler at Starr Carr (1953), and Arthur MacGregor's book *Bone, Antler, Tooth and Horn: The Technology of Skeletal Materials since the Roman Period* (1985). In this work, MacGregor outlines bone, antler, tooth and horn industries concentrating on Medieval Europe. He includes a description of the physical and mechanical properties of these raw materials and a discussion how these properties have influenced the selection of each raw material for specific artifact types and how their physical properties limit and define the craftsman's choice. Further refinements of regional and temporal sequences continued throughout the 1980s and 1990s, receiving a significant boost in June 2000, with the establishment of the Worked Bone Research Group (WBRG). The WBRG is an official Working Group of the International Council for Archaeozoology (ICAZ). It was originally formed during an informal London meeting of about thirty specialists, in February 1997. Since then, the group has held biennial international conferences and has its own website: www.wbrg.net. Its purpose is to improve communication between individuals studying worked animal hard tissues (especially bone, antler, and tooth) with special emphasis on archaeological finds. A broad diachronic, and multi-disciplinary approach has been adopted in order to promote the exchange of ideas concerning attitudes to and procurement of raw materials, technology, and cognitive aspects of bone working. The focus of recent conferences have been discussions of individual assemblages, the results of experimental research on both manufacturing techniques and use wear, including macro wear with low stereoscopic magnifications and micro wear employing a metallographic light microscope with a great deal of emphasis on verification of identification by experiment.

For example, the 8^{th} meeting of the WBRG, which took place in Saltzburg in 2011, covered a wide range of subjects, mainly focused on research from Europe but also from Asia and the South Pacific. Attention has also been increasingly focused on selection of raw materials and the relationship between technology and continuity of social traditions. The core of the discussions has dealt with methodological and theoretical considerations rather than details of local typologies with a general consensus beginning to emerge around approaches to this class of archaeological object (www.wbrg.net). As such, the WBRG is an extremely valuable research network for anyone interested in the study of osseous artifact assemblages.

The Arctic and Sub-Arctic

The rich and varied bone and antler artifact assemblages from sites in the North American Arctic and Sub-Arctic regions has also provided an important source of research material for many scholars. Like their European counterparts, northern specialists have been heavily influenced by concepts, methods and techniques first developed for the study of lithic technology, particularly with regard to reduction sequences (châines opératoires), replicative experiments and microscopic use wear analysis.

Two early examples are studies completed in 1984 - Raymond LeBlanc's study of cultural continuity at the stratified Rat Indian Creek site, Yukon Territory, which contains a systematic demonstration of primary core reduction techniques, such as whittling, scraping and polishing based on the examination of formal tools and detritus, and Rebecca Cole-Will's examination of the impact of the introduction of European metals on the technology of the Copper Inuit of Banks Island, which develops a process model for the reduction of whole caribou antlers to finished antler artifacts. Cole-Will also performed replicative experiments with metal tools to identify the range of technological procedures and their association with morphological features.

In 1985, Genevieve LeMoine completed a Master's Thesis, *Experimental Use Wear Analysis of Bone Tools*. Based on a small sample of bone tools from a site in Alberta, the purpose of this study was to design and carry out experiments aimed at developing criteria for identifying distinctive use wear on bone tools, such as awls, needles, choppers and fleshing tools. Her doctoral dissertation, *Experimental Analysis of the Manufacture and Use of Bone and Antler Tools among the Mackenzie Inuit* (1991) continued her experimental work in this field, but unlike previous studies on Thule and Inuit bone and antler technology, she focused her analysis more on the tools themselves rather than the debitage produced to make them (Ibid: 9). Her research achieves three main goals: to develop criteria for identifying microscopic traces of manufacture and use on bone and antler tools through replicative experiments; to apply the results of an experimental program to an archaeological sample; and, to reconstruct the design system used by the Mackenzie Inuit in making these tools (Ibid: iii, 1).

Amy Margaris' 2006 doctoral dissertation, *Alutiiq Engineering: The Mechanics and Design of Skeletal Technologies in Alaska's Kodiak Archipelago*, also makes an important contribution to our understanding of Inuit bone technology. By examining the interplay between bone raw materials' innate and working properties and tool design, through replicative experiments and in depth study of five specific tool types, Margaris is able to identify multiple design pathways toward a generalized goal of maximizing tool longevity, or circulation time, tool recycling and conservation (2006: 12-13).

The most recent example of northern research examining bone tool technology, comes from Patricia J. Wells' 2012 doctoral thesis on *Social Life and Technical Practice: an Analysis of the Bone Tool Assemblage at the Dorset Palaeoeskimo Site of Phillip's Garden, Newfoundland.* This study primarily aims to understand how technology shaped the social life of the site's inhabitants over time, first, through qualitative and quantitative artifact analysis, their material sources, their frequency over the site; and secondly, the way the tools were constructed and used, employing low powered magnification to understand the nature of material acquisition, reduction, use and re-use (2012: 2). Using data from the same site, Wells, M.A.P. Renouf and Tim Rast created replica lithic tools to manufacture replicas of four specific types of artifact found at Phillip's Garden – bird bone needles, caribou antler harpoon heads, caribou bone barbed points and whale bone foreshaft-like implements (2014). From their examination of the tools under low-powered magnification, they observed likenesses between the manufacture trace patterns on both replicas and archaeological specimens, concluding that these comparisons can inform some understanding of Dorset technological practice (Ibid: 415-417).

In terms of general trends, research, which began in the 1950s and continued on into the 60s, focused on the study of expedient tools, has with a few exceptions, gradually tapered off, while, current trends in the study of bone technology parallel those of archeology as a whole (LeMoine 2007: 12).

> Studies of manufacturing techniques for example, have developed from descriptions of manufacturing sequences and technological traditions (Mary-Rousselière 1984) to comparisons of traditions between and among contemporaneous peoples (Choyke 1982.83, 1983; Morrison 1986), to examinations of choices made by artisans during manufacture (LeMoine and Darwent 1998) and descriptions of 'châines opératoires' (Dobres 1996) (Ibid: 15).

The Northeast

In the past one hundred and thirty years, Iroquoian archaeological research has seen significant changes in focus and theme. In contrast to their approach to the analysis of ceramics, which focussed on distinguishing stylistic variation, early scholars concentrated their studies of osseous technology on distinguishing artifact types according to their perceived function. To a great extent this process drew on cross-cultural comparisons, and to a lesser extent, on the meagre evidence gleaned from early historical accounts of the Iroquoians and Algonquians of the Northeast. Despite these handicaps nineteenth century researchers were able to make a number of significant contributions to our understanding of Iroquoian osseous technology.

In 1885, Charles Rau published the monograph, "Prehistoric Fishing in Europe and North America", which contained detailed descriptions of a rich variety of osseous tools and his interpretations of their functions. Employing ethnographic analogies ranging from the Arctic Archipelago to Tierra del Fuego, his approach appears to have been influenced by those European archaeologists like Sven Nilsson, who postulated a psychic unity for mankind - the idea that similar mental processes in all humans at the same level of development would result in similarities in material culture. European scholars used this approach in conjunction with a chronological system based on technological stages of development in the Old World, (Stone, Bronze, and Iron Ages), to interpret Old World development. Unfortunately, Rau's application of this approach encouraged invidious comparisons between "civilized" Old World societies and "savage" New World societies and inevitably placed the latter on the lowest level of his ranking system.

Following Rau, these principles were adopted and developed by W.M. Beauchamp, in New York State, and David Boyle and W.J. Wintemberg, in Ontario. Their studies took the form of short reports and lengthier monographs published as bulletins by the New York State Museum and as Appendices to the annual *Report of the Minister of Education, Ontario*. Their analysis of the function of osseous artifacts depended heavily on common sense, although some crude replicative experiments were also performed. Since, information based on direct ethno-historic accounts was rare, their conclusions were based on analogies referring mainly to the rich inventory of bone artifacts in use among the Inuit. At this time, some similarities between European and North American bone and antler artifacts were also being attributed to historical contact between Aboriginal groups and Europeans (Beauchamp 1902, 1903; Wintemberg 1904, 1905).

Oddly, their belief in a general psychic unity for all mankind in no way prevented most New World archaeologists from viewing the "superior" European as the source of technological innovation for the "primitive" native North Americans. Their point of reference for the introduction of technological innovation was nearly always the European discovery of America in A.D. 1492. The prehistory of Europe, based on the notion of in situ technological evolution, was perceived as dynamic and progressive, while New World archaeologists represented North American prehistory as static. For example, Beauchamp and Wintemberg both refused to consider the possibility that bone combs and eyed needles existed prior to European contact (Beauchamp1903: 85-86, Wintemberg 1904:39-43). They attributed the absence of these artifact types in Pre-Contact times to a lack of technological capacity and seem to have regarded Iroquoian cultures as static and incapable of innovation. Boyle, as a stricter supporter of psychic unity, adamantly opposed these views, claiming, “We might just as well claim European origin for the idea of our stone gouges because they are hollow, or for anything else, because it may happen to be sharp, or blunt, or straight, or crooked, or round, or square, many things so characterized having been known to exist in Europe at one time (1904:42).”

All three recognized the distinctness of the osseous artifact assemblages of northeastern North America but looked elsewhere for their origins. An example of this thinking was the identification of drilled and ground human cranial discs as "gorgets". There is no ethno-historic evidence that these objects were ever worn as gorgets, a form of armour protecting the throat, anywhere in the New World or the Old. Because they were similar in shape and size to shell gorgets worn by native peoples in North America and metal gorgets of European origin, it was assumed that they were used for the same purpose (Boyle 1888, Beauchamp 1902). In fact, we now know that they were most probably used as rattles (Jamieson 1983, Pearce 2004).

Another good example of this type of thinking is the identification of perforated bone tubes as whistles. David Boyle was among the first to question such speculation.

> Attempts to use them as the name (WHISTLE) suggests, prove failures, although in some cases it is possible to produce sounds with them by closing one or two of the apertures where there are respectively two or three. Occasional results of this kind do not prove the original purpose to have been that of a whistle, any more than tubular door-keys were so intended (1904:32-33).

Generally, functional labels were applied to artifacts with little effort made to place them within precise spatial or temporal contexts, using a combination of formal characteristics and ethnological analogy, a practice best described as antiquarianism, or ‘artifactology’, as opposed to archaeology.

After the turn of the century, W.J. Wintemberg moved away from this method of analysis toward a more systematic and precise examination of the formal characteristics of artifacts. He also made a greater attempt to place them within more precise spatial and temporal boundaries. His work and that of other Canadian archaeologists differed from the work of contemporary American archaeologists, who attempted to define culture areas using the direct historic approach. For example, W.J. Wintemberg's article "Bone and Horn Harpoon Heads of the Ontario Indians", published in 1906, still reflected the formal analysis of the nineteenth century. Although a map showing the distribution of finds is provided (1906:34) artifacts are described individually, in great detail, but with little effort to present observations systematically. Also cited and supported by Wintemberg was a theory propounded by British scholar, W. Boyd Dawkins that "there are no savage tribes known which use the same set of implements without being connected by blood. (p. 233) (Ibid: 3)."" This theory is used to explain the similarity between harpoons from Ontario and those of the Inuit by a direct relationship. Wintemberg even suggested a possible "Eskimo" occupation of southern Ontario (Ibid: 36). Fifty-one specimens are described from sites in the Canadian Arctic, Alaska, France, Great Britain and Switzerland in addition to those from Ontario. Little effort was made to control for ethnic variation and differences in site dates among the Ontario specimens, the major focus of his discussion being the artifact as a functional object. Wintemberg's later work (1928, 1931, 1936, 1939) reflects the influence of Harlan I. Smith (1910) and Arthur C. Parker (1922).

Smith used artifact function as a major focus and organizing principle for the classification and analysis of cultural materials and attempted to use function to infer division of labour, social systems, and subsistence practices. Smith's "Prehistoric Ethnology of the Kentucky Site" (1910) is a good example of this approach. In this study artifacts were considered in dynamic contexts - how they were made, how they were used and who used them and how they compared with artifacts from similar sites closely related in place and time. As Smith's title suggests, he was concerned with "prehistoric ethnology" not just with the artifacts themselves.

On the other hand, Parker's work drew on Iroquois ethnology to interpret archaeological material, thus adding a framework of temporal and cultural continuity to the interpretation of archaeological data. He succeeded in defining an Iroquois cultural tradition distinct from the pan North American approach of previous researchers. To some extent, Wintemberg's later work emulates Parker's "The Archaeological History of New York". In Canada, this type of artifact analysis continued more or less unchanged until after the Second World War, while in adjacent parts of the United States archaeologists had already begun to apply the Midwestern Taxonomic System to the study of cultural chronologies.

After 1945, archaeology in the Northeast was marked by a growing concern for chronology that resulted in research concentrating almost exclusively on ceramics and ceramic seriation in an effort to define cultural sequences, in some ways to the detriment of the study of lithic, bone, and other kinds of artifacts because it was believed that ceramic evidence was more sensitive to subtle changes through time and between ethnic groups (Emerson 1954, MacNeish 1952, Ritchie 1944, 1969, Wright 1966). The process of clarification of the spatial and temporal dynamics of various sequences continues to the present day with scholars focussing on increasingly narrow fields of study. The refinement of ceramic sequences has also been accompanied by a greater interest in the study of settlement patterns both at the regional, inter-site and intra-site level. Iroquoian archaeology has also been influenced by ecological anthropology resulting in efforts to interpret Pre-Contact activities in terms of ecological systems reconstructed by means of archaeobotany and zooarchaeology.

These processes of clarification, refinement, specialization, and diversification have largely side-stepped the study of osseous artifacts, often treating them in a cursory fashion in most site reports and ignoring them almost completely when wider temporal and spatial relationships are studied. In 1936, W.J. Wintemberg's Roebuck site report devoted approximately forty-six pages of text to the description, manufacture, and use of bone, antler, tooth and shell objects. This represents about 33% of the text. In contrast, by 1974, J.V. Wright's Nodwell site report devoted approximately twenty pages to the same purpose, representing about 7% of the text. In *The Ontario Iroquois Tradition* (1966) Wright states, “Ceramic evidence, consisting of both rimsherd types and single attributes, is most heavily relied upon to trace the various sequences through time. Other data, such as settlement pattern, burial characteristics, lithic and bone traits, however, are used where possible (xii)”. This amounts to two to three pages of discussion at most, of a total of approximately one hundred pages of text (Ibid: 72, 74, 77, 87, 90). Thus, the description, analysis and discussion of osseous artifacts, when and where it occurs in Iroquoian archaeological reports, is often extremely brief. With the exception of a few reports focussing specifically on osseous assemblages that will be described later, this trend continues to the present day.

Notable exceptions are the Master's theses of Karen McCullough (1978), Marie Ferdais (1983) and Christen Junker-Andersen (1984), as well as a few published and unpublished studies (Junker-Andersen 1981, Gates St-Pierre 2007, 2010). These reports devote themselves entirely to the examination of Pre-Contact Iroquoian bone technology. For example, McCullough's analysis focuses on a large sample of worked deer phalanges from the Draper site, located in south central Ontario, while Marie Ferdais' focuses more broadly on the analysis of an entire worked bone assemblage from a Late Middle Woodland site in southern Québèc, Pointe-du-Buisson Station 4. Both researchers examine attributes related to raw material, morphology, manufacturing techniques and use wear: McCullough in order to refine the classification of a single artifact type, worked deer phalanges, into twenty-two more discreet sub-types; Ferdais in order to examine in detail the attributes of a whole assemblage of worked bone artifacts from a single stratified site.

Junker-Andersen's, *A Preliminary Typology of Bone Awls and Awl-Like Implements from Ontario Archaeological Sites* (an unpublished paper on file at University of Toronto) provides, "...a more accurate picture of the forms and functions or certain types of osseous artifacts commonly found in Ontario archaeological assemblages... (1981: 38)." Junker-Andersen analysed over seven hundred artifacts from twelve archaeological sites as well as from the Royal Ontario Museum collections, in an effort to develop a morphologically-defined typology and a taxonomic system for awls and awl like implements, including attempting to distinguish the attributes of a variety of awls, husking pins, leisters, fish hooks and projectile points. Although brief, this study represents an important initial step in unpacking the catch-all artifact category - awl, so often applied indiscriminately to many of the long, sharp implements found on Iroquoian sites.

In 2007, Christian Gates St-Pierre tackled a similar challenge in his article, “Bone Awls of the St. Lawrence Iroquoians: A Micro-wear Analysis (2007: 107-118)”, published in, *Bones as Tools: Current Methods and Interpretations in Worked Bone Studies* (2007). Using replicative experiments and micro-wear analysis, he attempts to identify the precise function of “...one very specific and problematic category of bone tools conventionally referred to as “awls” (2007: 107).” The findings of both these and other studies will be discussed in greater detail and compared and contrasted with my own findings in Chapter 4.

Another, more specialized focus of attention has been the analysis of artifacts manufactured of human bone (and related scattered human bone). In 1983, I published a paper *An Examination of Prisoner Sacrifice and Cannibalism at the St. Lawrence Iroquoian Roebuck Site,* which analysed both formal artifacts and scattered human bones found in middens. In 1984, Martin Cooper completed a more comprehensive study, *An Analysis of Scattered Human Bone from Ontario Iroquoian Sites*, which examined the temporal frequency and spatial distribution of scattered human bone as well as human bone artifacts from sites across southern Ontario (Cooper 1984, an unpublished paper on file at University of Toronto). More recently, Tara Jenkins, McMaster University, produced a major research paper titled, *Contexts, Needs and*

Social Messaging: Situating Iroquoian Human Bone Artifacts (2011). This study examines the significance of the cultural modification of human bone, its transformation into artifacts and the spatial and temporal trends associated with this practice. Jenkins also explores the role played by one particular human bone artifact type – the human cranial rattle. In 2005, Ronald F. Williamson and Annie Veilleux published, *A Review of Northern Iroquoian Decorated Bone and Antler Artifacts: A Search for Meaning*, which examines the symbolism inherent in the designs found on bone and antler artifacts as well as the ideological roles played by the animals from which they were derived (Williamson and Veilleux 2005).

In 2010, Gates St-Pierre published “Iroquoian Bone Artifacts: Characteristics and Problems”, a general overview of Iroquoian research on bone technology, including some of the many challenges and problems facing Iroquoian researchers studying bone tool assemblages. He enumerates a number of pressing issues including the lack of morphological standardization, the need to establish valid functional identifications through micro wear analysis, as well as examination of material procurement, manufacturing techniques and technological choices. Typically, most of reporting of Ontario Iroquoian osseous technology is presented as a subsection of the faunal analysis, with more emphasis placed on what animal species the tools are derived from and less on how they were manufactured or how they were used (for an exceptions see Chapdelaine 1989; Thomas 1998).

Thus, the decline in focus on the study of formal tool typologies to some extent corresponds to an increase in interest in faunal analysis. Frances Stewart argues that early Iroquoian researchers neglected zoo-archaeological considerations in favour of formal artifact analysis (1997: 76). Ironically, today the opposite seems to be the case. Since interest in zoo-archaeological research began in earnest in the 1970s, most of the analysis of osseous artifacts has been relegated to small subsections of much larger, more comprehensive archaeological and zoo-archaeological reports. In a sense, the formal analysis of Iroquoian osseous artifacts is 'taking a back seat' to faunal analysis. This situation is extremely regrettable for a number of reasons, especially when one considers the large number and variety of bone artifacts that occur in many Iroquoian assemblages and the potential importance of these artifacts for interpreting Iroquoian material culture in terms of ethnicity and technological development.

Iroquoian osseous artifact research reflects general trends – some very early formal analysis; specialized study of the temporal and spatial aspects of specific artifact types; later experimental and replicative use wear analysis; and research on symbolic meaning. Unlike ceramic and lithic research, osseous artifact assemblages still lack a well defined and commonly accepted typology. This lack of a standardized system of classification has made terminology confusing and inter-site comparisons difficult. In many ways, the objective of my doctoral research is a return to the beginning – formal typology, but with the benefit of more recent research that draws on this wider range of topics. As LeMoine suggests archaeologists, "must work backwards from the finished artifacts to the design system that produced them. The archaeologist can infer spatial and temporal aspects as well. The archaeologist can then reconstruct a ‘brief’ or summary of the design system, including the following: function, material, context, ‘style’, date, geographic location, expectations and habits, technical knowledge and efficiency (Chippendale 1986: 446, Figure One, cited in LeMoine1991: 26).”

Scope of Current Research

The scope of my research will be more comprehensive than previous studies of Iroquoian osseous technology. The analysis will encompass over eight thousand specimens, representing entire bone artifact assemblages rather than being limited to specific artifact types. Form, function and style as well as temporal and functional variations, will be examined at the level of individual attribute, artifact type and site assemblage. Where appropriate, low-powered microscopic analysis will be employed, to derive the maximum amount of information relating to manufacture and use wear.

Specimens will first be sorted into artifact types based on attributes of raw material, morphology, metrics, manufacture and use wear. The five site assemblages will then be compared in order to identify significant variations in type attributes and frequencies between site assemblages. The analysis will examine the similarities and differences between the five site assemblages in the context of: subsistence and micro-environments, site function, ethnicity and temporal variation. The result will, I hope, provide Iroquoian researchers with a comprehensive, more refined, yet easy to use, classification system that will enable them to more thoroughly analyse their artifact assemblages and to undertake further comparative research.

As mentioned, Gates St-Pierre has enumerated a number of issues that need to be addressed if Iroquoian osseous specialists want to move our knowledge forward. These include the lack of morphological standardization, the need to establish valid functional identifications through micro wear analysis, as well as examination of material procurement, manufacturing techniques and technological choices (2010: 80-81). This list provides a very ambitious research agenda for Iroquoian scholars. It is hoped that the research described in the following chapters will take a modest first step in addressing some of these challenges.

CHAPTER 2

Methodological Approaches

Amy Margaris argues that archaeologists "…reverse engineer artifacts in order to uncover problems these objects were designed to solve, and the associated skills and strategies employed by their unseen users (2013: 669)." In this sense, archaeologists are attempting to reconstruct the 'design systems' employed to create the artifacts by their makers. A design system is defined by Chippindale as, "a summary of how an artifact is made, including technical aspects, such as material choice and manufacturing technique; morphological aspects such as size, shape and even decoration of an artifact; and even symbolic aspects such as whether and in what way an artifact is invested with symbolic meaning (1986: 5)." The following is a brief review of some of the concepts, research frameworks and approaches that have influenced my research strategy.

'Chaînes Opératoires' and Reduction Sequences

One popular methodological tool that has been used to reconstruct prehistoric design systems is the 'chaîne opératoire' approach, first defined by French ethnographer André Leroi-Gourhan (1943). It has been employed mainly as a methodological tool to analyse lithic assemblages but it has subsequently been borrowed by many osseous tool specialists, particularly those working on Arctic and Sub-Arctic assemblages (Betts 2007; LeMoine and Darwent 1998; Morrison 1986; Nagy 1990; Wells 2012). Frederick Sellet explains that:

> …the chaîne opératoire aims to describe and understand all cultural transformations that a specific raw material had to go through. It is a chronological segmentation of the actions and mental processes required in the manufacture of an artifact and in its maintenance into the technical system of a prehistoric group. The initial stage is raw material procurement, and the final stage is the discard of the artifact (1993: 106).

Michael Shott argues that the ‘chaîne opératoire’ approach, originating in Europe, is essentially the same thing as ‘reduction sequence’ concept employed mainly in North America (2003). On the other hand, Gilbert Tostevin believes that, “The reduction sequence approach is specific to the study of stone tool technology, past or present. Chaîne opératoire, however, covers all material culture behavior, past or present…Its analytical scope is thus enormously larger than that of reduction sequence (2011: 352).” He suggests that, “chaîne opératoire provides the wider and more anthropological context in which to study material culture behaviour through time. The reduction sequence approach, however, provides a better example of epistemological rigor in the use of etic vs. emic observations in prehistoric contexts without ethnographic informants (Ibid: 364).”

Both approaches attempt to follow the stages of artifact production from initial raw material selection, through the physical acts employed to reduce the raw material to a final finished form. The first step is to separate the artifacts according to raw material; the second step, to understand the techniques and methods used to produce the assemblage, the third step, to reconstruct the morphological characteristics of the products of the operational sequence, and the final step is to determine if all steps in the chaîne opératoire are present for each raw material (M. Soressi and J.-M. Geneste 2011: 338-339). Each artifact can be situated within the process through an analysis of ‘technical stigmata’, traces of the physical actions employed to manufacture the object (Ibid: 337). Typically, these stigmata are considered in conjunction with traces of use wear that have been identified through experimental replication.

Experimental Archaeology

Since the 1970s and 1980s, much functional analysis has been based on experiments in imitative behaviour which have tried to understand the technological knowledge that has gone into producing artifacts by attempting to replicate them. S.A. Semenov (1964) was responsible for the modern revival of this type of experimental or actualistic study although a century earlier prehistorians in both Europe and North America were attempting to replicate Pre-Contact technology with experiments of varying degrees of sophistication. The work of these early experimenters, Semenov and those who have followed him, are well documented by Graham et al (1972) and Coles (1973, 1979) and more recently by Gates St-Pierre and Walker (2007).

The early studies deal almost exclusively with the replication of lithic technology. However, more recently, archaeologists have used this analytical tool to examine osseous technology. These studies can be divided into two basic categories: those attempting to detect expedient tools associated with butchering sites by examining fracture patterns and evidence of possible use wear (Sadek-Kooros 1972, Bonnichsen 1979, Blaylock 1980, Beebe et al 1983); and those attempting to describe and define formal categories of artifacts within bone artifact assemblages (Camp-Fabrer et al 1977, Chomko 1975, Frison and Zeimers 1980, Ferdais 1983, Gates St-Pierre 2007; Junker-Andersen 1984; LeBlanc 1984, LeMoine 1985, 1991; Margaris 2006; McCullough 1978; Nagy 1990; Newcomer 1974). Evidence from experimental archaeology can provide Iroquoian researchers with a very rich source of analogies even though, with the exception of McCullough, Ferdais, Junker-Andersen and Gates St-Pierre, few studies have concerned themselves with material from the Northeast.

What role will experimental analogies play in the research proposed here? The small number of experiments yielding either direct or indirect analogies to Iroquoian assemblages limits their utility. When and where the use of experimental analogies is appropriate they will be for the most part direct analogies drawn from use wear studies, reduction processes or observations relating to the natural properties of raw materials. They will be useful in determining what an object was last used for before its loss or discard and, as such will provide a complementary source of data to the evidence provided by analysis of the chaîne opératoire.

Ethnographic Analogy

Archaeologists have used ethnographic analogies in the interpretation of archaeological data ever since archaeology began to be practised. These analogies can be divided into two categories: 1) direct analogies that are drawn from societies known to be historically linked to the Pre-Contact societies being studied by archaeologists, and, 2) indirect analogies - those that are drawn from societies in general not from those linked to the Pre-Contact societies being studied. These analogies are drawn from environments that are assumed to be similar and from societies that are assumed to be at similar levels of technological development. Archaeologists have employed both kinds of analogy but initially favoured general, indirect analogies in the analysis of archaeological materials.

However, in North America, the advent of the "direct historic approach" in archaeology saw direct analogy gain supremacy among archaeologists. When ethnohistorical and ethnological analogies are applied to the archaeological data, at present, it is almost always in the form of direct analogy. More recently, archaeologists have questioned the role played by anthropologically and historically derived analogies in the interpretation of archaeological data. This questioning is partly an out-growth of a general re-thinking of the relationship between archaeology and anthropology. Proponents of the "new archaeology" of the 1960s, began to seriously question the use of ethnographic analogy - not whether analogies should be employed but how and when. As Binford argues:

> ...as a scientist one does not justifiably employ analogies to ethnographic observations for the "interpretation" of archaeological data. Instead, analogies should be documented and used as the basis for offering a postulate as to the relationship between archaeological forms and their behavioural context in the past. Such a postulate should then serve as the foundation of a series of deductively drawn hypotheses which, on testing, can refute or tend to confirm the postulate offered (1967:1).

Elsewhere he suggests that ethnographic data should be used as a "source of model building inspirations, resources for testing hypotheses which seek to relate material and behavioural cultural phenomena (1968:286-287)." Thus, for Binford, "Analogy serves to provoke certain types of questions which can, on investigation lead to the recognition of more comprehensive ranges of order in archaeological data (1967:10)." Following Binford, a number of scholars developed "a new kind of anthropology that is based upon the observation and interpretive skills that are peculiar to archaeology (Gould 1980:3)." Termed, "ethno-archaeology" this approach seeks to sever archaeology's dependent link on conventional ethnology in the belief that "...the aim of ethno-archaeology and the use of ethnographic sources is to seek regularities in human behaviour which can be tested against archaeological data, rather than provide analogical situations which can be "fitted" to the data (Tringham 1978:185)." What this amounts to is a reversal of the traditional roles of archaeology and anthropology. It is archaeology that, by means of replicative experiment and the observation of material culture in behavioural situations, provides the evidence against which anthropologically derived ethnographic analogues can be tested, verified or rejected.

More recently, Iroquoian scholars such as Peter Ramsden have noted that despite the obvious benefits of having at least some eye witness observations, their net effect on Iroquoian prehistory has been negative (Ramsden 1996). With reference to Huron archaeology, Ramsden argues that it "…is defined with reference to the members and antecedents of an ethnic group as they were perceived by members of a totally alien society, at a particular point in time (Ramsden 1977) (Ibid : 105)." He goes on to say that, “This ethnic specificity is not necessarily a big problem, nor even necessarily always a bad thing, but it leads to a situation in which issues in Huron prehistory are often borrowed from the study of Huron history, in the narrow sense, and thrust backward in time (Ibid:105).”

What role will ethnographical and ethnohistorical analogies play in my analysis? The scarcity of ethnohistorical data relating to bone artifacts among the Iroquoians limits the use of direct analogy to a great degree. For the most part then, when and where their use is appropriate, both direct and indirect analogies will be employed.

Distinguishing Style and Function

The basic unit of analysis that I have chosen for my research is the artifact. As such, it is important to review the discussions that deal with two important and sometimes difficult-to-distinguish aspects of artifact analysis: style and function. As early as 1929, V. Gordon Childe suggested that certain material cultural objects and practices were better indicators of ethnicity than others: distinctive pottery, ornaments and burial customs more reflective of ethnicity than say, types of weapons and tools, which would be more diffused (cited in Chrisomalis and Trigger 2004: 424). The definition and inter-relationship of style and function as aspects of archaeological analysis have been discussed at length, a debate that continues to this day (Binford 1973, Dunnell 1978a, 1978b, Conkey 1978, Close 1978, Close et al 1979, Hodder 1979, Jelinek 1976, Plog 1980, Redman 1977, Sackett 1973, 1977, 1982, 1990, Wiessner 1983, 1984, 1990, Wobst 1977). This has led to a proliferation of definitions of what style and function are and ultimately to a confusion of the role they play in artifact analysis. In the present discussion, I will focus on the views of four authors: R.C. Dunnell (1978a, 1978 b), J.R. Sackett (1973, 1977, 1982, 1990), Ian Hodder (1979, 1990) and Polly Wiessner (1990).

Dunnell provides a retrospective of the roles played by style and function in archaeological analysis. He groups approaches to archaeology into three categories, culture history, cultural reconstruction, and processual or scientific archaeology: culture historians employed a common sense notion of function by means of which artifacts were pigeon-holed, while their notion of style was also based on common sense. Its utility, as opposed to function, was in the definition of cultures or societies in time and space through the use of artifact types. Types were "dominantly stylistic but the test of historical significance does not exclude technological or functional attributes if they change over time in particular areas. Consequently, particular formulations often mix criteria (Jelinek 1976:26)." Through the use of ethnographic analogy the cultural reconstructionists applied greater statistical and methodological rigour to the notions of style and function resulting in more explicit functional and stylistic types (Dunnell 1978a: 197).

In the processual, or scientific, approach advocated by Dunnell, "…the purpose of archaeology is seen as generating laws that account for culture change; the paradigm is frankly evolutionary in character (Leone 1972: 26) (Ibid195)." Following the same rules for cultural evolution as for biological evolution, Dunnell suggests that two kinds of traits should be discernible: 1) traits that have discrete selective values over measurable amounts of time should be accountable by natural selection and a set of external conditions; and, 2) traits identified as adaptively neutral will display a different kind of behaviour because frequencies are not accountable in terms of selection or external contingencies (1978a: 199). Thus, function manifests itself as those forms that directly offset the Darwinian fitness of the populations in which they occur, while style denotes those forms that do not have detectable selective values (Ibid: 200)."

J.R. Sackett outlines three approaches to style versus function. The "standard approach" suggests that, "what is stylistic is by definition diagnostic and concerns the manner in which morphological or formal, variation among artifacts reflects culture-historically significant units of ethnic tradition (1982:63)." What is functional is non-diagnostic in terms of ethnic tradition and essentially general and utilitarian. The "iconological approach" suggests that, "style ought to be narrowly equated with specific elements of non-utilitarian formal variation which functions symbolically as a kind of social iconology to identify human groups (Ibid: 78)." Function is defined as essentially the same as for the "standard approach". The "isochrestic approach", favoured by Sackett, suggests that style is, "a full complement of function, and it is to be looked for wherever artisans encounter options of form and use to "choose" from in pursuing a given task (Ibid: 59)." To illustrate this point, Sackett explains that:

> An artifact can be regarded from two contrasting but fully complimentary, points of view. In the first it is perceived in action as a thing that was manufactured and in turn used in a succession of activities that made up daily life in a given cultural setting. Just as any artifact has an active voice which connotes function so it has

a passive voice which connotes style. In this later case we are viewing it not as an actor in a variety of roles but instead as a signpost or banner advertising the arena in which the roles are being performed (1977:370).

Isochrestic choice is no more than the expression in material culture of a kind of behavior that permeates all aspects of culture. That artisans tend to “choose’ by conforming to and perpetuating the isoschrestic options imposed on them by technological traditions within which they work is presumably no different from their conforming to and perpetuating the specific gestures, idioms of speech, way of disciplining children, and magical practices appropriate to, and characteristic of, the social groupings in which such traditions are fostered (1990: 35).

As Sackett remarks, “ethnicity lies as much in the manner in which a Chinese cook butchers a chicken as in a Mao jacket or a Ming vase (Ibid: 42).” Just as Sackett's definitions of style and function are complimentary, so too, are Sackett's and Dunnell's points of view. Although their perspectives are different, Dunnell's processual notion of function is a concept that compliments Sackett's definition of function as the "active voice" of any artifact. Sackett's "passive voice", in the form of style, does not contradict Dunnell's notion of style as "adaptively neutral". Thus, I believe that it is possible to employ both notions of style and function in the solution of the problem that I will shortly discuss.

With the advent of the post-processual paradigm in the 1970s and 1980s, researchers began to seriously question the ability of archaeology to come to completely objective conclusions about past societies based solely on materialist interpretations of the archaeological record. The work of post-processualists such as Ian Hodder is of particular relevance because he demonstrates how style may have been used to communicate "within-group corporateness” in reference to “outsiders". This is particularly relevant to my analysis of the Draper site assemblage which may have contained a significant ethnic sub-population of “outsiders” from the St. Lawrence Valley and elsewhere. Hodder cites a number of ethnographic examples where two or more ethnic groups are living within a single community and where, under circumstances of economic stress, some of these groups appear to be using material cultural objects to emphasize their ethnic separateness from the other groups. This challenges the assumption that, "similarity in material culture reflects degrees of contact and interaction (1979:452).” In fact, "ethnographic work suggested that the material cultural differences between tribes can only be understood if material culture is seen as a language, especially within group cohesion in competition over scarce resources (1979: 447).” The notion of material culture as a language echoes Sackett's thinking as it relates to style and function as passive and active "choices". However, in Hodder’s examples, style not function appears to be operating as an "active voice" in the language of material culture.

Finally, just as Ian Hodder argues that material cultural can be understood as a language, Polly Wiessner argues for the communicative role of style (1990: 105). In her essay, *Is There a Unity in Style?,* Wiessner begins her discussion by suggesting that the question: “What is style?” needs to be re-phrased as “What is stylistic behavior?”

> Although it would be ideal to have a definition of style that would allow us to identify stylistic attributes in artifacts, to separate the stylistic from the functional from the technological, I doubt that this will ever be possible due to the very nature of style, alas. (1990: 105).
>
> If style is to be of use to archaeological analyses, it is necessary then to concentrate on the communicative aspects of style “as a way of doing” in addition to recognizing that style, amongst other things, is part of non-verbal rather than

> verbal behavior. This is not to reduce style to communication, but to draw out the central aspect of style that is of use to archaeologists (ibid: 106).

Wiessner defines style as, "a means of communication based on doing something a certain way (Ibid: 106)." It can be also be expressed as, "a means of non-verbal communication to negotiate identity (Ibid: 108)." Accordingly, then, "The task of the archaeologist is to use all available historical and contextual information to assist in determining what was being communicated in the past (Ibid: 108)."

> Situations that switch on group identity include fear, inter-group competition and aggression, need for cooperation to reach certain goals, and imposed political control requiring group action. Those situations that could switch on personal identity would be inter-individual competition, options for economic gain, and break down of the social order that would require individuals to seek solutions for their own problems, amongst others (Ibid: 109).

Therefore, style should contain information on the nature of relationships within and between groups if the symbols style plays upon can be interpreted, yet only careful quantitative and descriptive analyses can lead us to accept one interpretation as being more plausible than another (Ibid: 111). In the context of the current analysis, it is the different situations that communicate group identity that most concern us here.

Research Strategy

My work will focus on the analysis of the osseous technology of Iroquoian societies of the Great Lakes and St. Lawrence Lowlands, particularly the St. Lawrence Iroquoians and ancestral Wendat. To this end, detailed comparisons will involve the assemblages from five roughly contemporaneous sites: McKeown and Roebuck, St.

Lawrence Iroquoian village sites; Keffer and Draper ancestral Wendat village sites; and Steward, a special purpose St. Lawrence Iroquoian fishing station.

The first stage of my research, the description of individual artifacts and their classification into types, will address the following questions:

1) How were artifacts made?

2) How were they used?

As mentioned earlier, a very loose typology for osseous artifacts already exists, the end result of over a century of scholarship in the Northeast. One of my objectives is to refine this typology by employing more detailed and rigorous analysis based on observations that will be outlined in the following pages.

How were they made?

Any study of osseous technology would be incomplete without an examination of the manufacturing processes associated with it. Few experimental or ethnoarchaeological data relate to the production of these kinds of artifacts. Nevertheless, it is possible to extract important information relating to methods and techniques of manufacture by direct observation. To this end, I will be examining a wide range of specimens representing all stages in the manufacturing process, from preform to complete artifact. Individual attributes examined will include: 1) raw material e.g. bone, antler, tooth and shell, 2) manufacturing technique e.g. grinding, scraping, drilling, grooving, and splintering, heat-altering.

These observations will be prefaced by a discussion of the mediums of bone, antler, tooth and shell, their physical properties and the extent to which their natural forms place limitations on the artifacts into which they can be made. Based on this analysis, I hope to understand the techniques employed by Iroquoian peoples in the production of this assemblage.

How were they used?

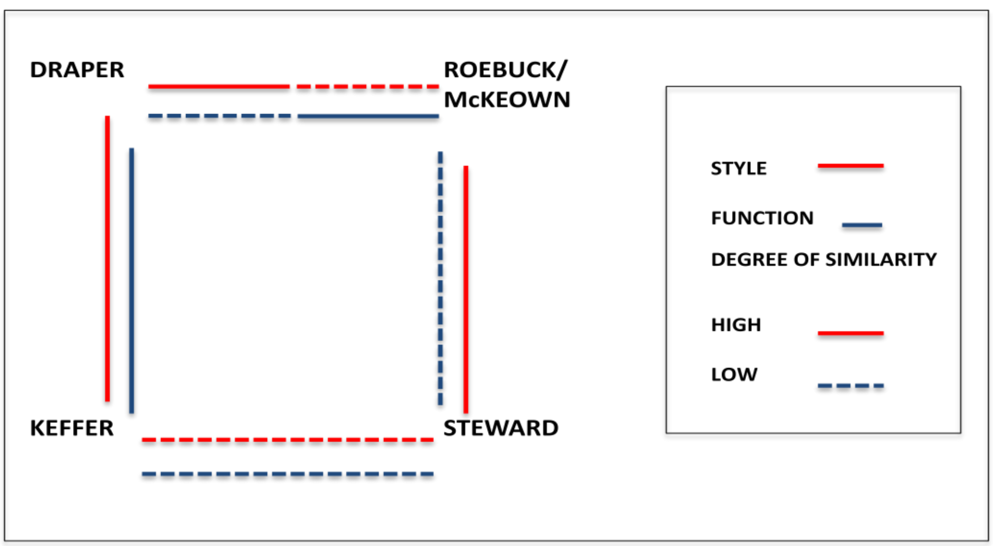
Researchers in the field of lithic studies have demonstrated that it is misleading to deduce an artifact’s function from strictly formal assessments. This is demonstrated by an examination of the use of terms like "awl" and "needle" in the archaeological literature. These terms often describe any object that is longer than it is wide and that is pointed at one end. This kind of guesswork is unnecessary when information that points to the use of these artifacts can be obtained through direct observation. To this end, I will be examining such attributes as: 1) degree of polish, location of polish, breakage, 2) length and width, 3) overall (longitudinal) and cross-section shape, tip and base shape, 4) presence and location of decoration. Through the examination and recording of such attributes I aim to understand the full range of uses for which bone, antler, and tooth artifacts were employed.

The answer to this second question also involves attaching labels to individual artifacts and groups of artifacts based on the association and frequency of attributes of wear, size, shape, raw material, and decoration. Based on the types derived from the data, it should be possible to divide the assemblages into a number of different categories of artifacts: 1) those necessary to the subsistence system – hunting, fishing, farming, food processing; 2) those necessary for making other things – stone working, woodworking, digging, building; 3) those necessary for clothing, personal adornment; 4) those used for leisure (games) or for ritual purposes; 5) by-products of these categories of objects and, 6) those of indeterminate use. The result of this stage of analysis should be an accurate description and classification of the osseous artifact types from five site assemblages. At this point, analogies will be drawn into the discussion. It should be emphasized that due to the paucity of ethnohistorical references it may not be possible to label most artifacts using analogical data. They can only be categorized according to greater or lesser degrees of certainty using this method.

The second stage of my research aims at understanding: 1) the functional relationships between specific types of artifacts and subsistence patterns and, 2) the stylistic correlation between artifacts and ethnic groups. In order to achieve this aim, I propose to compare and contrast the frequencies of artifact types at each of the five site assemblages under study. These sites have been selected because their function, ethnic affiliation, temporal placement and geographical locations are known and therefore, can be controlled for. As I stated earlier, each artifact and artifact assemblage exhibits aspects of style and function, aspects that are dualistic and often indistinguishable. I intend to demonstrate how style and function can be segregated under the controlled conditions of the five site assemblages

These sites have been chosen for this study for a number of reasons. All four village sites have large and varied assemblages of bone artifacts and, as such, each assemblage should accurately reflect the full range of variability. Four of the sites share a common function. McKeown, Roebuck, Draper and Keffer are all large habitation sites; one is a special purpose fishing station - Steward. The three St. Lawrence Iroquoian sites, Roebuck, McKeown and Steward, are largely ethnically homogenous; the populations of the two ancestral Wendat sites, particularly Draper, may include exotic St. Lawrence Iroquoian ethnic components. The St Lawrence Iroquoian and ancestral Wendat sites also occupy two distinct micro-environments which may have had an influence on their subsistence patterns. This too will be considered in comparisons of the data. It is believed that the similarities and differences in the function and ethnic affiliation of these sites can be controlled and compared in such a way as to improve our understanding of the functional and stylistic roles played by these artifacts in the Iroquoians adaptive system. I will test that assumption by constructing the following model (See Figure 2.1).

Figure 2.1 – Predicting Stylistic and Functional Variation



It is postulated that the degree of similarity and difference of artifact types between sites will correlate to environment, ethnicity and site function. For example:

1) McKeown/Roebuck versus Steward - these sites have the same ethnic affiliation, general temporal placement and geographical proximity however, their function is different. McKeown and Roebuck are major habitation sites; Steward is a special purpose fishing station. Thus, it is predicted that functional attributes and artifact types are those that will demonstrate a low degree of similarity, while stylistic attributes and artifact types will demonstrate a high degree of similarity.

2) Steward versus Keffer/Draper - These sites have only their general temporal placement in common. Their function, geographical contexts and ethnic affiliation are different. Therefore, both their stylistic and functional attributes and artifact types should demonstrate a low degree of similarity.

3) McKeown/Roebuck versus Keffer/Draper - These sites differ in geographical context and ethnic affiliation but are similar in temporal placement and function, although there is evidence of interaction. All four are major habitation sites, while the first two are St. Lawrence Iroquoian, and the latter two, ancestral Wendat. Thus, they should demonstrate a high degree of similarity for functional attributes and artifact types but a low degree of stylistic similarity.

Draper <u>may</u> have a significant St. Lawrence Iroquoian component and thus <u>may</u> be ethnically mixed. If Draper is a large centre where different ethnic groups appear to be in competition for scarce resources, as some scholars have suggested (Hayden

1979, Ramsden 1977), then one might expect a type of identity display similar to that described by Hodder (1979). In other words, stylistic attributes reflected in the material culture patterning of the artifact assemblages should demonstrate a low degree of similarity between ethnically different groups. The difficulty arises in the segregation of functional and stylistic attributes and artifact types in ethnically-mixed assemblages. The solution to this difficulty lies in a wider comparison of the Keffer and Draper site assemblages with the other three:

- artifact types found in significant frequencies at McKeown, Roebuck, and Steward but not at Draper and Keffer should relate to the St. Lawrence Iroquoian ethnicity and, therefore, should be considered stylistic;
- artifact types found in significant frequencies at Draper and Keffer but not at McKeown, Roebuck and Steward should relate to ancestral Wendat ethnicity and, therefore, should also be considered stylistic;
- artifact types found at Steward in high frequencies but not at McKeown, Roebuck, Draper and Keffer should relate to Steward's special purpose function as a fishing station and therefore, should be considered functional.

The third stage of my research will attempt to understand the part played by osseous technology in the adaptive system of these populations. Were the St. Lawrence Iroquoians more riverine-oriented in their subsistence strategies and less dependent on agriculture than the ancestral Wendat? Is this is reflected in the types of artifacts found in St. Lawrence Iroquoian assemblages, their frequency and in the types of faunal materials from which they were made? It has been suggested that there is a greater percentage of osseous as opposed to chipped lithic artifacts in St. Lawrence Iroquoian assemblages (Pendergast 1972: 161). Is this true? If so, is it due to differential access to raw materials or separate technological traditions?

Artifact Variables

Morphology

The morphological observations made for each artifact were designed to record basic qualitative and quantitative attributes taking into account the range of variation within each artifact type. These include maximum length, maximum width at proximal end (base), maximum width at mid-point, overall (longitudinal) shape, cross-section shape, proximal end (base) shape, distal end (tip) shape, number and type of grooves, number of notches, number of holes, decoration, completeness of specimen, fragment remaining, stage of completion of specimen, raw material and artifact type. When referring to the orientation of objects the terms distal and proximal follow the usage of Camp-Fabrer and Stordeur (1979): the business end (usually the sharpened or worked end) is the distal end, the other end (usually not worked, the hafted end or the 'handle') is the proximal.

Each variable and its specific attributes are discussed below. Artifacts were measured using 'Mecanic Typ 6901' sliding callipers and metrics recorded in millimetres and were also visually examined using a standard 'Carl Zeiss' microscope to a power of 4X or with the unaided eye.

1. <u>Maximum length</u> - Length was recorded in mm from the proximal to the distal end of each artifact. Where there were no obvious proximal or distal ends, no base and tip, as in the case of round or oval artifacts, irregular-shaped artifacts or broken artifacts, this measurement was simply taken between the points of greatest distance.

2. <u>Maximum width at base</u> (proximal end) - Maximum width at base was recorded in mm. This measurement was taken only when the base of proximal end of an artifact was intact and represents the maximum width at the widest end (base) of elongated or tubular artifacts. In the case of irregular, broken or discoidal artifacts this measurement was not recorded.

3. <u>Maximum width at mid-point</u> - This measurement was recorded in mm on artifacts where the mid-point was known as in the case of complete artifacts such as awls, needles, points, etc. In the case of irregular or rounded artifacts this measurement represents the maximum distance between points perpendicular to the measurement of maximum length.

4. <u>Overall shape</u> - This variable describes the approximate shape of artifacts in relation to their longitudinal axis and involves (fairly) qualitative judgments. Artifacts are classified as approximately "symmetrical", "asymmetrical", "tubular", "irregular", i.e. they had no regular shape in relation to their longitudinal axis, and "natural", i.e. they are not modified in shape relative to their long axis. In the case of modified deer phalanges a separate set of observations were made based on the code developed by Karen

McCullough for her analysis of the Draper site deer phalanges (1978:117-118) and is reproduced in Figure A1.2.

5. Cross-section shape - This variable describes the cross-sectional shape of artifacts, that is, an imaginary cross-section that cuts across the longitudinal axis of the artifact. As in the case of overall shape, judgments were qualitative and approximate. Cross-section shape categories are illustrated in Figure A1.3 and are based on the code originally developed for the Draper site. In the case of modified deer phalanges, I have recorded the longitudinal cross-section of both the dorsal and the ventral surfaces of each specimen. This seemed appropriate for this highly individual and variable artifact type. The cross-section which cuts perpendicular to the long axis of modified deer phalanges is almost invariably natural. It is therefore felt that the attributes particular to the longitudinal cross-section yield more information. The observations relating to this particular variable are illustrated in Figure A1.4 and are based on the code developed by McCullough for the Draper deer phalanges (1978:121).

6. Base shape (proximal end) - This variable describes the shape of the base or proximal end of artifacts. Observations were based on a list of alternative shapes that most closely approximate the following descriptive terms: "natural" or unmodified; "flattened", i.e. in a straight line perpendicular to the long axis of the artifact; "rounded", i.e. curved in a line perpendicular to the long axis; "pointed", i.e. tapering to a point at the base; "basally notched", i.e. notched perpendicular to the long axis at the base; "side-notched", i.e. notched parallel to the long axis at the base; "grooved", i.e. with a

circumferential groove cut perpendicular to the long axis; "socketed", i.e. with a socket drilled or gouged into the bottom of the base parallel to the long axis of the artifact, and "irregular", i.e. modified but not into any kind of regular shape. Base shapes are illustrated in Figure A1.5. In the case of deer phalanges observations were made based on the code developed by McCullough (1978:127) that is reproduced in Figure A1.6.

7. Tip shape (distal end) - Tip shapes are illustrated in Figure A1.7 and are based on the code originally developed for the Draper site artifacts. To this code, has been added the angle for each tip shape. As in the case of base shape an attempt has been made to find the most appropriate fit of artifact to general category of tip shape. In the case of broken artifacts or those without distal or proximal points of reference this variable was not recorded. Again, in the case of deer phalanges a separate set of attribute selections were employed for this variable. These are presented in Figures A1.8 and are based on the code developed by McCullough for the Draper deer phalanges (1978:126).

8. Type of groove - This variable describes the type of groove used to produce artifacts including bone beads, bone tubes, antler and bone projectile points and deer mandible corn-huskers. Since each artifact may display the marks of one or more grooves, attribute choices may describe "continuous grooves", "discontinuous grooves", a combination of both depending upon whether or not the grooves circle the circumference of the artifact in question.

9. Number of grooves - This variable describes the number of circumferential grooves observed on individual artifacts.

10. Number of notches - This variable describes the number of notches that may be observed on individual artifacts.

11. Number of holes - This variable describes the number of holes that may be observed, gouged, or drilled in individual artifacts.

12. Decoration - This variable describes the presence and general type of decoration observed on individual artifacts. Decorations were classified into three general categories - "geometric" (for example, three dots in a row), "figurative" (for example, representation of an animal or object) and “indeterminate”.

13. Completeness of specimen - This variable describes whether or not a specimen is "broken" or "whole".

14. Fragment remaining - This variable describes the portion of a broken artifact that remains to form the specimen under examination. Attribute selections of "tip", "shaft" and "base" refer to the general artifact categories of awls needles and points. Selections such as "split" and "one-half" refer to the general artifact categories of tubular objects and bi-pointed, centre-eyed needles since these are the common breakage patterns for these types of artifacts. Artifacts with no apparent pattern of breakage were coded "indeterminate".

15. Stage of completion - This variable describes stage of manufacture that each artifact obtained before being discarded into an archaeological context. These include "finished" or completed artifacts, i.e. those that have been used and therefore show signs of use wear; "preformed" artifacts, i.e. those that have a roughed-out form of known finished artifacts but show no signs of use wear and appear to have been broken or flawed during the manufacturing process and discards; "detritus, i.e. pieces of bone, antler and shell that show marks of the manufacturing process such as grooving, whittling, or grinding but which represent the discarded detritus. Where it is not possible to determine the use or form of a specimen showing signs of modification it is coded "indeterminate".

16. Raw material - This variable describes one of the four general categories of raw material from which the artifacts under analysis are manufactured, i.e. "bone", "antler", "tooth", and "shell".

17. Nature of specimen - This variable describes the functional class into which each artifact on first examination was placed. This selection of artifact types is an amended version of the code developed for the analysis of the Draper site artifacts.[7] It should be stressed that this list of artifact types was subject to further revision based on the completion of the analysis.

7 This list was based on the labels commonly applied to osseous artifacts found on Iroquoian sites.

Manufacturing

Several reduction models have been developed for osseous artifact assemblages, each typically involving the initial selection of the raw material, preparation of a core or preform and the completion of a finished artifact (Nagy 1990: 79-81). LeMoine points out that although the manufacture of both lithic and bone tools involve reductive techniques,

> there are a greater variety of techniques: scraping, cutting, grooving, grinding, sawing and drilling of bone (versus the percussion and pressure flaking of stone). On the other hand, the evidence of these many different techniques is substantially easier to identify than different types of flakes and flake scars (see Campana 1980, 1987; d'Errico et al 1982-1984, LeMoine 1985, Newcomer 1974, Plisson 1983, 1984). These traces are readily identifiable using standard use-wear techniques, although early stages of work can be obscured by later traces (1991: 36).

Some artifacts may have been discarded before completion, some recycled, reworked for a secondary use and some modified bone fragments may simply represent debitage produced as a by-product of artifact production. Both incomplete artifacts and debitage will also be examined in this study. As will be described, a variety of techniques were employed in the manufacture of artifacts. Each leaves characteristic traces in the form of "signatures" or "stigmata" that often survive subsequent stages of modification, such as use, breakage, re-use and discard. The observations relating to the manufacture of these artifacts have been designed to reflect hypothetical stages in the production.

First, each artifact was examined for evidence of the manufacturing techniques employed to reduce the basic raw material to a workable preform; secondly, those modification processes that were employed to further shape these workable forms to roughed-out versions of finished work were identified; finally, those processes that could be interpreted as the last stage in the finished and ready-to-use artifacts were also identified.

It should be noted that the purpose of this reduction model is the organization of the attributes and variables associated with the manufacturing process and makes no claim to represent any "reality" in the mind of the peoples who produced this artifact assemblages. The purpose is to get a clearer understanding of the processes that may have been involved. Indeed, the results of this analysis demonstrate that not all artifacts passed through these stages before completion. Where this is the case an observation of "indeterminate" has been entered on coding forms.

In addition to recording the presence of manufacturing techniques, I have also noted the locations of the "signatures" or “stigmata” for these techniques. The selections for location of manufacturing technique is as follows: proximal end or base, distal end or tip, ventral surface, dorsal surface, right lateral surface, left lateral surface, centre (in the case of drilled or gouged holes), overall and indeterminate. The following definitions draw on the experimental work of a number of archaeologists (Blaylock 1980, Bouchud 1977, Campana 1980, Cole-Will 1980, d’Errico et al 1982-1984, LeMoine 1991,Nagy 1990, Newcomer 1974, Peltier and Plisson 1986, Rigaud 1972, 1984, Stordeur-Yedid 1980).

1. Wedging - Wedging involves the production of splinters of bone by the insertion of a wedge-shaped object usually of stone, bone or wood into a natural or artificially produced groove in the bone surface. The wedge is then struck with a hammer to produce the desired long splinters. The characteristic signatures for wedging are the traces of crushing in the groove as it absorbs the force of the blow. This is usually associated with the groove and splinter method.

2. Bashing - Bashing (Chopping or Free Hand Percussion) produces a similar signature to crushing and fracturing as wedging but without the use of an intermediary wedge. The splinters, hinges or notches produced using this technique are more random in shape and size (Blaylock 1980: 145; Nagy 1990: 106) and very often display spiral fractures associated with fresh bone. The technique simply involves the use of a hammer applied directly to the bone in order to smash the bone into workable splinters.

3. Grooving and splintering - Grooving and splintering involves the production of long splinters of antler or bone of a pre-determined shape and size. This is accomplished by grooving the bone or antler surface with parallel converging lines and levering or wedging the preformed splinters from their matrix. Sometimes natural grooves in the bone are deepened and the bone is slit by applying force to its articular surfaces. Grooving may be accomplished using a variety of stone, bone or tooth gouges or chisels. This leaves a characteristic signature of deep longitudinal grooves with parallel striations along the long axis of the splinter. Some researchers have noted that the shape of the grooves may vary depending on the tool used; iron grooving tools leaving square shaped grooves (Cole-Will 1980: 68) while v-shaped grooves are produced by

lithic burins (d'Errico <u>et al</u>, 1982-1984: 84-85). This technique is associated with the production of awls, points, needles and other long pointed artifacts. As such it represents one of the most frequently used primary reduction technique.

4. <u>Grooving and snapping</u> - Grooving and snapping produces a similar signature to grooving and splintering except that the grooves and corresponding striations are perpendicular to the long axis of the artifact. This technique is usually associated with the manufacture of tubular or hollow artifacts such as beads, tubes, conical points and scrapers made from mandibles. It is also often associated with the reduction of antler to usable sections for manufacture into points.

5. <u>Grinding</u> - Grinding (or Abrading) is a technique usually associated with the second and third stages of manufacture. Thus long pointed or tubular artifacts with rough edges are ground into smoother contours or, alternatively natural surfaces are ground in preparation for polishing as in the case of projectile points. According to experimental replication, the signatures for grinding vary, long, deep striations that are usually parallel to the long axis of the artifact, but which may also be present as short, thick striations that cross each other (d'Errico, <u>et al</u> 1982-1984: 53; Nagy 1990: 105; Peltier and Plisson 1986: 73) with cross or parallel hatched appearances when the direction of the grinding has been changed while the artifact is being turned and re-oriented in the grinding process. Grinding is usually accomplished using a variety of rough stone tools or abrading materials.

6. Scraping (also sometimes called whittling/carving) - Scraping is a technique usually associated with the second or indeterminate stage of manufacture. It is usually produced using a chipped stone tool such as a scraper, spoke-shave, burin or a utilized flake. Researchers have identified two types of marks left when material is scraped: longitudinal striations that may undulate (Campana 1980, Peltier and Plisson 1986, Stordeur-Yedid 1980) and short irregular divots or ruts produced perpendicular to the long axis of the artifact or to the direction of the scraping action. These divots or ruts in the surface of the bone are the result of the uneven application of the chipped stone tool to the surface of the bone, antler or tooth and are called 'chatter-marks' (Campana1980: 84, d'Errico et al 1982-1984:31, LeMoine 1985, Newcomer 1974, Rigaud 1972, 1984). LeMoine notes that it is often possible to identify traces of scraping macroscopically, with the unaided eye or low magnification while microscopically, these are completely obscured (1991: 163).

7. Drilling (or gouging) - Drilling involves the production of holes in artifacts. It may be accomplished in a number of ways that include drilling with chipped stone tools, gouging with the same and may often be found in association with burning. As Newcomer has demonstrated, this can be accomplished relatively quickly (1977: 298). The characteristic signatures of these three techniques are hard to determine because they may be used in combination and the use of one subsequent to another may effectively obliterate any trace of use. The presence of artificially created holes where they do not naturally occur represents the basis for the observation that drilling has been used in the manufacturing process. Due to the difficulties involved in distinguishing particular

varieties of drilling, I have recorded the use of chipped stone tools to drill as part of the observations for whittling and burning which have been recorded under observations related to carbonisation.

8. Flaking - Flaking is a manufacturing technique that is rarely found in this artifact assemblage. Flaking does not lend itself as readily as other techniques for the working of bone and antler into finished formal tools. The signature of flaking is basically the same as for flaked or chipped stone artifacts, the presence of concoidal flake scars, that usually occur along the working edge of the artifact and are the result of the application of a soft hammer of wood, antler, or bone to the surface of the artifact.

9. Heat Alteration – Heat alteration is a manufacturing technique employed in three different and distinct ways. First, it may be used to apply decoration to the surface of antler or bone, resulting in a signature of patterned scorching and flaking of the bone surface as in the case of decorated deer phalanges. Secondly, it may take the form of burning with the purpose of creating holes in a variety of objects, such as perforated deer phalanges and canine tooth pendants. In this case it is most often found in association with drilling and gouging and has characteristic localized scorching and flaking of the bone surface. Thirdly, it may take the form of overall burning for the purpose of hardening the artifact to give it greater strength. Characteristically, this type of carbonisation covers the entire artifact uniformly as in the case of points, or may be localized on the "business end" of the artifact as in the case of fire hardened tips of awls. This type of burning is also used to blacken bone beads for strictly aesthetic reasons and is accompanied by a heavy degree of polishing.

10. Polishing – Polishing has been described as a fine abrasive technique that adds lustre to the material being worked (Nagy 1990: 112). Polishing makes surfaces worked with various stone tools more uniform and shinier. The striae left by such tools become fainter and almost disappear as polishing proceeds (d'Errico et la. 1982-1984: 51). LeMoine describes it as, "the interaction of two materials, one harder than the other ... characterized by scratches, sometimes visible to the unaided eye (1991: 18)", polish being a form of abrasion on a molecular scale (1991: 22). She notes two variations of the term polish, invasive and non-invasive, forming two ends of a continuum (Ibid: 58-59). She defines invasive polish as, "one that covers all or more of the surface where wear is present, including sides and even bottoms of striations. It is produced by a soft material that conforms to the surface of the tools" (Ibid: 58). Non-invasive polish is, "a polish which does not conform to the tool surface, affecting only high points. In early stages of development, such a polish may be seen only in isolated spots, or may form lines of polish, along the high points of grinding striations for example" (Ibid: 59). She also explains that polishes can be bright, highly reflective, or dull, that is smooth but less reflective, reflectivity being a secondary characteristic of polish (Ibid: 59).

Polishing as a manufacturing technique is often very difficult to distinguish from polishing as a result of use wear. In order to record this attribute it was most important to examine the location of the polish before making any distinctions. Overall polish often associated with the surface of bone beads and bone and antler points was usually of a very high gloss and therefore, easy to distinguish from use wear. This was not the case for polish that covered the overall surface of specimens but which could have been the result of constant handling, as in the case of polish on the bases and shafts of bone awls. In these cases I have erred on the side of use wear as an explanation, reserving polish as an attribute of manufacturing for artifacts where polish is most obviously intentional. Where polish was more localized such as on the working or "business end" of bone awls, it was identified as use wear.

Use Wear

During the life history of each artifact it undergoes a number of alterations related to manufacture, use wear, and natural modification after discard. Of these the most difficult to detect is use wear. According to LeMoine, there are three ‘schools’ of microscopic use wear analysis each defined by the type of microscope employed: the Low Power school; the High Power approach, and the Scanning Electron Microscope (SEM) school; each with its advantages and disadvantages (1991: 10-11). The low power approach is relatively fast and uses the most readily available equipment, although the ability to identify use wear is reduced; the high power approach, which is the most popular, is the most efficacious, but takes longer to learn, requires more expensive equipment, is limited to examining smaller specimens and often requires the use of thin acetate replicas; the SEM approach is the most demanding of the three approaches, requires specialized methods of specimen handling as well as access to very expensive machines, although improved results can offset these disadvantages (Ibid: 12-13).

Legrand and Sidera suggest that macroscopic analysis, undertaken with the unaided eye or a low powered stereoscopic microscope "is most efficient on well-worn atrifacts, which display tangible volume deformation and well developed traces (2007: 71)." High power analysis is most efficient if volume deformation is lightly developed, particularly for tools that are worn by friction such as awls, needles, hooks, spoons, etc...(Ibid: 75). As mentioned previously, a low powered microscope was employed in my analysis, a standard Carl Zeiss binocular microscope which was used almost exclusively to examine to tips of awls and projectile points for evidence of re-sharpening. I have chosen to use only a macroscopic, low powered approach for the following reasons:

- The ability to observe most traces of manufacture and use wear with low-powered magnification or the unaided eye;
- Prohibitive cost of and lack of access to either a high powered or scanning electron microscope;
- Lack of access to a reference collection of experimental replicas;
- The large volume of the specimens to be examined within a limited timeframe;
- The adequate level of results required given the non-experimental nature of my research.

Observations of use wear made during the course of this analysis are based on the recognition of certain repeated and patterned physical characteristics that occur on the working surfaces of artifacts. Working surfaces were identified using common sense decisions concerning an artifact's function. These were based on morphological attributes such as length, width, shape of base, shape of tip, etc. For instance, a long thin artifact with a blunt base and sharp narrow tip, one that fits comfortably into the hand, was identified as an awl. As such, its working surface is its tip. Nevertheless, all surfaces were thoroughly examined in order to make sure less obvious traits were not overlooked. In addition to the identification of attributes of use wear, their extent from working edges was recorded as well as their location. The following are use wear variables observed for each artifact. As with manufacturing techniques, the following definitions draw on the experimental work of a number of archaeologists (Bouchud 1977, LeMoine 1985, 1997).

1. Polish – Use wear polish is the result of the repeated rubbing of the surface of an artifact against another softer surface. Examples are the hide that awls are used to perforate, or the twine or cord that beads are strung upon. Use wear polish can be distinguished from manufacturing polish because it is often more localized and usually displays a higher degree of brightness than polish that is the result of accident or repeated handling. Striations which are the result of manufacturing techniques such as grinding and scraping are smoothed as a result of repeated use (LeMoine 1985: 43-46, 71-72, 1991: 307, 1997: 104-112; Bouchud 1977: 257-267). The extent of this polish is often very difficult to measure. Certain clues from other attributes associated with the artifact can be of great assistance. For instance, polish on the tips of awls will often end in conjunction with a change in shape of the working tip, where the tip obtains close to the same thickness as the rest of the shaft. This polish may also be found in conjunction with striae that are circumferential and perpendicular to the long axis of the

awl (LeMoine 1985:44-45). This area of polish is usually of a much higher gloss than polish on the rest of the awl's surface and may also be of a much lighter colour, the surface being constantly cleaned as a by-product of the way it is being used. Locations recorded for polish were as follows: tip (distal end), shaft, base (proximal end), overall, any combination of tip, shaft and base (in the case of pendants and needles) and one or more inner edges (in the case of tubular artifacts).

2. Striations - Striations associated with use wear were the most difficult of the use wear variables to observe and record. Both Bouchud and LeMoine observe striations which were perpendicular to the long axis of the tips of experimental awls (Bouchud 1977: 257-267; LeMoine 1985: 44-45, 1997: 104-112). These striae are the result of the same perforating and twisting action employed in the tools use. Under 4X magnification they appeared only as faint, fine lines.[8] In addition to their low visibility it was also often difficult to distinguish them from the blurred remnants of manufacturing processes such as grinding and whittling. For these reasons this variable was rarely recorded. When it was recorded the direction of the striation was noted, providing an important clue to their identification as use wear. The locations and directions of striations were as follows: parallel on the tip (distal end), shaft, base (proximal end), or any combination of these and perpendicular to the tip, shaft, base or any combination these. I should be noted that this variable was designed mainly for use wear on awls, points and chisels and is of little application to other artifact types.

8 The lack of high powered magnification had its greatest negative impact on the ability to identify use-wear here.

3. Breakage - The recording of the location and extent of breaks from the working edges of artifacts was considered important because it is easy to measure and it gives us valuable information about artifact use. The manner in which an artifact is broken during use will recur in patterns that will point to its ultimate function. Even though some of the breakage recorded will be accidental in origin, it will also be random and non-patterned. For this reason measuring the extent of the break from the working edge was considered of primary importance. Locations were breaks occurred were as follows: tip (distal end), shaft, base (proximal end), split lengthwise (in the case of tubular objects), and any combination of these.

4. Pocking - Pocking as a result of use wear was observed in the form of repeated and localized denting on the surface of a small variety of artifacts including awls, wedges, flakers and soft hammers. As noted by LeMoine, pocking as well as crushing was observed on the tips of experimental awls used to pierce both tanned and raw hide (1985: 43-45). This pocking is the result of repeated contact of the artifact with other artifacts or raw materials in the process of use. This pattern had to occur in localized and non-random patterns in order to be recorded as use wear. Locations where this variable was recorded are as follows: tip (distal end), shaft, and base (proximal end) or any combination of these.

5. Crushing - Like pocking, crushing was observed on artifacts whose use involved the application of considerable force. Crushing was observed to take the form of patterned and localized compaction on artifacts like wedges, where the working edge or tip comes in contact with another object with some force. The other instance where crushing

could be identified and classified as use wear was in the case of artifacts that had been hafted. The surface of the base of the object often shows crushing where the base comes in contact with the shaft, as in the case of projectile points or hafted awls. Locations where crushing was recorded were the same as those for pocking.

6. Fracturing (or flaking) - Fracturing due to use wear was identified as breakage, but on a much smaller scale. Small nicks and fractures were often present on the tips of awls and projectile points where repeated stress and fatigue resulted in the exfoliation of small flakes and chips of bone or antler. This pattern also occurs on the tips of flakers used for working stone. LeMoine observed both polish and flaking on the working edges of experimental bone choppers (1985: 71, 1997: 104-112). Locations where fracturing was recorded were the same as those for crushing.

