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LITHIC IDENTITIES: DEVELOPING A TYPOLOGY OF TSIMSHIAN STONE-TOOLS

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ABSTRACT

Inferring group identity from material culture has been a goal of archaeology almost since the inception of the discipline. Identifying past cultures and groups of people using lithic materials in particular is especially problematic given the restrictive nature of stone-tools where distinguishing between purely stylistic, functional and technological elements is difficult to do. Using the concept of isochrestic variation as a framework for studying style and the unintentional signaling of group identity in material culture, this thesis analyzes stone-tools manufactured by ancestral First Nations Tsimshian and compares them to similar stone-tools manufactured by other groups of people on the Pacific Coast in order to show that Tsimshian group identity can be recognized in their lithic technology. This hypothesis is testable because of the convergence of archaeological data and Tsimshian oral traditions demonstrating cultural continuity and a shared Tsimshian identity over at least the last 5000 years in Prince Rupert Harbour.

Keywords: Tsimshian, Prince Rupert Harbour, Northwest Coast, Pacific Coast, Lithic Analysis, Cultural Identity, Ethnic Identity, Group Identity, Style, Oral History, Oral Traditions

DEDICATION

This work is dedicated to my parents Michael and Marlene Pritchard who have always showed faith in me even when I did not deserve it. To my dad who passed away just before I finished this thesis, I will miss you very much and look forward to playing a round with you on the big golf course in the sky.

ACKNOWLEDGEMENTS

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I would also like to thank my cohort and the faculty at the University of Western Ontario for their emotional and intellectual support throughout my two-years there. No need to name names, you know who you are. Finally, I would like to thank the manufacturers of the stone-tools that I examined for without them there would be no thesis; I hope my interpretation is accurate.

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CHAPTER 1: INTRODUCTION

RESEARCH OBJECTIVES AND GOALS

Classifications are central to archaeology because without them analysis of the material that we excavate is impossible (Hayden 1984:79). As specific forms of classification, typologies can be constructed in any number of ways depending on the research question(s) one wants to answer and the specific purpose(s) of the typology. There are two main goals of this thesis: 1) to develop a typology that adequately reflects the morphological variability in Tsimshian stone-tools, and 2) to be able to use this typology to test whether or not Tsimshian identity is expressed in, and recoverable from, their lithic technology. As will be demonstrated, although curated stone-tool types manufactured by the Tsimshian exhibit considerable variability in form, sub-types can be recognized that share a number of characteristics. Some of these tool-types such as hand and hafted mauls and splitting adzes are considerably different from the same tool-types manufactured by other groups of people, and these differences relate to stylistic/cultural preferences and thus group identity.

WHO ARE THE TSIMSHIAN?

The Tsimshian are a First Nations group who currently live along the North Coast of British Columbia in and around Prince Rupert Harbour (see map 2.1). Collectively and historically the Tsimshian refers to the Nishga on the Nass River; the Gitksan on the Upper Skeena River above Kitselas canyon; the Coast Tsimshian on the lower reaches of the Skeena and the adjacent coast; and the Southern Tsimshian on the coast and islands to the south (Halpin & Seguin 1990). The lithic materials that are analyzed in this thesis come from both Coastal Tsimshian sites and unprovenienced contexts around Prince Rupert Harbour only (see map 4.1). The ethnographic accounts that describe and define Tsimshian culture and society are based on Coastal Tsimshian tribes of the same area and include the Gitwilgyoots, Ginax'angiik, Gitzaxłaał, Gitsiis, Gitnadoiks, Gitando, Gispaxlo'ots, Gitlaan, and Giluts'aaw (Garfield 1939; Martindale & Marsden 2003). Some of the more prominent aspects about Tsimshian culture and society that have been studied by early ethnographers/anthropologists such as Barbeau (1929, 1961), Barbeau and Benyon (n.d.), Benyon (n.d.), Boaz (1916), and Garfield (1939) include their oral traditions, kinship systems, social and political organization, economy, mobility patterns, technology, art, religion/spirituality, and warfare as they were observed during the 19th and early 20th centuries. According to Tsimshian oral traditions, or "adawx", some lineages have been living on the Northwest Coast of British Columbia since the end of the last Ice Age (10,000 to 13,000 years ago). However, archaeological data only documents the presence of people living in the Prince Rupert Harbour area for the last 5,500 years, as sites predating this time are thought to be underwater (Ames 2005; Ames & Maschner 1999; Cybulski 2001). As with all groups of people who have long and rich histories, the Tsimshian as a people, culture, and society have undergone substantial changes throughout their history. Fortunately though, many aspects of Tsimshian culture and society recorded by ethnographers can be traced through the archaeological record into prehistory and so there is a sound basis for attempting to infer Tsimshian identity from their stone-tools.

WHY DEVELOP A TYPOLOGY OF TSIMSHIAN LITHICS?

As will be made clear during the course of this thesis, determining whether or not group identity is expressed in material culture, and if so, how it is expressed, have been perennial goals of archaeologists for a long time. Answering these questions allows one to proceed to the heart of almost all archaeological research, which is to understand the relationship between material culture, or more aptly, material culture patterning, and past peoples and cultures. Without understanding this relationship, archaeologists cannot make meaningful interpretations and inferences about the past.

Classifications and artifact typologies have been used by archaeologists almost since the inception of the discipline to connect past groups of people with material culture, thereby helping to establish the space-time framework upon which our understanding of world prehistory rests (Adams & Adams 1991; Chang 1967; Hayden 1984; Krieger 1944; Kroeber 1948; Read 1974; Taylor 1948; Whallon & Brown 1982). Both are cornerstones of archaeological inquiry as they help to spatially and temporally order material that is excavated. When Christian Thomsen re-ordered the artifact collections of the National Museum in Copenhagen according to stone, bronze, and iron raw materials in 1836 it became possible to relatively date the artifacts and the deposits in which they were found, and the peoples and cultures that produced them. With the recognition that artifacts and deposits could be dated came the realization that it was possible to establish the cultural-history for much of the world, and determining the temporal and cultural affinities of artifacts, deposits, and sites became the goal of most, if not all, archaeology for much of the late 19th and early to mid-20th centuries (Adams & Adams 1991; Dunnell 1978; Hayden 1984; Trigger 2006). Presently regional chronologies and culture-histories have been sufficiently established for many parts of the world, which allow archaeologists to ask more substantial (anthropological) questions of their data.

Although classifying materials and developing typologies may seem like pedestrian or *passé* endeavours to some contemporary archaeologists, we still need to be able to situate new finds within the space-time framework established by our forbearers (Adams & Adams 1991). Thanks to the efforts of previous archaeologists, when we dig a site today and recover projectile points or ceramics we are able to identify the specific types of projectile points and wares and then relate these to specific time periods and/or areas and the people who lived there. However, not all areas and types of artifacts have been studied to the same degree and classifying materials and developing typologies continue to be of utmost importance in archaeology. In addition to the general and overall importance of establishing artifact typologies to identify past groups of people and better understand world prehistory, there are several specific reasons for developing a typology of Tsimshian lithics.

First, in this thesis current understandings about Tsimshian lithics will be reviewed and reformulated by drawing together more recent data and diverse collections into one study. There is no widely established typology of Tsimshian lithics beyond MacDonald and Inglis's (1981) overview, which was based on research conducted in the 1960s and 70s, and large amounts of Tsimshian lithic materials have been collected since then. The typology established by MacDonald and Inglis is also hardly an in-depth analysis of Tsimshian stone-tools; rather it is more of a presence/absence account of when different tool-types began to appear in the archaeological record at Tsimshian sites. There is also a large collection of Tsimshian lithics housed in the Museum of Northern B.C. that has never been reported on and that will add greatly to our current understanding of Tsimshian lithics that is derived almost solely from MacDonald and Inglis's overview.

Second, and more importantly, what has only been implicit before is now made explicit. This work will include a detailed description of tool-types and the diagnostic characteristics that define them and an account of the morphological variability within them. Rigorousness and replicability are two hallmarks of a scientific archaeology and by making the analysis of Tsimshian lithics accessible and the methodology explicit the resulting information will be useful for future researchers.

Third, and as was stated above, this thesis will also explore whether or not group identity (defined later as including social, ethnic, and cultural identity) is expressed in, and can be recovered from, material culture in general and lithic materials in particular. If artifact typologies are used to identify and spatially and temporally order past groups of people and cultures they require the assumption that group identity is, in fact, manifest in material culture. While this may be true for some forms of material culture in some contexts some of the time, it does not hold true all of the time and this assumption must be tested if we want to be able to use material culture to reconstruct and understand world prehistory.

Fourth, being able to link material culture with Tsimshian group identity will assist greatly in efforts to trace population movements and accounts of migration in Tsimshian oral traditions. As will be elaborated on in the next chapter, immigration into Coastal Tsimshian territory by foreign groups of people has periodically occurred over the last few thousand years. Currently, a project investigating the commensurability of archaeological data and these accounts of migration and conflict is beng carried out on the Dundas Island group, located just off the Pacific Coast near Prince Rupert Harbour. Evidence of village forms and architecture that differ significantly from known Tsimshian patterns have been found in an area where Tlingit and/or Athapascan migrants are thought to have settled. These non-Tsimshian style villages have been tentatively interpreted as representing the presence of other groups of people in the region, thus supporting the accounts of migration in Tsimshian oral traditions (Andrew Martindale and David Archer, personal communication). Much like the village forms and architecture then, if one has a decent understanding of Tsimshian lithics and the preferences that Tsimshian tool-makers had then they are in a better position to recognize tool-forms that deviate from the Tsimshian norm. Thus, by linking material culture to Tsimshian group identity it may be possible to find material correlates of accounts of migration in Tsimshian oral traditions.

Fifth, rarely in archaeology are we afforded the luxury of synthesizing ethnographic data and indigenous oral history with archaeological data into an anthropological understanding of the material and people that we study. More often than not, linking material recovered during excavations with contemporary or recent peoples and cultures is next to impossible and instead we are resigned to defining artificial archaeological cultures in time and space. As will be shown, archaeological data and Tsimshian oral traditions can be combined to demonstrate cultural continuity between historic-period Tsimshian described in ethnographic accounts and people living in Prince Rupert Harbour thousands of years ago. Linking the past and present allows for testing whether or not Tsimshian identity is expressed in, and recoverable from, their stone-tools.

THESIS LAYOUT

The second chapter provides background information that is required to develop the argument put forward in this thesis. This information includes brief summaries of the chronology of the Pacific Coast and developments that characterize sub-periods, a review of the history of archaeological research in Prince Rupert Harbour, and current understandings about Tsimshian stone-tools derived from this research. Links between the ethnographically-described Tsimshian and people living in Prince Rupert Harbour throughout prehistory are also established and by doing so, the temporal and spatial parameters of this study are defined.

The third chapter is mainly theoretical in nature and examines how archaeologists attempt to infer group identity from material culture. The relationship between group identity and archaeological cultures and the various roles, purposes, and kinds of typologies within archaeology are discussed.

The fourth and fifth chapters outline the methodology employed in the analysis of Tsimshian lithics. Included here are a brief discussion of the artifact types examined and the archaeological sites and collections that provide the bulk of material, definitions of tool-types, variables, and attributes, and a summary of the specific statistical techniques used for examining variability and establishing type identity and meaning. The problems and limitations with the Tsimshian and non-Tsimshian lithic data are also discussed.

The sixth chapter presents the results of the analysis of Tsimshian lithics and discusses how Tsimshian stone-tools compare to similar tool-types manufactured by other groups of people on the Pacific and Alaskan Coasts. Variability within tool-types is examined and Tsimshian preferences are established. Potential sub-types are also identified and quantitative and qualitative differences between Tsimshian stone-tools and stone-tools manufactured by other groups of people are highlighted.

The seventh chapter summarizes the results of the analysis and discusses whether or not potential sub-types and differences between Tsimshian and non-Tsimshian stone-tools reflect functional or technological factors or stylistic preferences. Differences between Tsimshian and non-Tsimshian tools that can be shown to relate to primarily stylistic preferences offer the greatest evidence of a Tsimshian group identity.

The eighth and final chapter is a synopsis of the thesis where the salient points are re-iterated and brought together into a coherent argument. Future considerations and suggestions for improvement are also offered.

CHAPTER 2: BACKGROUND INFORMATION

PACIFIC COAST AREA AND CHRONOLOGY

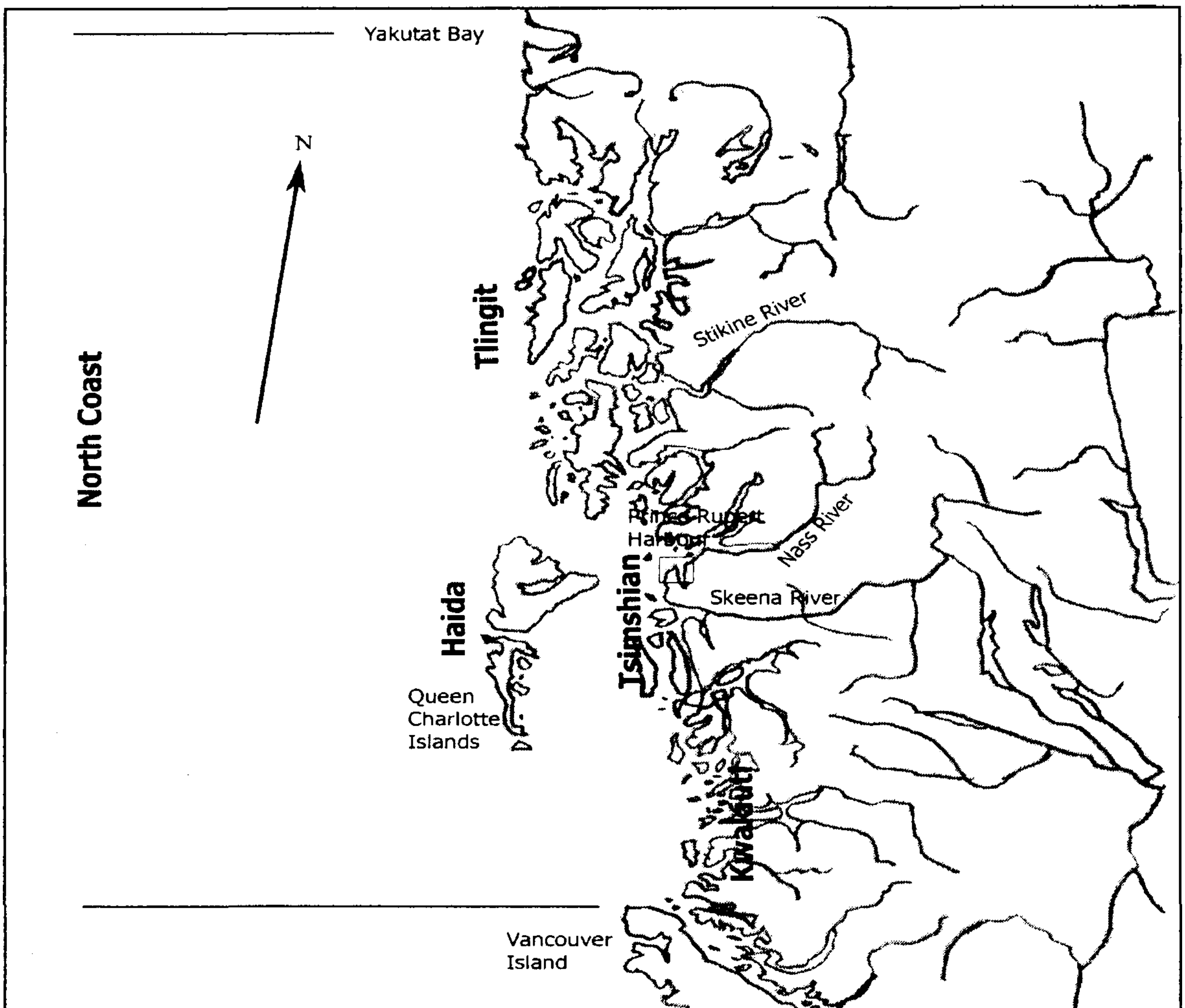
The Pacific Coast encompasses the area from Southeast Alaska in the north to Northern California in the south and the landmass in between, and archaeologists working here make a distinction between the South, Central and North Coast regions (see map 2.1). The South Coast includes the area from Northern California to the mouth of the Columbia River. The Central Coast stretches from the Columbia River to the northern tip of Vancouver Island. The North Coast includes the area from the northern tip of Vancouver Island to Yakutat Bay in Southeast Alaska. Pacific Coast prehistory is divided into three temporal periods: Paleo-Indian (> 11,000 RCYBP), Archaic (11,000 to 5500 RCYBP), and Pacific (5500 RCYBP to European contact c. A.D. 1787).

ARCHAIC PERIOD (11,000 TO 5500 RCYBP)

Archaeologists working on the Pacific Coast have given a variety of names to the Archaic Period depending on their research orientation and area , including the Early Boreal (Borden 1975), Palaeomarine (Davis 1990), Microblade Tradition (Carlson 1996), and Early Coast Microblade Complex (Fladmark 1982). The Archaic Period is characterized by the proliferation of microblade and cobble tool manufacturing traditions and generalized hunting, fishing, and gathering economies where local environments are exploited (Ames & Maschner 1999; Matson & Coupland 1995). Microblade and cobble tool manufacturing traditions are found throughout the Pacific Coast and offshore islands, except on the North Coast mainland where many of the Archaic deposits are thought to be below current sea levels (Ames 2005; Ames & Maschner 1999; Matson & Coupland 1995).

PACIFIC PERIOD (5500 RCYBP TO EUROPEAN CONTACT)

The Pacific Period is generally held to be the time when people begin to approximate the ethnographic cultural divisions and patterns (Ames 2005; Ames & Maschner 1999; Martindale & Marsden 2003; Matson & Coupland 1995). This period is usually sub-divided into three sub-periods, an Early, Middle, and Late Period, with the temporal limits of each varying from region to region.



Map 2.1 Map of the Pacific Coast and Locations of Various First Nations Groups

The Early Period is marked by the appearance or development of subsistence practices, settlement patterns, and material culture resembling ethnographically described cultures. During the Middle Period substantial social and economic changes occur, including the development of partial to full sedentism, storage technology, social stratification, and endemic warfare and even more parallels can be made with the historic-period ethnographic cultural divisions and groups of people living during this time. The Developed Northwest Coast Pattern as it is referred to by Matson and Coupland (1995) is in full stride by the beginning of the Late Period and continues until shortly after contact with Europeans (Ames 2005; Ames & Maschner 1999; Martindale & Marsden 2003). The Prince Rupert Harbour archaeological sequence is the key Pacific Period chronology for the North Coast region as it is the only large, multi-site sample spanning the entire period from a single cultural region north of Vancouver Island (Ames 2005).

PRINCE RUPERT HARBOUR CHRONOLOGY

The Early Pacific Period (5000 to 3500 RCYBP) in the Prince Rupert Harbour region is characterized by the presence of small, dispersed communities where local resources were collected and utilized and contact between coastal and interior groups is limited (MacDonald & Inglis 1981; Martindale & Marsden 2003; Matson & Coupland 1995). Many researchers have shown that significant cultural shifts occurred during the Middle Pacific Period (3500 to 1500 RCYBP) and strong ties to the historic-period Tsimshian can be made at this time (Ames & Maschner 1999; MacDonald & Inglis 1981; Martindale & Marsden 2003; Matson & Coupland 1995). During this period there is evidence of the ethnographically known coast-to-interior seasonal mobility cycle, which also implies an intensified subsistence economy and storage technology. There is also evidence for increased social stratification and the formation of extended households and corporate residential groups as the basis of the economy. By the Late Pacific Period (1500 RCYBP to European contact in A.D. 1787) the Developed Northwest Coast Pattern is fully developed among the Tsimshian.

Subsequent to the NCPP, Joyce May (1978) conducted excavations at the Ridley Island site (GbTo-19) and additional work was done at the Lachane/Co-op site (GbTo-33) in 1987 by Bjorn Simonsen (1988). Gary Coupland began conducting excavations at the McNichol Creek site (GcTo-6) in 1990 and has continued working in Prince Rupert Harbour ever since (Coupland, Bissel, & King 1991). David Archer (1984) and MacKie (1986) conducted surveys of the lower Skeena River estuary located just to the south of Prince Rupert Harbour and mapped 117 sites in the process. There is currently research being carried out on the Dundas Island group (including Zayas, Melville, Baron, and Dundas Islands), a series of offshore Islands located near Prince Rupert (Martindale and Archer, personal communication).

CURRENT UNDERSTANDINGS OF TSIMSHIAN LITHIC TECHNOLOGY

The primary aim of the NCPP was to trace the development of historic-period Tsimshian culture through the archaeological and material records (MacDonald & Inglis 1981:37), and the NCPP excavations yielded large amounts of material culture for study. However, beyond MacDonald and Inglis's (1981) overview, which discusses progression and elaboration in Tsimshian stone, bone, and antler tools through time, there have been no detailed reports on Tsimshian lithic materials recovered as part of the NCPP or other excavations beyond the recent release of Ken Ames (2005) monograph. Although Ames (2005) described over 9000 artifacts recovered as part of the NCPP and reported for the first time on many of the Tsimshian stone-tools and tool-types that are examined in this thesis, no attempt was made to look for morphological tendencies within tool-types and, as will be shown, many of the mean measurements reported were, for whatever reasons, incorrect.

What Ames (2005) monograph and the earlier overview by MacDonald and Inglis (1981) established is that there is continuity in Tsimshian material culture over at least the last 4000 or 5000 years. New elements are added to an existing pattern but do not significantly alter it and changes that do occur are quantitative and likely reflect elaborations in the social and economic organization of the Tsimshian (MacDonald & Inglis 1981:42). Prior to ca. 3500 RCYBP, cobble and pebble tools dominate lithic assemblages and other than a few ground slate points and pencils, ground stone technology is lacking. After 3500 RCYBP chipped stone peaks in frequency, ground slate points and pencils occur in abundance and new pecked and ground stone artifacts such as nephrite adze/chisel blades (celts), perforated and notched net sinkers, and stone clubs begin to appear. By 1500 RCYBP the lithic technology of the ethnographically described Tsimshian is fully developed. In addition to the existing tool-kit, massive and elaborate pecked and ground stone artifacts including stone splitting adzes, hand and hafted mauls, bark shredders, and bowls/tobacco mortars occur, and during this time zoomorphic motifs are often incorporated into stone artifacts. In short, the material data correlates well with the faunal, settlement, architectural, and oral data that will be reviewed below that indicate continuity in Tsimshian culture and identity in Prince Rupert Harbour over the last several thousand years.

THE DEVELOPED NORTHWEST COAST PATTERN

First Nations groups along the Pacific Coast of North America are commonly referred to as complex hunter-gatherers. Although there is local and regional variability, they share a suite of characteristics that were described and recorded by ethnographers and can be identified archaeologically. Matson and Coupland (1995) refer to this suite of characteristics as the Developed Northwest Coast Pattern. People on the Pacific Coast: 1) resided in permanent villages for at least parts of the year; 2) had economies that rely on the production of massive quantities of food and the ability to store it for later use; 3) had extended households as the basic unit of production and consumption; 4) produced complex technologies; 5) exhibited full and part-time occupation specialization; 6) sometimes manipulated the environment in order to increase productivity; 7) had rigid social hierarchies with ascribed status; and 8) had large populations and high population densities (Ames 1994; Ames & Maschner 1995, Matson & Coupland 1999). As is shown below, there is archaeological and oral evidence for many of these characteristics that can be used to connect the ethnographically described Tsimshian with people living in the Prince Rupert Harbour area in the past. Before examining this evidence a brief description of Tsimshian subsistence economy and settlement and mobility patterns is warranted.

SUBSISTENCE, SETTLEMENT AND MOBILITY PATTERNS

Tsimshian subsistence economy is best thought of as a delayed return or storage economy involving intensive harvesting of seasonally abundant resources; most notably salmon, eulachon, and berries (Ames 1994; Ames & Maschner 1995; Matson & Coupland 1999). This type of economy demanded that the Tsimshian move a few times each year into areas known to have abundant resources that could be harvested at particular times and processed and stored for later use. These predictable resources were supplemented by a wide-range of locally available, less plentiful resources.

With the building of Fort Simpson 40 km to the north of Prince Rupert in 1834 the Tsimshian shifted their winter settlement to this area, and it remains the major center of Tsimshian occupation on the coast today (Garfield 1939:275; MacDonald & Inglis, 1981:52). Prior to this, the Tsimshian resided in aggregated villages in Prince Rupert Harbour at Old Metlakatla Pass (Venn Passage) for the winter months where they subsisted on stores of salmon and eulachon oil and by harvesting locally available resources (see figure 4.1) (Ames & Maschner 1999; Garfield 1939; Martindale & Marsden 2003; Matson & Coupland 1995). In late February or early March, most of the Tsimshian moved by boat to the mouth of the Nass River where they intensively harvested eulachon in order to render highly valued grease/oil (Ames & Maschner 1999:120-121; Garfield 1939:277). After harvesting and processing the eulachon, the Tsimshian returned to Prince Rupert Harbour and to the surrounding islands where they collected local resources until late spring or early summer (Ames & Maschner 1999:121). At this time each of the Tsimshian tribes that had gathered together in winter villages in Metlakatla Pass dispersed into summer villages throughout the lower Skeena River Valley where they intensively harvested spawning salmon and other locally available resources until early fall (Ames & Maschner 1999:121). After drying salmon and berries for later consumption, the Tsimshian tribes moved back to aggregate villages in Prince Rupert Harbour for the winter and early spring.

There are four main features that can be traced through the archaeological and oral records to at least 1600 RCYBP and that develop from events occurring in the Middle Period between 2000 and 3500 RCYBP: 1) large-scale harvesting of seasonally abundant resources; 2) seasonal mobility between the coast and interior to procure these resources; 3) use of storage technology; and 4) exploitation of locally available resources to supplement stored foods. To fully understand these developments, the impact of population demographics on the creation of extended family households and on the relationship between coastal and interior Tsimshian communities must be examined.

CONTINUITY IN TSIMSHIAN CULTURE AND IDENTITY

Middle Period 3500 to 2000 RCYBP

Beginning around 3500 RCYBP, the population began to increase in Kitselas Canyon in the interior and Prince Rupert Harbour on the coast (MacDonald & Inglis 1981:45; Marsden 2001; Martindale & Marsden 2003; Matson & Coupland 1995:191). Not coincidentally, during this period the exploitation of locally available resources also increases and there is evidence of large-scale harvesting of eulachon and salmon (Ames & Maschner 1995:140-141; Martindale & Marsden 2003:25; Matson & Coupland 1999:187, 191). Evidence for this increase in population comes from several sources including the appearance of new settlements; an increase in the size of shell middens and rate of refuse deposition; and from Tsimshian oral records. Evidence for these changes in subsistence economy comes primarily from the faunal, artifactual, and settlement data.

Tsimshian oral records tell us of the abandonment of Temlaxam (Hagwilget Canyon) due to a period of cold weather and famine, resulting in the migrants eventually settling throughout Tsimshian territory (Martindale & Marsden 2003:23). While some of the migrants settled in Kitselas Canyon and founded their own settlement called Ts'myaaw, others were dispersed in areas along the Nass River or continued down the Skeena River and joined the Gitwilgyoots (Marsden 2001; Martindale & Marsden 2003:23-24). After consolidating their position in Kitselas Canyon, the migrants from Temlaxam were eventually joined by groups of people from other settlements in the region and a loose network of alliances was formed with other tribes to the west (Martindale & Marsden 2003:23-24). Another migration occurred some time later involving the migrants from Temlaxam who chose to settle in Gitksan territory. These people also made their way down the Skeena River and eventually settled amongst the Coastal Tsimshian tribes of the Ginax'angiik and Gitsiis (Marsden 2001; Martindale & Marsden 2003:26).

Located in Hagwilget Canyon, the Hagwilget (GhSv-2) site is interpreted as a large village between 4500 and 3500 RCYBP, however after this time the site was occupied less intensively and is interpreted as a fishing station (Ames 1979). Conversely, located in Kitselas Canyon and dated to between 3600 and 3200 RCYBP, the Skeena phase at Giteaus (GdTc-2) provides archaeological evidence for the original migration from Temlaxam. Allaire (1979:46-47) suggested an intrusion of people from the east based on the appearance of eastern lithic tool forms such as parallel flaked lanceolate points that are common in sites in Hagwilget Canyon prior to abandonment of that area; an increase in the use of eastern raw materials such as obsidian and green chert; a decrease in groundstone and cobble tools, which are found in earlier components at Giteaus and coastal sites; and an increase in chipped stone tools. The tool-kit at this time is suited more towards mammalian hunting and is less similar to local or coastal technologies, suggesting immigration of foreign people to the region.

Evidence for a population increase along the coast comes from the appearance of new settlements in previously uninhabited regions, most notably on the many offshore islands that dot the coast (Martindale & Marsden 2003:26). Sites like Lucy Island (GbTp-1) that only now began to be occupied are associated with exploitation of near-shore marine shallows and kelp beds (Ames & Maschner 1999:142; Martindale & Marsden 2003:26). In Prince Rupert Harbour, thin discontinuous layers of shell midden are replaced by deep, concentrated shell middens at the Boardwalk (GbTo-31), Lachane/Co-op (GbTo-10), and Garden Island (GbTo-23) sites (Matson & Coupland 1995:191), reflecting larger village occupations and an increase in population in the region (MacDonald & Inglis 1981:45).

Based on changes in lithic technology and the faunal remains present, the Paul Mason phase (3300 to 2700 RCYBP) at the Paul Mason site in the B.C. interior can be taken as evidence for large-scale salmon harvesting (Coupland 1988:237-239; Matson & Coupland 1995:187). Compared to the earlier Skeena phase, the Paul Mason phase contains a sharp decrease in chipped stone tools (46% to 17%); an increase in groundstone abraders, which indicates an increase in bone and antler tools; the appearance of slate knives, which are commonly associated with fish processing (Hayden 1989); the appearance of many large external hearth features and cache pits; and the predominance of salmon faunal remains (80% of the total), although faunal remains in general are rare. The presence of twelve large, rectangular dwellings all with prepared floors also suggests permanent year-round occupation and by extension intensification of resource procurement and possibly storage (Ames & Maschner 1999; Matson & Coupland 1995:187). Rectangular houses are the main processing and storage facilities among the Tsimshian (Ames 1994:217), and there presence here suggests they could have been used for such purposes at this time.

The artifactual and faunal evidence along the coast also suggests a greater exploitation of locally available resources and possibly the exploitation of seasonally abundant resources and use of storage technology. Changes to the coastal tool-kit include perforated and notched net sinkers, unilaterally barbed bone harpoons, socketed points, composite harpoons, sea-mammal bone rods, mussel shell knives, and in increase in the proportion of ground slate points (Ames & Maschner 1999:140-141; MacDonald & Inglis 1981:45; Matson & Coupland 1995:191), all of which indicate a greater emphasis on marine resources. Post-hole patterns from various sites in Prince Rupert Harbour are interpreted as evidence for fish-drying racks (Coupland 1988:220; MacDonald & Inglis 1981:52), and kerfed or bentwood boxes that appear in coastal assemblages could certainly have been used for storage purposes (Ames & Maschner 1999:140). According to Robinson and Wright (1962:41 in MacDonald & Cybulski 2001:9) the Tsimshian used clay to seal the seams of boxes used to store meat and the discovery of eight burials from Prince Rupert Harbour that have partial or complete whitish clay outlines suggests that boxes could have been used for storage at this time. The increasing appearance of plank houses along the coast also suggests greater sedentism and by extension increasing exploitation of locally available resources and possibly even storage use (Ames 1994:217; Ames & Maschner 1999:141).

The deep, concentrated shell middens appearing at the Boardwalk, Lachane/Co-op, and Garden Island sites mentioned earlier contain a greater abundance and variety of shellfish remains (Matson & Coupland 1995:191). Middens from earlier components at these sites contain predominantly mussel shell whereas later middens are made up of clams, mussels, rock cockles, and whelks. Faunal remains from the Boardwalk site also contain an increase in the proportion of shore-dwelling birds, which also suggests increasing diversity and possibly the exploitation of previously untapped environments (Stewart & Stewart 2001:186). Salmon and eulachon faunal remains begin to appear in abundance in middens from the Dodge Island site (GbTo-18), suggesting an increase in the exploitation of these seasonally abundant resources (Ames 1998:78). Given that Dodge Island is located in Prince Rupert Harbour and is a considerable distance away from salmon and eulachon habitats, these resources would have had to be transported back to this site for consumption. As such, mobility patterns approaching those observed and recorded by ethnographers start to emerge.

Late Period (After 2000 RCYBP)

These trends in population demographics and subsistence economy continue well into the beginning of the modern era 2000 RCYBP. During this time the population continues to increase along the coast, locally available and seasonally abundant resources such as salmon and eulachon are increasingly exploited, seasonal mobility between the coast and interior is established, and there is more direct evidence for the use of storage technology. Evidence for these developments comes primarily from faunal and settlement data, and Tsimshian oral records.

After the migrations from Temlaxam, the oral records describe a period when many people from the northern interior and coast moved south into Tsimshian territory (Marsden 2001; Martindale & Marsden 2003). After a period of substantial conflict between the Tsimshian and the invading Tlingit (and possibly Athapascans), which resulted in the abandonment of the coastal region by the Tsimshian to the interior, the Tsimshian together with their interior kin reclaimed the coastal area and assimilated the remaining Tlingit into their society (Marsden 2001; Martindale & Marsden 2003:28-29). It was not until after the Tsimshian reclaimed the coastal region that all of the tribes along the Skeena River built winter villages in Metlakatla Pass, further expanding the population in this region (Marsden 2001:74). All of the Coastal Tsimshian tribes now had two homes; one in Metlakatla Pass in Prince Rupert Harbour where they stayed for the winter and one in their traditional territories along the Skeena River where they stayed for the summer (Marsden 2001:83).