Code and Coding Form

The specimens from all five sites will be coded according to a standardized set of observations of formal, decorative, metrical, use wear, and manufacturing techniques.[9] The code is a revised version of the code originally used on the Draper bone and antler artifacts in 1975. The present coding form incorporates the original content with revisions in keeping with recent advances in the study of raw materials, use wear, and reduction sequences. Detailed codes and the coding form are contained in Appendix 1.

9 EXCEL tables containing data cross tabulations are available from the author on request.

CHAPTER 3

Ethno-historic Evidence

In the past, Iroquoian archaeologists have relied heavily on ethno-history to interpret Pre-Contact archaeological evidence relating to ethnic identity, subsistence and settlement patterns. As we have noted, despite the obvious benefits of having at least some eye witness observations some scholars have suggested the net effect on Iroquoian prehistory has been negative (Ramsden 1996: 105). In the case of osseous artifacts, ethno-historic references to their manufacture and use in the Northeast are quite limited. This means that archaeologists have been relatively unencumbered by historic 'facts' and to some extent have relied on their own intuition. This in itself has had negative consequences leading to a lack of scientific rigour and detailed analysis which the current research aims to address.

The paucity of 'eye-witness evidence' is not surprising for a number of reasons. Much that was important by way of technology for Aboriginal peoples was of little value to Europeans. For example, Jacques Cartier who first encountered Iroquoians in AD 1534 has little to say in this regard. Although he recounts having distributed knives, awls, glass beads, combs and other trinkets on this first voyage, he expresses the view that the people have little of value themselves, their canoes and hemp fishing nets excepted (1993: 24-25, 70). In light of the fact that some of these groups, the Stadaconans for example, had to travel a long way to the Gulf of St. Lawrence it is not all that surprising that they may have been travelling light.

Objects are often remarked upon where their use is unusual or where they are dramatically different, or in some cases, very similar to their European counterparts. Most descriptive passages focus on the external appearance of Aboriginal peoples, their style of clothing, their ornaments, their practice of hunting, warfare, games and their religious beliefs. Again, this is not surprising given that early accounts were written for European audiences by men who were primarily soldiers and missionaries.

One of the first questions that would have interested European audiences was: What do native North Americans look like? Therefore, a considerable amount of writing is devoted to describing the external appearance, physical characteristics, clothing and the personal adornments worn by them. Cartier mentions that the Iroquoians he encountered in the Gaspe shaved their heads in circular designs, from which we can infer that they had some tool for shaving (1993: 24). Sagard, de Creux and Lafitau make a number of references to the practice of tattooing and tattooing needles as well as awls used for piecing ears and noses (Lafitau 1974, Volume 1: 178, Volume 2: 38, 42, Wrong 1939: 127), hair ornaments (Lafitau 1974, Volume1: 173), necklaces and bracelets of shell (Cartier 1993: 62, 99; Conacher 1951: 128, 129).

> But those who paint themselves permanently do so with extreme pain,—using, for this purpose, needles, sharp awls, or piercing thorns, with which they perforate, or have others perforate, the skin. Thus they form on the face, the neck, the breast, or some other part of the body, some animal or monster,—for instance, an Eagle, a Serpent, a Dragon, or any other figure which they prefer; and then, tracing over the fresh and bloody design some powdered charcoal, or other black coloring matter, which becomes mixed with the blood and penetrates within these perforations, they imprint indelibly upon the living skin the designed figures (Thwaites 1896 -1901, Volume 38: 251).

> With awls, spear points or thorns they so puncture the neck, breast or cheeks as to trace rude outlines of those objects; next, they insert into the pierced and bleeding skin a black powder made from pulverized charcoal which unites with the blood and so fixes upon the living flesh the pictures which have been drawn that no length of time can efface them.... The men as well as the women pierce the lobes of their ears, and place in them earrings made of glass or shells. The larger the hole, the more beautiful they consider it. They never cut their nails....They wear belts and bracelets ingeniously manufactured from Venus shells, which we commonly call porcelain, or from porcupine quills; and necklaces made in this fashion they value highly (Thwaites 1896-1901, Volume 1: 279-281).

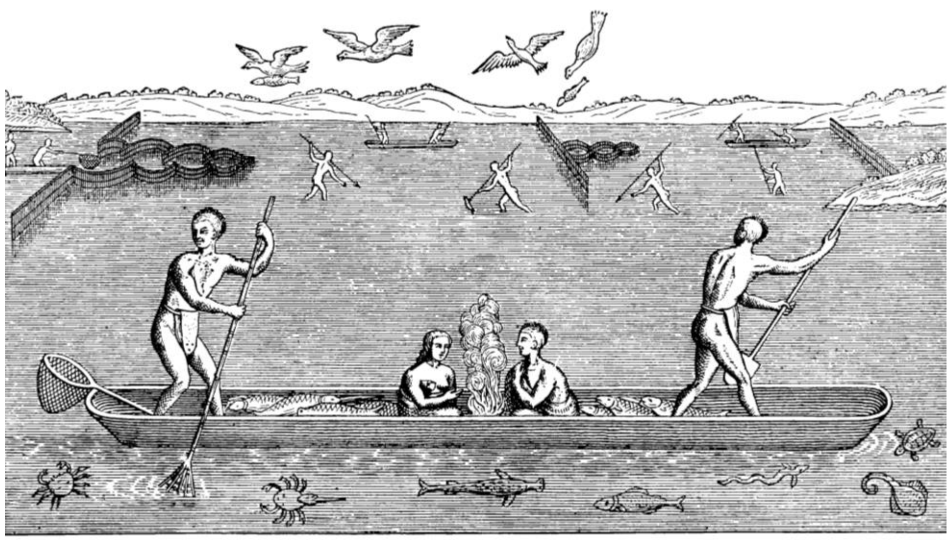
Even more numerous are early accounts devoted to hunting, fishing and warfare. In his brief list of words from their language Cartier records words for: hatchet (asogne, addogue), sword (achesco), bow (ahena), arrow (cacti, quahetan) and earthenware dish (undaco, undaccon), from which we can infer that the Iroquoians he encountered possessed equivalent objects of Aboriginal manufacture (1993: 92-95). Thévet, Champlain, Sagard, Le Jeune, Denys, Le Clercq, de Creux and Lafitau have left us descriptions of spears and arrows tipped with bone and antler points, (Conacher 1951: 103; Denys 1908: 409, 428, 442-443; Lafitau 1974, Volume 2: 115; Schlesinger, et al 1986: 6, 37, 90; Wrong 1939: 98); bone fish hooks and harpoons (Denys 1908: 431, 486-487; Wrong 1939: 184), and even bone flutes (Schlesinger, et al 1986: 16, 43).

As isotope analysis of dental tissue indicates, fish provided an extremely important part of the Iroquoian diet (van der Merwe, et al 2003: 253, 259).[10] Different species of fish were caught in different ways, employing many different implements. Eels for example, were fished at night, from canoes, using torches to attract them and

10 Species specifically mentioned by early commentators as important for the Wendat include whitefish (Assishendo), sturgeon, trout, pike, red-mullet (Einchaton) and a small herring-like fish (Auhaitsiq) (Kinietz 1940:25- 28). Cartier describes eels (Esgeny or Esgue ny) as being particularly important for the St. Lawrence Iroquoians (1993: 49, 53).

leisters to spear them (Nicolas 2011: 389); catfish using fish hooks, spears and harpoons (Ibid: 376); striped bass with a dip or gill nets (Ibid: 378); whitefish with gill nets placed under the ice in the winter and with large dip nets in rapid water (Ibid: 380, 381); pike were caught under the ice in winter with lures and harpoons (Ibid: 382); and sturgeon like pike, were taken with a line, net or a spear (Ibid: 383). D.B. Quinn (1955), cited by Junker-Andersen (1988: 103), credits Théodore de Bry with the earliest published illustration of Aboriginal fishing methods in Virginia, dating to AD 1590, where he briefly describes the use of spears and weirs to catch eels and other fish.

Figure 3:1 Methods of Fishing Practised by Indians (Orr 1917: 37)



Methods of fishing practised by the Indians—After De Bry.

This illustration was reproduced in by Roland Orr in his report, *Ontario Indians: Their Fisheries and Fishing Appliances* (1917) and is reproduced here in Figure 3:1. It clearly shows a man in the stern with a pronged fish spear and a long handled dip net.

Paul Le Jeune's Jesuit Relation of AD 1634 provides us with a rare and detailed description of the use of both nets and spears for fishing by the Montagnais. The spear or 'harpoon' he describes as:

> ...an instrument composed of a long pole, two or three fingers thick, at the end of which they fasten a piece of pointed iron, which is provided on both sides with two little curved sticks, which almost come together at the end of the iron point. When they strike an eel with this harpoon, they impale it upon the iron, the two pieces of stick yielding by the force of the blow and allowing the eel to enter; then closing of themselves, because they only open through the force of the blow, they prevent the impaled eel from getting away (Thwaites 1896-1901, Volume 6: 311).

Although in this case the central point is made of iron, Beauchamp suggests that this spear is based on an older design which would have had a central point made of bone (1905: 130-131). A similar object is described by Antoine Denis Raudot in 1709 (Kinietz 1940: 370).

The *Histoire naturelles des Indes Occidentelles* (2011), attributed to Louis Nicolas, a Jesuit who lived in New France between AD 1664 and AD 1675, devotes a great deal of descriptive narrative to the plants, animals, fish and birds of Canada as well as their methods of collection/capture and their uses. It is based on his observations of Aboriginal life ways and was published after his death. Nicolas also leaves us with valuable descriptions of how various fish and game were caught. Particularly relevant to this study is another description of eel fishing.

> The eel is taken a second way: with a spear. Only the natives practice this kind of fishing, which they do at night with torches. It takes hardly any time at all to spear canoes full of them in less than half a foot of water. Their way of preparing eel is to open it up along the back and to smoke it, and then make large bundles

> of them when they have been smoked, for these people do not use salt (Ibid: 390).

In one plate of the *Codex Canadensis*, a series of drawings that accompany Nicolas' text, he depicts two men standing in a canoe, one man in the stern is holding a large weighted, dip net labelled 'Kouabaagan' (the Cree word for scoop net is Kwaapihwaan), as well as what looks like a rattle and what could be a long pole with a fish lure attached; the man in the bow is blowing on a long tube with holes in it like a flute. At the bottom of the drawing is a large fish labelled 'Atikamek' (the Cree word for whitefish) and another drawing of the scoop net labelled 'Bateskoupan", a unilaterally barbed harpoon with a line and a lure and another fish spear whose tip is labelled 'Eskan' (the Cree word for horn or antler) (2011: Plate XV, Figure 19: 126). It is reproduced here as Figure 3.2.

Much less writing is devoted to the description of daily life where everyday artifacts used to cultivate and prepare food, make clothing and manufacture objects would have been employed. Cartier mentions the use of four cornered mats to sit upon, finely woven like tapestry (1993: 63), from which we can infer the use of some sort tool for weaving and basketry, possibly made of bone or wood and shaped like a needle or awl. Examples of just such objects have been recovered from all five sites that form the basis of this study and will be described later.

Figure 3.2: Illustration of Fishing Techniques from the Codex Canadensis

Rare Book Collection, Codex Canadensis, Louis Nicholas. Registration 4726.7, Gilcrease Museum Archives.

Bone needles for canoe and snowshoe making as well as shell bracelets and necklaces are described as being interred with the dead (Conacher 1951: 128-129; Le Clercq 1910; 301). The use of bone counters, blackened on one side, are also described as being used in a game resembling knuckle bones is described by Le Clercq and Lafitau (Denys 1910: 294; Lafitau 1974, Volume 2: 189, 196).

In his 1916 monograph *Iroquois Foods and Food Preparation*, F.W. Waugh provides an overview of the implements employed by the historic Iroquois to process and prepare foods. He cites early references by Champlain, Lafitau, Loskiel and Hennepin to spade-like wooden implements, pick axes of wood and hoes made from deer scapulae and tortoise shells attached to a stick as well as hoes made from flattened antlers (1916: 14-15. 16). In his monograph *Iroquois Uses of Maize and Other Plant Foods*, Parker also cites the presence of antler hoe blades on old archaeological sites made from, "...pieces of flattened antler with one worn edge and lower surfaces well polished... (1910: 25, Figure 1). In addition, he mentions the use of an implement described as a husking pin.

> Husking pins are shaped much like the ancient bone and antler awls but generally have a groove cut about a third of their length about which is fastened a loop, through which it is designed that the middle finger be thrust, the point of the husking pin is held against the thumb. In husking the hand is held slightly open, the ear grasped in the left hand, ear but downward, the point of the husker thrust into the nose of the ear and under the husk, by sidewise shuttle motion, the thumb closes quickly over the pin and tightly against the husk, and a pull of the arm downward and toward the body tears away the husk (1910: 32-33).

Parker suggests that many of the bone awls found on archaeological sites may be husking pins as well as hide working awls (Ibid: 33). Another interesting implement for processing corn is the deer mandible scraper (Ibid: 53, Figure 9). He describes this object, which consists of an unmodified ramus, as rare. "The jaw was held by the anterior toothless portion and with the sharp back teeth was scraped from the cob....The Seneca housewife when she uses the jaw scraper, with characteristic humour says, "I am letting the deer chew the corn first for me (Ibid: 53).""

Historic Period implements such as spoons and ladles, eating paddles and eating sticks, were largely made of wood; knives, of stone and bark (Waugh, 1916: 67-71). Both Waugh and Parker suggest that the shapes of some Historic Period spoons suggest, "prototypes of clam-shell, others apparently being based upon spoons of horn or similar material, and others still upon the gourd-shell ladle or dipper (Parker, 1910: 57; Waugh, 1916: 68)."

The Sites

As indicated, the five sites that will be compared in this study are three St. Lawrence Iroquoian sites - McKeown, Roebuck and Steward; and two ancestral Wendat sites - Keffer and Draper. The McKeown site is located in eastern Ontario, in Augusta Township, Grenville County, and covers about 1.6 hectares (Pendergast 1993: 1). The site is located on sandy, well drained soil, south of the main branch of the South Nation River, close to one of its tributaries and about five kilometres north of the St. Lawrence River. Although the site has been known since the early 1900s, the only major excavation was undertaken by James F. Pendergast in 1986. About 30% of the site was excavated exposing complete or partial portions of twenty-three longhouses as well as sections of a massive ditch and palisade (Wright 2004: 2). Based on his analysis of the ceramic assemblage and settlement patterns, Pendergast suggested that this was a large fortified village dating to circa AD 1500 (1993: 21). Some ancestral Wendat pottery is present in the assemblage (Ibid: 30). He also suggests that the village was expanded twice, perhaps three times, in order to accommodate an influx of St. Lawrence Iroquoian refugees from other villages (Ibid: 25). One metal object of European origin was recovered, an iron awl (Wright and Wright 1993).

First noted by W.E. Guest in 1856, the Roebuck site is also located in Augusta Township, Grenville County, to the east of the McKeown site. It has been the subject of two major excavations. W.J. Wintemberg excavated and analyzed most of the site's settlement patterns and material from its refuse middens in 1912 (1936). J.V. Wright returned to the site in the 1960s to conduct more limited excavations (1966). Based on their findings, the site has been characterized as a large fortified village covering approximately 3.2 hectares and dating to circa AD 1450 (Pendergast 1993: 21). The ceramic assemblage from Roebuck contains a small amount of ancestral Wendat pottery, according to MacNeish, 4.1% (1952: 65). Over ninety percent of the site has been excavated.

The Steward site is located still further east of McKeown and Roebuck sites, on Stata's Creek about 100 metres from the banks of the St. Lawrence River near the town of Morrisburg, Dundas County, Ontario. The site was first recorded by Wintemberg in

1913. It was the subject of a limited excavation by J.V. Wright in the fall of 1972 when he uncovered portions of two longhouses (1972: 6-8). Wright observed that the longhouses were five and ten feet wider than longhouses found at village sites such as Roebuck measuring 100 ft by 25 ft and 165 ft. by 30ft. (1972: 6-7). While the bunk lines of the Steward longhouses were the same distance from the exterior walls, there were far fewer interior pit features than found at village sites (Ibid: 7). Wright interpreted these patterns as evidence of a relative lack of concern for heating the longhouses and of structures being adapted to protect fish processing activities from the rain (Ibid: 7). The longhouses also contained three infant burials, one contained two foetuses, possible twins, and the other a three month old infant (Ibid: 7).

A stratified midden, undetected in 1972 but associated with the site was excavated by Phillip J. Wright in 1979. Based on ceramic evidence and radio-carbon dates, it has been identified as a small, stratified fishing camp site intermittently occupied between roughly AD 1150 and AD 1550, most of the material recovered pertaining to the Late Iroquoian Period (Jamieson 1982; Junker-Andersen 1984). Faunal analysis suggests that it was occupied seasonally in the early spring and in the late summer and fall to exploit sucker, redhorse, bass and eel fisheries (Junker-Andersen 1988: 101).

Based on the historical accounts of Jacques Cartier's voyages of AD 1535 and AD 1541 to the villages of Stadacona and Hochelaga, located near present day Québèc City and Montréal, most scholars agree that the inhabitants of these villages were Iroquoian speaking peoples generally referred to in the literature as St. Lawrence

Iroquoians. A comparison of the archaeological material from prehistoric sites in the upper St. Lawrence Valley such as McKeown, Roebuck and Steward with sites on the lower St. Lawrence suggests that these can be considered part of a broadly-based but regionally variable Iroquoian group who were culturally related to the people encountered by Cartier in the early 1500s. As such, the people of these sites are assumed to have been Iroquoians, and the archaeological evidence indicates that they fit into the general patterns of behaviour for the Iroquoians of the Northeast. They may also be assumed to have resembled their Iroquoian kindred to the west and south in many of their practices and life ways.

The Keffer and Draper sites are only two of a number of sites that are clustered along tributaries debouching into Lake Ontario between their headwaters in the Oak Ridge Moraine, an elevated landform, and the shores of Lake Ontario. These rivers and large creeks are (west to east): the Humber River, the Don River, the Rouge River and Duffins Creek. The Draper site was a major fortified village located near the present town of Pickering just northwest of Toronto. It was located approximately sixteen km north of Lake Ontario on a steep bluff overlooking the west bank of West Duffins Creek. The site has been examined by a number of researchers over the years (Hayden 1979, Ramsden 1977) but was not the subject of a major excavation until it was salvaged in 1975 and 1978 (Finlayson 1985). The site covers 4.2 hectares and dates to between AD 1450 and AD 1500 (Finlayson 1985: 437; Warrick 1990: 239-243). It is believed to be the result of a coalescence of smaller communities based on settlement pattern data.

According to scholars, 5% of the ceramics are St. Lawrence Iroquoian types (Pendergast 1980, Ramsden 1977). Almost the entire the site was excavated.

The Keffer site is located just north of Toronto in the present day town of Vaughn. The site was situated on the upper reaches of Don River about 25 km from Lake Ontario. An ossuary associated with the village, was investigated early in the 20th century. However, the site was not the subject of major investigation until the mid 1980s when it was salvaged over three field seasons by W.D. Finlayson (Finlayson, Smith, Spence and Timmins 1985; Finlayson, Smith and Wheeler 1987). Based on these investigations, the site was found to be a heavily fortified village covering about 2.5 hectares with an associated ossuary. According to his ceramic analysis, Smith concludes that Keffer dates to between AD 1450 and AD 1500 (2014) and that it is later in date than the Draper site (1991: 25, Table 58). Birch and Williamson suggest that Keffer, which is the largest Iroquoian site located in the Don drainage, is the last in a series of sites that probably coalesced to form this community (2013: 35). A small amount of St. Lawrence Iroquoian pottery was recovered from the site, about 2% (Smith 1991: 19, 52; Table 21). Approximately 80% of the site was excavated in 1985. Based on ceramics and other material cultural evidence, both Keffer and Draper are described as communities ancestral to the historic Wendat Nation (Finlayson et al 1985, Ramsden 1977, Smith 1991).

These five sites were selected for comparison for a number of reasons:

- They are roughly contemporaneous, Pre-Contact sites;

- Four are large, fortified villages;
- They share a common broadly based Iroquoian tradition;
- They are located in contiguous, overlapping eco-zones.

Physical anthropological evidence suggests that the populations of these two regions were interacting intensively between circa AD 1400 and circa AD 1600, and that this interaction was greater between the ancestral Wendat and St. Lawrence Iroquoians than for the neighbouring ancestral Neutral for example (Molto 1983: 213). This evidence of intermarriage between the two groups may reflect trading alliances and is supported by the presence small amounts of stylistically 'exotic' pottery and pipes and other objects such as clay and steatite beads found on these sites. Their presence is considered evidence of St. Lawrence Iroquoian men and women who may have been either captives, allies or refugees, depending on how one interprets the dynamic relationship between ancestral Wendat and St. Lawrence Iroquoian peoples in the Late Pre-Contact Period (Jamieson 1990a, 1990b; Pendergast 1985, 1993). At Draper, about 5% of the ceramics can be classified as St. Lawrence Iroquoian; at the Keffer site the frequency is about 2% (Pendergast 1980; Ramsden 1977, Smith 1991). To a lesser extent, small amounts of 'Huron' pottery types are also found on the Roebuck and Steward sites and particularly, at the McKeown site (Pendergast 1980: 24; 1993: 30).

Furthermore, based on his analysis of rim sherds attributed to the St. Lawrence Iroquoians, Pendergast suggests that some of the St. Lawrence Iroquoian women living in the Draper site continued to manufacture their traditional ceramic ware; few incorporated traditional Huron motifs (1980: 21). He also identifies a distinctive heavy, thick ware which he believes was not made by St. Lawrence Iroquoian potters and which may represent a facsimile of St. Lawrence Iroquoian pottery made by ancestral Wendat potters (1980: 23).

Pendergast postulates that by AD 1550, exotic archaeological materials found on ancestral Wendat sites such as Parsons, Draper and Keffer, most closely resemble those from the St. Lawrence Iroquoian McKeown, Glenbrook and Dawson sites (1993:26). By AD 1580, he suggests that the increased presence of St. Lawrence Iroquoian pottery on ancestral Wendat sites represents “the last vestiges of the St. Lawrence Iroquoians to move from their homeland (Ibid: 26).”

As mentioned, all the sites under study can be roughly dated to the Late Pre-Contact Period. This period is characterized by large villages which have evidence of intercommunity conflict in the form of multiple rows of palisades and scattered human bone in refuse middens (Birch and Williamson 2013; Ramsden 1977, Warrick 2008). In fact, Birch and Williamson have suggested that Draper, Keffer and other contemporaneous communities may have been in conflict with neighbouring villages in this region during this period (2013: 157-163). Warrick has characterized the Late Pre-Contact Period (A.D. 1420-1550) as one of,

> demographic stability associated with a series of interrelated historical events: appearance of very large villages formed by amalgamation of several small ones, unprecedented regional concentration of villages, establishment of density dependent diseases such as tuberculosis, development of trade with Shield Algonkians, formation of tribes, intertribal warfare, and the immigration of St. Lawrence Iroquoians (2000: 185).

All five sites that are the focus of this study date within this time frame and would have been subject to the patterns and pressures he describes.

Evidence of European Contact

It is often assumed that the metal objects and ready-made metal tools, knives, awls, axes, etc…, distributed as gifts or exchanged by Europeans for furs during the Early Contact Period would probably have quickly replaced some but not all types of artifacts in Aboriginal tool kits. Some accounts, like those of seventeenth century chronicler Nicolas Denys, state that "...in place of arming their arrows and spears with bones of animals pointed and sharpened, they arm them today with iron, which is made expressly for sale to them (Le Clercq 1908: 442-443)."

However, the process of replacement may have differed from place to place. Evans' analysis of material from the Le Caron site, a Wendat village dating to circa AD 1615-1640, suggests a syncretic continuum (2002: 14-16, 59). Evidence suggests that items of European origin were more likely to be ritual or 'luxury' in nature and not those everyday items found in the traditional Iroquoian tool kit (2002). For example, with reference to the frequency of glass beads, Evans suggests that these artifacts were readily incorporated into the Wendat material culture because of similarities with conventional ornamental forms and physical attributes related to traditional spirituality; traditional awls were never completely replaced by European counterparts, a trend noted by other scholars (Ibid: 24, 25). She also notes the tendency to use European raw material to produce traditional artifact forms of both ornamental and prosaic items (Ibid: 26, 28, 30, 37, 43, 57).

Although there is no evidence of direct contact between Europeans and the inhabitants of these five communities, evidence of indirect contact takes the form of a few metal objects of European origin. As the recent example of an iron axe found at the Mantle site[11] demonstrates, European objects were making their way into the interior from the coast in small quantities during this period. At the McKeown site they take the form of a single iron awl (Wright and Wright 1993). At Draper items originally identified as European (Ramsden 1977), a knife blade and a finger ring, may be made of native copper (Ramsden personal communication). In fact, evidence to date suggests that the Mantle and Seed-Barker sites are the only pre-AD 1550, ancestral Wendat sites along the north shore of Lake Ontario to yield European copper artifacts (Fox, Pavlish and Hancock 1995 cited in Birch and Williamson 2013: 151).

Initially, the impact of the introduction of these items would probably have been small. There is no evidence that there was any kind of large scale replacement of osseous tools with European metal counterparts. This would come much later. In any case, based on studies of the impact of the introduction of metal on bone and antler technologies elsewhere, the replacement process would have been gradual and selective. Based on her study of bone tools from sites in North Dakota, Janet Griffits concluded that:

11 Mantle is considered a probable successor community to the Draper site (Williamson and Birch 2013).

> The adoption of new technologies is a complex process that varied between tool types and hints at the complexity of technological change and stability. The replacement processes were not random, and were more complex than is often assumed when research focuses only on large scale concepts of acculturation. Unfortunately, the observation that some bone tools dropped out fairly rapidly has led to a popular perception that all bone tools did, but all bone tools are not the same (in Gates-St. Pierre and R. Walker, 2007: 103).

In fact, evidence suggests that the introduction of European metal technology led to a florescence of certain types of Iroquoian bone artifact, for example bone combs that become much more finely made and ornate after the introduction of metal saws and files (Williamson and Veilleux 2005). With reference to Oneida site assemblages, Pratt has suggested that human cranial rattles, unilateral and bilateral barbed harpoons, plain and ornamented combs, shell beads, canine pendants are more popular in the Late Pre-Contact and Early Contact Periods (1976: 139-140, 145, 151).

> In late prehistoric times (late Chance and early Garoga phases), changes in the artifact inventory include …the sporadic addition of antler combs, perforated animal teeth and shell disc beads. This time period also marks the introduction of the antler harpoon and of the conical antler projectile point (1976: 149).

On Onondaga sites, Bradley observes that a large range of traditional tools persisted into the Garoga Phase from late Owasco times – bone awls, flat centrally perforated needles, antler billets and fishing gear, while the ornamental use of bone and antler changed radically, with increased frequency of bone beads, perforated canine pendants, modified deer phalanges, asymmetrically ground bear molars, antler combs, turtle shell rattles, and face effigies (1987: 41-42). However, in the Proto-historic Period, Bradley notes a decrease in the frequency of bone beads and pendants correlated to an increase of copper beads and pendants, as well as an increase in more elaborate bone and antler artifacts such as combs, effigies and human skull ‘gorgets’ (Ibid: 64). Bradley also notes that by the mid 1600s, bone and antler utilitarian objects – awls, harpoons and fishing gear all but vanish among the Onondaga to be replaced by similar items made of iron and brass; on the other hand, ornamental objects such as effigies combs became more elaborate with the introduction of metal tools used to create them (1987: 126, 128).

With reference to Neutral sites of the pre-fur trade period A.D. 1500-1580), Lennox and Fitzgerald note that the small amounts of European metal scrap that reached the lower Great lakes were re-worked into ornamental items such as tubular rolled beads (Lennox and Fitzgerald 1990: 429). At the same time, shamans bone ‘sucking tubes’ begin to appear, while artifacts that begin to disappear from Neutral assemblages include drilled proximal deer phalanges (Ibid: 423). In the years that followed, the flow of European items such as axes and knives were added to the list of exotic items, along with increased amounts of marine shell, glass beads and ground stone beads (Ibid: 429-430). Fitzgerald notes that ornamental items such as bone beads, their waste and preforms dominate the bone and antler assemblages on Contact Period Neutral sites and suggests that bone tools were being replaced by more durable European items (1982: 199). At the Christiansen site, bone beads represent 63.64% of the bone and antler objects (Ibid: 200). Utilitarian tools made from bone and antler represent 50% of the assemblage at the Proto-historic Fonger site, and then diminish at the later Historic Period Christiansen (21.13%), Walker (26.97%), Hood (17.92%) and Hamilton sites (14.02%)(Ibid: 199).

Studies elsewhere suggest that the impact of the introduction of European tools was probably not 'across the board', so to speak. Janet Griffitts found that the use of awls for processing silica rich plant material (like corn) and for basket making persisted into the Historic Period, while the use of awls for other tasks such as, hide working declined on prehistoric and historic sites along the Missouri River (cited in C. Gates St-Pierre and R. Walker, 2007: 99). All this evidence suggests that European trade goods would have been very rare and had very little impact on the osseous assemblages of the late Pre-Contact five sites under examination here.

The Site Assemblages

The collections that form the basis of my research were located in a number of museums within the provinces of Ontario and Québèc. The Roebuck, McKeown and Draper site assemblages are housed at the Canadian Museum of History, Gatineau, Québèc. The Roebuck assemblage numbers approximately 2,200 specimens. This collection was first described by W.J. Wintemberg in his Roebuck site monograph of 1936 (1972). His discussions provide some very interesting insights into how osseous artifacts were manufactured and how they were used. Wintemberg also attaches labels to many of the artifacts. His approach however, lacks scientific refinement and rigour and is therefore, dated. I will re-examine the Roebuck collection and re-analyse the material in light of more recent advances in analysis and for the sake of standardized comparisons. The McKeown site assemblage numbers about 450 specimens and was analysed by the author in 1986. The Steward site assemblage numbers approximately 190 specimens and was housed in the offices of the Ontario Regional Archaeologist, in

Ottawa. This collection was originally analyzed by me in 1980 and 1981 and subsequently by Christen Junker-Andersen of the University of Toronto and included in his Master's thesis.

The Draper artifacts, comprising over 4,000 specimens, were first examined by Ms. Karen McCullough who produced a draft report (1978a) now on file at the Museum of Ontario Archaeology, in London, Ontario. McCullough subsequently focussed her analysis on a single artifact category and completed a Master's thesis at the University of Calgary titled "Modified Deer Phalanges at the Draper Site" (1978b). Since that time several persons have examined parts of the assemblage but without producing a final report. As mentioned, the Draper site collection is now housed at the Canadian Museum of History, Gatineau, Québèc. The Keffer site assemblage is housed at the Museum of Ontario Archaeology, in London, Ontario. The Keffer collection, about 1,300 specimens, was analysed by the author based on the 1985 excavation. Material excavated in 1988 was not included in this analysis. Faunal identifications of artifacts to the species level were based on analyses undertaken by Frances Stewart (McKeown); W.J. Wintemberg (Roebuck); Harri U. Mattila (Keffer); Tina Burns (Draper), and Christen Junker-Andersen (Steward).

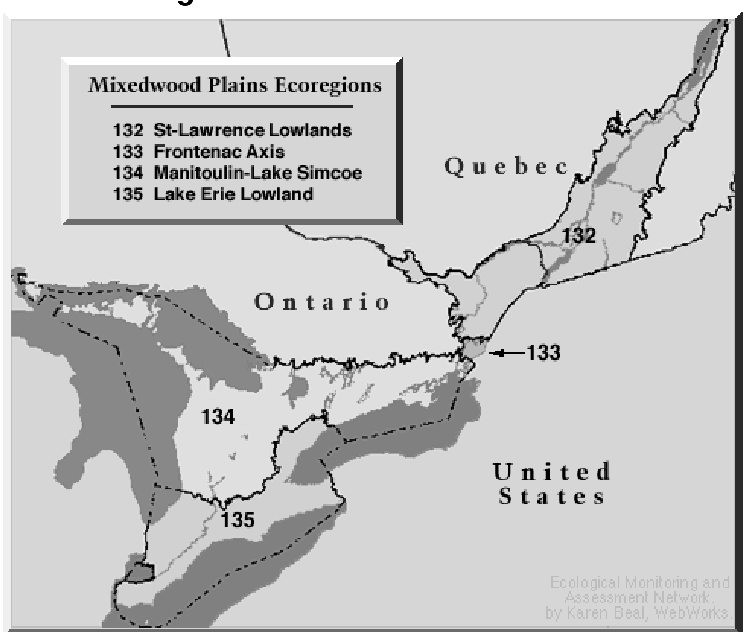
Micro-Environments

The McKeown, Roebuck and Steward sites are located within the Canadian Biotic Province (Dice 1943). This zone is dominated by hardwood and coniferous forests: "Pines of several species constitute an important sub-climax, one which on sandy soils may persist indefinitely. Bogs and swamps form another conspicuous sub-climax, in which spruce, tamarack, and northern white cedar are important trees" (ibid: 15). Limestone underlies much of the area and although shale and dolomite deposits are common, chert is not (Chapman and Putman 1984: 82); "…lakes, poorly drained depressions, morainic hills drumlins, eskers, outwash plains and other glacial features are common (Ibid: 14-15)." The region is intersected with sandy and till plains, and clay beds, and as such, would have been well suited for the cultivation of crops such as corn. The sites are located in Climate Zone C, which has 150 to 170 frost free days annually, roughly from May 3rd to October 8th (Ontario Ministry of Agriculture, Food and Rural Affairs website 2013). It has an annual precipitation rate of 39.4 mm. Both McKeown and Roebuck are located within the South Nation River drainage system, while Steward lies on a creek draining into the St. Lawrence River. A wide range of aquatic species would have lived in these habitats and the land adjacent to them would have provided a rich variety of plant and animal species (Stewart 1997: 251).

The Keffer and Draper sites, on the other hand, are located within northern limit of the more temperate Carolinian Biotic Province (Dice 1943). This zone is dominated by mixed hardwood and beech maple forests (Ibid: 17); nut-producing trees such as oak, beech hickory, chestnut and walnut (Rowe 1972). Although, many of the trees found here are also common to the area around McKeown, Roebuck and Steward such as, sugar maple, beech, white elm, basswood, red ash, white oak and butternut, there are considerable differences from place to place in the climax (Dice 1943: 17; Stewart 1997: 186). A till plain overlies the region deeply cut by two major river systems, the

Don (adjacent the Keffer site) and the Humber (close to the Draper site), both draining into Lake Ontario to the immediate south. The sites are located in Climate Zone B, which has 160 to 170 frost free days annually, roughly from April 30th to October 13th (Ontario Ministry of Agriculture and Food 2013). It has an annual precipitation rate of 31.2 mm, slightly less than for the sites in the Grenville County. The region is intersected with a mixture of clay loam and sandy soils and is free of swamps and bogs. As Stewart suggests, “At A.D. 1500 the environment was almost certainly one of great diversity in both plant and animal life (1997: 254)”. As she also notes, this environment would have provided excellent habitats for deciduous forest ungulates and turkeys however, animals restricted to marshlands and climax coniferous forests would not be expected in large quantities (ibid: 188).

Figure 3.3: Microenvironments



A more recent evaluation by the Ontario Ministry of Natural Resources now classifies these two regions as the 'Mixedwood Plains Ecozone' (Crins et al 2009: 45), however this ecozone is sub-divided into two contiguous 'ecoregions':

- Ecoregion 6E (Lake Simcoe-Rideau)[12] extending from Lake Huron in the west to the Ottawa River in the east, including most of Lake Ontario shore with the exception of the Toronto/Hamilton/Niagara shoreline regions (Ibid: 47); and,
- Ecoregion 7E (Lake Erie-Lake Ontario)[13], extending east from Windsor and Sarnia to the Niagara peninsula and Toronto region (Ibid: 50).

Like the Carolinian/Canadian Biotic Provinces, the main difference between these two are milder temperatures, less precipitation and a longer growing season in the southern region (Ibid: 47-52):

- Ecoregion 6E (Lake Simcoe-Rideau) – growing season is 205 to 230 days, mean summer rainfall is 198 to 281 mm. (Ibid: 47); and,
- Ecoregion 7E (Lake Erie-Lake Ontario), growing season is 217 to 243 days, mean summer rainfall is 196 mm to 257 mm. (Ibid: 50).

Subsistence Patterns

The subsistence patterns of the five sites being studied in this analysis are well documented (Burns 1979, Fecteau 1981, Junker-Andersen 1984, Monckton 1992,

12 This can be further subdivided into the Manitoulin-Lake Simcoe and the St. Lawrence Lowlands Ecoregions, which are divided by the Frontenac Axis just to the east of Kingston, Ontario.
13 Also known as the Lake Erie Lowland Ecoregion.

Stewart 1997, Wright 1981). Archaeobotanical evidence suggests that the inhabitants of all five communities shared a common pattern of dependence on domesticated corn, beans and squash, as well as tobacco, and that they also exploited a wide variety of wild fruit and plant species (Fecteau 1981, Monckton 1992, Wright 1981).

The most comprehensive zooarchaeological research that brings together evidence for these sites is the doctoral dissertation of Frances L. Stewart*, Proto-Huron/Petun and Proto-St. Lawrence Iroquoian Subsistence as Culturally Defining,* completed in 1997. The major foci of her research are the faunal samples from the Keffer and McKeown sites and also samples from other contemporaneous sites in these regions, including Roebuck, Draper and Steward. It identifies both differences in the particular species exploited and the degree to which the same animals were exploited (Stewart 1997: i).

Analysis of the faunal remains from the Keffer site demonstrates that its inhabitants exploited fish and birds from large bodies of water like Lake Ontario and nearby rivers and streams while mammals were hunted in a variety of habitats, mostly open areas with secondary growth and deciduous forest within the Keffer catchment area (Ibid: 242-247). Notably, 61.1% of the remains (by NISP) were fish, whitefish, catfish and trout being the preferred species (Ibid: 242). Only 29.3% were mammals, deer being the most predominant followed by dog, and beaver, followed in lesser numbers by woodchuck, squirrel and chipmunk (Ibid: 243). Most of the hunted species were from open areas or deciduous woods with the sites vicinity while other less common species such as porcupine, marten, snow shoe hare, lynx and moose would have been obtained from beyond Keffer's ten kilometre catchment area (Ibid: 243). Birds accounted for only 3.6 % of the total, with wild turkey, followed by passenger pigeon and grouse, dominating the sample, and to a lesser extent a variety of wild ducks (Ibid: 244). A small percent of remains were turtle, frog, toad and snake, with painted turtles comprising half the reptilian remains (Ibid 245).

> Consideration of the natural histories of the species represented allows several conclusions. First most were taken from deciduous woodlands or more open areas, but greater distances were covered in order to exploit whitefish. Second the various procurement activities were undertaken in specific seasons. Fishing occurred in the fall and to a lesser degree in the spring. Birds were not hunted in the spring and some species were taken only over the warm weather months. Reptiles and amphibians were gathered from spring to fall. Deer hunting was likely a fall and late winter activity and beaver, bear and turkey too were most easily captured in the winter. Most hibernating species must have been taken in the warm weather. Caged bears and dogs could have been killed whenever the desire or need arose (Ibid: 245).

The faunal remains from the McKeown site, (including Stewart's samples and those analyzed by Ostéotechque de Montréal Inc), revealed some similarities but also some interesting and significant differences. Yellow perch, sucker and walleye/sauger dominated fish remains, while catfish, bass and American eel were also common; members of the salmon family were rare (Ibid: 259). Among mammals, white-tailed deer and beaver dominated, followed by muskrat and black bear (Ibid: 260). Snow shoe hare, woodchuck, porcupine, raccoon and marten were present to a much lesser extent (Ibid: 262). Birds were weakly represented in the sample, passenger pigeon, golden eye duck, ruffed grouse and Canada goose being the most common (Ibid: 263). Frogs, toads, turtle and snake were also present in small amounts, while clams, were surprisingly common (Ibid: 264).

Based on this evidence, Stewart concluded that McKeown inhabitants collected animals from two different river systems and from a variety of forests, as well as open areas that they themselves often created. Mammals, particularly deer and bear, were the greatest contributors to the diet, followed by fish, particularly members of the sucker and perch families. Among birds, passenger pigeons, various sorts of ducks and grouse were taken but only rarely. A few turtles, snakes and amphibians were collected. Gathering invertebrates was also a minor activity (Ibid: 281).

The McKeown villagers took fish from a variety of waters, primarily in the spring and hunted game in swampy and forested areas, primarily in the fall and winter (Ibid: 282). The greatest fishing activity was in the St. Lawrence River and its tributaries but to a lesser extent, also in the more sluggish South Nation River system (Ibid: 273). One unexpected finding was the absence of dog remains at the McKeown site. Comparison with other sites in the area has shown that dog remains are rarer on St. Lawrence Iroquoian sites than on those of the ancestral Wendat (Ibid: 266-267). Another surprising finding was the high incidence of black bear remains, including the burial of a nearly complete skeleton of a young bear (Ibid: 267). Stewart concluded that, “The numbers recovered from McKeown suggest that its inhabitants focused on fish and mammals, followed only by a minor pursuit of birds, and infrequently collected amphibians, reptiles and shellfish (Ibid: 277).”

Using MNIs from the longhouse samples to measure abundance, Stewart also suggests that each McKeown villager would have consumed from 20.04 kg to 22.88 kg of meat annually versus from 23.57 kg to 36.19 kg of meat annually at Keffer (Ibid: 287). Stewart concluded that differences between zooarchaeological samples from the two sites were not the result of differences in proportions of the major classes of animals, fish accounting for about 62 % of identified vertebrate samples from both sites, and mammals accounting for 30 % and 36.8 % of vertebrate specimens at Keffer and McKeown, respectively (Ibid: 291). However, some large birds appear to be more common at Keffer (Ibid: 292). Birds account for 3.65% of sample compared to .57% at McKeown (Ibid: Figure 8-2).

At Keffer, trout species, whitefish and bullhead catfish predominate versus suckers and sauger/walleyes at McKeown, where American eel is also present in significant quantities (Ibid: 292-293). Using the Brainerd coefficient of similarity, Stewart demonstrates that when the NISPs for the macro faunal fish specimens are compared, the coefficient for the aggregate houses is 68.32, and for individual houses, only 45.29, thus the fish remains from the two sites are quite dissimilar (Ibid: 294). For mammals, statistics suggest that while there are similarities between the two sites, they are not the same (Ibid: 296). While deer predominate at both sites, beaver and bear are more prevalent at McKeown, dog and moose completely absent. (Ibid: 298).

The Roebuck site faunal samples are derived from Wintemberg's 1912 excavations and J. V. Wright's work at the site in 1970. Wintemberg reported that Roebuck villagers depended on the following mammals in order of abundance: deer, beaver, dog, black bear, raccoon, pine marten, muskrat, porcupine, otter, fisher, mink, woodchuck, hare, red squirrel, lynx, moose, wapiti, wolf, skunk, wolverine, red and grey fox, chipmunk, black or grey squirrel, seal[14] and possibly bison[15] (1972: 14). Bird bones were not numerous but there was evidence of the following in order of importance: Canada goose, ruffed grouse, Sandhill crane, loon, bald eagle, passenger pigeon, swan, raven, gull, hawk, wood pecker and duck (Ibid: 14).[16]

Fish bones and scales were numerous representing seven identifiable species: yellow pickerel, catfish, pike, buffalo fish, carp, gar pike, chub or horned dace (Ibid: 15). Shells of fresh water clams were found in abundance, predominately Eastern Elliptio (Ibid: 15). Turtles and frogs were present in small numbers (Ibid: 14-15). This picture is largely confirmed by the faunal analysis of material excavated by Wright in 1970, with White-tailed deer predominating mammal species, followed by black bear and beaver; with fish the second most important meat source; fresh water clams the third source of meat; and avian species contributing to subsistence in a very minor way (Bissell 1989: 26). Additional fish species identified included lake sturgeon, lake trout, redhorse sucker, burbot, sunfish, largemouth bass, pumpkinseed and walleye (Bissell 1989: 16, Theodor 1989: 5).

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14 According to Wintemberg, seal is represented by a single phalanx.
15 According to Wintemberg, bison is represented by a distal phalanx and broken head of a scapula.
16 As is the case for McKeown and Roebuck, avian species are weakly represented at the nearby St. Lawrence Iroquoian sites such as Cleary (Fry 1989: 5; Garden 1988:23) and McIvor (Chapdelaine 1989: 209).

A sample of one third of the Draper mammalian faunal assemblage was analyzed by Tina Burns in 1979. Burns identified twenty-seven mammal species, Eastern cottontail, Varying hare, chipmunk, woodchuck, Grey and Red Squirrel, beaver, Deer mouse, Meadow vole, Microtine, muskrat, porcupine, wolf, dog, Red and Grey fox, Black bear, raccoon, marten, fisher, weasel, skunk, otter, bobcat, deer, moose and wapiti (1979: 43). The seven most important were, in the following order: White-tailed deer, dog, woodchuck, black bear, beaver, muskrat and raccoon (Ibid: 34). Deer and bear represented the most important meat source, representing 93.6% of all available meat (Ibid: 34). Frances Stewart notes that the Draper fish were like those from Keffer in the frequency of catfish remains and other species (1997: 339-340). Stewart concluded that in general terms, with the exception of whitefish which occurred in higher frequencies at Keffer, the faunal remains from Draper and Keffer were comparable (Ibid: 341-342).[17]

The Steward site faunal assemblage, analyzed by Junker-Andersen indicated that it was a fishing station seasonally occupied in the spring and early summer when spawning stocks of redhorse and small mouthed bass were available and then in the fall when spawning eels were caught (Junker-Andersen 1984: 163-164). Junker-Andersen identified at least fifty-five species, over 22% invertebrates, 52.5% fish, 18.4% mammals, 0.9% birds, 0.5% amphibians and 0.1% turtles (Ibid: table 2:245). He suggests that a variety of methods were employed in catching fish including weirs, traps, nets and leisters and, as eel are fished at night, hunting of beaver and deer could

17 Stewart cautions that the absence of whitefish at Draper may be a function of selective identification rather than an accurate reflection of the absence of this species (1997: 339).

have been conducted during the day (Ibid: 164). In fact, based on the faunal remains the main source of meat actually consumed at the site was deer, the main function of the fishery being to collect stocks of fish to be processed on site and preserved for later consumption (Ibid: 165). Birds and turtles were present but not in significant quantities; fresh water clams however, were found in abundance (Ibid: 165).

Raw Material Selection

The first step in the reduction of raw materials to tools is the selection of the raw material from which the tools are manufactured. The availability, form and mechanical properties of each of these raw materials displays distinctive characteristics that effect its suitability for the manufacture and use of specific types of artifacts as well as the limitations of its use. As a by-product of subsistence activities, osseous raw materials would have been plentiful and, unlike stone, would have been more easily obtainable for all Iroquoian peoples living in the Northeast. Our knowledge of the properties of these materials is largely derived from controlled laboratory experiments (Margaris 2013: 670). As Margaris notes, the material properties of osseous material are “innate and dimensionless, meaning they do not vary with the geometry of an object (2013: 671).” Terrestrial limb bones for example, function to provide structural support and are therefore, stiff and strong, these properties limiting how this material can be used (Ibid:671). Indeed, in certain circumstances, osseous materials would have been preferable to other raw materials given their physical properties. In his study of factors influencing the use of stone projectile tips based on ethnographic literature, Chris Ellis argues that bone, antler and even wood would have been preferred to stone for projectile points (both spears and arrows) because these materials are less friable, thus more reliable for repeated use, and more easily replaced (1997: 64-65). For example, organic spear tips would be preferred for use to hunt smaller game and herd animals, in environments with denser undergrowth, for closer contact thrusts with prey and where multiple thrusts are employed (1997: 64).

Bone can be divided into two main types – compact and cancellous. Compact bone is mechanically strong, while cancellous bone is relatively less strong but is tougher and more resistant to fracture. Tests on deer bone or other artiodactylae support the characterization of these as strong and stiff but not particularly resistant to fracture; they are well suited for tools that require constant pressure such as awls (Wells 2012: 31). Margaris notes that awls and other hand held instruments used for skin and hides, “needed first and foremost to be stiff, and able to withstand compressive, bending and torsional forces without buckling. Tools used in basketry and working other fibres did not require very sharp tips (Margaris 2013: 681).” Avian wing bones, though hollow and thin walled are structurally strong and stiff, making them convenient as awls, portable containers and ideal for flutes and whistles (Ibid: 672). As mentioned ,bone would have been in plentiful supply for tool production as a by product of hunting and fishing activities.

Unlike bone, antler is composed of dead tissue. Its natural shape predisposes it as a raw material for projectile points, hoes, picks and flakers. It has about twice the ‘work of fracture’ (the work required to drive a crack through the material) of bone which makes it more impact resistant, although it has lower bending strength, elasticity and mineral content (Currey 2002: 126). Antler is therefore, generally weaker than bone due to its lower mineral content but considerably tougher, with greater ability to absorb shock, a function of its being used for defence and protection (Margaris 2013: 671). The fracture resistance of antler has long been recognized by archaeologists (Guthrie 1983, Knecht 1997, Margaris 2013: 671, citing Albrecht 1977, MacGregor 1895, MacGregor and Currey 1983, Petillion et al, 2011, Pokines 1998, Stodiek 2000). Antler is therefore, better suited for projectile points such as harpoons and for flakers (Wells 2012: 34-35).[18] Heating antler makes it more brittle and easier to work (Ibid: 420) as does soaking it in water (Cole-Will 1980: 69; Knecht 1997: 200). Thus, antler is easier to work than bone because of its structural properties and its composition (Ibid: 200). Antler, like bone, would also have been in plentiful supply both in the form of fresh and shed antlers. According to research from Northern Europe for example, 65% of the antler picks recovered from Stonehenge, were derived from shed antlers and 35% from slain deer; authors also note that antler if stored properly can last for months, if not years (A.J. Legge cited in Serjeantson and Gardiner 1995: 418).

Based on experiments replicating bone and antler tools with flint flakes, Margaris found that workability of raw materials was greatly influenced by whether materials were fresh or old, and soaked or dry (2006:111). She cites replicative experiments (Westcott and Holladay 1999: 66-67), which describe taking less than ten minutes to longitudinally section the metapodial of a fresh road-kill deer using jasper burins, while the same task

18 It is interesting to note that *Sky Holder*, a key mythological figure in Iroquoian cosmology, vanquishes his twin brother *Flint*, with "… properly lethal 'horns of a stag' (Wonderley 2009: 55,68)."

took over 45 minutes when the bone had been air dried for an unspecified time (Ibid: 113 -114, Table 4.5). However, "working times for all but the driest of the white-tailed deer bone and for soaked reindeer antler converged on the one hour mark, which accords with Newcomer's 60-minute blank production time using American elk antler (Newcomer 1977)(Ibid: 111)." Both fresh antler and bone were easier to work than dry; when boiled or soaked antler was softened enough to shave with a knife (Ibid: 115-116). "While water soaking does little to "rejuvenate" dry corporeal bone, it is, according to MacGregor (1985: 64) and H. Knecht (1997: 200) quite effective on antler (Margaris 2006: 123)."

Thus, the factor that most strongly influenced blank production time was the *state* of the raw material as it dried out, becoming stiffer and more resistant to cutting with time (Ibid: 122). Yet Margaris also points out that there seems to be a general consensus among experimenters that abrading, usually reserved for the final shaping of a piece, is most effective when a material is dry (e.g., Watts 1999: 64; Westcott and Holladay 1999: 66)(Ibid: 122). Thus, when trying to reconstruct the manufacturing process, not only do we need to consider the *state* of the raw material, but the *stage* of manufacture – preforming, shaping or finishing.

Teeth (and tooth) are composed of three major components enamel, dentin and cementum. Enamel is extremely hard and resistant to wear. The three major components are uniquely employed in the incisor teeth of many mammalian herbivores and rodents where the three tissues wear at different rates, the enamel slowest, thus producing a continually self-sharpening tip to the tooth (Currey 2002: 187-188). This feature makes these incisors perfectly adapted for use as blades for woodworking chisels and knives. Canines when modified by splitting or grinding will maintain the same sharp edge.

Shell is composed of two main substances, a outer layer of calcium carbonate and an inner layer of porcellaneous or nacreous material, translucent ‘mother-of-pearl’. The resultant structure is very hard, durable and resistant to damage and acts as a form of natural armour protecting the soft organisms contained within. The lips of clam shells for example provide a sharp cutting edge and their natural saucer like shape makes them suitable for use as a spoon or scoop. The opalescence of the nacre was highly prized for its iridescent quality and highly valued as a raw material for beads and other personal adornments.

As Wintemberg remarks in his report *The Use of Shells by Ontario Indians*, clam shells (Unios) were, “utilized to some considerable extent, not only in the domestic economy of Indians, but also in the ornamentation of persons (1908: 38).” He suggests shell could have been put to use for a range of functions including cups, spoons, knives, razors, pottery making, tanning and woodworking as well as providing the raw material for the manufacture fish hooks and of course, for ornaments such as beads, pendants, gorgets, pins and wampum (Ibid: 38-90). Although freshwater shell would have been easily available, it also often required more time and effort to work. According to P.J. Francis, beads are often made using the ‘heishi’ method,

> … a procedure in which bivalve shells or similar flat material is chipped into small circlets and then bored. After bored blanks are produced, they are strung on a

> stick or thick fiber and rubbed atop a flat stone or in a grooved stone. Thus, all the beads are shaped and polished and neighbouring beads tend to fit snugly together (1989: 31).

When interpreting the raw material choices made for bone, antler, tooth and shell artifacts, it is also important to consider them in the larger context of the entire range of raw materials available to Iroquoian peoples such as stone, wood, leather, clay, native copper and plant materials. Osseous materials were plentiful and well suited for the manufacture of many kinds of implements, but other materials were also often readily available and better adapted for certain artifact types.

Chapter 4

Refining Artifact Types

As stated in the Introduction, one of the main objectives of this dissertation is to develop a standardized typology for the osseous artifact assemblages from five Iroquoian archaeological sites and to make some observations with regard to their defining characteristics. The first step in this analysis was sorting of the large numbers of artifacts into general categories. This process was simple and follows the tradition of Iroquoian scholars. The early classification of awls was based on purely formal characteristics. Rau, Beauchamp, Boyle and Wintemberg classified tools first, according to basic morphological characteristics such as shape and size (Beauchamp 1902, 1903-1904; Boyle 1903-1904; Orr 1911, Rau 1885, Wintemberg 1904, 1906, 1928, 1931, 1936, 1939). Thus, long, sharply pointed tools were labelled either awls, points or needles - those with perforations were more likely to be labelled needles; those showing evidence of hafting, projectile points; the residual category were awls.

Their second step was to draw on ethno-historic literature for both Iroquoians and other Aboriginal groups in the Northeast in order to assign more specific labels to general artifact categories where this was possible. Thus, the general category of needles was subdivided into netting needles, snow-shoe needles, etc., based on similarities to descriptions of analogous artifacts identified in the literature and in a few cases on ethnological objects themselves. It also allowed less formal artifacts such as composite fish-hook barbs and deer-mandible corn scrapers to be identified. Scholars also often drew on ethnographic analogies from a wide range of non-Iroquoian cultures with rich bone and antler assemblages. This was necessary due to the general lack of accounts describing Iroquoian bone objects in the early Historic Period and the disappearance of much of this technology as a result of its replacement by European tools. These efforts resulted in the development of a very loosely applied and non-standardized classification system for osseous artifacts employing what has been a largely intuitive process.

I propose to refine the existing typology by employing a more exhaustive and detailed set of morphological and metric attributes in my analysis. As in the past, I will draw on ethno-historic literature and ethnographic analogy, although I will confine my use of sources to the Northeast. In some cases, with the use of low-powered microscopic observation it will be possible to refine general artifact types based on patterns of use wear. This will make it possible to eliminate ambiguities between artifact labels such as awl, projectile point and bone barb. Observations of manufacturing techniques will also make it possible to distinguish preferences in the employment of these techniques for different artifact types.

The Assemblages used to Define Artifact Types

Over 8,000 specimens, from five sites, were examined in the course of this dissertation. Artifacts from four sites were analysed in detail using the code and coding form described in Chapter 2. These four sites are: McKeown and Roebuck - late Pre-Contact St. Lawrence Iroquoian villages; Keffer - a late Pre-Contact ancestral Wendat village; and Steward - a seasonally occupied, St. Lawrence Iroquoian fishing camp site. The Draper assemblage, from another late pre-contract ancestral Wendat village site, was analysed only at the level of type for the purpose of inter-site comparisons. However, Karen McCullough, a researcher working for the Museum of Indian Archaeology in London, Ontario (now the Museum of Ontario Archaeology), produced a preliminary analysis of some but not all of the artifact categories from Draper (1978a), and her findings will be drawn upon where applicable.

Methodology

The methodology employed for this research is based on analytical techniques employed by previous researchers and on additional observations developed by myself. To this end statistics are derived from a sample of each artifact type, where ever possible based on complete artifacts, however, in order to derive the maximum amount of data, incomplete specimens are included where appropriate. This means for example, where tips were present, their shapes are recorded and where bases were present their shapes were recorded.

Morphological observations and measurements are based on the type of raw material, shape and size of the specimens. Methods of manufacture are reflected in a variety of manufacturing techniques, each technique leaving characteristic traces in the form of "signatures" which often survived subsequent modifications, such as use, breakage, and natural alteration. These techniques include grinding, scraping, drilling, flaking, polishing and heat altering. During the life history of each artifact underwent a number of alterations related to manufacture, wear, and natural modification after being discarded. Of these, the most difficult to detect is use wear. These included breakage, polish, fracturing, flaking and pecking. Observations of use wear made during this analysis are based on the recognition of certain repeated and patterned physical characteristics which occur on the artifacts employing low powered magnification and the un-aided eye.

Some Considerations

When considering how artifacts were manufactured, used, re-used and discarded, it is important to keep the following factors in mind. Unlike some other raw materials such as exotic forms of shell and ivory and some lithic materials, bone, antler, tooth and shell would have been easily obtainable within the immediate environment and, as a by-product of hunting, fishing and food processing, would have been in plentiful supply. Furthermore, these raw materials are very easy to work and to re-work. Dulled tips of awls can be easily resharpened and broken tips recycled for other uses such as leister barbs, pins and composite fish hooks. As experimental studies demonstrate most osseous artifacts can be manufactured very quickly (Newcomer 1977: 300). It is also important to consider where artifact types fit on the expediency versus curation continuum (Binford 1979).

> Curated tools are cared for and valued. Investing time and labor in the manufacture and maintenance of curated tools increases tool efficiency and extends tool use (Binford 1977)…In contrast to curation, an expedient strategy anticipates sufficient materials and time to make tools when needed. Expediency is materially wasteful and represents a minimal technological effort where tools

are produced when needed, used, and discarded at their use location (Fuld 2012: 39).

Generally, curation strategies are associated with frequent residential relocation and expediency strategies with sedentary groups (Kelly 1992). Therefore, in the case of Iroquoian groups, one would expect more expediency objects than highly worked and curated artifacts. However, this is not always the case. As Kristen Fuld found for Northwest Coast Aboriginal groups, the presence of curated, specialized tools may also be a response to managing risk since many procurement activities are seasonal, mobile and aquatic, and high risk activities with severe failure costs (Fuld 2012: 91). Fuld also found that tools used for modification such as blades, chisels, handles, wedges and punches may also be highly curated, while awls and flakers may be less so, as their form does not affect their performance to the same degree (Ibid: 92).

In addition, unlike chipped stone, the detritus created in the process of worked bone and antler, is often indistinguishable from debris that results from food processing such as butchering and marrow extraction. Much of this probably goes unrecognized in faunal collections. This very often makes the reconstruction of the initial stage of the reduction process, difficult, if not impossible to identify. It is also more difficult to reconstruct the reduction sequences because shaping and finishing stages often obliterate traces of previous modification. As a result, standardized artifact types may in fact be more difficult to define than in the case of chipped lithic and ground stone artifacts. The data that is possible to record is mainly limited to what is observable and visible to the unaided eye on finished artifacts. Some artifact types such as awls and bone beads are numerous. Others, such as bone pendants, are rare. In some cases there will not be enough available data to formulate a list of defining characteristics and out of necessity conclusions were tentative. All these factors present challenges and to some extent have limited the ability to make conclusive statements about some artifact types.

Implements for Hide/Bark Working, Sewing, Weaving and Basketry

Many early chroniclers in the Northeast record the use of woven objects such as nets, baskets and mats made from natural fibres such as hemp. Cartier noted that the Hochelagans he visited in AD 1536 used four cornered mats that were woven like a tapestry (1993: 63). He also recorded that the Stadaconans possessed fishing nets made from hemp (Ibid: 24, 25). According to Champlain, Sagard and Henri Joutel, large seine nets also appear to have been widely used by the Huron (Kinietz 1940:24- 29).[19] André Thévet described the use of snowshoes to travel and hunt in winter, "…rackets woven with cords like a sieve, two and one-half feet long and one foot wide… (1986: 6)." The widespread existence and use of such objects implies the existence of a number of types of tools to make them.

Awls

Bone awls are not specifically mentioned in Northeastern ethno-historic accounts. There are references to the use of "...little well pointed bones for painting on skins..." and for tattooing (Lafitau 1974, Volume 2: 32, 38), as well as for the piercing of

19 In AD 1687, Joutel described nets as long as two hundred fathoms, and two deep (Kinietz 1940: 29).

ears and noses (Lafitau 1974, Volume 1: 178; Wrong 1939:127) however, little else. Awls have also been identified by archaeologists as clothes-fixing pins and eating implements (Wintemberg 1936). The general morphology of awls, the fact that they are long and sharply pointed, suggests that they were used as perforating tools. They comprise a large proportion of the osseous assemblages of Iroquoian sites.

Chrestien Le Clercq, a Recollet missionary working among the Gaspesiens (Micmac), mentions the practice of interring bone 'needles' used for making canoes and snowshoes with women in their burials (Le Clerq 1910: 301). Whether he may be referring to awls used for perforating bark, to centre-eyed needles or to both, is not clear. At the Seneca Adams site (circa AD 1570), awls were found in associated with seventeen male burials (65.4% of the total) and seven female burials (29.9% of the total); they were associated mainly with adults but also with one adolescent (Wray et al 1987; 40-41). The abundance of this type of artifact throughout Pre-Contact Iroquoia suggests that they were an indispensable part of the tool-kit of both men and women. However, the artifact category of 'awl' or 'awl-like implement' has been widely misused and confusingly applied in a great deal of the literature, not just in Iroquoian studies but elsewhere. As Genevieve LeMoine observes:

> Examination of the plates in many archaeological reports and monographs has lead (sic) me to the conclusion that many archaeologists have very little idea of what is required of an awl. Almost any vaguely pointed implement is likely to be included in that category. In many cases, it appears that these so-called awls are too dull to be really useful for piercing hide... (1991: 128).

Replicative studies suggest that they can be made relatively quickly, between five and fifteen minutes (Campana 1989; Lyman 1984, Newcomer 1977). Amy Margaris argues that the wide variation within this category may also reflect wear and resharpening; or simply reflect few constraints on their design as they are easy to make, to maintain, and to replace (2013: 684). Awls were easy to make quickly and easy to replace, the ultimate expediency tool.

In his study of bone awls, Junker-Andersen defines 'awl' as simply "…a sharply pointed bone or antler tool, usually shaped by means of whittling and/or grinding, manufactured for the purpose of piercing leather or hides primarily as part of the clothing production (1981: 9)." Using two major attributes which distinguish awls from others types of artifacts, their points and bases, he divides them into four main categories: long bone awls, splinter awls, ulna awls and antler awls (Ibid: 9, 11). He suggests that typically awls have tips which are sharp and acutely angled, with a range in angle from 8 to 22 degrees and large bases (Ibid: 11-12).

Long bone awls, manufactured from the long bones of medium to large sized mammals, are described as being the longest and most varied in morphology of awls, with one or more articular facet modified, or the entire proximal or distal end unmodified (Ibid: 13). The range of tip angles is 8 to 22 degrees (a mean of 13.2 degrees) and a length range of from 53 mm to 139 mm (a mean of 90.3 mm) (Ibid: 14-17). Typically, ulna awls, here defined as a sub-category of long bone awls, are manufactured from the ulna of various mammalian species and conserve the olecronon process and trochlear notch as a handle; with lengths ranging from 95.4 mm to 140.6 mm (a mean of 123.9) and tip angles ranging from 9 to 27 degrees (a mean of 13.2 degrees) (Ibid: 17-19).

Splinter awls, which Junker-Andersen suggests are expediency tools, are manufactured from bone splinters which rarely retain their articular ends, are shorter than long bone awls[20] with lengths ranging from 37.4 mm to 90.6 mm (a mean of 54 mm) and tip angles ranging from 7 to 10 degrees (a mean of 8.9 degrees) (Ibid: 19). Antler awls, he suggests are often indistinguishable from antler flaking tools, and for this reason, although he defines them as a sub-category of the artifact type - awl, he hesitates to include them as such, in his study (Ibid: 20-21).[21]

Chapdelaine observes much the same pattern for awls from the Late Pre-Contact, St. Lawrence Iroquoian McIvor site, located just east of the Roebuck and McKeown sites, in Grenville County, Ontario, where he noted a bi-modal distribution of both awl lengths and thicknesses (1988: 293; 1989: 207). Timmins also classifies the awls from the Glen Myer Period, Calvert site based on tip and cross-section shape (1997: 144-145). His Type 1 consist of awls with gradually tapering tips that are round in cross-section, Type 2 are acutely tapering and flat in cross-section; Type 3 are similar to Type 2 in tip and cross-section shape but are made exclusively from deer ulnae (Ibid: 145, Table 7.18).

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20 The same observation about long bone versus splinter awl length is made by Beauchamp (1902: 255).

21 Two antler specimens from Roebuck may have been used as awls, but it is more likely they were projectile points.

In his 2007 analysis of bone awls, Christian Gates St-Pierre employs replicative experiments and micro-wear analysis in an attempt to identify the precise function of a sample of one hundred awls and awl-like tools from five Pre-Contact, St. Lawrence Iroquoian sites (2007: 107-118). Noting that, "Awls are certainly the most ubiquitous category of Iroquoian bone tools," Gates St-Pierre defines awls simply as, "pointed tools for piercing holes (2010: 72)." I prefer this definition to others because it is the simplest and best encompasses the wide range of variation that occurs within this artifact type. This is the definition that I have employed to classify the objects I am labelling as 'awls'.

Gates St-Pierre conducted a total of sixteen experiments using replicas of bone awls to pierce smoked cow hide, wet and dry birch bark, to husk corn cobs, and to smooth leather-hard clay coils (Ibid: 110). The results of these experiments can be briefly summarized as follows:

- tips of awls used on hides appear somewhat rounded, even if prone to micro-flaking; with a matte linear polish which developed into a bright polish which followed the topography of the surface; long fine parallel striations appeared except where a twisting motion was employed, in which case they appeared perpendicular to the long axis;
- polish on awls used on bark took a long time to appear, but when it did, was very smooth and bright and also, tips had a rounded surface; striations were rare, but they sometimes occurred on the tip; no chipping or flaking was present ;
- awls (husking pins) used on corn and clay had similar micro-wear, edges becoming rapidly rounded or bevelled (visible to the naked eye); a bright polish

quickly appeared with numerous striations, larger and more frequent on clay, and more random for corn (Ibid: 111-112).

Gates St-Pierre concludes it is possible to distinguish awls used to pierce hide, from those used on bark, and from those used on clay and corn, but not to distinguish between those used on clay and corn (Ibid: 113). However, he observes that when he compared the micro-wear on the replica awls to the wear on the archaeological specimens, he sometimes found it difficult to identify contact material, except in a general way, for example, an undetermined hard material (wood, bark, bone, antler, shell) or an undetermined soft material (dry hide, fresh hide, plant, clay) (Ibid: 113). Dry hide was most easily recognizable and was identified as the contact material for one third of the tools, while bark was less easily recognizable but present on many specimens; some specimens could be only be identified as coming into contact with unidentified silica rich plants; and one tool may have been used on shell; only two specimens had the wear characteristic of corn husking pins (Ibid: 113-114).

While some of these awls were clearly multifunctional, Gates St-Pierre concludes that, "awls and awl-like bone tools generally had a single, specific function, and apparently may have had to be transformed if they were to perform other tasks (Ibid: 114-115)." However, he also notes that other studies have obtained different results. For example, Janet Griffitts found that between 20% to 40% of bone awls, from prehistoric and historic sites along the Missouri river in North Dakota, were multi-functional (cited in C. Gates St-Pierre and R. Walker, 2007: 99). More recent use wear research by Gates St-Pierre and Mathew Collins, based on osseous material from the

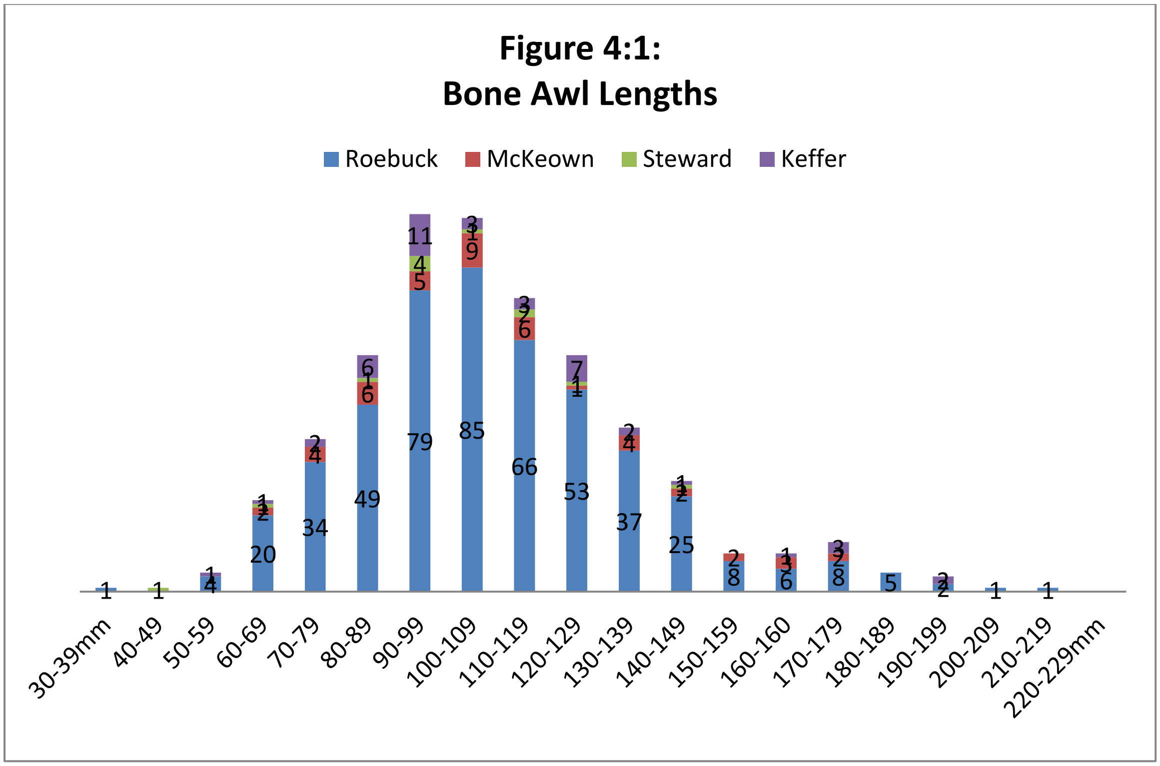
Mailhot-Curran site in the St. Anicet cluster of St. Lawrence Iroquoian sites in southern Quebec, indicates that some bone tools were indeed re-worked for different purposes – in one case a corn husking pin has been reworked for use as an awl (2015).

The characteristics that I used to distinguish ‘awls’ from other sharp pointed bone objects are the shape of the tip or ‘business’ end, evidence of re-sharpening and use wear in the form of polish. Six hundred and four specimens were examined in detail with the following results. Of these, most are made of long bones of large mammals but a small number are derived from avian species and the long bones of small mammals such as dog, racoon, etc. The preferred initial step in producing a preform was splintering: 76.6% retain signs of being splintered from a mammal long bone, a few (5.4%) retain signs of first being grooved longitudinally. In 12.4% of cases, it was not possible to find any traces of the first stage of reduction. In 75.5% of cases, specimens have then been shaped by grinding and in 14.5%, by scraping (although scraping was the most visible method of shaping at Keffer (61.4%). Finally, 48.3% of specimens show signs of being finished with further scraping. The location of these reduction techniques on the specimens varies for example, 72.9% are ground overall while 63.1% of scraping occurs only on the tip.

In sum, it appears that the majority of the specimens were made by first producing long bone splinters, in many cases by splitting deer metapodials; rough splinters were then smoothed and shaped by grinding; a few specimens display the "chatter-marks" characteristic of the use of chipped lithic tools to carve or whittle and scrape artifacts into shape. Some specimens from both Keffer and Roebuck sites displayed evidence of heat alteration: two were burned on the tip (perhaps to harden them), three were burned overall (possibly accidentally) and four were burned overall and then polished (perhaps for aesthetic reasons). Six specimens have designs incised along their shafts, five are geometric and one, of indeterminate nature.

In terms of morphology, 66.5% of specimens were symmetrical in overall outline, while 25.5% were asymmetrical. Cross-section shape of the majority, 80.6%, is natural, but these shapes vary considerably. The majority of tips, 54.4%, were gradually tapered and sharply pointed; 30.3% were flaring and sharply pointed; the remainder were less regular in shape. Most (87.3%) of these awl tip shapes have angles which are 10 degrees or less. Base shape was natural in 46.1% of the specimens; 24.9% were rounded, while 11.7% were irregular. Of the remainder, 5.8% of bases were flattened (20.5% at Keffer), 2.4% pointed and 1.3% basally notched (11.4% at Keffer). Two specimens have notches along their sides, one from Roebuck has four and one from Keffer, eighteen. Six specimens have a single groove near the base and one specimen has two grooves. Evidence from historic Iroquois sites in New York State indicates that some iron awls were hafted in bone handles (2003: 150), and it is probable that some of the shorter ‘splinter’ type bone awls were also hafted in bone, antler or wooden handles.

An examination of the length of all specimens reveals that the average length is 109 mm; the majority, 61.9%, are between 70 mm and 120 mm in length; 15.4% are less than 70 mm in length, while the remainder - 22.7%, are greater than 120 mm. One specimen from Roebuck exceeded 211 mm in length.[22] The average width of their bases is 12 mm; 51.3% are less than10 mm and 44.1% between 11 mm and 20 mm.[23] The distribution of bone awl lengths is presented in Figure 4:1.



Use wear took the form of two phenomena - polish and breakage. Both were measured from the tip or 'business' end of each awl. Polish when visible appears on the tip in 49.8% of cases (only 29.5% at Keffer), 6.7% of cases were polished overall

22 Boyle notes that the longest specimen in the Ontario Provincial Museum Collection, found in Ontario County, was 292 mm long, while another found in the Laidlaw collection, from Lot 5, Concession 2, Bexley Township, Victoria County, is 266.7 mm in length (1903-1904a: 78).
23 By way of comparison, at the McIvor site awls range between 31.5 and 170.6 mm in length, with an average length of 87.3 mm, standard deviation of 34.6 mm; with widths of 10.4 mm plus/minus 3.5 mm and 5.9 mm plus/minus 2 mm (1988: 293).

(although this is the predominant pattern for 38.6% of cases at Keffer). Polish on tips is probably the result using awls to perforate hides or other pliable materials. As predicted in hide-piercing experiments (Bradfield and Brand 2013; Buc 2011), polish did not extend more than 50 mm from the tip in most cases. Many specimens also exhibit a certain degree of overall polish on shaft and base, probably the result of handling during use. An examination of the length of broken tips demonstrates that most are between 50 mm and 80 mm. This pattern supports the conclusion that breakage, like polish length, is the result of consistent patterns of use and not the result of accident. Only two examples of what could be labelled antler awls were found in the Roebuck assemblage. They closely resembled their bone counterparts in overall morphology but have thick sharp shaped tips. One had a pointed base which had been shaped by scraping and grinding, while the other had a hollowed base with circumferential groove as a result of being initially grooved then snapped. Both specimens may well be points and not awls. They both measured 55 mm in length.

In summary, it is also important to remember a number of factors influencing how awls were manufactured:

- raw material was plentiful;
- production of splinters would often have been a by-product of splitting long bones for marrow;
- the manufacturing process could be very simple and of very short duration;
- ‘awls’ could be very easily resharpened or reshaped and recycled as other tool forms.

Typically, awls demonstrate the following defining characteristics:

- Tips are symmetrical, long and tapering, although in a number of cases, tips flare slightly with concave sides - this variation in shape may be due in part to whether the specimen has been resharpened, hence the slightly concave sides;
- Most tip shapes have angles of 10 degrees or less;
- Tips display visible polish, in most cases not farther than 50 mm from the tip;
- Some show evidence of re-sharpening;
- Most were made from mammal long bone, but also from large avian species;
- Most are symmetrical in overall shape;
- Although they have a variety of base shapes, most are unmodified, retaining their natural form;
- A few have geometric or indeterminate designs on shafts;
- An average length of about 109 mm; although splinter awls are shorter than long bone awls.

Needles

Although there is no mention of them in the ethno-historic sources for Iroquoian groups, it has been suggested that bi-pointed, centre-eyed needles were used to produce snowshoe webbing (Wintemberg 1936: 58) and other woven objects such as mats (Tuck 1971: 75; Ritchie 1969: 212). Needles are known to have been employed to make snowshoes by neighbouring Algonquian-speaking groups and Wintemberg observes that, “needles do not seem to be found south and west of the state of New York, where snow shoes were probably never used; in Ontario they occur at Iroquoian sites, which all lie within the region where snow shoes were a necessity (1936: 58-59)."[24] The needles described here were not used for sewing, like European eyed needles, but for weaving. As other scholars have noted,

> …few, if any eyed bone needles have been recovered from archaeological contexts outside the Arctic region after the Paleoindian and initial Early Archaic Periods. Skin clothing for ethnographically-documented groups outside the Arctic appears not to have been made using eyed needles but, instead, was sewn using bone awls and the "pierce and lace" method (Hatt 1969 [1914]) (Osborn 2014: 49).[25]

Bi-Pointed Needles

Bone needles are one of the most easily recognizable artifact types on Iroquoian sites distinguishable by their bi-pointed shape and centrally located eye. Most of the examples recovered from archaeological sites are fragmentary. This is probably the result of the stress placed on the central hole and the thinness of the section of bone between the edge of the hole and the outer edge of needle. All seven centre-eyed needles from the McKeown site assemblage were fragmentary; of the twenty-nine specimens from Keffer, only three are whole; of the thirty-eight specimens from Roebuck, only five are whole; of the sixty-six specimens from Draper, only five were whole.

All specimens appear to be manufactured from mammal ribs. Specimens were produced by splitting a large section of rib lengthwise. Of the complete specimens examined in detail, all are symmetrical in overall shape, bi-pointed and very thin and bi-

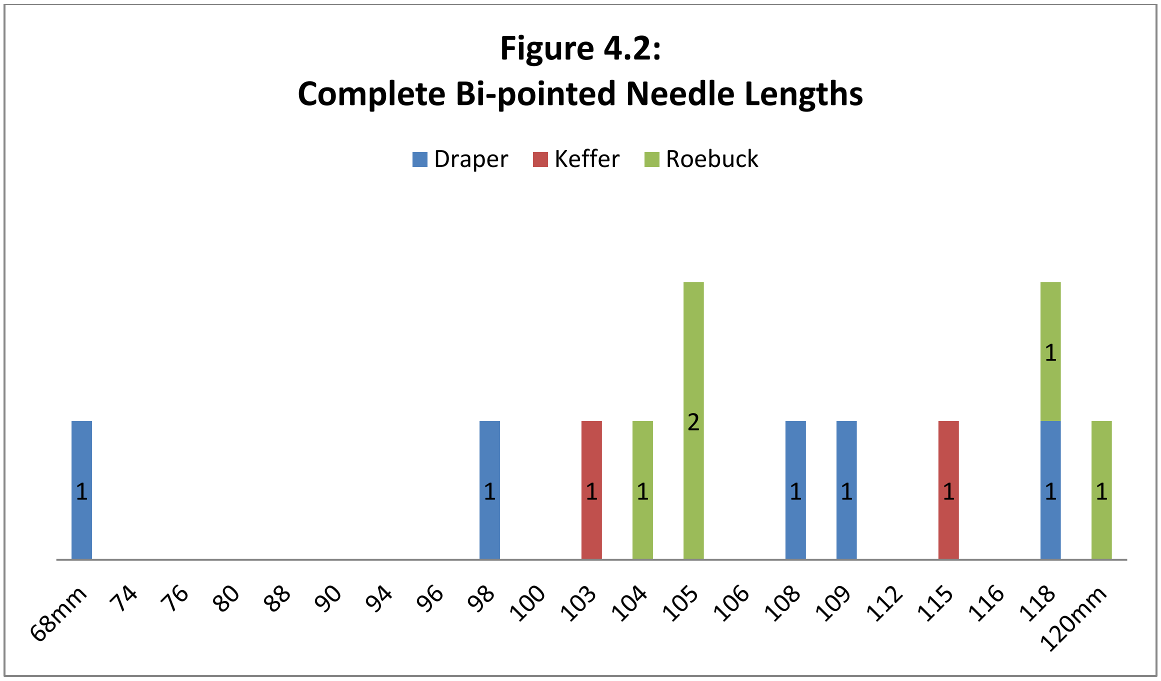
24 Elsewhere, Wintemberg notes the scarcity of netting-needles at the Neutral Lawson site and suggests there may have been counterparts made of wood (1939: 31).
25 Needles of this type were found on the Archaic Period, Morrison Island site, located on the Ottawa River (Clermont and Chapdelaine 1998: 35-37).

convex or concave/convex in cross section shape. Specimens vary in tip shape: one is long and sharp, two are slightly flaring, three are thick and short, and two are rounded. The majority of the complete specimens (75%) were first splintered or split, one specimen showed evidence of being grooved and then splintered; 75% showed signs of being further shaped by grinding, then seven specimens, or 87.5% were finished by being perforated by gouging; all are perforated near the centre but usually slightly closer to one end of each specimen.[26] This pattern of slightly offset holes has been attributed to better ease of use in weaving (Wintemberg 1936: 58).[27] Use wear, in the shape of polishing, was visible on six specimens, in five cases this was overall and in one case, only on one tip. As mentioned, breakage can also be attributed to use wear.

The average length of the complete specimens was 102 mm; average mid-point width is 8 mm. The three complete specimens from Keffer measure 103 mm, 109 mm and 115 mm in length; those from Roebuck are 104 mm, two are 105 mm, 118 mm and 120 mm in length. McCullough, describing the five complete Draper specimens, notes that two have holes almost dead centre, while three others have holes 20 mm to 22 mm closer to one end; their lengths range between 68 mm and 118 mm and measured: 68 mm, 98 mm, 108 mm, 109 mm, and 118 mm, with mid-point widths between 6 mm and 10 mm (McCullough 1978a). Lengths of complete specimens only are plotted in Figure 4.2.

26 Wintemberg notes that seven of the thirty-seven specimens he examined had holes drilled nearer one end than the other. However, he does not record how large this difference is(1936: 58).

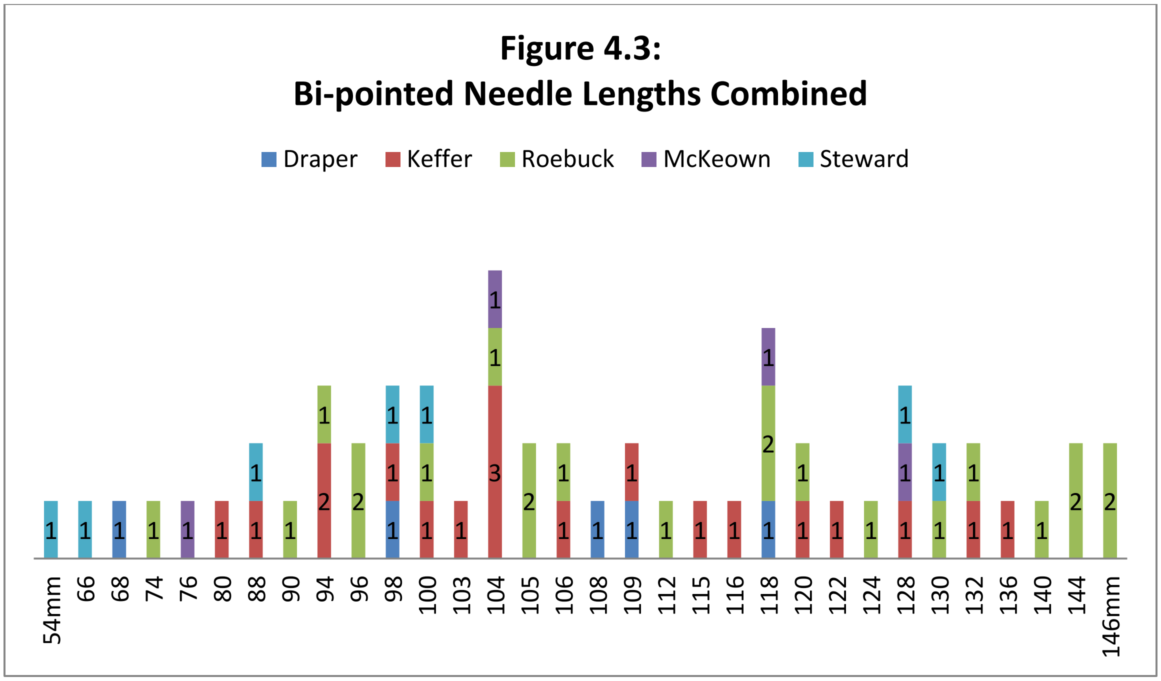
27 Recent use wear analysis of needles from the St. Anicet cluster of sites in Quebec suggests that they may not have been used for making nets (Gates St-Pierre and Collins 2015).



Since many of the specimens have been broken near their mid-point and given that the hole is located in the approximate centre of the needle, a rough estimate of their original total length can be calculated by doubling. When lengths of these broken specimens are doubled and then plotted along with the lengths for complete specimens, they cluster themselves into four general sizes.

- Type A, between 54 and 98 mm in length;
- Type B, between 100 and 116 mm in length;
- Type C, between 118 and 124 mm in length;
- Type D, between 128 mm and 146 mm in length.

This data is presented in Figure 4.3. This range in size suggests the possibility that the needles were designed to be used for a range of different tasks – making snowshoes, weaving nets, mats, etc…



Specimens had a midpoint width of between 6 mm and 10 mm, with an average mid-point width of 9 mm.[28] Typically, bi-pointed needles demonstrate the following defining characteristics:

- They are bi-pointed, with short, thick shaped tips;
- Have an eye (eyes) perforated near the centre, or slightly off-centre of the length of the needle;
- Mostly manufactured from mammal ribs;
- Frequently broken at the point of perforation;

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28 By comparison, the five complete specimens recovered from the Draper site had mid-point widths between 6 mm and 10 mm (McCullough 1978a.). Maximum lengths were not available for those specimens from the McIvor site as all were fragmentary, maximum widths ranged from 6.2 to 8.4 mm, with an average width of 7 m (Chapdelaine 1988: 294).

- Variable in length, ranging from approximately 50 mm to 150 mm, with an average length of 102 mm;
- Have mid-point widths between 6 mm and 10 mm, with an average width of 8 mm.

Bone Sewing Needles

Although found on Archaic sites, needles which resemble European metal sewing needles, with a single point and a single eye located at the opposite end, are rarely found on Iroquoian sites.[29] However, a single complete specimen was recovered from the McKeown site. This specimen is 53 mm in length and 5 mm in width at its base, where the single small perforation has been made; and 4 mm in width at its mid-point. The specimen is symmetrical in overall shape. The tip shape which is 10 degrees or less in angle is narrowly pointed and very sharp; the cross-section shape is oval. The needle appears to have been manufactured from a sliver of mammal long bone and then ground overall and perforated. Use wear appears in the form of a high polish overall. Unlike the bi-pointed needles described above, it is assumed that this needle was used for sewing. With reference to similar objects found at the Dawson site, Pendergast has suggested that, "their close resemblance to the European article cannot help but suggest that the inhabitants had contact with Europeans (1972: 282-283)." With only one specimen as an example of this artifact type, it is not possible to generate an exhaustive list of defining characteristics other than to observe that single-pointed, eyed needles:

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29 Three similar needles were recovered from the St. Lawrence Iroquoian, Dawson site, located on the Island of Montréal, Québèc (Trigger and Pendergast 1972: 282-283; Plate XV).

- Are symmetrical in overall shape;
- Have sharp narrow tips and rounded bases;
- Have a single perforation in on end;
- Are highly polished from use.

Metapodial Needles

Another more specialized object which occurs less frequently on Iroquoian sites has been labelled by archaeologists a ‘metapodial needle’. With reference to the Iroquois Morgan states, “A small bone near the ankle joint of the deer, has furnished the moccasin needle from time immemorial; and the sinews of the animal thread. These bone needles are found in the mounds of the west, and beside the skeletons of the Iroquois, where they were deposited with religious care (1922: 360).” Hennepin also makes reference to an awl-like implement. “Instead of Awls, they make use of a certain sharp Bone, which is above the heel of the Elk (1974: 526).” One specimen illustrated in Plate XIV, 22, Wintemberg identifies as an, “Awl made from the splint bone of a moose (1936: 158).” It is difficult from these descriptions to know exactly to which joint in the ‘ankle bone’ or ‘heel’ they are referring however, the specimens examined here are made from small vestigial metapodials that occur naturally in the hind legs of ungulates.

The seven complete specimens examined in detail were all from Roebuck. These are natural in overall shape and natural in cross-section. They range in length from 52 mm to 81 mm, with an average length of 70 mm. Bases have a naturally occurring proximal bulb which is minimally modified; one is shaped to be more rounded, one example is drilled and one is notched. This naturally occurring bulb could have been used for the attachment of a piece of thread, or twine, while the sharpened tip would have facilitated production of woven and webbed items such as mats and nets. Ultimately, their exact use is not possible to determine without more contextual data.

A variety of indeterminate techniques have been employed to modify the distal end; three have then been scraped - one overall, one on tip and one on base; two ground on tips only, and one ground overall. Tips vary in shape but all are sharp: one is long and sharp, one thick and sharp, one flaring and sharp, two are concavely asymmetrical and sharp. Most tip shapes (83.3%) are angled at 10 degrees or less. Four specimens have polish from use wear on their tips.

Typically, metapodial needles have the following defining characteristics:

- They are made from rear *cervid* metapodial;
- Natural in overall shape;
- Bases are rarely modified, preserving a naturally occurring bulb;
- Tips are ground or scraped to sharp point;
- Range in length from 52 mm to 81 mm, with an average length of 70 mm.

Bone Scrapers

Eight specimens, all from Roebuck sites were identified as bone scrapers, probably used for working hides.[30] The distinguishing characteristic that suggests these objects were used to scrape animal hides is use wear in the form of polish that is present along the lateral edges of four of the seven examples. As described, these objects show little signs of modification and may be difficult to distinguish from general

30 No specimens that could be labeled ‘beamers’ were identified in the five assemblages examined.

bone waste. It is possible that they are present in other site assemblages but have gone unrecognized in faunal samples. Five of these objects can be identified as sections of deer long bones, three tibias, one femur and one metapodial. All have been flaked along their lateral edges. All are roughly rectangular in shape; lengths range from 101 to 145 mm, with an average length of 122 mm; and widths from 14 to 22 mm, with an average of 18 mm. Two examples show signs of first being split or splintered, then flaked and then ground. Proximal and distal ends were not modified. Typically, bone scrapers demonstrate the following defining characteristics:

- They are roughly rectangular in shape;
- Are mainly manufactured from deer long bones;
- Modification is minimal, although they are often flaked along lateral edges;
- Lengths vary ranging from 101 to 145 mm, average width is 18 mm.

Implements used for Food Processing

Ethno-historic accounts describe the diet of Iroquoian groups as quite varied, including the cultivated staples of corn, beans and squash, wild fruits, berries and roots, domesticated dog, wild birds, fish and game. Processing, storing, preparing and serving this food required a wide range of implements made of a variety of mediums including: vegetable-derived materials such as wild hemp, grass, reed, wood, gum and bark; mineral-derived materials such as stone, sand and clay; and of course, animal-derived materials such as sinew, bone, antler, tooth and shell. Waugh makes reference to a number of items used for this purpose in his monograph*, Iroquois Foods and Food*

Preparation including: spoons made from bark, clam shell, mammal scapulae and wood, wooden and bone eating sticks and paddles, eating paddles made from deer ribs (1916: 45, 68, 69, 70, 85).

Deer Mandible Corn Scrapers

The use of modified deer mandibles to remove kernels from corn cobs is recorded by Parker for the Five Nations Iroquois (1910: 53-54) and by Waugh (1916: 96,169).[31] Wintemberg has suggested that four deer mandibles with the condyles and coronoid process removed may have been used as corn scrapers at the Roebuck site (1936: 48). Pendergast suggests the same function for a similarly modified mandible found at the Salem site (1966: 34). However, the artifacts I have identified as mandible corn scrapers are not complete or near complete mandibles but rather consist of sections of the body of the mandible, with teeth attached, scored and broken into sections on average 50 mm in length.[32] I found no examples of these objects on any of the three St. Lawrence Iroquoian sites examined, although one deer mandible from Roebuck showed evidence of having been grooved but then apparently discarded. Eight specimens, all from Keffer, were examined in detail. Specimens ranged in length from 31 mm to 59 mm, with an average length of 50 mm. The majority (88.9%) show signs of being first grooved and snapped; then 77.8% appear to have been modified by scraping distal/ventral/dorsally (one example is drilled), then 66.7% were then ground. The body of the mandibles are naturally hollow. The majority (six or 66.7%) display use

31 These tools have the ascending ramus removed.
32 It is also possible these objects were a type of bead.

wear in the form of polish on both inner edges. This polish indicates that these objects were probably suspended on a cord in the same fashion as bone beads. This may have been to ensure these tools were not misplaced during the long process of scraping large quantities of kernels from corn cobs. Typically, deer mandible scrapers demonstrate the following defining characteristics:

- Are derived from deer mandibles;
- Most are scored and snapped on two ends and then ground;
- Most have polish around their interior surface, probably wear caused by suspension;
- Have an average length of 50 mm.

Husking Pins

Corn husking pins are known from historic Iroquoian groups and are described by both Parker (1910:32-33) and Waugh (1916: 40, 169). Examples from their publications are reproduced in Figure 4.4.

Figure 4.4: - Corn Husking Pins (After Waugh 1916, Parker 1910).

> Husking pins are shaped much like the ancient bone and antler awls but generally have a groove cut about a third of their length about which is fastened a loop, through which it is designed that the middle finger be thrust. The point of the husking pin is held against the thumb. In husking the hand is held slightly open, the ear grasped in the left hand, ear butt downward, the point of the husk, by a sideways shuttle motion, the thumb closes quickly over the pin and tightly against the husk, and a pull of the arm downward and toward the body tears away the husk (Parker 1910:32-33).

Similar objects recovered on Pre-Contact Mesoamerican sites, have been likened to the 'piscador'[33] or 'corn shucker' still used by Oaxcan farmers to slit open corn husks and to remove kernels from cobs (Flannery and Winter 2009: 37). When found on Iroquoian sites, archaeologists have often confused these objects with awls. The major difference between these two artifact categories is the shape of the tip, the awl being much sharper and narrowly tapering angle. The wider tips of husking pins would be unsuitable for the perforation of hides or other similar materials. Unlike ethnohistoric specimens, these husking pins do not have a groove for the attachment of a thong. A few specimens have been flaked along their lateral edges to create an even scraping edge, perhaps to scrape corn kernels from the cobs.

Seventy-seven specimens identified as husking pins were examined in detail. All of the specimens are made from large mammal long bones. Of these, 64.5% appear to have been first indeterminately splintered or split (32.3%); 77.4% are then ground, while seven (11.3%) show evidence of flaking. The majority of specimens (77.4%) were symmetrical in overall shape; 17.7% are asymmetrical; 80.6% of the tips of husking pin are characteristically, thick short shaped tips and are generally slightly convex and

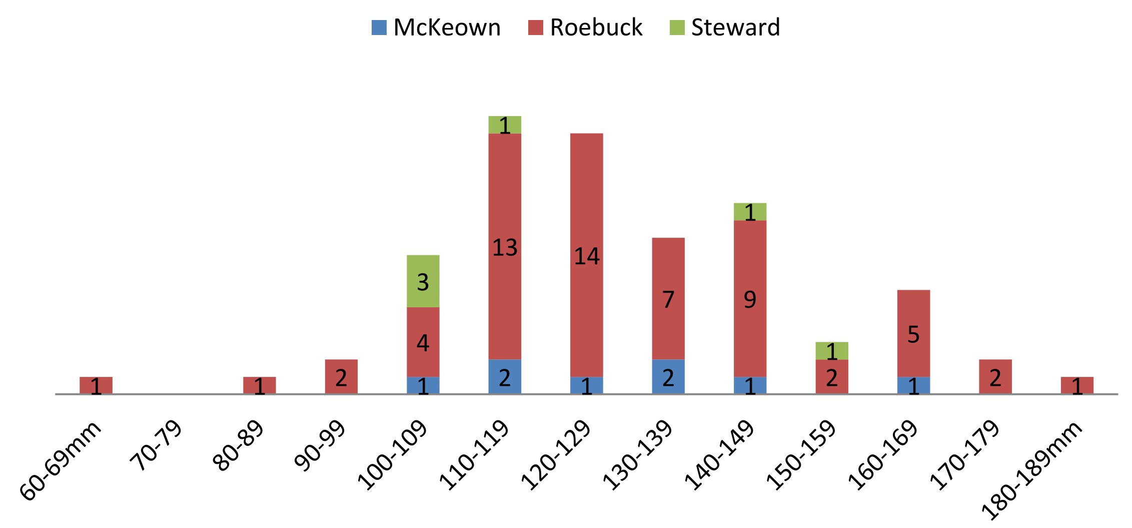
33 These objects are also referred to as 'trapiscador' in some studies.

rounded in shape, eight tips (12.9%) have a flaring sharp shape. Tip shapes are have angles 25 degrees or greater. Of the bases 50% are natural, 27.4% are rounded, a few are also irregular, flattened or pointed in shape. The majority are natural in cross section but other shapes also occur. Six are decorated with geometric designs, two from Roebuck and four from Steward.

Wintemberg, Pendergast and Junker-Andersen all note that the tips of some specimens have been charred (Wintemberg 1936: 55, Pendergast 1963: 5; 1966: 58; Junker-Andersen, 1981: 24). Only one such example exists from the McKeown site, but many specimens recovered from the Roebuck site are charred and blackened (Wintemberg 1936: 55). Junker-Andersen attributes this to a conscious effort to fire hardened them (Ibid: 24) and indeed, the fact that they have been heat treated and subsequently polished by use suggests that the application of heat was purposeful and intended to harden the tips. Polish, where observable, occurs on the tips and along the lateral edges, but is localized on the tips in 54.7% of cases. This wear pattern is consistent with their handling and use as implements to separate the husks from ears of corn. The distribution of corn husking pins lengths is presented in Figure 4.5.

At the McKeown, Roebuck and Steward, lengths range from 66 mm to 182 mm, with an average length of 128 mm; mid-point widths from 13 mm to 22 mm, with an average of 15 mm; and base widths between 8 mm and 35 mm, with an average of 17 mm. In his study of awls and awl-like objects Junker-Andersen notes that bone husking pins are more highly finished and more frequently decorated than long bone awls; range in length from 91.5 to 191.2 mm (a mean of 123.8 mm) with a tip point angle from 17 to 57 degrees (a mean of 27.8 degrees) (1981: 23-24).

Figure 4.5:
Corn Husking Pin Lengths



In his Master's thesis, Junker-Andersen provides us with detailed schematic illustrations of the decorative patterns on these objects from the Steward site which I have reproduced here in Figure 4.6 (1984: 289-290, Figure 27). The designs on some of these objects, those with closed chevrons, closely resemble the incised chevron designs found on pottery rim sherds. These and other designs are strikingly similar to those on fragments of objects of similar shape and size found on the Putnam site, located on the Black River, Jefferson County, New York, southeast of the Steward site (Skinner 1921: 130,131, Plate XXV). These are reproduced in Figure 4.7.

The Putnam site is a late Pre-Contact St. Lawrence Iroquoian village, contemporaneous with McKeown and Roebuck, one of a number of St. Lawrence

Iroquoian villages defined as the Sandy Creek cluster (Pendergast 1985: 23). Two of the objects, second and third from the right, have broad, blunt tips which may indicate they too are husking pins. The other specimens are missing their tips.

Figure 4.6: Schematic illustrations of incised decorative patterns on presumed awls, awl-like implements, and fragments (Junker-Andersen 1984: 289, Figure 27)

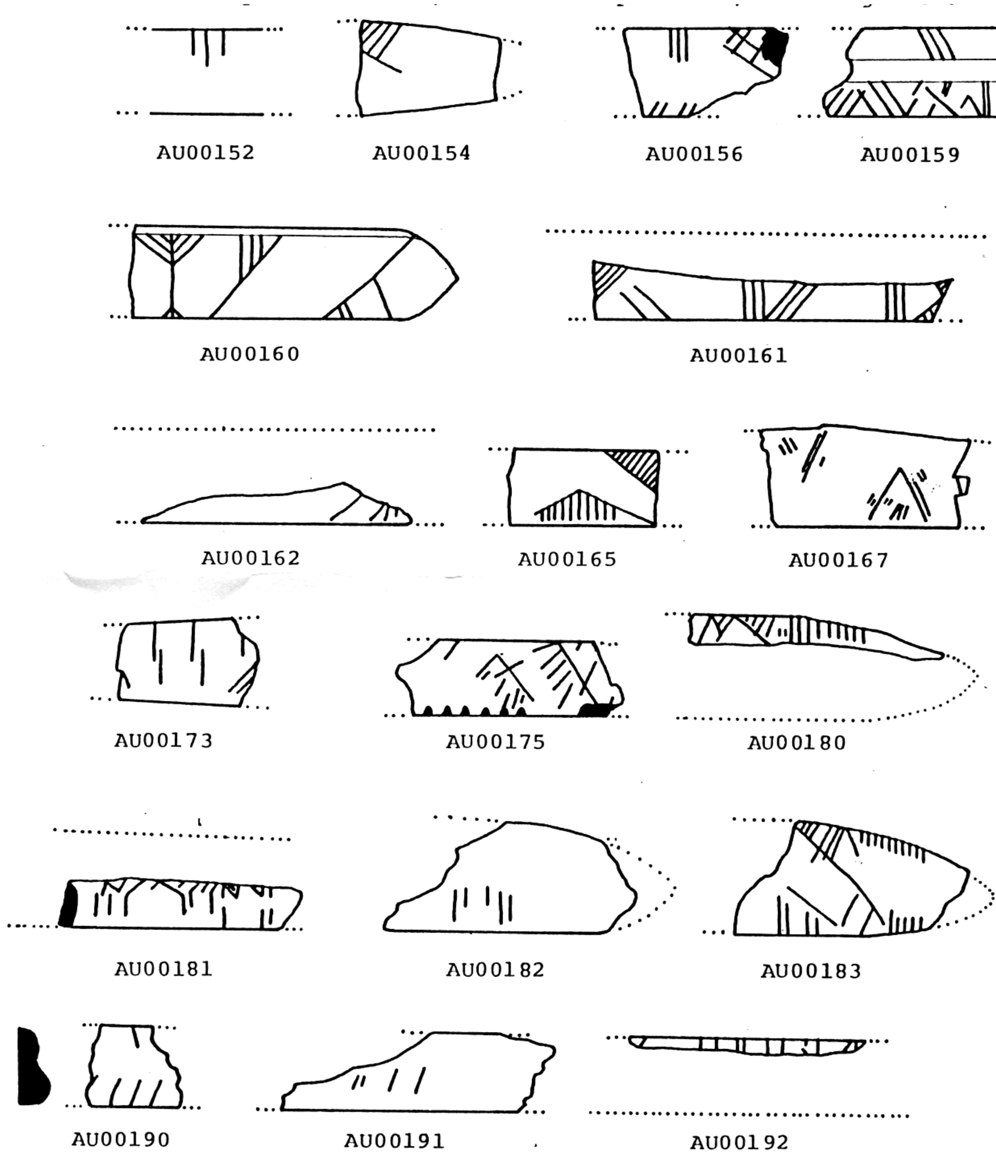


Figure 4.6: continued…

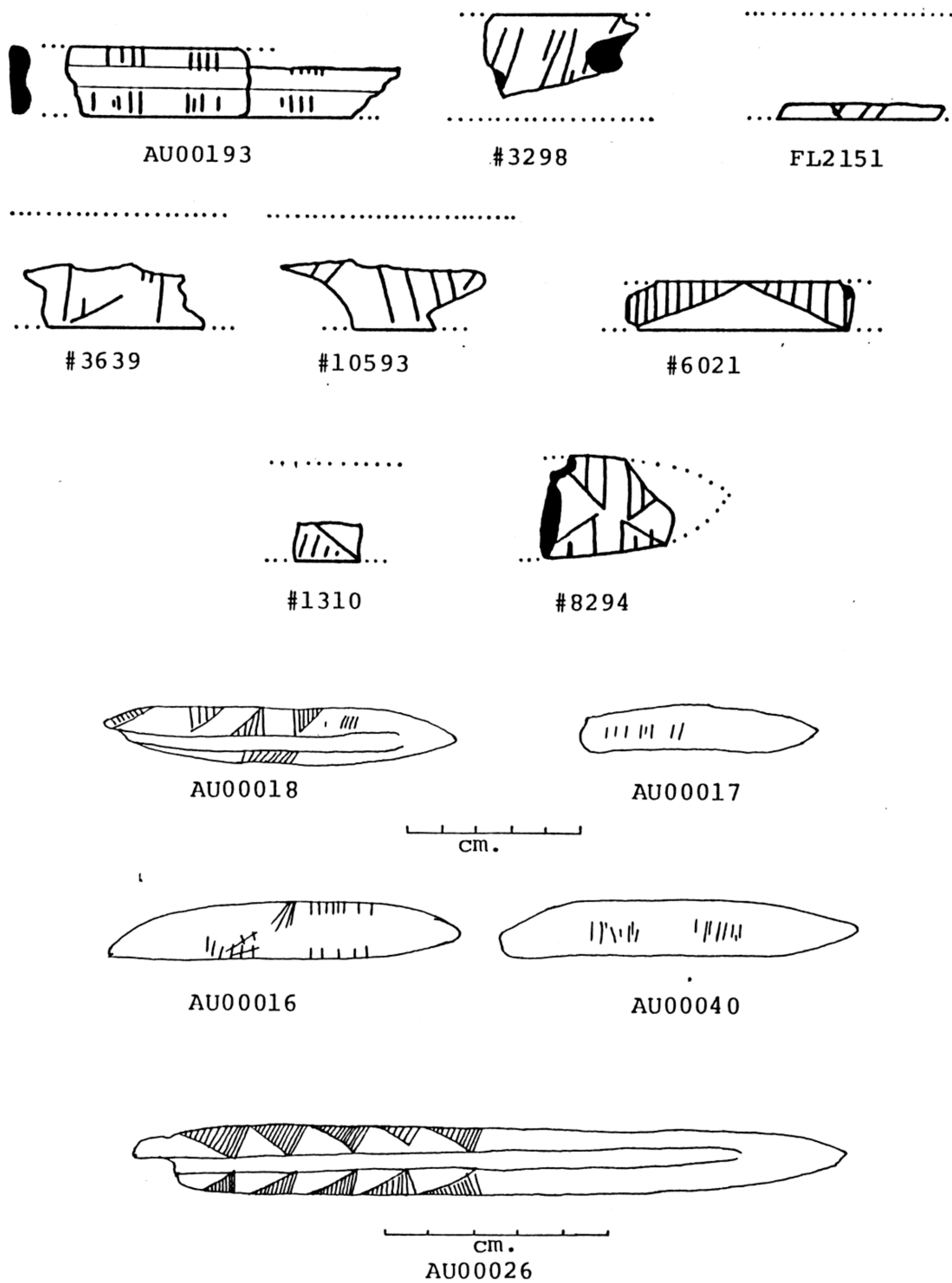
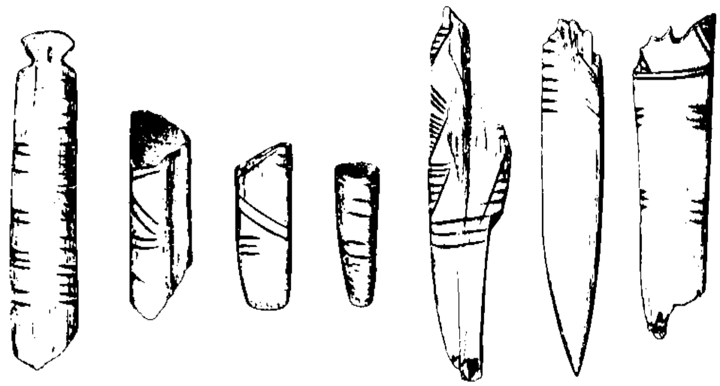


Figure 4.7: Objects from the Putnam site, Jefferson County, New York (Skinner 1921: 130,131; Figures 32, 33).



As noted, some of the specimens have been flaked along their lateral edges. This may have been in order to remove the jagged edges left after splitting the long bones. This pattern of flaking may not have been removed by subsequent reduction stages of grinding or scraping. An alternative explanation is that the lateral edges have been flaked to create an even scraping edge, perhaps to scrape corn from the cobs. Polish shows up along many of these edges and may be due to just such use.

In his examination of use wear on awls and awl-like objects from five St. Lawrence Iroquoian sites[34], Gates St-Pierre used micro wear analysis to establish valid distinctions between tool types such as awls and husking pins. He found only two objects that had micro wear diagnostic of corn husking, both of which had high values in terms of length and width and broad point angle (2007: 114). However, other objects with similar morphology, definitely do not have wear patterns consistent with corn husking and furthermore, some appear to be clearly multifunctional based on the

34 These sites were Roebuck, McIvor, Salem, Glenbrook and Summerstown Station.

presence of more than one use wear pattern (Ibid: 114). In this case, there appears to be a weak correlation between form and function. Clearly, further research which examines the relationship between morphological characteristics and micro wear is required to validate distinctions between tool types. Nevertheless, I suggest that corn husking pins demonstrate the following defining characteristics:

- Sharp, thick acute tips, angled at 25 degrees or greater;
- Rounded or natural bases;
- Some are decorated with triangles of oblique lines;
- A few are flaked along their lateral edges;
- Use wear occurs as polish on tips and along shaft;
- Have an average length of 128 mm; average base widths of 17 mm.

Implements used for Hunting and Fishing

Aboriginal groups in the Northeast followed a seasonal calendar of hunting and fishing activities based on the availability of prey and the optimal conditions for their capture. Elizabeth Tooker summarizes the typical seasonal round for the Huron for example, as follows:

- Spring – trading, hunting, fishing, warfare and agriculture;
- Summer – agriculture;
- Fall – fishing, hunting;
- Winter - hunting (1962: 71).

It is not surprising that there are many early references to hunting and fishing as these were activities which also greatly interested European observers, particularly with reference to the fur trade and the potential for resource exploitation by future colonists. Jacques Cartier first encountered a large, Iroquoian speaking fishing party camping on the Gaspe Peninsula in late July; he makes only passing reference to the use of canoes and nets by these 'Stadaconans', noting that they "… had not anything above the value of five sous, their canoes and fishing-nets excepted (Cartier 1993: 24)."[35] However, the vocabulary he collected from this group and the Hochelagans is slightly more informative, listing as it does terms for some of the other items in the Aboriginal tool kit such as, knife, sword, hatchet, bow and arrow (Ibid: 33-34, 93-94). The assumption being, if these words not only referred to a European knife for example, they also may have referred to something of Aboriginal origin that resembled, or was used in the same manner. André Thévet, a sixteenth century French historian who never visited North America but who obtained second hand accounts from those who had such as Jacques Cartier and other, records the use of weapons of both antler and bone to hunt game during the winter (1986: 6, 37, 90). A rather fanciful illustration of just such a hunting scene is reproduced from this account in Figure 4.8.

> To capture these animals, ten or twelve of them get together armed with long lances and pikes fifteen to sixteen feet long, armed at the end with some bone of a stag or other beast a foot long or more, instead or iron, carrying [also] bow and arrows armed the same way. They then go through the snows which are around all year round, tracking the stags through the said very deep snows and uncover the trail, which having been uncovered they set up cedar branches, which are green in all seasons, in the form of a net under which they hide themselves, armed as I said. And as soon as the stag arrives, attracted by the pleasure of this

35 These nets were made of hemp (Cartier 1993: 25).

greenery and the path beaten down, they hurl themselves on him with thrusts of the pikes and arrows that they force him to leave the path and get into the deep [151v] snow up to the belly, where being unable to make headway he is struck by the blows until dead (Ibid: 6).

To take these beasts then, you will see them in groups of ten or twelve, armed and provided with long staves like spear or halberds, lances or pikestaffs, some being twelve, other of fifteen feet [in] length, armed at the end not with iron or other metal but with some fine bone of stags, wild boars (sic), wild asses (sic) and reindeer (sic)… (Ibid: 90).

Figure 4.8: Hunting Scene (Thévet AD 1557)

The Jesuits recorded that the Huron hunted bear and deer with bow and arrow as well as with traps (Thwaites 1896-1901, Volume 26: 313; Volume 30; 53). Champlain also described the use of traps as well as deer drives (Biggar 1929: 60-61, 85). Gabriel Sagard, who lived among the Huron in AD 1623-1624, records that rabbits were caught in snares (Wrong 1939: 223); cranes and geese were also snared or hunted with bow and arrow (Ibid: 98, 220-221). He describes spear points as being used, "...like a sword to jab and pierce their prey at close quarters (Ibid: 428)[36]."

The Jesuits noted that the Montagnais preferred to hunt deer and moose when there was a heavy covering of snow which made it easier for them to chase down on snowshoes and dispatch with spears; when the snows were lighter they were hunted with bows and arrows (Thwaites 1896-1901, Volume 6: 293). The carcass was then skinned and bones removed, the meat cut into strips and dried and smoked over a fire and then arranged in packages and transported back to their villages for future use (Ibid: 295). Nicolas Denys, who lived among Aboriginal groups in Acadia between AD 1632 and 1670, also describes lances or spears used to hunt moose and deer in the deep snows of winter (Denys 1908: 409, 42). When taken in the Spring, beaver were captured using a baited trap; in Winter using nets placed under the ice or by breaking into their lodges and killing the beaver, fleeing under the ice, with a large club "…armed on one side with an iron blade made like a Carpenters chisel, and on the other with a Whale's bone, I believe (Ibid: 67)."[37] The bone was used to sound the ice to see if it is

36 Champlain also makes reference to the Huron using long spears tipped with 'swords' both for hunting and warfare ( ).

37 The qualifying words "I believe" suggests that the writer may not have been sure that the

hollow and the blade to cut a breathing hole to which to lure the beaver. Porcupines were taken in traps or coursed with dogs; bears, taken in traps in the Spring and in Winter, killed in their dens; hares, martens and squirrels were caught in nets or hunted with bows and arrows as were birds (Ibid: 68).

Wintemberg asserts that most of the points were, "of bone and antler, some of which may have been used in warfare; human bones pierced with such points have been discovered in New York (Skinner 1:149), Ohio (Willoughby 1:131 and 2:51) and Kentucky (Moore 10:468, 478-479) (1936: 59)." In summary, Aboriginal groups would have used a variety of implements to hunt and trap game: bows and arrows, spears, traps, nets, snares and deadfalls (Engelbrecht 2003: 10-15), many of these made from antler and bone. Although the focus of the discussion that follows is on implements used for hunting and fishing, it goes without saying that some of the projectile points may also have been used as tips for weapons used against foes. However, in my review of ethnographic sources I have not found any references to bone or antler tipped weapons of war. As Milner suggests, "Weapons were mostly the same as, or virtually indistinguishable from, everyday tools. In the Eastern Woodlands, people were maimed and killed with the same arrows, celts, and knives used when hunting, working wood, and performing other essential domestic tasks (1999: 109-110)."[38]

Champlain, Sagard and other Jesuits missionaries living among the Huron record the use of fishing implements such as nets and the use of nets in conjunction with

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bone was actually whale bone.

38 Skeletal remains from the UxBridge ossuary, Ontario, have been pierced by a bone point (R. Williamson personal communication).

canoes and weirs as well as the use of lines and nets placed under the ice in winter (Thwaites 1896-1901, Volume 23: 95; Volume 19: 73; Biggar 1929: 56-57, 167-168; Wrong 1939: 98). Most fish were generally caught with large seine nets or gill nets which was the preferred method for the important whitefish fishery (Rostlund 1952: 29). Some species such as eels were caught in eel traps, basket traps and weirs, or at night with the aid of torches and spears (usually leisters); trout, pike and salmon were also often speared (Rostlund 1952: 37; Wrong 1929: 105, 311).

Charles Cleland, with reference to the prehistoric inland fishery of the northern Great lakes (Lakes Superior, Michigan and Huron), suggests an evolution of fishing technology from Archaic to Late Woodland Periods (1982). He postulates that fishing technology first developed from an adaptation of hunting techniques: various forms of spears being the primary implements, followed by seine nets used for shallow inshore fishing and finally, gill nets employed for deep offshore fishing (Ibid: 777-778).

> The change follows or coincides with the discovery and use of offshore species in the late Woodland Period. It also implies a redesign of nets towards their specialized use in deep water to take larger species. It should be emphasized that the development of the technology employed in the proto-historic fishery represented a combination of all types of fishing gear developed earlier (Ibid: 777-778).

> Increased efficiency of technology over time does not necessarily imply the simple replacement of less efficient implements by more efficient ones. For the case in point, the accommodation of new implements into pre-existing technological complex produces a technology that becomes more efficient as it becomes more diversified. It is probable that replacement is a function of the total energy expenditure, rather than the comparative efficiency of particular implements (Ibid: 781).

It is assumed that the same pattern of technological evolution occurred in the lower Great Lakes and that a variety of methods were used to obtain fish, depending on the species and the time of year: barbed spears, detachable harpoons, fish hooks and lines, weirs, dip, seine and gill nets.

Our understanding of why bone and antler were selected for the manufacture and use as projectiles and other hunting and fishing tools has been greatly informed by the large body of experimental work undertaken by archaeologists interested in stone, bone and antler technology. This work allows for a number of general statements concerning the relative utility of stone versus bone and antler as the raw material for point manufacture (Knecht 1997). These factors would have influenced the choices made by Iroquoian tool makers and are important to keep these in mind in the discussion of organic projectile point types.

- Lithic raw materials may have been less readily available than organic media;
- Lithic points take less time to produce than bone or antler points, but if the latter are produced in series the time difference is somewhat reduced;
- Stone points are more lethal but organic points are more durable and possible to repair.

Thus, in terms of conditions of manufacture and lethal effectiveness, stone is the better raw material yet, in terms of durability and maintenance, organic materials are preferable (Ibid: 206). The morphology of organic projectile points is more restricted by material properties than lithic point forms, while the net result in reworking damaged bone and antler points is a simply decrease in length and sometimes, a change in relative proportions (Ibid: 200, 205). The choice of antler versus bone as a raw material for projectile points appears to be influenced by the following factors:

- Antler is less likely than bone to be needed for non-technological purposes;
- Antler points are more easily worked, more fracture resistant and, if damaged, more easily reworked than bone (Ibid: 206).

Breakage and damage was caused by contact with bone yet the ability of antler to penetrate even large bones while sustaining little or no damage was remarkable (Ibid: 197). Bone points are more often broken beyond repair than antler points which, therefore, have a longer use life; furthermore, the location of breakage on antler points is more often on the tip than the shaft as is the case for bone points and therefore, antler points can be more easily repaired by re-sharpening the tip without having to remove it from the haft (Ibid: 203). As Raymond LeBlanc points out, in the context of many Arctic and sub-arctic archaeological assemblages, “In many regions where organic materials were available for tool production, lithic tools played a minor or subsidiary role in technological systems (Ibid: 531).” I believe this to be the case for the five sites studied here. While not as numerous as in south-central Ontario, chert sources that could have been exploited by Aboriginal people are located within both the Ottawa and Rideau river drainage systems (Fox 2009: Figure 1, 356,359) although it should be noted these are located outside the territory of the St. Lawrence Iroquoians. The St. Lawrence Iroquoian peoples of eastern Ontario appear to have preferred making their projectile points of organic materials such as bone and antler while the ancestral Wendat, Neutral and Iroquois favoured lithic rather than organic raw materials.

Based on a review of specimens from a number of Iroquoian sites across Ontario, Junker-Andersen distinguishes the following bone projectile point types plus one antler point type:

- stemmed (3 different sub-types);
- side-notched;
- bilaterally barbed;
- stemmed and notched open socketed;
- socketed barbless;
- socketed triple barbed;
- socketed double barbed;
- single barbed;
- triangular and leaf shaped;
- socketed antler point (1981: 33-34).

For convenience, these ‘types’ are re-grouped into three major forms:

- Conical bone points, made from the long bones of small to medium and large sized mammals or large birds, conical in shape, with a sharp bevelled tips and hollow shafts and bases;
- Conical antler points, made from the tips of antler tines, are similar in shape, but have a hollowed out base;
- Simple bone points, flatter in cross section, variable in shape, but recognizable by their distinct barbs, stems and notches (Ibid: 34-35).

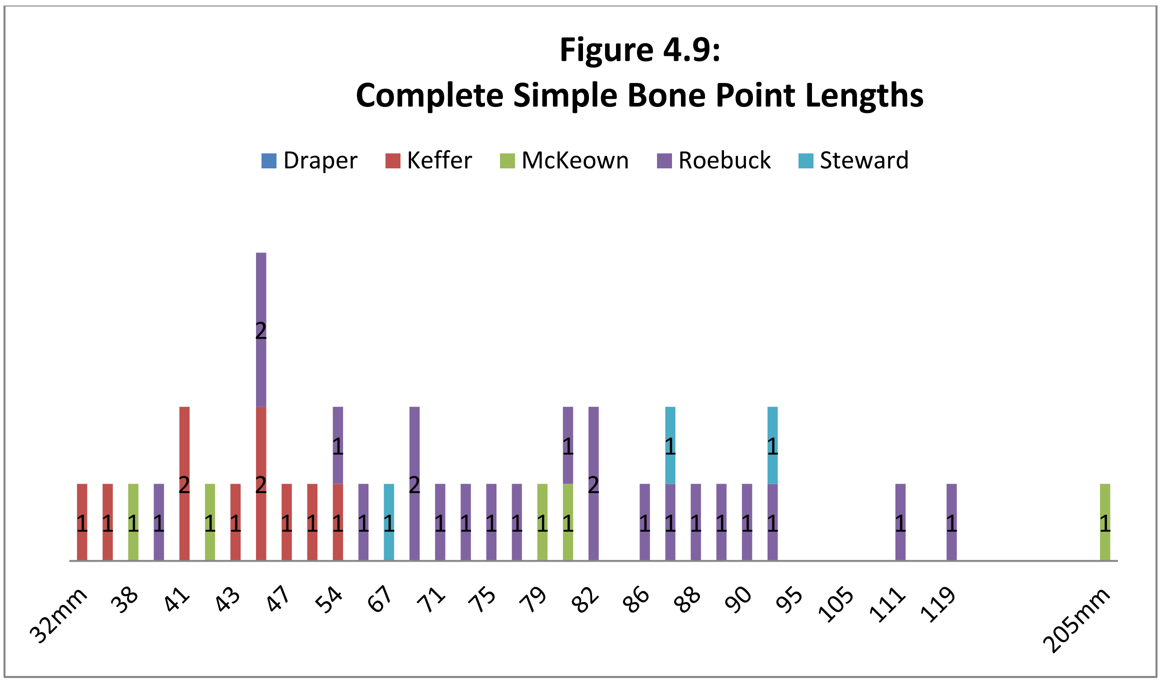
Simple Bone Points

These kinds of points are found on many Iroquoian sites and vary greatly in overall characteristics – size, presence or absence of stems, tangs, channels and notches. They have been identified as projectile points because most resemble many different varieties of lithic points. Most also display some design feature to enable hafting. Some would have been hafted to arrow and spear shafts, others to fish leisters. Some specimens are superficially very similar in shape to bone awls but are distinguishable in being smaller in size and showing no traces of the localized polish or re-sharpening which typify many awls. It should also be noted that at least some of these specimens could have been used as central prongs for fish spears.

Most of the bone points are derived from mammal long bones although at Keffer a few derive from avian species (Mattila 1989). Forty complete or nearly complete specimens were examined in detail. Most are symmetrical in overall shape and have thick, acutely angled or sharply pointed and flaring tips. Base shapes varied considerably however most were slightly rounded (35.2%), flat (17.6%) or pointed (14.7%) with dorsal and ventral surfaces tapering to a thin wedge in order to facilitate hafting. Three specimens were basally-notched and four were side-notched. After being preformed using an indeterminate splintering technique (82.5%), they were then shaped by a combination of grinding (60%) and scraping (20%) and some then finished with polishing (27%). Four specimens were heat altered and polished on their tips. One specimen from McKeown was ground, heat altered and polished.

Their lengths varied considerably, between 32 mm and 205 mm, with an average length of 70.5 mm; all are between 5 mm and 13 mm in width at their bases, the average base width being 7 mm. The six complete points from McKeown were an average of 87 mm in length, and 5 mm in base width, although one exceptionally long specimen skews this average. This specimen, which measures 205 mm in length or roughly eight inches long, is close to the same length as the bone spear points used to hunt large game which are described by André Thévet as "… armed at the end with some bone of a stag or other beast a foot long or more…(1986: 90)." The sixteen complete points from Roebuck range in length from 39 to 135 mm and are an average length of 79.9 mm, with an average base width of 7.7 mm; and the four complete points from Steward are an average of 81 mm in length and 6 in base width. By way of comparison, the eleven complete Keffer points were shorter, ranging in length from 32 mm to 54 mm, with an average length of 45 mm and an average base width of 6 mm. The nine complete points from Draper were an average of 46.1 mm in length and an average of 9.7 mm in width (McCullough 1978a). Lengths of simple bone points are plotted in Figure 4:9.

I have followed Junker-Andersen's terminology in labelling these artifacts as 'simple bone points' that is, points that are, "flatter in cross section, variable in shape, but recognizable by their distinct barbs, stems and notches (Ibid: 35)." However, I have added to this type larger lance-like points that would have been hafted onto spears as described above by Thévet. These too are by definition 'simple'. Thus, within this category I have included two sub-types: short bone points that resemble their lithic counterparts and which would probably have been used as arrow heads to hunt small animals and birds (like those defined by Junker-Andersen) and much larger lance-like points that would have been hafted onto spears and used for hunting larger mammals. This category of artifact deserves much further study in order to refine the list of defining characteristics.



Typically, simple bone points can have the following shared characteristics:

- Symmetrical in overall shape;
- Have variable base shapes, including channelled, pointed, side-notched, corner-notched, etc..;
- Variable lengths and base widths.

Conical Bone Points

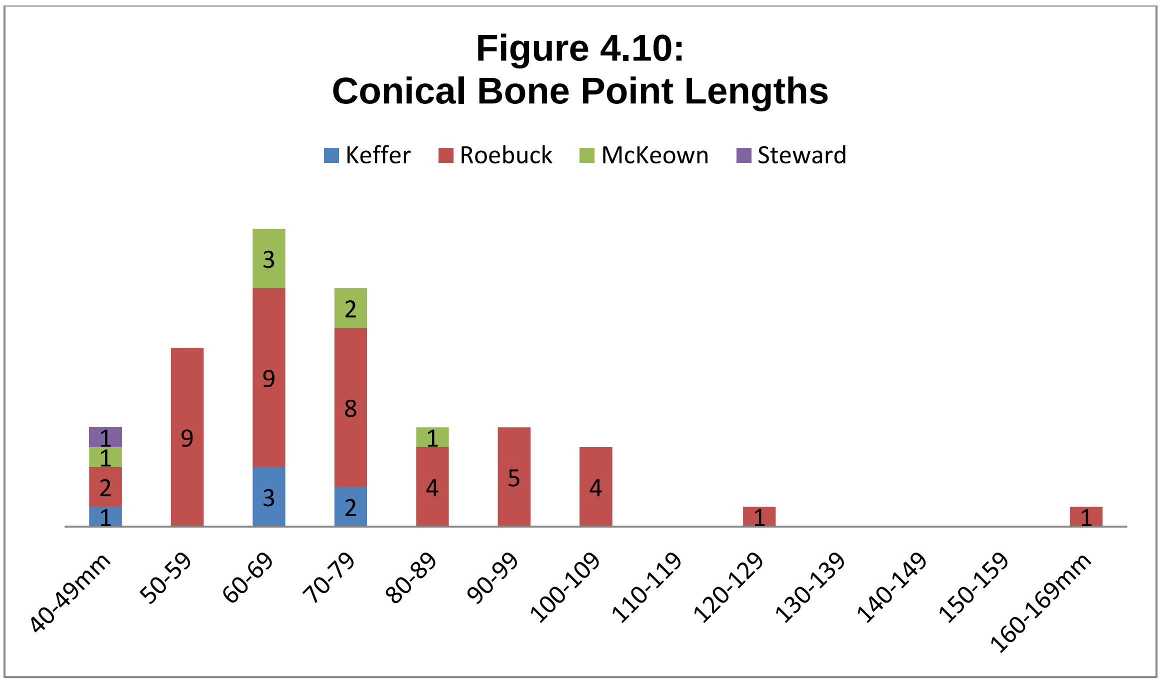
As Wintemberg notes, examples of conical bone points have been found on St. Lawrence Iroquoian sites in Ontario and Québèc as well as in Jefferson Co, New York; on ancestral Wendat sites in Victoria County, and on Neutral sites in Waterloo and Elgin Counties, Ontario (1936: 25, 26). Wright suggests that they appear be characteristic of the early portion of the Southern and Northern division Huron sequence (1966: 72). They represent the most common variety of bone point on all five sites under examination here. Their distinguishing characteristics are their conical shape and hollow shaft and base.

Fifty-six conical bone points were examined in detail. Most are derived from mammal long bones, although sometimes large avian long bones have been used. For example, of the Roebuck specimens Wintemberg labelled as 'hollow' bone points, he identified the majority as being made from mammal bones, including a deer mandible, and five from avian long bones (1936: 24-25). Similarly, most of those from McKeown and Keffer were identified as mammal (Stewart 1988, Mattila 1989.) as were most from Draper (Burns 1979). Using zooarchaeological mass spectrometry, recent biomolecular analysis of conical bone points from the St. Lawrence Iroquoian Droulers site indicates that at least some of these points were derived from black bear (Gates St-Pierre and Collins 2015).

Most are symmetrical or roughly symmetrical in overall shape and natural in cross section. All conical points are made from hollow segments of long bone shaft, not on long bone splinters. The manufacturing techniques employed to make conical bone points are very similar to those used to make simple bone points, with grinding and polishing being employed to shape and smooth the exterior surface. Long bone shafts were cut transversely, exposing the marrow cavity and ground to a point at one end creating a thick, sharp tip. Most (80%) tip shapes have angles of 30 degrees or more. The base was made by a circumferential groove and snap with the ragged edge subsequently ground smooth. The resulting more or less flat hollow base provides a socket into which the wooden shaft of the projectile can then be inserted. Conical bone points in general have flat bases but some also have concave bases.

Of the twenty-nine complete or near complete specimens found at Roebuck, six have concave bases with two barbs and two have concave bases with three barbs (Wintemberg 1936: 25). I identified forty-five near complete specimens of which nine had concave bases, two with three barbs. Of the seven complete specimens from McKeown, two have a concave bases, one with three barbs. One complete concave-based specimen at Steward also had three barbs at its base (Junker-Andersen 1980: 14). By contrast, none of the conical bone points from the Draper or Keffer sites have concave bases. As Gates St-Pierre notes, the concave-based variety do occur in limited quantities on other ancestral Wendat sites in Ontario such as the, Kirche, Hardrock, Payne and Lite (2014, 2015: 42). These types of points are also found of St. Lawrence Iroquoian sites in Jefferson County, New York State (Abel 2001: 266; Gates St-Pierre 2015: 42; Skinner 1921: 128, Plate XXIII).

McCullough, in her examination of conical points from the Draper site, notes two distinct sizes of point; one group with an average length of 45.3 mm and average width of 7.3 mm, and a second group with an average length of 80 mm and an average width of 10 mm (1978a: 2). The length of complete specimens from Keffer, McKeown and Roebuck ranges from 45 mm to 160 mm; base widths range from 7 to 18 mm; with an average length of 73 mm and an average base width of 11 mm. As is the case with the conical points from Draper, complete specimens exhibit a range of lengths; however, they do not exhibit a bimodal distribution. The distribution of conical bone point lengths is presented in Figure 4.10. Most are between 50 mm and 80 mm in length. One exceptional specimen from Roebuck is 160 mm in length. These attributes - greater length and concave base shape, may be expressions of a distinctive St. Lawrence Iroquoian style.



Typically conical bone points have the following defining characteristics:

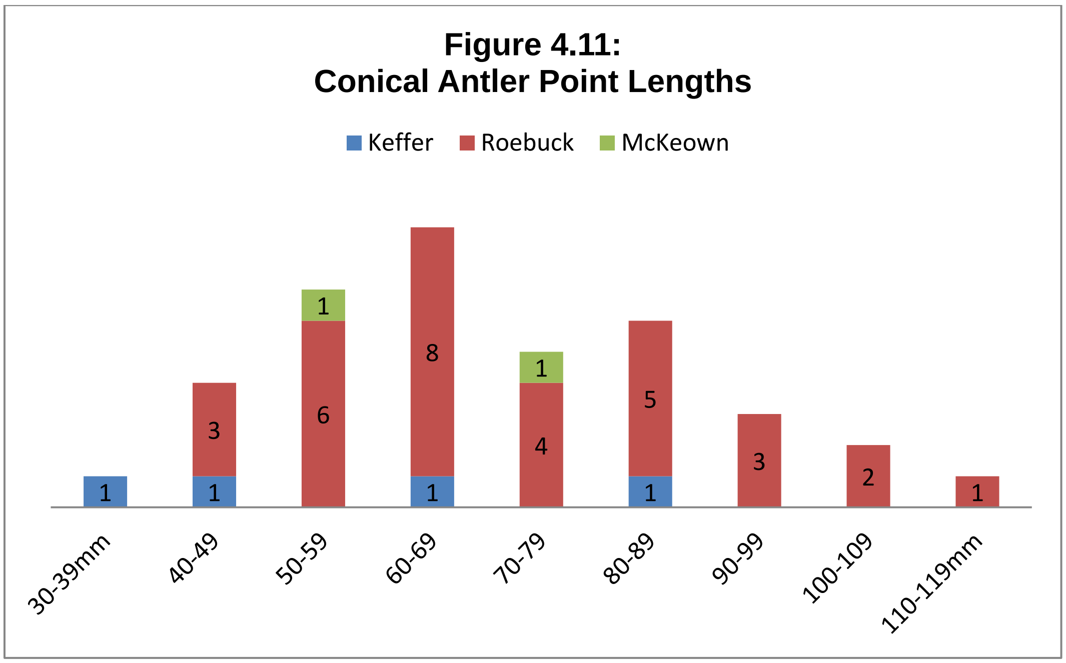
- Hollow shafts and bases,

- Some bases are flat, some concave with tangs;
- Symmetrical overall shapes;
- Natural cross section shapes;
- Thick and sharp tips;
- Variable lengths, ranging from about 45 mm to over 160 mm;
- Base widths range from 7 to 18 mm, with an average width of 9.5mm.

Conical Antler Points

Like bone points, the distinguishing characteristics of this artifact type are their conical shape and hollowed out bases. However, unlike conical bone points which they closely resemble, conical antler points do not have hollow shafts. Thirty-eight specimens were examined in detail. The tips of points were shaped by grinding or whittling the naturally tapering tip of an antler tine to a sharper point. In three cases the points are slightly bent along the shaft towards the tip; 55.3% of tip shapes have angles of 20 degrees or greater; 44.7% have angles 10 degrees or less.

One complete conical antler point from McKeown is 91 mm in length and 13 mm at its base. The four complete specimens from Keffer range in length from 34 mm to 83 mm, with an average length of 55 mm; thirty complete specimens from Roebuck range in length from 46 mm to 111 mm, with an average length of 73 mm. The average length for all three sites is 71 mm. Like their bone counterparts, most are between 50 mm and 79 mm in length. Base widths from all three sites are more consistent, ranging from 7 mm to 15 mm, with an average base width of 12 mm. Both conical bone and antler point types have comparable base widths. As Guthrie demonstrates by experiment, osseous points with diameters under 10 mm to 11 mm penetrate game more effectively than thicker points (1983: 294). The distribution of conical antler point lengths is presented in Figure 4:11. It is worth noting that similar to some conical bone points, some conical antler points have concave bases. Base shapes of conical antler points from Roebuck and McKeown are approximately 50% concave and 50% flat.



All complete specimens from Keffer have flat bases. Only one specimen from Draper has a concave base. Similar conical, concave based antler points have also been found in Jefferson County, NY, (Beauchamp 1978, Plate 32). Fifteen conical antler points, two complete, thirteen fragmentary, all with flat bases, were found at the St. Lawrence Iroquoian Salem site, Glengarry County, Ontario

(Pendergast 1966: 32).[39] Typically, conical antler points have the following defining characteristics:

- Most are symmetrical overall shape;
- Most are grooved and snapped, then scraped or ground;
- All bases are hollow, some are concave in shape, some flat;
- Most are natural in cross section but some have been modified to oval, circular square, biconvex and dorsally and ventrally flattened shapes;
- The majority of tips are thick and short in shape, although a five examples have slightly flaring tips;
- The average length is 71 mm; average base width is 12 mm.

Barbs/Prongs

As previously mentioned, several early European commentators record the use of fish hooks, spears and nets to catch fish (Thwaites 1896-1901, Volume 54: 149; Wrong1939: 2, 588; Biggar 1922-36, III: 389). Both Sagard and Champlain refer to the use of composite fish hooks among the Huron. These hooks consisted of a wooden shank to which a bone barb was attached by means of a piece of cord and would have been used for angling. According to Sagard, these were often found in the stomachs of large fish, such as the lake sturgeon (Wrong 1939: 189).[40]

Rostlund divides North American Aboriginal fish hooks into three different categories: gorges which are single bi-pointed slivers of bone or other material,

39 Wintemberg notes that antler points in general are rare on Neutral sites (1939: 17).
40 Rostlund suggests sturgeon were caught using spears or nets exclusively, stating that there are no known references to the Aboriginal use of hooks to catch sturgeon (1952: 11).

attached at their middle to a line; composite fish hooks which are composed of a bone barb lashed to a piece of wood and carved fish hooks which are made from a single piece of bone (1952: 113, 119). Of these three varieties, the first two are equivalent to the shorter prong/barb type described here. The carved fish hook type will be discussed later in this chapter.