Analysis of architecture and settlement patternsindicates that Tsimshian communities on the coast changed dramatically around 2000 RCYBP when larger, hierarchically arranged villages began to replace smaller, more egalitarian villages (Archer 2001:214). An explosion of new sites in the area including the McNichol Creek (GcTo-6), Ridley Island (GbTo-19), and Grassy Bay (GbTn-1) sites dated to 1580, 1990 and 1615 RCYBP respectively, suggest an increase in the population of this region (Stewart & Stewart 2001:194). Even at sites such as Boardwalk and Dodge Island, which were occupied before this time, there is an increase in the size and rate of deposition of shell middens after 2000 RCYBP (Stewart & Stewart 2001:194, 196), which also indicates an increase in population.

While local habitats continued to be exploited, the faunal evidence from a number of sites indicate a greater emphasis on storable resources such as salmon and eulachon. The predominance of fish faunal remains at the McNichol Creek and Ridley Island sites, 96% of total and 98% of total respectively, show focused rather than diversified economies (Stewart & Stewart 2001:194). At the McNichol Creek site 90% of fish remains were from salmon, indicating the importance of this resource. Almost exclusively post-cranial elements of salmon were found, suggesting that they were caught and processed somewhere else before being transported back to the site and stored for later consumption (Coupland *et al.* 1993). At the Ridley Island site, in addition to an abundance of salmon remains, eulachon remains were also found in high proportions, which suggests that the annual spring move to the Nass River may have been part of the subsistence economy and mobility pattern at this time (Ames & Maschner 1999:141; Fladmark *et al.* 1990:233). The fact that these sites were at least semi-sedentary in nature also suggests that storage technology played a key role in the subsistence economy (Ames 1994:217).

The Role of Extended Households

Up to now the role that Tsimshian extended households (residential corporate groups) played in their subsistence economy has not been discussed. Ames (1994:213) suggested that the evolution of Northwest Coast subsistence (including Tsimshian subsistence) is rooted in the evolution of the domestic mode of production, which involves household subsistence and participation in trade networks. To fully capitalize on the enormous spatial and temporal variability in resource distribution in Northwest Coast environments, household subsistence requires a high degree of labour organization and specialization (Ames & Maschner 1999:148). Household members are organized into specialized work forces that capitalize on resource variability by performing multiple complex tasks simultaneously and managing spatially clustered, temporally varying, and clumped resources (e.g. salmon, eulachon, and berries) (Ames 1994:211; Ames & Maschner 1999:250). Division of labour within households is very complex and can fall along many lines including age, sex, elite/non-elite, free/slave, and specialist/non-specialist (Ames 1994:211). In order to demonstrate the emergence of extended households among the Tsimshian we need to look at the evolution of architecture and for evidence of labour organization and specialization.

The appearance of rectangular architecture in the archaeological record is the most widely used indication for the development of extended households on the Northwest Coast. The appearance of these structures in several areas is thought to indicate the appearance of more formally organized or structured households since square spaces are more easily organized and formally arranged than their pit-house predecessors (Ames & Maschner 1999:160). It is easier to segregate interior space of rectangular structures than pit-houses as is evidenced by the highly structured internal living arrangements during historic times along the lines of status and economic activities (Ames & Maschner 1999:152; Garfield 1939:277). Rectangular houses are also much easier to expand as the size of households increase because they only require the extension of one of their sides rather than the entire diameter (Ames & Maschner 1999:161). Rectangular houses are also more functional as they provide a dry, comfortable, and spacious place above the ground in which people can perform a variety of tasks and store foods (Ames & Maschner 1999:161). During historic times Tsimshian houses were used as smoke-houses, drying sheds, and storage facilities and the use of these structures for these purposes probably extends back in time (Ames 1994:217; Ames & Maschner 1999:161).

The appearance of rectangular plank houses at the Paul Mason site in the interior noted above and at the Boardwalk site along the coast between 3500 and 3000 RCYBP can be taken as evidence for the existence of residential corporate groups at this time. The increasingly widespread emergence of these structures through time at other sites such as

McNichol Creek, Ridley Island, Garden Island, Dodge Island, Kitandich, Baldwin, and Lachane/Co-op shows continuity in architecture through to historic times and suggests the proliferation of this type of household organization.

Labour specialization in historic times generally occurred on a part-time basis and involved any number of economic activities including basket making, painting, net making, fishing, hunting, woodworking, etc. (Ames & Maschner 1999:164). Specialization of this kind ensured the presence of skilled individuals who could accomplish tasks needed for the household economy (Ames & Maschner 1999:164). Beyond woodworking however, there is very little evidence for labour specialization in Tsimshian territory dating back 3500 RCYBP. The presence of plank houses, bentwood boxes, and possibly canoes at this time (as is inferred by the location of sites like Lucy Island that could only have been reached by boat and the transportation of large amounts of eulachon to Ridley Island and salmon to McNichol Creek) certainly speaks of specialist production in woodworking. The earliest evidence for another type of non-woodworking specialization comes from the presence of a smelted copper sheet recovered from one of the burials in Prince Rupert Harbour dating to 2600 RCYBP (Ames 1994:220; Ames & Maschner 1999:164; Martindale & Marsden 2003:30). Although there is only limited evidence for occupation specialization, this does not lessen the probability that extended households developed during the Middle Period for two reasons: first, identifying occupation specialization in the archaeological record is very hard to do; and second, the presence of rectangular architecture and specialists in building plank houses indicates in and of itself that households were organized around specialists (Ames & Maschner 1999:164).

CHAPTER SUMMARY

The main goals in this chapter were to provide background information about the Pacific Coast, to review the history of archaeological research in Prince Rupert Harbour and our understanding of Tsimshian lithic technology, and to present the multiple lines of evidence that demonstrate continuity between the historic-period Tsimshian living in Prince Rupert Harbour and people living in this area over the last few thousand years. The artifactual, architectural, faunal, settlement, and oral data all testify to the persistence of Tsimshian subsistence, settlement and mobility patterns, social and household organization, and by extension a shared Tsimshian identity and cultural continuity for at least the last 1500 years and in all probability closer to 3500 years or more. All of this means that there is a sound basis for attempting to test the hypothesis that lithic materials from Prince Rupert Harbour and dating to the Middle and Late Periods reflect Tsimshian group identity.

CHAPTER 3: THEORETICAL CONSIDERATIONS

As was stated in the introductory chapter, classifications are paramount in archaeology. Chang (1967:71) quipped that 80 to 90 percent of an archaeologists time is spent classifying materials and the remaining 10 to 20 percent is devoted to doing something intelligent and useful with the resultant categories. Archaeological classifications serve two fundamental purposes: 1) they help to facilitate comparison of phenomena over wide areas, and 2) they help to summarize data and save time in sorting and describing phenomena (Adams & Adams 1991; Chang 1967; Ford 1954; Hayden 1984; Hill & Evans 1972; Krieger 1944; Read 1974; Whallon & Brown 1982). In other words, classifications bring order to a set of phenomena by creating mutually exclusive categories into which phenomena *may be* partitioned based on similarities and differences. In contrast, typologies are specific forms of classification that *actually sort* phenomena into these categories (i.e. types), but they are also created with additional purposes in mind (Adams & Adams 1991; Brew 1946; Dunnell 1971; Ford 1954; Hill & Evans 1972; Krieger 1956; Read 1974; Rouse 1944; Taylor 1948; Whallon & Brown 1982). They can be constructed for basic descriptive, comparative and analytical (i.e. intrinsic, interpretive, and historical) purposes and/or instrumental (i.e. ancillary and incidental) purposes (Adams & Adams 1991:158-165). There are phenetic, stylistic, chronological/spatial, functional, emic, and culture classifications designed to serve these needs (Adams & Adams 1991:216-223).

DEFINING TYPE AND TYPOLOGY

Following numerous others, types are defined as classes of phenomena that exhibit internal cohesion and external isolation and they are constructed by recognizing dimensions in formal (in this case morphological) variability shared by these phenomena (Adams & Adams 1991; Chang 1967; Cormack 1971; Cowgill 1982; Hill & Evans 1972; Hodson 1982; Sackett 1966; Shennan 1997; Whallon & Brown 1982). In other words, tool-types are classes of tools where the individual members of each tool-type are more similar to each other than they are to any members in any other tool-type. This definition accords well with the idea that tool-types are non-random clusters of diagnostic variables that may be discovered, or imposed, on any given set of data using various statistical procedures. Typologies then, as was mentioned above, are methods of actually sorting phenomena into categories.

"A typology is a conceptual system made by partitioning a specific field of entities into a comprehensive set of mutually exclusive types, according to a set of common criteria dictated by the purpose of the typologist. Within any typology, each type is a category created by the typologist, into which he can place discrete entities having specific identifying characteristics, to distinguish them from entities having other characteristics, in a way that is meaningful to the purpose of the typology." (Adams & Adams 1991:91)

PURPOSES OF TYPOLOGIES

Descriptive typologies simply describe and/or illustrate phenomena at a level other than an individual basis. In descriptive typologies, artifacts and other phenomena are grouped together according to form modalities of visible attributes; thus, artifacts are grouped according to their morphology (Adams & Adams 1991:159). As you can imagine, all typologies are descriptive at least to some extent; however, with descriptive typologies the description of classes of artifacts is an end in and of itself. Descriptive typologies are most frequently used when isolated or new material that is poorly understood is found (Krieger 1944:273).

Chang (1967) argued that archaeology is comparison or it is nothing. In order to make sense of material culture and understand world prehistory, archaeologists frequently compare phenomena between sites, between regions, and between time-periods, and many typologies are designed to meet these needs. Like descriptive typologies, comparative typologies communicate information about the phenomena under study and are more often than not based on morphological attributes. However, comparative typologies differ from descriptive typologies in that they make use of several collections and the knowledge gained from comparing collections is frequently used for other purposes.

Analytical typologies are designed not so much for communicative purposes as for gaining a better understanding of the material or phenomena being classified (Adams & Adams 1991:160). They may be used to answer questions regarding qualities inherent in the phenomena under study, such as when, where, why, or how an artifact was made, to shed light on something about past peoples and cultures, or to understand, development and change in phenomena over time and space. Answering each of these questions requires the study of different attributes and leads to different kinds of classifications.

Instrumental-ancillary typologies attempt use the classified phenomena to tell us about something else entirely (Adams & Adams 1991:158). For example, typologies that use pottery and certain types of lithic artifacts (e.g. projectile points) to aid in the identification and dating of deposits are perhaps the oldest and most ubiquitous of all instrumental-ancillary artifact typologies. Included among these typologies are the archaeological culture classifications that spatially and temporally order world prehistory and the use of artifact typologies for ethnic identification. Instrumental typologies can also be constructed for incidental purposes, which are essentially mnemonic in nature (Adams & Adams 1991:165). As was mentioned above, classifications in general serve to summarize and save time in sorting and describing phenomena, and most, if not all, typologies help archaeologists to digest, remember, and communicate the large amounts of data that we routinely deal with (Krieger 1956:141).

KINDS OF CLASSIFICATIONS

Phenetic (morphological) classifications are created primarily for descriptive and comparative purposes and given that archaeologists frequently publish all of their finds, at least in classificatory form, they are the most common of all archaeological typologies (Steward 1954:54). They include all of the types in a given body of material that can be recognized on the basis of intrinsic attribute combinations that regularly cluster together and are frequently used as a first step towards taxonomic classifications designed for other purposes (Adams & Adams 1991:217-218).

Stylistic and functional classifications are particular kinds of phenetic classifications where only certain (presumably) stylistic or functional attributes of phenomena are classified and used to define types. In practice though, purely functional and stylistic typologies are very rare as it is often hard to distinguish between or isolate stylistic and functional attributes. This point will be expanded on below.

Chronological and spatial classifications are often based on a combination of intrinsic stylistic attributes that cluster together and extrinsic attributes where there is consistent patterning of types in the archaeological record. Most of the artifact typologies that are used to identify prehistoric cultures in time and space rely on artifacts or features with the highest degree of stylistic loading (e.g. pottery, projectile points, houses, graves) (cf. Carr & Neitzel 1995; Chilton 1999; Conkey & Hastorff 1990; Clark 1989; Close 1989; Dunnell 1978, 1986; Flenniken & Raymond 1986; Hayden 1984; Hegmon 1992, 1998; Hurt & Rakita 2001; Jelinek 1976; Magne & Matson 1980; Meltzer 1981; O'Brien & Lyman 2003; Plog 1983; Shennan 1989; Stark 1998; Sackett 1977, 1982; Weissner 1983; Wilmsen 1974). In contrast, functional classifications sort phenomena according to their presumed purpose, which may be based on a combination of intrinsic and inferential attributes such as edge angle, weight, edge wear, and context (Hayden 1984:89).

In emic classifications, classifiers attempt to duplicate how the makers and users of phenomena would have grouped things together and thus presumably reflect some intention on the part of the maker (Hayden 1984). Emic typologies were in fashion during the middle part of the 20th century when many anthropologists felt that they should represent the world as their subjects see it. The logic behind the use of emic typologies is summed up nicely by Krieger (1944:272) when he stated

> "…ideally, an archaeological type should represent a unit of cultural practice equivalent to the "cultural trait" of ethnography…it is apparent that both concepts may serve the same purpose, namely, that of identifying distinct patterns of behaviour or technology which can be acquired from one human being to another, and thus serve as tools for the retracing of cultural developments and interaction."

Thus, for archaeologists during the early to mid-20th century, emic typologies were closely aligned with their primary goals of reconstructing culture-histories. During this time, the dichotomy between emic (i.e. real) versus etic (i.e. artificial) typologies and their usefulness for reconstructing past cultures and interpreting past human behaviour was the source of much debate (cf. Brew 1946; Ford 1954; Spaulding 1953; see Hill & Evans 1972 for an excellent review of the issues involved in this debate). However, because typologies should be constructed with specific aims in mind, this debate misses the point entirely and both emic and etic typologies can be, and have been, successfully used for a variety of purposes.

ARCHAEOLOGICAL CULTURE CLASSIFICATIONS AND GROUP IDENTITY

In contrast to definitions and usages of culture found in cultural anthropology and other disciplines, archaeological culture classifications refer to a distinctive material assemblage that is assumed to have been produced and used by a distinct ethnic group; thus archaeological cultures are thought to be analogous to a group of people. Archaeological cultures are artificial constructs defined using a normative and polythetic view of culture as recurring patterns of certain diagnostic types of remains (e.g. pots, implements, burial rites, house forms, etc.) assuming that these material expressions equate to cultural norms and group identity (Childe 1956:123; Shennan 1989:5-6; Stark 1998:3). Clarke (1968:188) went so far as to simply designate archaeological assemblages as culture. The concept of an archaeological culture was first used in the late 19th century by archaeologists attempting to link prehistoric groups of people and cultures with contemporary ethnographic cultures and it is closely linked with nationalism, ethnicity and group identity (Trigger 2006:232-234). The concept of an archaeological culture is also often associated with Kossinna and the '*Kulkurkreis*' school of ethnology (Veit 1989), and other early 20th century archaeologists and anthropologists who operated within a culture-historical paradigm (e.g. Childe 1929, 1936, 1956; Krieger 1944; Kroeber 1948; McKern 1939; Rouse 1939). Identifying archaeological cultures continue to be of utmost importance to contemporary archaeological endeavors as new finds still need to be placed within the space-time framework established by our forbearers. One need only take a cursory look at the archaeological literature and the labels used to identify (real and imagined) past groups of people to see how central the concept of an archaeological culture is to our understanding of world prehistory (e.g. Clovis, Dorset, Thule, Mousterian, Anasazi, Hohokam). When direct-historical links can be established between present and past groups of people then archaeological cultures are no longer artificial.

Culture classifications differ from other archaeological classifications in that in other classifications artifacts or phenomena are classified into types based on shared attributes and in culture classifications it is the clustering of certain types of diagnostic artifacts that are used to identify and define cultures. In the book "Rethinking Archaeology", Chang (1967:10) eloquently described the process of how archaeologists are able to identify and order past groups of people or cultures in the archaeological record using material culture.

"...artifacts are grouped, according to their physical attributes, into classes presumed to be of cultural significance, and the time-space arrangements of the classes of artifacts do seem to portray a consistent and consistently patterned picture of cultural interrelationships. Small attributes of artifacts are grouped into types; type groups into foci or phases; foci and phases move up and down and sideways, resulting in regional sequences, horizons, traditions, and co-traditions. Culture histories or areas, ranging in magnitude from a locality to a whole continent, have been known to be reconstructed by means of the typological classification of attributes of artifacts" (Chang 1967:10).

Clarke (1968) introduced the concept of a polythetic description to archaeology to describe the kind of grouping that archaeologists had been doing more or less intuitively for decades and that Chang, perhaps unwittingly, describes above. Polythetic descriptions are based on a set of conditions or attributes, none of which are necessary or sufficient for attribution of any item to a group. Instead, each member of a group is only expected to share a large number of these attributes and each attribute is to be shared by a large number of a group's members. In practice, almost everything at a level other than an individual artifact are polythetic descriptions, including chronological (e.g. pottery seriations) and spatial (e.g. projectile point) typologies and the archaeological cultures they purport to temporally and spatially order.

"...practically all anthropological reasoning rests on the premise that cultural variation is discontinuous: that there are aggregates of people who essentially share a common culture." (Barth 1969:9)

With this statement Barth succinctly summed up the centrality of the culture concept to our understanding of humanity and world prehistory. Later in the article, he asserted that the concept of ethnic groups is not so far removed from other concepts such as culture and society (Barth 1969:11), all of which are used to differentiate between groups of people. Although many people may question the commensurability between ethnic, cultural and social identity, and distinctions between these terms can certainly be made depending on the contexts in which they are used, they all also partially capture the essence of the same thing; namely that individuals within a particular ethnic, culture, or social group self-consciously identify with other members of that group, which in turn are collectively recognized as being different than another group of people. Recognizing self-conscious identification from the material and archaeological records is certainly a problem in archaeology (Shennan 1989:14); however, when the material and archaeological records can be combined with accounts in oral histories to describe and demonstrate a shared culture and history, then the argument for a prehistoric group identity can be made.

Tsimshian *adawx* are oral records of historical events of collective political, economical, and social significance (Marsden 2002:102). Although they are owned by specific lineages and passed on over generations, *adawx* are formally acknowledged by Tsimshian society as a whole and collectively represent the history of the nation. In the context of this thesis, because cultural continuity in Prince Rupert Harbour over the last several millennia has been established and the Tsimshian are a group of people with a shared language, culture, territory, history and identity, distinguishing between ethnic, cultural, and social identity is simply irrelevant and group identity is used instead for heuristic purposes.

THE STUDY OF GROUP IDENTITY IN ARCHAEOLOGY

From the preceding discussion it should be clear that two of the most common uses of typologies in archaeology are for identifying and ordering past groups of people in the archaeological record. It is my contention that identifying archaeological cultures based on recurring patterns of certain diagnostic (usually stylistic) attributes and types of remains requires the assumption that the identity of these groups of people is expressed in the material that is used to define them. Thus, during the early to mid-20th century archaeologists implicitly studied group identity when they were using the style of material culture to reconstruct culture areas and histories.

The style of material culture has been an explicit focus of archaeological research for only the last few decades and given that it is a slippery, multivalent, and multidimensional concept there is little agreement among archaeologists on a single definition or usage for it (Conkey & Hastorf 1990:2; Hegmon 1992:517; Odell 2001:49; Plog 1983:129). Before launching into a discussion about the explicit study of group identity via style, it is important to note how artifact style was recognized and studied by archaeologists working within a culture-historical framework.

For culture-historians, style was synonymous with other terms such as foci, phases, complexes, industries and even cultures (Rouse 1960:319), all of which were used to denote similarities and differences between groups of artifacts and other phenomena. In so doing, the style of material culture was used by culture-historians to establish the whole space-time framework upon which our understanding of prehistory rests (Dunnell 1978). In this sense style is considered as a group's preferred way of doing things (Kroeber 1948; Hegmon 1992; Hodder 1990; Sackett 1982), and it is this conceptualization of style that is synonymous with group identity and that has allowed archaeologists to use it as a basis for ordering world prehistory.

The archaeologists of the 1960s and 70s inherited two major conceptual frameworks for analyzing material culture from their culture-historical predecessors: 1) although the link between style in material culture and the identity of past groups of people was not explicitly studied by earlier archaeologists, styles of artifacts were nonetheless used to establish the spatial-temporal framework, and 2) conversely, functional units of artifacts such as axes, hoes, projectile points, pots, etc., which were largely intuitively constructed in the culture-historical paradigm, were used to infer site functions (Dunnell 1978).

The classic Binford-Bordes debate is an excellent example of how the polemic between style and function played out in material culture analysis during the mid-to-late 20th century. In his study of Middle Paleolithic Mousterian lithic assemblages, Bordes (1961), operating within a culture-historical approach and under the assumption that artifact form is determined primarily by stylistic preferences of the people who made the artifacts, inferred the presence of four distinct ethnic Mousterian groups of people based on an analysis of lithic artifacts. In contrast, Binford (1966, 1973), operating within the functionalist and systems-theory paradigm that characterized processual archaeology and under the assumption that artifact form is determined largely by functional and technological constraints, used factor analysis to suggest that the lithic toolkits from different Mousterian sites were related to the different activities that were carried out at the sites and not ethnic stylistic preferences. The debate between Bordes and Binford illustrates that the final form of material culture is determined by stylistic, functional, and technological considerations.

For most archaeologists of the 1960s and 70s, stylistic elements of material culture were treated as passive phenomena (Hegmon 1992:520). Instead, artifact form was thought to be determined primarily by function (intended use of object) and technological constraints (specific ways of manufacturing artifacts and internal properties of specific raw materials) (Binford 1973; Clark 1989; Close 1978, 1989; Jelinek 1976) and stylistic elements of material culture were only considered after the elements relating to function and technology were filtered out. However, because different objects often perform similar functions (e.g. hand mauls are also often used as pestles, the poll of splitting adzes were also used like mauls to pound things, etc.) and that it is the mode and context in which objects are used that determines function, function itself has very little bearing on the form of an object (Kukan 1978:58; Pye 1969:92-96).

It took the now famous axiomatic statement by Wobst (1977) that "style has function" to help pave the way for the explicit study of style in archaeological research. Operating within an information-exchange theoretical framework, Wobst (1977) argued that style functioned in cultural systems as an avenue of communication. Although Wobst's theory of style can be criticized on a number of grounds (see Hegmon 1992:520-521 for a useful summary), he brought consideration of style in material culture and its relationship to human groups and identity to the forefront of archaeological thought by treating style as an active phenomenon and a component of human activity rather than the passive phenomenon that it was relegated to prior to this time.

In arguing that style transmits information about personal and social identity that is used for identification via comparison with other groups of people, Wiessner's (1983:256-257; 1989) emblemic and assertive styles built on Wobst's idea that style serves primarily a communicative function. Rather than suggesting that only simple invariate and recurrent messages will normally be transmitted stylistically as Wobst (1977:323) did, Wiessner's emblemic and assertive styles allow room for the communication of ambiguous and complex messages (Wiessner 1985). For Wiessner (1983:257), emblemic style, defined as "formal variation in material culture that has a distinct referent and transmits a clear message to a defined target population", holds the key to understanding group identity. Another, perhaps less well-known, perspective of style that privileges the communicative function can be found in Macdonald (1990) where he related Wiessner's emblemic and assertive styles to what he terms protocol and panache respectively.

All definitions and usages of style that view it as serving primarily a communicative function are emphasizing only one component of style; the *use* of style-bearing objects (Hegmon 1992:521). For example, Wobst's information-exchange definition of style and Wiessner's emblemic style only consider the intentionality in which style is embedded in material culture for the purpose of communication. In contrast, other researchers give consideration to the production and perpetuation of style through learning and tradition (Hegmon 1992:521), and this perspective requires other conceptualizations of style including the unconscious way it is imparted onto material culture during manufacture. Towards this end, it took another now famous statement that "technology has style" (Lechtmann 1977) to open up the floodgates for researchers wanting to examine how style is unconsciously embedded in material culture.

As was noted above, technology, along with function and style, influences the final form an artifact will have. Lechtmann (1977) argued that as a socially learned way to manufacture material culture, technology had a style of its own and could be understood only within its social and cultural context. I argue, as others have (e.g. Close 1989; Sheppard 1988), that stone-working is a culturally-learned, or taught, tradition and that what is learned is a group's preferred ways of manufacturing stone-tools. Similar to Lechtmann's work on technological style although focusing on the more passive elements of it, Sackett (1982, 1990) argued that style resides in the choices made by artisans, particularly those choices that result in the same functional end. Sackett considered the choices made by artisans as "isochrestic" variation in material culture, and it is this variation that reflects socially learned traditions of manufacture. Isochrestic variation is appealing for those attempting to recognize group identity because style is seen as a particular subset of material culture variation that has ethnic or cultural significance, regardless of whether group identity is intentionally communicated (Hegmon 1998; Sackett 1990). Sackett (1982) also defined "iconological" style, which is similar to both Wobst's and Wiessner's view of style as intentionally serving a communicative function. As one would expect from his definition of isochrestic variation, Sackett does not distinguish between functional and stylistic attributes of material culture as do many other archaeologists, because style is seen as being all-pervasive.

CHAPTER SUMMARY

One of the main goals of this chapter was to define types and typologies and discuss *what* typologies are used for and the different kinds of typologies that serve these purposes. Here it is important to note that while all typologies attempt to sort phenomena into mutually exclusive categories and are heuristic tools used to investigate phenomena, neither the purposes for which typologies are created nor the different kinds of typologies that can be constructed are mutually exclusive categories themselves. In other words, many typologies explicitly and/or implicitly serve multiple purposes and different kinds of typologies can serve the same purposes. For example, while pottery seriations are analytical-historical typologies because they study change in pottery through time or space, many times they are also analytical-interpretive typologies because they are used to tell us about the people who made the pottery and instrumental-ancillary typologies because they are used to tell us about something other than the pottery itself (e.g. the date of a component or site, the presence of a particular group of people or culture, etc.). Similarly, for pottery seriation to actually aid in dating deposits or identifying sites, pottery must be described enough so that it can be meaningfully compared between contexts. Thus, pottery seriations are necessarily descriptive and comparative typologies as well.

Another goal of this chapter was to illustrate *how* typologies have actually been used by archaeologists to infer the presence of past groups of people and *why* this method works for studying group identity. Here, it was argued that if types and typologies are to be used (successfully) for identifying and ordering past peoples and cultures, they require the assumption that group identity is expressed in material culture. Archaeological interest in group identity is almost as old as the discipline itself, even though it has not always been explicitly recognized or studied as such. Starting as an implicit assumption built into culture-historical approaches to archaeology that used morphological-stylistic elements of material culture to construct typologies and inform our understanding of the archaeological record and world prehistory, group identity via style began to be studied explicitly by archaeologists in the 1960s, 70s, and 80s. During this time, various interpretations of style were offered as a means of studying group identity. By and large, perspectives on style can be broken down into those that privilege the intentionality and communicative aspects of style for signaling group identity and those that focus on the unintentional signaling of group identity through unconscious learning of culturally preferred ways of manufacturing material culture.

For purposes of this thesis, given the functional and technological constraints of lithic raw materials that limit the opportunity for intentional stylistic input (Close 1989), and the fact that stone-working is a culturally learned or taught tradition, the concept of isochrestic variation where style is seen as being all-pervasive is particularly appealing and is critical to understanding (lithic) technology and group boundaries (Hegmon 1998). The reasoning for using stylistic rather than functional attributes of artifacts as markers of group identity is simple: where both consciously and unconsciously embedded stylistic attributes of artifacts may indicate specific manufacturing traditions (which in turn equate to social or ethnic groups), functional attributes, because they are largely determined by the intended use of the object and raw material restrictions, are thought to cross-cut ethnic and other social boundaries. However, recent attempts at linking material culture with groups of people have examined the entire technological system in which artifacts are produced (Dietler & Herbich 1998; Lechtmann 1977; Stark 1998), and style does not always have to be, or even can be in some circumstances, divorced from function or technology (Hegmon 1998).

CHAPTER 4: METHODOLOGY

To develop a typology where the resultant types have the potential to be used as indicators of Tsimshian group identity three things must be accomplished:

1. The preferences Tsimshian tool-makers had when making their stone-tools must be understood. Although types are formulated and described according to a combination of diagnostic characteristics, they are defined by their modalities or central tendencies (Adams & Adams 1991:239-240). To accomplish this end, variability within tool-types must be examined, summary statistics describing the central tendencies and spreads must be recorded, and patterns that are prevalent in the distributions of variables that may indicate sub-types must be identified.

2. Tsimshian tool-types and potential sub-types of tools must be able to be consistently identified and described according to a finite set of criteria. As was noted in the last chapter, useful types are polythetic descriptions that are formulated based on a combination of diagnostic characteristics, which can be intrinsic and/or extrinsic to the actual entity depending on the purpose for which types are created. As is shown below, there are several ways to determine characteristics useful for formulating Tsimshian tool-types.

3. The resultant tool-types and sub-types of tools must have meaning. The resultant tool-types must be formulated for some purpose, in this case for testing whether or not Tsimshian identity is expressed in, and recoverable from, their stone-tools. To actually test this hypothesis, Tsimshian stone-tools must be compared to stone-tools made by other groups of people. The 95% level of significance is used for identifying sub-types and significant differences between Tsimshian and non-Tsimshian stone-tools.

OVERVIEW OF METHODOLOGY

Facilitating comparison of tool-types was the overriding concern that guided the initial selection of tool-types and variables, and it entailed two things. First, it is generally held that some tool-types are better for distinguishing between different manufacturing traditions, and by extension groups of people, than others. For example, given the opportunistic and expedient nature of many Northwest Coast stone-tools such as hammerstones, choppers, and abraders, it would be very hard to quantify any significant differences between Tsimshian and non-Tsimshian stone-tools of these classes. This is because expedient stone-tools involve minimal amount of time and effort to manufacture in anticipation of time and appropriate raw materials at the place of use (Bleed 1986, Nelson 1991). As such, there are fewer decisions involved in making and using expedient tools and thus less chance that they will reflect culturally-learned traditions of manufacture and group identity. There is also an enormous amount of morphological variation in expedient tools that prohibits the identification and comparison of standardized or normative types. In contrast, highly curated tool-types such as adzes, celts, and projectile points, have more input in terms of time and effort to manufacture that is compensated by tool maintenance and recycling (Binford 1979). As a result, curated tools are purposely shaped and highly standardized in form reflecting the many choices involved in their manufacture and thus they have greater social input and a better chance of providing the discriminatory power that is needed to distinguish between different manufacturing traditions and social groups (Wilmsen 1974:93). It is precisely because formal, curated tools are morphologically more homogeneous than expedient tools that allow them to be used as diagnostics.

Second, both continuous and discrete morphological variables of tools that are commonly used in other lithic analyses are examined. For example, projectile points are often described using continuous variables such as maximum length, maximum width, maximum thickness, basal width, etc. and discrete variables such as presence/absence of notching, presence/absence of stems or other hafting elements, basal shape (e.g. convex, concave, or straight), etc. (e.g. Binford 1963; Flenniken & Raymond 1986; Magne & Matson 1980; Smith 1954; Thomas 1981). For other tool-types such as adzes and mauls, attributes most suitable for comparison involve hafting elements (e.g. perforated vs. full-groove vs. ¾ groove vs. ½ groove around tool circumference, groove width, groove depth) and characteristics of the bit edges and polls (Adams 2002). Tool-types and variables that were examined are presented in the next chapter.

EXAMINING VARIABILITY

Examining the variability within tool-types is a necessary first step in not only understanding the preferences that Tsimshian tool-makers had when manufacturing stone-tools but also for identifying variables and variable clusters that may be indicative of sub-types. Examining variability involves the use of basic, descriptive statistics and is concerned with understanding the central tendencies and distributions of attributes for all of the variables used in this analysis. Understanding the central tendencies and distributions of attributes allows for the confirmation or rejection of any assumptions about the normality of distributions of attributes or equality of variances, which in turn affects the applicability of some of the more complex, inferential statistical techniques used to identify significant variable associations and diagnostic variable clusters. Visually plotting the distributions of attributes also allows for tentative inferences to be made about the variables that may be more indicative of sub-types. In short, all of the more meaningful statistical methods used to establish type identity and meaning depend on the basic, descriptive statistics used to describe the variability of attributes.

Among the descriptive statistical methods that are used to examine variability are minimum and maximum variable values, means, medians, and standard deviations, frequency tables for discrete variables, and histograms showing the distributions of continuous variables.

ESTABLISHING TYPE IDENTITY

As was mentioned above, type identity refers to the combination of diagnostic characteristics that make it possible to consistently identify tool-types and potential sub-types. Because they operate on two different levels of analysis, variable-clustering and object-clustering techniques are two complementary ways of analyzing material culture to formulate types (Whallon & Brown 1982:xvi). Whereas variable-clustering techniques attempt to understand the relationship between two or more variables and identify any variables that consistently co-occur within tool-types, object-clustering techniques attempt to group similar objects together based on a matrix of similarities and differences between objects (Cowgill 1982; Spaulding 1982). Variable-clustering techniques are thus good for establishing internal cohesion of tool-types and object-clustering techniques are good for establishing external isolation of tool-types. The specific statistical methods used in both variable-clustering and object-clustering techniques depend on the scale of measurement.