Another artifact known from the historic record is the fish leister or trident (Thwaites 1896-1901, Volume 6: 311; Rau 1885: 150). This object consisted of a wooden spear tipped with a single long centre prong and two smaller backward-pointing prongs with which to pierce and hold fish. These prongs were often made of bone. Brennan (1975), describes the leister as, "...on the design of the familiar trident of Neptune, used to gaff fish from a boat or shore. Two, usually three, tines ... are set into a base at the end of the shaft with two tines, the outside pair..., being barbed... (170)." Rowland Orr, who provides an illustration of a fishing spear which is reproduced in Figure 4.12, suggests they were used mainly for fishing eels (1917: 30).

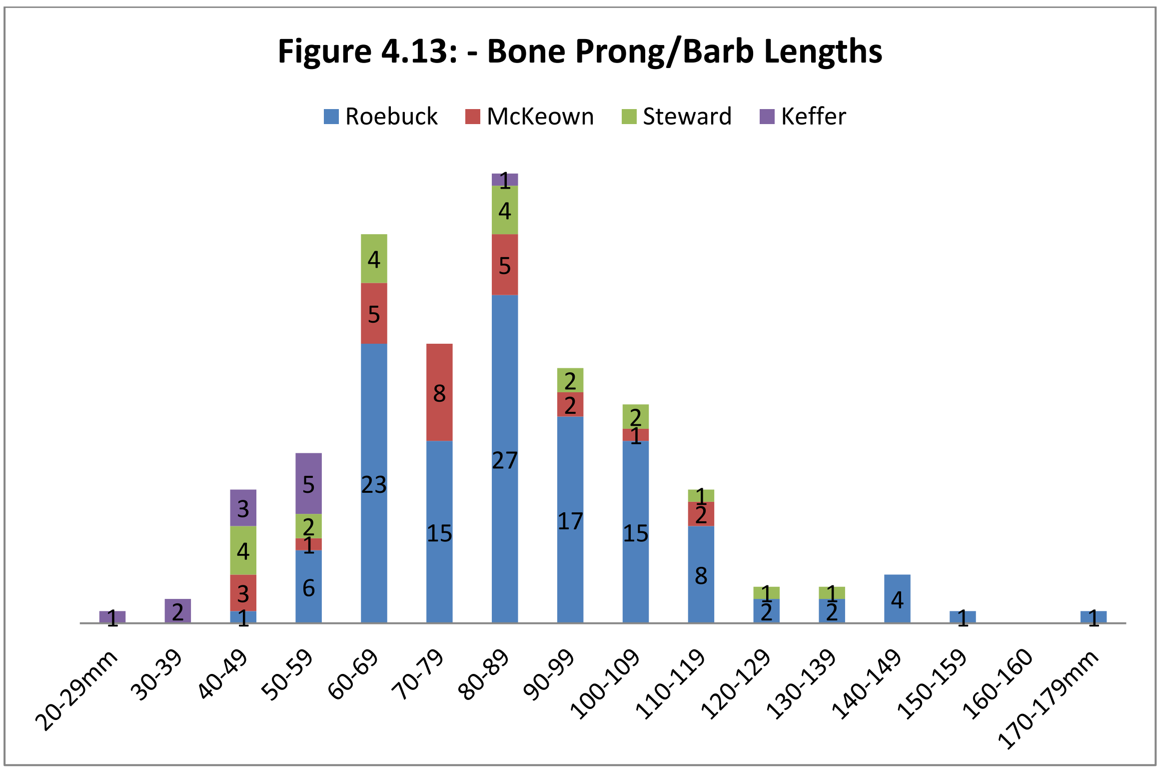
As Junker-Andersen notes, it is very difficult to develop criteria to distinguish these artifacts from those of similar shape, although he observes that they are fairly short (no specific measurements are provided) and that they often display polish around the base, possibly as a result of hafting (1981: 27-28).

Figure 4.12: - A Fishing Spear (Orr 1917: 30)

Similar short, bi-pointed items have also been identified as ‘bait-holders’ or ‘gorges’ which would have had a line attached to the middle of their shafts (Orr 1917: 25, 26; Rostlund 1952: 113,119). Many objects that I have identified as prongs may also have been labelled awls by other researchers. Although they resemble splinter awls and have sharp, long tapering points, they do not exhibit use wear in the form of polish that is characteristic of awls. They are also much less finely finished.

One hundred and eighty-six complete specimens from the Roebuck, McKeown, Steward and Keffer sites were examined in detail. Complete specimens appear to have gone through a variety of stages of manufacture including scraping, grinding and polishing, or combinations thereof: 85.5% first splintered, then 48.6% ground overall, 30.4% on tip only, 8.7% are polished overall. In terms of overall shape, 60.9% asymmetrical, 33.3% symmetrical. Like awls, the tips of the majority of prongs tend to be long and tapering with angles of 10 degrees or less. Although they are mostly symmetrical, 27.5% are concave and asymmetrical in shape. Base shapes vary but most are unmodified and irregular, 23.9% have been worked to a point, but a few specimens have also been worked to produce a flattened, rounded, laterally notched base. The majority are natural in cross section. Their lengths vary considerably, ranging from 27 mm to 179 mm, with an average length of 75 mm. Similar specimens from the St. Lawrence Iroquoian, McIvor site, range in length from 38 mm to 73 mm (Chapdelaine 1988: 294). The distribution of lengths appears to be bimodal.

Some of the smaller specimens may have been barbs from component fish hooks, as described by Sagard. These are short irregular slivers of bone which have been worked into a sharp asymmetric point. Others may have been leister prongs, long needle-like bone slivers which have been worked to long tapered points. Most of the first category have sharp, but asymmetric tips, while the tips of the second category are long and needle-like. Because the tip shapes are so variable, the major distinguishing characteristic may be size: fish hook barbs being less than 70 mm long, prongs are 70 mm or greater in length. In any case, broken leister prongs could have been easily re-cycled as fish hook barbs or bait-holders. The distribution of lengths for bone prongs/barbs is presented in Figure 4.13.



Typically, bone prongs demonstrate the following defining characteristics:

- They are both asymmetrical and symmetrical in overall shape;

- Have sharp, long tapering tips, angled at 10 degrees of less;
- Are variable in cross section and base shape;
- Less finely finished than bone awls or projectile points;
- Variable in length, with an average length of 75 mm.

Barbed Antler and Bone Points

Archaeologists have interpreted barbed antler and bone points as representing components of fish spears. Rostlund divides fish spears into three classes; simple fish spears, leisters and harpoons (1952; 105). The latter two classes are found widely across the Northeast but less frequently south of the Great Lakes (Ibid: Map 35, 293). As he points out a simple spear consisting of a long shaft with a fire hardened and bearded tip, can pierce and kill a fish but is less effective in retrieving it than the leister with its flexible side prongs and the harpoon with its detachable but retrievable head (Ibid: 105).

As mentioned, we know from early European accounts that leisters were used in the eel fishing of Iroquoian groups (Thwaites 1896-1901, Volume 6: 311).[41] These spears were driven downwards to strike the eel, the two side prongs parting and then closing to secure the fish which is simultaneously impaled on the central prong. Another variety of projectile point that is recorded by early observers was detachable, secured to the canoe with a long cord in the traditional manner of the true "harpoon" (Charlevoix 1763, quoted by Rau 1884:87). In 1709, Antoine Denis Raudot, an

41 Junker-Andersen suggests that this type of spear was only used for eel fishing (1981:34).

administrator in New France, describes what is clearly a detachable harpoon used by Aboriginal groups in 'northern regions':

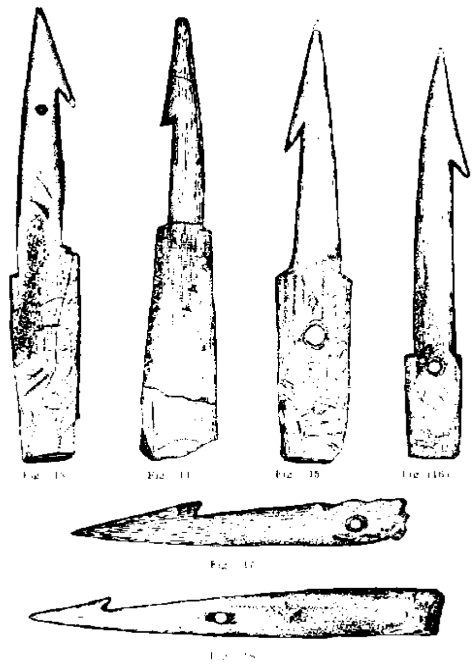
> They use a pole eighteen to twenty feet long, at the end of which there is a dart made of a flat and sharply pointed bone with teeth to the top. This dart is pierced and attached with a small cord to the pole in which it fits. When a savage spears a fish in eight to ten fathoms of water this dart leaves the pole and remains attached by the teeth to the body of the fish, which he then draws to him (Kinietz 1965: 370).

These kinds of detachable barbed points were mainly used in catching large fish such as sturgeon and lake trout.

At the Seneca Adams site (circa AD 1570) a bilaterally barbed bone 'harpoon' was recovered from an adult female interment and a unilaterally barbed 'harpoon' from an aged adult male interment (Wray et al 1987: 43) and at the Early Contact Period Seneca Tram site, a bilaterally barbed 'harpoon' was interred with an adolescent male, none were interred with young or middle aged adult males (Wray et al 1991: 57). Thus, evidence suggests that they would have been an important item in the tool kit of both men and women.

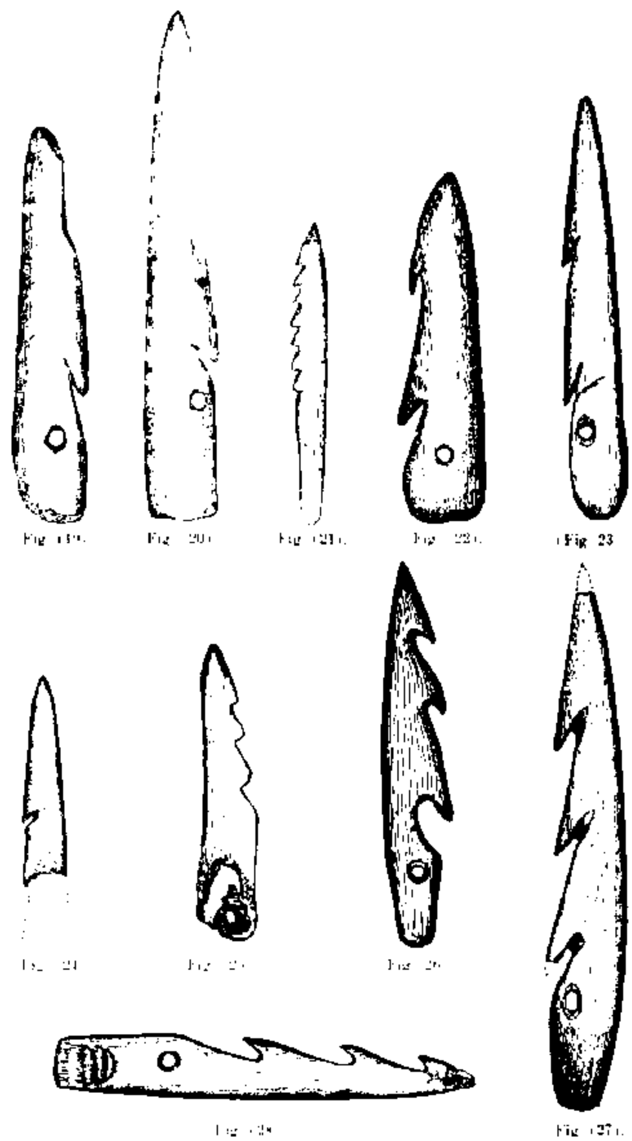
In his article, *Bone and Horn Harpoon Heads of the Ontario Indians,* Wintemberg distinguishes three types of 'harpoon': unilaterally barbed (with both single and multiple barbs), bilaterally barbed and toggle-heads (1905: 33-56). The single barbed varieties he illustrates are almost exclusively made from antler. They are reproduced here in Figure 4.14. They are large and square-shouldered, some with holes drilled near the base or along the shaft (Ibid: 41-42, Figures 8 to 18).

Figure 4.14: Unilaterally Barbed Harpoons (Wintemberg 1905: Figures 8-18)



Most illustrated in his article are from the Sealey Farm, Brant County where they are found in association with large quantities of European trade goods. Most of the multiple barbed variety illustrated in the article (Ibid: 44-46, Figures 19, 20, 22, 23, 25, 26, 27, 28, 29, 30) are also made of antler (only two are bone) and have holes drilled near the base or along the shaft, but they are smaller, more round-shouldered or rounded near their base than the single barbed variety. These come from a wider range of Ontario Counties – Brant, York, Simcoe, Victoria and Peterborough.

Figure 4.15: Unilaterally Barbed Harpoons (Wintemberg 1904: Figures 19, 20, 22, 23, 25, 26, 27, 28)



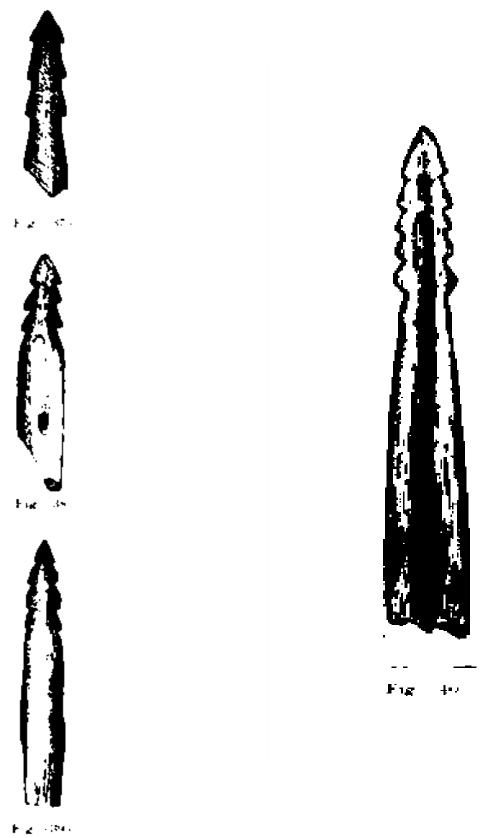
The second type which are bilaterally barbed come from a number of Ontario counties – York, Halton, Norfolk and Victoria and are the most common type across Iroquoia, (Ibid: 46-47, Figure 33-35, 37-40). They are smaller and more slender than the unilateral type; they do not have a hole for the attachment of a line and tend to be more often made from bone than from antler (Ibid: 48).[42] Wintemberg suggests that, “The eel spear described by Le Jeune was unlike anything figured in this article, unless some of our unilateral specimens were fastened together to a shaft… (Ibid: 38).” However, as will be discussed later, these particular specimens are more likely to represent the central prong of a leister or spear than a detachable harpoon head. These closely resemble conical antler projectile points described earlier except for the presence of the hole drilled in the shaft.

In terms of geographical distribution, Wintemberg notes that the unilaterally single barbed specimens are most frequently found in Brant and Wentworth Counties; bilaterally single and multi-barbed specimens are found more frequently to the east, in south central Ontario; toggle-heads are widely distributed (Ibid: 54). Wright suggests that the unilateral and bilateral barbed harpoon is a trait which appears to have gained in importance in both Northern and Southern division Huron sequences (1966: 77).

I have distinguished two main barbed point types: bilaterally barbed and unilaterally barbed, based on their overall shape.

42 Wintemberg also notes that most specimens are fragmentary with the basal portion missing (1905: 48).

Figure 4.16: Bilaterally Barbed Harpoons (Wintemberg 1904: Figures 37-40).



Unilaterally Barbed Points

This artifact category can represent either the unilaterally barbed side-prong of the fish-spear common to groups in the Northeast or, for those with line holes drilled in their shafts or bases, the detachable harpoons used to catch large fish like trout and sturgeon.

Of the four complete unilaterally barbed points from Roebuck, one is made from antler, the other three from bone.[43] The one complete specimen from Roebuck made from antler is 161 mm in length and 11 mm at its base; it has one barb. Another broken antler specimen has a hole drilled in its shaft for the attachment of a line. One complete specimen from Keffer, made of bone, is 220 mm long and 13 mm at its base with four barbs.

By way of comparison, the three complete specimens found at the Draper site are made from antler. They have single line holes near rounded bases and are 122 mm, 159 mm and 183mm in length respectively, 18 mm, 23 mm and 24.5 mm in base width; the first two four barbs and the last has two barbs although McCullough suggests it may not have been completed (McCullough 1978a: 6-7). Another complete specimen found at the Draper is bone and is 53 mm in length, 11 mm in width, with one barb and no line hole (Ibid: 4). The first three specimens closely resemble Wintemberg's Type 1, the detachable harpoons with rounded-shoulders and bases described as 'unilaterally multi-barbed' (Wintemberg 1905: 45-47). Like Wintemberg, Prevec and Noble note the preponderance of the unilaterally single-barbed antler harpoon type (both holed and un-holed) on later Historic Neutral sites like Walker, Hamilton and Thorold (1986: 47, 48). This large square-shouldered type of detachable harpoon, often found in conjunction with large quantities of European trade goods, was not found on any of the five sites under examination.[44]

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43 One is apparently derived from a sea mammal (Wintemberg 1936: 28).

44 Beauchamp suggests that unilaterally barbed harpoons were made by the Iroquois only after contact with Europeans, "…long after whites entered New York (1902: 328)."

By comparison, of the two complete specimens from the Petun, Sidey-Mackay site[45], one was made of deer bone, has four barbs, no hole at its base and is 179 mm in length; another was made of antler has one hole in the base, three barbs, and is 184 mm in length and 16 mm in width (Hamalainen 1999: 3). Both are unilaterally barbed. At the prehistoric Onondaga Barnes site the three complete unilaterally barbed bone harpoons were 164 mm (with two line holes in its base and two barbs), 180 mm (with three barbs) and 230 mm (with one barb) in length (Tuck 1971: 159). In summary, this general category of artifact can be divided into two distinct types: a short, usually single barbed variety that would have been hafted and which represents the side prong of a fish spear and, a much larger, single or multi-barbed variety with a line hole in its base or shaft which represents a detachable harpoon. Typically, unilaterally barbed points have the following defining characteristics:

Single barbed prongs are:

- Made of both bone and antler, but most often bone;
- Single barbed;
- Asymmetrical in overall shape;
- Tips vary but all are sharp: thick sharp, short sharp, flaring sharp;
- Base shapes vary;
- Majority are natural in cross section, flattened, concave convex;
- Majority are splintered, then formed by scraping and grinding;

45 Some researchers believe the Sidey-MacKay site may in fact be Ojibway (Ramsden, personal communication).

- Lengths vary.

Detachable harpoons are:

- Made of both bone and antler, but most often antler;
- Asymmetrical in overall shape, later versions are square shouldered;
- Tips vary but all are sharp: thick sharp, short sharp, flaring sharp;
- Base shapes vary, some rounded but later versions are square;
- Many larger specimens have line holes drilled in their base or on the shaft;
- Single barbed;
- Majority are natural in cross section, flattened, concave convex;
- Majority are splintered, then formed by scraping and grinding;
- Lengths vary but most exceed 100 mm.

Bilaterally Barbed Points

Bilaterally barbed points, Wintemberg's Type 2, probably represent the centre prong of spears, tridents or leisters used to catch fish. These would have been hafted onto a long wooden shaft and were not detachable. Seven complete specimens were examined in detail. The maximum lengths vary widely; they ranged from 84 mm to 178 mm, although most fell between a range of 84 and 123 mm. Bases ranged in width from 7 mm to 23 mm.[46] One complete specimen from Keffer is 103 mm and a base width of 13 mm. It has two barbs. The four complete specimens from Roebuck ranged in length from 84 mm to 178 mm, with an average length of 125 mm; and ranged in

46 A bilaterally barbed bone harpoon from the prehistoric Onondaga Barnes site measured 152 mm in length and has two barbs on one side and three on the other (Tuck 1971:159).

width from 7 to 23 mm, with an average width of 13 mm at their base. The number of barbs ranged from two to eight.[47] None had holes drilled in their bases. A single complete bone specimen from the McKeown site has eight barbs and is 123 mm in length with a rounded base which is 13 mm in width. Another unfinished preform is 226 mm long, 19 mm at its base and has the two barbs.

It is worth noting that a bilaterally-barbed object which I classified as a miscellaneous bone artifact, may be another variety of harpoon prong. This object (VIII-F- 11730) was found in the Roebuck site assemblage. Wintemberg simply describes it as a 'decorated bone tool' (1936: 158, Plate XIV, 28). It measures 121 mm in length, 11 mm in width at its midpoint and 7 mm in width at its base. It is symmetrical in overall shape and has twenty-four shallow notches along either of its lateral edges (twelve per side). These notches slant away from the tip and run from just above the base to about midway up the shaft. Its tip shape is thick and acutely angled; its base shape flattened. It is convex/concave in cross-section and appears to have been made by first splintering a mammal long bone, then scraping and grinding it smooth. Notches were then added to finish the object. A very similar object (AlGt-2:19676) which is fragmentary was found in the Draper site assemblage. Given the scarcity of these types of artifacts in the five assemblages examined here, it was difficult to develop a list of defining characteristics.

Typically, bilaterally barbed points have the following defining characteristics:

47 Wintemberg notes that one broken specimen, Plate 1, Fig. 22, had 3 barbs on one side and 4 on the other, while another broken specimen had 1 barb on one side and 8 on the other Plate 1, Fig. 23. This latter specimen may have been brought from the Atlantic coast (1936: 29).

- Made from both bone and antler;
- Are mostly symmetrical in overall shape;
- Tips vary but all are sharp: thick sharp, short sharp, flaring sharp;
- Base shapes vary, most are rounded;
- Barbs range in number from as few as two to eight or more;
- Majority are natural in cross section, flattened, concave convex;
- Majority splintered, then formed by scraping and grinding;
- Lengths vary, but on average are 123 mm, with bases 14 mm in width.

Carved Bone Fish Hooks

Another item in the fishing tool kits of Iroquoians was the carved bone fish hook. As Rostlund points out, excepting certain regional variation, the fish hook was not of great economic importance in the Aboriginal fishery (1952: 113).

> The baited hook is rarely taken by salmon and shad while ascending rivers, and almost never by lake herrings and whitefishes. Since these species were of great importance in the catch, both in quantity and quality, it is little wonder that fishhooks played a relatively small role in the fisheries (Ibid; 113-114).

Their use would have been confined to ‘voracious’ species of lesser economic importance such as trout, pikes, burbot and perhaps striped bass (Ibid: 114). Wintemberg observes that,

> These hooks might seem rather large for use in our inland waters, but they were certainly not too large when we consider the usual size of such fish as the garfish, pike, yellow pickerel, and common catfish, of which we found remains in refuse heaps (1936: 31).

He suggests that in style this type of hook closely resembles the traditional European metal fish hook most of us are familiar with and has been found on archaeological sites in Ontario and New York State (Ibid: 31). A single specimen is present in the St. Lawrence Iroquoian Dawson site collection (Pendergast and Trigger 1972: 259) and Pendergast describes a fish hook of this type found at the St. Lawrence Iroquoian Glenbrook site, located in Glengarry County, Ontario (1981). This complete specimen has a rectangular knob at the top of the shank for the attachment of a line and measures 78 mm in length and 23 mm wide at its base; the barb is about 50 mm long (1981: 24, Plate 8, Figure 18). Tuck describes two such specimens from the prehistoric Onondaga Barnes site, measuring 32 mm in length and 11 mm in width, and 35 mm in length and 13 in width (1971: 158). Fitzgerald also reports a fish hook of this type from the Historic Neutral Christiansen site; it is 41 mm in length and 12 mm in width, with a barbless hook 20 mm in length (1984: 207).

In his Roebuck site report, Wintemberg identifies four specimens as carved bone fish hooks, two of which are broken, and eighteen other pieces of modified long bone which he suggests are in the process of being made into barbed fish hooks (1936: 31-33, Plate I, Figures 31,32). I identified only twenty such specimens from Roebuck and only five of these were complete enough to be described in detail. All are manufactured from a section of mammal long bone, first indeterminately modified, probably by splintering, and then scraped and ground to their final shape. The one finished complete specimen (VIII-F-14010a) measures 78 mm in length and 8 mm in width. It has a characteristic ‘J’ shaped overall shape, with a long slender shank and a single long, very sharp, inward turned barb. The barb is 52 mm from base to tip. The proximal end is grooved for the attachment of the line.[48]

In the Draper site assemblage, I identified one incomplete fragmentary specimen. One complete specimen (catalogue number 652884a), not included in the Keffer assemblage provided to me was identified by Harri Mattila. This is 35.1 mm long and 8.2 mm wide; the barb is 13 mm long (Mattila 1989). No specimens of this type were found at McKeown or Steward site.

As Wintemberg suggests, the manufacture of this type of hook was difficult as shown by the number of unfinished and broken specimens (Ibid: 33); and it is difficult to estimate how many more may have been lost, broken and discarded in situ during the fishing activities. This could explain the rarity of this artifact type found on village sites. Given the amount of effort invested in their manufacture, it is assumed that this would have been a highly curated tool. Typically carved bone fish hooks have the following defining characteristics:

- They are ‘J’ shaped, with a single inward-turning barb;
- Usually the shank is longer than the barb;
- Barb is approximately on half to two thirds the length of the shank;
- The end of the shank is often grooved or perforated to accommodate a line;
- Lengths vary, between 35 and 78 mm; with an average width is 8 mm.

48 Wintemberg observes that another specimen from Roebuck differs from most other examples found on Iroquoian sites by having a hole for the attachment of the line (1936: 31).

Woodworking Implements

Wood and bark were among the most important raw materials employed by Iroquoian peoples. They were used for the construction of longhouses, palisades and other structures. They were also used for the manufacture of the most common household objects such as bowls, platters, spoons, baskets, etc… as well as larger objects such as snowshoes, paddles and canoes. Wood provided handles for hoes and other digging implements and shafts for arrows, spears and weapons such as clubs. The manufacture of these objects would have involved a number of stone and osseous tools as well as the use of fire.

As Waugh notes, the manufacture of wood into dishes, spoons, etc., was evidently a laborious process, especially before the arrival of European metal tools (1916: 65). The method employed to manufacture wooden implements appears to have been a combination of charring with live coals and then shaping by scraping with chisels of stone or teeth. Both Sagard (Wrong 1939: 227) and Hennepin describe the manufacture of wooden bowls using beaver incisors (1974: 103).

> When they would make platters or wooden spoons, or porringers, they drill their wood with their stone hatchets, and hollow it with fire, and do often scrape it, and polish it with beaver's tooth (Hennepin 1974: 527).

Rodent Incisor Chisels/Blades

As mentioned above, sources indicate that incisor teeth of large rodents were used for woodworking and they are widely distributed on Iroquoian sites across the Northeast. Recent use wear studies at the St. Lawrence Iroquoian Mailhot-Curran site confirm that indeed rodent incisors were used to work wood (Gates St-Pierre and

Collins 2015). Beaver incisors were used for this purpose in most instances but there are also cases of woodchuck, muskrat and porcupine (Gates St-Pierre 2010, Wintemberg 1936, Junker-Anderson 1980, Chapdelaine 1988).[49] It is not surprising that the hard and durable quality of large rodent teeth should be adapted to human needs. As mentioned previously, teeth (and ivory) are composed of three major components - enamel, dentin and cement. Enamel is extremely hard and resistant to wear. The three major components are uniquely made use of in the incisor teeth of many mammalian herbivores and rodents where the three tissues wear at different rates, the enamel slowest, thus producing a continually self-sharpening tip to the tooth (Currey 2002: 187-188). This feature makes these incisors perfectly adapted for use as blades for woodworking chisels and blades. As a raw material, rodent incisors would have been highly valued for their special qualities and it is predicted that woodworking tools would have been highly curated.

The size and shape of these artifacts make it probable that they were inserted in bone, antler or wooden handles for easier use. Parker (1922:119) illustrates a specimen found inserted in a bone handle.[50] Gates St-Pierre notes that they are sometimes left in situ, attached to the mandible which acts as a handle (2010: 73). As noted by Clermont and Chapdelaine in their analysis of modified incisors from the Morrison Island site, their presence is widespread on Archaic sites across the Northeast

49 Of the fifteen modified rodent incisors found at Steward, 13 were beaver and 2 porcupine (Junker-Andersen 1980: 8).
50 Rodent incisors hafted into the ends of bone tubes were also found in burials at the Archaic Period, Indian Knoll site, Ohio (Webb 1974; 296-297).

(1998: 28).[51] Of the one hundred and forty-six complete or nearly complete specimens examined, 99% are derived from mandibular incisors. These are divided into two major types; gouge-scrapers, also commonly called chisels (Kennedy 1967), and side scrapers, also commonly called knives (Ibid 1967). Side scrapers appear to be longer than gouge-scrapers, 53.16 mm +/- 7.52 versus 46.17 mm +/- 7.34 (Clermont and Chapdelaine 1998: 35). They also suggest that the gouge-scraper type was hafted in two ways: hafting of the radicular part in a handle in alignment with the axis of the tooth, and transversal hafting or use of the tooth in its natural socket (1998: 35).

Ninety-eight specimens were examined in detail. Most of those from Roebuck were derived from beaver but a few are derived from porcupine and woodchuck (Wintemberg 1936: 50, 52). Of those from McKeown site, 87% are beaver and 13% porcupine. Of those from the Steward site, thirteen (86.6%) are beaver and two (13.3%) are porcupine (Junker-Andersen 1980: 7-10). Of those from the Draper site, 96.2% are beaver incisors (82.7% of identifiable specimens are lower incisors) and 3.8% are woodchuck (McCullough 1978a: 16-20). This pattern, the use of predominantly longitudinally split mandibular beaver incisors, holds true for other Iroquoian sites.[52]

The distal end (crown) of most specimens is natural, although six specimens (6.9%) showed signs of having their tips modified to create a longer sharper point. Most

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51 Clermont and Chapdelaine identified 699 worked incisors from the site (1998: 28)!
52 At the McIvor, twenty-three of thirty-one beaver incisors were split longitudinally; at the Sidey-Mackay site fifty-seven out of seventy-one, were split longitudinally (Hamalainen 1999: 6).

root ends are also natural, although one specimen had an irregular shaped root and one is pointed. As mentioned above, it is assumed that these tools were hafted into handles for easier use. All showed some signs of a very minimal amount of modification which was the product of human action. This took the form of first splitting the tooth lengthwise in fifty cases (57.5%) and of grinding on the lateral surface of the tooth. In thirty-two examples (36.8%) the teeth are not split, only ground; while the five remaining specimens are modified in some indeterminate way. By way of comparison, at the St. Lawrence Iroquoian McIvor site Chapdelaine notes that twenty- three of the thirty-one beaver incisors (74%) were split lengthwise (1989: 207). Of those ground, 26.4% are ground only on the tip; 49.3% had some form of grinding laterally; 13.8% only right laterally and proximally; and 4.6% ground overall. It is assumed that the splitting and grinding, particularly the lateral grinding was meant to produce a long sharp cutting edge by exposing the dentin, just as it occurs on the tips of the incisors naturally.

Use wear in the form of polish along the lingual surface was observable in five instances, polish along the tips in six cases. Of the majority of specimens, 53.7% ranged in length between 31 mm and 50 mm. Those from McKeown ranged from 22 mm to 76 mm, with and average length of 41 mm, those from Roebuck ranged from 30 mm to 70 mm, with and average length of 50 mm; those from Steward ranged from 40 mm to 45 mm, with an average length of 43 mm, and those from Keffer ranged in length from 33 mm to 72 mm, with an average length 56 mm;. The overall average length of those examined in detail was 46 mm. Typically, rodent incisor blades/chisels have the following defining characteristics:

- They are mainly mandibular incisors of beavers;
- Many are split lengthwise and ground along their lateral edges;
- Distal/crown ends are mostly unmodified, although a few cases they have been ground to long sharp point;
- Proximal/root ends are rarely modified except by grinding;
- They range in length from 22 mm to 76 mm, with an average length of 46 mm.

Canine Chisels/Blades

Bear, wolf and dog canine teeth, modified in a number of different ways, were also probably used as blades for knives or chisels; hafted and used in a similar manner as beaver incisors. Wintemberg suggests that this artifact type is peculiar to the 'Eastern or Mohawk-Onondaga group of Iroquois' [St. Lawrence Iroquoian] none being found on Neutral, Erie or Seneca sites (1936: 51). On the other hand, he notes that they have also been found on 'early Huron' sites in Victoria County, Ontario and on sites in Vermont and in Jefferson County, New York State (Ibid: 52). Pendergast also identified bear canine chisels on the St. Lawrence Iroquoian Salem site, Glengarry Co., Ontario (1966: 34) and they have been identified on the sixteenth century St. Lawrence Iroquoian Mailhot-Curran site in the Saint-Anicet cluster, Québèc (Chapdelaine, personal communication). While Wright notes that worked bear canines are found throughout the Southern and Northern division Huron sequences (1966:72, 74), he also suggests that bear canine 'knives' are a distinguishing feature of St. Lawrence Iroquoians bone technology (2004: 1248).

At Roebuck, Wintemberg identifies twelve complete and two fragmentary canines that have been made into chisel blades (1936: 21, 51-52). All were derived from bear. On the other hand, I identify thirty-one bear canines from Roebuck that appear to have been modified as chisels. Of the thirty-one specimens from Roebuck, twenty-seven were complete. They range in length from 25 mm to 76 mm, with and average length of 50 mm. Most are split longitudinally and then ground. Use wear appears in the form of polish on root and crown ends.

Three specimens from the McKeown sites were complete; two were derived from bear, one derived from a wolf. The larger bear teeth are is 63mm and 69 mm in length and has been heavily ground on one lateral edge. The smaller wolf tooth is 29 mm long and has been split lengthwise and polished along its inner surface. Their average length is 54 mm. A single complete modified lower bear canine from Steward measures 52 mm in length. Two specimens from Keffer were identified as possibly dog canines and one was derived from a bear. They are 31 mm, 34 mm and 60 mm in length respectively. McCullough identified ten bear canine chisels in the Draper site assemblage (1978a: 32). Of these, some have been longitudinally split or transversely sawn and then, ground on the inner surface; one was sawn transversely through the root, two have transverse 'v' shaped notches through the root; most have wear in the form of polish on either distal or proximal ends or both (Ibid: 32-33). Typically, canine chisels have the following defining characteristics:

- Most are made from bear canines, although canines of other species are sometimes used;

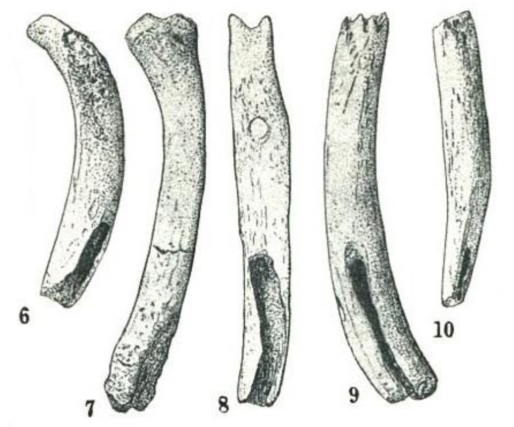
- Most are longitudinally or transversely split and then ground on their inner surface;
- Use wear often occurs in the form of polish on root and crown ends;
- They range in length from 25 mm to 76 mm, depending on the species, but have an average length of 51 mm.

Antler Handles

The effective use of the chisels and blades described above would have required hafting into handles made from wood, antler or bone. In fact, Wright suggests that antler handles are one of the distinguishing types found in St. Lawrence Iroquoian bone assemblages (2004: 1248). Eleven examples in the Roebuck assemblage were identified as possible antler handles. Two were examined in detail. One was first grooved and snapped then preformed in some indeterminate manner. Both then show evidence of being scraped on their distal ends and ground on their proximal ends. Finally, one has been finished by being drilled. These two specimens are 159 mm and 162 mm in length respectively, and 34 mm and 44 mm in width. Unfortunately, the assemblages examined yielded too few examples to produce a list of defining characteristics. Five examples of possible antler handles from the Roebuck site are reproduced in Figure 4:17.

In addition to household utensils, the longhouses themselves, perimeter palisades, drying racks, and other structures were made from wood. This wood would have derived from local trees and been cut down, trimmed to size and de-barked, activities that would have required their own special set of tools. A small number of antler and bone objects may have served this purpose.[53]

Figure 4.17: Antler Handles (Wintemberg 1936, Plate XIV).



Antler Wedges

Margaris argues that wedges must be stiff and strong in order to support heavy loads and transfer them ably through wood (2013: 680). Wintemberg suggests that these types of tools could have been used to split pieces of wood, to loosen bark from trees or as chisels and he notes that they have been found on sites in Jefferson County, New York, on Erie and Seneca sites in western New York, on Neutral sites in southwestern Ontario, and Huron sites in York and Victoria County (1936: 49).

Wintemberg identified seven modified antler tines from Roebuck as wedges or chisels, their only distinguishing characteristics being a wedge shaped tip (1936: 49). Use wear appears in the form of battering and pocking on either or both distal and

53 Guest (1856: 273, Figure 3) identifies a perforated object from Roebuck as being made of walrus ivory, Wintemberg suggests it is actually made of antler (1936: 21-22).

proximal ends of the antler tine (Wintemberg 1939: 27). I was only able to positively identify one example of this type from Roebuck and one from Keffer. The example from Roebuck is first grooved and snapped, then ground on distal/tip end and scraped on proximal/base end. It measures 97 mm in length; 19 mm in width at its base and 14 mm at mid point. The Keffer specimen is incomplete; the shaft is broken 40 mm from the tip which has been ground to a thick sharp point; where use wear is visible in the form of fracturing. Unfortunately, the assemblages examined yielded too few examples to produce a list of defining characteristics.

Bone Hammers

Two specimens, one from Keffer and one from Draper have been identified as bone hammers. Only the complete Keffer specimen was analysed in detail. It was first modified in some indeterminate way to create a preform and then ground. It has a natural distal and proximal ends that were unmodified. It measures 200 mm in length; 35 mm at its base and 21 mm at midpoint. Use wear is present in the form of pocking on the distal end and on the shaft. Again, the assemblages examined yielded too few examples to list defining characteristics.

Antler Adzes/Chisels

Antler adzes or chisels would have been used in wood working. Again, it is conjectured that live coals would have been applied to burn away specific sections of wood and then the wooden objects formed and shaped by using an adze or chisel to remove the unwanted charred wood.

The single complete example from Keffer is 173 mm in length and 23 mm at its base. It has first been modified in some indeterminate way and then ground and scraped on its base. Then, it appears to have been further ground and polished on both base and tip. It is asymmetrical in overall shape with a thick sharp tip. The base is grooved. Use wear in the form of polish appears on the tip and extends 58 mm down the shaft. A certain amount of fracturing is visible on the base and extends 11 mm down the shaft. The two examples from the Roebuck site are fragmentary. They display the similar manufacturing techniques and use wear, but both have single holes drilled in their bases, presumably for hafting. Again, the assemblages examined yielded too few examples to list defining characteristics.

Implements for Stone Working

Although ethno-historic accounts make no mention of stone working tools such as bone and antler hammers, flakers or punches, their presence in the archaeological record in conjunction with finely flaked stone tools and with detritus and cores of chert suggests that they were employed widely by Iroquoian peoples. Antler has long been recognized as an ideal material for working cherts due to its toughness and resilience. The large number of modified antler tines found on the five sites under study certainly suggests they were widely used as a raw material for tools requiring these properties. Less frequently bone has been employed for this purpose.

Bone and Antler Flakers

Modified antler tines have been identified by many researchers as flakers for stone working on most sites across Iroquoia and one would expect their frequency and distribution to correlate with both the frequency and sophistication of lithic technology on these sites.[54] Flakers are relatively easy to make. Based on their experimental replication of bone flakers Nami and Scheinsohn estimate that invested production times vary between three and fifteen minutes, depending on the piece, but always within this range (1997: 257). Objects identified as flakers include minimally worked antler tines and more finished, cylindrical specimens. In the former case, because modification is minimal, their identification as flakers is tentative.

Cylindrical flakers, also called 'drifts', are widespread across the Northeast and are presumed to be used for indirect percussion flaking stone versus the percussion flaking function of larger, less modified specimens. Prevec and Noble note the preponderance of cylindrical antler drifts on Historic Neutral sites like Cleveland, Fonger, Christianson, Walker, Hamilton and Thorold (1986: 47, 48). Wright suggests that this latter type occurs as early as the Middle Iroquoian Stage in Ontario and is particularly frequent on ancestral Neutral sites (1973: 86). Examples of these cylindrical flakers from the Middleport and Lawson sites are illustrated in Wright's, *Ontario Iroquois Tradition* (Ibid: 189, Plate XVI, Figure 9; 195: Plate XIX, Figure 8).

Two cylindrical pieces of antler from the Historic Neutral Hood site, identified as flakers or drifts, have been ground with rounded ends and parallel sides; the one complete specimen is 37 mm long and 11 mm in diameter (Lennox 1984: 103, Figure 50). At the Christiansen site, another Historic Neutral site, five cylindrical pieces of

54 Wintemberg suggests that the high frequency of flakers at the Neutral Lawson site accords with number of flaked stone tools (1939; 29).

antler have also been identified as flakers or drifts; however, as Fitzgerald notes this identification is largely by convention as, "there is no wear on the pieces to suggest this function (1982: 204). The complete specimen measures 95.8 mm in length with a diameter of 7 mm and resembles in dimension a similar object identified by Lennox at the Hood site as a flaker preform (1984: 103). By way of comparison, the antler flakers from the Neutral Lawson site measured between 1 5/8th inches (41 mm) and 3 ¾ inches (95 mm) in length (Wintemberg 1939: 29).

Twenty-two complete modified antler tines were examined in detail. Most tips are thick and acutely pointed, in some cases having been slightly ground to a sharper bevelled shape. Bases are mostly unmodified although in 24.9% of cases they are rounded. All are manufactured from antler tines which have been removed from their branches by snapping - 23.5% were grooved and snapped, 17.6% were simply snapped and 52.9% of cases the process was indeterminate; 64.7% were then ground or scraped, of these 17.6% were scraped on tips and 11.8% overall; 23.5% were ground on bases, 35.3% ground on tips.

All are natural in overall shape and in cross section. Use wear takes the form of polish and small fractures which occur on the tips of the specimens probably as a result of pressure contact with the stone artifacts they were used to make. This conforms to wear patterns identified by researchers conducting replicative experiments where the only use wear identified was pitting that can be either superficial or deeper depending on the length of use time (Campana 1980, 1989; Nami and Scheinsohn 1997). Polish from use wear was observed in 23.5% of cases; fracturing in 17.7% of cases.

Lengths varied considerably. Those from McKeown are 90, 94 and 96 mm in length, with an average length of 93 mm; those from Roebuck are between 73 mm and 180 mm in length, with an average length of 119 mm and the single specimen from Steward is 116 mm in length. The five complete flakers from Keffer ranged between 62 mm and 113 mm in length, with an average length of 83 mm. Of the sixteen specimens from Draper which McCullough identified as antler flakers, ten are complete. They range in length from 41 to 92 mm, with an average length of 70.4 mm (1978a: 22).

We face the same challenge when identifying certain modified bone objects as 'flakers' as for antler 'flakers'. Their modification is often minimal and the identification is tentative based on use wear. However, they appear to have certain characteristics in common with their antler counterparts. Seven specimens, one from Keffer and six from Roebuck, were examined in detail. First they appear to have been indeterminately modified; three show signs of being ground and two are ground and scraped (one overall and one on the tip only). They all have thick short sharp blunt tips. Bases are natural or unmodified. The bone flaker from Keffer was 139 mm in length, the bone flakers from Roebuck measured between 142 and 161 mm in length, with an average length of 150 mm. These are within the same length range as for antler flakers. Use wear was in the form of polish observed on 50% of the tips. McCullough identified two objects from Draper which she suggests were reworked awls, as bone flakers. These are 80.1 mm and 84.8 mm in length and are highly polished (1978a: 22-23). Typically, both antler and bone flakers demonstrate the following defining characteristics:

- Modification is minimal, in the case of antler detaching tines from branches, in the case of bone, some form of splintering;
- Shaping was by grinding and scraping distal and proximal ends;
- Smaller cylindrical forms, sometimes called drifts, were used for pressure flaking;
- Use wear occurs as pocking and polishing on tips and along shafts;
- Tips are blunt or rounded;
- Use wear in the form of small fractures on the tips;
- Lengths vary, with an average length around 85 mm.

Implements for Digging

As Waugh mentions, both hoeing and digging implements were employed by eastern woodland tribes (1916: 14). In the account of his second voyage to Stadacona, Cartier mentions the practice of “working the soil with short bits of wood about half a sword length (1993: 69). Gabriel Sagard also records that, "every year they [the Huron] sow their corn in the same fields and places, which they freshen or renew with their little wooden shovels, made like an ear in shape, with a handle at the end; the rest of the ground is not cultivated, but merely cleared of injurious weeds (Wrong 1939: 93-94).” Champlain also noted the use of spade-like instruments of hardwood (Biggar 1929: 65). The use of pick-axes of wood was recorded by Hennepin (1974: 527).

According to other sources, the historic Iroquois had previously used hoes made from hafted deer scapulas and tortoise shells. “They used formerly the shoulderblade of a deer, or a tortoise-shell, sharpened upon a stone, and fastened to a thick stick instead of an hoe; but now they have iron spades and hoes (Loskiel 1794: 67)."

> Hoes of a flat piece of antler have been frequently found on Iroquois territory, several of these in southwestern Ontario. Stone and flint implements suggesting use as hoes or spades have been found all over the alluvial lands on the Mississippi and its tributaries, as well as in the Iroquois country. The form most widely distributed is of oval or elliptical outline, with rounded or pointed ends, some being notched for attachment to a handle, which may have been fastened on either parallel with the longer axis, or at an angle to it.
>
> Shell was evidently not favoured by the Iroquois as a material for hoes, though it was so employed by surrounding nations. An Onondaga name for the latter implement is atcokdQ"saa'.
>
> A wooden digging-stick or spade, ehe'di'akta', is said to have been used as recently as sixty years ago. A model of this was constructed by an Onondaga informant.' A notch at one side afforded a place for the foot in digging. The implement was made of hardwood, such as white oak, ironwood, or hickory (Waugh 1916: 14-15, Plate I, fig. a).

Given the vast cornfields that surrounded many villages and the requirement to dig palisade and house wall trenches as well as storage and burial pits, clearly digging implements, some of them made from bone or antler, would have been an important part of the Iroquoian tool kit employed in daily life.

Antler Hoes/Picks

Antler hoes/picks, a very rudimentary digging tool, would have been manufactured by simply detaching tines from deer antlers and hafting these on to wooden shafts. They were probably employed in both agricultural activities and in the construction of palisade and longhouse trenches and of earthworks. Wright identifies this artifact type as a distinguishing feature of St. Lawrence Iroquoian bone technology (2004: 1248). In his Roebuck site report, Wintemberg describes thirteen artifacts, listed under the heading of ‘problematic’ objects, as possible hoes for turning the ground in preparation for planting but he also suggests they could have been used as mattocks for loosening clay or even for removing bark from trees (1936: 89).

The sixteen specimens examined in detail exhibited different degrees of modification. Each specimen has been manufactured on a large, thick branch of antler which has been ground or scraped to form a thick acute tip and a rounded base. In one case a hole has been drilled in the base to facilitate hafting. Of these, 76.9% were first indeterminately modified; 23.1% showed evidence of being grooved and snapped, 38.5% being ground. Most specimens have a characteristically thick short sharp or blunt, often unmodified, tips. Bases are most often rounded or pointed. Of those ground, three are ground on base, three are ground on the tip, two were ground overall. Five are drilled at the base or proximal end, four examples had one hole drilled and one has two holes. One is socketed, probably for easier hafting. They are natural in cross section. Use wear appears in the form of pocking and polish on the tips. This sort of damage would be expected in the course of digging in the soil.

Complete specimens range in length from 166 mm to 208 mm, and in thickness from 22 mm to 31 mm. Most were between 90 mm to 200 mm in length, with an average length of 169 mm and an average base width of 18 mm. Typically, antler hoes/picks demonstrate the following defining characteristics:

- They are made of antler tines and have little modification except for being grooved and snapped at their base and then ground;
- Some have holes drilled in their bases, probably to facilitate hafting;

- Most exhibit use wear in the form of polishing and pocking on their tips;
- They are an average of 169 mm in length and 18 mm at their base.

Objects for Ritual and Leisure

Specific references to bone objects used for ritual and leisure activities are few. André Thévet speaking of the both 'Canadians' and Maritime Aboriginal groups, describes flutes made of the long bones of stags and other wild animals (1986: 16, 26, 43). Early commentators also make reference to rattles made of tortoise shell used in celebratory dances and curing ceremonies (Morgan 1922, Parker 1916, Tooker 1964). Charms derived from animal bone, claws and skins were also employed (Tooker 1964: 120-121). As well, reference is made to the widespread practice of games of chance (Tooker 1964: 114-116).

Modified Turtle Shell

The use of turtle shell rattles is well documented in the ethno-historic record. Sagard and other early missionaries record the use of such rattles in curing and other religious ceremonies (Fenton 1987: 27, 78-79; Tooker 1964: 77, 93, 101,102; Thwaites 1896-1901, Volume 15: 179) and it is important to note the significant role that the character 'Turtle' plays in Iroquoian myth and symbolism (Tooker 1964: 79,140,147,153 -155). In his overview of turtle images and turtle shell objects from archaeological contexts in Ontario, Pearce notes not only the use of turtle shell for rattles, pendants and gorgets, but also the use of turtle images on stone and ceramic effigy pipes, deer phalanges and catalinite pendants, (2005: 92-97).

In fact, turtle shell rattles found in both archaeological and ethno-historical contexts across North America have taken three different forms: body rattles – worn on the wearers ankle or upper arm, handheld rattles and wooden staff rattles, although it is handheld rattles which are most common among the historic Iroquois (Brown 2011: 14). “To make this rattle they remove the animal from the shell, and, after drying it, they place within it a handful of flint corn, and then sew up the skin, which is left attached to the shell. The neck of the turtle is left attached to the shell (Morgan 1922: 269).” The rattle pictured in Morgan’s work does not however, have any perforations but rather is lashed together with withes. Modified turtle shells with seven to eight perforations have been found in prehistoric Iroquois graves and modified fragments in middens. Parker suggests that they may have been knee rattles (1916: 489).[55] These types of rattles are found across a large geographic area from the Early Iroquoian through to the Late Iroquoian Period, spanning 650 years, reaching their zenith on Proto-historic and Historic Neutral sites (Pearce 2005: 100-101). This artifact type is also widespread on Mississipian Period sites (AD 850 – AD 1700) in the American Southeast (Brown 2011).

Modified turtle shell fragments appear in limited quantities on three of the five sites under study**.** Four fragments of worked turtle shell were identified at Keffer, two derived from Painted turtle (Mattila 1989). One specimen from Keffer may be part of a rattle, the carapace has been modified by drilling and grinding, but the other three pieces are too fragmentary to identify possible function. The single specimen from

55 Among the Seneca, Parker records the use of turtle shell rattles in the ceremonies of two medicine societies: the Towii’sas Company, Sisters of the Dio‘he’ko – the spirits of corn, beans and squash (Box turtle shell) and the False Face Company (Snapping turtle shell only),(1909: 179, 183-183).

Roebuck which is derived from a Painted turtle is also perforated along the edge and may be a portion of a rattle (Wintemberg 1936: 75). Unfortunately, the modified turtle fragments recovered from the assemblages under study were too fragmentary to list defining characteristics based on their data. However, a number of other studies allow us to generate a list of defining characteristics based on the study of more complete specimens from other sites (Fox 2002, Pearce 2005, Wray et al 1987). For example, a complete turtle shell rattle from the Seneca Adams site (circa AD 1570), measuring 106 mm by 134 mm, has four holes in both carapace and plastron which are clearly aligned to facilitate the two halves being tied together (Wray et al 1987: 47). This specimen was interred with a probable adult female in a double burial containing a dog skeleton and another adult female (Ibid: 47). Data compiled by Pearce on sixty-five rattles from thirty-three Ontario Iroquois sites indicates:

- Use of Box Turtle predominates, but Painted, Blandings and Snapping turtle shell were also used;
- No uniformity in the number of holes made in two rattle elements, carapace and plastron;
- Between one and nine holes have been recorded (Pearce 2005: 100-101).

Deer Scapula Pipes

Crudely made ‘pipes’ made from deer scapulae are probably one of the most unusual objects encountered in this study. To date, this artifact type has been found in greatest frequency on the Roebuck site (1936: 84). Pendergast also notes their presence on the Salem site, where five specimens were found and he identifies them as a trait associated with St. Lawrence Iroquoians (1966: 33, Plate 14 (1)). They have also been found at the St. Lawrence Iroquoian McIvor site[56] (Chapdelaine 1988: 297; 1989: 208) and on ancestral Wendat sites in the Trent Valley (Ramsden 1990: 91).[57] Wright suggests that they are bone artifact types distinctive to the St. Lawrence Iroquoians (2009: 1248).

Wintemberg identifies twenty-nine examples in various stages of manufacture at the Roebuck site (1936: 84). I was only able to positively identify twenty-three specimens from the Roebuck assemblage as bone pipes and only ten were complete and finished enough to be described in detail. Two examples were found at Keffer and one at Draper, none were recovered from the McKeown or Steward sites. As mentioned, this is in many ways an intriguing artifact type whose actual function is hard to identify definitively given its variability. It is worth quoting Wintemberg at length to understand the range in variation and modification of these objects.

> Twenty-seven of the unfinished specimens have the spine, acromion, and the thinner portion of the plates broken off, three of them having no bowl cavity started, and one lacking the articular end, though the stem is scraped and polished; one of two other specimens with unfinished stems has the glenoid cavity burnt and one seems to have a completed bowl. Seven specimens have a burnt spot in the glenoid cavity but are not excavated, and two others, which are not burnt, have the cavity slightly gouged out (Ibid: 84).[58]

With reference to the Salem site specimens, Pendergast observes that:

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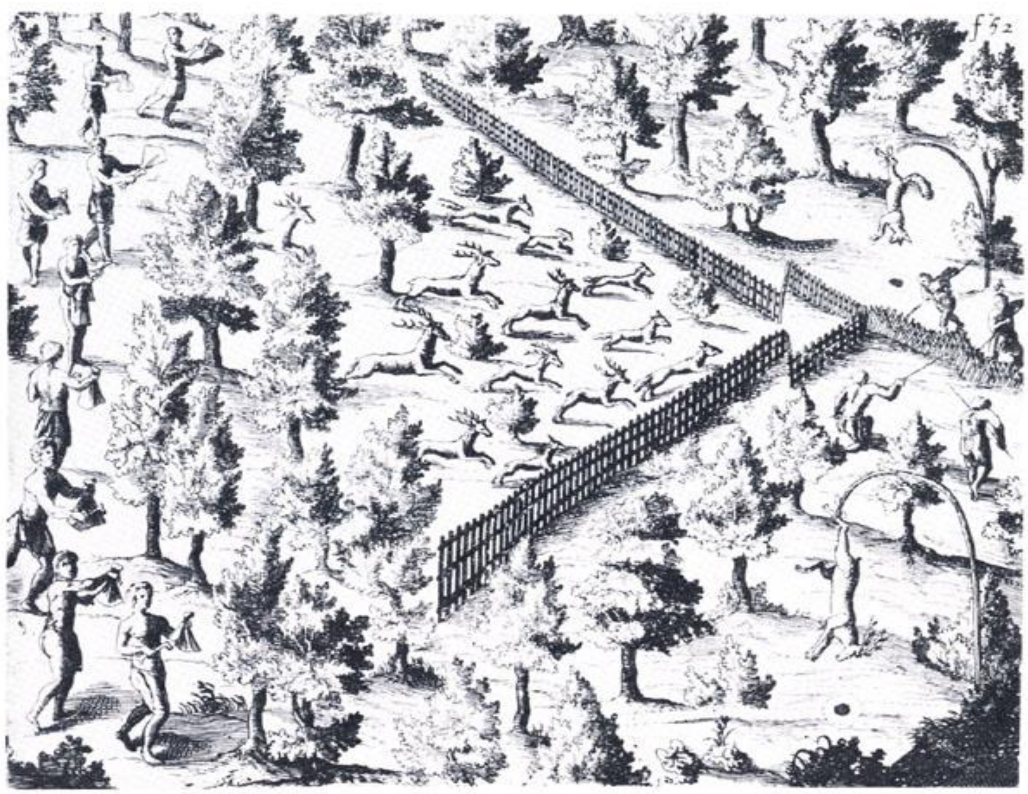
56 This specimen, like many from Roebuck appears unfinished (Chapdelaine 1988: 297).
57 It is worth noting that Wintemberg describes a modified wapiti phalange as a 'bone pipe' found at the Neutral Lawson site (1939: 42).
58 Wintemberg identifies a similarly modified deer scapula at the Lawson site (Ibid: 42).

> Other than having the glenoid cavity hollowed out, very little modification has taken place. Judging from the amount of burning in the bowl, the pipes have not been smoked for long periods and were probably used only when the bone was green. None of these pipes have stem perforations; apparently the cellular structure of the bone is sufficiently porous to allow passage of air from the bowl to the smoker (1966: 33).

Why were so many examples left unfinished? Does the lack of finish suggest another use? Are they really unfinished or did some of them serve some function other than smoking pipe? Were they only used briefly, for a limited time and a specific activity and then discarded? Were they used in hunting ritual or some form of scapulomancy?

Figure 4.18: A Deer Drive, AD 1615 (Biggar 1929)



In the illustration of a deer drive (reproduced above) witnessed by Champlain north of Kingston, Ontario, in AD 1615, some of the drivers/hunters are holding scapulas and long bones which they appear to use as some form of noise makers (Biggar 1929: 81-85). Is there some form of ritual connection between deer hunting activities and modified deer scapula artifacts? Perhaps the modified scapulas were being used for a number of different functions. Ultimately, it is not possible to be definitive without better contextual evidence.

Ten specimens were examined in detail. The first step in the reduction process appears to have been to remove the scapular body then to scrape the spine. In 33.3% of cases traces of scraping are present on the distal end, and in 33.3%, the proximal end; 66% show evidence of having heat altered in the glenoid fossa before being scraped to form a bowl; two examples have notches along the surface of the spine, one has four notches, one has eight notches. The single complete example from Keffer is 165 mm long with the tip of the stem measuring 13 mm, while those from Roebuck ranged in length from 51 mm to 170 mm, with an average tip of stem width of 7 mm. Those most likely to have used as smoking pipes, are shorter, ranging between 90 and 130 mm. Typically, deer scapula pipes have the following characteristics:

- They are highly variable in form;
- Often are only minimally modified, often having only the body of the scapula removed;
- Have a scorched and hollowed out glenoid cavity, which forms the bowl;
- Are typically between 90 mm and 130 mm in length.

Modified Phalanges

There are few references in the ethno-historic record of deer phalanges being modified for use as tools, games, or ornaments, yet all these functions have been suggested for this artifact. Le Jeune describes a game in which a perforated piece of bone was thrown into the air and then caught with another bone (Thwaites 1896-1901, Volume 7: 95, 97). This closely resembles ethnographic descriptions of the cup-and-pin game of the neighbouring Algonkian groups. This game consisted of a varying number of perforated phalangeal bones being strung at one end of a leather thong the other end of which was attached a long pointed bone pin. The object of the game was to catch the perforated phalanges on the pin (Culin 1973:529-455). On this basis, many Iroquoian researchers have identified some specimens as parts of cup-and-pin games (Beauchamp 1902:316; Guilday 1963; McCullough 1978b: 91; Ritchie 1969: 270; Smith 1910:182; Wintemberg 1928: 37; 1931: 92; 1936: 69; Willoughby 1935:226; Wright 1960: 115). Nevertheless, this interpretation only refers to the proximally and distally hollowed and perforated phalangeal bones and not those that have been heavily ground on dorsal and ventral surfaces and have been identified as ‘toggles’.

Thus, there are at least two major types of modified deer phalanges referred to in the academic literature for which a wide variety of uses have been suggested; for a more detailed discussion of this subject, I refer you to McCullough (1978b:86-99). McCullough notes the high degree of variability of this artifact type and cautions against assigning labels to specimens such as ‘cup-and-pin’ or ‘toggle’ without ethnographic evidence to support these identifications (1978b: 105).[59] She divides the modified phalanges from Draper into twenty-four classes defined by five modes, but for purposes of comparison with other site assemblages, divides them into the two 'traditional' variants – 'ground' and 'perforated' (1978b: 18, 59). For the purposes of this discussion, and for the sake of simplicity, I have compressed these twenty-four classes into these two variants, with the addition of one additional variant of 'counter' and a residual category of 'other'. Specifically, I have merged McCullough's classes into three sub-groups: the ground sub-group is equivalent to her Classes 5, 11, 12, 20, 21, 22, 23, 24; the perforated sub-group, to her Classes 1, 2, 3, 4; and the counter sub-group to her Classes 7, 8, 10,13,14,16, and19. The residual category 'other' is equivalent to her Classes 9, 15, 17 and 18.[60]

The first group have been heavily ground, drilled and gouged to an extreme degree on both dorsal and ventral surfaces. These most closely correspond to what have been described as toggles, for the fastening of cloaks and other forms of apparel. McCullough uses the general term 'ground' to describe these items and notes that this artifact type appears only in the Late Iroquoian Period; its distribution is mainly restricted to Erie and Southern Division Huron sites (Wright 1973: 72) and St. Lawrence Iroquoian sites, that is those located in southern-eastern and south-central Ontario, the very northern edge of New York State and in western Quebec (McCullough 1978b: 102-104).

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59 McCullough points out that only 3% of Draper modified phalanges are hollowed at both ends as required for elements in the cup-and-pin game (1978: 104).

60 These classes are listed and described in McCullough 1978b:17 to 42.

Emerson, who considered worked phalanges to be of diagnostic value for dating sites, also suggests that the ground variety are a late time marker (1954: 91).

The second group are phalanges which have slight dorsal grinding, and a moderate amount of ventral grinding and drilling or gouging of holes in their distal ends. McCullough labels these as 'perforated' phalanges. These most closely fit descriptions of elements of cup-and-pin game pieces and they have been identified as such by many archaeologists (Beauchamp 1902: 316; Emerson and Popham 1952: 162; Smith 1910: 182; Ritchie 1969: 270; Wintemberg 1928: 37, 1931: 92, 1976: 69; Willoughby 1935: 226; Wright 1960: 115). However, it seems more likely that they functioned as beads, bangles, jinglers or decorative fringes for garments (Beauchamp 1902: 317; Parker 1922: 197; Ramsden 2009: 308; Ritchie 1969: 270-271, 289; Tuck 1971: 69; Wright 1960: 115). McCullough notes that this type is known as early as the Princess Point Period and is widely distributed throughout the Early, Middle and Late Iroquoian Periods, increasing in frequency during the Middle Period, then deceasing in the Late Period and disappearing completely during the Contact Period (1978b: 60,101). Emerson and Wright make the same observation with reference to this category of worked phalange (Emerson 1954: 91; Wright 1966: 72, 77). With reference to Neutral sites, other researchers have also noted a decrease in 'perforated' phalanges after the Proto-historic Period (Lennox and Fitzgerald 1990, Prevec and Noble 1983).

The third group have moderate dorsal and heavy ventral modification and have been ground, drilled and scraped to a varying degree, with abstract or figurative and animal designs scorched or scored onto the dorsal surface. Many of the specimens have abstract designs in the form of rows of dots or hash marks, which may represent different numeric values. At the late sixteenth century ancestral Wendat Benson site, located in the Trent valley, Ramsden found twenty-seven whole or fragmentary worked deer phalanges (2009: 308). Nine of these phalanges (33.3%) show signs of having been stained with a reddish brown pigment. Ramsden suggests that,

> The evidence of pigment, along with the high polish and burned on decoration on some specimens, strongly suggest that these artifacts had a primarily decorative or "showy function, possibly as ornaments on clothing, and thus may have had ritual or status significance (Ibid: 308).

Boyle suggests, these types of phalanges could represent a form of tally or counter in some sort of game, "perhaps shaken and thrown as dice, or in some such way as the peach-stone or plum stone game is now played among the Iroquois, namely, in a shallow wooden bowl (1903-1904a: 80)." In AD 1721, at the Huron village at Detroit, Charlevoix described a variant of this game where each participant played with six or eight 'little bones', each piece had six unequal faces, two of which were painted different colours (Kinietz 1940: 73). The relative lack of modification and consistent pattern of decoration of the counter sub-group would suggest a similar function.

Of the two hundred and ninety-eight specimens examined in detail, the majority (78.5%) are first ground; 11.2% are drilled only; in 20 cases carbonisation occurs, in some cases this is combined with grinding and polishing. Thirty-one specimens (13%) are heat altered on the dorsal surface to create geometric designs, 14 (5.9%) have figurative designs, and three (1.3%) have indeterminate designs. Of those specimens exhibiting grinding, 17.9% are ground ventrally and laterally, while 59.4% are ground ventral/laterally and dorsal/distally. Only one example shows signs of intentional polishing. Drilling occurs in 31.8% of cases - four on proximal end only, two on distal end only, seven ventral/laterally, seven dorsal/distally; twenty-two are drilled on all surfaces, one proximal distal/dorsally, one proximal ventral/dorsally, twenty-five distal ventral dorsally.

Most specimens, 85.6%, are between 31 mm and 60 mm in length. Given the fact that specimens' dimensions are determined largely by the natural dimensions of deer phalanges as this is rarely modified, this attribute is not expected to vary significantly. Three specimens from the Roebuck site exceed 80 mm in length; these are probably derived from moose. Use wear polish was present on very few specimens.

The ground sub-group is the most popular variety on all four village sites, accounting for 49% to 72% of the total number of specimens in this artifact category. The counter sub-group is significantly more popular at the Keffer site, while the perforated sub-group is significantly least popular at the Draper site. Six specimens from Steward are of the perforated variety. At the nearby St. Lawrence Iroquoian McIvor site, only two of a total twenty-three phalanges are of the perforated type while the remaining twenty-one are ground (Chapdelaine 1989: 208).

In Table 2 of her thesis, McCullough presents the absolute frequencies for the twenty-four classes of the worked phalanges that she analysed (1978:18). The sample consists of six hundred and forty-nine specimens. If one regroups them as I have described above, the ground variety represents 69.3% of the total, the counter variety

15.3%, the perforated variety 3.6% and the residual category 11.7%. I identified a total of one thousand and thirty-two complete and fragmentary specimens in the Draper assemblage. Of these, six hundred and sixty were of the ground variety (63.9%), one hundred and forty-four were of the counter variety (13.9%), twenty-nine were of the perforated variety (2.8%) and one hundred and ninety-nine were of the 'residual' category (19.3%).

As McCullough demonstrates, modified phalanges are highly variable and ultimately, it may be impossible to be definitive about their exact use (1978b: 105). She has developed a definitive typology for worked deer phalanges, which as I have explained, I have simplified here. Typically, modified deer phalanges demonstrate the following defining characteristics:

Ground Phalanges

- Heavily ground, drilled and gouged to an extreme degree on both dorsal and ventral surfaces;
- Most closely correspond to what have been described as toggles, for the fastening of cloaks and other forms of apparel.

Perforated Phalanges

- Slight dorsal grinding and a moderate amount of ventral grinding;
- Drilling or gouging of holes in their distal ends;
- Most closely fit descriptions elements of the cup-and-pin game pieces but more likely functioned as beads, bangles, jinglers or decorative fringes for garments.

Counters/Markers

- Moderate dorsal and heavy ventral modification;
- Ground, drilled, and scraped to a varying degree with abstract or figurative designs, scorched onto the dorsal surface.

Bone Counters

Five unusual objects, two complete and three fragmentary, found at Keffer have been modified to create flat, roughly rectangular, highly polished tablets of bone. They resemble the tiles used in modern games of dominos or ‘ma jong’. On first examination, I thought the two complete specimens might be made from walrus ivory due to their density and unusually high polish, and that they might be exotic imports to the site. However, subsequent faunal analysis identified them as bone (Mattila 1989). Initially, they appear to have been modified in some indeterminate manner to create a preform probably by grinding. Then they were finished by further grinding and polishing to a very high sheen. The two complete specimens measure 41 mm by 12 mm and 32 mm by 10 mm and are between 4 mm and 9 mm in thickness. Ethno-historic sources for the Onondaga describe a game of chance which uses black and white coloured peach stones and a shallow bowl, called ‘ta-yune-oo-wah-es’ but in New England, a variant of this game was called ‘hubbub’ (Beauchamp 1902: 318-319).

> Hubbub is five small Bones in a smooth Tray, the bones bee like a Die, but something flatter, blackened on one side and white on the other, which they place on the ground, against which violently thumping the platter, the bones mount changing colours with the windy whisking of their hands to and fro: which action in that sport they much use, smiting themselves on the breast, and thighs, crying out Hub, Hub, Hub; they may be heard play at this game a quarter of a mile off (Beauchamp 1902: 319, quoting Wood 1865, part 2, chapter 14).

No definite function beyond some sort of gaming piece can be suggested at this time and there are too few complete specimens to develop a list of definitive characteristics.

Human Bone Artifacts

Artifacts made from human bone have been recovered from many Iroquoian sites across southern and eastern Ontario and New York State, often occurring at the same time as fragments of scattered human bone found in middens. Based on the temporal and geographical distribution of scattered human bone and artifacts of human bone, several scholars suggest that there is a marked increase in occurrence of both scattered human bone and by the appearance of artifacts of human bone in the Late Iroquois Period (Cooper 1984: 20, 25; Jenkins 2011: 26; Pratt 1976: 139, 145,149, 151). They also note that the frequency of human bone artifacts tapers off after AD 1550 and in the Historic Period and is found in small amounts on Neutral and Petun sites (Cooper 1984: 25, 76; Finlayson 1985: 439; Trigger 1981; Wright 1966). Taken together, scattered bone and artifacts of human bone have been traditionally interpreted as associated with captive sacrifice, cannibalism and trophy taking (Cooper 1984, Jamieson 1983, Wright 1966).

However, more recent research which focuses mainly on human bone, has challenged this interpretation, suggesting more complex, alternative explanations for their occurrence including that scattered bone represented victims of freezing or drowning or of interpersonal violence, disturbed secondary burials, de-fleshing as part of traditional mortuary rituals, and shamanism (Jenkins 201; Rainey 2002: 160-163). This broader interpretation, which attributes scattered human remains to a variety of cultural practices, not just prisoner sacrifice and its related practices, is probably more accurate. However, since the present study concentrates only on finished tools and objects this discussion that follows focuses only on research pertaining to artifacts of human bone.

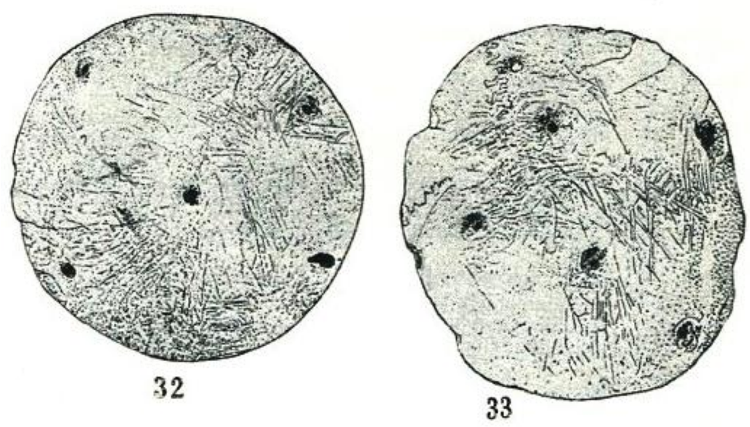
Human Cranial Discs

The most common artifacts manufactured from human bone are discs made from portions of human crania (Jenkins 2011: 32). This type of artifact has been found across Iroquoia (Cooper 1984). Several researchers have suggested that modified cranial fragments found on these sites represented rattles or pendants derived from prisoners or slain enemies (Cooper 1984, Jamieson 1983, Pratt 1976). However, a number of other functions have been postulated as well as the suggestion that they may be curated fetishes derived from revered ancestors (Abel and Fuerst 1999: 34; Ramsden 2013: 223).

Wintemberg identified eight objects from the Roebuck site as ‘gorgets’, both complete or fragmentary, and several broken pieces of crania apparently in the process of manufacture into ‘gorgets’ (1936: 19). Based on certain formal characteristics, it is apparent that several different methods and combinations of methods of manufacture were employed. Wintemberg suggests seven perforations as an attribute typical of gorgets, citing three similar examples from Ontario (1936:74). However, there does not seem to be supportive evidence for more than two other specimens with seven perforations. Both these specimens are fragmentary and have five perforations. Figure

4.19 reproduces two examples from Roebuck, one with seven perforations and one with five.

Figure 4.19: Human Cranial Discs (Wintemberg 1936, Plate XV).



Regardless of how many holes each specimen has, all holes have one common characteristic: they originate from the convex surface. However, the method of making perforation varies - two specimens have roughly gouged, beveled holes, the possible result of a rough, sharp and hard tool being rotated back and forth. Two other specimens have very even neatly beveled holes, suggesting that a smooth evenly pointed object was rotated, perhaps by means of a bow drill. Five of the specimens have simple smooth rounded holes. Wear has removed much of the evidence of the manufacturing process in the holes of many of the specimens. One unusual example is specimen VIII-F-13065. Here the holes are made by cutting an oblong gouge, which perforates at its deepest point, that is, in the centre of the gouged trough. Ten of the thirteen specimens from Roebuck have rounded rims in cross-section. It seems likely that after being initially cut to a rounded shape, they were held in a vertical position and ground smooth against a horizontal abrading surface or by a tool held horizontal to them. They might also have been held in a horizontal position and ground vertically along the edge. The final effect was, however, to produce a rounded edge, which became more smooth and polished with wear. Two of the specimens display sharply angled rims in cross-section.

Surface treatment also varies from specimen to specimen. One complete specimen with no perforations has little or no surface treatment. Of the eleven other complete or fragmentary specimens, the surfaces show signs of being ground and then polished to varying degrees. Six cases also display scratches over the polished surface that can be attributed to the accidents of use. As Wintemberg notes, specimens are rarely embellished and only one specimen bears what could be described as decoration, this consisting of five straight parallel lines on the convex surface (Ibid: 74). These are too evenly spaced to be considered accidental. The meaning or significance of these five lines is unclear.[61]

Five specimens, three from Roebuck and two from McKeown, are complete. The three from Roebuck measured 113 mm, 105 mm and 98 mm in diameter respectively with thicknesses ranging from 5 mm to 7 mm.[62] Of the two complete cranial discs recovered from the McKeown site, one derived from portions of a parietal and occipital and one from an occipital bone. These measured 98 mm and 100 mm in diameter

61 A similar object from the Clearville site appears to be decorated with a sunburst and a headless figure (Williamson and Veilleux 2005: 3, Figure 1)
62 Two human cranial discs from the Neutral Clearville site measure 109 mm and 111 mm in maximum diameter (Jury 1941: Plate XVIII, Figure 1, Plate IX, Figure 1).

respectively, with a thickness of 7 mm. Each had slightly rounded rims with three holes gouged close to their peripheries. When the holes are aligned, the slightly undulating surface of the rims matched up with a very tight fit, supporting the idea that these two objects were lashed together.[63]

Although Abel and Fuerst suggest that these objects are rarely found in pairs and therefore, were probably not parts of rattles (1999: 34), the two paired specimens from McKeown seem to contradict this interpretation and support the idea they were used as rattles. It is worth noting that two human parietal discs, interpreted as bowls, were found at the St. Lawrence Iroquoian McIvor site (Chapdelaine 1989: 212, Plate 11.23). Pairs of cranial discs also identified as rattles were recovered from the burials at the circa AD 1570, Seneca Adams sites (Wray et al 1987). These specimens ranged in diameter from 103 to 110 mm, with a mean diameter of 107.2 mm; four were derived from parietals and one from a frontal bone; holes drilled along the edges indicate the two halves were tied together (Ibid: 45-46). Both individuals associated with the rattles were adults (Ibid: 46).[64]

In her study of human bone artifacts from the Keffer site, Dori Rainey identified seven adult parietals and two sub-adult segments as parts of finished and incomplete 'gorgets' and she notes that those with perforations are more finished than those without (2002: 139-140). In 2011, Tara Jenkins re-examined the human bone artifacts

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63 Pratt identified two similar halves of cranial rattles from the Early Contact Oneida, Diable site, Madison County, New York State (1976: 139, Plate 21, p 212).

64 The human cranial discs appear to be derived from individuals as young as 21 years of age, one pair possibly from a female (Wray et al 1987: 46).

from Keffer. She identified ten objects as fragments of nine finished or incomplete cranial rattles (2011: 72). In my examination of the Keffer assemblage, I was only able to identify five finished cranial discs all of which are fragmentary. Due to their fragmentary state, it was not possible to measure diameter of most, however the specimens ranged from 5 mm to 8 mm in thickness. One near complete specimen (catalogue number 710227) not in the collection loaned to me for this study, was described by Mattila - it measured 100 mm by 92 mm in diameter and had four perforations (Mattila 1989).

Two complete discs were recovered from the Draper site, both derived from left parietals; one with three holes gouged evenly spaced perorations and the other with four perforations; these are 93 mm in diameter and 6 mm in thickness; an additional unfinished cranial disc was 60 mm by 51 mm in dimensions and had no perforations (McCullough 1978a).[65]

When considered in conjunction with the scattered human bone from the refuse deposits around the sites, it is tempting to regard these objects as trophies of war derived from the heads of enemy captives. It is also worth noting that several depictions of Iroquois captives being led in single file procession depict each individual prisoner carrying a rattle (Jenkins 2011: 38). It is not possible to determine from the detail in these illustrations whether these rattles are made from human bone, turtle shell

65 Cooper identified only 5 cranial fragments from the Draper site excavations of 1975 and 1976, as cranial rattles or pendants (1984: 65); with one additional specimen identified by Ferguson from 1973 excavations, Cooper counts a total of 6 modified human cranial artifacts (1984: 66). This number is contradicted by the 16 cranial fragments identified by both McCullough (1978a: 37) and by the author.

or hollow gourds, however, it may suggest that this type of object was closely associated with ritual surrounding the capture and execution of enemy prisoners. However, as Wintemberg points out a number of the fragments appear to be derived from the crania of children (1936:74). As I have already noted, these objects may be attributed to other cultural practices (Rainey 2002; Jenkins 2011; Abel and Fuerst 1999; Ramsden 2013).

That they are worn in the same manner as European gorgets (covering the lower part of the throat and sternum) or that they served the same purpose (protection) is unlikely. Certainly, the fact that all the finished specimens bear varying degrees of polish or modification on their convex surface, that only four have both surfaces modified, and that scratches resulting from accident and wear occur on the convex surface suggests that this was the surface facing outwards and upon which most use wear occurred. This pattern of wear would also be the result if two discs were sewn or lashed together to form a rattle. Again, this interpretation is supported by two specimens found at the McKeown site, which, when the holes around their peripheries are aligned, fit together perfectly. Typically, human cranial discs demonstrate the following defining characteristics:

- They are roughly circular in shape, with both rounded a flat rims;
- Usually but not exclusively derived from parietal bones;
- Sometimes found in pairs;
- Perforated around their exterior edges (to facilitate lashing together);

- Rarely decorated, sometimes with incised lines;
- Between 98 and 113 mm in diameter, with an average diameter of 104 mm and between 5 and 10 mm in thickness, with an average of 7 mm.[66]

Beads and Other Objects of Human Bone:

Other objects of human bone vary considerably in shape and size. One specimen from Roebuck (VIII-F-13908), derived from the middle portion of a human fibula, is 43.6 mm long and 9.5 x 9.0 mm in overall diameter. Both ends have been cut and residual sections of the shaft broken off. The medullary cavity is hollowed out. Wintemberg suggests that this object was a bead (Ibid: 64). The exterior surface shows signs of smoothing either by polish or wear. VIII-F-13160 is made from a right fibula; VIII-F-13316, from a left fibula; and VIII-F-20899, from a left radius. When considered in conjunction with specimen VIII-F-13908 these three specimens may represent, as Wintemberg suggests blanks in the process of manufacture into beads (Ibid: 64). Specimen VIII-F-13160, has both distal and proximal ends broken off. The surface is fairly dull with no evidence of polish but the proximal end bears the signs of being ground and tapered to a certain extent. Specimen VIII-F-13316, consisting of the distal end and half the shaft of a fibula, shows marks of scratching and polishing along the shaft. Specimen VIII-F-10899 has the proximal end broken off and the distal end scored and broken off. The shaft has been polished to a certain extent. VIII-F-10901, the distal end of a left radius, is 48 mm long; VIII-F-13315, the distal end of a right

66 A single, atypical specimen from the Seneca, Tram site (circa AD 1580) measures only 57 mm in diameter and has only two centrally located holes. It more closely resembles shell gorgets than the human cranial rattles described here (Wray et al 1991: 56).

radius, is 53 mm long. Both these specimens are scored around their circumference and may also represent a stage in the modification of radii into suitable shaft-blanks for beads. No other use for them can be suggested. VIII-F-10049 is made from a right fibula and has both articular ends scored and broken off. The ends and shaft have been ground and polished to a certain extent. Wintemberg describes it as a problematical object and suggests no function (Ibid: 87). However, it may also be in the process of being made into beads.

Objects which Wintemberg describes as 'awl-like' are made from human ulnae as are two other modified bones which may represent 'awl-like' objects in the making (1936: 19). VIII-F-9985 is made from a left ulna; the proximal end is broken off while the distal end has been intentionally removed and ground to a blunt point. This point was cut aslant the shaft. The shaft and point bear striations, probably resulting from the grinding process and also display a high polish most likely as a result of wear. VIII-F-9986 is made from a right ulna; the distal end has been removed and ground to a blunt point, as in the case of the previous specimen. It also displays the same grinding and polishing.[67] VIII-F-10900 is made from an ulna. The distal end has been removed and ground to a blunt point. The point and part of the shaft bear evidence of grinding and polishing. The proximal end and part of the shaft have been broken off. VIII-F-11825 is derived from a right ulna. The distal end has been scored and broken off. VIII-F-14064 is made from a right ulna. The distal end has been scored and removed.

67 Illustrated by Wintemberg 1936: 24, Plate XLV.

Wintemberg suggests that the first three objects are too large to be used as sewing awls but may have been used as snowshoe punches or to punch holes in birch bark (1936: 56). He also suggests that in addition to two sharpened antler tines and an object made from a bear ulna [68], the three modified human ulnae may have been used as daggers (Ibid: 59). Similar objects are reported and described by Pendergast for the Salem and Payne sites, although none of these is made of human bone (1966: 37-38). Certainly the shape of the ulnae would make them convenient weapons or tools. As Wintemberg points out, the sigmoid notch and olecranon process provide a convenient grasping handle (Ibid: 56).

In her study of human bone artifacts from the Keffer site, Dori Rainey identified a right calcaneous that had been modified to create a hole near the outer cortex, no interpretation of function was suggested (2002: 140). The objects made from ulnae, fibulae, and radii are by nature less distinctively human than the cranial discs and less readily identifiable with the individuals from whence they came. It is probable that, although recognized as human by their manufacturers, they were selected for practical rather than symbolic reasons. As Jenkins suggests rituals employing human bone artifacts would have been believed to connect people to the spirit world (2011: 6, 16). Thus, while artifacts of human bone may have served symbolic, supernatural or more mundane functions, the weight of evidence suggests their use was primarily in a symbolic and religious contexts.

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68 This object is illustrated by W.J. Wintemberg 1936: 28, Plate XVII.

Personal Adornments

Early European chroniclers focussed a great deal of attention to recording the physical appearance of Aboriginal groups they encountered, including describing their clothing and personal adornments. On his second voyage in AD 1536, Cartier describes shell beads called ‘esnoguy’ as being highly valued by the people Hochelaga (1993: 62).[69] On his third voyage in AD 1541, he was presented a crown of leather trimmed with shell beads as well as bracelets of shell beads by the Chief of the Stadaconans as sign of great honour.

> …the said Agona took a piece of tanned leather of a yellow skin edged with Esnoguy (which is their riches and the thing which they esteemed most precious, as wee esteemed gold) which was upon his head instead of a crowne, and he put the same on the head of our Capitaine, and took from his wrists two bracelets of Esnoguy, and put them on the Capitaines armes,…(1993: 99).

At feasts and dances, both Sagard and Champlain describe Huron women as being adorned with their finest possessions including as many strings of wampum beads as their wealth allowed (Tooker 1964: 21). Most of the beads recovered from the five sites under study are bone and not shell. Archaeological evidence would suggest that the great popularity of freshwater and marine shell beads was a relatively recent phenomenon and that other raw materials were preferred for the manufacture of beads and personal adornments prior to the seventeenth century (Pendergast 1989: 97).

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69 The curious description of how this shell was obtained, by using a human corpse as bait, may in fact be the result of a confusion of the terms: ‘esnoguy’ or shell, with the term ‘esgneny’ or ‘esgue ny’ which means ‘eel’, according to the Hochelagan word lists recorded by Cartier.

Cylindrical Bone Beads

The Iroquoian ethno-historic record does not make reference to bone beads, although similar items are described by the Jesuits as hair ornaments (Thwaites 1896-1901, Volume 15: 155). Nevertheless, bone beads and bone tubes are found in large quantities on a number of Iroquoian sites, particularly among the ancestral Neutral and ancestral Wendat; in some cases, accounting for the majority of worked bone specimens (Fitzgerald 1982: 199-204; Lennox 1981: 305-306; Lennox and Fitzgerald 1990: 423; Prevec and Noble 1983: 46, 47; Nasmith-Ramsden 1989; Thomas 1998: 87-88; Wright, 1981: 94).

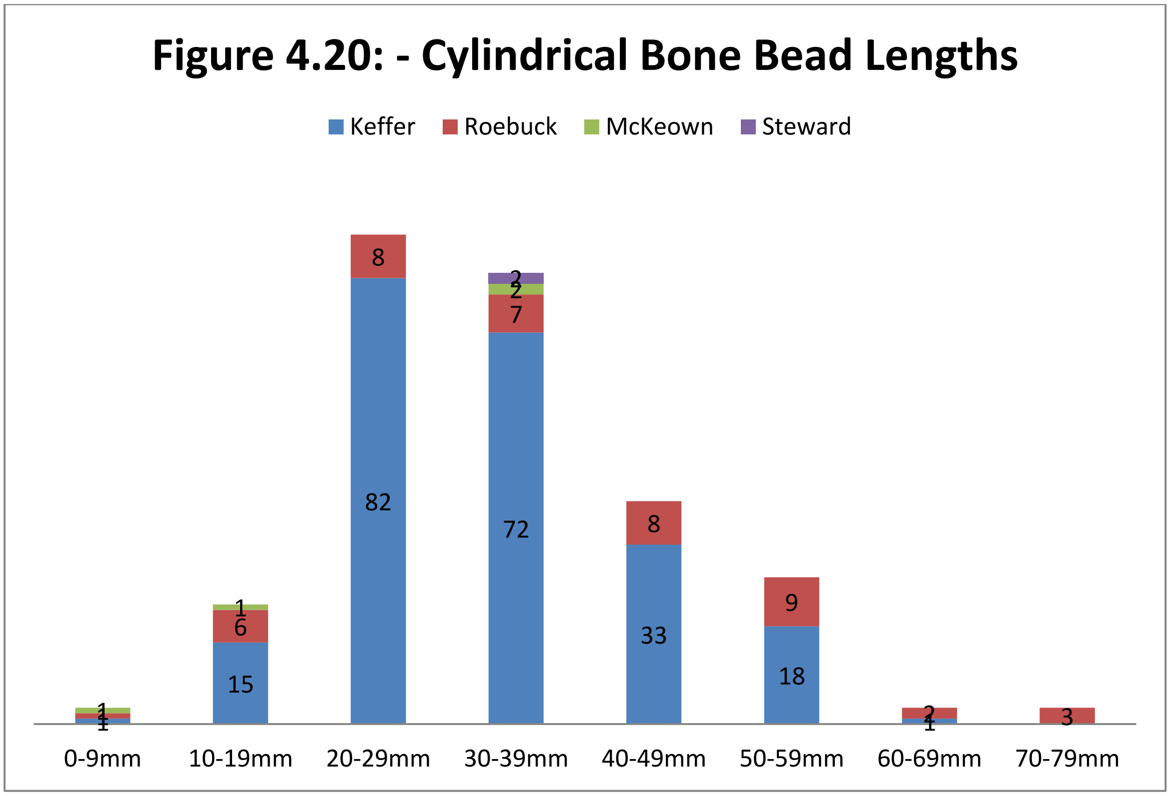
Thomas divides the sixty-two beads he examined from the Parsons site into three subtypes: distinctive beads – a single bead made from the mandible of a red fox; generalized beads – fifty specimens manufactured using the groove and snap technique, with their ends more or less ground smooth; and crude beads – eleven specimens whose ends are jagged (1998: 88-89). Most of the Parsons beads, whether derived from bird or mammal bone are about 29 mm in length (Ibid: 91). Interestingly, Thomas also found that the Parson site houses contained over twice as many complete beads as bead fragments, while village middens contained twice as many bead fragments as complete beads; he also found that the deposition of finished beads occurred more in one locale than in other excavated portions of the site (Ibid: 93).

Beads were made from both bird and mammal long bones. The beads from Keffer were almost evenly derived from avian (52%) and mammal (48%) long bones (Mattila 1989); those from Draper were 56% mammal and 53% avian; at McKeown 63%

were avian and 37% mammal; at Roebuck 84% were derived from avian species and 16% from mammal (Wintemberg 1936: 64); at Steward, 50% were avian and 50% mammal (Junker-Andersen 1984: 267).

Of the two hundred and seventy-two complete specimens examined in detail, six were unfinished. The majority – two hundred and twenty-two, came from the Keffer site. Specimens showed little variation with the exception of cross-section shape which varied according to the natural shape of the long bone selected. All of the beads are circumferentially grooved on both ends, snapped and the rough edges ground. Most display an overall polish on the exterior surface and at both ends either from manufacture, wear, or both. Some specimens also exhibit a slight polish on the interior edges of both ends, although this is difficult to observe.

All specimens are tubular in overall shape and most are natural in cross-section shape (98.8%), although two are oval and one slightly flattened. Eighteen (6.9%) are scorched blackened and polished overall, while one specimen is scorched on one end. Most beads exhibited overall polish (69.9%). However, the majority of those exhibiting exterior polishing are from Keffer (81.9%), while those from McKeown and Roebuck show much less polish (25% and 27.3% respectively). Six cases from Keffer have designs incised along their lateral surfaces, five (2.3%) geometric and one specimen an indeterminate design. There are fifteen examples (6%) with notches along their lateral surface. Of these, seven have a single notch, two have two notches, two have four notches, one has five notches, two have seven notches and one has ten notches. Two examples have one hole drilled in the centre, one example has two holes drilled in the centre.



The distribution of bead lengths is presented in Figure 4:20. Average bead lengths are: Keffer – 32 mm; McKeown – 32 mm; Steward – 34 mm; Roebuck 48.9 mm. The longest specimens (over 80 mm) are found at Roebuck and may in fact represent tubes rather than beads. In terms of diameter, 82.5% of all specimens are less than 10 mm. As with length, the larger specimens which are between 11 and 20 mm in diameter are found at Roebuck. While the beads from McKeown varied more in length, the majority of specimens are within the same range as those from Keffer, between 21 and 40 mm.[70] Average length of beads for all sites is 35 mm. This falls well within range for average bead lengths recorded for other Iroquoian sites presented in Table 4:1.

Table 4.1: Comparison of Bead Lengths for Selected Iroquoian Sites

Site	Affiliation	Average Length (mm)	Source
Roebuck	St. Lawrence Iroquoian	48.9	Jamieson - this study
McKeown	St. Lawrence Iroquoian	32	Jamieson - this study
Glenbrook	St. Lawrence Iroquoian	45.3	Pendergast 1981
Steward	St. Lawrence Iroquoian	34	Jamieson - this study
McIvor	St. Lawrence Iroquoian	(beads/tubes) 49.2 +/- 15.6	Chapdelaine 1988
Keffer	Ancestral Wendat	32	Jamieson -this study
Dunsmore	Ancestral Wendat	32.9	Thomas 1998
Hubbert	Ancestral Wendat	28.2	Thomas 1998
White	Ancestral Wendat	31	Tripp1976
Walker	Neutral	40	M.J. Wright 1981
Christiansen	Neutral	44.5	Fitzgerald 1982
Hamilton	Neutral	70	Lennox 1981
Sidey-MacKay	Petun	30	Hamalainen 1999
Kloch	Mohawk	33	Funk and Kuhn 2003

As Tripp observes for beads at the ancestral Wendat White site, there appears to be a clear preference for proportions of 3:1 (1976: 254).

Evidence suggests that cylindrical bone beads were manufactured in three main steps. First, the overwhelming majority (95%) were manufactured by employing a groove and snap technique. Most (92.7%) were then ground on both ends and

70 The majority of beads from the Proto-Huron, Kirche site measured between 11 mm and 50 mm (Nasmith-Ramsden 1989: 46); those from the Mohawk, Klock site ranged between 20 mm and 47 mm (Funk and Kuhn 2003: 44).

ventral/dorsally. Then, 77.6% were finished with polishing. As Newcomer has demonstrated, tubular bone beads can be manufactured in a matter of minutes (1977: 298). The presence of exterior polish in such a large number of specimens, poses the question whether the polish was produced as the last stage in the manufacturing process or as a result of use wear, or both. This is a question that is not possible to answer definitively. Internal polish can be detected in 83.3% of cases, which display some polish along both ends inner edges. However, what can be suggested is that polishing, whether intentional or as a result of use wear, is probably a good indicator that these specimens are in fact beads, and not tubular objects employed for some other purpose. Only one specimen from Keffer has been drilled. Typically, cylindrical bone beads have the following defining characteristics:

- Tubular in overall shape;
- Derived from both bird long bones and those of small mammals;
- Are rarely decorated with incised lined and notches;
- Polished on most exterior surfaces with some polish on interior edges;
- Lengths vary; an average length is about 35 mm and an average width is 8 mm.

Bone Tubes

References to bone tubes in the ethno-historic record are rare. The only reference I could find was for André Thévet who mentions, “Their flutes are made of the bones of legs of the stag or other wild animal (1986: 16, 26, 43).” As mentioned, similar bone items are described by the Jesuits as hair ornaments (Thwaites 1896-1901, Volume 15: 155). Wintemberg suggests that some bone tubes may have been "hair spreaders" (1936: 61). Others suggest they are shamans sucking tubes (Prevec and Noble 1983: 46-47). Lennox and Fitzgerald describe 'sucking tubes' which first made their appearance among the Neutral during the 1630s and 1640s as being associated with an extractive curing procedure (Lennox and Fitzgerald 1990: 423-425; Fitzgerald 1990: 241-248). Thomas proposes a number of other possible uses "…such as sockets for feathers in costumes, parts of containers for small objects, as sliding elements of snares, or as parts of some other type of compound artifacts (1998: 88)."[71] The length of some would also make them appropriate as cases for centre-eyed needles. Ultimately, without better contextual data, it is difficult to assign any definitive function to this type of artifact.

Six specimens are identified as complete bone tubes. Like bone beads, all are cylindrical in overall shape and retain a natural form in cross section. Length has been used as the distinguishing characteristic between beads proper, as adornments, and tubes which may have served a number of purposes as suggested above. Based on a bimodal distribution of lengths at the Walker site, M.J. Wright classifies specimens over 55 mm in length as tubes, those less than 55 mm as beads (1981: 94), while Lennox suggests 100 mm as a cut off (1981: 306). Tubes appear to be less well 'finished' than bone beads and have less exterior polish. I used this characteristic in addition to Lennox's cut off length of 100 mm or more, to distinguish beads from tubes.

71 In addition to functions such as feather holders, hair spreaders, components of snares, etc… it is interesting to note that bone tubes used as handles for rodent incisor chisels were found in burials form the Archaic Period, Indian Knoll site (Webb 1974: 296-297).

Lengths of tubes examined ranged from 100 to 133 mm with an average length of 112.4 mm; diameters ranged from 12 to 25 mm, with an average of 16.4 mm. Four specimens had holes drilled in the centre of their lateral surface, one had a hole drilled near one end. Tubes, like beads, appear to have been first, circumferentially grooved and snapped (52.9%); then ground on their ends (47.1%) or drilled (23.5%). Only two specimens (10.8%) show visible signs of further finishing in the form of exterior polish and only one (5.9%) is finished with further grinding.

It should be noted that the specimens examined from the five sites under study, differ considerably from those described by Lennox for Neutral sites. In the case of the Hood site, some specimens have complex incised decorations (Lennox 1984: 100). These are the objects he suggests may have served a special purpose such as shaman's 'sucking tubes'. Recent biomolecular analysis of bone tubes from the St. Lawrence Iroquoian Droulers site, indicates that they were derived from black bear (Gates St-Pierre and Collins 2015). As suggested by Thomas, more mundane functions are probable for the specimens examined here which bear little or no decoration. Typically, bone tubes have the following defining characteristics:

- Longer than bone beads, exceeding 100 mm in length;
- Less finished than beads;
- Sometimes have centred holes drilled in their lateral surfaces;
- Are rarely decorated. [72]

72 Prevec and Noble also suggest that tubes found on Historic Neutral sites, measuring between 60 mm and 157 mm, often bear geometrically incised decoration (1983:47).

Shell Beads

As mentioned previously, shell beads were described by Cartier as early as AD 1535 when he describes the inhabitants of Hochelaga as wearing, "bracelets of Esogunay" or *freshwater* shell. In later accounts, the Jesuits, Champlain and Sagard describe necklaces and bracelets of shell worn proudly and cherished with great value by the Huron (Biggar 1929:133-135; Thwaites 1896-1901, Volume 15: 155) (Wrong 1939:144) and if the frequency of these observations is any measure, use among the Huron, both as personal adornments and as burial offerings, was widespread (Otto 2013: 115). Sagard indicates that the beads he describes, "consist of the ribs of those large *sea-shells* (emphasis mine) called *vignols* like periwinkles, which they cut into a thousand pieces, then polish them on sand-stone, pierce a hole in them and make necklaces and bracelets of them…(Wrong 1939: 146)."

Shell beads have been the focus of a great deal of scholarly research and discussion. Wintemberg describes the simplest beads as consisting of, "entire shells, not altered in any way, except that they were pierced for stringing. For this purpose both land and freshwater species were freely utilized; beads fashioned of whole shells being perhaps the most common objects of the kind found in Ontario (1908: 65)." More numerous were beads made from marine shell. These took the form of marine shell cut up, ground and smoothed to form discoidal beads (Wrong 1939:146) which for the earlier period, were mostly white (Ceci 1989: 71; Hammel 2007: 318; Otto 2013: 120). Shell beads also took the form of "strings of a small freshwater spinal shell, called in the Seneca dialect "Ote-Ok-Ko-a", the name of which is bestowed on modern wampum

(Morgan 1922: Volume II, 51)." This shell bead type has been identified as whole freshwater snail (Ceci 1989: 69).

While marine shell beads occur in a variety of shapes, two of the most common are discoidal beads about 5 mm to 8 mm in diameter and 1 mm to 2 mm thick; and tubular beads 5 mm to 10 mm in length and 4 mm to 5 mm in diameter (Bradley 1987: 67).[73] Archaeological evidence suggests that marine shell was traded into the interior of the Northeast in limited quantities from the Archaic Period onwards (Trigger 1976; 139, 169). However, there is a decline in the presence of exotic trade goods such as marine shell from the Archaic and Middle Woodland Periods to the late Woodland Period (Ibid: 169). This situation changes by the late fifteenth century when Atlantic marine shell in the form of beads and other ornaments, much of it whelk (Busycon) but also oyster and quahog, began to appear in larger quantities on Iroquoian sites (Bradley 1987: 21, 25, 34; Snow 1984: 255, 257; 1994: 67). Their presence increased steadily until the end of sixteenth century, discoidal beads being gradually replaced by tubular beads in the form of wampum.[74] Unmodified marine shell and partially modified marine shell, suggesting in situ bead manufacture is also found on Iroquois sites at about the middle of the sixteenth century (Engelbrecht 2003: 132). Tubular and discoidal marine shell beads have also been found in burials at the St. Lawrence Iroquoian sites in Québèc – five

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73 Wintemberg, citing Holmes (1880) suggests that wampum beads are commonly ¼ to ½ inches (6 to 12 mm) in length and one eighth to one quarter inches (3 to 6 mm) in diameter (1908: 86).
74 According to Lynn Ceci, true 'wampum' can be distinguished from other kinds of shell beads by the following traits: white beads made from narrow columella of small welks, *Buscyon canaliculatum* and *Buscyon carica,* and purple beads made from hard shell clams, *Mercenaria mercenaria;* tubular, well-finished and smooth in shape; with an average diameter of 4 mm, length 5.5 mm and bore 1 mm (1989: 63). The major difference between true wampum and earlier Proto-wampum, is the larger, stone-drilled, bi-conical bore of Proton-wampum (Ceci 1989: 68).

tubular beads from the Mandeville site; twelve tubular and fourteen discoidal marine shell beads from Place Royale, Québèc City (Clermont and Chapdelaine 1992: 155). Beads of freshwater and marine shell do not appear in large quantities on any of the five sites that are part of this study, a pattern consistent with evidence from across Iroquoia for this time period (Pendergast 1989: 97, 101).

Fifteen complete and fragmentary shell beads were recovered from the Keffer site. Of these, four were made from freshwater snail shells, one was of marginella shell, seven were tubular conch shell beads and three were discoidal shell beads made from a bi-valve. The tubular beads ranged in length from 8 mm to 18 mm, with an average length of 13.5 mm; and diameter from 4 mm to 6 mm, with an average diameter of 5.4 mm. The two complete discoidal shell beads are 15.7 mm in diameter and 3.7 mm thick and 8.2 mm in diameter and 2.5 mm thick.

At Draper, McCullough identifies four complete and eight fragmentary marine shell specimens; one large bead is 58.1 mm long and 17 mm wide, while eight smaller beads are between 10 and 15 mm in length, three other fragmentary specimens are 28 mm in length; the majority are highly polished (1978a: 25).[75] She also identifies twenty-five snail shell beads, perforated by grinding; they ranged in size from 17.5 to 39.5 mm, with an average length of 23.7 mm (1978a: 26).

Twelve shell beads were found in the Roebuck assemblage. Wintemberg identifies three as freshwater snail shell beads while four were identified as columella

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75 In his preliminary report on the 1975 Draper excavations, Finlayson reports twp conch shell and five marginella beads (1975: 226).

from marine shell (1936: 63).[76] These are cylindrical in shape and measure between ½ an inch (12.7 mm) and 2 1/8th inches (53.9 mm) in length (Ibid: 63). He also notes the presence of two pieces of worked marine shell which may indicate the beads were manufactured on site (Ibid: 63). The freshwater snail shell beads were perforated by making a hole in the lip (Ibid: 63).

According to Wintemberg, marine shell beads were present in the collections of previous excavators at the McKeown site (1936: 63). I initially failed to identify any such specimens from the 1987 excavations but subsequently found five complete tubular marine shell beads in the Canadian Museum of History collections which were recovered from the site by James F. Pendergast in 1957. These beads ranged in length from 10 mm to 14 mm and 5 mm to 7 mm in diameter, with an average length of 12.4 mm and an average diameter of 5.6 mm. One freshwater shell specimen may be a shell pendant. This is represented by a piece of freshwater clam shell unmodified except for a single hole drilled through its centre. No other function can be suggested for this artifact. One other very small fragment of shell displays evidence of being heavily ground. It is so small, however, that it is impossible to say much more about it.

A single small shell bead recovered from the Steward site, made from the columella of marine shell, was identified by Phillip J. Wright, the site's excavator, but was not included in the collection provided to the author (Junker-Andersen 1984:155).

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76 No discoidal marine shell beads were found on the Roebuck site although they have been found on nearby sites of the same culture, probably the McKeown site (1936: 63).

As mentioned, marine shell became much more common on sites dating to the Historic Period such as the Neutral Hood and Christiansen sites, particularly in burial contexts. It may be useful to include metrics on these beads as a measure of comparison. At the Christiansen site (circa AD 1615) Fitzgerald identified two hundred and twenty-two shell beads. Of these, one hundred thirty-six were thin discoidal beads, derived either columella or large freshwater bivalves measured between 6.2 mm and 14.9 mm in diameters with an average of 7.79 mm; six thicker discoidal beads were smaller in diameter, between 7 mm and 20.2 mm with an average of 10.77 mm; seventeen tubular columella beads ranged in length from 6.3 mm to 22 mm with an average length of 7.08 mm, diameters ranged from 3.6 mm to 12.7 mm with an average of 7.08 mm; two large beads were globular in form, averaging 10.5 mm in thickness and 13.6 mm in diameter (1982: 214-216). Fifty-nine beads made from complete sea snail shells (*prunum apicinum*) were also recovered; shells measured an average 11 mm in height and 7 mm in width (Ibid; 215).

Lennox identified three hundred and fifty-nine shell beads from the Hood site (circa AD 1640) of which two hundred and twenty five were discoidal ranging from 5 mm to 15 mm in diameter, with a mean of 11.4 mm, and 1 mm to 5 mm in thickness, with a mean of 2.2 mm; one hundred and twenty-seven tubular beads ranging in length from 3 mm to 7 mm in length, with and average length of 5 mm, and ranging in diameter from 3 to 5 mm, with an average of 4 mm (1984: 98). Other shell beads included: five *marginella conoidalis* marine shell beads, ground at the apex; one *goniobasis lives* freshwater shell bead, perforated at the lip; another univalve pierced through lower whorls and a columella bead blank measuring 53 mm long and 18 mm in diameter (Ibid: 98).[77] A comparison of size shows that the tubular marine shell beads from Roebuck and Draper sites appear to be much larger than those from McKeown or from Historic Period Neutral sites such as Christiansen and Hood or Historic Period Huron and Iroquois sites. Typically, shell beads demonstrate the following defining characteristics:

Simple Shell Beads

- Made from univalves of either freshwater or marine shell;
- Modification is minimal, consisting of a perforation near the edge of the lip, or the apex of the shell;
- Size depends of the species.

Discoidal Beads

- Usually made from marine shell;
- Are drilled, usually bi-conically prior to European contact, and heavily ground around their edges;
- Range in diameter from 5 to 14 mm, and 1 to 3 mm in thickness.

Tubular Beads

- Usually made from marine shell;
- Are heavily ground overall;
- Range in length from 5 to 58 mm, and in diameter from 2 to 12 mm, beads from Proto-historic and Historic Period sites are generally, much smaller.

77 Lennox noted that short bone beads and short bone tubes were absent at Hood (1984: 100).

Shell Pendants

Shell Pendants are more variable in shape than beads and occur with less frequency on Iroquoian sites (Wintemberg 1908: 70-72). At Keffer, only eight specimens were identified as such and only one each at Draper and Roebuck. Only four were complete enough to analyse in detail. These ranged in length from 26 mm to 46 mm and in width from 19 mm to 32 mm. They appear to have been first shaped into preforms in some indeterminate manner; then three were shaped by grinding and two by drilling; three were finished by polishing. Two have one hole drilled in proximal end and one specimen has eight notches along it lateral edges. Given the small sample and variability in shape it is difficult to define a 'type' of shell pendant. Suffice it to say that typically, they demonstrate the following defining characteristics:

- They are usually derived from freshwater bivalves;
- Shapes vary, some specimens are notched;
- Lengths vary, with an average length of 32 mm.

Canine Pendants

Pendants made of canines of bear and small mammals such as dog, wolf and racoon have been found on sites across Iroquoia.[78] The feature which distinguishes them from unmodified canines is the drilling or notching present at their proximal (root) end which enables them to be suspended from on a cord. Sixteen complete specimens were examined in detail. They ranged in length from 21 mm to 64 mm, the larger

78 At the Roebuck site, Wintemberg reports a dog canine with neural cavity exposed by grinding both ends. I failed to locate this specimen in the collection (1936: 64).

specimens being derived from bear. Of the complete and fragmentary canine pendants at Roebuck, four are bear canines and one a racoon canine (Wintemberg 1936: 65). The two complete specimens from Roebuck are derived from bear and measure 49 mm and 64 mm in length; the single specimen from McKeown is a wolf canine and measures 42 mm in length. The two complete specimens from Keffer are 21 mm and 38 mm in length. All sixteen canine pendants from Keffer were wolf or dog; as were most of those from Draper, where twenty-two were identified as dog and only four were bear (McCullough 1978a: 32). No canine pendants were identified at Steward.

Modification takes the form of drilling in proximal or root end - twelve of the complete specimens have one hole and one has two holes. Some have evidence of holes being drilled by first burning and then drilling. Other examples are grooved at the root end to facilitate suspension. Typically, canine pendants demonstrate the following defining characteristics:

- They are most often derived from dog/wolf or bear;
- Only the root ends are modified, mainly by burning and drilling or grooving;
- Size varies depending on the species.

Bone and Antler Pendants

In their overview of Iroquoian decorated bone and antler objects, Williamson and Veilleux note the widespread distribution of bone pendants in many forms – simple, notched, in the form effigies or maskettes (2005: 16-17). However, bone pendants are rare on the sites under examination here. Only fourteen fragments from the Draper site were identified as such. McCullough reports five deer long bone epiphyses perforated and smoothed; five vertebral disc epiphyses have also been perforated suggesting use as pendants (1978a: 28). A roughly rectangular antler pendant (23.2 mm by 18.9 mm, 2 mm thick) with well smoothed edges and a single hole in the upper left hand corner was also identified by McCullough (Ibid: 29). As well, she identified two turtle long bones sections that had been circumferentially grooved and notched as possible pendants (Ibid: 30). A badly damaged antler effigy was also found at Draper; portraying the figure of a bear and a human face that may have been an amulet or part of a pendant (Ibid: 55). Unfortunately, this type of artifact seems too variable in morphology and few in number on the sites under examination to derive a list of defining characteristics.

Bands/Armlets

Decorated bands, often with incised decorations are found in limited quantities on the five sites under study. They were most numerous on the Draper and Keffer sites. Most authors assume these were worn as armbands or bracelets. They are found in greatest frequency on Middle Ontario Iroquoian sites located in south western Ontario, of mainly ancestral Neutral but also ancestral Wendat affiliation (Williamson and Veilleux 2005: 18). Many are decorated with complex incised lines and impressed dots. Williamson and Veilleux note that almost 60% of the designs are rows of dots and have suggested that these designs may mimic the tattoos mentioned in a number of ethno-historic accounts of Iroquoian peoples (2005: 20). They also suggest that the triangles filled with dots which occur on some specimens may refer to Thunderbird wings and tail, lightning bolts or snake manifestations (Ibid: 20).

At Draper, McCullough identified thirty eight complete and fragmentary bands – three were nearly complete, twenty-nine were fragments and six were preforms; nine were made from antler and twenty-nine were bone (six of the preform blanks were made from mammal rib) (1978a: 34). The largest nearly complete specimen was 106 mm long and 32 mm wide (Ibid: 34). Thirteen were decorated with either incised dots/triangles or incised lines; four were blackened by scorching and then polished; ends, where present, have single and double perforations (Ibid: 34).

At Keffer, all ten specimens were fragmentary and were made from antler; seven were decorated; the longest fragment was 61.2 mm; and widest 18.3 mm (Mattila 1989). Only one example of this artifact type was found at Roebuck. It was manufactured from a deer rib. It is 54 mm in length and 7 mm wide. Typically, arm bands or armlets demonstrate the following defining characteristics:

- They are made from both bone and antler;
- Many are decorated with complex incised and impressed lines;
- Ends are perforated with either one or two holes.

Antler Combs

Antler combs are another type of artifact that was rarely found on the five sites under study. Unlike the elaborately carved effigy combs of the Historic Period, these combs are more basic in design. The contrast between Pre-Contact and Post-Contact Period combs is well illustrated by Parker (1916: 491, Plate XXII, Figure 4). A good example of the earlier type of comb is a crudely made specimen with three prongs and notching along both its edges that was found at the ancestral Neutral Lawson site. It is 3 5/16th inches (84 mm) long and 11/14th inches (17 mm) wide (Wintemberg 1939: 33, Plate XII, Figure 1).

What appears to be a preform for a comb of this type was recovered from the Roebuck site (Wintemberg 1936: Plate XV, Figure 1). This specimen is similar in overall shape and size to the Lawson specimen but has five prongs (Ibid: 61). From this unfinished example, Wintemberg reconstructs a manufacturing process whereby holes were first worked through the antler before longitudinal channels were worked from these holes down the length of the object to produce the combs prongs (Ibid: 61). Based on his examination of both complete and unfinished specimens, Gates St-Pierre suggests that:

> Archaeological preforms and manufacturing debris indicate that combs were manufactured by first obtaining a rectangular or trapezoidal shape, which was next divided in two sections by a horizontal line engraved somewhere in the middle (Figure 8 e-f). this was followed by the engraving of vertical guiding-lines in the lower part which were then cut out to form the teeth using modified rodent incisors (chisels) or stone knives (and later, with metal tools). The handle was apparently carved after the teeth. A rough draft was first marked out and one or a series of holes served as decoration or as starting points for more elaborate carvings (Figure 8a-d, g). Finally, the combs were sometimes painted dyed, or embellished with feathers and beads (Weisshuhn 2004) (2010: 77).

A complete and highly polished four pronged antler comb 68 mm long and 28 mm wide was recovered from the Draper site and is described by McCullough (1978a: 40). The body or non-segmented portion of the comb is characterized by notching along both edges and by a hole centred between the edges. The hole is 7 mm long and 5 mm wide with smooth edges. The edge notching begins 9 mm from the pointed end and extends along both sides for a length of 26 mm, terminating a few millimetres from the teeth (Ibid: 40).

Wintemberg also identified two fragmentary and possibly unfinished antler objects as combs at the Uren site (1928: 33, Plate XXII, Figures 1 and 2). These specimens do not however, resemble either the Lawson comb or the comb from Draper. They more closely resemble those illustrated by Gates St-Pierre (2010: 77, Figure 8a, b, and g). It is possible that some of the awl-like antler objects found in the assemblages may be the broken teeth of combs, however this is not possible to ascertain with any certainty. McCullough notes some interesting wear on the tips of the prongs of the Draper comb.

> Close examination of the distal ends of the prongs revealed tiny transverse grooves or indentations on the under surface of the comb. On the first and third fingers the grooves are also visible on the upper or convex surface (Ibid: 40).

Clearly, these types of combs are not as large or ornate as their historic Iroquoian counterparts. However, they do appear to demonstrate the following defining characteristics:

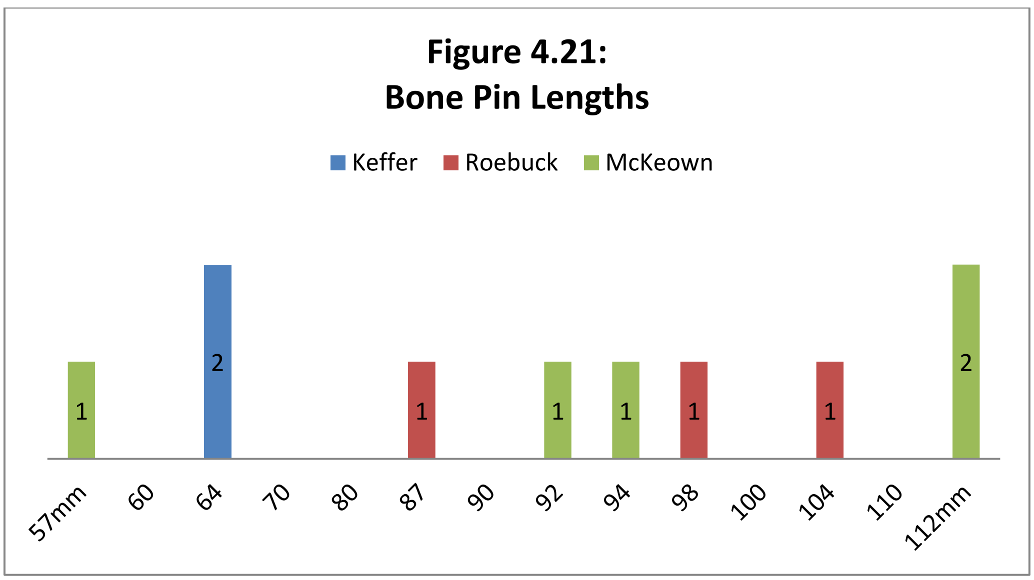
- They are smaller and less elaborate than historic Iroquois combs;
- Some have geometric patterns incised on the upper portion or handle;
- Some have holes drilled at their apex;
- Prongs vary in number from three to five or more;
- Lengths range from 68 to 84 mm, and widths from 17 to 28 mm.

Bone Pins

Some of the objects recovered from Iroquoian sites resemble bone awls in their overall shape although they tend to be more highly polished and are often decorated with incised lines. These have been identified by some archaeologists as clothes-fixing pins, hairpins, tattooing needles, bodkins and even eating implements (Pearce 2003; Williamson and Veilleux 2005; Wintemberg 1936). These types of objects are found on a large number of sites across Ontario and New York State from the Early, Middle and Late Iroquoian Periods and as Williamson and Veilleux note, they are often found in sweat bath floors and walls suggesting they may have been used in the management and arrangement of hair (2005: 21-27). As these authors have also suggested, the high level of polish displayed on these items can easily be attributed to the natural oil or animal fats that were applied to the hair (Ibid 27).

Ten complete specimens were examined in detail. Most (60%) were symmetrical in overall shape, the remainder asymmetrical. Most (60%) were natural in cross section although 20% were roughly triangular and 20% rectangular. Most tips (60%) are long and gently tapering, two are thick and acutely tapering and two are sharp and flaring. Four specimens (40%) have rounded bases, two are basally notched, two are natural, one is flat and one is grooved. They appear to have been first reduced to preforms by an indeterminate splintering technique. Three show signs of being scraped on the tip and two on the base, one on both tip and base and one along the lateral edges. They were finished by being ground smooth overall; only 30% appear to have also been finished by polishing overall.

Three specimens (30%) displayed polish on their tips and 30% along there lateral edges, either as a result of manufacturing or as a result of use wear. Three specimens (30%) were decorated with incised geometric lines. The three complete specimens from Roebuck ranged in length from 87 mm to 104 mm, with an average length of 96.3; base widths ranged from 6 mm to 12 mm with and average width of 9 mm; the five complete specimens from McKeown were between 57 mm and 113 mm in length, with an average of 93.8 mm; between 7 mm and 16 mm in base width with an average base width of 9.8 mm. The two complete specimens from the Keffer site were much shorter by comparison - 63 mm and 64 mm in length and 4 mm and 5 mm in width at their base. The distribution of lengths for bone pins is presented in Figure 4.21.



Typically, bone pins display the following distinguishing characteristics:

- Most are symmetrical, long and slender in overall shape;
- Highly polished overall;

- Often decorated with geometric designs;
- Tips and bases of varying shapes;
- Variable in lengths, with averages clustering around 63 mm and 94 mm; base widths ranging from 4 mm to 7 mm.

Fish Vertebra Beads

Twenty-eight large fish vertebra recovered from the Draper site may have been used as beads. They all have a hole in the middle of the vertebral column which would have facilitated being strung on a cord. Otherwise they are not modified. These types of artifacts were not found in the collections from the other four sites under study. It is possible that they were missed in the initial sorting and cataloguing of the collections.

Modified Clam Shells

Modified clam shells have been widely found on Iroquoian sites across the Northeast but their exact function is hard to identify. Wintemberg identified a large number of modified clam shells at the Neutral Lawson site and suggests that they may have been used as scrapers and smoothers in making clay pots (1939: 30). These specimens are not modified except for use wear along the ventral edge or on the dorsal surface (Ibid: 30). Clam shells are also mentioned as being used as knives (Thwaites 1896-1901, Volume 31: 45) and they may also have been used as spoons (Parker 1910: 57; Waugh 1916: 68).

At Keffer, twenty-five complete or fragmentary clam shell valves exhibited little modification but use wear along their ventral edge and exterior surfaces. These were interpreted as being pottery smoothers. An additional two fragmentary specimens had been ground and polished along their edges, both having three notches. These could have been parts of shell pendants but given their fragmentary state it is hard to be definitive.

At Roebuck sixteen modified clam shells were identified. Most exhibit use wear along their ventral edges and exterior surfaces, one specimen has a hole drilled near its centre. At McKeown, only two modified clam shell specimens were identified. The complete specimen has one perforation drilled in its centre, but is otherwise not modified. The second fragmentary specimen has been ground along its edges to form a triangular shaped like a projectile point.

McCullough reports sixty-one whole or fragmentary modified freshwater clam shells from the Draper site which she divides into eight sub-groups:

- two whole shells chipped along their ventral margin which may have been used as spoons;
- four valve fragments that have a single perforation and may have been ornaments;
- twelve valve fragments with modified ventral margins; exterior wear which may indicate their use working hides, wood or pottery;
- five shells with sharp edges that have been worn and which could have been used as skinning knives;

- twenty-one shells with wear on their exterior surface which may have been used to smooth pottery;
- ten valve fragments worn along one or more edges;
- four shells whose outer edges are extensively worn and chipped through use, possible scrapers or woodworking implements;
- three shells which have been cut into rectangular shapes, pendant-like forms that have not been perforated (1978a: 59-61).

These artifacts may have served as multipurpose tools that could have been used for a number of tasks ranging from pottery making to hide skinning. Therefore, they are too variable in both form and possible function to generate a list of defining characteristics.

Frequency of Manufacturing Techniques:

To the following observations I would add the caveat that many traces of manufacturing techniques employed in the initial stages of artifact production, would have been obliterated by subsequent stages of reduction. Therefore, the discussion that follows does not claim to accurately represent all techniques used at all stages of the reduction process – from preform to finished artifact. Rather, it presents a snap shot of those techniques whose traces remain visible to the naked eye or under low-powered magnification.

The predominant manufacturing technique employed in almost all cases is grinding, particularly in the shaping stage of production. Scraping was employed less often than grinding during the shaping stage. It's used was particularly prevalent for the production of awls, bone and antler projectile points, husking pins and antler picks. Scraping does not appear to be more prevalent on one site than another. However, incised decoration does appear to have been employed more often by St. Lawrence Iroquoian artisans, particularly in the decoration of husking pins. Polish was employed mainly in the finishing stages of production, particularly for cylindrical bone beads, bone pins, shell beads and bone and antler projectile points. As noted earlier, polish as a result of use wear is difficult to distinguish from intentional polish.

Drilling was not a commonly employed technique. Often combined with burning, it was mainly confined to the shaping stage of the production of needles, perforated phalanges, canine pendants, cranial discs, scapula pipes, snail and marine shell beads and pendants. Flaking was the least common technique employed and was confined to the production of bone scrapers and a few husking pins. As mentioned, carbonization was a technique often employed in conjunction with drilling to make holes in objects. However, it was also used as a decorative technique on phalange counters and to blacken some cylindrical bone beads prior to polishing. The tips of a few bone and antler projectile points and husking pins also appear to have been intentionally blacked, perhaps to harden them.

Conclusions

This chapter attempted to refine the classification of commonly used artifact types for a wide range of bone, antler, tooth and shell objects based on a more detailed and exhaustive analysis of repeated patterns of morphology, metrics and use wear from five artifact assemblages. In some cases making the link between form and function was not very difficult, in others it was more of a challenge. Some types appear to have very standardized, distinctive, defining characteristics. They would have taken more time to produce as they are more complex in form and in some cases, such as objects made from modified teeth, raw materials would have been harder to obtain. These can be placed in the category of curated tools and include:

- cylindrical bone beads;
- canine pendants;
- decorated bands/armlets;
- shell beads (tubular and discoidal marine shell and freshwater snail types);
- bone pins;
- bi-pointed, eyed needles;
- metapodial awls;
- conical bone and antler points;
- unilaterally and bilaterally barbed bone and antler points (harpoons);
- barbed bone fish hooks;
- modified deer phalanges (ground, perforated and counter types);
- human cranial rattles;
- turtle shell rattles;
- scapula pipes;
- canine chisels/blades;

- rodent incisor chisels/blades;
- mandible scrapers;
- husking pins;
- cylindrical flakers.

Other types appear more variable in form. These can be placed in the category of expediency tools – they would not have taken much effort to produce, raw materials were plentiful and they could be easily re-worked and re-cycled and could have served a number of purposes. These include:

- awls;
- simple bone points;
- component fish hook barbs;
- leister prongs/barbs;
- bone tubes.[79]

A third group are even more variable in form. These can also be placed in the category of expediency tools - they would have been rudimentary to produce from plentiful raw materials and could also have performed multiple functions. These include:

- antler flakers;
- antler handles;

79 Not including the large and often elaborately decorated bone sucking tubes identified on Neutral sites.

- antler picks;
- antler adzes/chisels;
- bone scrapers;
- modified clam shells.

A final group are simply too idiosyncratic and rare to type. These include:

- pendants (bone, antler, shell);
- human bone artifacts.

Bone and antler are very plastic mediums, easy to work and rework. The fact that some artifacts have been reworked and repurposed presents a challenge for the development of a rigid and standardized typology. These hybrid artifact forms are often impossible to type and have been relegated to the 'miscellaneous' category. Some scholars suggest that where there is doubt micro-wear analysis is one definitive means of assigning 'real' functional labels to objects with similar formal characteristics (Gates St-Pierre 2007: 116).

> The distinction between awls and husking pins presented here illustrates how morphological criteria alone can be misleading when trying to establish functional categories and, as a consequence, these should always be established in conjunction with other lines of evidence such as the results of microwear analysis (Ibid: 116).

As work by Gates St-Pierre has demonstrated, this analytical technique holds out interesting possibilities for future research. Yet for reasons already mentioned, analysis using a high powered microscope was beyond the scope of this study. To use this technique effectively requires considerable experience and specialized expertise and also may not be available to many scholars or be a viable alternative to low powered and unaided eye observations when dealing with very large assemblages. Having available a reference collection made of experimental replicas, applied in different ways to different materials, is also key to the successful application of high-powered use wear analysis. In the case of multipurpose tools such as awls, use wear analysis may only tell you what an object was last used for not necessarily the use for which it was initially designed.

I would argue that there are other factors that also make the assignment of functional labels challenging. Subjectivity can lead to widely divergent results. This underlines the importance of using a standardized set of observations like the ones employed in this study and the need to provide this statistical information in detail. This will enable other researchers to clearly understand why functional labels have been assigned to specific objects and to make well informed comparisons with their own findings.

Another challenge takes the form of fragmentary worked bone and bone detritus that may have been overlooked in the faunal assemblages. For example, Junker-Andersen identified an additional seventy-nine fragments of worked bone during his faunal analysis of the Steward site assemblage which were not part of the worked bone assemblage provided to me for analysis. The Steward assemblage is small compared to the assemblages from sites such as Draper, Keffer and Roebuck. Sifting through the faunal collections for these sites in order to identify worked fragments that had been missed in the original sorting process would be a vast undertaking. More recently, careful examination of osseous debitage has enabled the identification of manufacturing techniques and the reconstruction of the ‘chaînes opératoires’ for the production of osseous artifacts from the St. Lawrence Iroquoian sites in the St. Anicet cluster in southern Quebec (Gates St-Pierre and Collins 2015). This underscores the importance of careful identification of working bone during the washing and cataloguing stage.

Chapter 5

Inter-site Comparisons

The Roebuck, McKeown, Draper, Keffer and Steward sites were chosen for this study for a number of reasons. Four of the sites share a common function. Draper, Keffer, McKeown and Roebuck are large habitation sites, while the Steward site has a special purpose. Draper and Keffer are ancestral Wendat sites, while Roebuck, McKeown and Steward are St. Lawrence Iroquoian sites. Four of the sites are the result of a single continuous occupation (decades) - Roebuck, McKeown, Keffer and Draper. Steward is the result many episodes of discontinuous but long term occupation (centuries). The greater time depth of the Steward site is not expected to influence the functional or ethnic attributes of the sites' assemblages. I believe I will be able to predict the functional and ethnic variation between these sites by making the following comparisons:

a) **Roebuck versus McKeown or Draper versus Keffer.** These pairs of sites are ethnically and functionally similar. Therefore, within each pair they should demonstrate a high degree of functional and ethic similarity.

b) **Roebuck and McKeown versus Steward.** These sites share an ethnic affiliation but their function is different. Roebuck and McKeown are village sites; Steward is a fishing station. Therefore, it is predicted that artifacts will demonstrate a low degree of functional similarity, while stylistically artifacts will demonstrate a high degree of similarity.

c) **Roebuck and McKeown versus Draper and Keffer.** These pairs of sites are ethnically different but are functionally similar. Therefore, they should demonstrate a high degree of functional similarity and a low degree of stylistic similarity.

d) **Steward versus Roebuck, McKeown, Draper and Keffer.** These two categories of sites are functionally different. Therefore, they should demonstrate a low degree of functional similarity.

We know from the presence of distinctive pottery motifs and pipe styles that there was some contact between ancestral Wendat and St. Lawrence Iroquoian populations, a small but significant percentage of these ceramics on sites being exotic (Pendergast 1980, 1989, 1993; Ramsden 1978, 1990, 2009; Smith 1991; Wintemberg 1936). This is particularly true for sites such as Benson, Dawn, Kirche and Coulter, located in the Trent Valley (Damkjar 1990; Nasmith-Ramsden 1989; Ramsden 1990, 2009).[80] St. Lawrence Iroquoian ceramics have also been noted on sites in the Humber River watershed including: Black Creek, Parsons and the Seed-Barker sites (Birch and Williamson 2013: 134) and for those in the Rouge-Duffins watershed (Pihl, Birch et al 2011) including the Draper, Mantle and Spang sites (Birch and Williamson 2013: 134, 138). According to some estimates, at the Draper site St. Lawrence Iroquoian ceramic motifs represent as much as 6.6% of total rims (Pendergast 1980: 8). At the Keffer site, Smith noted the presence of two St. Lawrence pottery types, 'Durfee Underlined' and

80 Other ceramic items attributed by Ramsden to the St. Lawrence Iroquoians include: milled clay beads and discoidal clay beads with a line encircling the hole similar to those found at Roebuck (1990: 91).

‘Roebuck Low Collared’, which he describes as small, representing about 2% of the total sample (Smith 1990: 19, 52; Table 21).

At Roebuck, MacNeish observes that Huron pottery types represent only 4.1% of the total (1952: 65), lower in frequency than on sites further to the east such as the Dawson site (10.4%), located on the Island of Montréal, and within the Summerstown cluster of sites around Cornwall, Ontario. Pendergast suggests that the higher incidence of Huron ceramic types on these sites may reflect a greater amount of interaction with the ancestral Wendat than on sites further west in the Prescott cluster, where both Roebuck and McKeown are located (1993: 26). Scholars have attributed the presence of these exotic ceramic types to a number of factors – the presence of trading partners and allies, war captives and refugees, or the exchange of pots and pipes themselves.

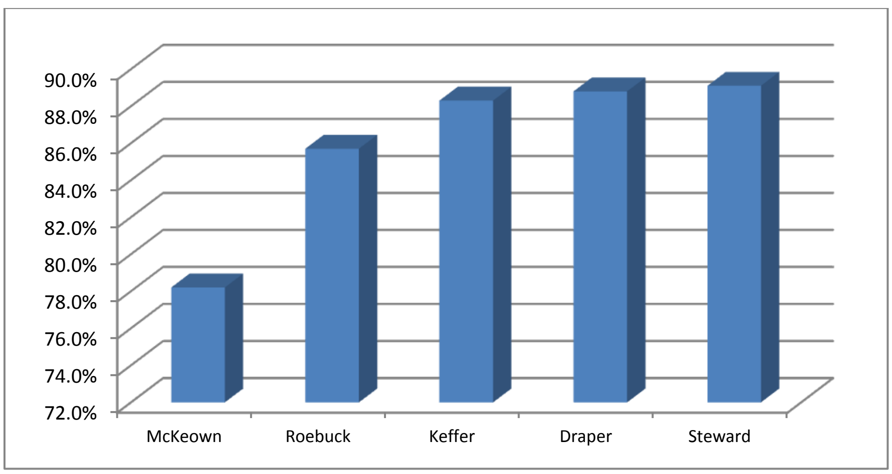
At the late sixteenth century Benson site, Ramsden interprets evidence of major longhouse expansions and the presence European metal objects, St. Lawrence Iroquoian pottery, pipes and other distinct artifact types as indicative of the, “adoption of St. Lawrence Iroquoian refugees, its resulting access to European trade items, and its economic shift to trade-oriented activities (2009: 316).” While this may not be the scenario that played out in all ancestral Wendat communities, I believe that at least some St. Lawrence Iroquoians and ancestral Wendat groups were allies and trading partners (Jamieson 1993). In the case of the five sites that form the basis of this dissertation, evidence suggests that St. Lawrence Iroquoians may have been incorporated into the Draper site population (Birch and Williamson 2013; Bradley 1987;

Pendergast 1980) while at Keffer, Roebuck and McKeown exotic pottery, pipes and clay beads are more likely to indicate contact between trading partners, allies and possibly inter-marriages that may have cemented these relationships. Therefore, it is reasonable to assume that a comparison of the osseous assemblages from these sites may demonstrate some exotic influences.

Raw Materials:

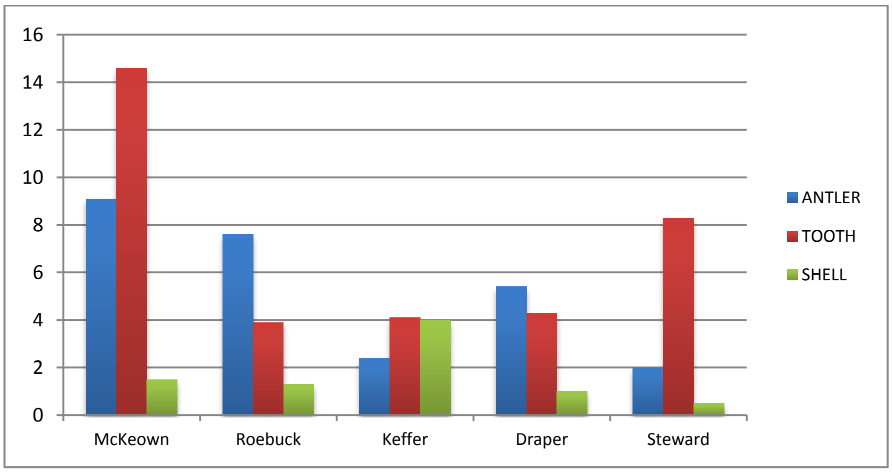
The frequency of raw materials used to produce artifacts of bone, antler, tooth and shell is presented in Figures 5.1 and 5.2.

Figure 5.1: Percentage of Bone Artifacts



The percentage of bone artifacts from four sites, approximately 85% to 90% of each assemblage, demonstrates a striking similarity. McKeown represents the exception where bone is only 78.2% of the raw material used to make objects. However, bone is obviously the preferred raw material for the manufacture of artifacts on all five sites. An examination of the incidence of antler, tooth and shell artifacts demonstrates that the Roebuck and McKeown sites have a higher frequency of antler artifacts than do Keffer and Draper. Steward exhibits the lowest frequency of antler artifacts. The antler artifacts found at Steward consist of two modified antler tines and two miscellaneous antler artifacts. There were no formal tools such as conical or barbed antler projectile points and no antler detritus.

Figure 5.2: Percentage of Antler, Tooth and Shell Artifacts



McKeown and Steward sites also demonstrate a much higher incidence of artifacts made from teeth, a reflection of the higher proportion of rodent incisor chisels found at McKeown and at Steward. Shell is the least frequent raw material found on all sites although it is most popular at the Keffer site. As we shall see, this is due to the higher frequency of worked clam shell. In terms of overall pattern, Draper and Roebuck demonstrate the highest degree of similarity.

Significant Variations in Artifact Types:

Although upon examination many of the differences in percentages of artifact types observed between sites are not marked – marked being considered 10% or greater, the following types appear to demonstrate significant variations which may reflect differences in site function, style (ethnicity), belief systems and subsistence patterns. A comparison of artifact type frequencies revealed ten artifact types which demonstrated significant variations in frequency between site assemblages. These variations were interpreted to be a reflection of the functional and ethnic variations between sites. A comparison of the number and percentage of each artifact type, including complete and fragmentary specimens, is presented in Tables 5.1 and 5.2. Table 5.1 presents data as percentages calculated for total osseous assemblages. In order to obtain a finer grained and more function-specific understanding of the distribution of artifact types, these were divided into the following categories:

- hide/bark working and weaving implements;
- food processing implements;
- hunting implements
- fishing implements;
- woodworking implements;
- stone working implements;
- digging implements;
- ritual and leisure objects;
- personal adornments;
- various modified objects.

Table 5.2 presents data as percentages of the total artifacts within these functional sub-categories.