Among the statistical techniques that are used to identify significant associations between variables are Chi-square and G-test for nominal variables and nominal variables with exceptionally low frequencies respectively, and correlation analysis for interval and ratio level variables.

Not all significant associations between variables are of equal importance in the formulation of types. Significant variable clusters should consist of independent variables from different domains because variables from the same domain are often interdependant (Adams & Adams 1991:177). For example, the weight of an artifact is expected to be positively correlated with the length, width, and thickness because as any of the latter three variables increase, weight also increases. Conversely, it is not logical to assume that the shape of the cross-section of a celt or the poll shape of a splitting adze have any direct bearing on their lengths, widths, or thicknesses. Therefore, if it can be shown that there are significant associations between variables from different domains (in this case whether or not continuous variables cluster according to discrete variables), then the diagnostic variable clusters are more meaningful in the formulation of sub-types.

Among the statistical tests that are used to determine significant variable associations from different domains are T-tests and ANOVA. Both are parametric methods designed to actually test the significance of any differences between the means of tools grouped according to nominal variables. T-tests are useful when comparing only two samples whereas ANOVA is useful when comparing more than two samples. The Kruskal-Wallace test is a non-parametric method used to test the significance of the difference between the means of tools grouped according to nominal variables when the variances between the two groups are shown to be unequal using Levene's test. Tukey's test is often used in conjunction with ANOVA to determine where the significant differences between groups lie (i.e. along which variables sub-types are significantly different from each other). Error-bar graphs using 95% confidence intervals are used to graphically illustrate the significant differences between potential sub-types identified in the T-tests and ANOVA and scatterplots are used to illustrate the clustering of sub-types of tools along the variables that show the most discriminatory power.

ESTABLISHING MEANING

It has already been mentioned several times that the purpose of developing a typology of Tsimshian stone-tools is to test whether or not Tsimshian identity can be recognized in their lithic technology, and towards this end their stone-tools must be compared to similar stone-tools manufactured by other groups of people. For some tool-types such as splitting adzes, hafted mauls, and large bowls/tobacco mortars, which have only been found in the North Coast region (de Laguna 1964; Drucker 1943; Stewart 1996) comparative tools are necessarily restricted to culture-areas adjacent to Tsimshian territory including Tlingit, Athapascan, and Eskimo-Aleut territories on the British Columbian and Alaskan Coasts, and among the Haida on the Queen Charlotte Islands. For other tool-types such as projectile points and celts, which are found throughout the Pacific and Alaskan Coasts, comparative tools can come from anywhere where there are published data available. To ensure chronological control and that penecontemporaneous variation is being examined, all Tsimshian and non-Tsimshian tools come from contexts dating to the Middle and Late Periods; however, most tools come from the Late Period.

Where there are quantitative data suitable for comparison, Tsimshian and non-Tsimshian tools are compared using T-tests and ANOVA. Qualitative descriptions and illustrations of artifacts are also compared to the Tsimshian examples. As was argued in the last chapter, tool-types exhibiting morphological differences that can be shown to relate to primarily stylistic preferences, rather than functional or technological factors, offer the best evidence for a Tsimshian group identity.

PROBLEMS AND LIMITATIONS

Problems with Provenience

Many of the stone-tools examined in this thesis lack proper provenience, and it is assumed, with good reason, that they are from Middle and Late Period contexts in Prince Rupert Harbour. Almost all of the stone-tools in the Museum of Northern B.C.'s collection were recovered from the surface by local collectors and donated to the museum. Whenever provenience data are included in the artifact catalogue it is very general. For example, bark shredder 292 (see Plate 1) was found 1 mile east of Metlakatla [village] and bowl 2163 (not pictured) was found on Digby Island, both of which are located in and around Prince Rupert Harbour. Given that artifacts from the Museum of Northern B.C. were recovered from the surface and donated to the museum by local collectors, there is confidence that they are from more recent, rather than earlier, deposits in and around Prince Rupert Harbour.

Also supporting this assumption, are the facts that splitting adzes, hafted mauls, and bowls/tobacco mortars are restricted to the North Coast region, and that these tool-types along with celts, clubs/pestles, and bark shredders only start appearing in Tsimshian assemblages in Prince Rupert Harbour during the Middle and Late Periods (Ames 2005; MacDonald & Inglis 1981). The only tool-types that are present throughout all three periods are chipped and ground stone projectile points and ground slate pencils (Ames 2005; MacDonald & Inglis 1981), and given that very few of these tools were in the collection from the Museum of Northern B.C., the provenience data for them is better than for other tool-types. To test whether or not the artifacts from the Museum of Northern B.C. actually do come from Middle and Late Period contexts in Prince Rupert Harbour they were compared with the same tool-types recovered from the nine sites included in this analysis that have secure dates. The results of these comparisons are presented in the next chapter.

Even for artifacts recovered from sites within Prince Rupert Harbour that have proper provenience there were problems with determining the period to which these artifacts belong. Although basal and terminal dates of occupation have been firmly established for entire sites and specific areas within sites, correlations between stratigraphic levels in different excavation units within sites is poorly understood. For example, area D of the Boardwalk site consists of 18 (1m x 1m) excavation units and one (1m x .5m) excavation unit with six radiocarbon samples taken from only three of these units (E4, E3, and E2) (Ames 2005:68-70). As such, while there is confidence that artifacts found in area D date to somewhere between 5,300 and 200 RCYBP, determining whether or not artifacts taken from unit F3 level 4 or unit D2 level 6 are closer to 200 than 5,300 RCYBP is problematic. Similar problems are prevalent at all of the sites in

Prince Rupert Harbour. With the primary aim of correlating excavated material with particular time-periods, Ames (2005) monograph was of great assistance for assigning lithic artifacts that could not be securely dated using original site reports to the Middle or Late Periods.

Problems with Incomplete Artifacts

As with most archaeological analyses that deal with material culture, there were both complete and incomplete, and fragmentary stone-tools examined in this thesis. For stone-tools that were incomplete a distinction was made between those that were nearly complete (i.e. tools that were at least 90% complete) and incomplete (i.e. tools that were less than 90% complete), which had ramifications for the analysis to follow. Whereas all of the variables measured on complete stone-tools are valid, only some of the variables on nearly complete and incomplete stone-tools are valid. For example, many splitting adzes were missing either the bit edge or poll to varying degrees. So, while the maximum width and thickness measurements are unaffected and still valid, recording the maximum length measurement and weight would have been inaccurate and useless for all intents and purposes. Nonetheless, artifacts deemed to be nearly complete were treated as complete artifacts and measurements of all of the variables were recorded but with the annotation (>) signifying that the true measurement would have been slightly greater than the one that was taken. This sacrifice allowed the sample sizes to be increased for a number of variables without losing too much accuracy because the artifacts were over 90% complete anyway. Conversely, for incomplete and fragmentary artifacts such as the bit or poll fragments of splitting adzes only measurements of variables that were valid (e.g. width of bit edge or poll, shape of poll) were taken. As a result of these procedures there are discrepancies between the numbers of valid measurements for different variables for all tool-types.

Problems with Comparative Data

A recurring theme in this thesis, and one that will be made clear when the results of the analysis are presented in chapter 6, is the paucity of comparable quantitative data on tool-types from the Pacific and Alaskan Coasts. For example, Drucker (1943:44-46) identified seven types of splitting adzes according to such variables as shape and condition of polls, shape of cross-section, shape of profiles, and the ratio of maximum width to maximum height (thickness) expressed on a nominal scale (i.e. height greater than width or height and width approximately equal) and only provided minimal quantitative data (e.g. splitting adzes range from 4.6 to 11" long, 1.5 to 3" wide, and 1.2 to 5" high with most ranging around 6 to 8" long and 2 to 3" wide and high). Drucker's data are difficult to use becuase he examined artifacts from throughout the North and Central Coasts and the summary statistics that he provides represent all artifacts regardless of where individual items were recovered. Slightly better is de Laguna's (1934:56-57) account of splitting adzes recovered from sites in Kachemak Bay, Alaska. Although the sample size is small (N = 3), she did provide exact length, width, and height measurements in addition to the number of grooves and ridges on each specimen. However, when describing celts de Laguna (1934:57) is similar to Drucker in that only summary statistics for all celts are provided (e.g. celts range from 4.5 to 21cm long and 2.3 to 8 cm wide). Although hardly exhaustive, these examples of descriptions of tools by de Laguna and Drucker are indicative of the quality of quantitative data from other areas on the Pacific and Alaskan Coasts and they emphasize the need for describing artifacts in detail as is attempted in this thesis.

Part of the reason for this lack of comparative data is the nature of archaeological excavations on the Northwest Coast. Seldom are large quantities of artifacts recovered during excavations; more often than not, only a few artifacts of any particular type are found and these are usually fragmentary. As a result, most published accounts only report on certain artifacts in piece-meal fashion and very few regional syntheses drawing from multiple sources and reporting on many artifacts are available. It is thus very difficult to generate a database that contains the quantities of the same tool-types from different areas required for robust statistical analysis.

All is not lost however, and archaeologists frequently have to make due with data that are available, and the descriptions and definitions of Tsimshian stone-tools can still be compared with qualitative accounts and accompanying illustrations in a meaningful way. For example, Drucker (1943:45) described type II splitting adzes as having rectanguloid cross-sections, thicknesses greater than widths, heavy-squared polls, and triangular profiles. Considering that many of the same, or similar, variables are used to describe the morphology of Tsimshian splitting adzes, comparing Drucker's (1943) sub-types of splitting adzes with Tsimshian examples can still be accomplished.

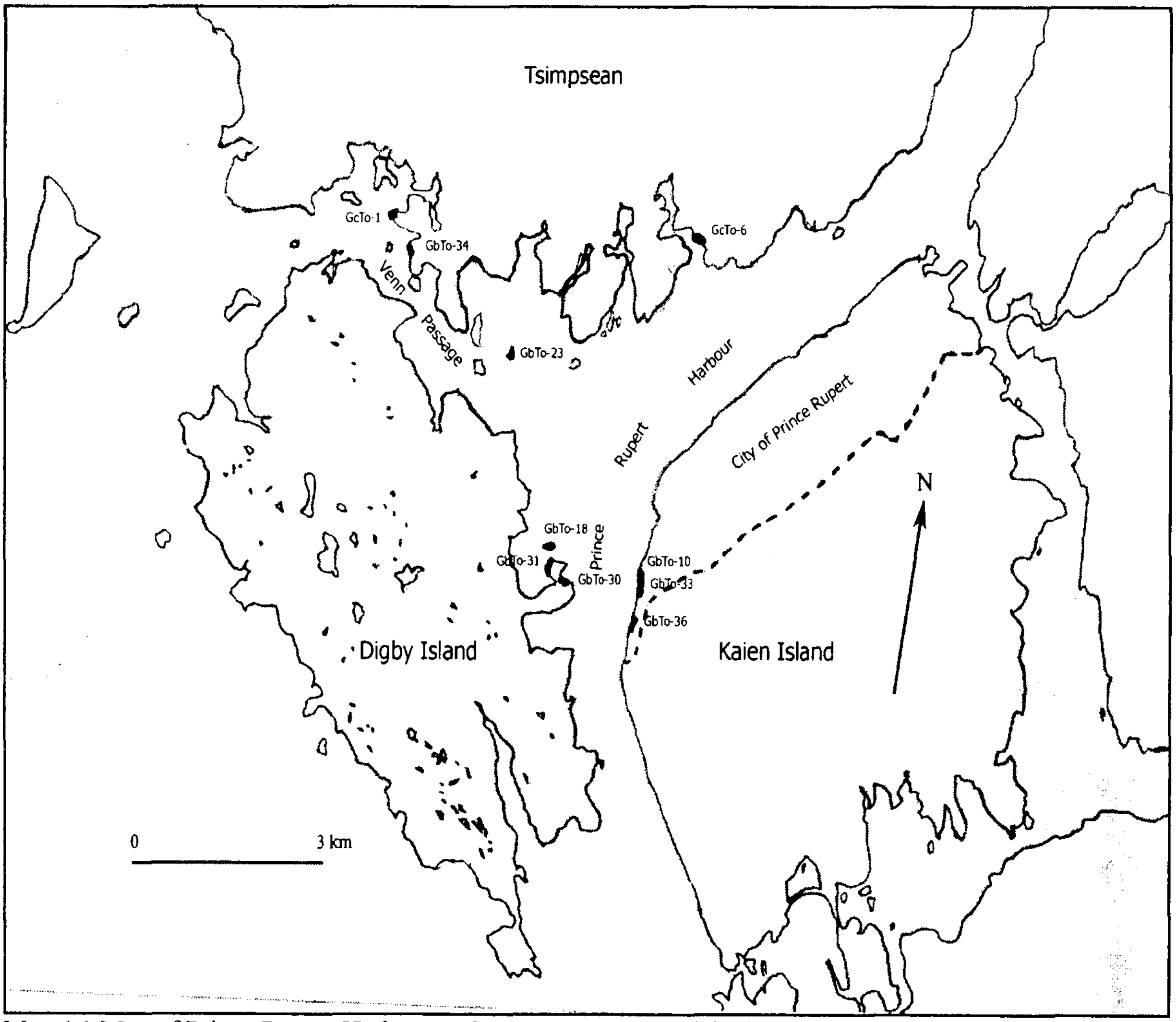
CHAPTER SUMMARY

The assessment of any typology is limited to issues regarding the appropriateness of variables selected to formulate types, the methodology employed to formulate types, and the inferred meaning of derived types (Mackie 1995:12). It is impossible to include all variables in all of their possible states when constructing a typology. Instead, the selection of variables in polythetic types is largely determined by the purpose for which the typology is created. Because comparison between Tsimshian and non-Tsimshian tool-types is the overriding purpose of the typology, tool-types and variables that are commonly recognized and widely cited are the necessary starting point.

The methodology that is used to examine variability within tool-types and formulate sub-types involving the use of multiple, complementary statistical techniques, has a long and highly debated history within archaeology (cf. Sackett 1966, 1969; Dumond 1974; Read 1974; Clay 1976; Christenson & Read 1977; Spaulding 1982; Hodson 1982; Cowgill 1982; Read & Russell 1996). Variability within tool-types is examined and form modalities reflecting the preferences that Tsimshian tool-makers had when manufacturing stone-tools are recorded through the use of basic descriptive statistics. The identities of sub-types are explicitly and rigorously established using more powerful inferential statistical methods and the meanings of formulated sub-types are established by comparing Tsimshian and non-Tsimshian tool-types and linking any differences to functional or technological factors, or stylistic preferences.

CHAPTER 5: SITE DESCRIPTIONS AND SAMPLES

As was mentioned in the introduction, much of the lithic material that is analyzed in this thesis comes from several sites around Prince Rupert Harbour. Map 4.1 shows the locations of sites in Prince Rupert Harbour. All of these sites are large, complex shell-midden sites with Boardwalk, Lachane/Co-op, Kitandich, Knu, Garden Island, and McNichol Creek being major villages and Dodge Island, Parizeau Point, and Baldwin being relatively smaller villages. While many of these sites were occupied throughout the entire 5,500 years or so of occupation in Prince Rupert Harbour, the stratigraphic data indicates they did not become village sites until the Middle and/or Late Periods. These data correlate well with the accounts of migration in Tsimshian oral traditions outlined in chapter 2.



Map 4.1 Map of Prince Rupert Harbour and Venn Passage (Metlakatla Pass)

DODGE ISLAND (GbTo-18)

Located on a small island at the entrance to Dodge Cove on the northeast side of Digby Island, the Dodge Island site was a small village occupied by the Tsimshian. It is described and reported on by Patricia Sutherland (1978); however, I was unable to get permission to view the unpublished manuscript while at the Canadian Museum of Civilization because she was out of the country at that time. There is an estimated volume of around 33,000 m^3 of cultural deposits at this site and fifteen radiocarbon samples were taken giving it a date of occupation spanning the Early and Middle Periods between 5580 +/- 255 and 2022 +/- 292 RCYBP (Ames 2005:57; Cybulski 1989).

GARDEN ISLAND (GbTo-23)

Located on a small island at the eastern outlet of Venn Passage, the Garden Island site is a large village site fronting onto the single largest tidal flat in Prince Rupert Harbour (Ames 2005:59-62). Of the estimated 23,790 m^3 of cultural deposits here about 297 m^3 were excavated. A total of thirteen radiocarbon samples were taken from above and below a buried humus layer, which indicates two discrete occupations (Ames 2005:59-61). The garden island site was occupied between 2077 +/- 308 and 1085 +/- 180 RCYBP (Cybulski 1989), although occupation could extend as far back as 4450 RCYBP (Ames 2005:102). Thus, the Garden Island site was occupied throughout the Middle and Late Periods.

PARIZEAU POINT (GbTo-30)

Located on the northeastern shore of Digby Island a short distance from the Boardwalk site, the Parizeau Point site is defined as a winter village by MacDonald and Inglis (1981:38); however, there are no published data available describing the site and it is uncertain exactly why it is considered to be a village. Ames (2005:62) suggested that Parizeau Point had a total volume of 54,400 m^3 of cultural deposits, although again, with no published data it is unclear how much of the site was excavated. Two radiocarbon samples were secured indicating initial and terminal dates of occupation of 2292 +/- 173 and 1415 +/- 190 RCYBP, placing occupation here firmly within the Middle and early Late Periods (Ames 2005:65; Cybulski 1989).

BOARDWALK (GbTo-31)

Located on the northeastern shore of Digby Island, the Boardwalk site is the most heavily excavated winter village site in the Prince Rupert Harbour area and is considered key to understanding the prehistoric development of the Coast Tsimshian (MacDonald & Inglis 1981:62). Boardwalk is defined as a winter village for several reasons including its large size (approx. 14,000 m^3 of cultural deposits), density of remains, and the presence of two large platforms where rows of plank houses once stood, each backed by a large ridge shell-midden deposit (Ames 2005:64; MacDonald & Inglis 1976:17; Stewart & Stewart 1996:40). The site was excavated over a three year period in 1968, 69 and 70, during which time between 1032 and 1041 m^3 were excavated (Ames 2005:65; Cybulski 1992:42), and it was continuously occupied during the Early, Middle, and Late Periods beginning around 4833 +/- 482 RCYBP and terminating during the historic period (Ames 2005:102; Cylbulski 1989); however, the sites use as a winter village only dates back to around 4,000 RCYBP and different areas of the site were used during different points in time (Ames & Maschner 1999:159).

LACHANE/CO-OP (GbTo-33 & GbTo-10)

Located on Kaien Island within the limits of the modern city of Prince Rupert, the Lachane/Co-op site is considered to be a winter village due to the high density of artifacts, the presence of human burials in midden deposits, and the presence of house platforms (Ames 2005:89; Banahan 2000:50). Approximately 1000 of the estimated 14,400 m^3 of cultural deposits were excavated, which produced thirty-three radiocarbon samples (Ames 2005:90; Cybulski 1989). Occupation of the Lachane Co-op site began around 5310 +/- 300 RCYBP and continued uninterrupted until around 580 +/- 50 RCYBP (Ames 2005:89-91; Cybulski 1989).

KITANDICH (GbTo-34)

Located on the north side of Venn Passage, the Kitandich site was a winter village as is indicated by the large flat inter-tidal zone in the front with evidence of canoe skids, house platforms containing up to twelve house depressions, and a large back shell midden (Ames 2005:95). Approximately 1655 of the estimated total of 153,600 m^3 of cultural deposits were excavated at Kitandich and this yielded five radiocarbon dates (Ames 2005:95). Occupation was continuous over a 5500 year period beginning around 5745 +/- 175 RCYBP and ending during the historic period, although it was only a village during the Middle and Late Periods (Ames 2005:95).

BALDWIN (GbTo-36)

Located on the west side of Kaien Island just to the south of the Lachane Co-op site, the Baldwin site was a small village as is indicated by the single row of house depressions backed by a ridge shell-midden. The site was partially excavated in 1973 by the NCPP as part of salvage excavations where an estimated 208 of the estimated total of 2250 m^3 of cultural deposits were excavated. Twelve radiocarbon dates were obtained from the site giving it a date of occupation between 3575 +/- 240 and 1453 +/- 112 RCYBP, placing it firmly within the Middle Period and early Late Periods (Ames 2005:95; Cybulski 1989).

KNU (GcTo-1)

Located on the north side of Venn Passage just to the west of Kitandich, the Knu site is a village settlement as is indicated by the flat intertidal zone in the front, broad platform with house depressions, and the large ridge midden in the back (Ames 2005:99). Published information on Knu is lacking so it is impossible to determine the total size of the site or how much of it was excavated. No radiocarbon dates were collected from this site; however the presence of many historic-period trade items and the fact that a proto-historic plank house was excavated here confirms that Knu was occupied up to the historic period.

McNICHOL CREEK (GcTo-6)

Located in a sheltered area on the north shoreline of Prince Rupert Harbour, the McNichol Creek site is a large village settlement indicated by the large, flat intertidal zone, house platforms containing at least fifteen house depressions arranged in two parallel rows, and the presence of a large back ridge midden running the length of the site (Banahan 2000:51). The site is estimated to be around 15,000 m^2 in size of which approximately 80 m^3 have been excavated and it was occupied as a village from about 2200 to 1400 RCYBP, or during the late Middle and early Late Periods (Banahan 2000:51-54).

THE COLLECTIONS

There are three collections of Tsimshian lithics that provide the artifacts examined in this thesis. One collection, consisting of around 200 finished tools and fragments including hand and hafted mauls, projectile points, splitting adzes, celts, clubs/pestles, bowls/tobacco mortars, and bark shredders, is housed in the Museum of Northern B.C. in Prince Rupert. A second collection of 20 artifacts including projectile points, celts, a splitting adze, and a hand maul from the McNichol Creek site is housed at the University of Toronto. A third collection, compiled as part of the NCPP and consisting of around 200 finished tools and fragments from the sites mentioned above including hand mauls, projectile points, ground slate pencils, splitting adzes, celts, clubs/pestles, bowls/tobacco mortars, and bark shredders, is housed at the Canadian Museum of Civilization in Ottawa. All of the comparative data on non-Tsimshian tool-types come from published sources (e.g. Ackerman 1968; Borden 1961; Clark 1974; Collier *et al.* 1942; Croes 1995; de Laguna 1934, 1956, 1960, 1964; Drucker 1943; Heizer 1956; Hrdlicka 1944; Keithahn 1962; King 1950; Mackie 1995; MacNeish 1960; Matson 1976; Niblack 1970; Smith, H.I. 1954; Smith, M.W. 1974; Stewart 1996; Townsend & Townsend 1961). Appendix A lists all of the individual tools, variables, and attributes examined from the collections and appendix B contains all of the raw comparative data on individual tools from outside of Prince Rupert Harbour. Both appendices can be found on the attached CD.

CLARIFICATION OF TERMS

Before presenting the tool-types analyzed in this thesis, some clarification of terms is warranted. Following numerous archaeologists (e.g. Adams & Adams 1991; Cowgill 1982; Drennan 1996; Shennan 1997; Spaulding 1977) the term *variable* is used to refer to a particular kind of observation of an artifact whereas *attribute* refers to a particular value or range of values of a variable. For example, 11.87 cm is the attribute of the variable maximum length and none, slight, or sharp are the range of attributes for the variable amount of taper. Attribute and variable *value* are synonyms and both terms are used interchangeably.

TOOL-TYPES AND VARIABLES

Bark Shredders (N = 7, all complete, Plate 1)

Stone bark shredders resemble cedar-bark shredders in form and were used for the same purpose of shredding or hackling the bark of the red cedar (Drucker 1943:56; Stewart 1996:63). Although cedar-bark shredders are found throughout Northern Coastal areas, stone bark shredders are only known from Tsimshian sites in Prince Rupert Harbour from the Middle and Late Periods (MacDonald & Inglis 1981:46-47). Among the variables of bark shredders that were examined are weight (g), maximum length (cm), maximum width (cm), and maximum thickness (cm).

Clubs/Pestles (N = 10, all complete, Plate 2)

As is discussed in chapter six, stone clubs/pestles can be distinguished from other clubs (i.e. war-clubs and fish-clubs) by their distinct form and lack of design. They were used as both clubs meant for dispatching ensnared game and as pestles for processing foods, pigments, plants, etc. as is indicated by the smooth finish from consistent abrasion and rough pitting and battering found on their ends. Clubs/pestles began to show up in assemblages in Prince Rupert Harbour during the Middle Period (MacDonald & Inglis 1981:46-47). Among the variables of clubs that were examined are weight (g), maximum length (cm), maximum width (cm), maximum thickness (cm), width/thickness ratio, length/width ratio, and length/thickness ratio.

Bowls/Tobacco Mortars (N = 24, 23 complete, 1 incomplete, Plates 3, 4 and 5)

In contrast to mortars, which have relatively shallow depressions and are ubiquitous throughout the Pacific and Alaskan Coasts, large deep bowls like those examined here, are sometimes referred to as "tobacco mortars" and have only been found in the North Coast region (Stewart 1996:66). They do not start showing up at Tsimshian sites in Prince Rupert Harbour until the Late Period, and even then they are a rare occurrence (MacDonald & Inglis 1981:46). Among the variables of bowls that were examined are weight (g), maximum length (cm), maximum width (cm), diameter (cm), height (cm), inside depression length (cm), inside depression width (cm), inside depression diameter (cm), depth of depression (cm), shape of sides (i.e. straight or curved), and shape of bottom (i.e. straight or curved). Here it is important to note that diameter measurements are the same as maximum length and width. For example, bowl GbTo-30:2000 (see Plates 3 and 5) is a circular bowl with a diameter of 24.1 cm whereas bowl XII-B:301 is a sub-circular bowl with maximum length and width measurements of 19.9 cm and 18.8 cm respectively. To make the measurements of these bowls comparable and useable for statistical analysis and plotting distributions, the diameter measurements for circular bowls were substituted for the maximum length and width measurements. In other words, the maximum length and width of bowl GbTo30:2000 is 24.1 cm each.

Mauls (Hand N = 15, 10 complete, 5 incomplete, Plate 6; Hafted N = 16, 15 complete, 1 incomplete, Plates 7 and 8)

In addition to expedient percussors and hammerstones, which are essentially unmodified (or barely modified) cobbles or rocks of sufficient size and weight for pounding things, there are a wide range of formal hand maul styles found throughout the Pacific Coast including nipple-top, flat-top, conical-top, cylindrical, stirrup, and T-shaped (Drucker 1943:49-50; Stewart 1996:29-37). All hand mauls are used for pounding implements such as wedges for splitting wood and stakes for fish weirs (de Laguna 1960:101; Stewart 1996:29) and many also served as pestles for grinding or as weapons in times of conflict (de Laguna 1964:111; Niblack 1970:281). Hand mauls are manufactured by selecting a pebble or cobble of appropriate size and material and then pecking and grinding it into the desired form and then polishing it (Stewart 1996:29).

Whereas hand mauls are more common on the Central and South Coasts, hafted mauls are more or less restricted to the North Coast region among the Haida, Tlingit, and Tsimshian, the Alaskan Coast among Pacific Eskimoan groups, and adjacent Athabascans in the interior (de Laguna 1964; Drucker 1943; Heizer 1956; Stewart 1996). There are a few examples from the Central Coast region illustrated by Stewart (1996:33) and Niblack (1970 Plate XXII Fig. 85) and reported by de Laguna (1964:113), although no dimensions are provided. Hafted mauls are lashed to a long handle and swung like a sledge-hammer and are used for many of the same woodworking purposes as hand mauls, only on a larger, heavier scale (Drucker 1943:49; Niblack 1970:279).

MacDonald and Inglis (1981:46) reported that hafted mauls began to show up at Tsimshian sites in Prince Rupert Harbour in the Late Period, and they made no mention of encountering any hand mauls during the course of excavations. Ames (2005:198) more or less confirmed this fact by stating that percussers (including mauls, hammerstones, and pestles) are present in very low frequencies during the Middle Period and expand greatly during the Late Period. Among the variables of mauls that were examined are number of hafting grooves (none, one, or two), weight (g), maximum length (cm), maximum width (cm), maximum thickness (cm), width/thickness ratio, length/width ratio, length/thickness ratio, ring diameter (cm), base diameter (cm), width of groove (cm), depth of groove (cm), and groove width/depth ratio.

Celts (N = 80, 54 complete or nearly complete, 26 fragmentary, Plates 9 and 10)

Celts are ubiquitous throughout the Pacific and Alaskan Coasts and are known from ethnographic sources (e.g. Boas 1909), use-wear analysis (e.g. Semenov 1964), and residue analysis (e.g. Broderick 1985) to be used for a variety of woodworking purposes. They are heavily curated tools that are either chipped, or more often, ground into shape with highly polished cutting edges and can be either hafted or unhafted. The three most common types of celts, referred to as D-adzes, elbow adzes, and straight adzes (also chisels) (Olson 1927) are recognized based on method of hafting; however, U-adzes and stone hafted adzes are also known from Southern Coastal areas only (Stewart 1996:24) and Drucker (1943) also developed a typology of Central and North Coast celts based on body shape, bit shape, and cross-section shape.

Referred to as nephrite adze/chisel blades by MacDonald and Inglis (1981), celts began showing up in Tsimshian assemblages in Prince Rupert Harbour during the Middle Period and increase in numbers throughout the Late Period (Ames 2005:197; MacDonald & Inglis 1981:46). Among the variables of celts that were examined are weight (g), maximum length (cm), maximum width (cm), maximum thickness (cm), width/thickness ratio, length/width ratio, length/thickness ratio, width of bit edge (cm), width of poll (cm), shape of cross-section (rectangle or oval), shape of bit edge (straight or convex), shape of poll (straight or convex), amount of taper (none, slight, or sharp), and direction of taper (none, towards bit, towards poll, or towards both ends).

Splitting Adzes (N = 78, 33 complete or nearly complete, 45 fragmentary, Plates 11 to 17)

Splitting adzes were originally described by early anthropologists/archaeologists such as Niblack (1890), de Laguna (1934), and Drucker (1943), and Northwest Coast archaeologists have informally adopted these descriptions ever since. In contrast to planing adzes (celts), which are used for fine woodworking including shaping planks and dugout canoes, splitting adzes are used for rough woodwork such as chopping down trees, splitting logs, etc. (de Laguna 1956:111; 1960:99-100; 1964:90). As such, they are heavy, weighing up to several pounds, usually have at least one groove or knob meant to facilitate hafting onto a T-shaped handle (de Laguna 1956:110; Drucker 1943:43) and are swung like a sledge-hammer much like hafted mauls.

Also much like hafted mauls, splitting adzes are generally restricted to the North Coast region among the Tlingit, Haida, and Tsimshian, and the Alaskan Coast among Pacific Eskimoan groups (de Laguna 1964:92); however, M.W. Smith (1974:13) described splitting adzes from the McClallum site on the Central Coast as being similar to Drucker's (1943) types I and III splitting adzes, and another example not fitting Drucker's typology. Drucker (1943:120) also reported two specimens from Bella Coola and two fragments from northern Kwakiutl territory, both of which are located on the northern Central Coast.

Splitting adzes are relatively recent additions to Tsimshian tool-kits and only began to show up at sites in Prince Rupert Harbour during the Late Period (MacDonald & Inglis 1981:46). Among the variables of splitting adzes that were examined are number of grooves (one or two), weight (g), maximum length (cm), maximum width (cm), maximum thickness (cm), width/thickness ratio, length/width ratio, length/thickness ratio, width of bit edge (cm), width of poll (cm), width of hafting grooves (cm), depth of hafting grooves (cm), hafting groove width/depth ratio, length of hafting grooves (< ¼, ¼ to ½, ½ to ¾ circumference around tool), shape of cross-section (rectangle or oval), shape of bit-edge (straight or convex), shape of poll side to side (straight, convex, or pointed), shape of poll front to back (heavy-squared or curved), amount of taper (none, slight, or sharp), location of taper (none, behind hafting groove, or in front of hafting groove), and direction of taper (none, towards bit, towards poll, or towards both ends).

Ground Slate Pencils (N = 33, 2 complete, 31 incomplete, Plate 18)

Ground slate pencils are found throughout the Alaskan and Pacific Coasts and are common among Pacific Eskimoan and Northwest Coast Indian groups including the Tsimshian, Haida, Tlingit, Bella Coola, and Coast Salish (de Laguna 1964:128-129; Drucker 1943:122 Table 9). They are a distinct class of tools commonly recognized by archaeologists working on the Pacific Coast; however, given that only fragments are usually recovered it is unknown precisely what they were used for (Drucker 1943:57). De Laguna (1934:79, 1956:159) referred to them as slate 'awls' and hypothesized that they are slender lance blades designed to break-off once they were embedded into the body of whales and other large sea-mammals, and this function would certainly explain why only basal portions of pencils are usually recovered.

Ground slate pencils are rare in Early Period components at Tsimshian sites in Prince Rupert Harbour and become more common in the Middle and Late Periods (MacDonald & Inglis 1981:46). Almost all of the ground slate pencils were classified as projectile points in the site reports and collections that were examined; thus, the variables of pencils that were examined are the same as for projectile points below.

Projectile Points/Bifaces (Chipped N = 28, 20 complete or nearly complete, 8 incomplete, Plate 19; Ground N = 104, 23 complete or nearly complete, 81 incomplete, Plate 20)

Chipped and ground bifaces and projectile points are found throughout the Pacific and Alaskan Coasts, although they have different distributions. Chipped projectile points are more common and show more diversity in forms in the South and Central Coasts and ground projectile points are more common in the North Coast, although they are also abundant among the Coast Salish of the south Central Coast (de Laguna 1964:127-131). Both ground and chipped projectile points and bifaces served as lance-heads, spearheads, daggers, arrowheads, knives, etc.