Table 5.1: Number and % of Total Specimens by Site

Sites	McKeown		Roebuck		Keffer		Draper		Steward	
Artifact Type	**No.**	**%**	**No.**	**%**	**No.**	**%**	**No.**	**%**	**No.**	**%**
Hide /Bark Working/Weaving Implements										
Bone Awl	136	30.2%	726	33.3%	146	10.9%	782	18.1%	43	22.3%
Antler Awl	0	0.0%	1	0.0%	0	0.0%	0	0.0%	0	0.0%
Centre-Eyed Needle	7	1.6%	38	1.7%	29	2.2%	60	1.4%	9	4.7%
Metapodial Needle	0	0.0%	8	0.4%	0	0.0%	7	0.2%	1	0.5%
Bone Sewing Needle	1	0.2%	0	0.0%	0	0.0%	0	0.0%	0	0.0%
Bone Scraper	1	0.2%	4	0.2%	2	0.1%	0	0.0%	0	0.0%
Sub-Total	**145**	32.2%	**777**	35.6%	**177**	13.2%	**849**	19.6%	**53**	27.5%
Food Processing Implements										
Husking Pin	41	9.1%	132	6.1%	0	0.0%	8	0.2%	15	7.8%
Mandible Scraper	0	0.0%	0	0.0%	10	0.7%	44	1.0%	0	0.0%
Sub Total	**41**	9.1%	**132**	6.1%	**10**	0.7%	**52**	1.2%	**15**	7.8%
Hunting Implements										
Simple Bone Point	13	2.9%	35	1.6%	18	1.3%	24	0.6%	6	3.1%
Conical Bone Point	9	2.0%	63	2.9%	8	0.6%	20	0.5%	3	1.5%
Conical Antler Point	5	1.1%	48	2.2%	9	0.7%	29	0.7%	0	0.0%
Sub-Total	**27**	6.0%	**146**	6.7%	**35**	2.6%	**73**	1.8%	**9**	4.6%
Fishing Implements										
Barbed Bone Point	1	0.2%	19	0.9%	3	0.2%	0	0.0%	0	0.0%
Barbed Antler Point	1	0.2%	5	0.2%	0	0.0%	5	0.1%	0	0.0%
Bone Barbs/Prongs	34	7.5%	163	7.5%	20	1.5%	73	1.7%	34	17.6%
Carved Fish Hook	0	0.0%	20	0.9%	0	0.0%	0	0.0%	0	0.0%
Sub-Total	**36**	8.0%	**207**	9.5%	**23**	1.7%	**78**	1.8%	**34**	17.6%

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Table 5.1: Number and % of Total Specimens by Site (continued)

Sites		McKeown		Roebuck		Keffer		Draper		Steward	
Artifact Type		**No.**	**%**	**No.**	**%**	**No.**	**%**	**No.**	**%**	**No.**	**%**
Woodworking Implements											
	Incisor Chisel	62	13.7%	50	2.3%	36	2.7%	146	3.4%	14	7.3%
	Canine Chisel	3	0.7%	30	1.4%	3	0.2%	13	0.3%	2	1.0%
	Antler Adze	0	0.0%	2	0.1%	1	0.1%	1	0.0%	0	0.0%
	Antler Wedge	0	0.0%	1	0.0%	1	0.1%	0	0.0%	0	0.0%
	Antler Handle	0	0.0%	11	0.5%	0	0.0%	16	0.4%	0	0.0%
	Sub-Total	**65**	14.4%	**94**	4.3%	**41**	3.1%	**176**	4.1%	**16**	8.3%
Stone Working Implements											
	Bone Hammer	0	0.0%	0	0.0%	1	0.1%	1	0.0%	0	0.0%
	Bone Flaker	0	0.0%	11	0.5%	1	0.1%	3	0.1%	0	0.0%
	Antler Flaker	0	0.0%	0	0.0%	7	0.5%	14	0.3%	0	0.0%
	Cylindrical Flaker (Drift)	0	0.0%	0	0.0%	0	0.0%	2	0.0%	0	0.0%
	Modified Antler Tine	6	1.3%	16	0.7%	4	0.3%	58	1.3%	2	1.0%
	Sub-Total	**6**	1.3%	**27**	1.2%	**13**	1.0%	**78**	1.8%	**2**	1.0%
Digging Implements											
	Antler Pick	14	3.1%	15	0.7%	2	0.1%	6	0.1%	0	0.0%
	Sub-Total	**14**	3.1%	**15**	0.7%	**2**	0.1%	**6**	0.1%	**0**	0.0%
Ritual/Leisure Objects											
	Scapula Pipe	0	0.0%	23	1.1%	2	0.1%	1	0.0%	0	0.0%
	Bone Counter	0	0.0%	0	0.0%	5	0.4%	0	0.0%	0	0.0%
	Phalange Counter	1	0.2%	31	1.4%	32	2.4%	142	3.3%	0	0.0%
	Human Cranial Rattle Disc	2	0.4%	13	0.6%	5	0.4%	17	0.4%	0	0.0%
	Human Bone Objects	0	0.0%	11	0.5%	0	0.0%	0	0.0%	0	0.0%
	Bone Tube	1	0.2%	6	0.3%	0	0.0%	9	0.2%	0	0.0%
	Sub-Total	**4**	0.9%	**84**	3.9%	**44**	3.3%	**169**	4.0%	**0**	0.0%

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Table 5.1: Number and % of Total Specimens by Site (continued)

Sites	McKeown		Roebuck		Keffer		Draper		Steward	
Artifact Type	**No.**	**%**	**No.**	**%**	**No.**	**%**	**No.**	**%**	**No.**	**%**
Personal Adornments										
Bone Bead	9	2.0%	61	2.8%	619	46.3%	1307	30.2%	4	2.1%
Bone Pendant	0	0.0%	0	0.0%	0	0.0%	14	0.3%	0	0.0%
Bone Armlet	0	0.0%	1	0.0%	5	0.4%	38	0.9%	0	0.0%
Bone Pin	8	1.8%	4	0.2%	4	0.3%	2	0.0%	0	0.0%
Antler Comb	0	0.0%	1	0.0%	0	0.0%	1	0.0%	0	0.0%
Marine Shell Bead	5	1.1%	10	0.5%	13	1.0%	13	0.3%	1	0.5%
Shell Pendant	0	0.0%	1	0.0%	7	0.5%	1	0.0%	0	0.0%
Snail Shell Bead	0	0.0%	3	0.1%	4	0.3%	24	0.6%	0	0.0%
Canine Pendant	1	0.2%	4	0.2%	16	1.2%	26	0.6%	0	0.0%
Ground Phalange	23	5.1%	238	10.9%	58	4.3%	661	15.3%	0	0.0%
Perforated Phalange	8	1.8%	48	2.2%	29	2.2%	30	0.7%	6	3.1%
Fish Vertebrate Bead	0	0.0%	0	0.0%	0	0.0%	24	0.6%	0	0.0%
Sub-Total	**54**	12.0%	**371**	17.0%	**755**	56.5%	**2141**	49.5%	**11**	5.7%
Various Modified Objects										
Miscellan. Bone Artifact	23	5.0%	140	6.4%	63	4.7%	87	1.9%	46	23.8%
Miscellan. Antler Artifact	7	1.6%	30	1.4%	3	0.2%	32	0.7%	2	1.0%
Miscellaneous Phalange	0	0.0%	0	0.0%	0	0.0%	199	4.6%	1	0.5%
Modified Bone/Antler Frag.	3	0.7%	7	0.3%	21	1.6%	0	0.0%	1	0.5%
Modified Clam Shell	2	0.4%	16	0.7%	29	2.2%	4	0.1%	0	0.0%
Modified Conch Shell	0	0.0%	1	0.0%	0	0.0%	0	0.0%	0	0.0%
Modified Turtle Shell	0	0.0%	0	0.0%	3	0.2%	1	0.0%	0	0.0%
Bone Detritus	16	3.5%	69	3.1%	112	8.4%	298	6.9%	3	1.6%
Antler Detritus	8	1.8%	62	2.8%	5	0.5%	78	1.8%	0	0.0%
Sub Total	**59**	13.0%	**325**	15.0%	**236**	17.8%	**699**	16.1%	**53**	27.5%
Grand Total	**451**	100.0%	**2178**	100.0%	**1336**	100.0%	**4321**	100.0%	**193**	100.0%

Table 5.2: Number and % of Sub Category Specimens by Site

Sites		McKeown		Roebuck		Keffer		Draper		Steward	
Artifact Type		**No.**	**%**	**No.**	**%**	**No.**	**%**	**No.**	**%**	**No.**	**%**
Hide Working/bark Working/Weaving implements											
	Bone Awl	136	93.8%	726	93.4%	146	82.5%	782	92.1%	43	81.1%
	Antler Awl	0	0.0%	1	0.1%	0	0.0%	0	0.0%	0	0.0%
	Centre-Eyed Needle	7	4.8%	38	4.9%	29	16.4%	60	7.1%	9	17.0%
	Metapodial Needle	0	0.0%	8	1.0%	0	0.0%	7	0.8%	1	1.9%
	Bone Sewing Needle	1	0.7%	0	0.0%	0	0.0%	0	0.0%	0	0.0%
	Bone Scraper	1	0.7%	4	0.6%	2	1.1%	0	0.0%	0	0.0%
	Sub-Total	**145**	100.0%	**777**	100.0%	**177**	100.0%	**849**	100.0%	**53**	100.0%
Food Processing Implements											
	Husking Pin	41	100%	132	100%	0	0%	8	15%	15	100%
	Mandible Scraper	0	0%	0	0%	10	100%	44	85%	0	0%
	Sub Total	**41**	100%	**132**	100%	**10**	100%	**52**	100%	**15**	100%
Hunting Implements											
	Simple Bone Point	13	48.1%	35	23.9%	18	51.4%	24	32.9%	6	66.7%
	Conical Bone Point	9	33.3%	63	43.2%	8	22.9%	20	27.4%	3	33.3%
	Conical Antler Point	5	18.5%	48	32.9%	9	25.7%	29	39.7%	0	0.0%
	Sub-Total	**27**	100.0%	**146**	100.0%	**35**	100.0%	**73**	100.0%	**9**	100.0%
Fishing Implements											
	Barbed Bone Point	1	3%	19	9%	3	13%	0	0%	0	0%
	Barbed Antler Point	1	3%	5	2%	0	0%	5	6%	0	0%
	Bone Barbs/Prongs	34	94%	163	79%	20	87%	73	94%	34	100%
	Carved Fish Hook	0	0%	20	10%	0	0%	0	0%	0	0%
	Sub-Total	**36**	100%	**207**	100%	**23**	100%	**78**	100%	**34**	100%
Continued on the following page…											

Table 5.2: - Number and % of Sub Category Specimens by Site (continued)

Sites		McKeown		Roebuck		Keffer		Draper		Steward	
Artifact Type		**No.**	**%**	**No.**	**%**	**No.**	**%**	**No.**	**%**	**No.**	**%**
Woodworking Implements											
	Incisor Chisel	62	95.4%	50	53.2%	36	87.8%	146	83.0%	14	87.5%
	Canine Chisel	3	4.6%	30	31.9%	3	7.4%	13	7.4%	2	12.5%
	Antler Adze	0	0.0%	2	2.1%	1	2.4%	1	0.5%	0	0.0%
	Antler Wedge	0	0.0%	1	1.1%	1	2.4%	0	0.0%	0	0.0%
	Antler Handle	0	0.0%	11	11.7%	0	0.0%	16	9.1%	0	0.0%
	Sub-Total	**65**	100.0%	**94**	100.0%	**41**	100.0%	**176**	100.0%	**16**	100.0%
Stone Working Implements											
	Bone Hammer	0	0.0%	0	0.0%	1	7.7%	1	1.3%	0	0.0%
	Bone Flaker	0	0.0%	11	40.7%	1	7.7%	3	3.8%	0	0.0%
	Antler Flaker	0	0.0%	0	0.0%	7	53.8%	14	17.9%	0	0.0%
	Cylindrical Flaker (Drift)	0	0.0%	0	0.0%	0	0.0%	2	2.6%	0	0.0%
	Modified Antler Tine	6	100.0%	16	59.3%	4	30.8%	58	74.4%	2	100.0%
	Sub-Total	**6**	100.0%	**27**	100.0%	**13**	100.0%	**78**	100.0%	**2**	100.0%
Digging Implements											
	Antler Pick	14	100.0%	15	100.0%	2	100.0%	6	100.0%	0	0.0%
	Sub-Total	**14**	100.0%	**15**	100.0%	**2**	100.0%	**6**	100.0%	**0**	0.0%
Ritual/Leisure Objects											
	Scapula Pipe	0	0.0%	23	27.4%	2	4.5%	1	0.6%	0	0.0%
	Bone Counter	0	0.0%	0	0.0%	5	11.4%	0	0.0%	0	0.0%
	Phalange Counter	1	25.0%	31	36.9%	32	72.7%	142	84.2%	0	0.0%
	Human Cranial Rattle Disc	2	50.0%	13	15.5%	5	11.4%	17	9.9%	0	0.0%
	Human Bone Objects	0	0.0%	11	13.1%	0	0.0%	0	0.0%	0	0.0%
	Bone Tube	1	25.0%	6	7.1%	0	0.0%	9	5.3%	0	0.0%
	Sub-Total	**4**	100.0%	**84**	100.0%	**44**	100.0%	**169**	100.0%	**0**	0.0%

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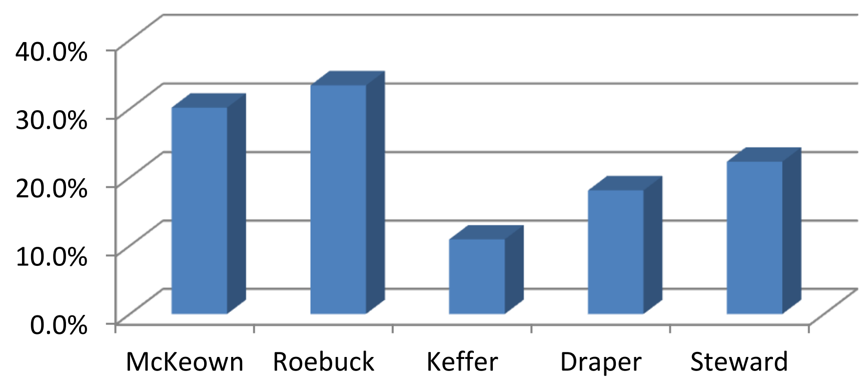
Table 5.2: - Number and % of Sub Category Specimens by Site (continued)											
Sites		**McKeown**		**Roebuck**		**Keffer**		**Draper**		**Steward**	
Artifact Type		**No.**	**%**	**No.**	**%**	**No.**	**%**	**No.**	**%**	**No.**	**%**
Personal Adornments											
	Bone Bead	9	16.7%	61	16.4%	619	82.0%	1307	61.1%	4	36.4%
	Bone Pendant	0	0.0%	0	0.0%	0	0.0%	14	0.7%	0	0.0%
	Bone Armlet	0	0.0%	1	0.3%	5	0.7%	38	1.8%	0	0.0%
	Bone Pin	8	14.8%	4	1.1%	4	0.5%	2	0.1%	0	0.0%
	Antler Comb	0	0.0%	1	0.3%	0	0.0%	1	0.0%	0	0.0%
	Marine Shell Bead	5	9.3%	10	2.7%	13	1.7%	13	0.6%	1	9.1%
	Shell Pendant	0	0.0%	1	0.3%	7	0.9%	1	0.0%	0	0.0%
	Snail Shell Bead	0	0.0%	3	0.7%	4	0.5%	24	1.1%	0	0.0%
	Canine Pendant	1	1.9%	4	1.1%	16	2.1%	26	1.2%	0	0.0%
	Ground Phalange	23	42.5%	238	64.2%	58	7.7%	661	30.9%	0	0.0%
	Perforated Phalange	8	14.8%	48	12.9%	29	3.8%	30	1.4%	6	54.5%
	Fish Vertebrate Bead	0	0.0%	0	0.0%	0	0.0%	24	1.1%	0	0.0%
	Sub-Total	**54**	100.0%	**371**	100.0%	**755**	100.0%	**2141**	100.0%	**11**	100.0%
Various Modified Objects											
	Miscellaneous Bone Artifact	23	38.9%	140	43.1%	63	26.7%	87	12.4%	46	86.8%
	Miscellaneous Antler Artifact	7	11.9%	30	9.2%	3	1.3%	32	4.6%	2	3.8%
	Miscellaneous Phalange	0	0.0%	0	0.0%	0	0.0%	199	28.4%	1	1.9%
	Modified Bone/Antler Frag.	3	5.1%	7	2.1%	21	8.9%	0	0.0%	1	1.9%
	Modified Clam Shell	2	3.4%	16	4.9%	29	12.3%	4	0.6%	0	0.0%
	Modified Conch Shell	0	0.0%	1	0.3%	0	0.0%	0	0.0%	0	0.0%
	Modified Turtle Shell	0	0.0%	0	0.0%	3	1.3%	1	0.1%	0	0.0%
	Bone Detritus	16	27.1%	69	21.1%	112	47.5%	298	42.7%	3	5.7%
	Antler Detritus	8	13.6%	62	19.2%	5	2.1%	78	11.2%	0	0.0%
	Sub Total	**59**	100.0%	**325**	100.0%	**236**	100.0%	**699**	100.0%	**53**	100.0%

Bone Awls:

A comparison of the incidence of bone awls reveals that they represent a greater proportion of the total osseous assemblages on St. Lawrence Iroquoian sites (Figure 5.3). They represent 30.2% of the total McKeown assemblage, 33.3% at Roebuck and 22.3% at Steward, yet only 10.9% at Keffer, and 18.1% at Draper. The percentage of awls at McKeown and Roebuck compares favourably with their frequency at other St. Lawrence Iroquoian village sites. At McIvor they represent 32.7% of total osseous assemblage (Chapdelaine 1988: 292); at the Glenbrook site they represent 36.2% (Pendergast 1981: 23).[81]

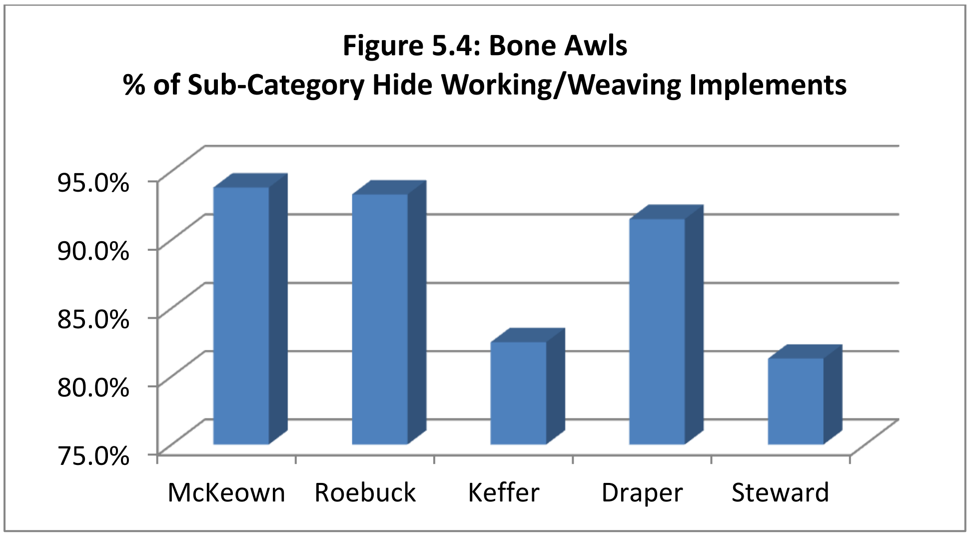
Figure 5.3: Bone Awls
% of Total



With awls amounting to only 22.28%, Steward has a significantly lower frequency of awls than either McKeown or Roebuck, which probably indicates that less use was made of awls than other types of tools at this fishing station. The even lower

81 The total osseous assemblages from McIvor amount to 269 specimens and from Glenbrook, 331 specimens.

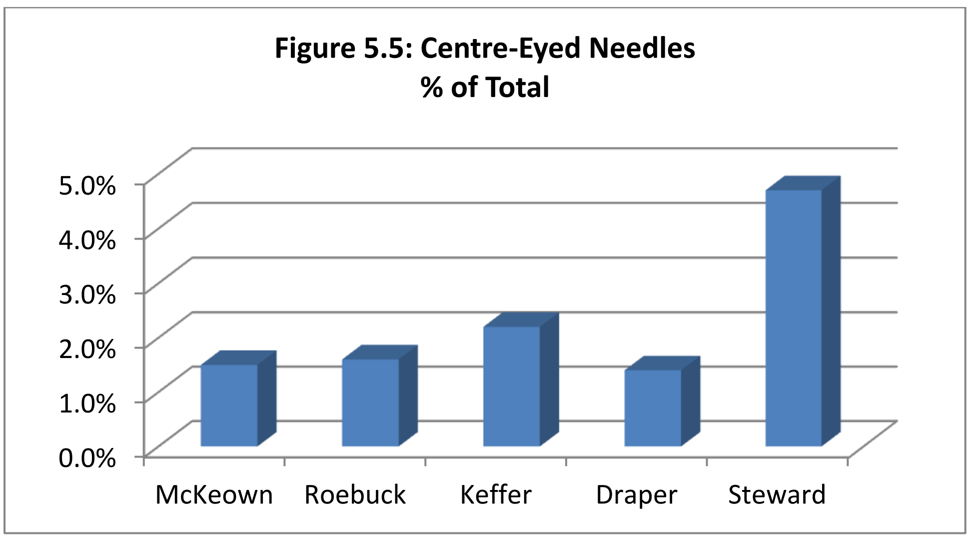
percentage of awls at Keffer (10.92%) and Draper (18.1 %) sites reflects the proportionally higher percentage of other artifact types – bone beads and deer phalanges. However, if the artifact assemblages are compared in terms of percentage of the sub-category of tools used for hide/bark working, weaving and basketry, the frequency across three sites – McKeown, Roebuck and Draper is comparable at 93.8%, 93.3% and 92.1% respectively (Figure 5.4).



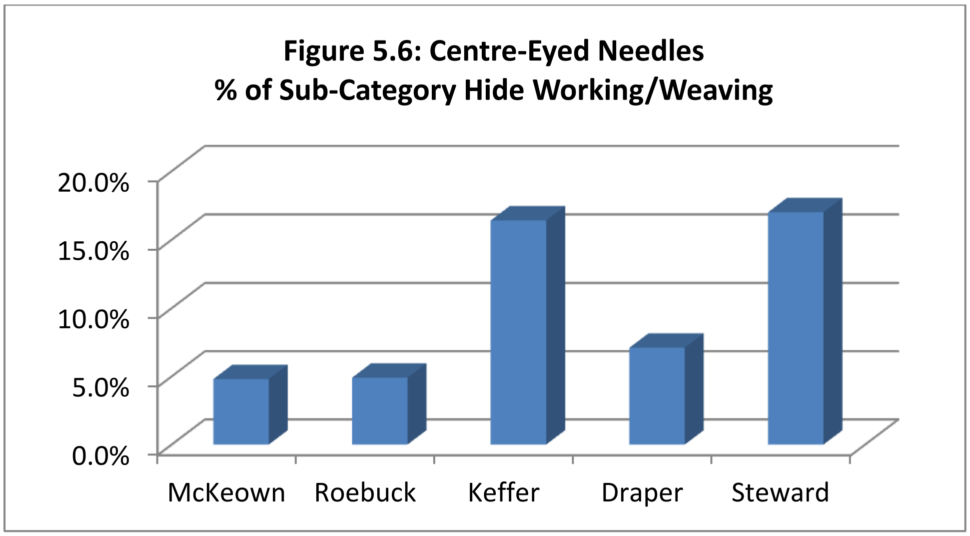
Again the lowest percentage, 81.1%, occurs at the Steward site which probably reflects the fact that less use was made of awls than other tools related to fishing at this special purpose site. Awls represent only 82.5% of sub-category at Keffer however, which is more difficult to explain. It is worth noting that both Keffer and Steward have a much higher proportion of centre-eyed needles within this sub-category.

Bi-pointed, Centre-Eyed Needles:

Centre-eyed needles, another common Iroquoian artifact type used for weaving articles such as nets, mats and webbing for snowshoes, appear as a greater proportion of the total site assemblage at the Steward site, where they represent 4.7% of the total osseous assemblage than at the other four sites where they only represent between 1.4% and 2.2% of the total assemblage (Figure 5.5). This pattern supports the notion that these objects are indeed used for making and mending nets and reflects the Steward site's specialized function as a fishing station where one would expect the need to weave and repair nets would be greater.

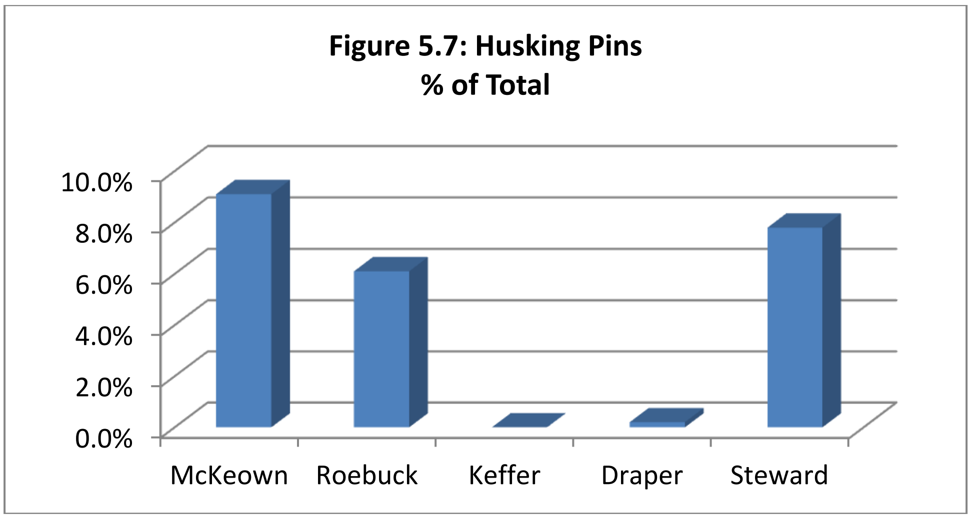


When considered as a percentage of the sub-category of tools used for hide/bark working, weaving and basketry, this difference is even more striking as they account for 17.0% of the total at Steward (Figure 5.6). The next highest percentage is found at the Keffer site where they are 16.4% of this sub-category. Centre-eyed needles are between 4.8% and 7.1% on the other sites. Again, this pattern appears to be consistent with Steward's special function as a fishing station where fishing nets could have been made, repaired and stored. It is harder to explain why they are higher in frequency at the Keffer site.   One possible explanation may lie in the higher frequency of whitefish found at Keffer. If indeed this reflects a higher dependence on whitefish rather than faunal identification bias as suggested by Stewart (1997: 339), then it may reflect a greater need for centre-eyed needles to make and repair the large gill nets that were used to catch them.



Husking Pins:

Corn husking pins are an artifact type known to have been employed by historic Iroquoian groups and are described by both Parker (1910:32-33) and Waugh (1916: 40, 169). However, unlike ethno-historic specimens, these husking pins do not have a groove for the attachment of a thong. Polish, where observable, occurs on the tips and along the lateral edges. This wear pattern is consistent with their handling and use as implements to separate the husks from ears of corn. Some specimens have been flaked along their lateral edges to create an even scraping edge, perhaps to scrape corn from the cobs. Polish is present on many of these specimens along these edges and may be the result of this kind of use. Thus, the laterally flaked variety of corn husking pin may have performed a dual husking-scraping purpose. It is also possible that these tools were used to decorate pottery and a number of them bear geometric decorations that echo pottery rim sherd designs.



This is particularly true of the husking pins from the Steward site (Junker-Andersen 1984: Figure 27, 289-290).[82] A comparison of the incidence of corn husking pins from each of the site assemblages demonstrates a striking difference between the ancestral Wendat and St. Lawrence Iroquoian sites (Figure 5.7) which is almost the reverse of that for mandible corn scrapers as we will see.

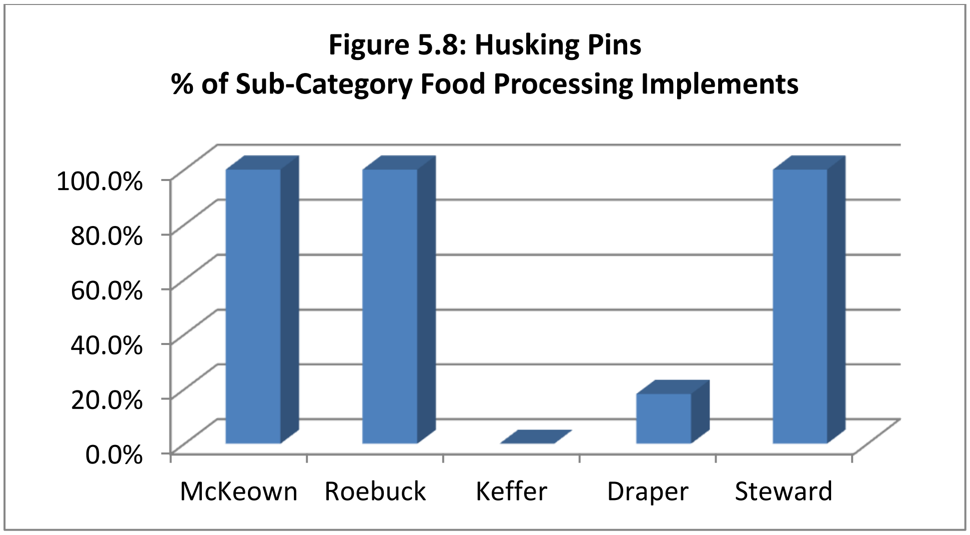
Husking pins are present almost exclusively in the St. Lawrence Iroquoian assemblages where they comprise about 6.1% to 9.1% of the total osseous

82 Junker-Andersen identifies these objects as 'presumed awls' but the tip shapes suggests they are too blunt to have been used for perforating hides or bark.

assemblage and 100% of the sub-category of food processing tools (Figure 5.8). Husking pins account for less than 0.2% of the total Draper assemblage and only 15% of the food processing tools. They are not found on the Keffer site. The small but significant presence of these artifacts on the Draper site is consistent with the presence of other kinds of St. Lawrence Iroquoian artifacts, particularly pottery. Therefore, this particular artifact type may also be an 'exotic' marker and an indicator of the presence of St. Lawrence Iroquoians living at the Draper site. As with their traditional pottery motifs, St. Lawrence Iroquoian women at Draper may have continued to make and use this 'traditional' St. Lawrence Iroquoian type of implement.

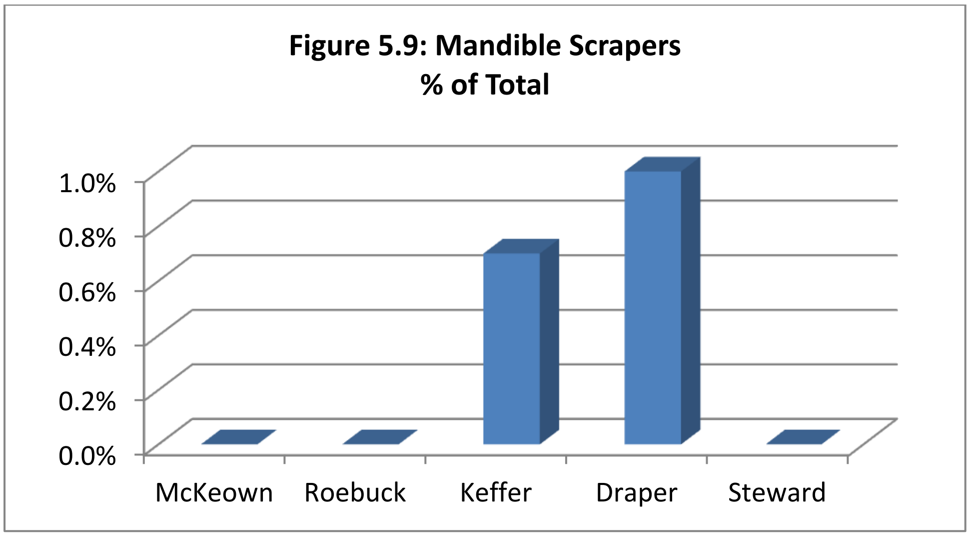
As mentioned, one of the distinguishing features of husking pins is the recurring designs found on many specimens. This form of incised decoration which closely resembles the incised triangles found on pottery rim sherds is particularly prevalent on specimens from the Steward site and is strikingly similar to decoration on similar objects found at the McIvor site and on St. Lawrence Iroquoian sites located in Jefferson County, New York. This form of decoration may also be an indicator of St. Lawrence Iroquoian cultural preference.

The scarcity of this artifact type at Keffer and Draper sites raises the question: what did they use to husk their maize? One possible answer may be wooden husking pins. Frank Speck documents the use of wooden 'corn husking pegs' among the Powhatan peoples of Virginia tools (Speck 1928: 388, Plate 97, 98). These are very similar in shape and size to bone husking pins but are made from oak and red cedar, hard, durable but more perishable raw materials.



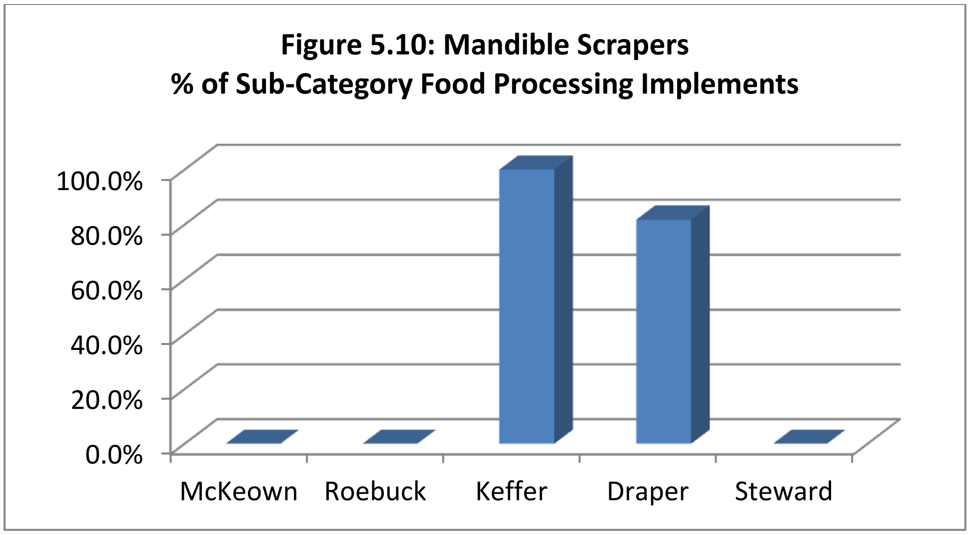
Deer Mandible Scrapers:

The use of deer mandibles to scrape kernels from corn cobs is recorded by Parker for the Five Nations Iroquois (1910:53-54) and by Waugh (1916:96, 169). Wintemberg suggests that four deer mandibles with the condyles and coronoid process removed **may** have been used as corn scrapers at the Roebuck site (1936: 48). One of these objects had been scored and broken at the distal end and I classified it as modified bone fragment. However, the artifacts I have identified as mandible corn scrapers are not complete or near complete mandibles but rather consist of sections of the body of the mandible, with teeth attached, scored and broken into pieces about 50 mm in length on average. The polish on the interior edges of many of the specimens indicates that these objects were probably suspended on a cord in the same fashion as bone beads. This may have been to ensure these tools were not misplaced during the long process of scraping large quantities of kernels from corn cobs.[83] A comparison of the incidence of this artifact type in each of the site assemblages demonstrates a striking difference between ancestral Wendat and St. Lawrence Iroquoian sites (Figure 5.9). Mandible corn scrapers are found exclusively on the ancestral Wendat sites where they comprise about 1% of the total site assemblages and between 85% and 100% of the sub-category of food processing tools (Figure 5.10).



The absence of this type of artifact form St. Lawrence sites is difficult to explain in terms of functionality and suggests a preference on their part for some other kind of tool to scrape the kernels from cobs of corn.

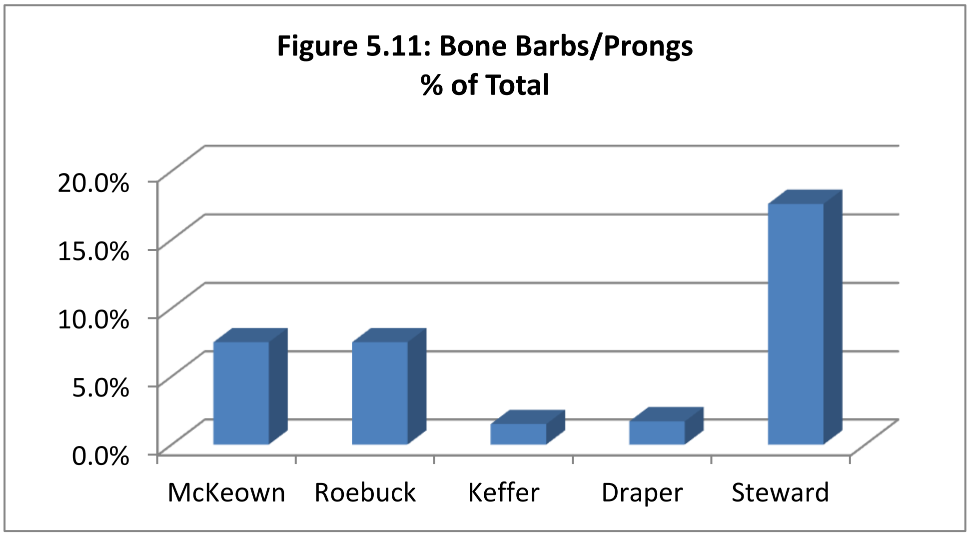
83 Another possibility would be that these objects are a variety of ornamental beads. This seems unlikely given the rough state of some specimens and the very different aesthetic of the highly polished bone beads present on the Keffer and Draper sites.

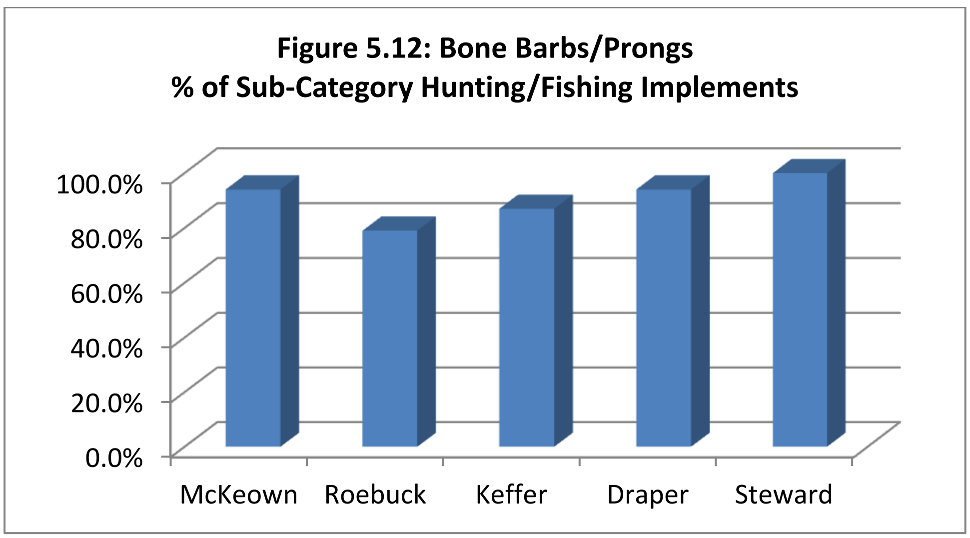


Bone Barb/Prongs:

Both Sagard (Wrong 1939:2, 588) and Champlain (Biggar 1929 (3):389) mention the use of compound fish hooks among the Huron. These hooks consisted of a wooden shank to which a bone barb was attached by means of a piece of cord. Another artifact known from the historic record is the fish leister or trident (Thwaites J.R. 6: 311; Rau 1885: 150). This object consisted of a wooden spear tipped with a single long centre prong and two smaller backward-pointing barbs with which to pierce and hold fish. These leister barbs and prongs were often made of bone.

Barbs and prongs represent a higher proportion of the osseous artifacts on St. Lawrence Iroquoian sites. At both the McKeown and Roebuck sites they represent 7.5% of the total osseous assemblage and at the Steward site, they represent 17.6% of the total (Figure 5.11). When considered as a percentage of the sub-category of fishing implements, they account for 94% at McKeown, 79% at Roebuck, 87% at Keffer and 94% at Draper. At Steward, they represent 100% of this sub-category (Figure 5.12).





The higher proportion of this artifact type on the Steward site is consistent with its special purpose as a fishing station.

Rodent Incisor Chisels:

A comparison of the percentage of rodent incisor chisels in each site's osseous assemblage demonstrates that the highest proportion occur at the McKeown site, where they are 13.7% of the total osseous assemblage (Figure 5.13). The next highest percentage is at Steward where they represent 7.3%.[84] At Roebuck they account for 2.3% of the total osseous assemblage, at Keffer 2.7% and at Draper 3.4%.

However, when rodent incisor chisels are considered as a percentage of the sub-category woodworking implements, the variation between sites is reduced. Except at the Roebuck site where they are only 53.2%, rodent incisor chisels represent over 80% of this sub-category. They account for 95.4% at McKeown, 87.8% at Keffer, 83% at Draper and 87.5% at Steward. As we will see, this is probably due to the greater use of canines as an alternative to rodent incisors for chisels at Roebuck, where they represent 31.9% of this sub-category.

Given the wide distribution of this artifact type on many Iroquoian sites and its being an indispensible and very portable part of the Iroquoian tool kit, its greater presence at McKeown may simply represent the greater exploitation of beaver by the McKeown community. While deer predominate, beaver and bear are more prevalent in the faunal remains at the McKeown site than at the other sites (Stewart 2001: 298).

84 It is interesting to note that over half the rodent incisor chisels were recovered from a single sub-square (Junker-Andersen 1980: 20). As such they may represent a single bag or other sort of container of chisel blades.

Figure 5.13: Rodent Incisor Chisels
% of Total

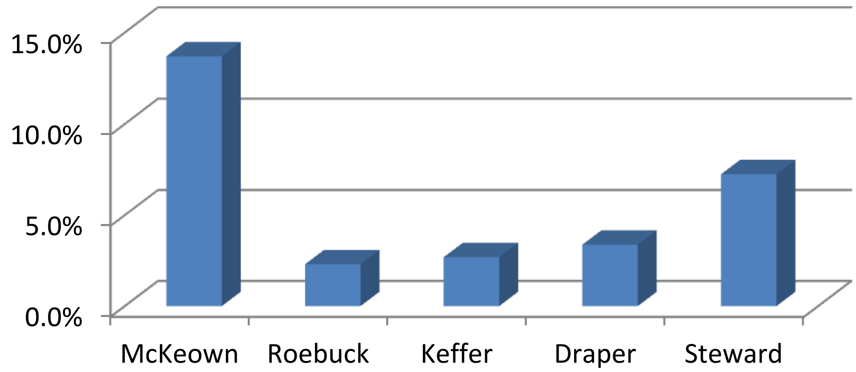
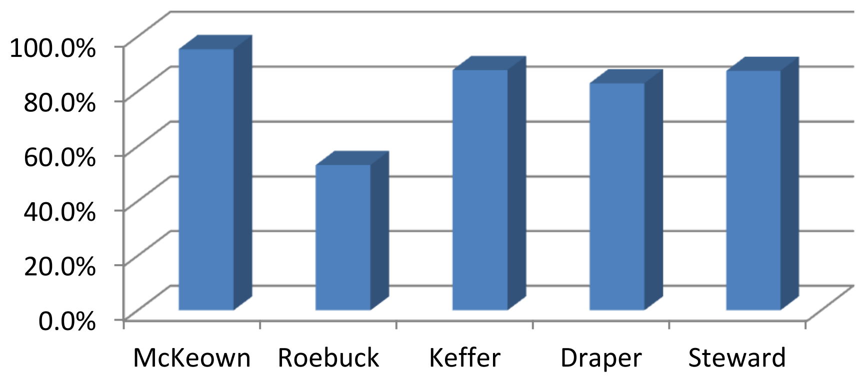


Figure 5:14: Rodent Incisor Chisels
% of Sub-Category Woodworking Implements

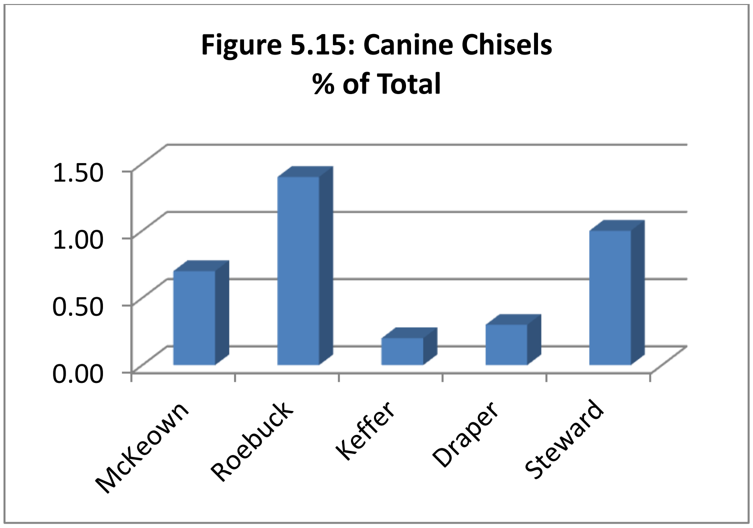


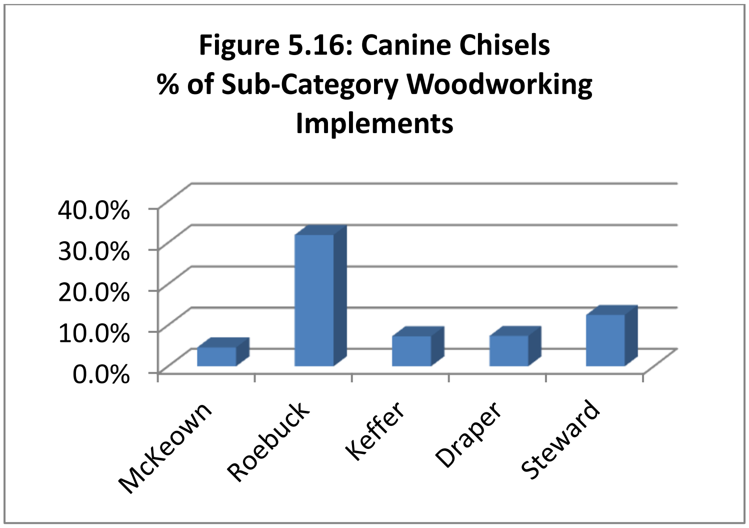
Rodent incisor chisels occur in comparable frequencies at two other St. Lawrence Iroquoian sites – McIvor where they account for 13.7% of the total osseous assemblage and Glenbrook, where they account for 11.5%. If the McKeown site dates to later in the 16th century which the presence of an iron awl and tubular marine shell beads seems to indicate, it is interesting to speculate that perhaps the growing importance of beaver fur in the European trade is reflected in this trend?

Canine Chisels:

Another wood working tool which is found in limited quantities on Iroquoian sites is the canine chisel, sometimes also labelled ‘knife or blade’. Typically the canine tooth of a large carnivore, most often a bear, wolf or dog, is spit longitudinally exposing the dentin but retaining the outer enamel. This creates the same kind of self-sharpening cutting edge found naturally in rodent incisors. If we look at the frequency of these artifacts as a percentage of the total osseous assemblage (Figure 5.15), we can see that they occur in the largest numbers on the Roebuck site, where they represent 1.4% of the total osseous assemblage.

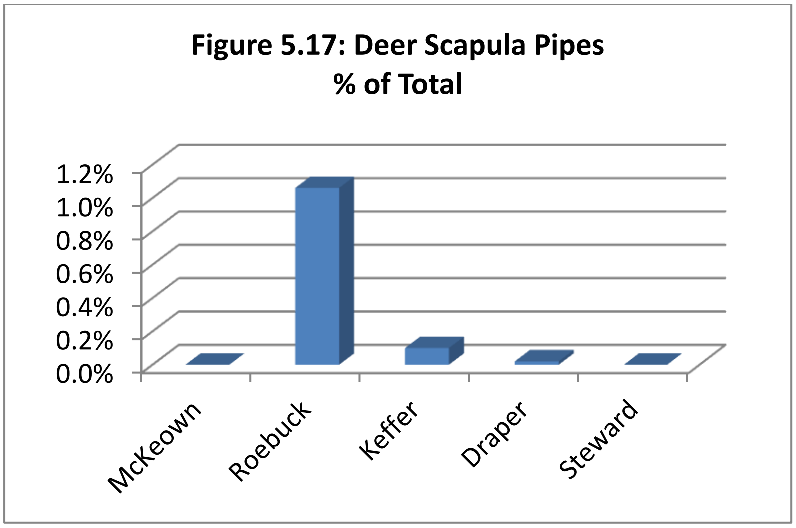
However, taken as a percentage of the sub-category woodworking implements, they represent 31.9% at the Roebuck site (Figure 5.16). This may indicate they are being used as an alternative to rodent incisors at Roebuck as suggested above. This pattern is difficult to explain, except perhaps as a reflection of the greater exploitation of black bear by St. Lawrence Iroquoian communities. If this is the case, then we must ask why they are not found in comparable frequency at the McKeown site. They account for 4.6% of the woodworking sub-category at McKeown, 7.3% at Keffer, 7.4% at Draper and 12.5% at Steward.





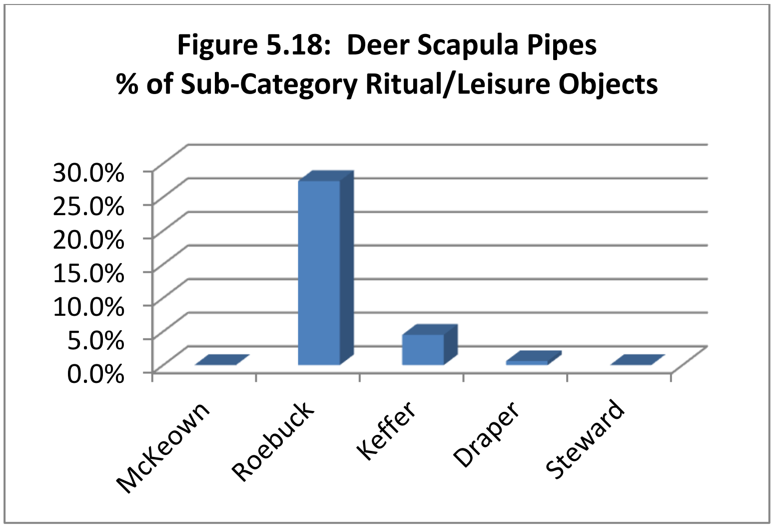
Deer Scapula Pipes:

It has been suggested that deer scapula pipes are a particular St. Lawrence Iroquoian artifact type due to their distribution and frequency on a number of St. Lawrence Iroquoian sites such as the Roebuck, McIvor and Salem sites (Chapdelaine 1988, Pendergast 1966).



This is particularly true of the Roebuck site where Wintemberg identified twenty-nine (many incomplete) specimens (1936: 84). My analysis of this collection only identified twenty-three specimens as pipes, representing 1.1% of the sites total osseous assemblage at Roebuck and 27.4% of the sub-category of objects related to ritual and leisure (Figures 5.17 and 5.18). Two specimens were found at Keffer and one at Draper. They have also been found in small numbers on ancestral Wendat sites in the Trent Valley (Ramsden 1990:91).[85] None were found in the Steward or McKeown site assemblages. Given the unfinished state of many of these specimens, one wonders if they are really intended for repeated use.

85 Other bone items ascribed by Ramsden to the St. Lawrence Iroquoians include: spatulate bone objects, bilaterally barbed harpoon heads and a carved fish hook fragment (1990: 91).



An alternative interpretation could be that they were used only once, or on a few occasions, as part of ritual linked to deer hunting. In any case, although these artifacts occur in small numbers, their presence on ancestral Wendat sites may indicate exotic influences or even the presence of St. Lawrence Iroquoians. They also appear only in a limited time horizon – the late Pre-Contact Period. If indeed they are related to some form of ritual connected to deer hunting, it may be that its practice was of very brief duration.

Modified Deer Phalanges:

As discussed in the preceding chapter, there are at least three varieties of modified deer phalanges:

- those heavily ground, drilled and gouged to an extreme degree on both dorsal and ventral surfaces - most closely corresponding to toggles, for the fastening of cloaks and other forms of apparel;

- perforated phalanges which have slight dorsal grinding and a moderate amount of ventral grinding and drilling or gouging of holes - most closely fitting descriptions of cup-and-pin game pieces, jinglers, fringes or beads;
- moderately ground, drilled or gouged to a varying degree with moderate dorsal and heavy ventral modification; with geometric or figurative designs scorched onto the dorsal surface - most likely representing a kind of dice or counters in some sort of game. McCullough suggests that they "are valuable diagnostic markers of cultural and chronological affinity (1978b: 101)." My analysis supports this conclusion.

The frequencies of the phalange sub-groups are calculated as a percentage of the total osseous assemblage are presented in Table 5.3. As indicated in Table 5.3, the highest total percentage of all sub-groups occurs at the Draper site, followed by Roebuck, Keffer, McKeown and Steward.

The ground sub-group is the most popular type on all four village sites, accounting for 4.3% at Keffer, 5.1% at McKeown, 10.9% at Roebuck and 15.3% of the total osseous assemblage at Draper. They are absent at Steward. The perforated sub-group is least popular at the Draper site, accounting for only 0.7% of total specimens, while the counter sub-group is more popular at the Draper and Keffer sites, representing 3.3% and 2.4% respectively. The Steward site assemblage with only seven specimens (3.6%), all but one of the perforated variety, may be too small to include in statistical comparisons but is included here for information.

Table 5.3: Modified Deer Phalanges as % of Total Osseous Assemblage

Phalange Type	McKeown	Roebuck	Keffer	Draper	Steward
Ground	5.1%	10.9%	4.3%	15.3%	0%
Perforated	1.8%	2.2%	2.2%	0.7%	3.1%
Counter	0.2%	1.4%	2.4%	3.3%	0%
Other	0%	0%	0%	4.6%	0.5%
% of Total Osseous	7.1%	14.6%	8.9%	23.9%	3.6%

The significant difference in these three sub-groups appears to be attributable to factors other than site function and ethnic affiliation. McCullough notes that the perforated or ‘cup-and-pin’ variety is found on Princess Point Complex sites in Ontario and persists into the Late Iroquoian Period (1978b: 100). On the other hand, the ground or ‘toggle’ variety appears only in the Late Iroquoian Period, while both varieties disappear on Historic Period sites (Ibid: 102). They account for 5.1% of the total osseous assemblage at McKeown, 10.9% at Roebuck, 4.3% at Keffer, 15.3% at Draper. They are absent at the Steward site.

If we assume that both ground and perforated phalanges were adornments or elements associated with clothing such as toggles, when considered as a percentage of the personal adornment sub-category, excluding Steward, the ground variety is least popular at Keffer at 7.7%, and most popular at McKeown and Roebuck, 42.6% and 64.2% respectively. It accounts for only 30.9% of the personal adornment sub-category at Draper.

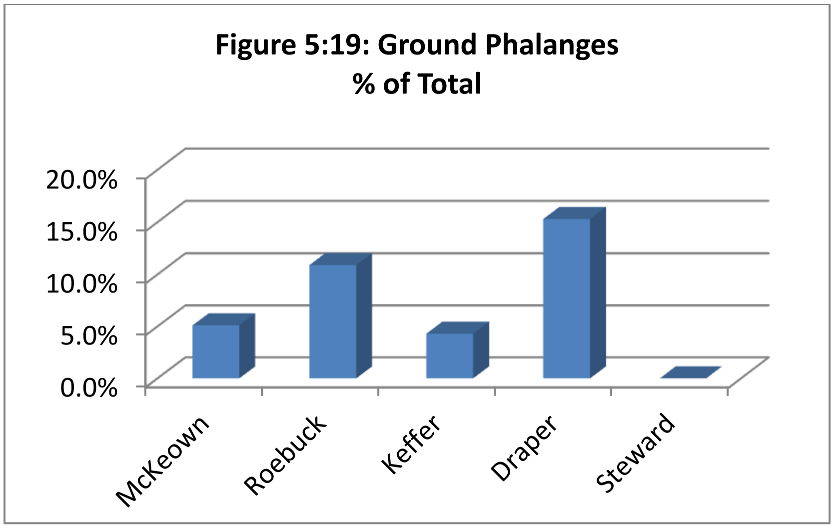


Figure 5:19: Ground Phalanges
% of Total
20.0%
15.0%
10.0%
5.0%
0.0%
McKeown
Roebuck
Keffer
Draper
Steward

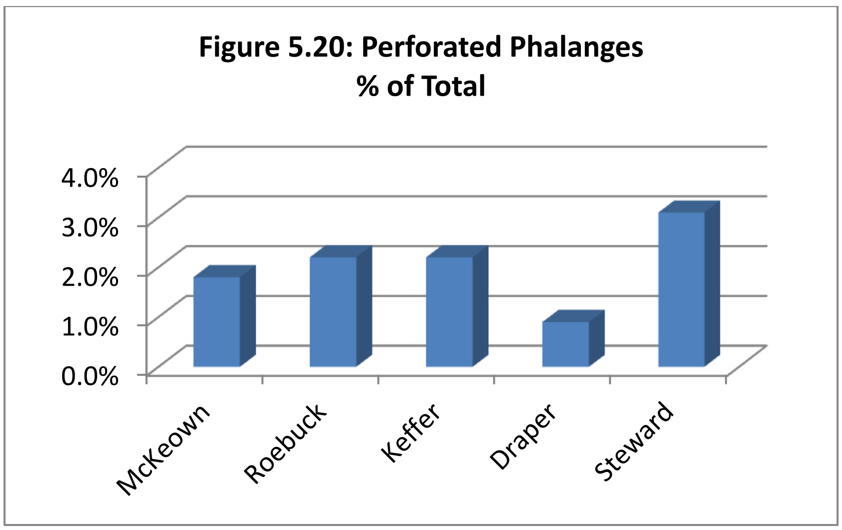


Figure 5.20: Perforated Phalanges
% of Total
4.0%
3.0%
2.0%
1.0%
0.0%
McKeown
Roebuck
Keffer
Draper
Steward

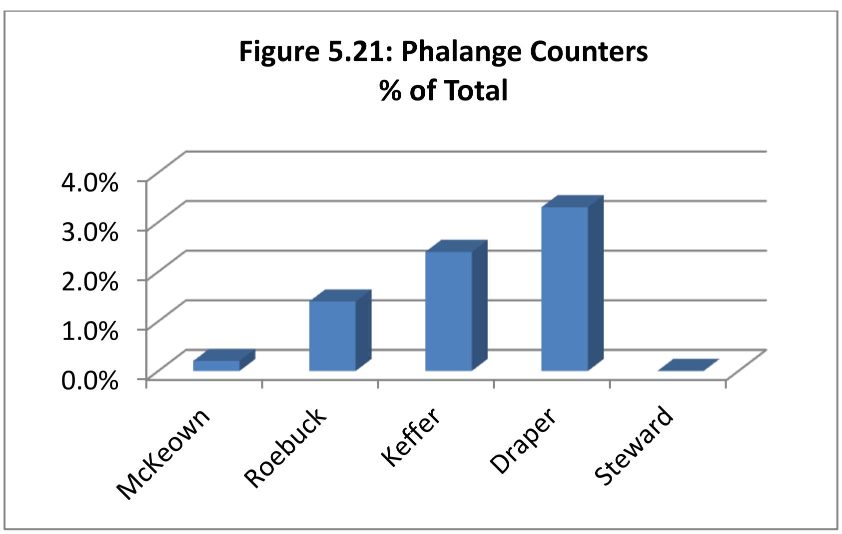


Figure 5.21: Phalange Counters
% of Total
4.0%
3.0%
2.0%
1.0%
0.0%
McKeown
Roebuck
Keffer
Draper
Steward

McCullough suggests that ground deer phalanges are a characteristic trait of St. Lawrence Iroquoian sites and this appears to be strongly supported by the evidence presented here (Ibid: 77).

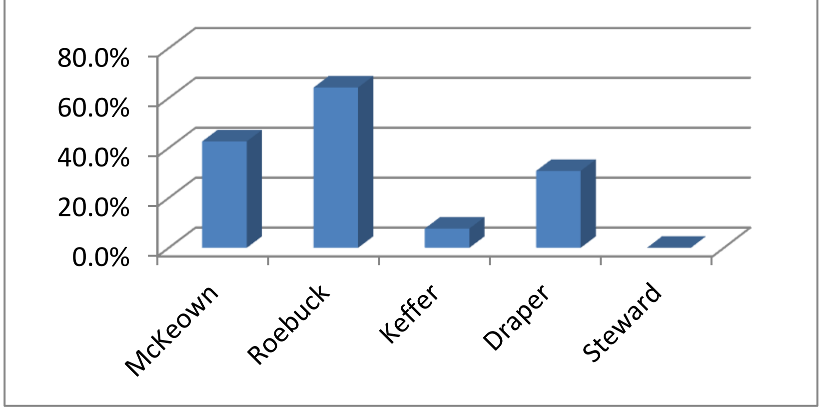
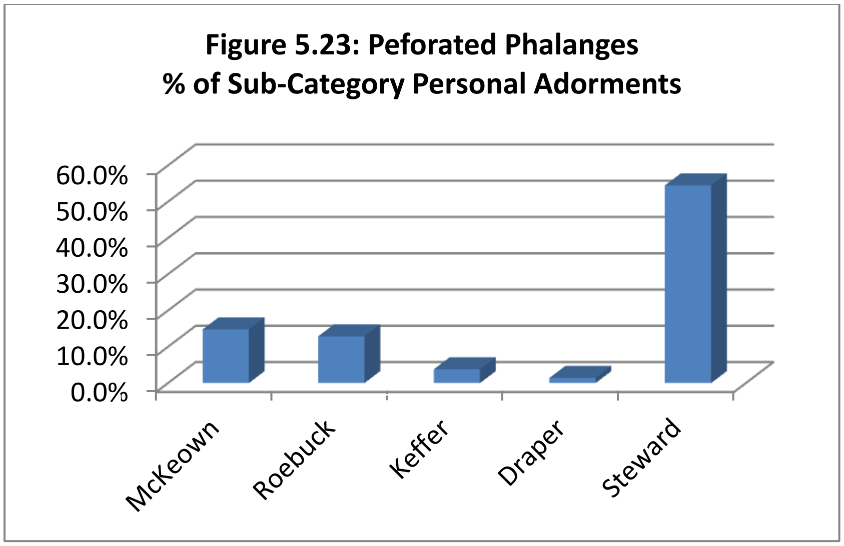


Figure 5.22: Ground Phalanges
% of Sub-Category Personal Adornments

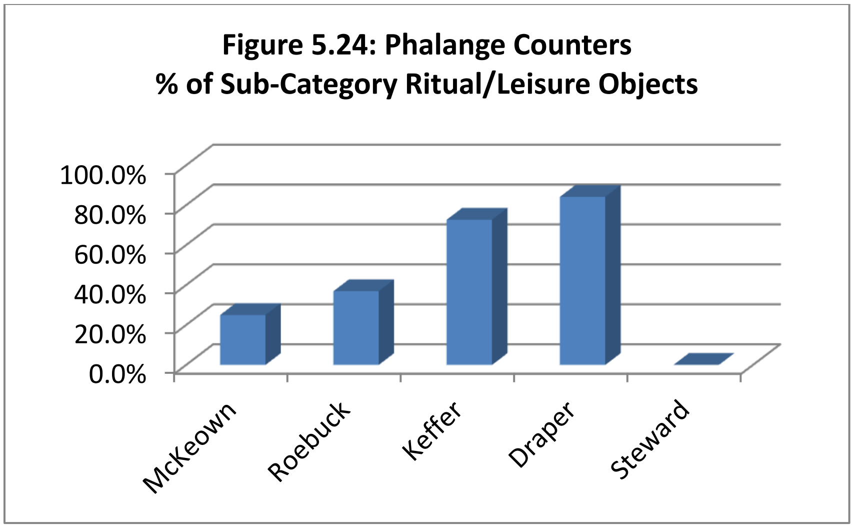
If the perforated phalange sub-category represents a type of fringe attached to clothing to act as a ‘jinglers’ rather than elements in the cup and pin game as many have suggested, when considered as a percentage of the functional sub-category personal adornments, the perforated variety (Figure 5: 23) is most popular at Steward (54.5%)[86], followed by McKeown (14.8%) and Roebuck (12.9%) and least popular at Keffer (3.8%) and Draper (1.4%).

86 Again it is important to note the small sample size at Steward.



The counter sub-group accounts for only 3.3% of the total osseous assemblage at Draper, 2.4% at Keffer, 1.4% at Roebuck and 0.2% at McKeown. It is absent at Steward. Understanding exactly what the counter type phalanges were used for is also difficult. They bear geometric, numeric and figurative markings whose significance is unclear. Were they counters for a game of chance? Were they tokens for some kind of exchange? Or were they used for divination? Unfortunately, no conclusive explanation can be made at this time.

If we assume that the counter sub-group was some sort of a token or marker, possibly used in a game of chance or a ritual of some sort (Figure 5:24), we see that as a proportion of the sub-category ritual and leisure it is much more popular at Draper (84.2%) and Keffer (72.7%), than at Roebuck (36.9%) and McKeown (25%), where there is only one specimen. As with the other sub-categories of modified phalanges, the challenge here is that we do not really know with any certainty what these objects were used for.

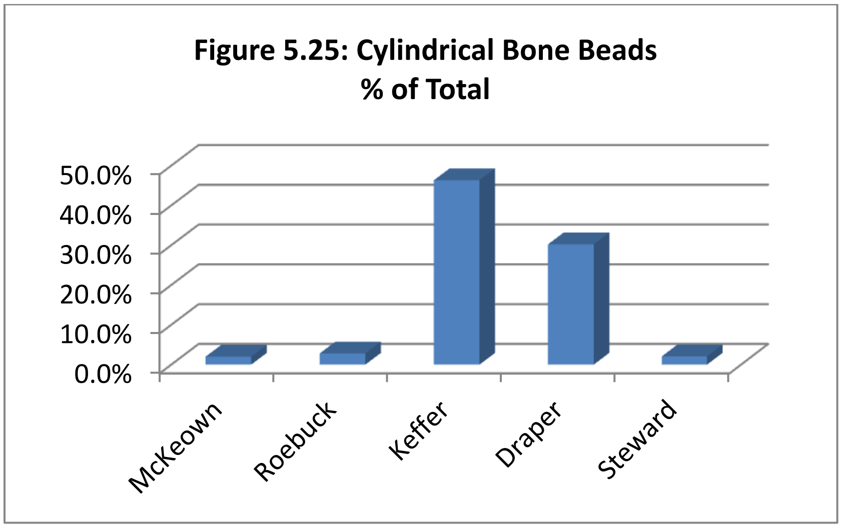


The variation in frequencies between sites seems to indicate that these artifact types are not highly reflective of site function. If in fact the ground and perforated phalanges are articles of personal adornment or elements attached to clothing, it is expected that they would be found on all five sites regardless of their function. If on the other hand, the counter sub-category were tokens in games of chance or some sort of ritual, it is more likely that they would be found at the village sites where these activities are more likely to have occurred than at fishing stations like Steward. The evidence from the five sites tends to support these assumptions.

Cylindrical Bone Beads:

A comparison of the incidence of bone beads reveals that they are a distinguishing artifact type on the ancestral Wendat sites, representing between 30% to 47% of all osseous specimens (Figure 5:25). In contrast, their presence on the St. Lawrence Iroquoian sites is small, representing less than 2.8% of all osseous specimens. They represent only 6.3% of the total osseous assemblage at the

Glenbrook site (Pendergast 1981: 21) and only 5.6% at the McIvor site (Chapdelaine 1989: 206).



As early as 1966, Pendergast suggested that,

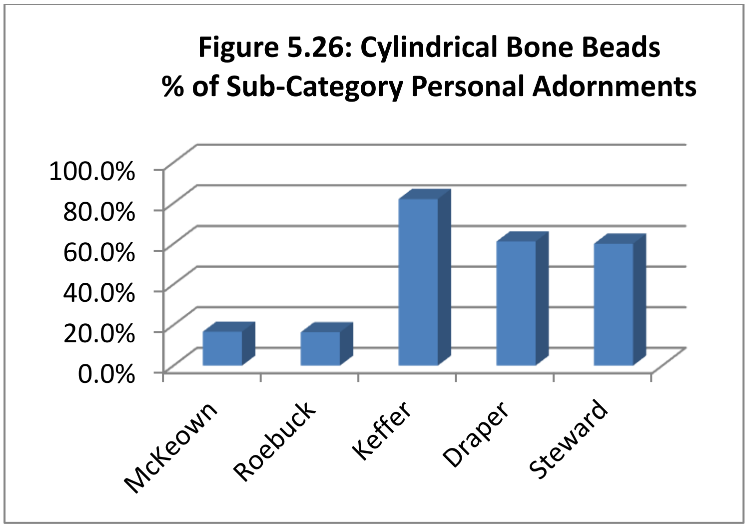
> The paucity of such beads relative to the size of the site samples involved is not typical of Iroquois [Iroquoian] sites. Furthermore, the preponderance of disc shaped clay and stone beads, vis-à-vis bird-bone beads, is not normal. Possibly this characteristic will emerge as a trait associated with Iroquois [St. Lawrence Iroquoian] sites in Eastern Ontario which produce significant quantities of low-collared and collarless pottery. The comparatively numerous large, relatively crude, mudstone beads found on these three sites [Salem, Gray Creek, Beckstead] may also emerge as a diagnostic trait (1966: 86).

Clearly bone beads represent preferred and very visible articles of personal adornment for these two ancestral Wendat communities, particularly for the people of the Keffer community. Why are there so many bone beads at Keffer? Are they indicative of the ‘exotic’ influence of their near neighbours the ancestral Neutral? Are they a reflection of the greater exploitation of avian species at Keffer and therefore, the greater availability of bird bone which was a preferred raw material for bead manufacture? Or are they simply a reflection of a preference for this form of personal adornment at the community level?

Other researchers have noted the high frequency of bone beads on both ancestral Wendat and ancestral Neutral sites in Ontario (Fitzgerald 1982: 199-204; Lennox 1981: 305-306; Lennox and Fitzgerald 1990: 423; Wright 1981: 94-97). They make up a large portion of total osseous assemblages on many other late Pre-Contact villages: 42.2% at the Dunsmore site (Thomas 1998); 41.7% at the Parsons site (Thomas 1998); 34.3% at the Baker site (ASI 2006); 30.7% at the Hubbert site (Thomas 1998); 30% at the White site (Tripp 1976); 38.4% on the Kirche site (Nasmith-Ramsden 1989), a late Pre-Contact village site in the Trent Valley.

The contrast between the five sites considered here is even more marked if we consider bone beads as a proportion of the sub-category personal adornments (Figure 5.26). They represent 82% of this subcategory at Keffer and 61.1% at Draper. They are only 16.7% at McKeown and 16.4% at Roebuck. We know from archaeological evidence that St. Lawrence Iroquoian peoples had a marked preference for beads made of other materials such as clay, slate and steatite. Therefore, this marked difference in frequency is to be expected. However, bone beads also represent 36.4% of this sub-category at Steward. This may be due to the small size of the assemblage. Finding articles of personal adornment is not surprising given who worked at the site processing the fish catch – namely, women[87] and children.[88]

87 Three infant burials (one containing two foetuses and one containing a three month old) were found within the Steward sites longhouses (Wright 1972: 7).



A similar pattern was observed by J.V. Wright at the Dougall site, a multi-component fishing camp site located at the northern end of Lake Simcoe at the Atherly Narrows (1972). At the Dougall site Wright noted that products of juvenile activity such as juvenile vessels, pipes and beads, were far more abundant than would be expected at one of the interior villages, the presumption being that in the fall women and children came to the site to 'put down' fish for the coming winter (1972:13,16). This is similar to an interpretation advanced by Junker-Andersen for the Steward site where women and children would also have helped process the catch (1981:160-161).[89] Clearly bone beads are not related to differences in site function. However, as previously discussed they appear to be a significant ancestral Wendat stylistic marker.