MacDonald and Inglis (1981:46) reported that chipped projectile points are rare throughout the Early, Middle, and Late Periods in Prince Rupert Harbour assemblages while ground slate projectile points are only rare in the Early Period and become more abundant during the Middle and Late Periods. Among the attributes of projectile points that are examined are type of manufacture (ground or chipped), weight (g), maximum length (cm), maximum width (cm), maximum thickness (cm), width/thickness ratio, length/width ratio, length/thickness ratio, width of base (cm), width/basal width ratio, shape of cross-section (biconvex/flat, diamond/polygonal, or square/rectangular), presence/absence of stem, presence/absence of basal thinning, presence/absence of notches, presence/absence of dulled lateral edges near base, and shape of base (straight, convex, concave, or pointed).

CHAPTER 6: RESULTS OF ANALYSIS

The results of the analysis of Tsimshian lithics from Prince Rupert Harbour and comparisons with similar tool-types found in other areas on the Pacific and Alaskan Coasts are presented in this chapter. All figures of histograms of continuous variables; error-bar graphs illustrating significant differences; scatterplots showing clusters of tools; frequency tables of distributions of nominal variables (see tables 81 to 117); results of statistical tests performed; summary statistics for tool-types; and plates illustrating tool-types, are provided at the end of the text. Discussion on whether or not potential sub-types and differences between Tsimshian and non-Tsimshian tools reflect functional or technological factors or stylistic/cultural preferences will follow in the next chapter.

BARK SHREDDERS (Plate 1)

Examining Variability

Table 1 contains summary statistics for bark shredders. As figures 1 through 4 illustrate, while weight and length are normally distributed and thickness is heavily skewed to the right because of one outlier, width has a bimodal distribution. The bimodal width distribution is not indicative of two sub-types because the small sample size makes any patterns that emerge inconclusive at best and spurious at worst. The only other pattern of note is that despite a mean of 3.27 cm, Tsimshian bark shredders are typically around 3 cm thick (i.e. thickness median is less than mean).

Comparison with Other Data Sources

Stone bark shredders are not discussed in any of the site reports and published accounts from other areas on the Pacific or Alaskan Coasts examined as part of this thesis. This result is not surprising given that they were only used in Northern Coastal areas (Stewart 1996:63) and have only been found among the Tsimshian (Drucker 1943:122 table 9). Instead, bone bark shredders are much more common among North Coast Indian groups. Drucker (1943:50-51) described a typical stone bark shredder as roughly D-shaped with average dimensions of 6.3" (L) x 4.7" (W) x 1.3" (T). This description and measurements apply well to the Prince Rupert Harbour specimens. Ames (2005:162) presented the lengths, widths, thicknesses, and weights of two bark shredders recovered as part of the NCPP. While their lengths (18 cm) and widths (10 and 12 cm) are in line with bark shredders analyzed here (see table 68), they differ in their thicknesses (2 and 3 cm) and weights (57 and 92 grams). As will be elaborated on below, most of the dimensions for tools reported by Ames (2005) are incorrect and are probably due to editing errors rather than errors in observation.

CLUBS/PESTLES (Plate 2)

Examining Variability

Table 2 contains summary statistics for clubs/pestles. As figures 5 to 11 illustrate, all variables are normally distributed except for thickness, which has a bimodal distribution. As with bark shredders, this bimodal thickness distribution is not indicative of sub-types because the small sample size may be unrepresentative resulting in inconclusive and/or spurious patterns. As is shown in plate 2, Club 982.1.122 is clearly different than the other clubs as is evidenced by not only the incised longitudinal lines, but also its length (26.7 cm), length/width (5.82) and length/thickness (7.76) ratios, all of which are considerably larger than the values of the other clubs. This club is very similar to a Tsimshian war-club shown in Niblack (1970: plate XXVII-122) in that it is relatively long and narrow and has a definitive handle; all other Tsimshian clubs examined lack handles.

Comparison with Other Data Sources

Data from outside of Prince Rupert Harbour on clubs/pestles are lacking, owing partly to problems with classification. Although war-clubs and other (i.e. fish) clubs can be recognized by their distinctive forms and sometimes elaborate decorations (e.g. Niblack 1970: figure 122a and plate XXVIII; Stewart 1996:54), as was explained in chapter four, plain clubs like those examined here are very similar to pestles and often served dual functions. Ames (2005:169) described clubs recovered as part of the NCPP as simple, columnar ground and pecked objects with mean lengths, widths, thicknesses, and weights of 6.4 cm, 2.8 cm, 1.8 cm, and 178 grams respectively. Although Ames' (2005) description of clubs is accurate, his measurements are much smaller than those reported for clubs/pestles here (see table 2).

Ames (2005:169) also noted that none of the Prince Rupert Harbour clubs are elaborate "Hagwilget club" forms found near Hazelton B.C. or the Queen Charlotte Islands. Data on clubs from either of these areas are not readily available, but in all probability they are war-clubs or fish-clubs rather than clubs/pestles and therefore any differences in form may relate more to different functions than technological or stylistic preferences. Keithahn (1962:72) reported on two pestles and one club from Southeast Alaska with lengths ranging from 18.3 to 29.3 cm, and widths and thicknesses of 5.5 to 6 cm and Collier *et. al.* (1942:69) described pestles from the Fraser and Thompson River area on the Central Coast as ranging from 4 to 12.5" in length and 1.5 to 3" in diameter. These measurements compare well to the clubs/pestles from Prince Rupert Harbour.

BOWLS/TOBACCO MORTARS (Plates 3 through 5)

Examining Variability

Table 3 contains summary statistics for bowls/tobacco mortars. As figures 12 to 18 illustrate, all variables are distributed normally and are not particularly revealing except weight, which is skewed to the right because of three exceptionally heavy outliers. Two of the three outliers show exquisite workmanship and are shown in plate 3: one has a zoomorphic frog design very similar to the three frogs carved onto a Tsimshian war-club pictured in Niblack (1970: plate XXVIII-132). The frog was one of the most significant crests of a number of lineages of the Tsimshian Raven clan/phratry (Garfield: 1967:19). The other decorated bowl has parallel vertically curving ripples running around the entire circumference of the vessel. Because of the outliers, the median weight is considerably less than the mean weight.

Identifying Potential Sub-types

As is shown in table 4, there are no significant differences between bowls with straight and curved sides; however, as is shown in table 5 and in figure 19, there are significant differences between bowls with flat and curved bases in terms of inside length, inside width, and depth of depression. As figure 20 illustrates, although bowls with flat and curved bases differ significantly along these variables, these two sub-types of bowls tend to inter-grade rather than form distinct clusters.

Comparison with Other Data Sources

Despite the fact large bowls/tobacco mortars are restricted to the North Coast region (Stewart 1996:66) there are very few descriptions of them from this area available. De Laguna (1934:60) described one bowl with rounded sides and base found near Homer (Kachemak Bay), Alaska, as 28 cm (L) x 26 cm (W) x 11 cm (H), with a depression that is 18 cm (L) x 16.5 cm (W) x 6.5 cm (D). Based on these measurements, this bowl is wider and has a longer and wider depression than any Tsimshian bowl and has a height and depth of depression just below the Tsimshian average (see table 3). Keithahn (1962: figure 4a and b) showed two bowls/tobacco mortars from Southeast Alaska and gave dimensions for one of them. It has a diameter of 23.6 cm and height of 17.3 cm placing it towards the upper end of the range for Tsimshian bowls. However, this bowl also has a 4 cm high base and flares cup-like to the upper rim, unlike any of the Tsimshian specimens. The other bowl, which is pictured but has no dimensions given, has curved sides and a flat base and looks very similar to Tsimshian bowl MA296 (pictured in plate 4). Finally, Ames (2005:163) reported the mean length (32 cm), width (13 cm), thickness (height) (9 cm) and weight (51 grams) of eight bowls recovered as part of the NCPP. It is doubtful that bowls that average 32 cm long and 13 cm wide weigh only 51 grams and when compared to the bowls examined in this analysis (see table 3), these figures are clearly incorrect.

MAULS (Plates 6 through 8)

Examining Variability

Tables 6 and 7 contain summary statistics for hand and hafted mauls. Tsimshian hand mauls fall into four commonly recognized sub-types: nipple-top, conical-top, flat-top, and stirrup or T-shape, and these are shown in plate 6. However, given the small sample sizes for each of these sub-types, determining whether or not they are quantitatively significantly different is severely hampered and the distributions are not very revealing (see figures 21 to 24). Although the sample size is only marginally larger for hafted mauls, there are a few patterns in the data worth noting.

As figures 25 to 28 illustrate, weight, groove width, and groove depth of hafted mauls are all distributed fairly normally and length/thickness ratio is heavily skewed to the right with one outlier. As figure 29 shows, length has a bimodal distribution with a cluster of four mauls at the right side with lengths between 16 and 17 cm and another cluster of six mauls with lengths between 12 and 14 cm. As figure 30 shows, width has a somewhat flat distribution with a cluster of six mauls with widths between 7 and 8 cm wide and six mauls with widths greater than 9 cm. As figure 31 shows, thickness is skewed to the right with most (73.33%) mauls having thicknesses between 8 and 10 cm. Conversely, as figure 32 shows, the width/thickness ratio is skewed to the left with most (86.67%) mauls having more or less equal widths to thicknesses (between .8 and 1.2). Particularly revealing is the bimodal distribution of length/width ratio shown in figure 33. Here the second peak reflects the group of exceptionally long mauls greater than 16 cm and the group of mauls with widths between 7 and 8 cm. As is discussed below, these are grooved hafted mauls with pointed-polls, which are a variant of grooved hafted mauls different than the ones with round or zoomorphic-polls. The bimodal distribution of groove width/depth ratio shown in figure 34 is also interesting. The first peak roughly corresponds to the first peak in the bimodal distribution of length/width ratio, which consists of mauls with relatively small length/thickness ratios and relatively large widths greater than 9 cm. In sum, it appears that the length/width ratio and corresponding length and width values, and groove width/depth ratio may be indicative of sub-types of hafted mauls. The discriminatory power of these variables are tested and discussed below.

Identifying Potential Sub-types

Although he did not recognize any clearly defined sub-types, Drucker (1943:49) identified three variants of grooved hafted mauls according to the shape of their polls; round, pointed, and zoomorphic. As table 8 shows, these three variants differ significantly in terms of weight and length/width ratio; thus there appears to be some quantitative support for identifying sub-types of hafted mauls according to the shape of their polls. However, zoomorphic-polled mauls are not a mutually exclusive category and they can be classified as having either round or pointed-polls. When only round and pointed-polled mauls are compared, the differences become even more significant. As table 9 shows, not only are the differences in weight and length/width ratio even more emphasized between the two sub-types, but width and width/thickness ratio are different as well. These results confirm that the bimodal distribution for length/width ratio is a decent indicator of sub-types, refute that the bimodal distribution of groove width/depth ratio is a good indicator of sub-types, and identify other variables upon which grooved hafted mauls with round and pointed-polls can be distinguished. Figure 35 is a scatterplot showing distinct clusters of round and pointed-polled mauls. As is illustrated, there is one pointed-polled maul (2289) that is more similar to round-polled mauls on all three variables. In fact, this maul is also more similar to round-polled mauls on all other variables and if not for the presence of a nipple on top of the poll giving it a pointed-profile, it would have been classified as a round-polled maul.

Comparison with Other Data Sources

Hand Mauls

Comparable data on hand mauls from outside of Prince Rupert Harbour are lacking; however, there are some data on Tlingit hand mauls reported by de Laguna (1960:101, 1964:111), some on Eskimoan hand mauls provided by various authors (Clark 1974:42; de Laguna 1956:141; Heizer 1956:46), and some on Coast Salishan hand mauls provided by Collier *et al.* (1942:69).

De Laguna (1964:111 plate 10k) described five hand mauls from Yakutat Bay as elongated sub-cylindrical cobblestones that range from 14.5 to 24 cm long and 3 by 4.7 cm to 4.6 by 8.4 cm in diameter. She also described two examples from Angoon, one of which is a stirrup or T-shaped maul with a base 6.5 by 7 cm and a length of around 11 cm and the other a flat-top maul with an enlarged base and flanged-top and measuring 6.5 by 9 cm in diameter at the base and 9.7 cm in height (de Laguna 1960:101 plate 5d and f). Although the Tlingit hand mauls from Yakutat Bay have similar dimensions to Tsimshian hand mauls (see table 6), albeit the smallest diameters are much smaller than the smallest Tsimshian example, there are no examples of sub-cylindrical hand mauls found among the Tsimshian. Additionally, whereas the flat-top hand maul from Angoon is similar in size and shape to Tsimshian flat-top mauls, the stirrup maul is considerably shorter than Tsimshian counterparts.

Eskimoan hand mauls from the north Alaskan Coast are of a different style altogether than those found on Central and North Pacific Coasts, including those of the

Tsimshian. Heizer (1956: figure 28 Ia, Ib, II, and III, plate 33a – c and plate 51c and d) and Clark (1974:42) reported cylindrical forms from Kodiak Island with tapering ends and either a groove or two to four finger pits around the middle for gripping, and flattened paddle-like forms with round striking heads and constricting handles similar to "pile-drivers" found on the South Coast. The cylindrical forms have an average length of 14.7 cm and diameter of 8 cm and the one paddle-like example measures 30.5 cm in length with a handle that is 4.5 cm in diameter. In contrast to the examples from Kodiak Island, de Laguna (1956: 141 plate 21-8 and plate 22-1) described two conical-top hand mauls, which she referred to as pestles, from Prince William Sound. These are almost identical to each other and range from 18.8 to 21 cm high, have flaring circular bases and a shaft that tapers upwards towards an enlarged head with eight facets. Although they have similar proportions and dimensions to Tsimshian conical-top hand mauls (see table 6), none of the Tsimshian examples have the distinctive faceted heads.

There are three sub-types of Coast Salishan hand mauls from the Central Coast described and illustrated by Collier *et al.* (1942: plate XVI figures g – m): flat-top, nipple-top, and conical-top. These range in length from 6 to 8.5 inches and are 3 to 3.75 inches in diameter and fall well within the range of Tsimshian hafted mauls. However, there are noticeable differences in form between Tsimshian and Coast Salishan hand mauls. Coast Salishan flat-top mauls flare-out at the base and top ends to form distinct collars rather than flanges like Tsimshian specimens. Further, Coast Salishan nipple or conical-top mauls have much less pronounced rings or collars on the top, much less severe tapers between the base and collar, and gently sloping rather than flared-out bases.

Hafted Mauls

Drucker (1943:49) made a distinction between grooved hafted mauls, which are D-shaped and have nearly equal widths and thicknesses and one, two, or three hafting grooves, and perforated hafted mauls, which are generally thicker and more elliptical in cross-section and have a hole rather than grooves for lashing the maul head to a haft. While both sub-types have comparable lengths and widths between 10.16 and 17.78 cm and 5.08 and 8.89 cm respectively, their thicknesses differ significantly. Whereas grooved mauls are between 6.35 and 9.14 cm thick, falling firmly within the range for

Tsimshian hafted mauls reported here (see table 7), perforated mauls are between 8.89 and 12.7 cm thick, falling for the most part beyond two standard deviations away from the mean thickness for Tsimshian hafted mauls. The substantially larger thicknesses of perforated mauls strengthen the idea that they are a distinct sub-type of hafted mauls different than grooved ones.

To my knowledge, only grooved hafted mauls have been recovered within Prince Rupert Harbour. In contrast, there is an excellent illustration of a Haida perforated-zoomorphic maul from the Queen Charlotte Islands provided by Niblack (1970: plate XXII-82) and two similar perforated-zoomorphic mauls illustrated by Stewart (1996:32); one from Fort Simpson just north of Prince Rupert Harbour within Tsimshian territory and the other from the northern North Coast. No dimensions are given for any of these examples nor are more specific proveniences provided. In light of the fact that Fort Simpson was built in 1834 by the Hudson's Bay Company largely to facilitate trade between Europeans and Indigenous groups along the North Coast region including the Tlingit, Tsimshian, and Haida (Garfield 1939:177), in all likelihood the perforated-zoomorphic maul recovered here was manufactured elsewhere on the North Coast and traded or carried into the region.

Comparable quantitative data on grooved hafted mauls from outside of Prince Rupert Harbour comes mainly from two cultural areas: data on Tlingit hafted mauls are provided by de Laguna (1960, 1964) while data on Eskimoan hafted mauls are provided by various authors (Clark 1974; de Laguna 1934, 1956; Heizer 1956; Hrdlicka 1944). As table 10 shows, Tlingit hafted mauls are significantly wider and thicker than Tsimshian mauls. Further, two of the three Tlingit hafted mauls have lengths (16.3 and 18 cm) that are just inside and beyond the upper limits of the length range for Tsimshian mauls. As table 11 shows, Eskimoan hafted mauls have smaller length/width ratios than Tsimshian counterparts; however, as table 12 shows, when taking the unequal variances into account, Tsimshian and Eskimoan hafted mauls are not significantly different along any variables. Incidentally, four of the nine Eskimoan hafted mauls have thicknesses (10, 11.5, 12, and 13 cm) that fall outside the Tsimshian range.

In terms of qualitative differences, when examining pictures of hafted mauls manufactured by Tlingit and Eskimoan groups it is hard not to notice their overall crudeness in comparison to Tsimshian examples. Rather than having well-defined hafting grooves that clearly demarcate the base and poll sections, most have poorly-defined or non-existent hafting grooves that do not even encircle the entire maul-head (e.g. de Laguna 1934: plate 21-6, 1956: plate 20-13, 14, and 16 and plate 21-5 and 10, 1960: plate 4b, 1964: plate 10j; Heizer 1956: plate 33d, e and g). Even in cases where there are well-defined hafting grooves that encircle the maul heads the hafting grooves run around the sides rather than front to back as the Tsimshian examples (e.g. Heizer 1956: plate 33f and h; Hrdlicka 1944: figures 75 and 76). There are also no examples of hafted mauls with pointed-polls found among Tlingit or Eskimoan groups. Rather, Tlingit mauls have rounded-polls, with one also being zoomorphic (de Laguna 1964: figure 21d), and Eskimoan mauls have rounded or, more often, flat-polls. Although taphonomic processes no doubt had an affect on the condition of Tlingit and Eskimoan mauls and may have partially worn away the surfaces and hafting grooves, there nonetheless remain striking qualitative differences between these and Tsimshian hafted mauls.

Examples of hafted mauls from Kitimat about 100 km to the east of Prince Rupert Harbour and still within Tsimshian territory, Katz on the Fraser River, northern Vancouver Island, and Vancouver proper are illustrated by Stewart (1996:33) but no dimensions are given. The example from northern Vancouver Island is an elongate cylindrical form with a rounded base and poll that has no close analogue within the Tsimshian examples. The base and poll sections of the hafted maul from Katz are relatively equal in size, which is different than the Tsimshian examples where, with one exception, the poll-sections are larger than the base. The two examples from the Vancouver area are different than the Tsimshian examples in terms of hafting grooves and profiles. Not only are the surfaces and bases rounded, giving the impression that they are little more than modified cobbles or elaborate net sinkers, the one example has a secondary hafting groove running over the poll and the other has a depression pecked-out on its underside to fit a handle. The three examples from Kitimat are different from one another and two of them have no close parallels among the Tsimshian examples; however one is very similar to maul 2289 discussed above. In addition to the presence of a nipple on top of the poll, the base and poll sections of both are approximately the same size. One of the other mauls from Kitimat has a rounded base and elongate conical poll and the other has a triangular profile because the poll-section juts out just above the hafting groove.

CELTS (Plates 9 and 10)

The first step when analyzing celts is to determine if the unprovenienced celts from the Museum of Northern B.C. are similar to celts from known provenience in Prince Rupert Harbour. If they are sufficiently similar, then there is a sound basis for assuming that the unprovenienced celts are, in fact, Tsimshian celts. Unfortunately, as tables 13 and 14 show, celts from known and unknown provenience are significantly different along most variables including weight, length, width, bit edge width, and poll width. However, there are several factors that offset the significance of these differences. First, the nature of surface collections versus excavations results in selective biases. Larger celts are much easier to see on the ground surface than smaller celts, especially for untrained individuals who may not know how to tell the difference between naturally and culturally modified stone. In contrast, celts found on archaeological sites in middens, house pits, features, etc. are more likely to be well-used, exhausted, or broken. Given the different methods of collection, it should not be surprising that the unprovenienced celts are larger and heavier. Second, during their life-cycle, celts are continually re-sharpened as their bit edges become dull and broken celts are frequently re-shaped into smaller ones (Mackie 1995). This strengthens the assertion that well-used celts found in archaeological contexts tend to be smaller. Third, the more telling ratio variables such as width/thickness, length/width, and length/thickness, show no significant differences between celts from known and unknown provenience. In other words, although provenienced and unprovenienced celts differ significantly along all of their maximum dimensions, which indicates that the unprovenienced celts are larger overall than the provenienced ones, celts from both groups have similar proportions. For these three reasons it is possible to treat unprovenienced and provenienced celts as coming from the same population of tools.

Examining Variability

Table 15 contains summary statistics for celts. As figures 36 and 37 and the differences between the means and medians in table 15 indicate, weight and length are skewed heavily to the right and both have somewhat of a bimodal distribution. As figures 38 to 44 illustrate, all other variables except for width of bit edge are normally distributed or are slightly skewed to the right and not particularly revealing. Bit width has a bimodal distribution with two peaks centering around 2.5 and 4.2 cm respectively, perhaps indicating two size preferences for the width of working edges.

The general skewing of the distributions can be taken as evidence of the impact re-sharpening and re-shaping has on the morphology of celts. The fact that length and weight are the most heavily skewed indicates that these variables are the most affected by re-use and recycling of dull and/or broken celts. Intuitively this makes sense because re-sharpening occurs continuously as a bit edge becomes dull through use and this would reduce the length of a celt to a greater extent than its width or thickness (Mackie 1995). Conversely, re-shaping occurs through continual re-sharpening and periodically when a celt is broken, and depending on the direction of the fracture, the length, width, and/or thickness could be greatly reduced. Obviously, weight is reduced when both re-sharpening and re-shaping occurs. Celts 828 (not pictured), GbTo-23:1083 (see plate 9), GbTo-31:2352 (not pictured), GbTo-31:4572 (see plate 10), GbTo-33:1101 (see plate 10) and GbTo-36:900 (see plate 10) are prime examples of celts having undergone heavy modification through use and/or breakage. The bimodal distributions of weight and length reflect not only smaller and larger celts but also celts that have been extensively re-shaped and/or re-sharpened to greater and lesser extents.

Identifying Potential Sub-types

The impact that intensive re-use and recycling has on celt morphology makes the validity of any sub-types that are identified suspect. However, given that re-use and re-sharpening has a greater impact on length and weight than on other variables, by excluding these two variables and any derivatives (i.e. length/width and length/thickness ratios) in the determination of sub-types, the impact that re-use and recycling has on the validity of sub-types can be minimized.

As is shown in table 16 and figure 45, celts with oval and rectangular cross-sections differ significantly in terms of width, thickness, bit width, and poll width. Figure 46 is a scatterplot showing the clustering of these two sub-types. As is shown in tables 17 and 18 and figure 47, celts with straight and convex polls differ significantly in terms of width and thickness. Figure 48 is a scatterplot showing the clustering of these two sub-types. As table 19 shows, celts with none, slight, and sharp tapers differ significantly in terms of their poll widths, which should not be surprising given that as celts taper more severely the widths of their polls decrease.

Drucker (1943:46-47) identified two types of celts which can be differentiated on the basis of their outlines (symmetric versus asymmetric) and three sub-types of symmetric celts differentiated according to their size (small versus large) and shape of poll (square-cut versus rounded) (see figure 49). As tables 20 to 22 show, when Tsimshian celts are classified using Drucker's (1943) typology they differ significantly in terms of width, thickness, and poll width; however, sub-types Ia and Ic account for most of this between-group variability and are the sources of these significant differences. These differences are illustrated in figure 50 and figure 51 is a scatterplot showing the clustering of these two sub-types. Again though, given that these two sub-types are differentiated at least in part by their relative sizes, the fact that type Ic celts are larger than type Ia celts is not surprising and merely confirms that celts can be distinguished along these dimensions.

To better understand the relationships between nominal variables and between Drucker's (1943) sub-types and the sub-types identified according to poll shape and cross-section above, Chi-square and G-tests were performed. As tables 23 through 26 show, there are no interdependent relationships between nominal variables; however, as tables 27 and 28 show, Drucker's (1943) sub-types and poll shape and shape of cross-section are interdependent. Whereas type Ia celts have predominantly straight polls (70.83%) and rectangular (70.83%) cross-sections, type Ic celts almost exclusively have convex polls (84.62%) and oval cross-sections (92.31%). Thus, not only do Drucker's (1943) sub-types account for differences in size they also do a reasonable job of accounting for differences in poll shape and shape of cross-section.

Comparison with Other Data Sources

Ames (2005:161) reported that celts from Prince Rupert Harbour recovered as part of the NCPP average 31 mm long, 9 mm wide, 10 mm thick, and 317 mm in weight. When compared to the averages for Tsimshian celts reported in table 15, these measurements are very different and incorrect and reporting errors are also indicated by the disparity between the average weight and the dimensions given. Discounting that weight is reported in millimeters, if the average celt weighed 317 grams they would be much larger than 3.1 cm long, 0.9 cm wide, and 1 cm thick.

Comparative quantitative data on celts from outside of Prince Rupert Harbour come from two broad geographical areas and can be loosely affiliated with two cultural groups: data on Eskimoan celts from the Alaskan Coast come from several authors (Clark 1974; de Laguna 1934, 1956; Heizer 1956) while data on Coast Salishan celts from the Central Coast/Gulf of Georgia Region come from various authors (Collier *et al.* 1942; Croes 1995; Mackie 1995; Matson 1974). As tables 29 and 30 show, Eskimoan celts are generally longer and narrower than Tsimshian celts and have significantly larger length/width ratios. As tables 31 and 32 show, Coast Salishan and Tsimshian celts are significantly different on every variable including length, width, thickness, width/thickness ratio, length/width ratio, and length/thickness ratio and on average Coast Salishan celts are longer, wider, and thinner than Tsimshian examples.

Summary data on Eskimoan celts from Kachemak Bay, Prince William Sound, and Kodiak Island are also available (de Laguna 1934, 1956; Heizer 1956). Celts from Kachemak Bay are between 4.5 and 21 cm long and 2.3 and 8 cm wide and celts from Prince William Sound are between 4.5 and 17.8 cm long, 3 and 7.3 cm wide, and 1.2 and 3.5 cm thick (de Laguna 1934: plate 19-2, 7 – 12 and plate 20-1, 1956: plate 12-1 – 5, and 7 and plate 13-2 - 8). Celts from both areas fall within the Tsimshian range, although Tsimshian celts have smaller minimum lengths, widths, and thicknesses and maximum widths and thicknesses (see table 15). Heizer (1956: plate 31b, c, g – o and plate 32a and b) classified celts from Kodiak Island as type Ia (small, flat, well-polished with tapering edges), Ib (similar to Ia but longer, wider, and thicker, and many only partially polished), IIa (large flaked adze blades with little or no polishing), or IIb (similar to IIa but with polished bit edges and on some surfaces). Type Ia are less than 6 cm long and from .5 to

1 cm thick, type Ib are from 6 to 16 cm long, type IIa are from 16 to 22 cm long and 5 to 8 cm wide, and type IIb are from 16.5 to 19 cm long and 5.5 to 6.5 cm wide; thus, some Eskimoan celts from Kodiak Island are much longer (types IIa and IIb) and much thinner (type Ia) than Tsimshian celts.

In terms of qualitative data, in contrast to Tsimshian celts, which with few exceptions (e.g. GbTo-31:1619, GbTo-34:8 and GbTo-34:164 not pictured) are pecked and ground into form and highly polished all-over, Eskimoan celts very rarely have all surfaces ground and polished and instead look crude and rough, have unfinished polls, and are predominantly chipped into form. One example also still retains the sawing groove from when it was detached from a larger piece of raw material (Heizer 1956: plate 31m). Because of the degree of finish of Tsimshian celts, none still retain sawing grooves from manufacturing. Additionally, whereas Tsimshian celts are fairly evenly split between having straight or convex/pointed polls, Eskimoan celts have, with two exceptions (e.g. de Laguna 1934: plate 19-12 and Heizer 1956: plate 31b), convex or pointed-polls.

Summary data on Coast Salishan celts from the Fraser-Columbia River area are provided by Matson (1976) and Mackie (1995). Celts from the Glenrose Cannery site are classified into three sub-types based on differences in size and raw material (Matson 1976:151-153). Small celts are between 2.9 and 5.3 cm long, 1.6 and 3.4 cm wide, and 0.5 and 1 cm thick and have mean lengths of 4.15 cm, widths of 2.8 cm, and thicknesses of 0.72 cm. Large celts are between 6.9 and 9.5 cm long, 2.4 and 5.6 cm wide, and 1.2 and 1.5 cm thick and have mean lengths of 7.87 cm, widths of 4.43 cm, and thicknesses of 1.33 cm. Modified pebble celts are between 2.5 and 6.4 cm long, 2.1 and 3.4 cm wide, and .8 and 1.3 cm thick and have mean lengths of 4.08 cm, widths of 2.65 cm, and thicknesses of 1.03 cm. Based on a study of close to 1500 Coast Salishan celts, Mackie (1995: appendix II) reported they are between 1.4 and 28.5 cm long, 0.3 and 8.6 cm wide, and 0.3 and 3.6 cm thick, and have polls from 0.4 to 7.7 cm wide and bit edges from 0.4 to 8.6 cm wide. On average they are 6.48 cm long, 3.71 cm wide, 1.34 cm thick, and have polls that are 2.87 cm wide and bit edges that are 3.51 cm wide. When combining summary data and data on individual celts from the Central Coast it is clear that Coast Salishan celts are much thinner than Tsimshian examples and this difference is evident in their proportions as well where they have considerably higher width/thickness and length/thickness ratios.

In terms of qualitative data, the celts from the Glenrose Cannery site are comparable to Tsimshian celts in that most are ground and polished over all surfaces and show a high degree of finish. Unlike Tsimshian celts though, they have predominantly straight sides and polls, and when they do taper it is only very slightly (Matson 1976: figure 8-22a – l). Mackie (1995) provided no illustrations of Coast Salishan celts but did provide data on poll shape, bit edge shape, and cross-section. Surprisingly, Coast Salish and Tsimshian have identical proportions of celts with rectangular and oval cross-sections (50% of each) and with straight (45.5%) and convex polls (55.5%); thus, contrary to what is indicated by the Glenrose Cannery celts, Coast Salishan celts do not have predominantly straight polls. Further, where only 14.75% of Tsimshian celts have straight bit edges and 85.25% have convex bit edges, 38.19% of Coast Salishan celts have straight bit edges and 61.81% have convex bit edges.

SPLITTING ADZES (Plates 11 through 17)

Similar to celts, splitting adzes from known and unknown provenience are first compared across all variables to determine how similar they are and to support the assumption that the unprovenienced splitting adzes were manufactured by the Tsimshian. Fortunately and unlike celts, as is shown in tables 33 and 34, splitting adzes from known and unknown provenience are not significantly different across variables except for weight and width of second hafting groove. Here, the small number of splitting adzes from known provenience with more than one hafting groove or that are complete enough for accurate weight measurements makes the significance of these differences questionable. Given the similarities between splitting adzes from known and unknown provenience on all other variables, it is reasonable to assume that the two samples came from the same population of splitting adzes.

Examining Variability

Table 35 contains summary statistics for splitting adzes. As figures 52 to 65 illustrate, although most variables are normally distributed or are slightly skewed to the right, the distributions of some variables warrant further investigation and discussion. For instance, weight and length have bimodal distributions where the small second peaks reflect a group of exceptionally large and heavy splitting adzes that share a number of characteristics (see figures 52 and 53). All of the splitting adzes within this group are single-grooved and most are very thick (> 7cm), have exceptionally large length/width ratios (>4) and small width/thickness ratios (<0.7), and have extremely deep hafting grooves (>1 cm). Given that length (r = .847), thickness (r = .815), and groove depth (r = .779) are all significantly positively correlated with weight, these similarities in and of themselves should not be surprising. However, given that these intra-group similarities are consistently different than other adzes coupled with the fact that these adzes have similarly small width/thickness and large length/width proportions, which are not significantly correlated with weight, strengthen the idea that these splitting adzes form a distinct sub-type. Figure 66 is a scatterplot showing the clustering of this group of splitting adzes.

Four other distributions are particularly revealing. As figure 60 shows, poll width has somewhat of a quadrimodal distribution, which as will be discussed in more detail below, reflects splitting adzes with differently shaped polls. Although splitting adzes are generally described as being thicker than they are wide, as is shown in figure 56, in this sample 11 of 64 or just under 20%, are wider than they are thick. Four of these splitting adzes with width/thickness ratios greater than 1 are very similar to forms found outside of Prince Rupert Harbour on the Alaskan and North Coasts. Adze 222 is elongate, has approximately equal width and thickness, and has a straight-poll like other type V splitting adzes discussed below; however, it also differs from other type V splitting adzes in that all of its surfaces are flat giving it a rectangular rather than triangular profile and the bit edge and poll are blunt rather than sharp. This adze most closely resembles an Eskimoan splitting adze found at Ruth Bay, Kodiak Island, Alaska (Clark 1974: plate 6 figure b). Three other splitting adzes with width/thickness ratios greater than one are type VII splitting adzes and are discussed separately below. As is shown in figure 61, width of the first groove has a bimodal distribution with two peaks centering around 3 and 4 cm. The largest groove width for double-grooved splitting adzes is 3.28 cm with most (63.64%) having groove widths under 2.78 cm. Therefore, this distribution reflects the expected difference in groove widths between single and double-grooved splitting adzes where single-grooved splitting adzes have one wide groove and double-grooved splitting adzes have two narrower grooves. As figure 62 illustrates, the distribution of depth of the first groove is heavily skewed to the right. This distribution further supports the idea that single-grooved splitting adzes have relatively larger grooves than double-grooved splitting adzes because the groove depths of double-grooved splitting adzes cluster at the left (smaller) end of the histogram (90.91% are less than 0.75 cm deep).

Identifying Potential Sub-types

In addition to the group of large, heavy splitting adzes already discussed, the results of T-Tests and ANOVA comparing splitting adzes across nominal categories reveal other significant differences that may indicate sub-types. Tables 36 and 37 confirm that the widths and depths of the first grooves are significantly different between single and double-grooved splitting adzes. However, single and double-grooved splitting adzes are similar on all other continuous and nominal variables. Further, given that they show similar ranges in morphological variability and double-grooved splitting adzes are present in four of six of Drucker's (1943) sub-types below, single and double-grooved splitting adzes do not represent two distinct sub-types. As tables 38 and 39 show, splitting adzes tapering in different directions differ in terms of their thickness, width of bit edge, width of poll, and groove width/depth ratio. The differences in width of bit edge and poll are expected given that splitting adzes that taper towards the bit edge should have smaller bit edge widths and splitting adzes that taper towards the poll should have smaller poll widths. However, as figure 67 shows, splitting adzes tapering towards the poll are much thicker than splitting adzes tapering towards the bit edge. As will be discussed below, this difference in thickness approximates the distinction between Drucker's (1943) types II, III, and VI splitting adzes on the one hand and types IV, V, and VII splitting adzes on the other.

As is shown in tables 40 and 41, splitting adzes with straight, convex, and pointed-polls differ significantly along many variables including thickness, width/thickness ratio, length/width ratio, and poll width. When looking at the nature of these differences in figures 68 through 71, splitting adzes with straight and pointed polls are at opposite extremes of each other and splitting adzes with convex polls fall in the middle. Figure 72 is a scatterplot showing the clustering of splitting adzes according to the shape of their polls. From this plot it is clear that splitting adzes with convex and pointed-polls greatly overlap with each other, yet both are somewhat removed from splitting adzes with straight-polls. These results are expected and confirm what is noted below about the similarities between Drucker's (1943) sub-types of splitting adzes; namely that his types II, III and VI splitting adzes tend to have convex or pointed-polls, whereas types IV, V, and VII splitting adzes tend to have straight or convex-polls. As tables 42 and 43 show, splitting adzes with polls that are heavy-squared and rounded from front to back differ significantly only in their length/thickness ratios and width of bit edges.

Drucker (1943:45) noted that characteristics that might have typological value, such as shape of poll (both front to back and side to side), shape of cross-section, and number of grooves appear to occur in all possible combinations. Nonetheless, he developed a typology of splitting adzes where sub-types are differentiated according to the shape of their cross-section and shape of their poll from side to side and front to back. Illustrations of Drucker's (1943) sub-types of splitting adzes are shown in figure 73 and table 44 summarizes the diagnostic characteristics that each sub-type exhibits. As tables 45 and 46 show, when classifying Tsimshian splitting adzes using Drucker's (1943) typology the sub-types differ significantly along almost all variables including length, thickness, width/thickness ratio, length/width ratio, length/thickness ratio, poll width, depth of first groove, and groove width/depth ratio.

If we examine these differences in figures 74 through 81, although the confidence intervals overlap along some variables, there seems to be a consistent distinction between types II and III splitting adzes on the one hand, and types IV and V on the other hand, with type VI splitting adzes overlapping with both groups and type VII splitting adzes being somewhat removed from the other sub-types. Figure 82 is a scatterplot showing how these sub-types cluster according to the variables that show the most discriminatory power. The broad division between types II and III on the one hand and type IV and V on the other are shown; there are only two or less types VI and VII splitting adzes with values for all three variables so these are not included. These broad similarities and differences are confirmed by Tukey's-Test (see table 47). Specifically, the results of Tukey's-Test show that type II splitting adzes are significantly different than types IV and V splitting adzes in terms of thickness, width/thickness ratio, and depth of first groove, and type V splitting adzes along the additional variables length/thickness ratio and first groove width/depth ratio. Type III splitting adzes are significantly different than types IV and V splitting adzes in terms of thickness and depth of first groove, type IV splitting adzes along the additional variable first groove width/depth ratio, and type V splitting adzes along the additional variables width/thickness ratio, length/thickness ratio, and width of first groove. Only two other significant differences are identified: types V and VI splitting adzes differ in their width/thickness ratios and types IV and V splitting adzes differ in their length/thickness ratios. Type VII splitting adzes and the variable poll width were excluded from Tukey's-Test because neither satisfied the sample size requirement.

As was indicated above, the differences identified between splitting adzes according to the shape of their polls and direction of taper approximate Drucker's (1943) sub-types. As table 48 shows, there is an interdependent relationship between Drucker's (1943) sub-types and poll shape where types II and III splitting adzes almost invariably (96%) have convex or pointed-polls; types IV, V, and VII splitting adzes all have straight or convex-polls; and type VI splitting adzes show no tendencies in poll shape. Similarly, and as table 49 shows, Drucker's (1943) sub-types and poll shape from front to back also have an interdependent relationship where types II, IV, and VII splitting adzes, and types III, V, and VI splitting adzes tend to have heavy-squared and rounded-polls respectively. Finally, as is shown in table 50, Drucker's (1943) sub-types and direction of taper also exhibit an interdependent relationship with types II and III splitting adzes tending to taper towards the poll or both ends; type IV splitting adzes tending to taper towards the bit edge; type V splitting adzes tapering in all directions; type VI splitting adzes only tapering towards the poll; and type VII splitting adzes having no taper. Thus, contrary to Drucker's (1943) suggestion, some of the nominal variables that may have typological value do tend to cluster.

Comparison with Other Data Sources

In addition to developing the first systematic typology of splitting adzes, Drucker (1943:44) also provided the ranges and mean ranges of lengths, widths, and thicknesses of splitting adzes that he examined. From table 51, it is clear that his measurements are similar to those reported for splitting adzes here (see table 35), which is fortunate because he examined numerous Tsimshian splitting adzes as part of his research. Conversely, as table 52 shows, Ames (2005:162) measurements for splitting adzes from Prince Rupert Harbour recovered as part of the NCPP are plainly incorrect, and to compound the error, he did not even provide the units of measurement.

Although quantitative data on splitting adzes suitable for comparison are severely lacking, there are some data on Tlingit splitting adzes from Southeast Alaska provided by Ackerman (1968), de Laguna (1960, 1964), and Keithahn (1962), and Eskimoan splitting adzes from the Alaskan Coast provided by Clark (1974), de Laguna (1934, 1956), and Heizer (1956). MacNeish (1960) also provided some quantitative data on splitting adzes from Southwest Yukon and there was one splitting adze (214) from the Queen Charlotte Islands examined as part of the collection from the Museum of Northern B.C. As tables 53 and 54 show, Tsimshian splitting adzes are significantly wider and have larger width/thickness ratios than Tlingit splitting adzes. As tables 55 and 56 show, Eskimoan splitting adzes are significantly thicker, have smaller width/thickness ratios, and have larger length/width and length/thickness ratios than Tsimshian splitting adzes.

In addition to differences in size and proportion, Tlingit splitting adzes differ from Tsimshian ones in the number of hafting grooves preferred, location of hafting grooves, and shape of poll. There are 11 examples of Tlingit splitting adzes illustrated: two by de Laguna (1956: plate 5a and b), six by de Laguna (1964: plate 5a, b, d, e, f and h), and three by Keithahn (1962: figure 1d, f and g) and with the exceptions of de Laguna (1964: plate 5b and e) none have forms similar to Tsimshian examples.

De Laguna (1956: plate 5a) shows an incomplete double-grooved splitting adze with a heavy-squared poll reminiscent of Drucker's (1943) type VI whereas Keithahn's (1962) figure 1d is a long and slender triple-grooved splitting adze also most closely resembling Drucker's (1943) type VI. None of the Tsimshian type VI splitting adzes have heavy-squared polls, although adze GbTo-30:7 is similar to de Laguna (1956: plate 5a) in profile but with a rounded-poll, and none are of the length or have three hafting grooves like Keithahn (1962: figure 1d). De Laguna (1964: plate 5a, d and f) can also be considered as type VI splitting adzes and unlike Tsimshian ones, which are only single or double-grooved and have heavy-squared or slightly rounded polls, they all have at least three or four grooves with knobs in between for hafting and two of the three have polls that curve inwards from top to bottom. De Laguna (1956: plate 5b) shows a single-grooved type II or III splitting adze with an exceptionally small, shallow hafting groove located at the rearmost portion of the poll. None of the Tsimshian type II or III splitting adzes have such small and shallow hafting grooves, or grooves located that far towards the rear of the poll. Keithahn (1962: figure 1f) shows a single-grooved splitting adze most closely resembling Drucker's (1943) type II or IV; however, without knowing the shape of the poll from side to side it is impossible to make a more conclusive classification. This splitting adze has a pronounced knob in front of the hafting groove and a small indentation to the rear of it, and a small lip at the top of the rear portion of the poll. None of the Tsimshian type II or IV splitting adzes have an indentation or lip on the poll.

Keithahn (1962: figure 1g) shows a double-grooved type III splitting adze very similar to adze 223 (pictured in plate 12); however, none of the Tsimshian type III splitting adzes, including adze 223, have more than one hafting groove. Finally, Ackerman (1968:34 Figure 14-1) reported a miniature splitting adze from Glacier Bay, Alaska, with three hafting grooves and measuring only 6.8 cm (L) x 1 cm (W) x 1 cm (T); however, it was probably not meant for the same heavy woodworking purposes as normal splitting adzes and thus its small size reflects functional rather than technological or stylistic/cultural differences.

In addition to the differences in size and proportion, Eskimoan splitting adzes differ from Tsimshian examples in type of hafting element preferred, location of hafting grooves and knobs, profile shape, and sub-types of splitting adzes preferred. Many examples of Eskimoan splitting adzes are illustrated: three in de Laguna (1934: plate 18-1 – 3), 22 in de Laguna (1956: plates 10-1-12 and 11-1-10), six in Heizer (1956: plate 32h and i and figure 26a - f), and six in Clark (1974: plates 6a-d and 7b and c). With few exceptions (e.g. de Laguna 1956: plate 10-3, 6 and 12), they have different forms than Tsimshian splitting adzes.

In contrast to Tsimshian splitting adzes where types II through V are the most abundant and occur in similar quantities, most Eskimoan splitting adzes are very rough and irregularly-shaped type VII splitting adzes, many of which are bullet-shaped and have poorly-defined or non-existent hafting grooves (e.g. de Laguna 1956: plate 10-1, 2, 4, and 11 and plate 11-1, 4, 8, and 9; Heizer 1956: figure 26e and f). Even some of the other types appear to be little more than elaborate type VII splitting adzes with a minimal amount of extra time and effort spent on shaping them (e.g. Clark 1974: plate 7b and c; de Laguna 1956: plate 10-3, 8 and 9 and plate 11-3; Heizer 1956: plate 32i). The hafting elements on many of these other types are marked not so much by hafting grooves as they are by pronounced ridges or knobs (e.g. Clark 1974: plate 6a and plate 7b; de Laguna 1934: plate 18-3, 1956: plate 10-8 and 10 and plate 11-2 and 6) and unlike Tsimshian splitting adzes, which have hafting grooves positioned near the rear of the poll, almost all hafting knobs and grooves on Eskimoan splitting adzes are located near the mid-point (e.g. Clark 1974: plate 6a – d and plate 7c; de Laguna 1934: plate 18-1 – 3, 1956: plate 10-6 – 10 and plate 11-3, 6 and 10; Heizer 1956: figure 26a, b, d, e and f and plate 32h and i). There is also one example of a single-groove type V splitting adze with a very shallow hafting groove that is located near the mid-point and extends around each side down to the base (Heizer 1956: figure 26b and plate 32i). None of the Tsimshian examples have grooves extending around the sides to the base. Additionally, unlike Tsimshian splitting adzes, which have shoulder sections that are as high or higher than the blade section in front of hafting grooves, Eskimoan splitting adzes are characterized by sloping shoulder sections between hafting elements and the poll (e.g. Clark 1974: plate 6a – d and plate 7b; de Laguna 1934: plate 18-1 – 3, 1956: plate 10-6 – 10, plate 11-1 – 3, 6 and 10; Heizer 1956: figure 26a, b, d - i) to the extent that some splitting adzes resemble whales in a side profile (e.g. Clark 1974: plate 6a; de Laguna 1956: plate 10-6 and 10 and plate 11-10).

As was noted above, Type VII splitting adzes are the most abundant sub-type of splitting adze among Eskimoan groups and this conclusion is echoed by Drucker (1943:46) when he stated that this type has only been found in southeast Alaska. However, adze 2422 was reportedly found on Hospital Island, which is a small island just off the northeast side of Digby Island, within Prince Rupert Harbour proper. This adze is similar to two other splitting adzes from unknown provenience, all of which are shown in plate 16. All three splitting adzes have rough polls and lack well-defined hafting grooves and instead have a small ridge on the top with a roughly pecked out section behind and two of the three are also only ground and highly polished around the bit edges. Given the clear provenience of adze 2422 and the similarities with the other two unprovenienced splitting adzes, it is safe to assume that the distribution of type VII splitting adzes can be expanded southward to include Prince Rupert Harbour.

Finally, plate 17 shows adze 214. Although this adze was part of the collection from the Museum in Northern B.C. it was found on the Queen Charlotte Islands and can be considered to be a Haida splitting adze. It can be differentiated from Tsimshian splitting adzes by its unique form: it has large length/width, length/thickness, and width/thickness ratios, lacks a well-defined hafting groove and instead has a large bulbous handle-like poll used to hold the lashing in place. This splitting adze is even different from other Haida splitting adzes pictured in Niblack (1970: plate XX-79d and plate XXIII-90 and 91) and looks more expedient than curated.

GROUND SLATE PENCILS (Plate 18)

As was mentioned in the last chapter, artifacts identified in site reports from Prince Rupert Harbour as projectile points actually consist of ground and chipped points and knives and ground slate pencils. The first order of business then is to determine whether or not it is possible to distinguish between these tool-types in a systematic manner. Figure 83 is a scatterplot showing all of the width and thickness values for all ground projectile points identified according to the shape of their cross-sections. There is a noticeable clustering of tools with relatively small widths and large thicknesses; these are ground slate pencils with diamond/polygonal or square/rectangular cross-sections. The few exceptions in this cluster, which are located on the periphery by virtue of their relatively large widths and/or small thicknesses, can be distinguished from pencils due to their large width/thickness ratios.

Table 57 contains summary statistics for ground slate pencils. As figure 84 illustrates, the first peak in the bimodal distribution of width/thickness ratio represents ground slate pencils whereas the second peak represents other ground projectile points and tables 58 and 59 confirm that these tool-types are significantly different in terms of width, thickness, and width/thickness ratio. As figures 85 to 87 illustrate, the other distributions of continuous variables of ground slate pencils are not very revealing. While thickness and width/thickness ratio are normally distributed, width has a flat distribution. No sub-types of pencils are identified based on nominal categories nor are there any differences in pencils between time-periods.

Comparison with Other Data Sources

Ames (2005:159) described ground slate pencils recovered as part of the NCPP as lengths of ground slate with polygonal cross-sections that are sometimes ground to a blunt point. They average 82 mm long, 25 mm wide, 11 mm thick, and 3 mm in weight, which are considerably shorter, wider, and thicker than the pencils reported here (see table 57).

There are virtually no good comparative quantitative data on individual ground slate pencils available; instead, there are descriptions and summary statistics of them provided by de Laguna (1934, 1956) and Heizer (1956). De Laguna (1934:79, 1956:159 plate 30) described Eskimoan pencils from Kachemak Bay and Prince William Sound as having oval, rectangular or hexagonal cross-sections, or sometimes a combination of all three at different points on a single specimen. They have one pointed end and the butt ends are rounded or finished off bluntly, tapered, or usually flattened, most likely for hafting. There is also one example with a hafting groove circling the butt (de Laguna 1956: plate 30-6). They range from 0.4 to 2 cm in diameter and from 7 to over 27 cm in length and average between 9 and 15 cm long and 1 and 1.3 cm in diameter. In contrast, Heizer (1956:49 plate 47a - c) described long pointed pencil-like implements from Kodiak Island as cylindrical to oval to lozenge shape in cross-section with a point beveled on both sides and ranging in length from 8 to 14.5 cm and being 1.2 cm in diameter. Whereas the descriptions and illustrations of Eskimoan pencils provided by de Laguna (1934, 1956) apply equally well to the pencils examined in this analysis, the pencils illustrated by Heizer appear much different; they have consistently round rather than faceted cross-sections. Further, while the diameters of Eskimoan pencils are similar to Tsimshian pencils reported here, it is next to impossible to comment on how Eskimoan pencils compare length-wise as there were only two complete Tsimshian specimens examined.

CHIPPED PROJECTILE POINTS/BIFACES (Plate 19)

With ground slate pencils identified and removed from the dataset, chipped and ground projectile points are compared. As tables 60 and 61 show, in addition to method of manufacture, chipped projectile points are significantly different than ground projectile points on almost every variable including length, width, thickness, width/thickness ratio, length/width ratio, and length/thickness ratio. Chipped projectile points are shorter, wider, and thicker than ground projectile points. Figure 88 is a scatterplot showing the clustering of chipped and ground projectile points.

Examining Variability

Table 62 contains summary statistics for chipped projectile points. As figures 89 to 97 illustrate, with the exception of length/width ratio, which has a flat distribution, most variables are normally distributed or are slightly skewed to the right and are not particularly revealing; however, the distributions of length and thickness warrant further consideration. The clustering of points around the peaks in the trimodal distributions of length and thickness reflect different sub-types of projectile points identified on the basis of cross-section shape. Where chipped projectile points with biconvex/hexagonal cross-sections cluster between the first and second peaks in both distributions, chipped projectile points with diamond-shaped cross-sections cluster between the second and third peaks in both distributions.

Identifying Potential Sub-Types

As tables 63 and 64 show, chipped projectile points with biconvex/flat and diamond-shaped cross-sections are significantly different along most variables including length, width, thickness, width/thickness ratio, and length/width ratio. Figure 98 is a scatterplot showing the clustering of these two potential sub-types. There are no significant differences between chipped projectile points from different time-periods or along any of the other nominal variables and none of the nominal variables are interdependent.

Strong *et al.* (1935) developed a step-wise typology for projectile points that has been used by many archaeologists working on the Pacific Coast. Within this typology projectile points are classified first according to the presence or absence of a stem element, second according to whether they are leaf-shaped or triangular in outline, and third according to the shape of the base or stem, and these types are shown in figure 99. When comparing Tsimshian chipped projectile points that were classified using this typology no significant differences are identified. In many site reports and published accounts of Pacific Coast excavations projectile points are classified minimally based on whether or not they are leaf-shaped or triangular; thus, classifying Tsimshian projectile points using this intuitive typology allows for meaningful comparison between similar sub-types of projectile points manufactured by different groups of people.

Comparison with Other Data Sources

Ames (2005:169) reported that leaf-shaped bifaces recovered as part of the NCPP usually have thick, lenticular cross-sections, ovate outlines, and concave bases with mean lengths, widths, thicknesses, and weights of 32 mm, 16 mm, 5 mm, and 129 mm respectively. It is unlikely that leaf-shaped bifaces with thick, lenticular cross-sections average 5 mm thick, and when compared to the averages reported here (see table 62), Ames' (2005) figures are clearly smaller and incorrect. As has also been shown, most Tsimshian chipped projectile points have straight or convex, rather than concave, bases.

To ensure that only similar types are compared, only non-stemmed leaf-shaped (sub-types NA a, NA b1, NA b2, and NA b3) chipped projectile points from other areas are examined, because with the exception of a single type NB a1 projectile point, these are the only forms found among the Tsimshian in Prince Rupert Harbour. There are very few comparable quantitative data on individual Tlingit (de Laguna 1964; Keithahn 1962), Eskimoan (Clark 1974; de Laguna 1934, 1956), and Coast Salishan (Croes 1995; Smith 1974) chipped projectile points. More common are summary statistics on specific point-types and these data are provided by several authors (Collier *et al.* 1942; Heizer 1956; King 1950; Matson 1976; Smith 1974). As tables 65 and 66 show, although Eskimoan chipped projectile points average much wider than Tsimshian examples, when taking the unequal variances into account width is not significantly different between the two groups. As table 67 shows, Tsimshian and Tlingit chipped projectile points are not significantly different along any variable. As tables 68 and 69 show, Coast Salishan chipped projectile points are significantly shorter and have correspondingly larger width/thickness ratios and smaller length/width ratios than Tsimshian examples. Given the dearth of comparative data on Tlingit chipped projectile points only Eskimoan and Coast Salishan points will be discussed further.

Heizer (1956:47-48) reported heavy, crudely flaked leaf-shaped blades from Kodiak Island as ranging from 8 to 27 cm long and 3 to 7 cm wide and averaging around 17 cm long in the upper levels, which is much larger than Tsimshian chipped projectile points averaging 7.97 cm long and 2.31 cm wide. The projectile points illustrated by Heizer (1956: plate 37) also look considerably different than Tsimshian examples. Whereas many Tsimshian projectile points (GbTo-18:224, GbTo-31:2026, GbTo-33:574, GbTo-34:1360, and GbTo-34:1589 shown in plate 19) have straight edges that taper between the mid-point and base, none of the Eskimoan examples have outlines shaped this way. Instead, they look like long lance-like blades, which are not even found in other areas on the Alaskan Coast (de Laguna 1956). Eskimoan chipped projectile points from Kachemak Bay are much smaller than ones from Kodiak Island and more similar to Tsimshian specimens. They range from 4 to 9 cm long and 1.2 to 3.2 cm wide, which is comparable to the Tsimshian ranges, and show the same range in forms as found among the Tsimshian specimens (de Laguna 1934: plate 30-1 – 3, 5 – 7, 11 – 13 and 19 - 22). However, some are also much broader than Tsimshian examples with widths ranging from 3.5 to 4.5 cm (de Laguna 1934: plate 30-23 and 26 – 29). The two chipped projectile points from Prince William Sound shown in de Laguna (1956: plate 28-10 and plate 29-11) are very similar to Tsimshian examples GbTo-36:245 and GcTo-6:34 (pictured in plate 19) in both size and form.

Collier *et al.* (1942:60-61) followed the typology of Strong *et al.* (1935) to classify chipped projectile points from the Upper Columbia River Basin but only provided the ranges in length. Taken together, types NA a, NA b1, NA b2, and NA b3 range in length from 3.81 to just over 19 cm, indicating that many of the points from this area are longer than Tsimshian points of the same types. Upon closer examination of the illustrations, not only are these projectile points longer but they also appear to be broader, especially nearer the base (Collier *et al.* 1942: plate I figures a – g). In fact, only two of the points pictured are even close in shape to Tsimshian examples (Plate I figures h and i). King (1950:13) classified chipped projectile points from the Cattle Point site in the San Juan Archipelago based on blade shape (leaf-shaped versus triangular) and stem/base characteristics. Non-stemmed leaf-shaped projectile points range in length from 2.8 to 6.7 cm, width from 1.1 to 3.4 cm, and thickness from 0.25 to 1.6 cm. Although these dimensions certainly fall within the range for Tsimshian points of the same types, the minimum length and width are considerably smaller and the maximum thickness is considerably larger and the Tsimshian average length of 7.97 cm is larger than the longest point. A close look at the illustrations in King (1950: figure 9) reveals that out of the wide-range of forms, many of which are not non-stemmed leaf-shaped, only points 1, 4, 26 and possibly 9 are similar to Tsimshian examples.

Smith (1974:10 figure 2-1) reported that type NA b1 projectile points in the Bertelson Suquamish Collection from the Columbia-Fraser region range from 3.1 to 4.7 cm long, 1.3 to 1.8 cm wide, and 0.4 to 0.8 cm thick, and three of the five points in this type have curved tips when looking at them in profile. Again, although these measurements are well within the range for Tsimshian projectile points of the same type, the Tsimshian average length of 7.97 cm is considerably larger than the longest point and none of the Tsimshian examples have curved tips. Although Matson (1976:107) divided leaf-shaped bifaces from the Glenrose Cannery site on the Fraser Delta into two types based on size, he provided summary data on each type separately and combined. Taken together, leaf-shaped bifaces are 3 to 9.5 cm long, 1.3 to 2.7 cm wide, and .5 to 1.3 cm thick and average 5.31 cm (L) x 1.98 cm (W) x .79 cm (T). These averages are considerably lower than the Tsimshian average for similar types, which is 7.97 cm (L) x 2.31 cm (W) x .93 cm (T). A close look at the illustrations shows that, although they differ in dimensions, many of the point forms are very similar to those found among the Tsimshian examples (Matson 1976: figure 8-1a, b, d, e, g, h, and k and figure 8-2b, c, and f).

GROUND PROJECTILE POINTS/BIFACES (Plate 20)

Examining Variability

Table 70 contains summary statistics for ground projectile points. As figures 100 through 108 illustrate, most variables are distributed normally or are skewed to the right; however, length has a clear bimodal distribution with peaks centering around 7.5 and 12.5 cm and weight also has somewhat of a bimodal distribution perhaps indicating two size preferences for ground projectile points. The width/thickness distribution is also particularly revealing. There is an abrupt change between the number of ground projectile points that have width/thickness ratios smaller and larger than around 3.66. Only ground projectile points with biconvex/flat cross-sections, or that have stem elements, have width/thickness ratios larger than 3.66, and as will be shown below, many potential sub-types differ significantly along this variable.

Identifying Potential Sub-Types

As table 71 and figure 109 show, ground projectile points with biconvex/flat cross-sections are significantly wider and thinner and have larger width/thickness ratios than ground projectile points with non-biconvex cross-sections. This result is partly expected because projectile points with non-biconvex cross-sections often have surfaces ground into two or three facets giving them a pronounced mid-ridge resulting in larger thicknesses. However, this feature does not explain why they are also not as wide. Illustrating these two potential sub-types in a scatterplot does not result in two discrete clusters of projectile points, instead they greatly overlap and inter-grade. As table 72 and figures 110 and 111 show, ground projectile points without basal thinning are significantly wider and thinner and have larger width/thickness and smaller length/width ratios than ground projectile points with basal thinning. Figure 112 is a scatterplot showing the clustering of these two potential sub-types. As tables 73 and 74 and figure 113 show, ground projectile points with dulled lateral edges have significantly narrower basal widths and smaller width/basal width ratios. Figure 114 is a scatterplot showing the clustering of these two potential sub-types. There are no significant differences between other nominal variables or between ground projectile points from different time-periods.

To better understand the relationship between these potential sub-types and between nominal variables Chi-square and G-tests were performed. As table 75 shows, shape of cross-section and presence/absence of basal thinning has an interdependent relationship where most (83.33%) ground projectile points with non-biconvex cross-sections thin towards the base and ground projectile points with biconvex or flat cross-sections tend (65%) not to thin towards the base. There are no other interdependent relationships between nominal variables.

Ground projectile points were also classified using the typology developed by Strong *et al.* (1935) and as table 76 shows, the sub-types differ significantly only in their width/thickness ratios. When looking at the nature of these differences in figure 115, it is clear that sub-type SB c has a much larger width/thickness ratio than all other sub-types and accounts for this significant difference. As table 77 shows, there is an interdependent relationship between ground projectile points with and without stems and the presence/absence of basal thinning where many (60%) non-stemmed ground projectile points have basal thinning and none of the stemmed projectile points do.

Comparison with Other Data Sources

Ames (2005:157-158) described ground slate points recovered as part of the NCPP as elongate triangular to excurvate lanceolate blades with worked bases and/or hafts. They are generally prismatic in cross-section with flat faces and beveled edges and the majority either lack a clear hafting element or have contracting tangs. The 25 complete specimens average 44 mm (L) x 9 mm (W) x 4 mm (T) and weigh 9 mm. Although his descriptions apply well to the ground slate points examined as part of this thesis, Ames' (2005) measurements are much smaller than those reported here and are clearly incorrect (see table 70). Similar to chipped projectile points, only non-stemmed leaf-shaped (sub-types NA a, NA b1, NA b2 and NA b3) ground projectile points manufactured by other groups of people were compared, as these are the predominant types manufactured by the Tsimshian. Summary statistics and quantitative data on individual Tlingit ground projectile points are provided by Keithahn (1962) and de Laguna (1964) while data on Eskimoan ground projectile points are provided by several authors (Clark 1974; de Laguna 1934, 1956; Heizer 1956) and data on Coast Salishan ground projectile points are provided by Croes (1995) and Matson (1976). As tables 78 and 79 show, neither Eskimoan nor Coast Salishan ground projectile points are significantly different than Tsimshian points on any variable. As table 80 shows, Tlingit ground projectile points are significantly broader than Tsimshian examples. However, the extremely small sample sizes for all three non-Tsimshian datasets leave much to be desired and the results of the T-Tests should be viewed with caution. More telling are the qualitative and summary data; however, only Eskimoan and Coast Salishan ground projectile points will be discussed further as data on Tlingit projectile points are virtually non-existent.

The proliferation of ground projectile point styles is much greater among Eskimoan groups than the Tsimshian. Heizer (1956:49-51 and plates 44 - 47) identified 14 types of Eskimoan slate points from Kodiak Island according to size-shape characteristics and suggested functions: Dart Points (types I, IV, V, and VI), arrowpoints (types IX, X, XIII, and XIV f), harpoon head tips (type XII), lance or whaling heads (types II, III, VII, XI, and XIV a – d) and flensing blades or lance heads (type VIII). Only types VII and VIII are non-stemmed leaf-shaped projectile points that are comparable (Heizer 1956: plate 47q, r, t – x and plate 45a – c). A similar form is shown by Clark (1974: plate 1e). On average these are 11.5 cm (L) x 3.2 cm (W) and 16.6 cm (L) x 5.1 cm (W) respectively, which are much larger than Tsimshian examples of the same type, which average 10.55 cm (L) x 2.04 cm (W).

De Laguna (1934, 1956) recognized five types of Eskimoan ground projectile points from Kachemak Bay and Prince William Sound: type I (blades with barbs), type II (blades with tang but without barbs or distinct shoulders), type III (leaf-shaped blades without barbs or tangs), type IV (blades with straight edges i.e. triangular), and type V (blades for knives). Only type III projectile points are directly comparable. Type III points from Kachemak Bay range from 10 to 14.8 cm long and 2.3 to 7.8 cm wide (de Laguna 1934:72). Although the range of length is comparable to the range for Tsimshian specimens, some of the Eskimoan points from Kachemak Bay are much broader (e.g. de Laguna 1934: plate 32-18, 20, 21 and 22). Ground slate points from Prince William Sound are very rare and only one leaf-shaped point is pictured (de Laguna 1956: plate 28-

9). Although no dimensions are given, this point is similar in shape to Tsimshian projectile points.

In addition to the data on individual leaf-shaped slate points from the Glenrose Cannery site provided by Matson (1976:150 and figure 8 – 21a - d), he also gave summary data on triangular-shaped points that are very similar to NA b forms. There are only three examples (Matson 1976: figure 8-21e – g) and these range from 5.4 to 7 cm (L) x 2.5 to 2.9 cm (W) x .4 to .6 cm (T). Taken together, although the leaf-shaped and triangular forms from the Glenrose Cannery site are very similar to Tsimshian examples, they are shorter, broader and thinner. In addition to the data on individual NA b forms from the Hoko River Complex site on the south shore of the Strait of Juan de Fuca, Croes (1995:216 figure 5.42-1 - 9) described the ground slate points and provided illustrations of them. He identified two types: a lance-like form that is long, faceted, and relatively thick, with most having beveled, rounded, or broken bases and flat surfaces with beveled edges giving a hexagonal cross-section, and smaller, thinner, triangular points. With the exception of the one extremely long point (Croes 1995: figure 5.42-9) all points of the former type are very similar to the long lanceolate forms found among the Tsimshian (e.g. GbTo-23:1656, GbTo-31:x239, GbTo-31:2258 and GbTo-34:1969 shown in plate 20).

CHAPTER 7: SUMMARY AND DISCUSSION OF RESULTS

In the last chapter variability within tool-types was examined with the twin objectives of establishing Tsimshian preferences for the final form of these tool-types and identifying any clusters of tools that share a number of characteristics and may indicate sub-types. Comparisons between Tsimshian and non-Tsimshian manufactured tools were also made with the aim of highlighting specific morphological differences. In this chapter potential sub-types and differences between Tsimshian and non-Tsimshian tools are summarized and where possible the meanings of these sub-types and differences are discussed in terms of whether they reflect functional and/or technological factors, and/or stylistic preferences. If differences between Tsimshian and non-Tsimshian tool-types can be shown to relate to primarily stylistic preferences than the argument that the tool-types exhibiting these stylistic differences reflect Tsimshian group identity can be made.

BARK SHREDDERS

Tsimshian bark shredders are homogenous in form and show little variability in size and shape. Even bark shredder GbTo-31:x69 (pictured in plate 1), which appears to be little more than an expediently or opportunistically modified piece of banded slate, and bark shredders GbTo-23:981 and GbTo-33:245 (also pictured in plate 1), which may be unfinished yet utilized preforms, have similar profiles and dimensions to finished examples. Given the overall morphological similarity between all bark shredders, no sub-types were identified.