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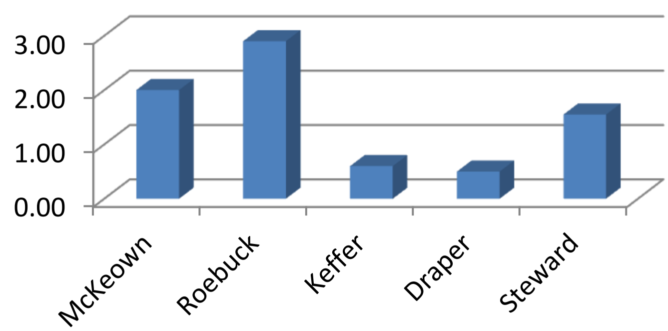
88 Ceramic material from the Steward site includes a complete juvenile pipe.
89 Few osseous artifacts were recovered from the Dougall site: two bone awls, three worked antler tines, one bird bone bead, one gorge, one antler point, one incisor chisel, a netting needle, a discoidal shell bead and four unidentified bone fragments (Wright 1972: 11).

Other Inter-site Variations:

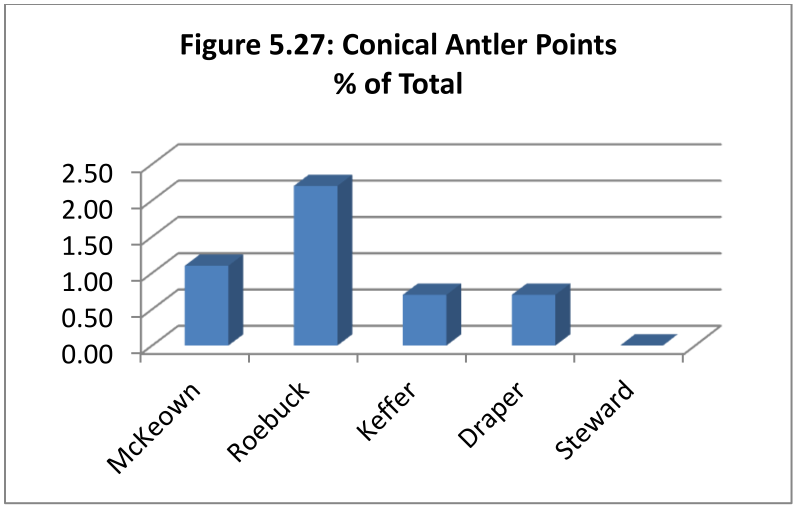
Less significant variations between site assemblages, but nevertheless noteworthy, are the following:

a) The St. Lawrence Iroquoian preference for organic raw materials for the manufacture of projectile points is dramatically illustrated by a comparison of frequencies of osseous versus lithic points. As a crude measure of comparison, when chipped lithic and osseous points from the four village sites are added together, bone and antler points account for between 24% and 35% of the total at Keffer and Draper sites whereas they account for about 93% at Roebuck and 84% at McKeown.

Figure 5.27: Conical Bone Points
% of Total

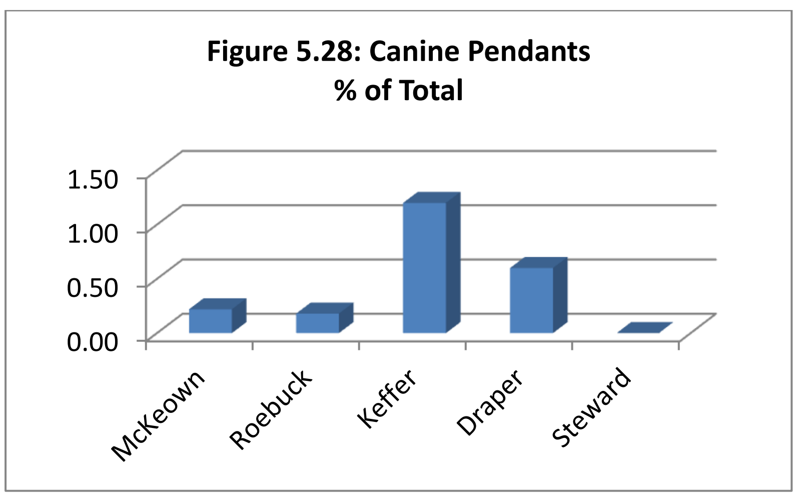


b) Conical bone points occur in greater frequency on St. Lawrence Iroquoian sites, and a specific sub-type, specimens with concave bases, appear to be a variation exclusive to St. Lawrence Iroquoians; the points found on St. Lawrence Iroquoian sites also tend to be greater in length.



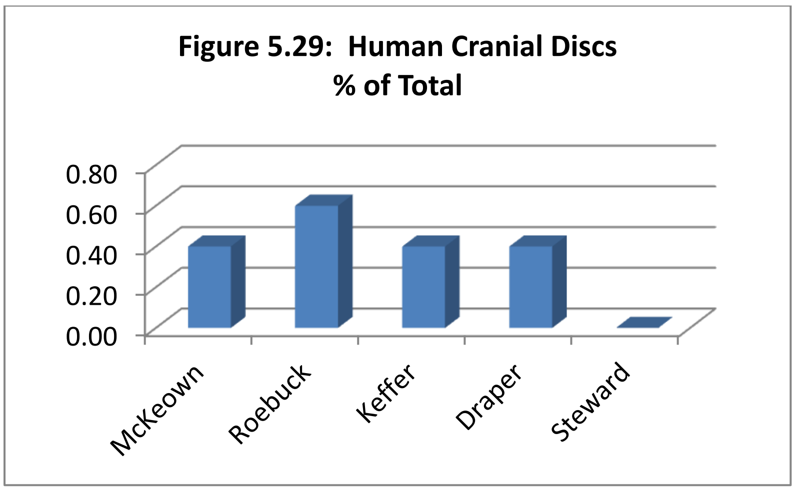
c) Like conical bone points, conical antler points occur in greater frequency on St. Lawrence Iroquoian sites; these also tend to be longer.

d) Pendants made from canines are present on all five sites. While bear canines predominate on the St. Lawrence Iroquoian sites, dog/wolf canines were more frequent on the ancestral Wendat sites. This may reflect the greater frequency of *canid* species present in the faunal remains from these sites;



e) Bone sewing needles with a single eye and single point also seem to occur in greater frequency on St. Lawrence Iroquoian sites, notably the McKeown site and the Dawson site. This type of needle is rare on Iroquoian sites and may be a late time marker;

f) Artifacts made from human bone, particularly discs derived from crania, occur on both ancestral-Wendat and St. Lawrence Iroquoian sites. They appear to be components of rattles and represent a Pan-Iroquoian artifact type particular to the late Pre-Contact Period.



Summary:

The foregoing comparison of artifact types from five archaeological sites indicates that there is marked variation in the incidence of ten artifact types in site assemblages. These are attributable to the different function and ethnic affiliation of these sites.

a) On all five sites regardless of function and ethic affiliation, bone is the preferred raw material for the manufacture;

b) Bone awls do not demonstrate significant variation on sites of different ethnic affiliation when considered as a percentage of the sub-category hide/bark working and weaving implements; there being significantly fewer awls at the Steward site is attributable to its function as a fishing station;

c) Similarly, the abundance of fish leister, fishhook barbs and prongs at the Steward site is attributable to this special function. The high frequency of these artifacts on all three St. Lawrence Iroquoian sites, relative to ancestral Wendat sites, may be explained by a greater dependence by the St. Lawrence Iroquoians on different fish species such suckers and eels as opposed to those exploited by ancestral Wendat such as whitefish captured with large nets;

d) Rodent incisor chisels are significantly more numerous at the McKeown site. Given the fact that these tools appear to be present on Iroquoian sites across the Northeast, this higher frequency may in fact simply be a reflection of the greater availability of incisors as beaver remains occur in larger proportion in the McKeown site faunal sample. It is interesting to note, however, that rodent incisor chisels occur in comparable frequencies on other St. Lawrence Iroquoian sites, accounting for 13.7% of the total osseous assemblage at the McIvor site (Chapdelaine 1989: 206) and 11.5% of the total osseous assemblage at the Glenbrook site (Pendergast 1981: 26). Sometimes bear canine incisor chisels appear to have been used as an alternative;

e) Mandible corn scrapers appear to be an ancestral Wendat artifact type and bone corn husking pins appear to be a St. Lawrence Iroquoian artifact type; the presence of mandible scrapers on St. Lawrence Iroquoian sites or the presence of corn husking pins on ancestral Wendat sites may indicate cultural interaction; in particular, the presence of bone corn husking pins in conjunction with St. Lawrence Iroquoian ceramics on ancestral Wendat sites may be indicative of St. Lawrence Iroquoian sub-populations;

f) Deer scapula pipes are a St. Lawrence Iroquoian artifact type; they are rare artifacts and their exact function is difficult to determine although they may be associated with deer hunting ritual; like corn husking pins their presence on ancestral Wendat sites may also be indicative of the presence St. Lawrence Iroquoian sub-populations; it is also possible that they are a time sensitive marker for the late Pre-Contact Period;

g) Modified deer phalanges are most numerous on the Draper site. Of the categories of modified deer phalange, the ground sub-group has the greatest incidence on all four village sites, the counter sub-group was the most prevalent on the Keffer site, and the perforated sub-group was least popular on the Draper site. The significant differences in frequency of these three sub-groups appear to be attributable to factors other than site function. Taken as a percentage of the functional sub-category personal adornments, the ground sub-group are significantly more popular on the two St. Lawrence Iroquoian village sites. Phalange counters bear numeric and figurative designs whose meaning so far eludes us. If they are counters for a game of chance or tokens in some system of exchange, then they appear to be most closely associated with ancestral Wendat communities;

h) Bone beads are significantly more popular on the ancestral Wendat sites than they are on the St. Lawrence Iroquoian sites, where stone and clay beads are predominant. It is important to note that the preferred raw material for these beads is bird bone and that avian species are found to a far lesser extent in the St. Lawrence Iroquoian faunal samples. Therefore, this pattern may reflect raw material availability as much as a cultural preference. That being said, when bone beads appear on St. Lawrence Iroquoian sites, they may indicate ancestral Wendat influence.

Conclusions:

In terms of distinguishing stylistic and functional artifact types for the four village sites: McKeown, Roebuck, Keffer and Draper, it is interesting to note that with the exception of corn husking pins and mandible scrapers which will be discussed later, the types of implements employed in everyday activities such as hide working, weaving, hunting, fishing, wood and stone working and digging are generally comparable. Stone working implements appear to be less numerous on the two St. Lawrence Iroquoian village sites. This is to be expected since the St. Lawrence Iroquoians had a less developed chipped lithic industry than the ancestral Wendat. While it is true that there are few projectile points and scrapers, flakes of both chert and quartzite are found. Based on their analysis of flotation samples from the McKeown site, Wright and Wright suggest that the St. Lawrence Iroquoians had a hitherto unrecognized utilized flake industry (Wright and Wright 1993: 4).

Gates St-Pierre suggests that, Iroquoians did not make and use stone tools as much as their predecessors did, with the possible exception of the Neutral, and that the manufacture of projectile points, scrapers, knives, drills, and other flaked stone tools almost came to an end in late Iroquoian times, these tools apparently replaced by their bone equivalents (2010: 80). Chapdelaine makes a similar point for the lithics at the Mailhot-Curran site, located within the St. Anicet cluster of St. Lawrence Iroquoian sites (2015: 227). Yet statistics suggest that the ancestral Iroquois, like the Neutral, were also an exception (Engelbrecht personal communication). Given the paucity of chipped lithics compared to the richness of the pottery and bone artifacts from Mailhot-Curran, Adrian Burke asks, "Est-ce qu'il s'agit d'une tendance généralisée de l'abandon de l'outillage en pierre taillée parmi les groupes sédentaires et horticoles, une hypothèse suggérée par certaines auteurs (Johnson and Morrow 1987)? Possiblement. Mais quand nous comparons la situation à Mailhot-Curran à d'autres groupes iroquoiens de l'Ontario et de l'État de New York, ces groupes sédentaires, villageois et horticoles ontariens et new-yorkais semblent continuer à produire at à utiliser des outils en pierre taillée en quantité appréciable (Burke 1991). Est-ce du a un manque de matière première de qualité ? Probablement (2015: 256)". It is apparent that the St. Lawrence Iroquoians at Mailhot-Curran used mostly local lithic raw materials and did not exploit chert to any great extent, even when sources were available. As Burke suggests, exotic cherts may have been obtained from sources more physically distant, but close in terms of St. Lawrence Iroquoian social and cultural networks (Ibid: 250). The same pattern is apparent for the Roebuck, McKeown and Steward sites, where the inhabitants did not exploit chert to any great extent, even when sources were available close by.[90]

Some minor differences in artifact frequency such as the greater percentage of leister prongs on St. Lawrence Iroquoian village sites may be attributable to the exploitation of different fish species, eels versus whitefish, within the two different eco-zones. The differences in utilization of bone derived from birds, bear and *canid* may indicate differential availability of these species for exploitation by St. Lawrence Iroquoian versus ancestral Wendat communities as well as reflecting cultural preferences.

If style is considered a non-verbal means of communicating identity, what do the differences in osseous assemblages tell us? What is being communicated and by who? The major differences between the four village sites relate to frequencies of personal adornments such as bone beads, artifact types which are more likely to be a visible stylistic expression of ethnicity or community based identity. Mandible scrapers also appear to be distinctive ancestral Wendat type. Husking pins and the decorative motifs found on them may be stylistic expressions of a distinctive St. Lawrence Iroquoian identity. There are also minor differences in some of the attributes of bone projectile points such as greater length and concave base shape. These may also be expressions of a distinctive St. Lawrence Iroquoian style of point. Ritual and leisure objects such as deer scapula pipes and phalange counters also demonstrate inter-site

90 Most of the chipped lithics found in the Roebuck and McKeown assemblages appear to be made from 'exotic' Onondaga chert and not more local cherts.

variation which divides along lines of ethnicity. The differences in frequency of these two artifact types are more difficult to explain because we don't know with any certainty their ritual significance or exact function.

When we compare the Steward site to the four village sites we see a much greater difference in the range of implements present. While this is to be expected at what was principally a fishing station, evidence indicates this was not the only activity taking place at the site. Based on his analysis of the Steward osseous assemblage Junker-Andersen suggests that a variety of activities occurred here beyond just fishing-related activities including hide working, bone tool manufacturing and net weaving (1981:167). Objects which I have identified as corn husking pins are also present at the Steward site. Archaeobotanical evidence certainly suggests that cultivated plants such as corn (Northern Flint variety) were being consumed on the site, as well as beans and tobacco which together comprise 73.9% of all carbonized seeds recovered (Fecteau 1981: 24-25). As Fecteau indicates:

> Carbonized corn cob fragments, distorted and fragmentary corn kernels, corn stalk fragments and corn kernel embryos were recovered from 199 of 221 (90%) floatation samples (Ibid: 24).

Was corn also being grown and processed here? The presence of corn stalks as well as cobs may indicate that limited amounts of corn (and perhaps beans) were being planted at the site during the spring fishing season and harvested, processed and eaten when the site was revisited in the late summer and early fall. It is interesting to note what types of artifacts are <u>not</u> present at the Steward site but which occur at the five village sites. A number of possible explanations for this pattern are possible.

While hide working and weaving implements such as bone awls and centre-eyed needles occur at Steward, antler awls, bone sewing needles and bone scrapers do not. It may be that the bone awls and centre-eyed needles represent items that were part of a portable tool kit carried to the Steward site by its occupants for use should the need arise. Hunting and fishing implements such as leister barbs and prongs, simple bone points and conical bone points occur but not barbed bone and barbed antler points (harpoons), conical antler points and fish hooks. Certainly the faunal evidence suggests that limited hunting was carried in conjunction with seasonal fishing activities and therefore, the presence some implements related to hunting are to be expected. The absence of barbed bone and antler points (harpoons) and fish hooks may simply indicate that the species of fish caught at the site and in its environs were not collected using these particular implements, but rather with leisters, nets and weirs. Wood working implements such as incisor and canine chisels occur at Steward but not antler adzes, wedges or handles. Like bone awls and centre-eyed needles, incisor and canine chisel blades are small and easily portable. These too may have been part of the standard tool kit carried by Iroquoians and used as need required. Stone working implements such as bone hammers, bone flakers, antler flakers are completely absent. Stone working is not an activity that would be expected on a fishing camp site. In any case, stone tool technology is not highly developed on the St. Lawrence Iroquoian sites in this region. Digging implements such as antler picks are absent. Given the limited number of longhouses (only two were located but others may have existed) and the complete absence of palisades at the site, it is to be expected that digging implements would be less in evidence than at village sites with large numbers of houses and multiple rows of palisades.

Ritual and leisure objects such as scapula pipes, human cranial discs, human bone objects, bone counters and phalange counters are absent at Steward. This may be an indication that the ritual and leisure time activities associated with these objects were mostly practiced at the main village site, when most of the population were gathered together in one place. It may also indicate that if games using counters were played, they were mostly played in the main village during the down time of the winter months and not during labour intensive periods such as seasonal fishing rounds, planting and harvesting. While personal adornments such as bone and shell beads and perforated phalanges that may have been decorative fringes are present, ground phalanges, bone pendants, antler combs, shell pendants are absent.

Various modified objects such as conch shell, turtle shell and antler detritus are absent. This is consistent with the Steward's main function as a fishing and fish processing site. Again, the reduction of raw materials to finished objects is an activity more likely to take place at the main habitation site where materials like marine shell and antler would have been cached for processing later.

The site appears to have been occupied long enough to plant and harvest corn and to build large and fairly permanent habitation structures. Women and children as well as men were present in significant numbers to help process and preserve the catch as evidenced not only by infant burials and juvenile ceramics but by personal adornments they were likely to have worn. A much greater range of activities is reflected in the osseous assemblages of the village sites including bone, antler and stone working, ritual activities and gaming.

Based on the foregoing discussion, I would conclude that the style/function approach employed in this study has both its strengths and weaknesses. I believe it has been quite successful in determining how the functional similarities and differences between these five sites are reflected in their osseous assemblages. It has also been successful in demonstrating major ethnic variation in the frequency of certain artifact types such as bone beads. It has been less successful when comparing frequencies of artifacts such as deer scapula pipes, worked deer phalanges whose exact function is not known.

The analysis has also been hampered by the lack of published comparable data from other ancestral Wendat and St. Lawrence Iroquoian sites. This has made it more difficult to distinguish what may be variation at the village level such as the prevalence of bone beads at the Keffer site, from stylistic preferences shared by groups who are part of a larger ethnic community. More research is required to confirm or contradict the interpretations I have offered here.

Chapter 6

Conclusions:

The main objectives of this dissertation were to examine the bone, antler, tooth and shell artifacts from St. Lawrence Iroquoian and ancestral Wendat archaeological assemblages, to develop a refined typology to classify them and to examine functional, stylistic and temporal variations between them. I believe that the preceding analysis has accomplished these objectives. Certain artifact types such as deer phalanges, marine shell beads and bone awls have been the subject of detailed analysis by other researchers, but most other osseous artifact types have not. Nor have many researchers attempted to examine osseous assemblages as a whole.

Among other things, my research also attempted to address the following two questions:

1) How were the artifacts made?

2) How were they used?

As previously stated, a very loose typology for bone, antler, tooth and shell artifacts already exists. One of my objectives was to refine this typology by employing more detailed and rigorous analysis based on the observations of the manufacturing processes associated with it. While little in the way of experimental or ethnographic data specifically relate to the production of these kinds of artifacts, it is possible to extract important information which provides evidence of the methods and techniques of manufacture by direct observation. I was able to examine a wide range of specimens representing different stages in the manufacturing process, from preform to finished artifact.

It is misleading to deduce an artifact's function solely from its formal attributes. This kind of guesswork is unnecessary when information that points to how artifacts were used can be obtained through direct observation. To this end, I examined use wear attributes such as polish, breakage, pocking, crushing and flaking in conjunction with overall length, width, and cross-section shape, tip and base shape, and the presence and location of decoration. This also involved attaching labels to individual artifacts and groups of artifacts based on the association and frequency of attributes of use wear, size, shape and raw material.

Drawing on ethno-historic references it was possible to label some of the artifacts to greater or lesser degrees of certainty. Based on the types derived from this data, it was possible to divide the assemblages into a number of different categories of artifacts, those necessary to the subsistence system – hunting, fishing, food processing; those necessary for making other things – stone working, wood working, building; those necessary for clothing, personal adornments, leisure activities (games) or for ritual purposes. This analysis has established a baseline for the classification of objects of bone, antler, tooth and shell and demonstrated that osseous assemblages are important to our understanding of Iroquoian subsistence, culture and life ways.

My research also aimed to understand the functional relationship between specific types of artifacts and subsistence patterns and the correlation between artifact types and ethnicity. In order to achieve this aim, I compared the frequencies of artifact types at each of the five site assemblages under study. The similarities and differences in the function and ethnic affiliation of these sites were controlled and compared in such a way as to improve our understanding of the functional and stylistic roles played by these artifacts in the Iroquoians adaptive system. As the preceding analysis has demonstrated, the distribution and frequency of artifact types has allowed me to define significant variations in artifact style and function, subsistence practices and time horizons.

The ancestral Wendat and St. Lawrence Iroquoians were two neighbouring and closely allied populations. Although these two populations were widely separated by geography, their osseous assemblages share many basic characteristics with each other and with other Iroquoian speaking groups in the Northeast. This supports what zooarchaeological and archaeobotanical evidence tells about these communities – that they were semi-sedentary horticulturalists who subsisted on a diet of corn, beans and squash supplemented by fish, game and wild plants. While there appear to be no major functional differences in life ways of the two groups, there do appear to be slightly different subsistence strategies reflected by the degree exploitation of different species, both fish and mammals? These differences can be attributed to the different micro-environments in which the groups lived, the availability of different species of fish and game.

While they shared the same basic subsistence patterns and life ways, their osseous assemblages reflect distinct cultural traditions. Why are there some differences in the types of osseous artifacts these two Iroquoian populations used?

As previously suggested, some differences may be attributable to differential access to lithic raw materials such as chert. However, it is also possible that some differences may simply be attributable to cultural preference. Just as different traditions are reflected in the distinct ceramic motifs and pipe styles they produced, these traditions are also reflected in their bone, antler, tooth and shell artifacts. Differences in the frequencies of personal adornments for example clearly reflect the different ethnic affiliation of the sites' populations – ancestral Wendat versus St. Lawrence Iroquoian.

Some of the frequencies of artifact types found at the Steward site, a fishing station, were different from those found on the four main habitation sites. This reflects not only the special function of the site and the activities performed there but the population profile of the people who worked there. The site appears to have been occupied long enough to plant and harvest corn and to build large and fairly permanent habitation structures. Women and children as well as men were present in significant numbers to help process and preserve the catch as evidenced not only by infant burials and juvenile ceramics but by personal adornments they were likely to have worn. A much greater range of activities is reflected in the osseous assemblages of the village sites including bone, antler and stone working, ritual and leisure activities.

However, these are only five archaeological sites - limited in terms of both ethnicity and geography; much more work needs to be undertaken. Unfortunately, it was not possible to draw comparisons with osseous assemblages from most other Iroquoian sites because site reports do not contain detailed morphological and metrical information about osseous assemblages. Many even lack representative photographs of artifacts which have been only very briefly described in the text. Often little beyond the attachment of type labels, rough counts and faunal identification is undertaken. Going forward, it is hoped that Iroquoian researchers will record and report more detailed data for Iroquoian osseous assemblages and undertake more comparative analysis.

Future Research

There are many lines of inquiry which are outside of the scope of the current study but which offer very interesting areas for future research.

1) One of the biggest challenges for anyone attempting inter-site comparisons is the lack of standardized, consistently applied terminology and consensus on the attributes that characterize types. Re-examination of existing osseous assemblages based on the attributes and typology developed here would provide greater detail and more consistent and comparable data with which to make inter-site comparisons. Existing collections hold a gold mine of information and with the solid foundation of methodology, coding form and standardized set of observations employed here, inter-site comparisons of osseous assemblages could be a new norm and not the exception.
2) This study focussed exclusively on sites of the late Pre-Contact Period affiliated with ancestral Wendat and St. Lawrence Iroquoians. Further analysis of other Wendat and St. Lawrence Iroquoian assemblages needs to be undertaken to broaden our data base and to test the conclusions drawn here. This type of research also needs to be extended to other Iroquoian groups – ancestral

Mohawk, Onondaga, Oneida, Cayuga and Seneca; Neutral and Petun.

3) This study developed basic, fairly high level artifact types with common defining characteristics. Further refinement of artifact types with the objective of defining sub-types, where they exist, such as the analysis undertaken by McCullough for modified deer phalanges, and Gates-St-Pierre for bone awls, would greatly enhance our understanding of the breadth of regional and cultural variations within types.
4) Bone and antler tools represent an important component of the technologies developed by Iroquoians to exploit their natural environment. Obtaining a more complete picture of their life ways is important to understanding this adaptation. Studies that examine the complete repertoire of tools used in hunting and fishing, for example would greatly enhance our understanding of how these tools were used and how they complemented lithic and other technologies.
5) As demonstrated by the artifact frequencies at the Steward site, the study of special purpose sites such as those used for fishing and hunting, can yield a great deal of important information about seasonal occupation, the range of activities conducted there, the types of species exploited, the community-level division of labour, the labour force profile and the technology employed to exploit these resources. The future excavation and analysis of special purpose sites has the potential to fill in large knowledge gaps with regard to Iroquoian life ways.
6) Due to logistical and time constraints, this study applied macroscopic observation to identify traces of manufacturing techniques and use wear. However,

employing high powered and SEM microscopes to examine traces of manufacturing and use wear of specific artifact types in conjunction with replicative experiments, would greatly enhance our understanding of how objects were made and what objects were actually used for. It might also help us better understand the impact of European metals tools on the manufacture of Late Pre-Contact bone technology through microscopic trace analysis.

7) Many Iroquoian sites in Canada excavated in the last forty years have been the subject of salvage excavations that employed heavy equipment. As a result, few sites had undisturbed living floors within longhouses and other activity areas. Subsequently a lot of valuable contextual information has been lost. Some studies such as Hayden's analysis of activity nucleation and domestic refuse concentrations within longhouse interiors at the Draper site (1979, 1982), Thomas' analysis of the distribution of bone artifacts from the Parsons site (1998) and Ramsden's study of longhouse extensions at the Benson site (2009) have demonstrated much can be learned about the distribution of osseous artifacts within discrete activity areas. More detailed analysis of the spatial distribution of bone artifacts within longhouse living floors and villages would help define specific activity areas, the presence of exotic populations and could also help us further define what objects were used for and how and where they were used.

8) A related, unanswered question posed by this study is: Where is the debitage? As mentioned, it is often difficult to distinguish bone debitage resulting from food processing from bone debitage resulting from tool production. In some cases

they may be one and the same. Nevertheless, as analysis of osseous debitage at sites in the St. Anicet cluster has demonstrated, it would be useful to conduct a closer examination of faunal remains, particularly those recovered from undisturbed contexts, in order to more completely reconstruct the initial stages of the 'châine opératiore' employed to make osseous tools.

9) As recent biomolecular analysis of osseous objects such as bone points and tubes demonstrates (Gates St-Pierre and Collins 2015), it is possible to make zoological identification to the genus level for objects so heavily modified that the original bone element and species cannot be identified. This avenue of research may permit us to identify whether or not specific animals were being selected as a source of raw material for the manufacture of specific artifact types.

As a final remark, let me state that this study has taken much longer to complete than originally anticipated. From the outset it may have been too ambitious in scope, perhaps a classic case of not being able to see the forest for the trees – over 8,000 trees all told. It has been a long journey but in the end I believe it puts us firmly on a path out of the woods.

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Appendix 1

Artifact Codes and Coding Form

ARTIFACT CODES

Site No.:

1. Draper
2. Keffer
3. Roebuck
4. Steward
5. McKeown

Catalogue No.:

Sub-catalogue No.:

Sub-catalogue letter:

Provenience:

1. house
2. midden
3. palisade
4. burial
5. general

MORPHOLOGY

Raw material:

1. bone
2. antler
3. tooth
4. shell
5. Ivory

Nature of Specimen:

1. modified deer phalange
2. bone bead
3. bone awl

4. centre-eyed needle
5. bone pendant
6. simple bone point
7. barbed bone point (harpoon)
8. bone band/armlet
9. scapula pipe
10. human cranial disc/rattle
11. miscellaneous bone artifact
12. bone bead wastage (merged with code 13, modified bone fragment)
13. modified bone fragment
14. fish vertebra bead
15. modified mandible fragment (merged with code 13, modified bone fragment)
16. antler awl
17. modified antler tine
18. conical antler point
19. barbed antler point (harpoon)
20. antler handle
21. antler comb
22. miscellaneous antler artifact
23. antler wedge
24. antler pick
25. carved bone fish hook
26. snail shell bead
27. modified clam shell
28. modified marine shell
29. modified turtle shell
30. canine chisel/blade

31. incisor chisel/blade

32. bone tube

33. conical bone point

34. antler adze

35. bone barb/prong

36. mandible scraper

37. marine shell bead

38. shell pendant

39. bone beamer (not used)

40. bone hammer

41. bone flaker

42. antler detritus

43. bone detritus

44. bone counter

45. bone husking pin

46. metapodial needle

47. bone scraper

48. awl or point fragments

49. bead or tube fragments

50. canine pendant

51. modified human bone object

52. antler flaker

53. cylindrical flaker (drift)

54. bone pin

55. bone sewing needle

Completeness of specimen:

1. complete

2. broken

Completeness of specimen:

1. finished
2. preform
3. unfinished
4. indeterminate
5. by-product

Longitudinal shape:

1. symmetrical
2. asymmetrical
3. irregular
4. tubular
5. natural
6. square
7. circular
8. oval
9. triangular

Cross-sectional shape (see figure)

Carbonisation:

1. absent
2. present on tip/distal
3. present on shaft
4. present on base/proximal
5. burnt overall
6. burnt and polished
7. burnt on break
8. burnt and ground

Decoration:

1. absent
2. geometric
3. figurative
4. indeterminate

Tip shape (see figure)

Finish on ends of tubes:

1. indeterminate
2. modified on both ends
3. both well worn
4. both rough
5. one rough, one modified worn
6. one rough, one well worn
7. one modified worn, one well worn
8. one indeterminate, one rough
9. one indeterminate, one modified worn
10. one indeterminate, one well worn

Interior polish:

1. one inner edge
2. both inner edges
3. interior

Type of circumferential groove:

1. continuous
2. discontinuous
3. both continuous and discontinuous
4. indeterminate

No. of grooves:

No. of notches:

No. of holes:

Base description:

1. natural
2. flattened
3. rounded
4. pointed
5. basally notched
6. side notched
7. grooved
8. socketed
9. bevelled
10. irregular

Fragment remaining:

1. tip
2. shaft
3. base
4. complete
5. split in ½
6. indeterminate shatter

METRICS

Maximum length (diameter) in mm

Maximum width at base (proximal end) in mm

Maximum width at mid-point in mm

STAGES OF REDUCTION

Primary reduction (Preforming):

1. wedged
2. bashed
3. split
4. groove and splinter
5. groove, twist and snap
6. indeterminate splintering technique
7. groove and snap
8. indeterminate
9. ground
10. flaked
11. whittled
12. drilled
13. snapped
14. broken

Secondary reduction (Shaping):

1. scraped
2. carved
3. ground
4. ground and scraped
5. scraped and ground
6. flaked
7. drilled
8. polished

Tertiary reduction (Finishing):

1. polished
2. bevelled
3. ground

4. ground and polished
5. flaked
6. drilled
7. scraped

LOCATION OF MANUFACTURING TECHNIQUE

Drilling:

1. proximal/base
2. distal/tip
3. ventral/lateral
4. dorsal/distal
5. right lateral/proximal
6. left lateral
7. overall
8. centre

For modified teeth only

1. lingual
2. buccal
3. lateral
4. distal
5. proximal
6. n/a
7. overall

For deer phalanges only

9. proximal/distal/ventral
10. proximal/distal/dorsal
11. proximal/ventral/dorsal
12. distal/ventral/dorsal

13. proximal/distal/ventral/dorsal

For cranial discs and clam shells

14. edge

15. edge/dorsal

Grinding: (see above)

Scraping: and whittling (see above)

Polishing: (see above)

Flaking: (see above)

USE WEAR

Location of polish:

1. tip
2. tip and shaft
3. tip, shaft and base (over all)
4. shaft only
5. shaft and base
6. base
7. distal end
8. proximal end
9. hole
10. tip and base

Extent from tip in mm

Location of striae:

1. parallel on tip
2. parallel on mid-shaft
3. parallel on base
4. parallel on shaft (overall)
5. perpendicular on tip

6. perpendicular on mid-shaft
7. perpendicular on base
8. perpendicular on shaft (overall)
9. parallel on tip and mid-shaft
10. parallel on tip and base
11. parallel on shaft and base
12. perpendicular on shaft and tip
13. perpendicular on tip and base or either end
14. perpendicular on shaft and base

Extent from tip in mm

Location of breakage:

1. tip
2. shaft
3. base
4. complete
5. split

Extent from tip in mm

Location of pocking:

1. tip
2. shaft
3. base
4. tip and shaft
5. shaft and base
6. tip and base
7. overall

Extent from tip in mm

Location of crushing (same as above)

Extent from the tip in mm

Location of flaking or fracturing (same as above)

Extent from tip in mm

(Note: 0 means not present or not applicable)

Figure A1:1

CODING FORM

Site: __________________ Coder: __________________ Date: ________________

PROVENIENCE:

Site: _: Cat. No. : _:_:_:_:_:_: Sub. No.:_:_: Sublet. : _:_: Provenience: _:_:_:

FAUNAL IDENTIFICATION:

Raw Material: _:

DESCRIPTION:

Nat. Spec. :_:_:_: Completeness :_: Completion :_: Length :_:_:_: Proximal Width :_:_:_:

Mid Width :_:_: Longitudinal Shape :_:_: Cross-Section Shape :_:_: Heat Altered :_:

Decoration Present :_: Tip Shape :_:_:

Primary Reduction (Blank Production):_:_: Secondary Reduction (Shaping):_:_:

Tertiary Reduction (Finishing):_:_:

Polish Location :_:_: Polish Extent :_:_:_: Striae Location :_:_: Striae Extent :_:_:_:

Breakage Location :_:_: Breakage Extent :_:_:_: End Finish :_:_: Interior Polish :_:_:

Groove Type :_: No. Grooves: _: No. Notches: _:_: No. Holes: _: Base Shape: _:_:

Fragment Remaining: _:_:

Pocking Location: _:_: Pocking Extent: _:_:_:

Crushing Location: _:_: Crushing Extent: _:_:_:

Fracture Location: _:_: Fracture Extent: _:_:_:

Drilling: _:_: Grinding: _:_: Scraping: _:_: Polishing: _:_: Flaking: _:_:

Figure A1:2

Overall Shape Phalanges

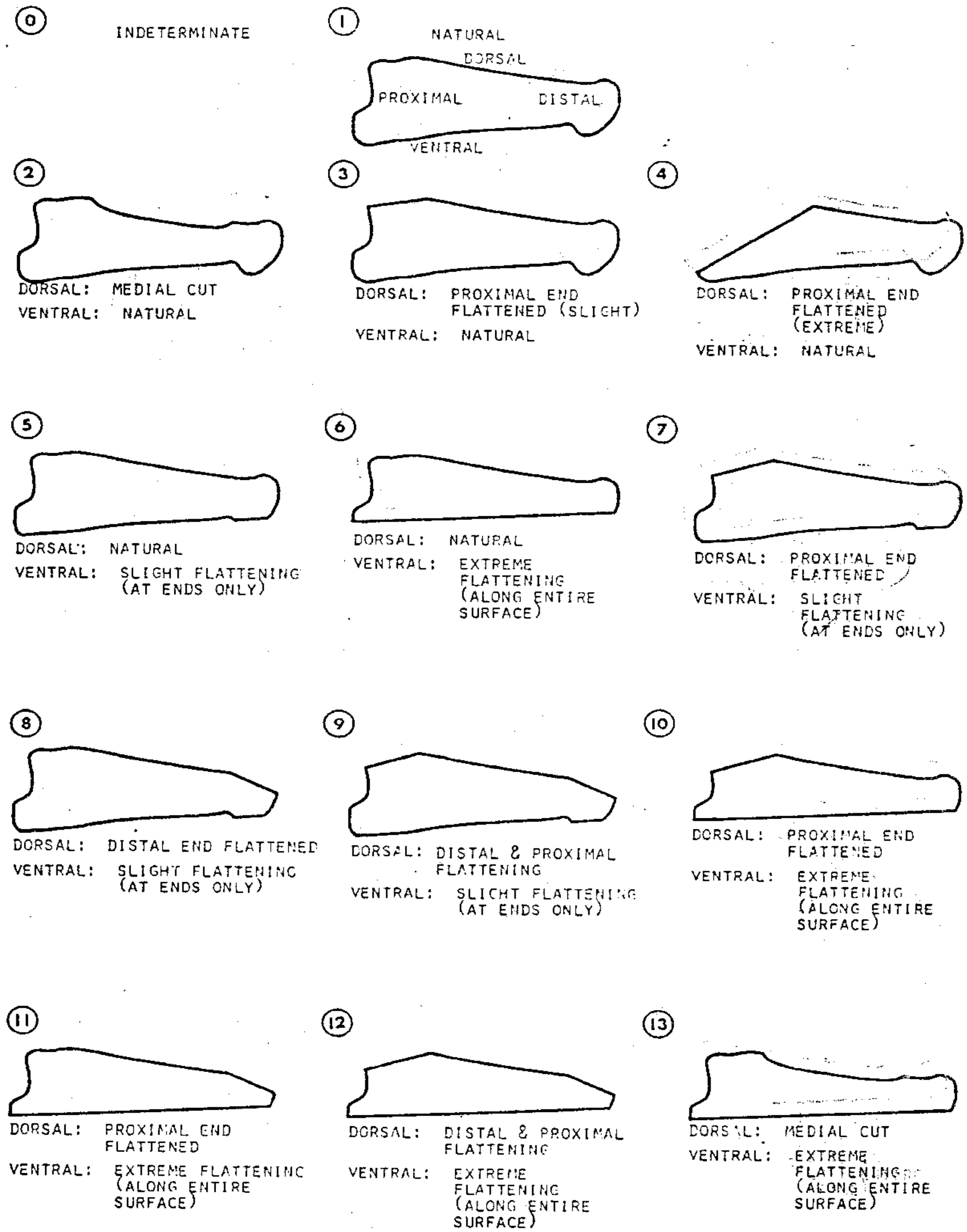


Figure A1:3

Overall Shape Phalanges (cont'd)

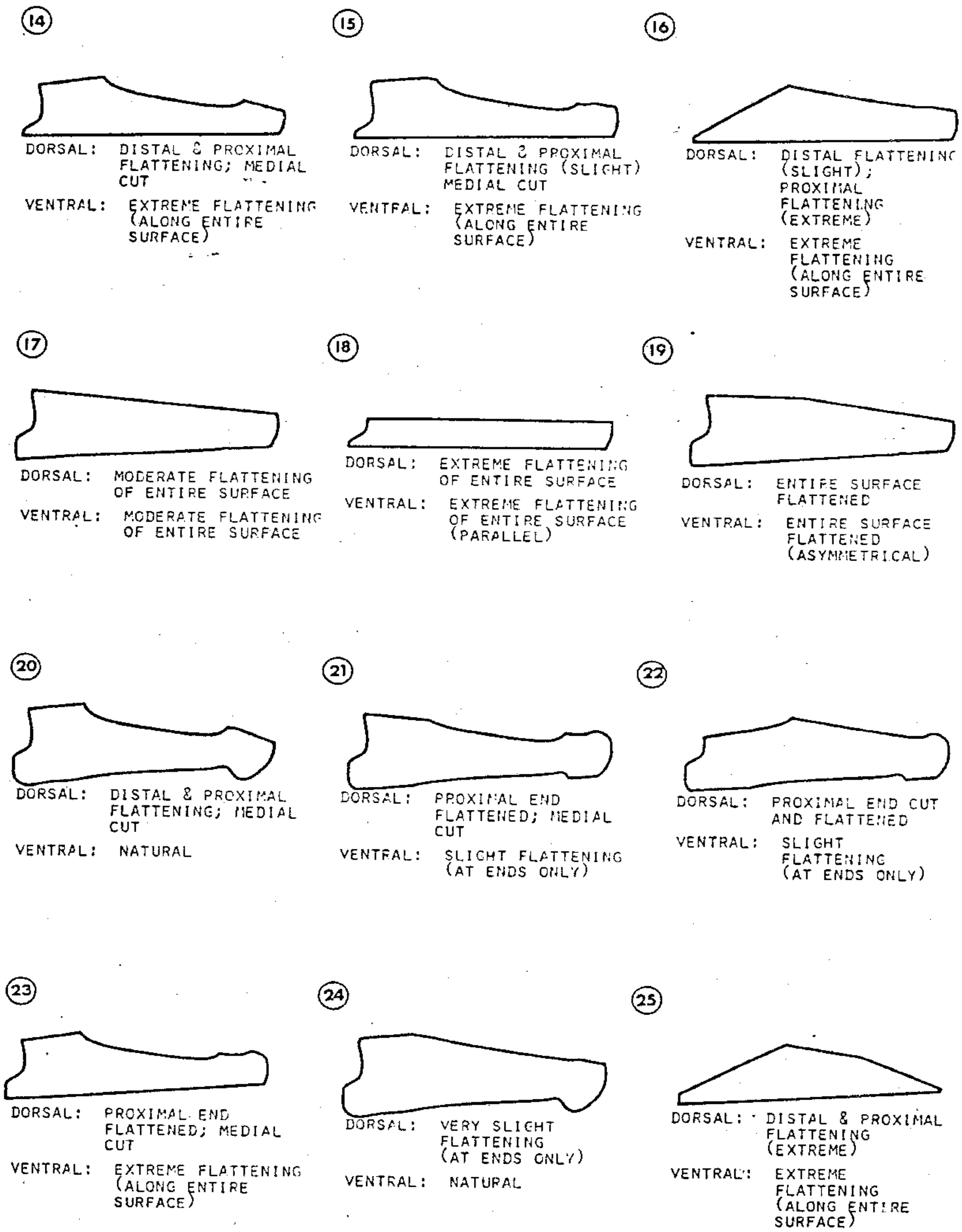


Figure A1:4

Overall Shape Phalanges (cont'd)

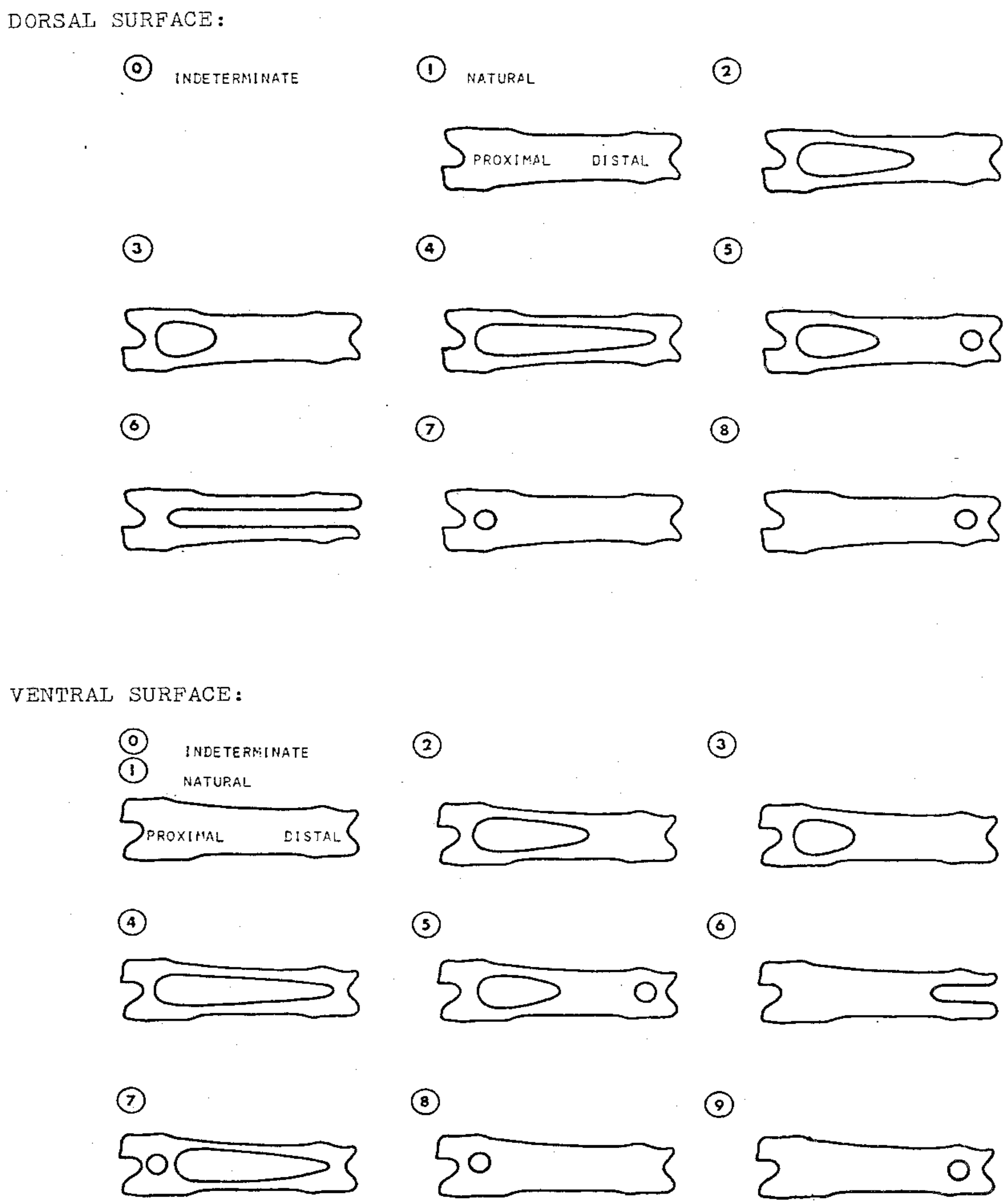


Figure A1:5

Cross-section Shape (All Specimens)

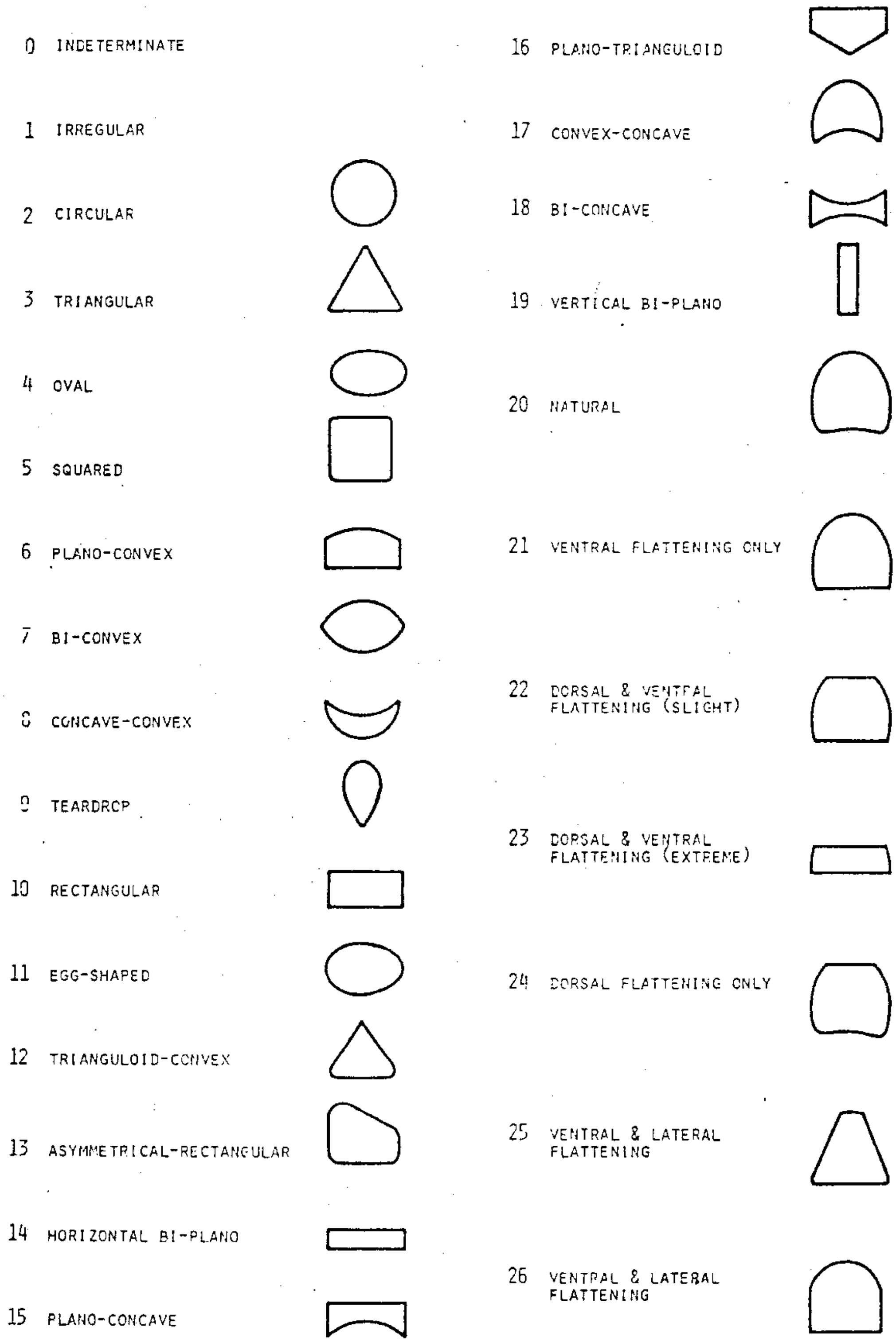


Figure A1:6

Base shape (proximal end)

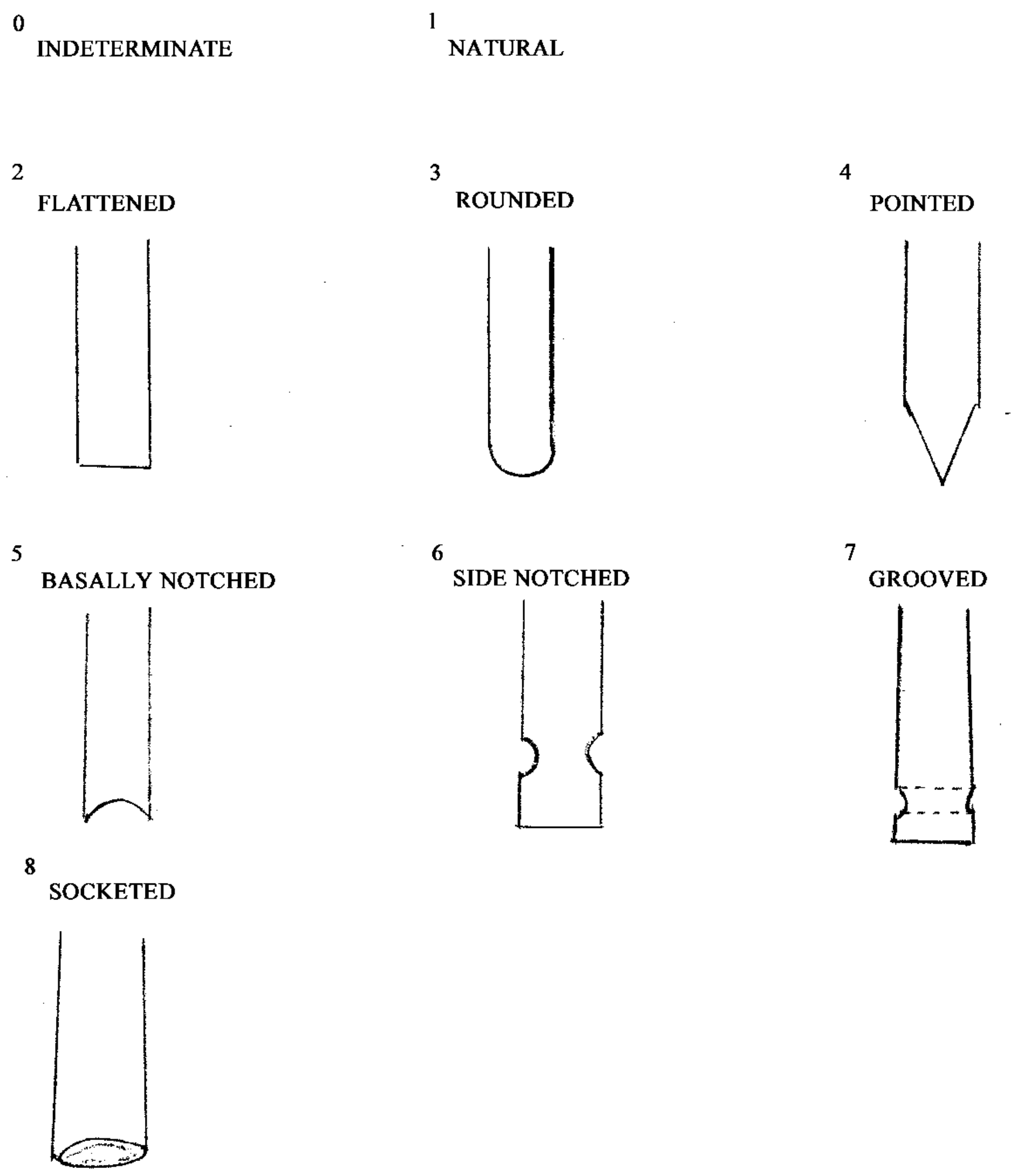


Figure A1:7

Base Shape (proximal end) Phalanges

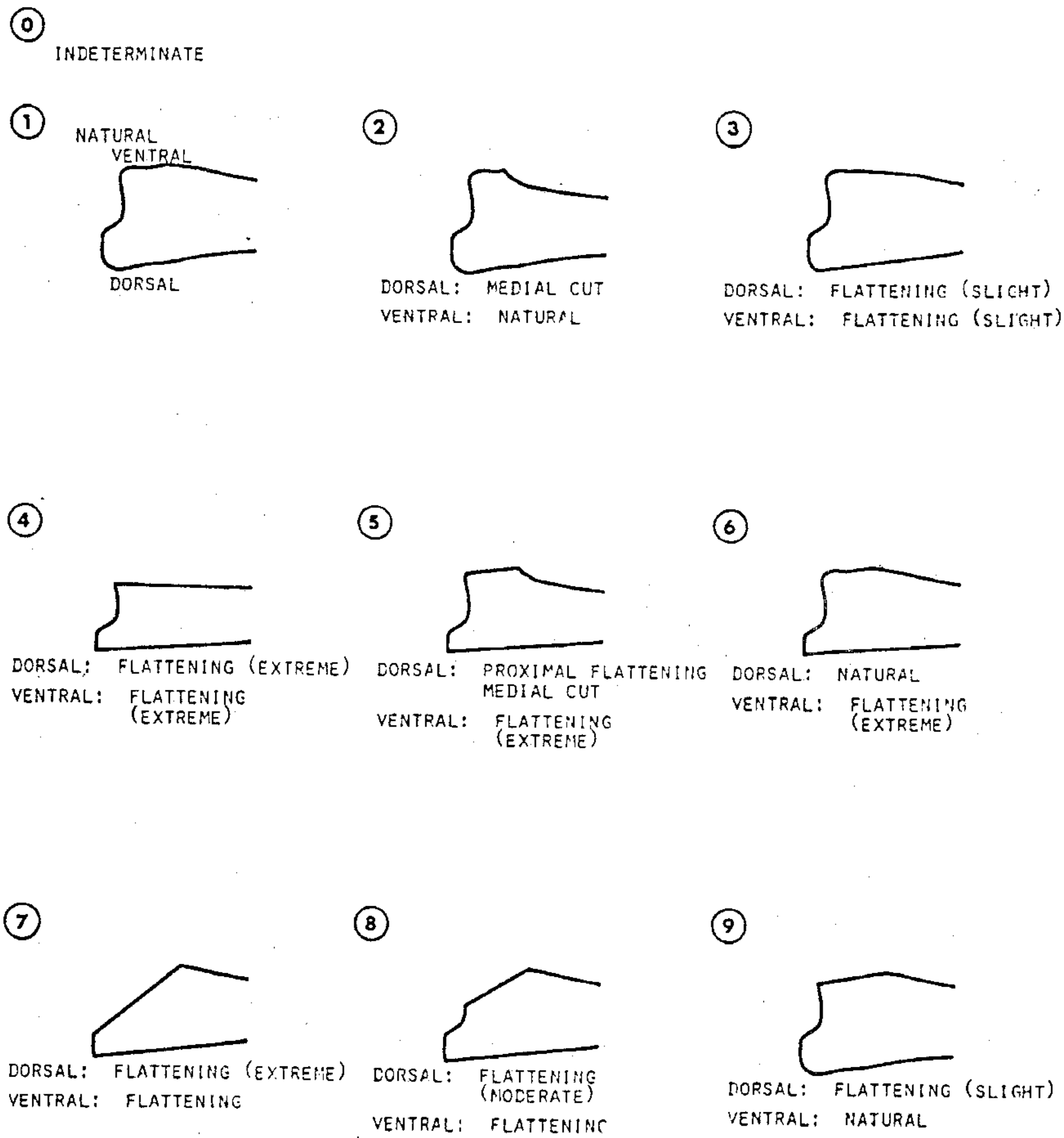


Figure A1:8

Tip shape (distal end of pointed objects)

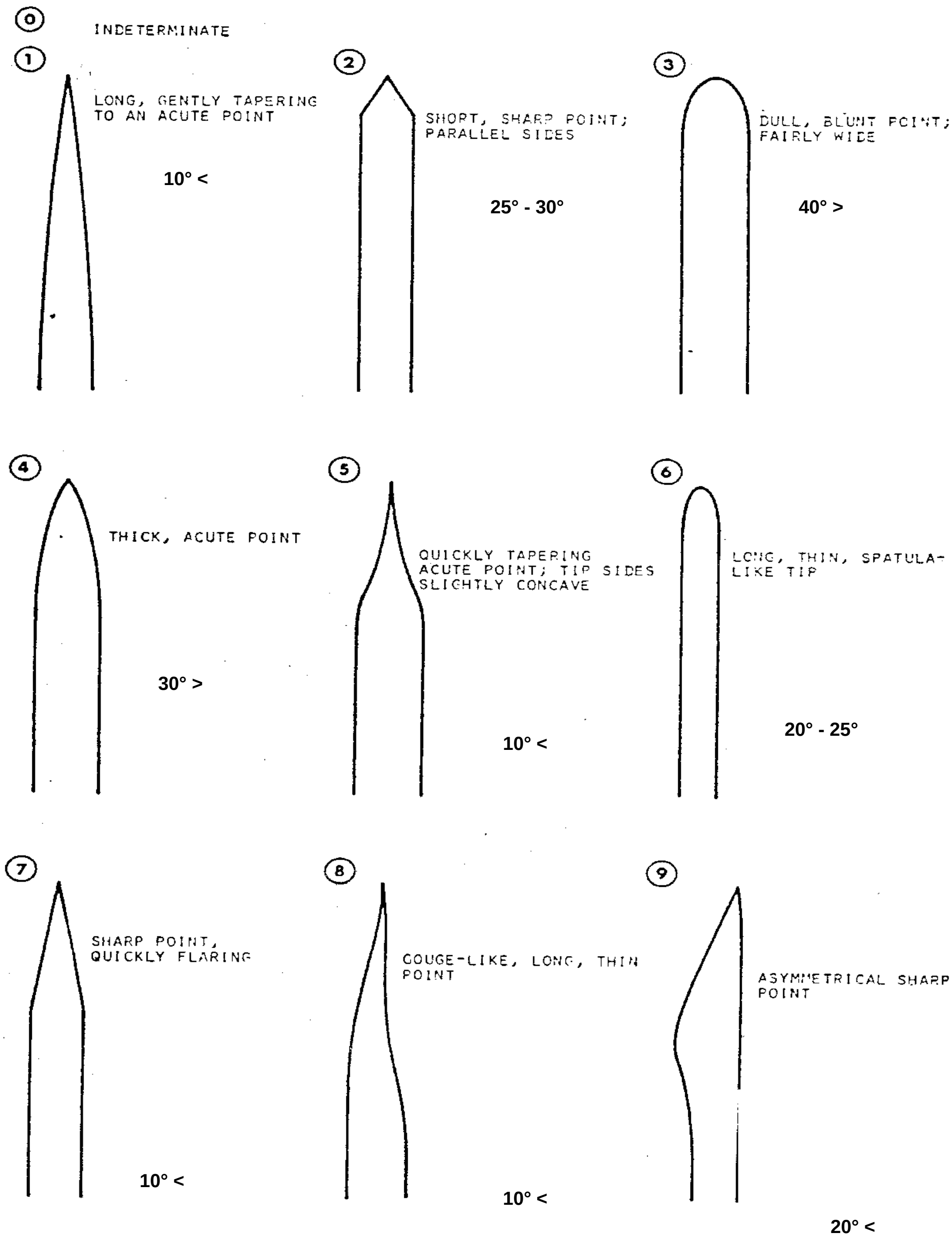
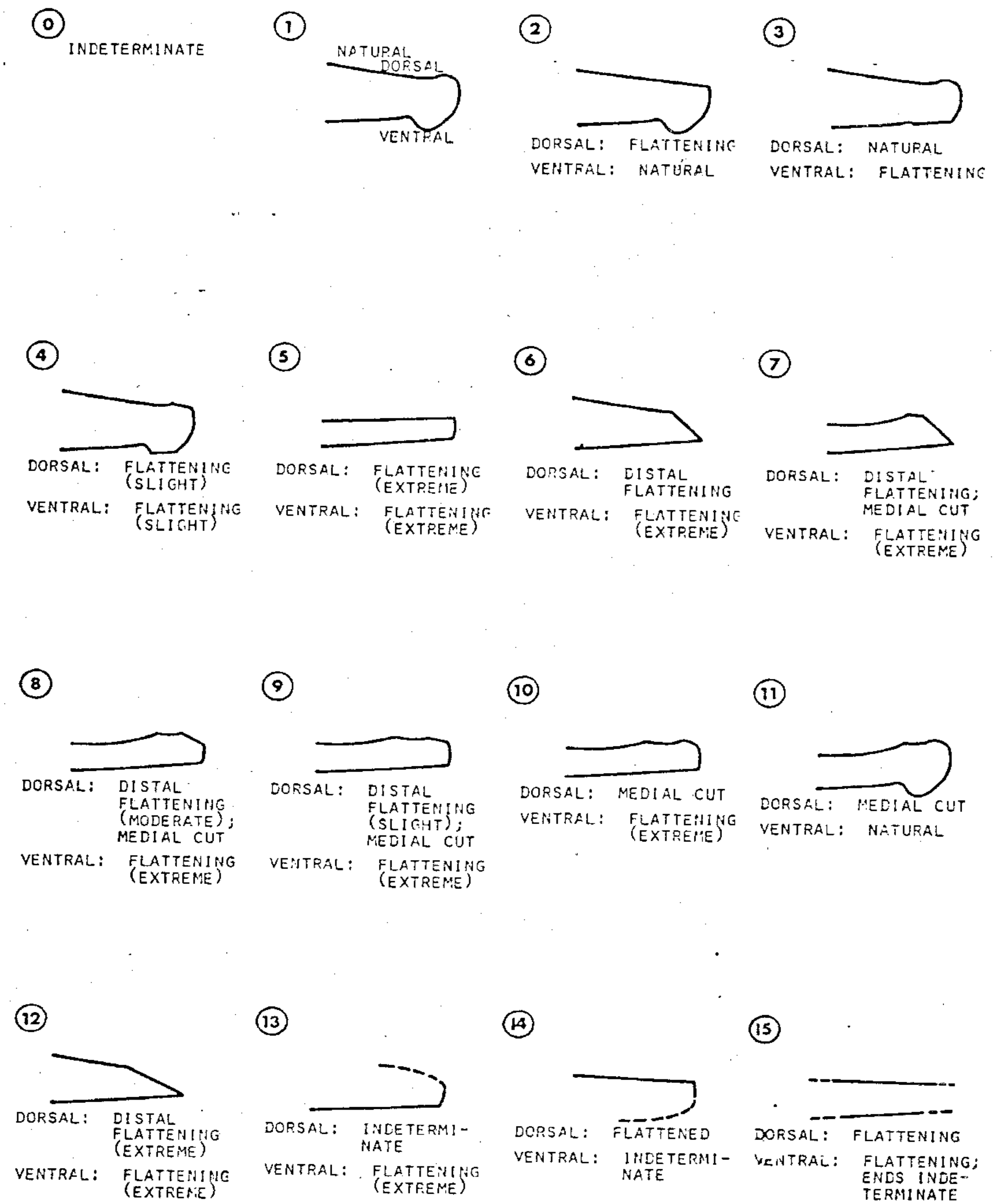


Figure A1:9

Tip shape (distal end) Phalanges



Appendix 2

Photographic Plates

Abbreviations:

- McKeown (Borden Number - Befv-1:)
- Roebuck (Borden Number - Befv-4, Old System Catalogue – VIII-F:)
- Steward (Borden Number - BfFt-3:)
- Keffer (Borden Number - AkGv-14:)
- Draper (Borden Number – AlGt-2:)

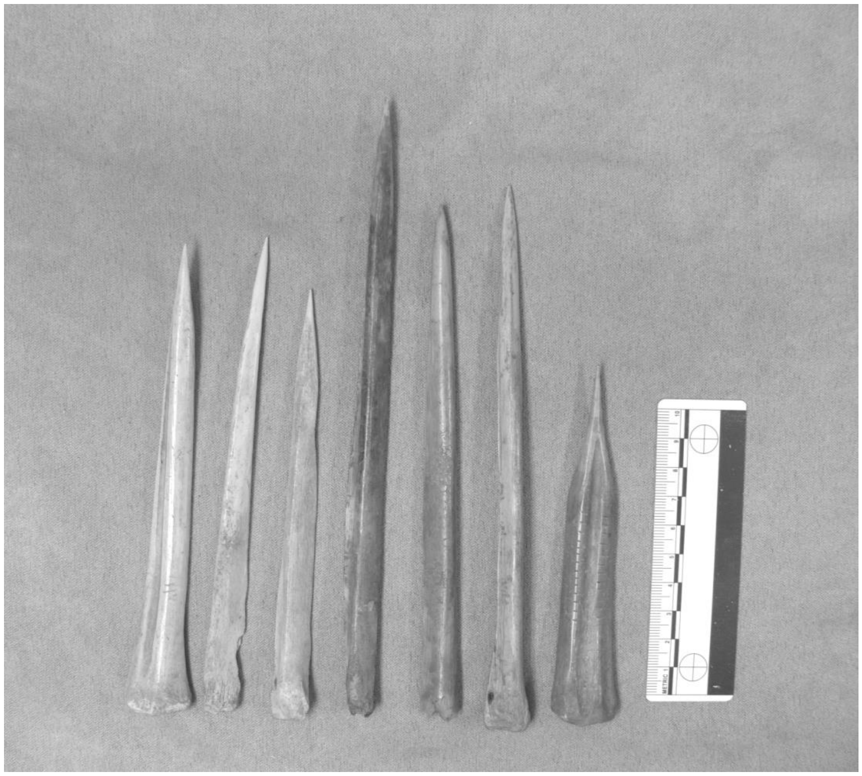


Plate 1 - Long bone Awls: Mckeown - 040016, 90272, 400081; Roebuck - 12218a, 9978, 9992, 11929a.

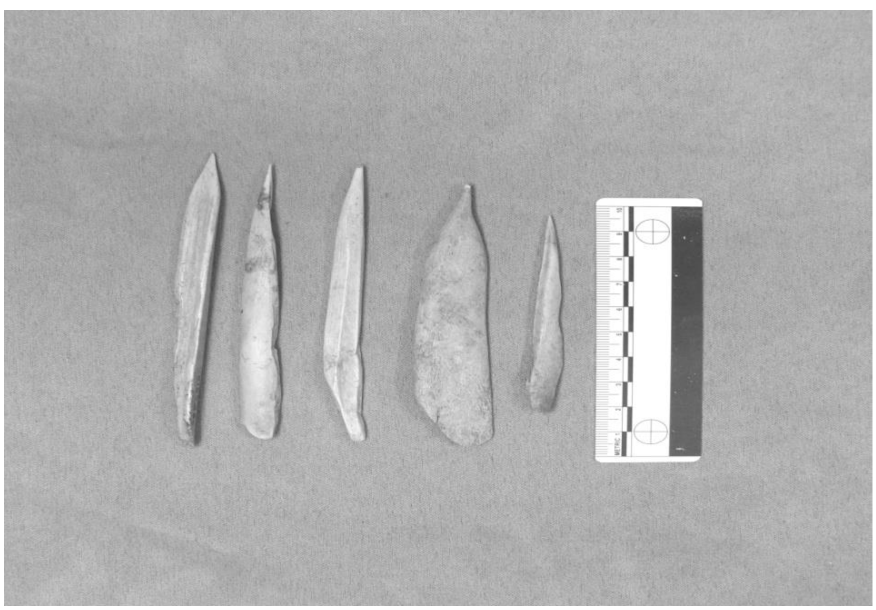


Plate 2- Splinter Awls: McKeown - 010436, 10702, 370059, 50379-2, 60097.

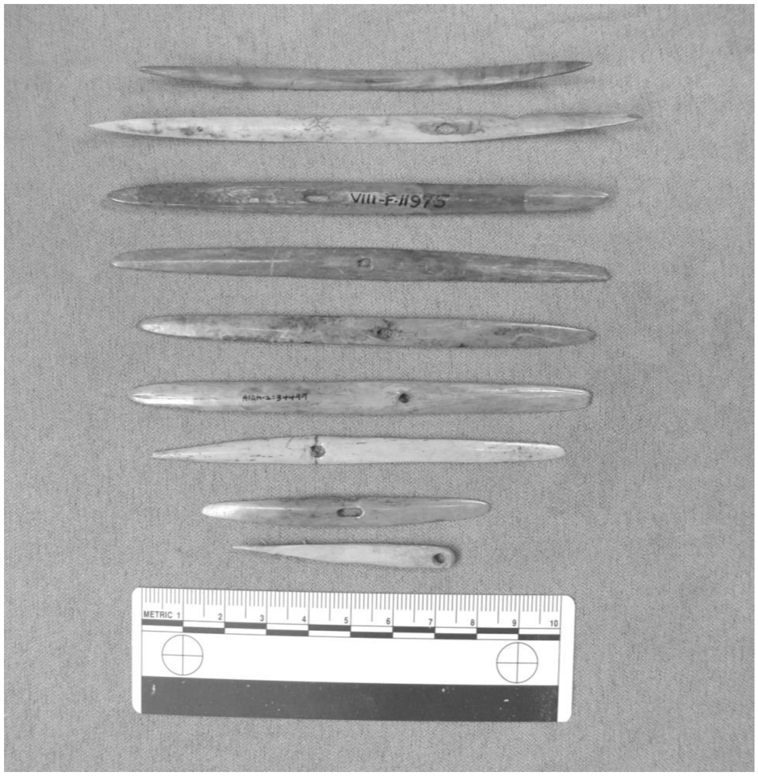


Plate 3 - Bi-pointed Centre-eyed Needles: Top Roebuck - 10884, 14054, 11975; Draper - 61563, 19966, 34499, 28383, 46571; Sewing Needle: McKeown - 0360033

Plate 4 - Metapodial Needles: Roebuck - 9982; Draper - 32755

Plate 5 Corn Husking Pins: Roebuck - 11745; McKeown - 050219-1; Roebuck - 10854, 9993, 10858, 10866, 12888.

Plate 6 - Mandible Preforms and Scrapers: Draper - 9730, 11910, 116387, 102457, 105397.

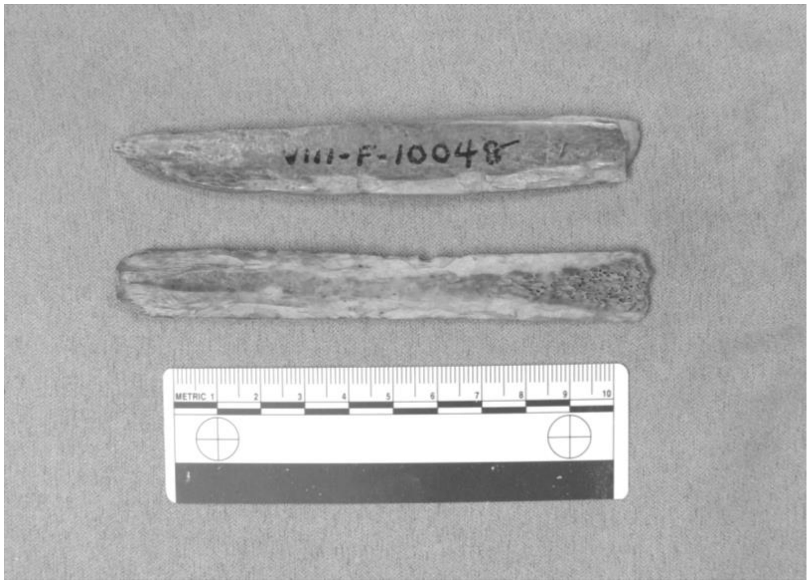


Plate 7 - Bone Scrapers: Roebuck - 10048, 12236

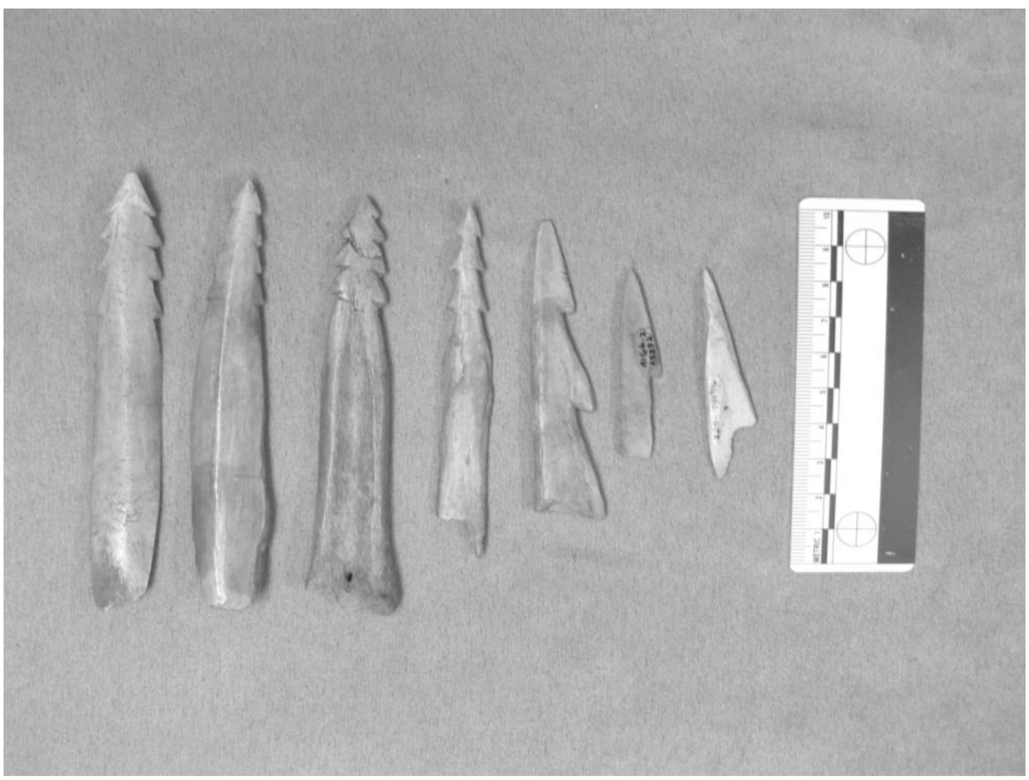


Plate 8- Barbed Bone Points: McKeown - 0360044, Roebuck - 11236, 10360, 10359, 11552; Draper - 25372, 11658

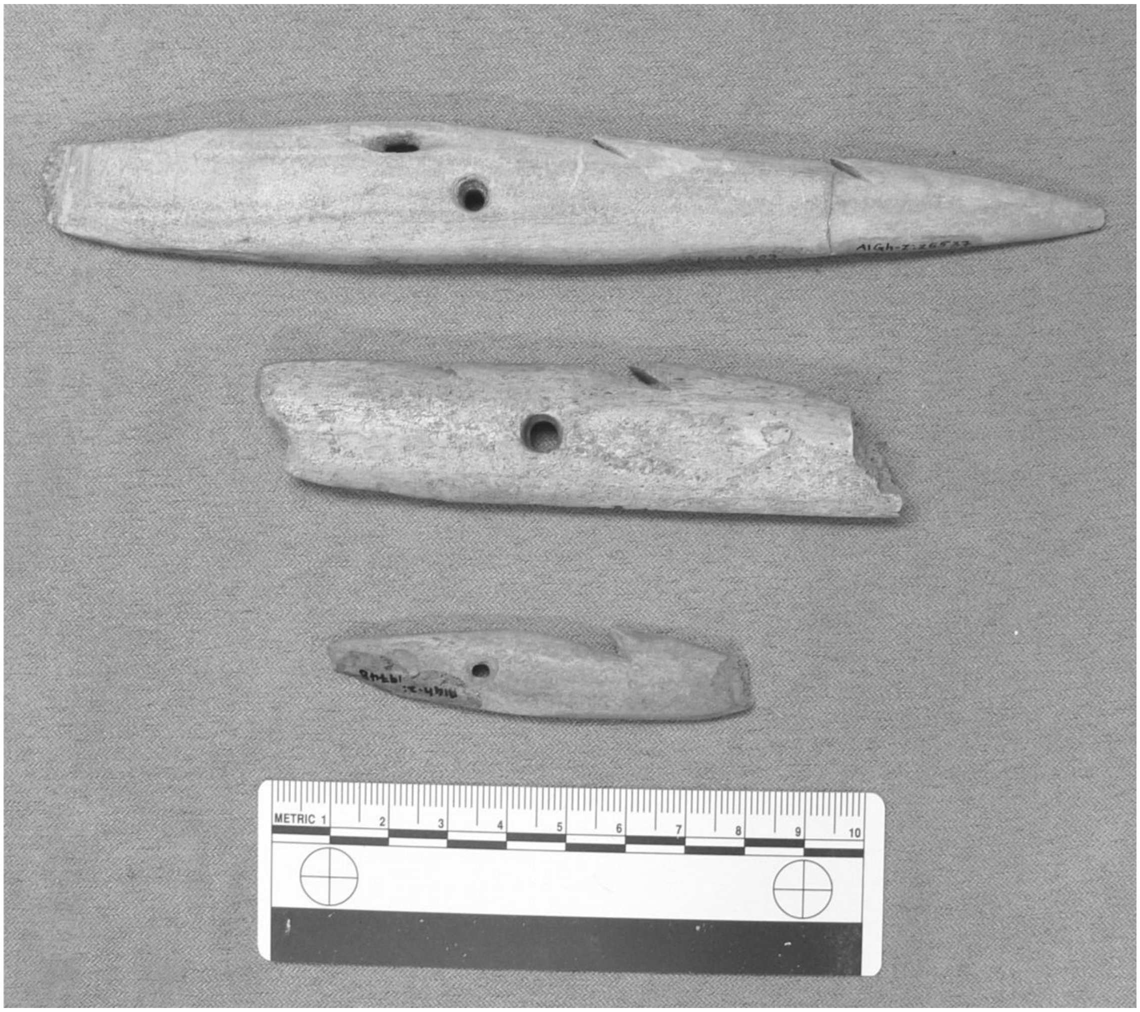


Plate 9- Barbed Antler Points: Draper - 11803; Roebuck - 11615; Draper - 19748.

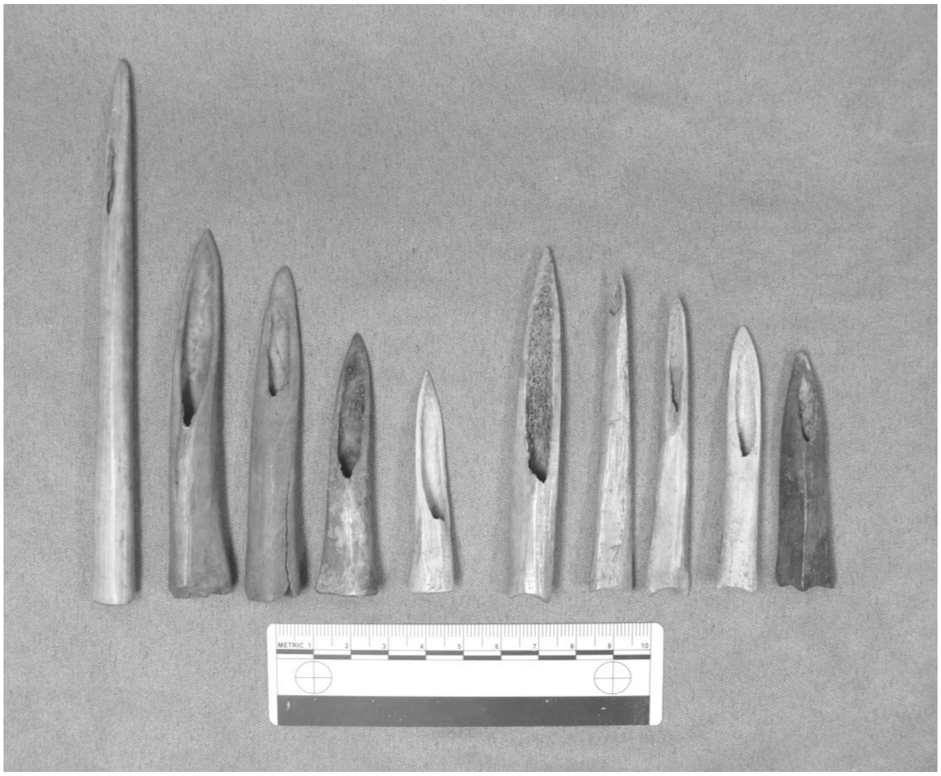


Plate 10 - Conical Bone Points: (Flat Bases) Roebuck - 13185, 10348, 10349; McKeown - 010028, 020038; (Concave Bases) Roebuck - 10347, 9998, 12196, 11229; McKeown - 050218.

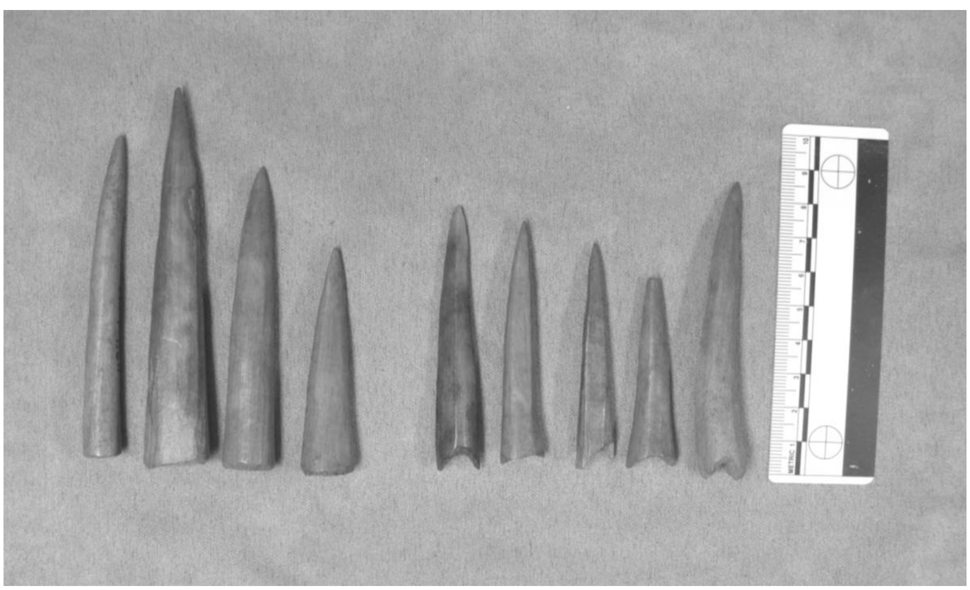


Plate 11 - Conical Antler Points: (Flat Bases) Roebuck - 9442, 11611, 10352, 10355, (Concave Bases) 11551, 10356, 11612, 11910, 14012.

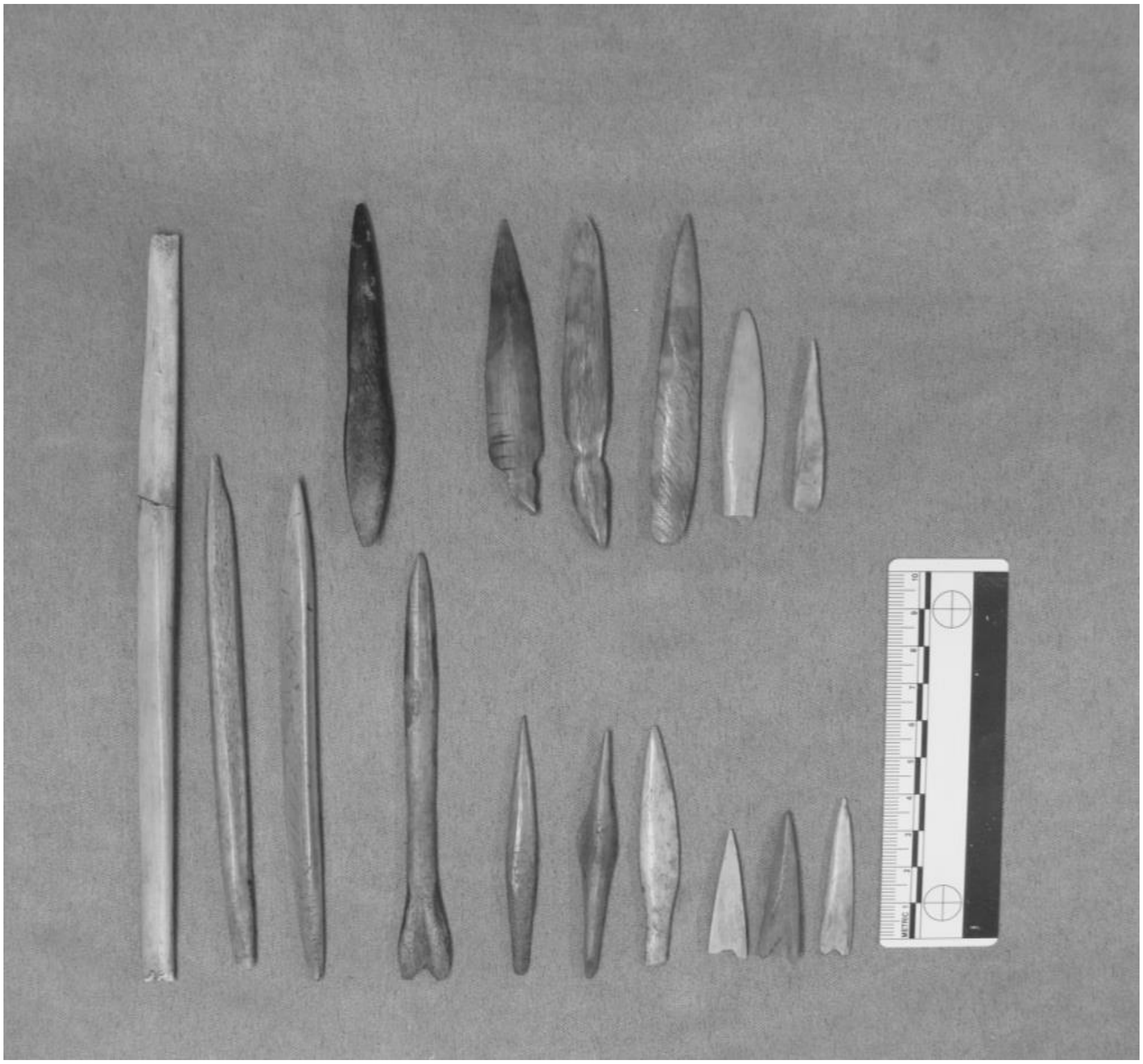


Plate 12 - Bone Points: Top Row: Roebuck - 11430 (antler), 11234, 10815, 11748, 11374, Draper -11309; Bottom Row: McKeown - 060191, Draper - 36499, 40106, Roebuck – 12197, 11942, 11960, McKeown - 090221, Draper - 31723, 66229, 14778.

Plate 13 - Bone Points: Keffer - 570360-1; 611354-1; 602731; 603000; 603508; 650767-1; 650767-2.

Plate 14-Fish Hooks, Broken Shanks/Barbs: Roebuck -11110, 14010, 11618, 10368, 11237.

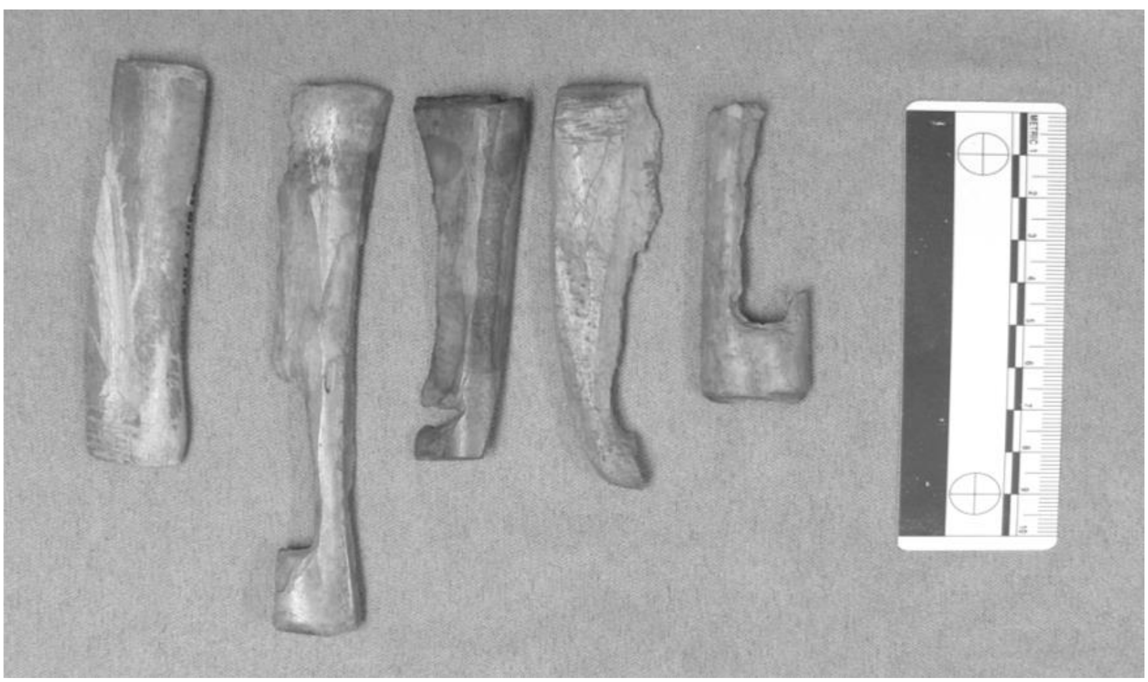


Plate 15- Fish Hook Preforms: Roebuck -11813, 10067, 10066, 11812, 11814.

Plate 16- Bone Barbs: Roebuck -11379, 11379, 11376, 11938, 11936, McKeown - 020448, 010817-3, 0120002, 050206, 0120004.

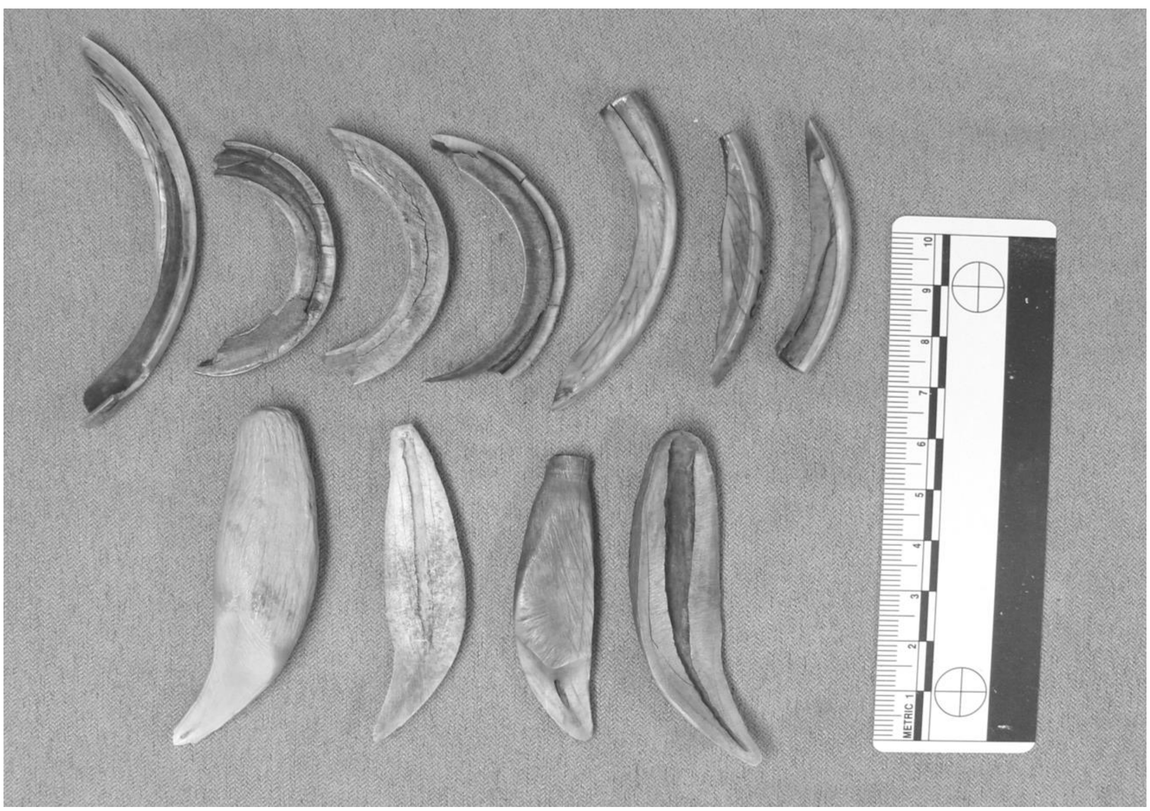


Plate 17- Incisor Chisels: Roebuck -10052, 10053, 11734, 11735, 11736, McKeown - 0130094. Canine Chisels: McKeown - 0130133, 010761; Roebuck - 11923, 11738.

Plate 18- Antler Adzes: Roebuck - 9943, 9944; Other Antler Objects: Roebuck - 9945, 9946.

Plate 19- Antler Handles: Roebuck - 12854, 11815, 12237, 10059; Phallus Shaped Antler Object: Roebuck - 11579.

Plate 20- Bone Hammer: Keffer - 571059-1.

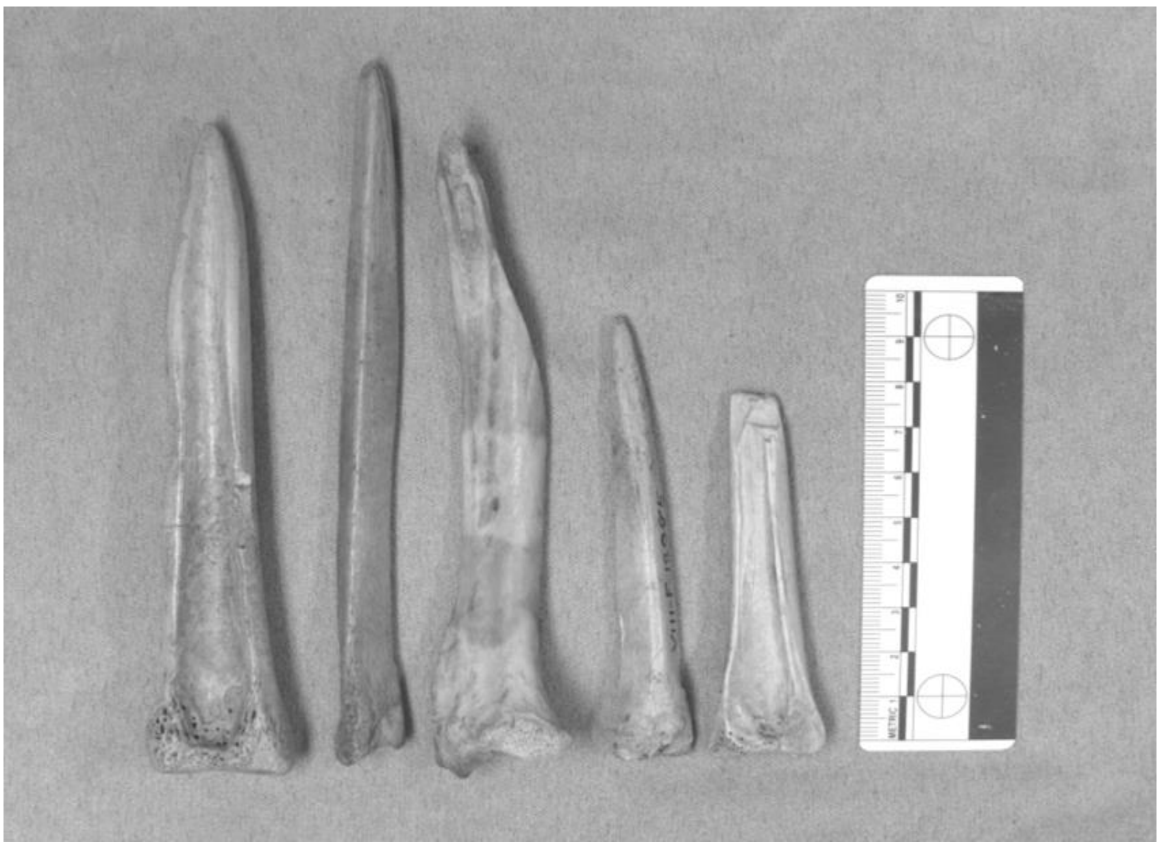


Plate 21- Bone Flakers: Draper - 18801; Roebuck - 11453, 11804, 9990a, 12985.

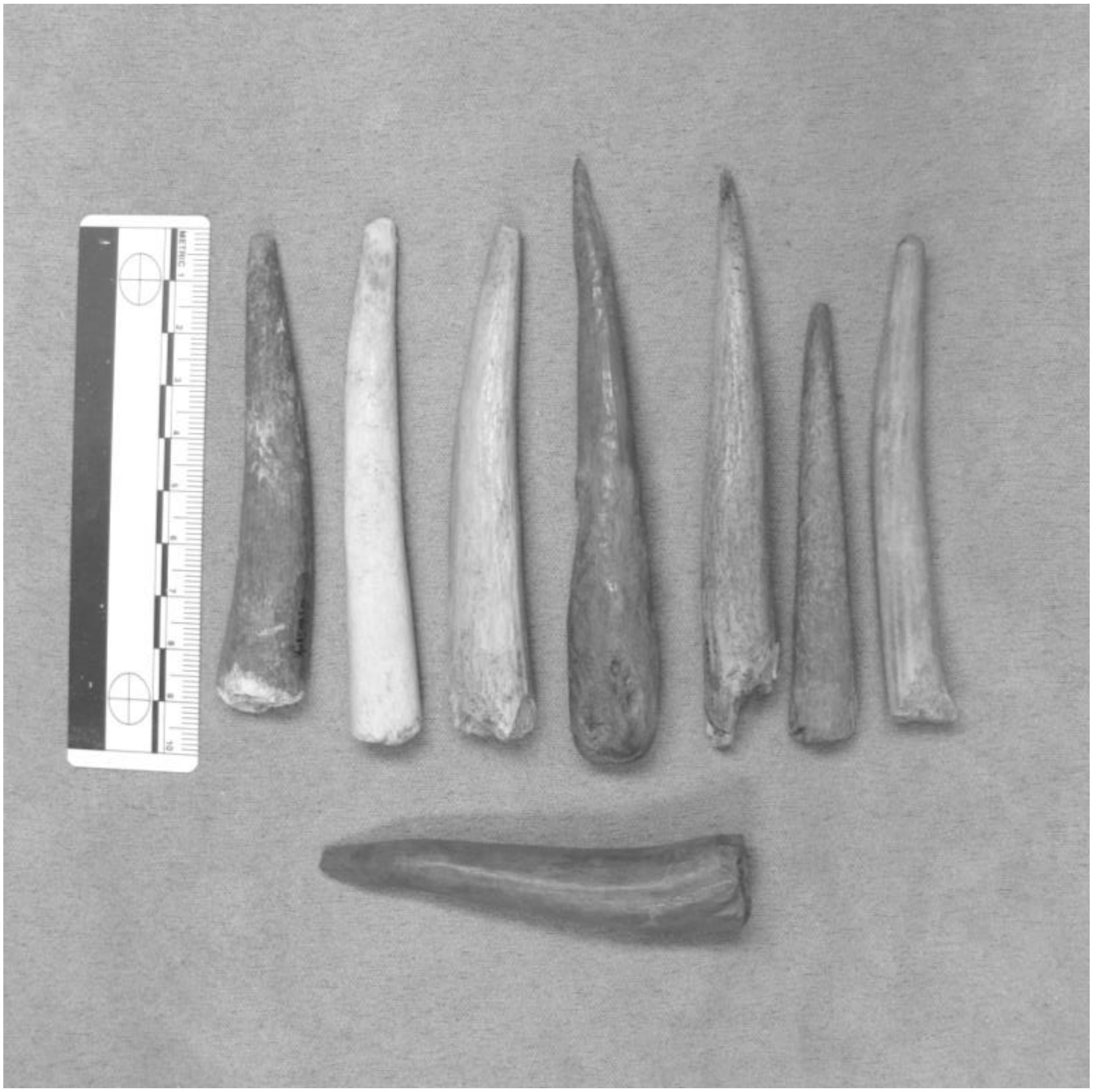


Plate 22- Antler Flakers: Draper - 12212, 11453, 36436, Roebuck - 10789, McKeown - 0600231, 010598, 010017; Antler Wedge: Roebuck - 11726.

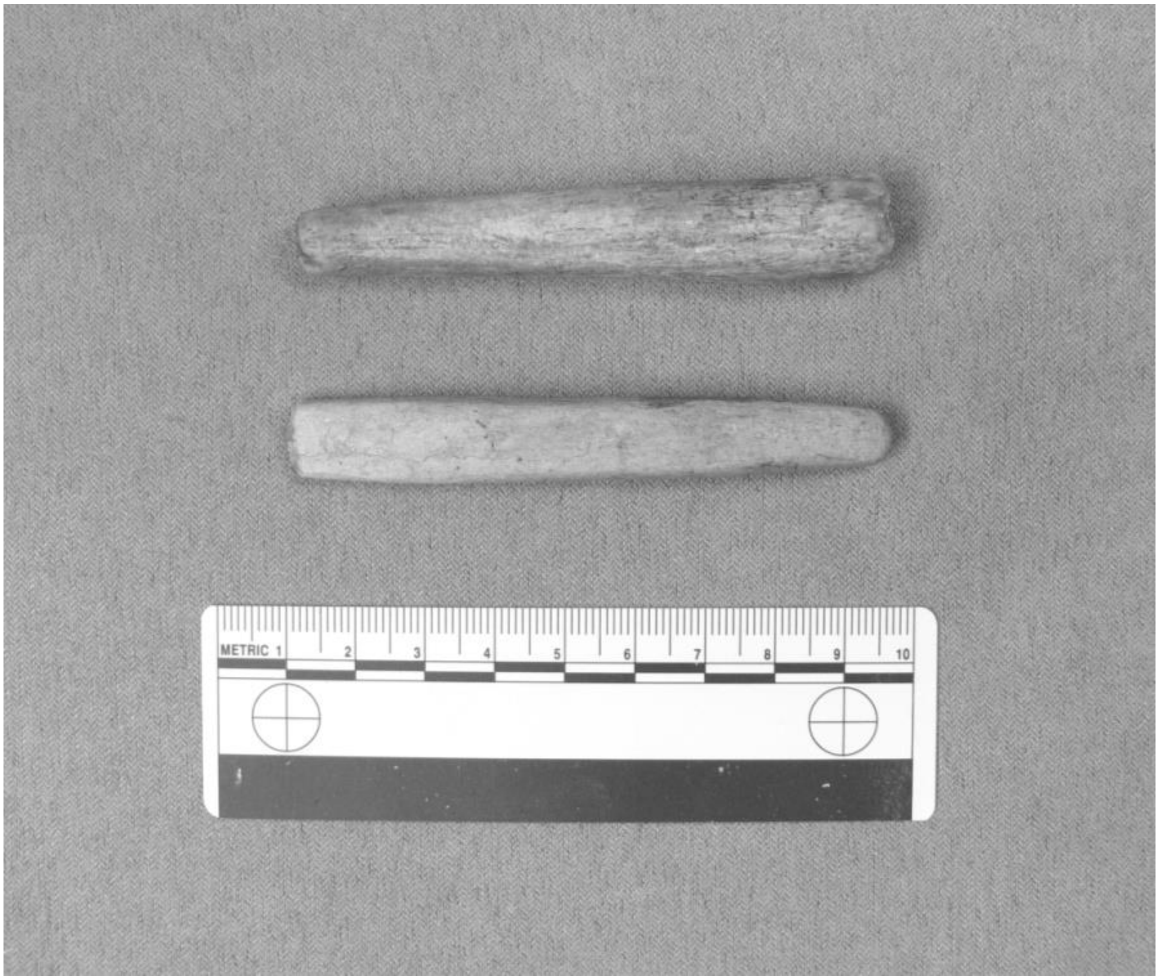


Plate 23- Cylindrical Antler Flakers: Draper - 38406, 11912.

Plate 24- Antler Hoes/Picks: Mckeown - 010816, 090107-2, 090107-1; Roebuck - 10788.

Plate 25- Deer Scapula Pipes from the Roebuck Site

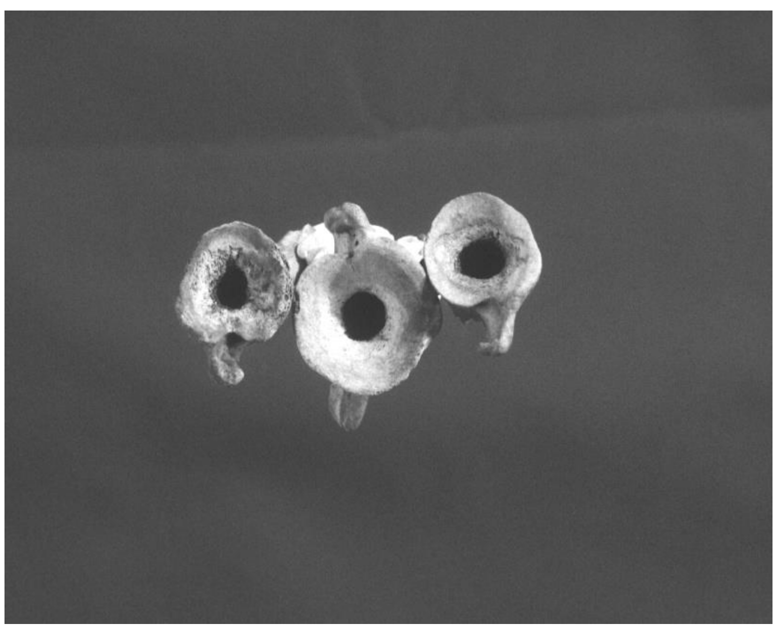


Plate 26- Deer Scapula Pipes from the Roebuck Site (Top View of bowls)

Plate 27- Gaming Counters: Keffer - 310004-1; 310004-2

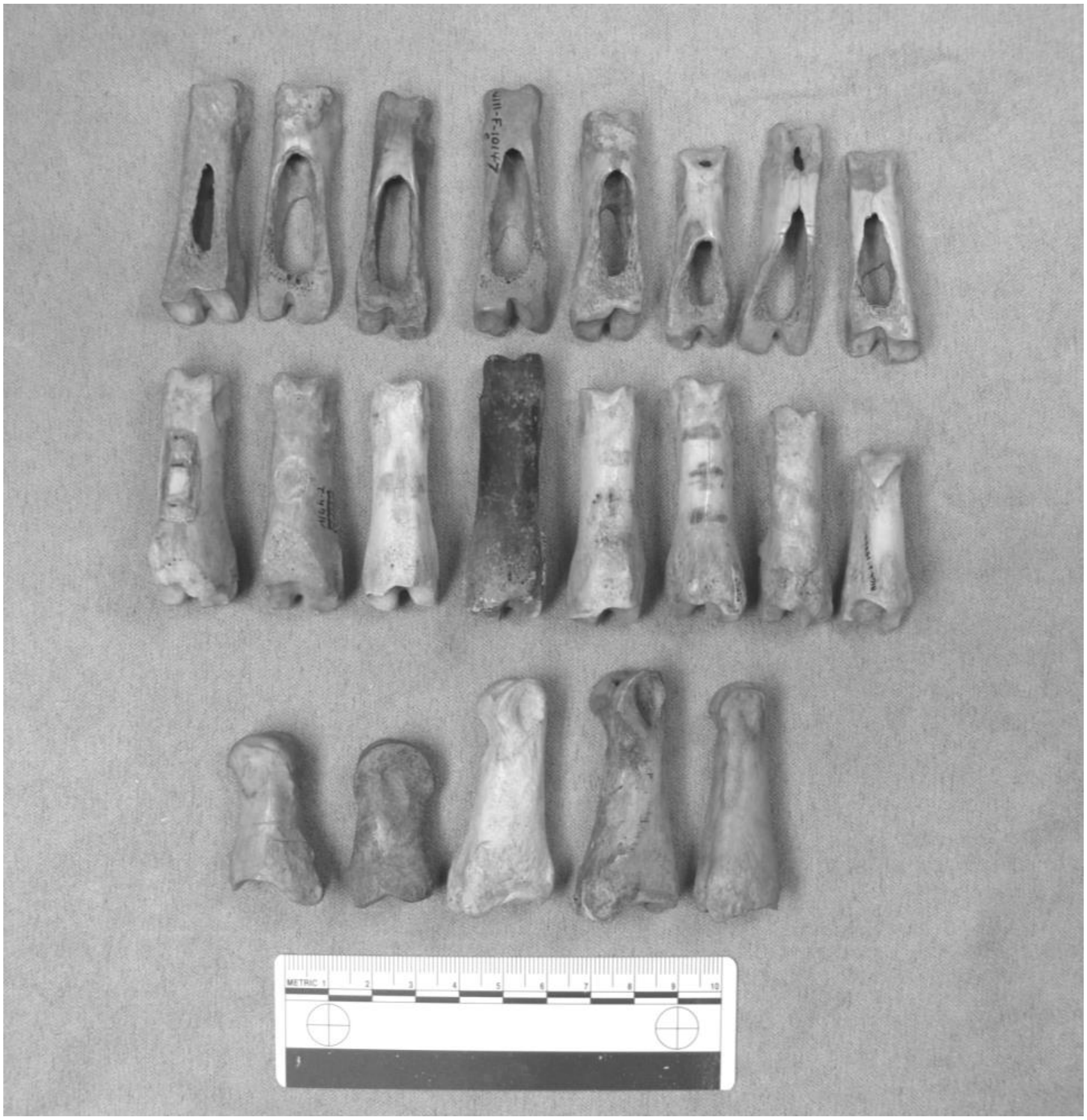


Plate 28- Modified Deer Phalanges: Ground – Roebuck - 10147a,b,d,e,f,g,h, 10148a; Counter – Draper - 49520, 14329a, 39752a, 23340a, 25125a, 40893, 39598a, 15762; Perforated – Roebuck - 1012 (2 pieces), 10124, 10125 (2 pieces).

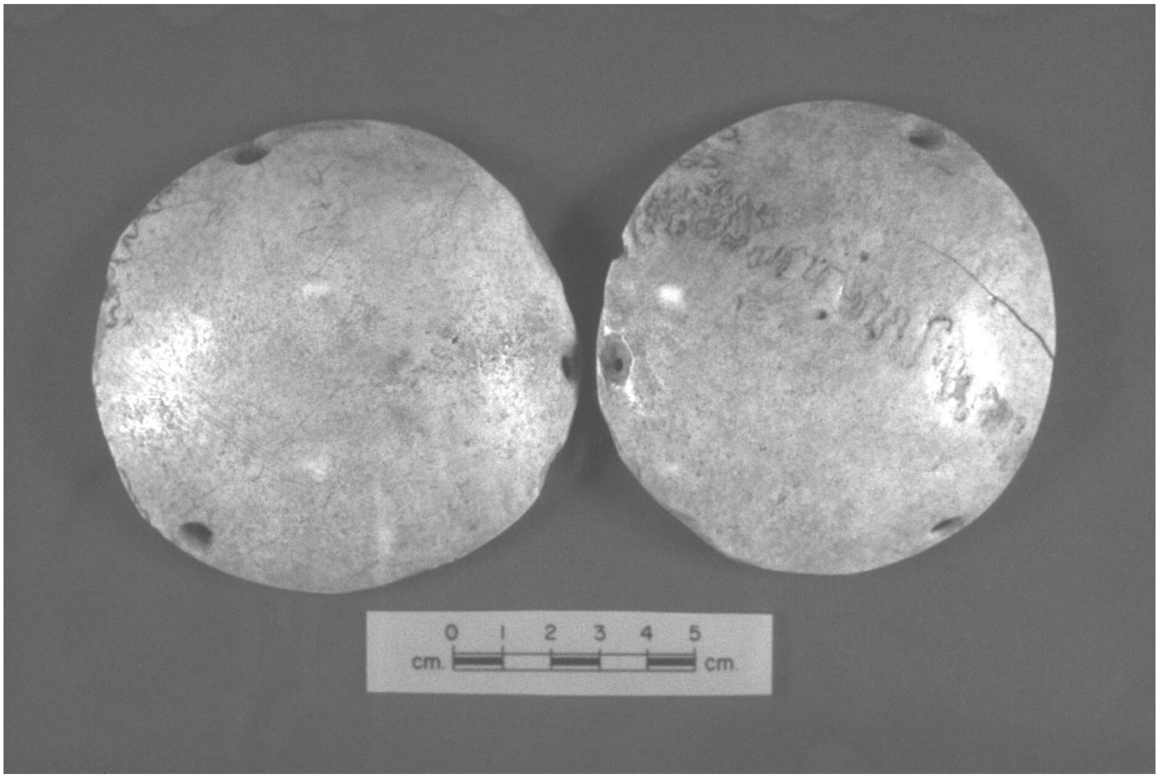


Plate 29- Human Cranial Rattle Discs: McKeown - 050234-1, 050234-2

Plate 30- Human Cranial Rattle Discs: McKeown - 050234-1, 050234-2 (articulated when holes are aligned)

Plate 31- Miscellaneous Human Bone Artifacts: Roebuck - 9985, 10900, 9986, 10049.

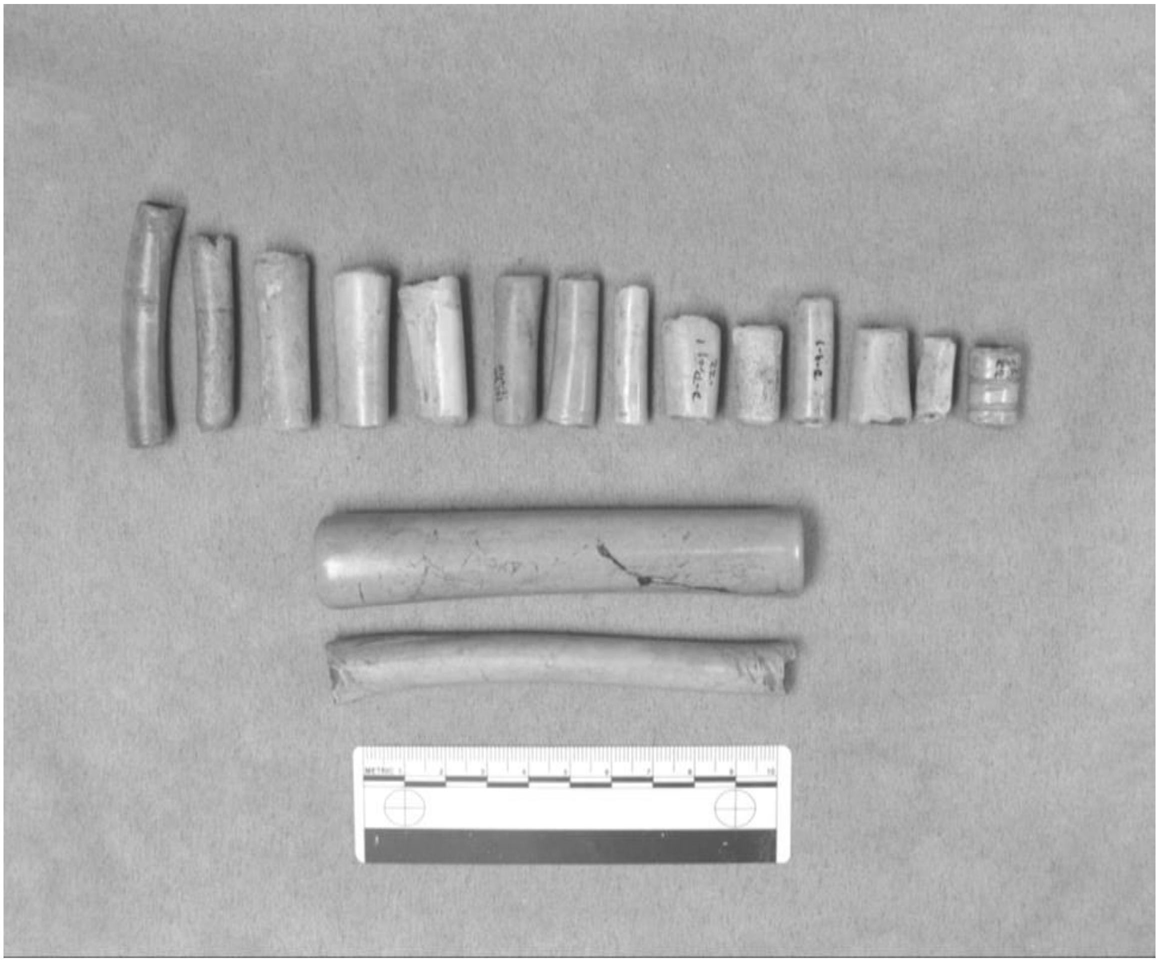


Plate 32- Bone Beads: Draper - 105772, 105737, 105736, 105732, 105773, 105725, 105747, 105750, 105733, 105748, 105752, 105749; Tubes: Draper - 25841, 10092.

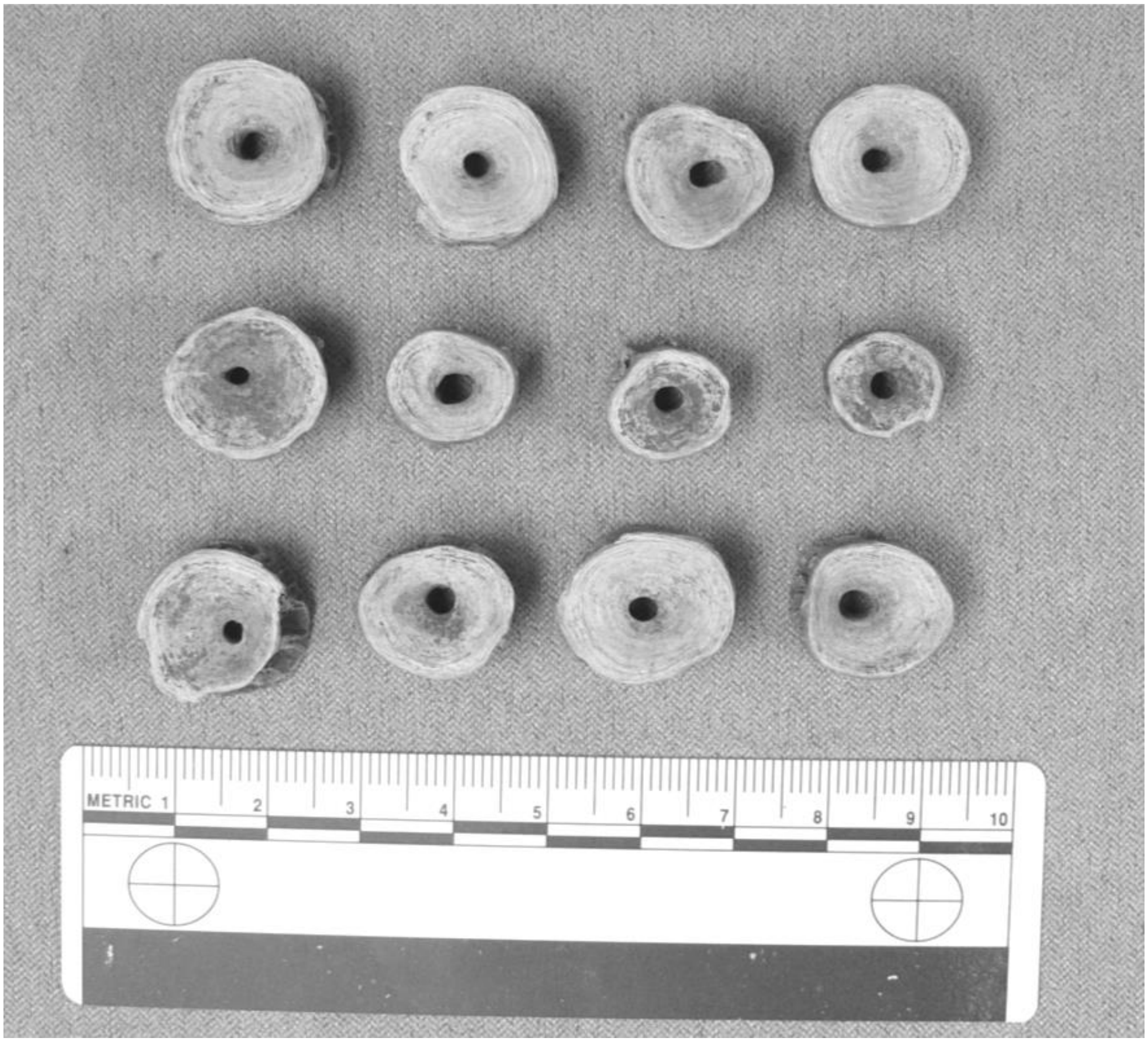


Plate 33- Perforated Fish Vertebrae: Draper - 68550, 68551, 68553, 68555, 68556, 68558, 68559, 68560, 68562, 68563, 68564.

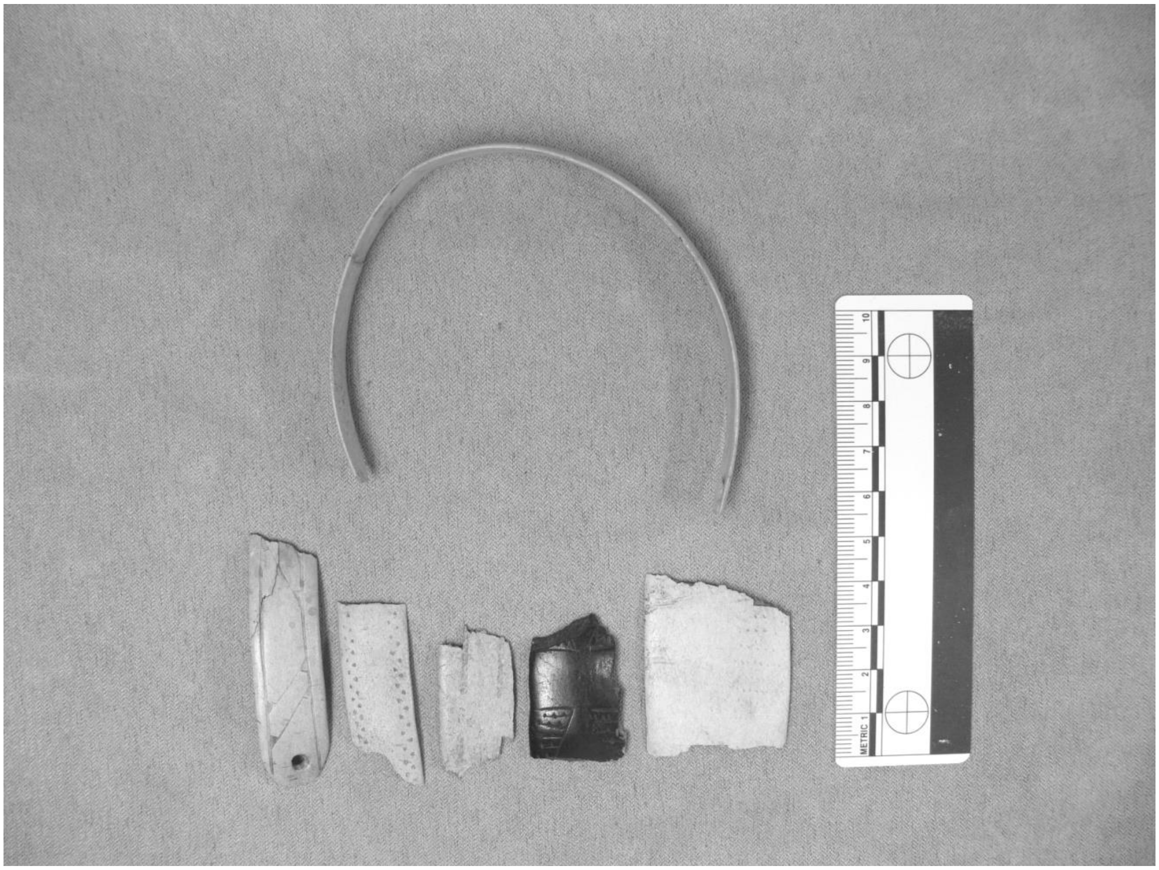


Plate 34- Decorated Bone Bands/Armlets: (Top Row) Draper - 102451a, (Bottom Row) Draper - 25845, 2478, 23121, 30734, 36533g.

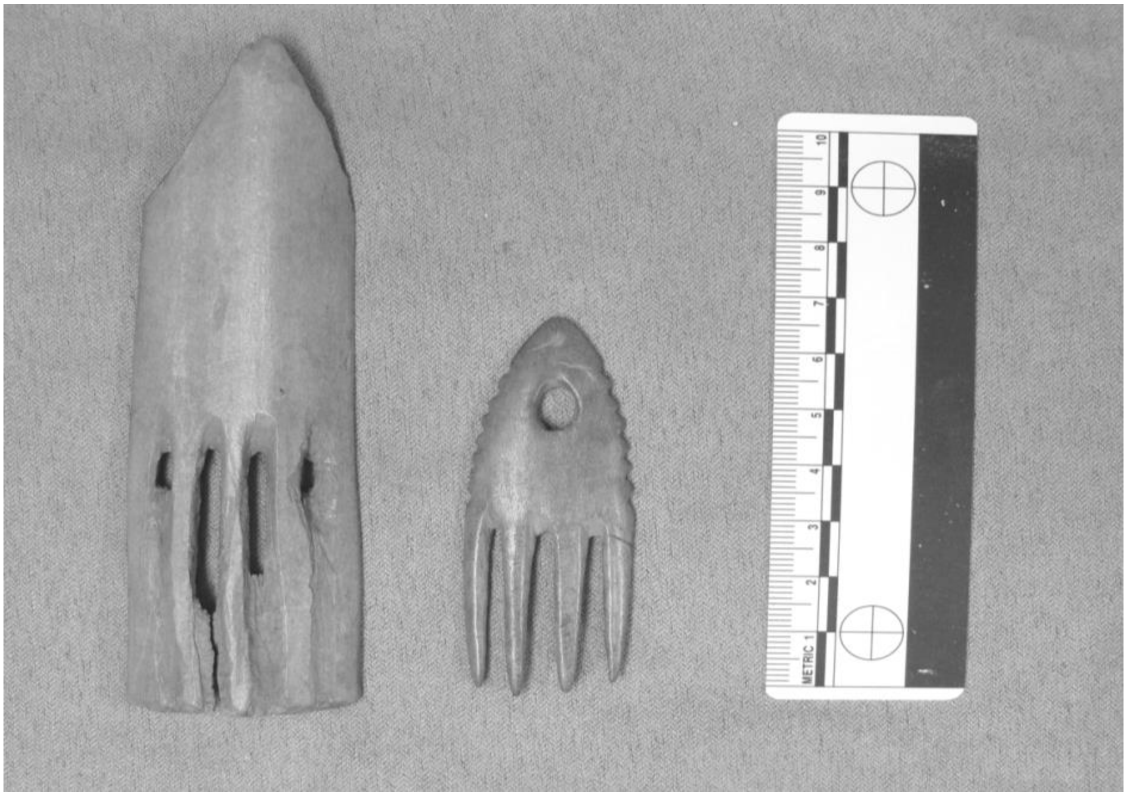


Plate 35- Antler Comb and Preform: Roebuck - 14072; Draper - 19812

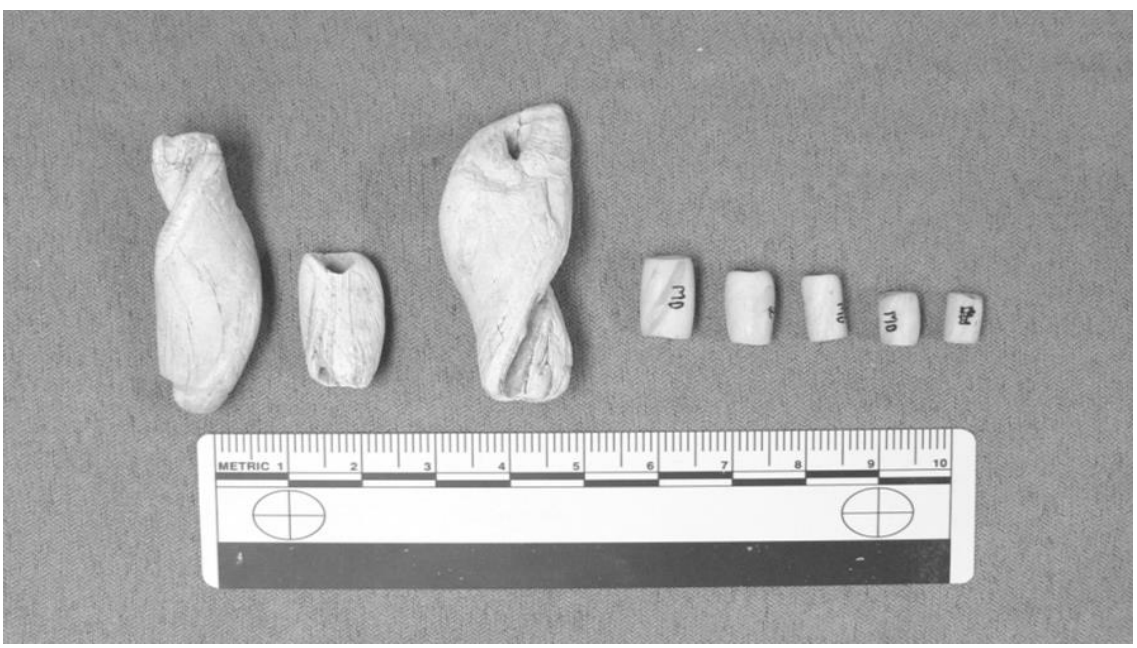


Plate 36- Marine Shell Beads: Roebuck - 13957, 12349; Draper -17220; McKeown - 2 (5 pieces).

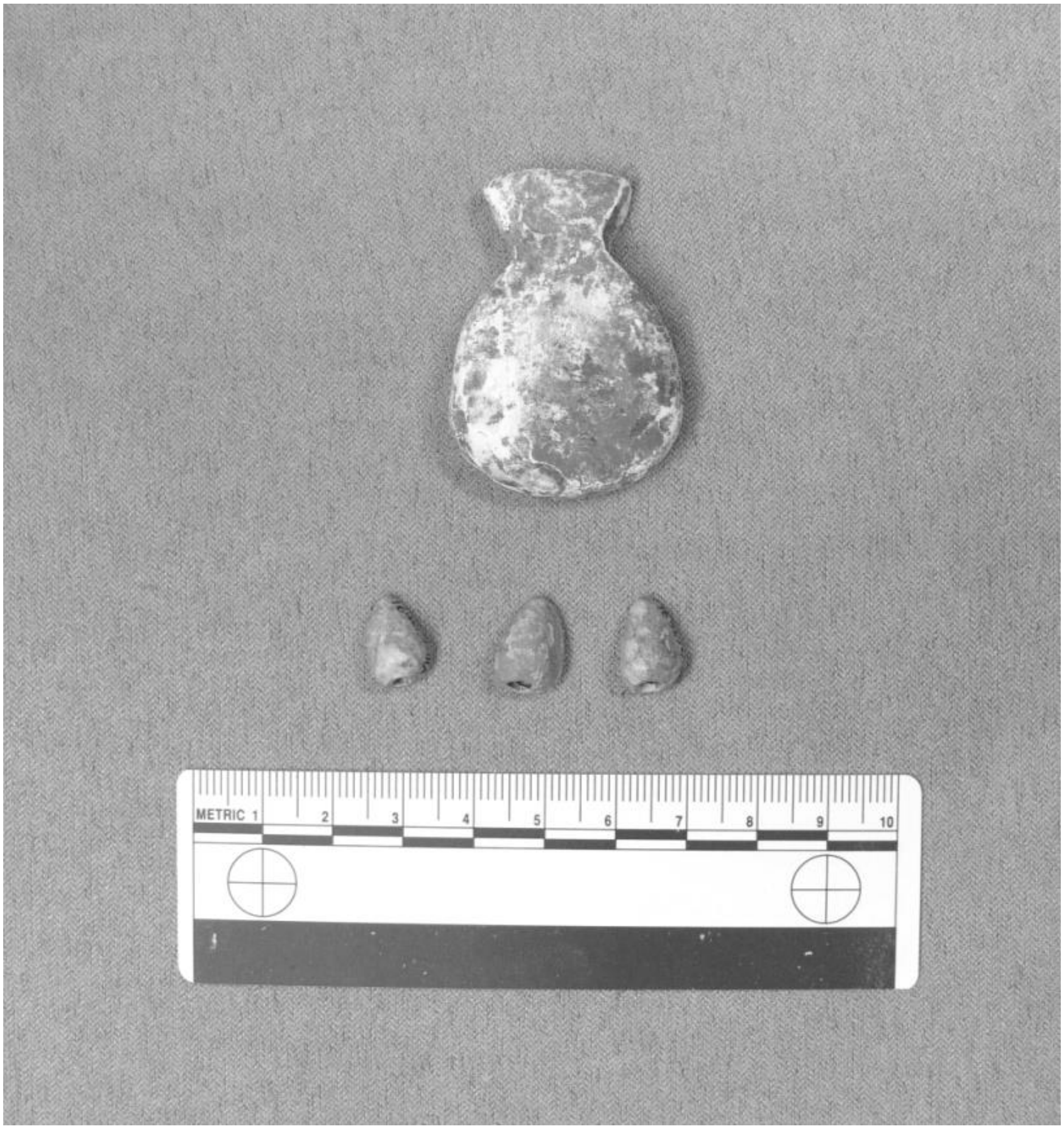


Plate 37-Shell Pendant: Roebuck - 13683; Snail Shell Beads: Roebuck - 13691 (3 pieces).

Plate 38 - Canine Pendant: Draper - 49069a, Roebuck - 9182, Draper - 2583, Roebuck - 13063, Draper - 6429, 26174a, 81505 (*Canid*).

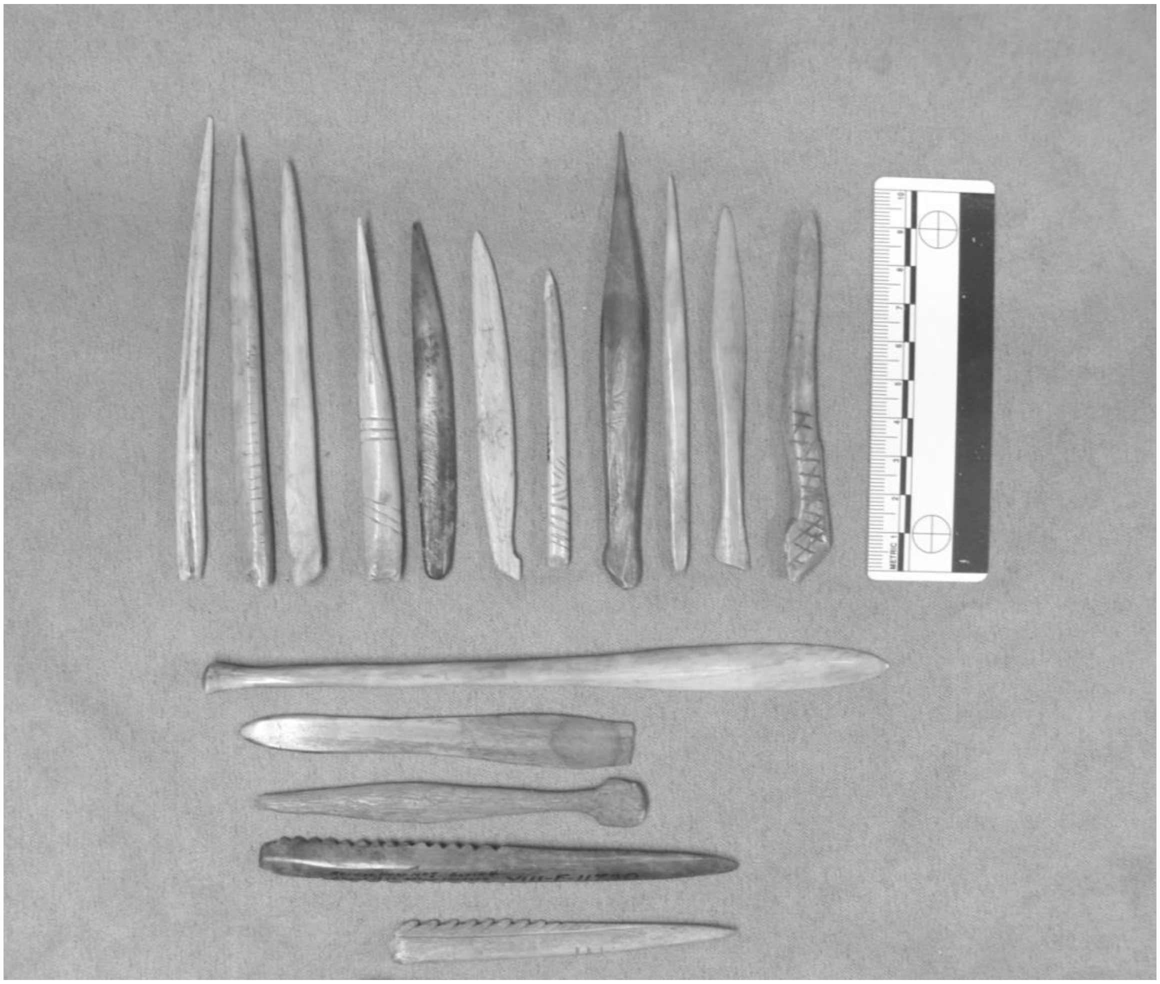


Plate 39- Bone Pins: McKeown - 050158, 030704, 090190-1, 080163, 0503791; Draper - 63163, 14699; Roebuck - 10018a, 11431, 11375, 12379; Miscellaneous Bone Objects: Roebuck - 11373, 11731, 9995, 11730, Draper - 19676.