Given the lack of comparable data from areas outside of Prince Rupert Harbour, bark shredders are not a decent tool-type for testing whether or not Tsimshian identity can be recognized in their stone-tools. With that said, stone bark shredders have only been found among the Tsimshian despite the prevalence of bone bark shredders elsewhere on the North Coast; thus their distribution, rather than form, may be of diagnostic value and indicate a Tsimshian identity.

CLUBS/PESTLES

Tsimshian clubs/pestles are also homogenous in form and exhibit little variability in size and shape, especially when club 982.1.122 (pictured in plate 2), which is clearly a war-club or fish-club and not a club/pestle, is removed from the dataset. This homogeneity suggests that whoever made and/or used these clubs/pestles had clear preferences for what the final forms should look like; if they are too big then they would be less effective as pestles and if they are too small then they would be less effective as clubs. No sub-types of clubs/pestles were identified.

Given the paucity of data from other areas of the Pacific and Alaskan Coasts, it is not possible to draw any concrete conclusions at this time about how Tsimshian clubs/pestles compare. Minimally, there are obvious differences in form between Tsimshian clubs/pestles and Haida and Nuu-chah-nulth war-clubs and fish-clubs pictured in Niblack (1970) and Stewart (1996) respectively. However, these differences likely reflect different functions rather than different stylistic or cultural preferences. Conversely, the clubs/pestles reported from Southeast Alaska and the Central Coast are functionally equivalent and very similar in form to the Prince Rupert Harbour specimens, which indicates that this tool-type is not a good indicator of Tsimshian identity.

BOWLS/TOBACCO MORTARS

Stone bowls/tobacco mortars are certainly heavily curated objects and there appear to be two variants manufactured by the Tsimshian that show marked differences in some dimensions; bowls with flat and curved bases. The degree to which bowls with flat and curved bases reflect two distinct sub-types rather than simply variations on a general theme is a matter of debate and conviction (i.e. whether one is a splitter or a lumper). Given the lack of discrete clustering of sub-types along the dimensions that are significantly different, I tend to view them as variations on a continuum.

The two variants of bowls most likely reflect stylistic preferences of manufacture. Function does not have any bearing on these variants because both were presumably used for the same purposes, namely as tobacco mortars and for grinding things. These variants also do not reflect technological differences as bowls in both variants were made from similar materials, predominantly basalt, but also gabbro, limestone and granite, and were manufactured by pecking and grinding into shape.

As with clubs and bark shredders, the paucity of data on bowls from areas outside of Prince Rupert Harbour precludes the possibility of making any concrete conclusions about how Tsimshian bowls compare. Therefore, this tool-type is not suitable for testing whether or not Tsimshian identity can be recognized in their stone-tools. Nonetheless, the significance of bowl 2219 (pictured in plate 3 and 4) with the zoomorphic frog design cannot be understated. As was mentioned in chapter 2, ownership of property, including both physical goods and territory, is a defining characteristic of ancestral First Nations groups along the Pacific Coast. Often, objects belonging to a particular house were embellished or marked with a crest owned by that house, thus signifying identity and ownership. Among the Tsimshian, as with other First Nations groups, the crests are most often found on house-posts, house-fronts and totem poles. However, there are examples of other artifacts such as war-clubs (e.g. Niblack 1970: plate XXVIII figure 132) and hafted mauls exhibiting zoomorphic designs possibly related to clans/phratries (e.g. mauls 294, 295, 341, and 982.1.117 on plates 7 and 8). House-posts, totem poles, war-clubs, hafted mauls and large deep bowls/tobacco mortars are all extremely durable objects that would (potentially) remain with a particular house sometimes for generations, and the zoomorphic frog design on bowl 2219 may be viewed as reflecting a Tsimshian house of the Raven clan's identity, and ownership of the vessel.

HAND MAULS

There are four sub-types of Tsimshian hand mauls: conical-top, nipple-top, flat-top, and stirrup or T-shape mauls. The small sample size precluded the possibility of statistically comparing sub-types to determine if they are significantly different along certain continuous variables. Impressionistically though, they can each be identified according to diagnostic characteristics. Nipple-top and conical-top mauls are very similar and both have a broad base that tapers upwards towards a collar about three-quarters of the way up. They differ in that nipple-top mauls taper to a small nipple-like head and conical-top mauls have relatively larger phallic-like heads. Flat-top mauls also have a broad base that tapers upwards towards a flat-top that may or may not flange slightly outwards. Stirrup or T-shaped mauls have a circular or sub-circular base that goes upwards and meets either a stirrup-shaped handle that encircles the hand when held, or a T-shaped handle with flanged ends.

Hand mauls are heavily curated artifacts with long use-lives and were sometimes re-used as mauls when broken (Ames 2005:166), and flat-top mauls could simply be reworked broken nipple-top or conical-top mauls and reflect a different stage in the life-cycle of hand mauls. Similarly, Drucker (1943:50) suggested that T-shaped mauls are often reworked stirrup mauls with broken handles and they should be grouped together accordingly. Thus, T-shaped mauls may also simply reflect a different stage in the life-cycle of stirrup mauls. Conversely, there are no valid (functional or technological) explanations for the pointed tops on many hand mauls (Stewart 1996:29) and the specific shape of the top reflects stylistic preferences. All hand mauls are ground and pecked into form and most are made from extremely hard igneous materials such as basalt, andesite, diorite, and rhyolite, although there are a few examples made from metamorphosed igneous materials such as gneiss and (basaltic?) tuff.

Despite the overall lack of comparative quantitative data on hand mauls, there are significant qualitative differences between Tsimshian hand mauls and hand mauls manufactured by the Tlingit, Coast Salishan and Eskimoan groups that can be linked to stylistic or cultural preferences and by extension a Tsimshian group identity. Sub-cylindrical hand mauls are more common among the Tlingit whereas they are virtually absent among the Tsimshian and the only example of a Tlingit stirrup maul is significantly shorter than the three examples of Tsimshian stirrup and T-shape mauls. The size difference between Tlingit and Tsimshian stirrup mauls can be attributed to stylistic or cultural preferences because presumably they both served the same purposes, mainly as pounding and grinding implements and possibly as weapons, and were manufactured in the same way, by pecking, grinding, and polishing into form. The absence of cylindrical mauls among the Tsimshian can potentially be explained by the dual functions served by Tsimshian clubs/pestles. De Laguna (1964:111) was unsure whether or not the Tlingit sub-cylindrical hand mauls were used as mauls or as pestles and it could be a matter of choice that the Tsimshian preferred to use their clubs/pestles in the same way the Tlingit used sub-cylindrical hand mauls. If this was the case and Tsimshian clubs/pestles are functionally equivalent to Tlingit sub-cylindrical hand mauls, then the differences between the rounded ends of Tsimshian clubs/pestles and the squared flat-ends of Tlingit hand mauls reflect stylistic or cultural preferences. There are no data available on the raw material of any of the Tlingit examples, beyond that the sub-cylindrical forms were made of cobblestone, and so it is impossible to determine what, if any, influence raw materials may have had on morphological differences.

The two types of Eskimoan hand mauls from Kodiak Island, the cylindrical form with tapering sides and finger-pits and paddle-like form, have no close parallels among Tsimshian hand mauls and even the conical-top hand mauls/pestles from Prince William Sound differ from Tsimshian counterparts in the style of the head. As was mentioned above, the purpose of pointed tops on hand mauls is unknown, so the differences in the style of heads on Eskimoan and Tsimshian conical-top hand mauls likely reflect stylistic or cultural preferences. Although flat-top, nipple-top, and conical-top hand mauls have been found among both the Coast Salish and the Tsimshian there are numerous noticeable differences in form within the same sub-types between the two indigenous groups. Assuming that Tsimshian, Eskimoan, and Coast Salishan hand mauls are functionally equivalent and have been manufactured by pecking, grinding, and polishing into shape, these differences reflect differences in raw materials and/or stylistic preferences. However, Tsimshian, Eskimoan, and Coast Salishan hand mauls are all made from similar materials including basalt, diorite, and granite (Collier *et al.* 1942:69; Heizer 1956:46). Thus, the differences in form between Tsimshian and Eskimoan and Coast Salish hand mauls reflect primarily stylistic or cultural preferences.

HAFTED MAULS

There are two sub-types of Tsimshian grooved hafted mauls; those with round and pointed-polls. These sub-types can be identified by not only the shape of their polls but also their weights, widths, width/thickness ratios, and length/width ratios. Both sub-types also have examples with zoomorphic designs on them. Presumably, function can be ruled out as a contributing factor to these differences in form because both sub-types of mauls were hafted the same way and used for the same purposes. Technology can also be partly ruled out as a contributing factor as mauls in both sub-types were pecked and ground into shape and were made from similar raw materials including usually basalt, but also limestone, diorite, andesite, granite, and gneiss. Given the technological and functional similarities and the fact that hafted mauls only come from Late Period contexts, round and pointed-polled mauls most likely reflect two stylistic preferences.

Like hand mauls, although comparative data on hafted mauls from outside of Prince Rupert Harbour are lacking, this tool-type provides evidence of a prehistoric Tsimshian group identity. As has been shown, there are qualitative and quantitative differences between hafted mauls manufactured by Tsimshian and Tlingit and Eskimoan groups, and these differences relate to stylistic or cultural preferences. Whereas pointed-polled mauls are common among the Tsimshian, they are absent among both the Tlingit and Eskimoan groups. Instead, Tlingit hafted mauls all have round-polls and are considerably wider and thicker than Tsimshian counterparts and Eskimoan hafted mauls, while not being significantly different in size or proportion to Tsimshian hafted mauls, usually have flat-polls and some have hafting grooves that run around the sides rather than front to back. Tlingit and Eskimoan hafted mauls are also much cruder than Tsimshian examples and often have poorly-defined or non-existent hafting grooves. The few examples of cylindrical and rounded hafted mauls from the Central Coast are clearly different forms than Tsimshian ones, and there are no examples of perforated hafted mauls from Prince Rupert Harbour. Instead, perforated hafted mauls are mostly known from the Haida on the Queen Charlotte Islands.

As was noted in chapter 4, hafted mauls are lashed to a long handle and swung like a sledge-hammer and are used for heavy woodworking purposes and this method of hafting and use is consistent throughout the Pacific and Alaskan Coasts (de Laguna 1964:113). Technological factors include raw material restrictions and manufacturing processes influencing the final form of an artifact. Hafted mauls are pecked and ground into shape much like hand mauls, which results in no manufacturing debris that can be used to reconstruct manufacturing processes; however, there are data on raw materials. Tsimshian, Tlingit, and Eskimoan hafted mauls were all made from similar raw materials. The raw materials from which Tsimshian hafted mauls were made was discussed above. Eskimoan hafted mauls were made from primarily andesite, but also granite and diorite (Heizer 1956:46) and Tlingit hafted mauls that have raw materials reported were made from limestone and gneiss (de Laguna 1960:101, 1964:112). Given the widespread availability and use of basalt by the Tlingit, it is likely they made hafted mauls from this material too. The influence of function and technology on the morphological differences between Tsimshian and non-Tsimshian hafted mauls is minimal and instead, these differences seem more indicative of stylistic or cultural preferences.

CELTS

The recycling and re-use of broken and dulled celts makes identifying sub-types problematic. Weight and length are reduced to a greater extent than other dimensions as a result of re-shaping and re-sharpening processes and identifying sub-types using these variables is not recommended. Instead, it has been shown that sub-types of celts may be identified by the shape of their cross-sections and polls. Whereas celts with oval and rectangular cross-sections have different widths, thicknesses, widths of bit edges and widths of polls, celts with straight and convex polls differ only in their widths and thicknesses. However, it was also shown that Drucker's (1943) typology of celts is more inclusive and does a good job of accounting for both differences in shape of cross-section and shape of poll. There are four sub-types of Tsimshian celts classified using Drucker's (1943) typology, which is shown in figure 49. Type Ia and Ic celts are by far the most common. Type Ia celts have relatively small widths, thicknesses and poll widths, sides that are straight or have a slight taper, and have predominantly rectangular cross-sections and straight polls. Type Ic celts are larger, also have straight or slightly tapered sides, and have almost exclusively oval cross-sections and convex polls. In contrast, there are very few type Ib and IIa celts and no type IIb celts. Type Ib celts are similar to type Ia celts only larger and type IIa celts have sides the taper severely towards the poll.

It would be presumptuous to offer any concrete explanations as to why these sub-types of celts exist until further research into the relationships between celt form and function, technology, and style has been done. However, it is possible to speculate why there are differences in celt poll and cross-section shape. As was noted in chapter 4, although celts are used for a variety of woodworking purposes and are tightly constrained functionally, they are hafted in a variety of ways and there is likely a relationship between method of hafting and shape of cross-section and poll. For example, the blade portion in D-adzes and elbow adzes are fitted into a shallow hafting groove, buttressed against a heel, and lashed into place to keep it secured (see figure 116). These features are clearly meant for blades with flat sides (i.e. rectangular cross-section) and straight polls as celts with oval cross-sections and convex polls would not fit so easily or tightly into these hafting elements. Alternatively, many of the larger celts with oval cross-sections and convex polls may have been hafted differently and lashed to a t-handle and used in much the same way as splitting adzes; however, without further research, this is little more than an untested assumption. Finally, squared corners break-off easily (Olausson 1983) and regrinding may produce rounded or irregular corners and some of the celts with convex polls may be re-worked celts with straight polls that had their corners broken.

It has also been shown that Tsimshian celts are considerably different from celts manufactured by other groups of people on the Pacific and Alaskan Coasts; however, it is difficult to rule out function, technology, and celt use-life as playing large roles in these differences. Although Eskimoan celts are significantly longer and narrower and have larger length/width ratios than Tsimshian celts, given the dynamic use-lives of celts, this difference in length/width ratio could simply reflect the fact that Tsimshian celts have been subject to more frequent re-sharpening and re-shaping episodes. This assertion is strengthened by the fact that Tsimshian celts have considerably smaller minimum lengths, widths, and thicknesses than Eskimoan celts indicating that Tsimshian celts were more fully exhausted. Qualitatively, where Tsimshian celts are fairly evenly split between having straight and convex polls, very rarely do Eskimoan celts have straight polls. Further, Eskimoan celts are often chipped rather than ground into form and more often than not have unfinished polls and unpolished surfaces. Given the relationship between hafting method and poll and cross-section shape discussed above and the different manufacturing methods utilized by Eskimoan groups (e.g. chipping rather than grinding), these qualitative differences between Tsimshian and Eskimoan celts likely reflect different hafting methods and technology, both of which could be stylistic/cultural preferences.

In contrast, although Coast Salishan celts are significantly longer, wider, and thinner than Tsimshian examples and have correspondingly different proportions they were manufactured in much the same way as Tsimshian celts by grinding and polishing into shape. However, where Tsimshian celts are usually made from hard igneous stone such as basalt and rhyolite, Coast Salishan celts were usually made from hard fine-grained greenstones such as nephrites, jadeites, and serpentines (Collier *et al.* 1942:70; King 1950:35; Mackie 1995:45-46). There are also examples of Tsimshian celts made from nephrite, gneiss, granite, andesite, marble, and several of unidentified material. Interestingly, although Tsimshian and Coast Salishan celts have identical proportions with straight and convex polls and rectangular and oval cross-sections, a much greater proportion of Coast Salishan celts have straight bit edges. Given all of the above, technology and hafting method appear to play minimal roles in the differences in form between Tsimshian and Coast Salishan celts, and instead these differences likely reflect differences in raw materials used and possibly stylistic preferences.

SPLITTING ADZES

Several potential sub-types of Tsimshian splitting adzes were identified from the analysis. A group of large, heavy splitting adzes identified on the basis of weight, length/width and width/thickness ratio appear to form a distinct sub-type but they do not share any nominal characteristics. In other words, this sub-type is not based on data from different domains (see chapter 4). Conversely, there are a number of morphologically similar splitting adzes that cluster based on both continuous and nominal variables and that form distinct sub-types. Towards this end, the shape of the poll from side to side and front to back and direction of taper are of particular diagnostic value. Although splitting adzes classified according to each of these nominal variables on their own have been shown to be significantly different along many continuous variables, Drucker's (1943) typology of splitting adzes does an excellent job of incorporating both nominal variables into a more inclusive classification (see figure 73).

Despite the enormous amount of morphological variability that made it hard to classify splitting adzes, Drucker (1943:44) was optimistic that his typology could be refined once more examples have been collected. He stated that whereas types I, II, V, VI, and VII represent extreme forms of splitting adzes, types III and IV are transitional forms and as has been shown, it is possible to rigorously define these sub-types. Types II and III splitting adzes are very similar to each other and only differ in the shape of their polls from front to back, yet both are consistently different from all other sub-types in terms of shape of poll and direction of taper, and their relatively small width/thickness and length/thickness ratios and deep hafting grooves. Type IV splitting adzes are also consistently different from all other sub-types and can be distinguished by a combination of relatively large width/thickness and small length/thickness ratios, relatively shallow hafting grooves, and poll shape. Type V splitting adzes can be identified by the combination of poll shape, large length/thickness ratios and shallow hafting grooves. Type VI splitting adzes appear to be the transitional forms as they are not sufficiently different from all other sub-types to warrant a separate classification; however, neither are they sufficiently similar enough to be included in any of the other sub-types. Finally, type VII splitting adzes are sufficiently distinct from all other types in terms of width/thickness ratio, groove depth, direction of taper, and lack of finish to warrant their own classification. Interestingly, there are no examples of type I forms among Tsimshian splitting adzes. Table 118 summarizes the morphological tendencies that Tsimshian splitting adzes classified according to Drucker's (1943) typology exhibit. As polythetic descriptions though, splitting adzes belonging to these sub-types are only expected to have some, but not all, of these characteristics.

With the exception of type VI splitting adzes, which appear to be the transitional forms, splitting adzes belonging to these sub-types are morphologically very similar to each other yet are distinct from other sub-types; in short, these sub-types exhibit internal cohesion and external isolation. However, do these differences in form reflect differences in function or technology, or stylistic preferences?

In a study examining stone-tools from Southeast Alaska, Keithahn (1962:67-68) divided splitting adzes into three functionally different sub-types: splitting adzes proper, which are used for light splitting to produce materials for implements, felling adzes, which are used for cutting down large trees, and char adzes, which are used to remove charred wood (e.g. from dugout canoes). Splitting and char adzes are very similar in form but can be distinguished by their V-shaped and sharp and U-shaped and blunted bit edges respectively. Felling adzes are relatively very long, narrow, and thin and have straight rather than slightly rounded or bulging sides. Attempting to classify splitting adzes using Keithahn's functional typology was difficult and resulted in many ambiguous classifications. For example, although adzes 203, 205, 1453, and 1946 (see plates 11, 12, 13 and 15) have V-shaped profiles similar to the splitting adze pictured in Keithahn (1962: figure 1 f) they have blunt bit edges. Conversely, although splitting adzes 216, 217, 302, and 1345 (see plates 11 and 12) have U-shaped profiles similar to the char adze pictured in Keithahn (1962: figure 1g) they have sharp bit edges.

In addition to these classificatory problems, there may not even be a sound basis for distinguishing between splitting, char, and felling adzes on functional grounds. Keithahn (1962:67) distinguished between char and splitting adzes based on testimony by Tlingit and Haida elders that fire was used to assist with felling trees and hollowing dugout canoes. Using this information he tested the ability of char adzes to remove charred wood and determined that they were well-adapted for this purpose. Additionally, the only justification given for distinguishing between ordinary splitting and felling adzes is that ordinary splitting adzes are (presumably) too short and weak for felling large trees several feet in diameter (Keithahn 1962:68).

In discussing the functions of splitting and planing (celts) adzes, de Laguna (1956:111, 1960:99-100, 1964:90) said that whereas splitting adzes are used for rough work such as chopping down trees, splitting logs, etc. planing adzes are used for finer work such as shaping planks and dugout canoes. While there is no doubt that char adzes are very effective for removing charred wood there is no reason to think that splitting adzes are any less effective. Moreover, there is no evidence that the Tlingit themselves made such functional distinctions between types of splitting adzes (de Laguna 1964:90). Given that there was no recollection by Tlingit and Haida elders that blunt adzes were used to remove charred wood despite a clear tribal memory of using fire to assist with woodworking (Keithahn 1962:67) coupled with de Laguna's ethnographically-informed assertion that all forms of splitting adzes were used for the same purposes, the functional distinctions between splitting, char, and felling adzes are circumspect. Keithahn's (1962) typology of splitting adzes is the only one that considers the relationship between form and function and given the classificatory and theoretical problems with it, function can be ruled out as being a major source of the morphological variability between sub-types noted above.

We can also rule out technology and use-life history as being major contributing factors to the diversity of forms found among splitting adzes. Regardless of sub-type, Tsimshian splitting adzes were pecked and ground into shape and most were polished to a finish using similar raw materials that were available. Hard stone such as nephrite and basalt are by far the most common raw materials used but there are also examples made from andesite, mica schist, gneiss, and granite, and some were made from unidentified material. None of the sub-types show preferences for specific types of raw materials.

Although splitting adzes are re-sharpened from time to time, although not to the same extent as celts, and occasionally break from use, the differences in poll shape between sub-types indicate that these processes have no impact on the formation of sub-types. For example, Type IV splitting adzes are considerably shorter and thinner than the other sub-types and they could potentially reflect splitting adzes that have been extensively re-worked over the course of their use-lives. However, the polls of type IV splitting adzes are heavy-squared and straight or convex and are wider than the polls of most other sub-types. Given that stone-tool manufacture is a reductive rather than additive process, it is impossible that the polls of type IV splitting adzes were re-worked from larger splitting adzes of other sub-types.

Functional and technological factors and use-life history do not appear to have much influence on the specific forms of splitting adzes. Further, given that splitting adzes only come from Late Period contexts and there are no differences in form over time, the sub-types that were identified are believed to reflect stylistic preferences and tendencies.

Along with hand and hafted mauls, splitting adzes are a class of tools that offer the best evidence for a prehistoric Tsimshian group identity. Tsimshian splitting adzes are significantly different than Tlingit and Eskimoan splitting adzes both quantitatively and qualitatively and these differences relate to primarily stylistic preferences and secondarily raw materials used. Tsimshian splitting adzes are considerably wider and have larger width/thickness ratios than Tlingit splitting adzes. Moreover, they differ in the number of hafting grooves preferred, location of hafting grooves, and shape of polls. Tsimshian splitting adzes are also considerably thinner and have larger width/thickness ratios and smaller length/width and length/thickness ratios than Eskimoan splitting adzes. Eskimoan splitting adzes also differ from Tsimshian examples in the preferred type of hafting elements, location of hafting grooves and knobs, profile shape, and sub-types of splitting adzes preferred. As was previously discussed, splitting adzes are a functionally constrained class of artifacts that were pecked and ground into shape and lashed to a T-shaped handle and used for heavy woodworking purposes. With the exception of the miniature Tlingit splitting adze reported by Ackerman (1968), which certainly was not used for heavy woodwork by virtue of its small size, Tlingit and Eskimoan splitting adzes are functionally equivalent to Tsimshian splitting adzes and were manufactured in the same way.

In terms of raw materials used, Eskimoan splitting adzes were made from diorite and other tough igneous stone of the basalt-greenstone series and metamorphosed slate-greywacke rock (Clark 1974:18, 59; de Laguna 1956:111; Heizer 1956:44) and Tlingit splitting adzes were made from predominantly greenstone such as schist, gneiss, serpentine, and chert, and fine-grained metamorphic rock (de Laguna 1960:100, 1964:90). Although many Tsimshian, Eskimoan, and Tlingit splitting adzes were made from similar fine-grained and hard igneous rock of the basalt-greenstone series, the use of greywacke by Eskimoan groups on Kodiak Island, Alaska certainly accounts for some of the differences in form. Greywacke is a very hard stone that consists of poorly sorted, medium-sized, angular grains and is much less predictable and harder to control than basalt, nephrite, and other finer-grained stone (Andrefsky 2005:52). As an unwieldy material, greywacke would certainly place constraints on the amount of shaping that could be done and would result in a very rough and crude-looking finish, which is exactly how many of the Eskimoan splitting adzes appear. However, the use of greywacke does not explain why hafting knobs are preferred over hafting grooves (even though both occur), why hafting elements are placed near the mid-points rather than polls, or the differences in profile shape between Eskimoan and Tsimshian splitting adzes. These differences and the ones noted above between Tlingit and Tsimshian splitting adzes most likely reflect stylistic preferences.

GROUND SLATE PENCILS

Ground slate pencils are a functionally-distinct tool-type that can be distinguished from ground projectile points by virtue of their large width/thickness ratios and diamond/polygonal/oval/rectangular cross-sections and usually the presence of basal thinning for hafting. As was previously mentioned, many of the site reports examined as part of this thesis wrongfully classified ground slate pencils as projectile points and knowing about these distinctions may help offset inaccurate classifications, even when only incomplete artifacts are found. No sub-types of ground slate pencils were identified.

Although ground slate pencils are found throughout the Pacific and Alaskan Coasts, the lack of comparable data does not allow for meaningful comparison and they are not a useful tool-type for recognizing Tsimshian group identity.

CHIPPED AND GROUND PROJECTILE POINTS/BIFACES

Two sub-types of chipped projectile points were identified on the basis of the shape of their cross-sections. Projectile points with bi-convex/flat cross-sections are much shorter, broader and thinner than those with diamond/polygonal-shaped cross-sections. Within each of these sub-types there is a range of variability with regards to presence/absence of hafting elements such as stems, notches, and basal thinning; however, as a rule very few Tsimshian chipped projectile points have formal stems and notches and instead basal thinning appears to be the favoured method of hafting. Chipped projectile points were also classified using the intuitive typology developed by Strong *et al.* (1935) with little success (see figure 99). While the sub-types did not prove to be statistically significantly different, they did prove useful for making comparisons with projectile points manufactured elsewhere on the Pacific Coast.

Although it is premature to make any definite claims about the functional, technological, or stylistic nature of these sub-types of chipped projectile points, the most parsimonious explanation is that they reflect different functions. Points in both sub-types were made from fine-grained basalt and so these sub-types do not reflect differences in raw materials. Instead, as was noted in chapter 4, chipped projectile points were used for a variety of purposes including as lance-heads, spearheads, arrowheads, daggers, knives, etc. all of which impact the form of a projectile point and it is likely that points in both sub-types were used for different purposes.

Although there were several potential sub-types of ground slate projectile points identified, two of them account for the most variability in form. Ground projectile points without basal thinning are wider and thinner and have larger width/thickness ratios and smaller length/width ratios than points with basal thinning. Within both of these sub-types some points have dulled lateral edges near the base and some do not; however, none of the points with basal thinning have stem elements whereas some of the points without basal thinning do. Intuitively this makes sense because projectile points that are thinned at the base were presumably hafted differently than projectile points with stem elements. This difference in hafting method indicates that these two sub-types reflect primarily functional differences rather than technological factors or stylistic preferences.

Like chipped projectile points, ground projectile points were also classified using the intuitive typology developed by Strong *et al.* (1935) to facilitate comparison with similar projectile point forms from other areas. While the sub-types were statistically significantly different in terms of width/thickness ratio, this difference is accounted for by only one sub-type (SB c), which has a considerably larger width/thickness ratio than the other sub-types. All other sub-types were similar in size and shape and therefore the typology developed by Strong *et al.* lacks quantitative validity.

When comparing Tsimshian and non-Tsimshian chipped projectile points/bifaces of the same sub-types, whereas Tsimshian points are not statistically significantly different than Eskimoan or Tlingit points, Coast Salishan points are significantly shorter and have correspondingly larger width/thickness ratios and smaller length/width ratios than Tsimshian examples. Qualitatively, the range of point forms found among the Tsimshian is quite restricted when compared to Eskimoan and Coast Salishan projectile points and no qualitative data on Tlingit points are available.

Although the lack of quantitative data on individual ground projectile points from other areas on the Pacific and Alaskan Coasts makes statistical comparisons questionable, the results nonetheless indicate that Eskimoan and Coast Salishan points are not significantly different than Tsimshian points and Tlingit points are significantly broader. Qualitatively, Eskimoan ground projectile points show a much greater diversity in forms and although Coast Salishan points are very similar in form to Tsimshian points, based on summary data they are shorter, broader, and thinner. Similar to chipped projectile points, there are virtually no qualitative data on Tlingit ground projectile points available.

Again, as was discussed in chapter 4, chipped and ground projectile points were used for a variety of purposes, all of which impact the final form of a projectile point. Therefore, unlike the other tool-types, chipped and ground projectile points are not functionally constrained classes of artifacts and until the relationship between projectile point form and function is better understood, which is not within the purview of this thesis, it would be presumptuous to make any claims about the functional, technological, or stylistic nature of differences between Tsimshian and non-Tsimshian projectile points. Given this, at this time ground and chipped projectile points cannot be easily employed in testing whether or not Tsimshian identity can be recognized in their stone-tools.

CHAPTER 8: CONCLUSIONS

One of the main goals of this thesis was to develop a typology that reflects the morphological variability in Tsimshian stone-tools and towards this end it has been shown that there are a number of morphological tendencies in select classes of Tsimshian stone-tools. For some tool-types including large bowls/tobacco mortars, nipple and conical-top hand mauls, hafted mauls, and splitting adzes these tendencies in form have been shown to reflect mainly stylistic preferences. For other tool-types such as flat-top, stirrip and T-shaped hand mauls, celts, and ground and chipped projectile points/bifaces, these morphological tendencies have been shown to reflect either functional differences or tools that have been reworked and recycled over the course of their use-lives.

Accomplishing the first goal was a prerequisite for accomplishing the second goal, which was to use preferences expressed by Tsimshian stone-tool manufacturers in order to test whether or not Tsimshian group identity is expressed in, and recoverable from, their lithic technology. Towards this end, several arguments were advanced that demonstrated that it is possible to recognize Tsimshian group identity in their stone-tools.

First, it must be determined how far back in time a Tsimshian group identity can be extended. Direct-historical links between historic-period Tsimshian that were described in ethnographic accounts and people living in Prince Rupert Harbour in antiquity were established using archaeological data and accounts in Tsimshian oral traditions. The overwhelming amount of artifactual, architectural, faunal, settlement, and oral data all testify to the persistence of Tsimshian subsistence, settlement and mobility patterns, social and household organization, and by extension a shared Tsimshian identity and cultural continuity for at least the last 1500 years and in all probability closer to 3500 years or more.

Second, once cultural continuity and a prehistoric Tsimshian group identity were established, a discussion of how and why artifact typologies are suited to investigate and recognize group identity from material culture was warranted. As was argued, two of the most ubiquitous purposes for developing typologies are to identify and order (real and artificial) past groups of people or cultures in the archaeological record. Specifically, it is the style of material culture that has been studied, both implicitly and explicitly, and used as an indicator of group identity, and chronological and spatial typologies that use stylistic elements of material culture to provide the foundation for the space-time framework upon which our understanding of human prehistory rests. Moreover, because stone-tool manufacture is a culturally-learned or taught tradition and the nature of lithic materials limits the opportunity for intentional stylistic input, Sackett's (1982, 1990) isochrestic definition of style was adopted as a framework for approaching and interpreting the morphological variability within Tsimshian stone-tools. Defined as the choices made by stone-tool manufacturers that result in functionally equivalent tools, style in this sense is unconsciously expressed in material culture and is both ever-present during the manufacture and use of artifacts and all-encompassing in the form of artifacts. This definition and use of style has two major implications for interpreting the results of comparisons between Tsimshian and non-Tsimshian tools:

1) Style can be expressed in morphologically similar tools that are used in different ways or for different purposes
2) Style can be expressed in morphologically different tools that are used in the same ways or for the same purposes.

With regards to the first implication, no attempt has been made in this thesis to determine the various functions or modes of use of the tool-types examined beyond the assumptions commonly held by Pacific Coast archaeologists. It is therefore not possible to make any claims about how tool-use may have differed among the Tsimshian or relates to a Tsimshian group identity. Instead, it is the second implication of how style is expressed in stone-tools that is of greater concern.

Third, once a framework for examining the covert expression of group identity in lithic artifacts using the style of material culture was established, Tsimshian and non-Tsimshian tools were compared and morphological differences were identified. Towards this end it was determined that differences between Tsimshian hand and hafted mauls and splitting adzes and the same tool-types manufactured by other groups of people on the Pacific and Alaskan Coasts were related to primarily stylistic preferences and therefore these tool-types provide good evidence of a Tsimshian group identity. Additionally, the overt signaling of Tsimshian clan/phratry identity was recognized on a specific large bowl/tobacco mortar, although this is more of an example of purposeful iconological or emblemic style rather than isochrestic style in signaling group identity.

With that said, there are two major shortcomings of this thesis that deserve a second mention and that make the conclusions reached preliminary rather than definitive. First, an archaeological truism, and one that certainly applies here, is that our research can always benefit from more data. As was noted in chapters 1 and 2, there is a lack of published accounts on Tsimshian stone-tools specifically and much of the time and effort put into this thesis was devoted to examining diverse collections, some of which have never been reported on, to record and understand the variability within Tsimshian stone-tools. Unfortunately, having to first develop a typology and understanding of Tsimshian stone-tools came at the expense of obtaining large amounts of comparable data and only easily accessible sources were consulted. Certainly many more data are available from private consulting companies, from reports filed with the ministry of small business, tourism, and culture in B.C., and from collections housed in other museums and institutions (e.g. Museum of Anthropology in Vancouver, University of British Columbia, etc.) that have the potential to strengthen or challenge the conclusions offered; however, accessing these sources was beyond the scope of this thesis and I am resigned to hoping that additional data can be included at a later date.

The second major concern is the inability to account for the impact that raw materials have on the morphology of stone-tools. I have attempted to account for the influences of function, technology, and style on the morphology of stone-tools. With the exception of chipped projectile points/bifaces, by focusing on the same ground stone tool-types that were used for the same purposes and were manufactured in the same way (i.e. pecking, grinding, polishing) by different groups of people, the effects that function and manufacturing processes have on morphological differences can be controlled for. By default then, any morphological differences between Tsimshian and non-Tsimshian tools must necessarily relate to differences in raw materials used or different stylistic preferences.

Where possible, it has been shown that many of the same types of raw materials were used by different groups of people in the manufacture of similar tools that show morphological differences. However, without a detailed analysis examining the internal characteristics of specific types of raw materials and how these characteristics inhibit or influence pecking, grinding, and polishing processes, it is hard to determine exactly how different raw materials may account for some of the morphological differences that were identified, beyond what has already been mentioned. The analysis in this thesis would benefit immensely from experimental research studying the relationship between raw material type and ground stone manufacturing processes. Despite the problems with the quality and quantity of comparable data and with accounting for the impact of raw materials on stone-tool morphology, this thesis still adds to our current understanding of Tsimshian lithic technology and can be used as an example of "traditional" archaeology where groups of people are connected with the material culture that they produce.

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TABLES

Table 1 Summary Statistics for Bark Shredders

Variable	N	Minimum	Maximum	Mean	St. Deviation
Weight	5	536.40	1101.40	865.72	209.09
Length	7	16.40	21.70	18.38	1.65
Width	7	10.29	13.91	12.21	1.38
Thickness	7	2.50	4.52	3.27	0.72

Table 2 Summary Statistics for Clubs/Pestles

Variable	N	Minimum	Maximum	Mean	Median	St. Deviation
Weight	9	281.90	978.60	534.92	518.90	208.17
Length	10	17.40	26.70	21.17	21.15	2.90
Width	10	4.01	6.04	5.29	5.48	0.65
Thickness	10	3.31	5.04	4.16	4.04	0.68
Width/Thickness	10	1.00	1.68	1.29	1.27	0.21
Length/Width	10	2.96	5.82	4.07	4.07	0.84
Length/Thickness	10	3.61	7.76	5.23	4.96	1.23

Table 3 Summary Statistics for Bowls/Tobacco Mortars

Variable	N	Minimum	Maximum	Mean	St. Deviation
Weight	23	1240.30	>13000	5005.83	3246.66
Length	24	11.39	33.20	18.52	4.31
Width	24	11.39	24.10	17.28	3.12
Height	24	7.50	19.10	11.99	2.81
Inside Length	23	8.08	17.54	12.55	2.47
Inside Width	23	8.08	17.54	12.26	2.43
Depth	23	3.45	13.50	7.32	2.54

Table 4 Results of T-Test Comparing Bowls with Straight and Curved Sides

Group Statistics

	Shape of Sides	N	Mean	Std. Deviation	Std. Error Mean
Weight (grams)	Straight Sides	9	5065.23	2881.43	960.48
	Curved Sides	14	4967.64	3567.20	953.38
Length (cm)	Straight Sides	10	17.58	3.46	1.09
	Curved Sides	14	19.19	4.84	1.29
Width (cm)	Straight Sides	10	17.34	3.33	1.05
	Curved Sides	14	17.23	3.09	0.83
Height (cm)	Straight Sides	10	13.24	2.62	0.83
	Curved Sides	14	11.09	2.67	0.71
Inside Length (cm)	Straight Sides	10	13.23	2.70	0.85
	Curved Sides	13	12.03	2.24	0.62
Inside Width (cm)	Straight Sides	10	13.15	2.65	0.84
	Curved Sides	13	11.57	2.09	0.58
Inside Depth (cm)	Straight Sides	10	8.24	2.28	0.72
	Curved Sides	13	6.60	2.58	0.72

		Levene's Test for Equality of Variances				
		F	Sig.	t	df	Sig. (2-tailed)
Weight (grams)	Equal variances assumed	0.119	0.733	.069	21	0.946
Length (cm)	Equal variances assumed	0.077	0.784	-.898	22	0.379
Width (cm)	Equal variances assumed	0.243	0.627	.083	22	0.935
Height (cm)	Equal variances assumed	0.442	0.513	1.950	22	0.064
Inside Length (cm)	Equal variances assumed	0.141	0.711	1.169	21	0.256
Inside Width (cm)	Equal variances assumed	0.150	0.702	1.598	21	0.125
Inside Depth (cm)	Equal variances assumed	1.642	0.214	1.586	21	0.128

Table 5 Results of T-Test Comparing Bowls with Flat and Curved Bases

Group Statistics

	Shape of Bottom	N	Mean	Std. Deviation	Std. Error Mean
Weight (grams)	Flat Bottom	11	5665.05	3457.60	1042.51
	Curved Bottom	12	4401.54	3062.76	884.14
Length (cm)	Flat Bottom	11	19.77	5.25	1.58
	Curved Bottom	13	17.45	3.15	0.87
Width (cm)	Flat Bottom	11	18.33	2.77	0.84
	Curved Bottom	13	16.38	3.23	0.89
Height (cm)	Flat Bottom	11	13.18	2.71	0.82
	Curved Bottom	13	10.97	2.57	0.71
Inside Length (cm)	Flat Bottom	11	13.69	2.44	0.74
	Curved Bottom	12	11.50	2.06	0.60
Inside Width (cm)	Flat Bottom	11	13.39	2.19	0.66
	Curved Bottom	12	11.22	2.23	0.64
Inside Depth (cm)	Flat Bottom	11	8.65	2.13	0.64
	Curved Bottom	12	6.10	2.32	0.67

		Levene's Test for Equality of Variances				
		F	Sig.	t	df	Sig. (2-tailed)
Weight (grams)	Equal variances assumed	0.369	0.550	0.929	21	0.363
Length (cm)	Equal variances assumed	1.258	0.274	1.337	22	0.195
Width (cm)	Equal variances assumed	0.001	0.981	1.570	22	0.131
Height (cm)	Equal variances assumed	0.011	0.916	2.048	22	0.053
Inside Length (cm)	Equal variances assumed	0.378	0.545	2.338	21	0.029
Inside Width (cm)	Equal variances assumed	0.046	0.833	2.359	21	0.028
Inside Depth (cm)	Equal variances assumed	0.515	0.481	2.732	21	0.012

Table 6 Summary Statistics for Hand Mauls

Variable	N	Minimum	Maximum	Mean	Median	St. Deviation
Weight	9	714.00	2264.40	1338.67	1133.80	495.95
Length	10	10.69	25.20	18.53	18.27	4.37
Ring Diameter	10	5.85	8.46	6.54	6.15	0.83
Base Diameter	8	6.44	10.8	8.82	8.80	1.56

Table 7 Summary Statistics for Hafted Mauls

Variable	N	Minimum	Maximum	Mean	Median	St. Deviation
Weight	15	715.10	2497.80	1512.70	1523.60	464.79
Length	16	11.43	16.68	14.15	14.29	1.77
Width	15	5.96	11.60	8.56	7.94	1.75
Thickness	15	5.48	9.65	8.11	8.34	1.31
Width/Thickness	15	0.82	1.88	1.08	1.09	0.27
Length/Width	15	1.18	2.45	1.71	1.74	0.42
Length/Thickness	15	1.41	2.80	1.78	1.67	0.39
Groove width	15	2.01	4.63	3.59	3.65	0.64
Groove Depth	15	0.36	1.52	0.83	0.77	0.36
Groove Width/Depth	15	2.61	7.24	4.84	5.06	1.50

Table 8 Results of ANOVA Comparing Hafted Mauls According to Poll Shape
Test of Homogeneity of Variances

	Levene Statistic	df1	df2	Sig.
Weight (grams)	1.361	2	12	0.293
Length (cm)	2.601	2	13	0.112
Width (cm)	0.390	2	12	0.686
Thickness (cm)	2.102	2	12	0.165
Width/Thickness	1.069	2	12	0.374
Length/Width	2.010	2	12	0.177
Length/Thickness	0.765	2	12	0.487
Groove Width (cm)	0.780	2	12	0.480
Groove Depth (cm)	0.310	2	12	0.739
Groove Width/Depth	0.250	2	12	0.783

		Sum of Squares	df	Mean Square	F	Sig.
Weight (grams)	Between Groups	1210699.611	2	605349.806	4.005	0.047
	Within Groups	1813710.749	12	151142.562		
	Total	3024410.360	14			
Length (cm)	Between Groups	7.568	2	3.784	1.250	0.319
	Within Groups	39.365	13	3.028		
	Total	46.933	15			
Width (cm)	Between Groups	16.058	2	8.029	3.625	0.059
	Within Groups	26.576	12	2.215		
	Total	42.634	14			
Thickness (cm)	Between Groups	4.095	2	2.047	1.222	0.329
	Within Groups	20.105	12	1.675		
	Total	24.200	14			
Width/Thickness	Between Groups	0.304	2	0.152	2.571	0.118
	Within Groups	0.709	12	0.059		
	Total	1.013	14			
Length/Width	Between Groups	1.098	2	0.549	4.660	0.032
	Within Groups	1.414	12	0.118		
	Total	2.512	14			
Length/Thickness	Between Groups	0.219	2	0.110	0.700	0.516
	Within Groups	1.879	12	0.157		
	Total	2.098	14			
Groove Width (cm)	Between Groups	0.767	2	0.384	0.934	0.420
	Within Groups	4.929	12	0.411		
	Total	5.697	14			
Groove Depth (cm)	Between Groups	0.087	2	0.044	0.306	0.742
	Within Groups	1.710	12	0.143		
	Total	1.797	14			
Groove Width/Depth	Between Groups	3.795	2	1.898	0.819	0.464
	Within Groups	27.807	12	2.317		
	Total	31.602	14			

Table 9 Results of T-Test Comparing Hafted Mauls with Round and Pointed-Polls
Group Statistics

	drucker2	N	Mean	Std. Deviation	Std. Error Mean
Weight (grams)	round-poll	6	1859.37	404.69	165.22
	pointed-poll	9	1281.59	354.21	118.07
Length (cm)	round-poll	6	13.47	1.19	0.48
	pointed-poll	10	14.56	1.98	0.63
Width (cm)	round-poll	6	10.13	1.30	0.53
	pointed-poll	9	7.52	1.10	0.37
Thickness (cm)	round-poll	6	8.28	1.25	0.51
	pointed-poll	9	7.99	1.42	0.47
Width/Thickness	round-poll	6	1.26	0.32	0.13
	pointed-poll	9	0.96	0.15	0.05
Length/Width	round-poll	6	1.34	0.10	0.04
	pointed-poll	9	1.96	0.36	0.12
Length/Thickness	round-poll	6	1.66	0.36	0.15
	pointed-poll	9	1.86	0.40	0.13
Groove Width (cm)	round-poll	6	3.76	0.57	0.23
	pointed-poll	9	3.47	0.69	0.23
Groove Depth (cm)	round-poll	6	0.90	0.34	0.14
	pointed-poll	9	0.79	0.39	0.13
Groove Width/Depth	round-poll	6	4.62	1.53	0.63
	pointed-poll	9	4.99	1.55	0.52

		Levene's Test for Equality of Variances				
		F	Sig.	t	df	Sig. (2-tailed)
Weight (grams)	Equal variances assumed	0.140	0.714	2.928	13	0.012
Length (cm)	Equal variances assumed	3.140	0.098	-1.218	14	0.243
Width (cm)	Equal variances assumed	1.196	0.294	4.189	13	0.001
Thickness (cm)	Equal variances assumed	0.059	0.812	0.406	13	0.691
Width/Thickness	Equal variances assumed	1.231	0.287	2.463	13	0.028
Length/Width	Equal variances assumed	3.823	0.072	-4.080	13	0.001
Length/Thickness	Equal variances assumed	0.020	0.890	-0.963	13	0.353
Groove Width (cm)	Equal variances assumed	0.089	0.770	0.856	13	0.408
Groove Depth (cm)	Equal variances assumed	0.160	0.696	0.551	13	0.591
Groove Width/Depth	Equal variances assumed	0.064	0.804	-0.456	13	0.656

Table 10 Results of T-Test Comparing Tsimshian and Tlingit Hafted Mauls
Group Statistics

	site	N	Mean	Std. Deviation	Std. Error Mean
Length (cm)	PRH	16	14.15	1.77	0.44
	Tlingit	3	15.43	3.09	1.79
Width (cm)	PRH	15	8.56	1.75	0.45
	Tlingit	3	11.80	2.31	1.33
Thickness (cm)	PRH	15	8.11	1.31	0.34
	Tlingit	3	10.13	1.63	0.94
Width/Thickness	PRH	15	1.08	0.27	0.07
	Tlingit	3	1.19	0.32	0.19
Length/Width	PRH	15	1.71	0.42	0.11
	Tlingit	3	1.36	0.45	0.26
Length/Thickness	PRH	15	1.78	0.39	0.10
	Tlingit	3	1.52	0.20	0.12

		Levene's Test for Equality of Variances				
		F	Sig.	t	df	Sig. (2-tailed)
Length (cm)	Equal variances assumed	1.928	0.183	-1.034	17	0.316
Width (cm)	Equal variances assumed	0.047	0.831	-2.807	16	0.013
Thickness (cm)	Equal variances assumed	0.271	0.610	-2.360	16	0.031
Width/Thickness	Equal variances assumed	0.289	0.598	-0.629	16	0.538
Length/Width	Equal variances assumed	0.107	0.748	1.297	16	0.213
Length/Thickness	Equal variances assumed	0.769	0.393	1.127	16	0.276

Table 11 Results of T-Test Comparing Tsimshian and Eskimoan Hafted Mauls

Group Statistics

	site	N	Mean	Std. Deviation	Std. Error Mean
Length (cm)	PRH	16	14.15	1.77	0.44
	Eskimoan	7	12.79	1.11	0.42
Width (cm)	PRH	15	8.56	1.75	0.45
	Eskimoan	9	9.59	1.92	0.64
Thickness (cm)	PRH	15	8.11	1.31	0.34
	Eskimoan	9	9.28	2.58	0.86
Width/Thickness	PRH	15	1.08	0.27	0.07
	Eskimoan	9	1.10	0.38	0.13
Length/Width	PRH	15	1.71	0.42	0.11
	Eskimoan	7	1.36	0.11	0.04
Length/Thickness	PRH	15	1.78	0.39	0.10
	Eskimoan	7	1.54	0.61	0.23

		Levene's Test for Equality of Variances				
		F	Sig.	t	df	Sig. (2-tailed)
Length (cm)	Equal variances assumed	3.731	0.067	1.873	21	0.075
Width (cm)	Equal variances assumed	0.000	0.998	-1.347	22	0.192
Thickness (cm)	Equal variances assumed	6.408	0.019	-1.483	22	0.152
Width/Thickness	Equal variances assumed	0.803	0.380	-0.176	22	0.862
Length/Width	Equal variances assumed	16.539	0.001	2.147	20	0.044
Length/Thickness	Equal variances assumed	0.845	0.369	1.154	20	0.262

Table 12 Results of the Kruskal-Wallace Test Comparing Tsimshian and Eskimoan Hafted Mauls

Ranks

	site	N	Mean Rank
Length (cm)	PRH	16	13.63
	Eskimoan	7	8.29
	Total	23	
Thickness (cm)	PRH	15	11.47
	Eskimoan	9	14.22
	Total	24	
Length/Width	PRH	15	12.93
	Eskimoan	7	8.43
	Total	22	

	Length (cm)	Thickness (cm)	Length/Width
Chi-Square	3.019	0.855	2.298
Df	1	1	1
Asymp. Sig.	0.082	0.355	0.130

Table 13 Results of T-Test Comparing Celts from Known and Unknown Provenience
Group Statistics

	site	N	Mean	Std. Deviation	Std. Error Mean
Weight	Known Provenience	8	119.80	214.98	76.01
	Unknown Provenience	15	325.21	214.75	55.45
Length	Known Provenience	36	6.57	3.52	0.59
	Unknown Provenience	18	10.50	4.16	0.98
Width	Known Provenience	40	3.66	1.51	0.24
	Unknown Provenience	31	4.87	1.12	0.20
thickness	Known Provenience	37	1.75	1.05	0.17
	Unknown Provenience	31	2.22	0.94	0.17
Widthk	Known Provenience	33	2.22	0.60	0.10
	Unknown Provenience	31	2.44	0.84	0.15
Lenwid	Known Provenience	33	1.80	0.48	0.08
	Unknown Provenience	18	1.95	0.58	0.14
Lenthk	Known Provenience	30	3.68	0.77	0.14
	Unknown Provenience	18	4.01	1.48	0.35
Bitwid	Known Provenience	25	3.30	1.30	0.26
	Unknown Provenience	19	4.44	0.74	0.17
Polwid	Known Provenience	31	2.46	0.80	0.14
	Unknown Provenience	20	3.19	0.82	0.18

		Levene's Test for Equality of Variances				
		F	Sig.	t	df	Sig. (2-tailed)
Weight	Equal variances assumed	0.584	0.453	-2.184	21	0.040
Length	Equal variances assumed	1.099	0.299	-3.640	52	0.001
Width	Equal variances assumed	2.165	0.146	-3.719	69	0.000
Thickness	Equal variances assumed	0.401	0.529	-1.905	66	0.061
Widthk	Equal variances assumed	0.984	0.325	-1.171	62	0.246
Lenwid	Equal variances assumed	0.780	0.381	-1.029	49	0.308
Lenthk	Equal variances assumed	6.189	0.017	-1.027	46	0.310
Bitwid	Equal variances assumed	6.116	0.018	-3.415	42	0.001
Polwid	Equal variances assumed	0.002	0.964	-3.144	49	0.003

Table 14 Results of Kruskal-Wallace Test Comparing Celts from Known and Unknown Proveneience Ranks

	site	N	Mean Rank
Lenthk	Known Provenience	30	24.43
	Unknown Provenience	18	24.61
	Total	48	
Bitwid	Known Provenience	25	17.02
	Unknown Provenience	19	29.71
	Total	44	

	lenthk	bitwid
Chi-Square	0.002	10.541
Df	1	1
Asymp. Sig.	0.966	0.001

Table 15 Summary Statistics for Celts

Variable	N	Minimum	Maximum	Mean	Median	St. Deviation
Weight	23	15.50	841.90	253.77	177.50	232.51
Length	54	2.52	18.30	7.88	6.83	4.15
Width	71	1.77	9.00	4.19	4.05	1.47
Thickness	68	0.89	6.05	1.97	1.59	1.02
Bit Width	44	1.87	6.30	3.80	3.84	1.22
Poll Width	51	0.62	4.56	2.75	2.66	0.88
Width/Thickness	64	1.28	5.54	2.33	2.28	0.73
Length/Width	51	0.92	3.16	1.85	1.77	0.52
Length/Thickness	48	2.36	7.66	3.80	3.61	1.09

Table 16 Results of T-Test Comparing Celts with Oval and Rectangular Cross-Sections
Group Statistics

	xsec	N	Mean	Std. Deviation	Std. Error Mean
Width	Oval Cross-Section	37	4.82	1.44	0.24
	Rectangular Cross-Section	30	3.35	1.13	0.21
thickness	Oval Cross-Section	33	2.29	1.00	0.17
	Rectangular Cross-Section	30	1.56	0.92	0.17
Widthk	Oval Cross-Section	33	2.26	0.57	0.10
	Rectangular Cross-Section	27	2.47	0.88	0.17
Bitwid	Oval Cross-Section	20	4.31	1.19	0.27
	Rectangular Cross-Section	20	3.24	1.03	0.23
Polwid	Oval Cross-Section	20	3.18	0.88	0.20
	Rectangular Cross-Section	28	2.40	0.73	0.14

		Levene's Test for Equality of Variances				
		F	Sig.	t	df	Sig. (2-tailed)
Width	Equal variances assumed	1.075	0.304	4.547	65	0.000
Thickness	Equal variances assumed	3.368	0.071	3.007	61	0.004
Widthk	Equal variances assumed	2.376	0.129	-1.107	58	0.273
Bitwid	Equal variances assumed	0.233	0.632	3.058	38	0.004
Polwid	Equal variances assumed	0.504	0.481	3.348	46	0.002

Table 17 Results of T-Test Comparing Celts with Straight and Convex Polls

Group Statistics

	polshp	N	Mean	Std. Deviation	Std. Error Mean
Width	Straight Poll	27	3.39	1.15	0.22
	Convex Poll	32	4.61	1.59	0.28
thickness	Straight Poll	27	1.53	0.72	0.14
	Convex Poll	28	2.33	0.99	0.19
Widthk	Straight Poll	26	2.32	0.51	0.10
	Convex Poll	27	2.10	0.60	0.11
Bitwid	Straight Poll	16	3.13	0.96	0.24
	Convex Poll	19	3.75	1.16	0.27
Polwid	Straight Poll	26	2.71	0.75	0.15
	Convex Poll	25	2.79	1.01	0.20

		Levene's Test for Equality of Variances				
		F	Sig.	t	df	Sig. (2-tailed)
Width	Equal variances assumed	2.802	0.100	-3.315	57	0.002
Thickness	Equal variances assumed	4.504	0.039	-3.388	53	0.001
Widthk	Equal variances assumed	0.738	0.394	1.444	51	0.155
Bitwid	Equal variances assumed	0.364	0.550	-1.690	33	0.101
Polwid	Equal variances assumed	1.397	0.243	-0.357	49	0.723

Table 18 Results of Kruskal-Wallace Test Comparing Celts with Straight and Convex Polls
Ranks

	polshp	N	Mean Rank
thickness	Straight Poll	27	19.31
	Convex Poll	28	36.38
	Total	55	

	thickness
Chi-Square	15.590
Df	1
Asymp. Sig.	0.000

Table 19 Results of ANOVA Comparing Celts According to Amount of Taper
Test of Homogeneity of Variances

	Levene Statistic	df1	df2	Sig.
Width	0.287	2	68	0.752
thickness	0.030	2	64	0.970
Widthk	1.033	2	61	0.362
Bitwid	1.954	2	41	0.155
polwid	0.576	2	47	0.566

		Sum of Squares	df	Mean Square	F	Sig.
width	Between Groups	1.205	2	0.602	0.271	0.763
	Within Groups	151.037	68	2.221		
	Total	152.242	70			
thickness	Between Groups	0.182	2	0.091	0.084	0.920
	Within Groups	69.611	64	1.088		
	Total	69.793	66			
widthk	Between Groups	0.347	2	0.173	0.320	0.727
	Within Groups	33.076	61	0.542		
	Total	33.423	63			
bitwid	Between Groups	1.112	2	0.556	0.361	0.699
	Within Groups	63.248	41	1.543		
	Total	64.361	43			
polwid	Between Groups	5.348	2	2.674	3.781	0.030
	Within Groups	33.241	47	0.707		
	Total	38.588	49			

Table 20 Results of ANOVA Comparing Drucker's Sub-Types of Celts
Test of Homogeneity of Variances

	Levene Statistic	df1	df2	Sig.
Width	1.213	3	40	0.317
thickness	6.495	3	40	0.001
Widthk	1.703	3	38	0.183
Bitwid	0.573	3	31	0.637
Polwid	2.051	2	28	0.147

		Sum of Squares	df	Mean Square	F	Sig.
Width	Between Groups	44.954	3	14.985	8.615	0.000
	Within Groups	69.571	40	1.739		
	Total	114.525	43			
thickness	Between Groups	27.629	3	9.210	11.892	0.000
	Within Groups	30.979	40	0.774		
	Total	58.608	43			
Widthk	Between Groups	1.129	3	0.376	1.130	0.349
	Within Groups	12.650	38	0.333		
	Total	13.779	41			
Bitwid	Between Groups	8.652	3	2.884	2.557	0.073
	Within Groups	34.960	31	1.128		
	Total	43.613	34			
Polwid	Between Groups	10.886	3	3.629	7.253	0.001
	Within Groups	14.009	28	0.500		
	Total	24.895	31			

Table 21 Results of Kruskal-Wallace Test Comparing Drucker's Sub-Types of Celts
Ranks

	drucker	N	Mean Rank
thickness	Type 1a	24	15.71
	Type 1b	3	21.67
	Type 1c	14	34.07
	Type 2a	3	23.67
	Total	44	

	thickness
Chi-Square	18.112
Df	3
Asymp. Sig.	0.000

Table 22 Results of Tukey's Test Comparing Drucker's Sub-Types of Celts
Multiple Comparisons

Dependent Variable	(I) drucker	(J) drucker	Mean Difference (I-J)	Std. Error	Sig.
Width	Type 1a	Type 1b	-0.90	0.808	0.685
		Type 1c	-2.25	0.444	0.000
		Type 2a	-0.87	0.808	0.707
	Type 1b	Type 1a	0.90	0.808	0.685
		Type 1c	-1.36	0.839	0.381
		Type 2a	0.03	10.077	1.000
	Type 1c	Type 1a	2.25	0.444	0.000
		Type 1b	1.36	0.839	0.381
		Type 2a	1.39	0.839	0.362
	Type 2a	Type 1a	0.87	0.808	0.707
		Type 1b	-0.03	10.077	1.000
		Type 1c	-1.39	0.839	0.362
thickness	Type 1a	Type 1b	-0.21	0.539	0.978
		Type 1c	-1.75	0.296	0.000
		Type 2a	-0.46	0.539	0.827
	Type 1b	Type 1a	0.21	0.539	0.978
		Type 1c	-1.53	0.560	0.043
		Type 2a	-0.25	0.719	0.986
	Type 1c	Type 1a	1.75	0.296	0.000
		Type 1b	1.53	0.560	0.043
		Type 2a	1.29	0.560	0.115
	Type 2a	Type 1a	0.46	0.539	0.827
		Type 1b	0.25	0.719	0.986
		Type 1c	-1.29	0.560	0.115
Widthk	Type 1a	Type 1b	-0.27	0.354	0.867
		Type 1c	0.29	0.200	0.473
		Type 2a	0.17	0.354	0.961

	Type 1b	Type 1a	0.27	0.354	0.867
		Type 1c	0.56	0.370	0.431
		Type 2a	0.45	0.471	0.779
	Type 1c	Type 1a	-0.29	0.200	0.473
		Type 1b	-0.56	0.370	0.431
		Type 2a	-0.12	0.370	0.989
	Type 2a	Type 1a	-0.17	0.354	0.961
		Type 1b	-0.45	0.471	0.779
		Type 1c	0.12	0.370	0.989
Bitwid	Type 1a	Type 1b	-1.06	0.658	0.387
		Type 1c	-1.04	0.411	0.076
		Type 2a	-0.19	0.788	0.995
	Type 1b	Type 1a	1.06	0.658	0.387
		Type 1c	0.02	0.699	1.000
		Type 2a	0.87	0.969	0.807
	Type 1c	Type 1a	1.04	0.411	0.076
		Type 1b	-0.02	0.699	1.000
		Type 2a	0.85	0.823	0.735
	Type 2a	Type 1a	0.19	0.788	0.995
		Type 1b	-0.87	0.969	0.807
		Type 1c	-0.85	0.823	0.735

Table 23 Results of G-Test Between Cross-Section with Bit Shape

Crosstab

			bitshp		
			Straight Bit Edge	Convex Bit Edge	Total
xsec	Oval Cross-Section	Count	2	23	25
		Expected Count	3.2	21.8	25.0
	Rectangular Cross-Section	Count	5	24	29
		Expected Count	3.8	25.2	29.0
Total		Count	7	47	54
		Expected Count	7.0	47.0	54.0

Chi-Square Tests

	Value	df	Asymp. Sig. (2-sided)	Exact Sig. (2-sided)	Exact Sig. (1-sided)
Pearson Chi-Square	1.016(b)	1	0.313		
Continuity Correction(a)	0.362	1	0.547		
Likelihood Ratio	1.053	1	0.305		
Fisher's Exact Test				0.431	0.277
Linear-by-Linear Association	0.997	1	0.318		
N of Valid Cases	54				

Table 24 Results of Chi-Square Between Cross-Section and Poll Shape

Crosstab

			polshp		Total
			Straight Poll	Convex Poll	
xsec	Oval Cross-Section	Count	10	19	29
		Expected Count	13.6	15.4	29.0
	Rectangular Cross-Section	Count	19	14	33
		Expected Count	15.4	17.6	33.0
Total		Count	29	33	62
		Expected Count	29.0	33.0	62.0

Chi-Square Tests

	Value	df	Asymp. Sig. (2-sided)	Exact Sig. (2-sided)	Exact Sig. (1-sided)
Pearson Chi-Square	3.306(b)	1	0.069		
Continuity Correction(a)	2.444	1	0.118		
Likelihood Ratio	3.342	1	0.068		
Fisher's Exact Test				0.081	0.059
Linear-by-Linear Association	3.253	1	0.071		
N of Valid Cases	62				

Table 25 Results of Chi-Square Between Cross-Section and Amount of Taper

Crosstab

			Amttaper			Total
			No Taper	Slight Taper	Sharp Taper	
xsec	Oval Cross-Section	Count	7	26	4	37
		Expected Count	7.6	21.8	7.6	37.0
	Rectangular Cross-Section	Count	8	17	11	36
		Expected Count	7.4	21.2	7.4	36.0
Total		Count	15	43	15	73
		Expected Count	15.0	43.0	15.0	73.0

Chi-Square Tests

	Value	df	Asymp. Sig. (2-sided)
Pearson Chi-Square	5.204(a)	2	0.074
Likelihood Ratio	5.348	2	0.069
Linear-by-Linear Association	1.184	1	0.277
N of Valid Cases	73		

Table 26 Results of G-Test Between Cross-Section and Direction of Taper

Crosstab

			Dirtaper				Total
			No Taper	Taper Towards Bit Edge	Taper Towards Poll	Taper Towards Both Ends	
Xsec	Oval Cross-Section	Count	7	3	24	3	37
		Expected Count	7.6	2.0	25.8	1.5	37.0
	Rectangular Cross-Section	Count	8	1	27	0	36
		Expected Count	7.4	2.0	25.2	1.5	36.0
Total		Count	15	4	51	3	73
		Expected Count	15.0	4.0	51.0	3.0	73.0

Chi-Square Tests

	Value	df	Asymp. Sig. (2-sided)
Pearson Chi-Square	4.230(a)	3	0.238
Likelihood Ratio	5.435	3	0.143
Linear-by-Linear Association	0.215	1	0.643
N of Valid Cases	73		

Table 27 Results of G-Test Between Cross-Section and Drucker's Sub-Types

Crosstab

			Xsec		Total
			Oval Cross-Section	Rectangular Cross-Section	
Drucker	Type 1a	Count	7	17	24
		Expected Count	12.3	11.7	24.0
	Type 1b	Count	2	1	3
		Expected Count	1.5	1.5	3.0
	Type 1c	Count	12	1	13
		Expected Count	6.7	6.3	13.0
	Type 2a	Count	1	2	3
		Expected Count	1.5	1.5	3.0
Total		Count	22	21	43
		Expected Count	22.0	21.0	43.0

Chi-Square Tests

	Value	df	Asymp. Sig. (2-sided)
Pearson Chi-Square	14.125(a)	3	0.003
Likelihood Ratio	15.924	3	0.001
Linear-by-Linear Association	7.376	1	0.007
N of Valid Cases	43		

Table 28 Results of G-Test Between Poll Shape and Drucker's Sub-Types

Crosstab

			polshp		Total
			Straight Poll	Convex Poll	
Drucker	Type 1a	Count	17	8	25
		Expected Count	11.3	13.7	25.0
	Type 1b	Count	0	1	1
		Expected Count	.5	.5	1.0
	Type 1c	Count	2	11	13
		Expected Count	5.9	7.1	13.0
	Type 2a	Count	0	3	3
		Expected Count	1.4	1.6	3.0
Total		Count	19	23	42
		Expected Count	19.0	23.0	42.0

Chi-Square Tests

	Value	df	Asymp. Sig. (2-sided)
Pearson Chi-Square	13.210(a)	3	0.004
Likelihood Ratio	15.337	3	0.002
Linear-by-Linear Association	12.103	1	0.001
N of Valid Cases	42		

Table 29 Results of T-Test Comparing Tsimshian and Eskimoan Celts

Group Statistics

	site	N	Mean	Std. Deviation	Std. Error Mean
length	Tsimshian	54	7.88	4.15	0.57
	Eskimoan	11	8.84	2.99	0.90
width	Tsimshian	71	4.19	1.47	0.18
	Eskimoan	15	4.06	1.43	0.37
lenwid	Tsimshian	51	1.85	0.52	0.07
	Eskimoan	11	2.27	0.27	0.08

		Levene's Test for Equality of Variances				
		F	Sig.	t	df	Sig. (2-tailed)
length	Equal variances assumed	1.539	0.219	-0.723	63	0.473
width	Equal variances assumed	0.010	0.922	0.303	84	0.763
lenwid	Equal variances assumed	4.352	0.041	-2.573	60	0.013

Table 30 Results of Kruskal-Wallace Test Comparing Tsimshian and Eskimoan Celts
Ranks

	site	N	Mean Rank
lenwid	Tsimshian	51	28.56
	Eskimoan	11	45.14
	Total	62	

	lenwid
Chi-Square	7.642
df	1
Asymp. Sig.	0.006

Table 31 Results of T-Test Comparing Tsimshian and Coast Salishan Celts
Group Statistics

	site	N	Mean	Std. Deviation	Std. Error Mean
length	Tsimshian	54	7.88	4.15	0.57
	Coast Salish	15	13.38	6.80	1.76
width	Tsimshian	71	4.19	1.47	0.18
	Coast Salish	16	5.12	1.61	0.40
thickness	Tsimshian	68	1.97	1.02	0.12
	Coast Salish	16	1.39	0.42	0.11
widthk	Tsimshian	64	2.33	0.73	0.09
	Coast Salish	16	4.01	1.87	0.47
lenwid	Tsimshian	51	1.85	0.52	0.07
	Coast Salish	15	2.63	0.97	0.25
lenthk	Tsimshian	48	3.80	1.09	0.16
	Coast Salish	15	9.91	4.39	1.13

		Levene's Test for Equality of Variances				
		F	Sig.	t	df	Sig. (2-tailed)
Length	Equal variances assumed	4.786	0.032	-3.899	67	0.000
Width	Equal variances assumed	0.012	0.911	-2.261	85	0.026
thickness	Equal variances assumed	4.972	0.028	2.188	82	0.032
Widthk	Equal variances assumed	26.889	0.000	-5.745	78	0.000
Lenwid	Equal variances assumed	7.171	0.009	-4.088	64	0.000
Lenthk	Equal variances assumed	89.085	0.000	-8.944	61	0.000

Table 32 Results of Kruskal-Wallace Test Comparing Tsimshian and Coast Salishan Celts
Ranks

	Site	N	Mean Rank
Length	Tsimshian	54	30.74
	Coast Salish	15	50.33
	Total	69	
thickness	Tsimshian	68	45.57
	Coast Salish	16	29.47
	Total	84	
Widthk	Tsimshian	64	35.34
	Coast Salish	16	61.16
	Total	80	
Lenwid	Tsimshian	51	29.78
	Coast Salish	15	46.13
	Total	66	
Lenthk	Tsimshian	48	25.33
	Coast Salish	15	53.33
	Total	63	

	length	thickness	widthk	lenwid	lenthk
Chi-Square	11.196	5.642	15.807	8.410	26.668
Df	1	1	1	1	1
Asymp. Sig.	0.001	0.018	0.000	0.004	0.000

Table 33 Results of T-Test Comparing Splitting Adzes from Known and Unknown Proveniences
Group Statistics

	site	N	Mean	Std. Deviation	Std. Error Mean
Weight (grams)	provenienced	6	545.38	109.71	44.79
	unprovenienced	24	1080.15	599.97	122.47
Length (cm)	provenienced	9	19.19	2.47	0.82
	unprovenienced	24	20.72	5.24	1.07
Width (cm)	provenienced	18	4.69	0.52	0.12
	unprovenienced	55	4.74	0.73	0.10
Thickness (cm)	provenienced	17	5.92	1.53	0.37
	unprovenienced	50	6.31	1.61	0.23
Width/Thickness	provenienced	16	0.81	0.20	0.05
	unprovenienced	50	0.79	0.23	0.03
Length/Width	provenienced	9	4.22	0.92	0.31
	unprovenienced	24	4.49	1.15	0.24
Length/Thickness	provenienced	9	3.35	0.46	0.15
	unprovenienced	24	3.23	0.78	0.16
Width of Bit Edge (cm)	provenienced	14	3.53	0.64	0.17
	unprovenienced	25	3.80	1.01	0.20
Width of Poll (cm)	provenienced	10	2.79	1.52	0.48
	unprovenienced	13	2.88	1.16	0.32
Width of First Groove (cm)	provenienced	16	3.34	0.69	0.17
	unprovenienced	44	3.64	0.91	0.14
Width of Second Groove (cm)	provenienced	3	3.60	0.49	0.28
	unprovenienced	8	2.71	0.58	0.21
Depth of First Groove (cm)	provenienced	16	0.76	0.33	0.08
	unprovenienced	44	0.91	0.50	0.08
Depth of Second Groove (cm)	provenienced	3	0.73	0.30	0.17
	unprovenienced	7	0.67	0.29	0.11
First Groove Width/Depth	provenienced	16	4.92	1.65	0.41
	unprovenienced	44	4.99	2.35	0.35

		Levene's Test for Equality of Variances				
		F	Sig.	t	df	Sig. (2-tailed)
Weight (grams)	Equal variances assumed	8.905	0.006	-2.147	28	0.041
Length (cm)	Equal variances assumed	4.215	0.049	-0.837	31	0.409
Width (cm)	Equal variances assumed	1.551	0.217	-0.292	71	0.771
Thickness (cm)	Equal variances assumed	0.026	0.872	-0.871	65	0.387
Width/Thickness	Equal variances assumed	0.027	0.871	0.192	64	0.848
Length/Width	Equal variances assumed	1.459	0.236	-0.631	31	0.533
Length/Thickness	Equal variances assumed	0.955	0.336	0.437	31	0.665
Width of Bit Edge (cm)	Equal variances assumed	2.429	0.128	-0.896	37	0.376
Width of Poll (cm)	Equal variances assumed	2.678	0.117	-0.147	21	0.884
Width of First Groove (cm)	Equal variances assumed	2.762	0.102	-1.172	58	0.246
Width of Second Groove (cm)	Equal variances assumed	0.276	0.612	2.344	9	0.044
Depth of First Groove (cm)	Equal variances assumed	5.164	0.027	-1.115	58	0.270
Depth of Second Groove (cm)	Equal variances assumed	0.001	0.983	0.300	8	0.772
First Groove Width/Depth	Equal variances assumed	2.031	0.160	-0.118	58	0.907

Table 34 Results of Kruskal-Wallace Test Comparing Splitting Adzes from Known and Unknown Provenience Ranks

	Site	N	Mean Rank
Weight (grams)	provenienced	6	7.33
	unprovenienced	24	17.54
	Total	30	
Length (cm)	provenienced	9	15.44
	unprovenienced	24	17.58
	Total	33	
Depth of First Groove (cm)	provenienced	16	27.47
	unprovenienced	44	31.60
	Total	60	

	Weight (grams)	Length (cm)	Depth of First Groove (cm)
Chi-Square	6.454	0.320	0.658
Df	1	1	1
Asymp. Sig.	0.011	0.571	0.417

Table 35 Summary Statistics for Splitting Adzes

Variable	N	Minimum	Maximum	Mean	Median	St. Deviation
Weight	30	346.20	2545.20	973.19	745.95	578.70
Length	33	12.04	31.70	20.31	19.63	4.66
Width	73	2.81	7.43	4.73	4.67	0.68
Thickness	67	3.64	10.61	6.21	5.97	1.59
Width/Thickness	66	0.50	1.85	0.80	0.76	0.22
Length/Width	33	2.61	6.72	4.36	4.21	1.11
Length/Thickness	33	2.32	5.43	3.33	3.09	0.77
Bit Width	39	1.50	6.27	3.70	3.55	0.90
Poll Width	23	1.01	5.38	2.84	2.51	1.30
Groove 1 Width	60	1.75	5.48	3.57	3.54	0.86
Groove 2 Width	10	1.89	4.17	2.93	2.98	0.71
Groove 1 Depth	60	0.26	2.13	0.88	0.79	0.46
Groove 2 Depth	9	0.23	1.10	0.67	0.71	0.29
Groove Width/Depth	60	1.95	11.97	4.92	4.76	2.16

Table 36 Results of T-Test Comparing Single and Double-Grooved Splitting Adzes
Group Statistics

	Numgrvs	N	Mean	Std. Deviation	Std. Error Mean
Weight (grams)	single-grooved adze	27	1016.19	594.80	114.47
	double-grooved adze	3	586.23	84.70	48.90
Length (cm)	single-grooved adze	30	20.53	4.81	0.88
	double-grooved adze	3	18.06	2.12	1.23
Width (cm)	single-grooved adze	51	4.76	0.69	0.10
	double-grooved adze	10	4.64	0.83	0.26
Thickness (cm)	single-grooved adze	49	6.39	1.61	0.23
	double-grooved adze	10	6.03	0.78	0.25
Width/Thickness	single-grooved adze	49	0.78	0.22	0.03
	double-grooved adze	10	0.78	0.17	0.05
Length/Width	single-grooved adze	30	4.41	1.11	0.20
	double-grooved adze	3	4.54	1.02	0.59
Length/Thickness	single-grooved adze	30	3.27	0.73	0.13
	double-grooved adze	3	3.18	0.45	0.26
Width of Bit Edge (cm)	single-grooved adze	27	3.72	0.98	0.19
	double-grooved adze	4	3.96	0.98	0.49
Width of Poll (cm)	single-grooved adze	18	3.06	1.37	0.32
	double-grooved adze	4	2.02	0.69	0.34
Width of First Groove (cm)	single-grooved adze	50	3.75	0.80	0.11
	double-grooved adze	10	2.68	0.48	0.15
Width of Second Groove (cm)	single-grooved adze	0(a)	.	.	.
	double-grooved adze	9	2.93	0.75	0.25
Depth of First Groove (cm)	single-grooved adze	50	0.95	0.47	0.07
	double-grooved adze	10	0.54	0.22	0.07
Depth of Second Groove (cm)	single-grooved adze	0(a)	.	.	.
	double-grooved adze	8	0.70	0.30	0.11
First Groove Width/Depth	single-grooved adze	50	4.83	2.29	0.32
	double-grooved adze	10	5.39	1.39	0.44

		Levene's Test for Equality of Variances				
		F	Sig.	t	df	Sig. (2-tailed)
Weight (grams)	Equal variances assumed	4.297	0.047	1.232	28	0.228
Length (cm)	Equal variances assumed	1.353	0.254	0.873	31	0.389
Width (cm)	Equal variances assumed	0.373	0.544	0.519	59	0.606
Thickness (cm)	Equal variances assumed	5.414	0.024	0.683	57	0.498
Width/Thickness	Equal variances assumed	0.628	0.432	0.061	57	0.952
Length/Width	Equal variances assumed	0.176	0.677	-0.197	31	0.845
Length/Thickness	Equal variances assumed	0.591	0.448	0.211	31	0.835
Width of Bit Edge (cm)	Equal variances assumed	0.000	0.990	-0.462	29	0.648
Width of Poll (cm)	Equal variances assumed	3.455	0.078	1.467	20	0.158
Width of First Groove (cm)	Equal variances assumed	2.831	0.098	4.059	58	0.000
Depth of First Groove (cm)	Equal variances assumed	5.291	0.025	2.648	58	0.010
First Groove Width/Depth	Equal variances assumed	1.162	0.285	-0.746	58	0.459

Table 37 Results of Kruskal-Wallace Test Comparing Single and Double-Grooved Splitting Adzes
Ranks

	numgrvs	N	Mean Rank
Weight (grams)	single-grooved adze	27	16.22
	double-grooved adze	3	9.00
	Total	30	
Thickness (cm)	single-grooved adze	49	30.38
	double-grooved adze	10	28.15
	Total	59	
Depth of First Groove (cm)	single-grooved adze	50	33.32
	double-grooved adze	10	16.40
	Total	60	

	Weight (grams)	Thickness (cm)	Depth of First Groove (cm)
Chi-Square	1.817	.140	7.825
Df	1	1	1
Asymp. Sig.	0.178	0.709	0.005

Table 38 Results of ANOVA Comparing Splitting Adzes According to Direction of Taper Test of Homogeneity of Variances

	Levene Statistic	df1	df2	Sig.
Weight (grams)	2.572	3	26	0.076
Length (cm)	1.170	3	29	0.338
Width (cm)	0.911	3	66	0.441
Thickness (cm)	1.988	3	61	0.125
Width/Thickness	2.449	3	60	0.072
Length/Width	3.332	3	29	0.033
Length/Thickness	1.402	3	29	0.262
Width of Bit Edge (cm)	0.975	3	34	0.416
Width of Poll (cm)	0.338	2	19	0.718
Width of First Groove (cm)	2.524	3	55	0.067
Depth of First Groove (cm)	1.558	3	55	0.210
First Groove Width/Depth	5.445	3	55	0.002

		Sum of Squares	df	Mean Square	F	Sig.
Weight (grams)	Between Groups	2227864.986	3	742621.662	2.580	0.075
	Within Groups	7484132.473	26	287851.249		
	Total	9711997.459	29			
Length (cm)	Between Groups	111.171	3	37.057	1.839	0.162
	Within Groups	584.401	29	20.152		
	Total	695.571	32			
Width (cm)	Between Groups	1.511	3	0.504	1.067	0.369
	Within Groups	31.151	66	0.472		
	Total	32.661	69			
Thickness (cm)	Between Groups	36.828	3	12.276	6.059	0.001
	Within Groups	123.598	61	2.026		
	Total	160.426	64			
Width/Thickness	Between Groups	0.305	3	0.102	2.234	0.094
	Within Groups	2.728	60	0.045		
	Total	3.033	63			
Length/Width	Between Groups	0.312	3	0.104	.080	0.970
	Within Groups	37.573	29	1.296		
	Total	37.886	32			
Length/Thickness	Between Groups	1.360	3	0.453	.911	0.448
	Within Groups	14.436	29	0.498		
	Total	15.796	32			
Width of Bit Edge (cm)	Between Groups	7.469	3	2.490	3.653	0.022
	Within Groups	23.174	34	0.682		
	Total	30.644	37			
Width of Poll (cm)	Between Groups	13.609	3	4.536	3.665	0.031
	Within Groups	23.519	19	1.238		
	Total	37.128	22			
Width of First Groove (cm)	Between Groups	2.389	3	0.796	1.049	0.378
	Within Groups	41.742	55	0.759		
	Total	44.130	58			
Depth of First Groove (cm)	Between Groups	1.365	3	0.455	2.189	0.100
	Within Groups	11.432	55	0.208		
	Total	12.796	58			
First Groove Width/Depth	Between Groups	57.397	3	19.132	4.809	0.005
	Within Groups	218.804	55	3.978		
	Total	276.201	58			

Table 39 Results of Kruskal-Wallace Test Comparing Splitting Adzes According to Direction of Taper
Ranks

	taperbitpoll	N	Mean Rank
Length/Width	No Taper	7	15.14
	Taper Towards Bit Edge	3	15.67
	Taper Towards Poll	14	17.04
	Taper Towards Bit Edge and Poll	9	18.83
	Total	33	
First Groove Width/Depth	No Taper	10	37.70
	Taper Towards Bit Edge	6	43.25
	Taper Towards Poll	31	27.95
	Taper Towards Bit Edge and Poll	12	22.25
	Total	59	

	Length/Width	First Groove Width/Depth
Chi-Square	0.639	8.465
Df	3	3
Asymp. Sig.	0.887	0.037

Table 40 Results of ANOVA Comparing Splitting Adzes According to Poll Shape
Test of Homogeneity of Variances

	Levene Statistic	df1	df2	Sig.
Weight (grams)	3.805	2	27	0.035
Length (cm)	1.105	2	29	0.345
Width (cm)	1.834	2	55	0.169
Thickness (cm)	1.732	2	53	0.187
Width/Thickness	2.846	2	53	0.067
Length/Width	1.435	2	29	0.255
Length/Thickness	3.219	2	29	0.055
Width of Bit Edge (cm)	4.202	2	24	0.027
Width of Poll (cm)	1.909	2	18	0.177
Width of First Groove (cm)	1.912	2	49	0.159
Depth of First Groove (cm)	4.598	2	49	0.015
First Groove Width/Depth	0.610	2	49	0.547

		Sum of Squares	df	Mean Square	F	Sig.
Weight (grams)	Between Groups	973360.847	2	486680.424	1.504	0.240
	Within Groups	8738636.611	27	323653.208		
	Total	9711997.459	29			
Length (cm)	Between Groups	105.391	2	52.696	2.698	0.084
	Within Groups	566.369	29	19.530		
	Total	671.760	31			
Width (cm)	Between Groups	1.095	2	0.547	1.155	0.323
	Within Groups	26.074	55	0.474		
	Total	27.169	57			
Thickness (cm)	Between Groups	26.957	2	13.478	6.108	0.004
	Within Groups	116.950	53	2.207		
	Total	143.907	55			
Width/Thickness	Between Groups	0.547	2	0.274	7.378	0.001
	Within Groups	1.965	53	0.037		
	Total	2.512	55			
Length/Width	Between Groups	10.770	2	5.385	6.203	0.006
	Within Groups	25.179	29	0.868		
	Total	35.949	31			
Length/Thickness	Between Groups	1.221	2	0.611	1.216	0.311
	Within Groups	14.567	29	0.502		
	Total	15.788	31			
Width of Bit Edge (cm)	Between Groups	4.227	2	2.113	2.927	0.073
	Within Groups	17.327	24	0.722		
	Total	21.554	26			
Width of Poll (cm)	Between Groups	12.276	2	6.138	5.647	0.012
	Within Groups	19.566	18	1.087		
	Total	31.842	20			
Width of First Groove (cm)	Between Groups	3.766	2	1.883	2.513	0.091
	Within Groups	36.721	49	0.749		
	Total	40.487	51			
Depth of First Groove (cm)	Between Groups	1.386	2	0.693	3.534	0.037
	Within Groups	9.606	49	0.196		
	Total	10.992	51			
First Groove Width/Depth	Between Groups	10.720	2	5.360	1.552	0.222
	Within Groups	169.230	49	3.454		
	Total	179.950	51			

Table 41 Results of Kruskal-Wallace Test Comparing Splitting Adzes According to Poll Shape

Ranks

	pollshape	N	Mean Rank
Weight (grams)	Straight Poll	9	14.00
	Convex Poll	12	14.67
	Pointed Poll	9	18.11
	Total	30	
Length/Thickness	Straight Poll	10	18.50
	Convex Poll	13	16.23
	Pointed Poll	9	14.67
	Total	32	
Depth of First Groove (cm)	Straight Poll	15	19.83
	Convex Poll	25	27.68
	Pointed Poll	12	32.38
	Total	52	

	Weight (grams)	Length/Thickness	Depth of First Groove (cm)
Chi-Square	1.161	0.809	4.860
Df	2	2	2
Asymp. Sig.	0.560	0.667	0.088

Table 42 Results of T-Test Comparing Splitting Adzes with Heavy-Squared and Rounded-Polls
Group Statistics

	polldetail	N	Mean	Std. Deviation	Std. Error Mean
Weight (grams)	Heavy-Squared	14	952.46	537.07	143.54
	Rounded	15	999.01	651.20	168.14
Length (cm)	Heavy-Squared	16	19.75	4.24	1.06
	Rounded	16	20.94	5.25	1.31
Width (cm)	Heavy-Squared	25	4.63	0.62	0.12
	Rounded	35	4.86	0.76	0.13
Thickness (cm)	Heavy-Squared	25	6.35	1.67	0.33
	Rounded	33	6.44	1.52	0.27
Width/Thickness	Heavy-Squared	25	0.77	0.22	0.04
	Rounded	33	0.79	0.23	0.04
Length/Width	Heavy-Squared	16	4.50	1.10	0.27
	Rounded	16	4.34	1.14	0.29
Length/Thickness	Heavy-Squared	16	3.02	0.51	0.13
	Rounded	16	3.54	0.80	0.20
Width of Bit Edge (cm)	Heavy-Squared	17	3.38	0.80	0.19
	Rounded	14	4.19	1.00	0.27
Width of Poll (cm)	Heavy-Squared	7	2.91	1.67	0.63
	Rounded	16	2.81	1.17	0.29
Width of First Groove (cm)	Heavy-Squared	24	3.60	0.94	0.19
	Rounded	31	3.52	0.82	0.15
Width of Second Groove (cm)	Heavy-Squared	3	2.89	0.88	0.51
	Rounded	6	3.04	0.68	0.28
Depth of First Groove (cm)	Heavy-Squared	24	0.88	0.54	0.11
	Rounded	31	0.87	0.41	0.07
Depth of Second Groove (cm)	Heavy-Squared	2	0.85	0.01	0.01
	Rounded	6	0.77	0.25	0.10
First Groove Width/Depth	Heavy-Squared	24	5.44	2.83	0.58
	Rounded	31	4.59	1.53	0.27

		Levene's Test for Equality of Variances				
		F	Sig.	t	df	Sig. (2-tailed)
Weight (grams)	Equal variances assumed	0.962	0.335	-0.209	27	0.836
Length (cm)	Equal variances assumed	0.455	0.505	-0.707	30	0.485
Width (cm)	Equal variances assumed	0.379	0.540	-1.279	58	0.206
Thickness (cm)	Equal variances assumed	0.005	0.945	-0.220	56	0.827
Width/Thickness	Equal variances assumed	0.041	0.839	-0.320	56	0.750
Length/Width	Equal variances assumed	0.000	0.997	0.401	30	0.692
Length/Thickness	Equal variances assumed	2.417	0.130	-2.217	30	0.034
Width of Bit Edge (cm)	Equal variances assumed	1.627	0.212	-2.511	29	0.018
Width of Poll (cm)	Equal variances assumed	1.348	0.259	0.175	21	0.863
Width of First Groove (cm)	Equal variances assumed	0.017	0.897	0.351	53	0.727
Width of Second Groove (cm)	Equal variances assumed	0.457	0.521	-0.280	7	0.788
Depth of First Groove (cm)	Equal variances assumed	3.605	0.063	0.064	53	0.949
Depth of Second Groove (cm)	Equal variances assumed	6.118	0.048	0.425	6	0.686
First Groove Width/Depth	Equal variances assumed	12.526	0.001	1.434	53	0.158

Table 43 Results of Kruskal-Wallace Test Comparing Splitting Adzes with Heavy-Squared and Rounded-Polls

Ranks

	polldetail	N	Mean Rank
Depth of Second Groove (cm)	Heavy-Squared	2	4.50
	Rounded	6	4.50
	Total	8	
First Groove Width/Depth	Heavy-Squared	24	29.21
	Rounded	31	27.06
	Total	55	

	Depth of Second Groove (cm)	First Groove Width/Depth
Chi-Square	0.000	0.242
Df	1	1
Asymp. Sig.	1.000	0.623

Table 44 Summary of Characteristics Describing Drucker's Sub-Types of Splitting Adzes

Drucker's Sub-Types	Diagnostic Characteristics
Type I	Elliptical Cross-Section (wider than high) Rounded Poll
Type II	Rectanguloid Cross-Section (much higher than wide) Heavy-Squared Poll from front to back Height as great or greater than at shoulder giving a triangular profile
Type III	Rectanguloid Cross-Section Poll Laterally Narrowed Poll Rounded from front to back
Type IV	Rectanguloid Cross-Section Width and Height nearly equal Heavy-Squared Poll from front to back
Type V	Rectanguloid Cross-Section Width and Height nearly equal Poll Rounded from front to back
Type VI	Long and slender Rectangular with rounded corners to cylindrical in Cross-Section
Type VII	Very Crude and often Asymmetrical Frequently only Bit Ends are Worked Rudely Pecked Polls Usually Lack Well-defined Hafting Grooves

(Source: Drucker 1943:44-46)

Table 45 Results of ANOVA Comparing Drucker's Sub-Types of Splitting Adzes
Test of Homogeneity of Variances

	Levene Statistic	df1	df2	Sig.
Weight (grams)	2.278	4	23	0.092
Length (cm)	3.216	4	26	0.029
Width (cm)	2.650	5	51	0.033
Thickness (cm)	4.256	5	49	0.003
Width/Thickness	3.711	5	49	0.006
Length/Width	3.869	4	26	0.013
Length/Thickness	4.902	4	26	0.004
Width of Bit Edge (cm)	3.944	4	24	0.013
Widht of Poll (cm)	2.347	3	15	0.114
Width of First Groove (cm)	2.024	5	47	0.092
Depth of First Groove (cm)	4.825	5	47	0.001
First Groove Width/Depth	3.381	5	47	0.011

		Sum of Squares	df	Mean Square	F	Sig.
Weight (grams)	Between Groups	1309642.220	5	261928.444	0.741	0.601
	Within Groups	8133504.298	23	353630.622		
	Total	9443146.518	28			
Length (cm)	Between Groups	197.970	5	39.594	2.410	0.064
	Within Groups	427.154	26	16.429		
	Total	625.124	31			
Width (cm)	Between Groups	1.239	5	0.248	0.466	0.800
	Within Groups	27.109	51	0.532		
	Total	28.348	56			
Thickness (cm)	Between Groups	65.443	5	13.089	9.243	0.000
	Within Groups	69.389	49	1.416		
	Total	134.832	54			
Width/Thickness	Between Groups	1.402	5	0.280	11.571	0.000
	Within Groups	1.188	49	0.024		
	Total	2.590	54			
Length/Width	Between Groups	12.258	5	2.452	2.815	0.037
	Within Groups	22.647	26	0.871		
	Total	34.904	31			
Length/Thickness	Between Groups	9.404	5	1.881	8.522	0.000
	Within Groups	5.738	26	0.221		
	Total	15.142	31			
Width of Bit Edge (cm)	Between Groups	4.854	5	0.971	1.029	0.423
	Within Groups	22.641	24	0.943		
	Total	27.495	29			
Widht of Poll (cm)	Between Groups	19.866	5	3.973	4.031	0.016
	Within Groups	14.785	15	0.986		
	Total	34.652	20			
Width of First Groove (cm)	Between Groups	6.750	5	1.350	2.147	0.076
	Within Groups	29.548	47	0.629		
	Total	36.298	52			
Depth of First Groove (cm)	Between Groups	4.373	5	0.875	5.841	0.000
	Within Groups	7.037	47	0.150		
	Total	11.410	52			
First Groove Width/Depth	Between Groups	131.723	5	26.345	11.591	0.000
	Within Groups	106.826	47	2.273		
	Total	238.550	52			

Table 46 Results of Kruskal-Wallace Test Comparing Drucker's Sub-Types of Splitting Adzes
Ranks

	Drucker	N	Mean Rank
Length (cm)	Type II	9	20.67
	Type III	8	19.88

	Type IV	5	5.40
	Type V	7	15.64
	Type VI	2	22.75
	Type VII	1	1.00
	Total	32	
Width (cm)	Type II	11	28.27
	Type III	14	30.29
	Type IV	10	28.05
	Type V	12	31.21
	Type VI	7	22.14
	Type VII	3	36.00
	Total	57	
Thickness (cm)	Type II	11	41.45
	Type III	14	37.00
	Type IV	10	22.30
	Type V	10	13.40
	Type VI	7	28.14
	Type VII	3	4.00
	Total	55	
Width/Thickness	Type II	11	13.82
	Type III	14	20.00
	Type IV	10	35.55
	Type V	10	40.90
	Type VI	7	26.93
	Type VII	3	51.67
	Total	55	
Length/Width	Type II	9	20.06
	Type III	8	19.25
	Type IV	5	7.80
	Type V	7	14.50
	Type VI	2	26.00
	Type VII	1	1.00
	Total	32	
Length/Thickness	Type II	9	9.67
	Type III	8	15.88
	Type IV	5	9.20
	Type V	7	27.71
	Type VI	2	26.00
	Type VII	1	22.00
	Total	32	
Width of Bit Edge (cm)	Type II	8	14.06
	Type III	8	14.25
	Type IV	5	10.30
	Type V	6	19.17
	Type VI	2	22.50
	Type VII	1	27.00
	Total	30	

Depth of First Groove (cm)	Type II	10	36.70
	Type III	12	37.29
	Type IV	10	21.65
	Type V	12	18.46
	Type VI	7	24.64
	Type VII	2	3.00
	Total	53	
First Groove Width/Depth	Type II	10	16.05
	Type III	12	20.13
	Type IV	10	32.10
	Type V	12	34.29
	Type VI	7	27.36
	Type VII	2	52.50
	Total	53	

	Length (cm)	Width (cm)	Thickness (cm)	Width/ Thickness	Length/ Width	Length/ Thickness	Width of Bit Edge (cm)	Depth of First Groove (cm)	First Groove Width/ Depth
Chi-Square	13.490	2.079	28.481	27.447	11.385	20.237	6.132	19.146	16.629
df	5	5	5	5	5	5	5	5	5
Asymp. Sig.	0.019	0.838	0.000	0.000	0.044	0.001	0.294	0.002	0.005

Table 47 Results of Tukey's Test Comparing Drucker's Sub-Types of Splitting Adzes
Multiple Comparisons

Dependent Variable	(I) Drucker	(J) Drucker	Mean Difference (I-J)	Std. Error	Sig.
Weight (grams)	Type II	Type III	-123.13	288.96	0.993
		Type IV	434.78	396.44	0.806
		Type V	316.91	313.42	0.848
		Type VI	138.28	464.87	0.998
	Type III	Type II	123.13	288.96	0.993
		Type IV	557.91	402.59	0.642
		Type V	440.05	321.16	0.652
		Type VI	261.41	470.13	0.980
	Type IV	Type II	-434.78	396.45	0.806
		Type III	-557.91	402.59	0.642
		Type V	-117.87	420.49	0.999
		Type VI	-296.50	542.86	0.981
	Type V	Type II	-316.91	313.42	0.848
		Type III	-440.05	321.16	0.652
		Type IV	117.87	420.49	0.999
		Type VI	-178.63	485.54	0.996
	Type VI	Type II	-138.28	464.87	0.998
		Type III	-261.41	470.13	0.980

		Type IV	296.50	542.86	0.981
		Type V	178.63	485.54	0.996
Length (cm)	Type II	Type III	-1.06	1.97	0.982
		Type IV	5.19	2.26	0.178
		Type V	1.27	2.04	0.971
		Type VI	-2.61	3.17	0.921
	Type III	Type II	1.06	1.97	0.982
		Type IV	6.25	2.31	0.080
		Type V	2.33	2.10	0.800
		Type VI	-1.55	3.20	0.988
	Type IV	Type II	-5.19	2.26	0.178
		Type III	-6.25	2.31	0.080
		Type V	-3.92	2.37	0.479
		Type VI	-7.80	3.39	0.177
	Type V	Type II	-1.27	2.04	0.971
		Type III	-2.33	2.10	0.800
		Type IV	3.92	2.37	0.479
		Type VI	-3.88	3.25	0.755
	Type VI	Type II	2.61	3.17	0.921
		Type III	1.55	3.20	0.988
		Type IV	7.80	3.39	0.177
		Type V	3.88	3.25	0.755
Width (cm)	Type II	Type III	-0.07	0.29	0.999
		Type IV	-0.07	0.32	1.000
		Type V	-0.30	0.30	0.859
		Type VI	0.13	0.35	0.995
	Type III	Type II	0.07	0.29	0.999
		Type IV	0.01	0.30	1.000
		Type V	-0.23	0.28	0.931
		Type VI	0.21	0.34	0.971
	Type IV	Type II	0.07	0.32	1.000
		Type III	-0.01	0.30	1.000
		Type V	-0.23	0.31	0.945
		Type VI	0.20	0.36	0.979
	Type V	Type II	0.30	0.30	0.859
		Type III	0.23	0.28	0.931
		Type IV	0.23	0.31	0.945
		Type VI	0.43	0.34	0.718
	Type VI	Type II	-0.13	0.35	0.995
		Type III	-0.21	0.34	0.971
		Type IV	-0.20	0.36	0.979
		Type V	-0.43	0.34	0.718
Thickness (cm)	Type II	Type III	0.39	0.49	0.930
		Type IV	1.92	0.53	0.006
		Type V	2.59	0.53	0.000
		Type VI	1.45	0.59	0.116
	Type III	Type II	-0.39	0.49	0.930
		Type IV	1.53	0.50	0.030
		Type V	2.20	0.50	0.001

		Type VI	1.06	0.56	0.342
	Type IV	Type II	-1.92	0.53	0.006
		Type III	-1.53	0.50	0.030
		Type V	0.67	0.54	0.730
		Type VI	-0.47	0.60	0.933
	Type V	Type II	-2.59	0.53	0.000
		Type III	-2.20	0.50	0.001
		Type IV	-0.67	0.54	0.730
		Type VI	-1.14	0.60	0.327
	Type VI	Type II	-1.45	0.59	0.116
		Type III	-1.06	0.56	0.342
		Type IV	0.47	0.60	0.933
		Type V	1.14	0.60	0.327
Width/Thickness	Type II	Type III	-0.06	0.06	0.888
		Type IV	-0.22	0.07	0.017
		Type V	-0.35	0.07	0.000
		Type VI	-0.14	0.07	0.357
	Type III	Type II	0.06	0.06	0.888
		Type IV	-0.16	0.06	0.098
		Type V	-0.30	0.06	0.000
		Type VI	-0.08	0.07	0.788
	Type IV	Type II	0.22	0.07	0.017
		Type III	0.16	0.06	0.098
		Type V	-0.14	0.07	0.300
		Type VI	0.08	0.08	0.819
	Type V	Type II	0.35	0.07	0.000
		Type III	0.30	0.06	0.000
		Type IV	0.14	0.07	0.300
		Type VI	0.22	0.08	0.048
	Type VI	Type II	0.14	0.07	0.357
		Type III	0.08	0.07	0.788
		Type IV	-0.08	0.08	0.819
		Type V	-0.22	0.08	0.048
Length/Width	Type II	Type III	-0.28	0.45	0.970
		Type IV	1.04	0.52	0.299
		Type V	0.36	0.47	0.936
		Type VI	-1.03	0.73	0.624
	Type III	Type II	0.28	0.45	0.970
		Type IV	1.32	0.53	0.127
		Type V	0.65	0.48	0.672
		Type VI	-0.75	0.74	0.845
	Type IV	Type II	-1.04	0.52	0.299
		Type III	-1.32	0.53	0.127
		Type V	-0.67	0.55	0.735
		Type VI	-2.07	0.78	0.091
	Type V	Type II	-0.36	0.47	0.936
		Type III	-0.65	0.48	0.672
		Type IV	0.67	0.55	0.735
		Type VI	-1.40	0.75	0.361

	Type VI	Type II	1.03	0.73	0.624
		Type III	0.75	0.74	0.845
		Type IV	2.07	0.78	0.091
		Type V	1.40	0.75	0.361
Length/Thickness	Type II	Type III	-0.32	0.23	0.631
		Type IV	-0.01	0.26	1.000
		Type V	-1.38	0.24	0.000
		Type VI	-0.89	0.37	0.140
	Type III	Type II	0.32	0.23	0.631
		Type IV	0.31	0.27	0.783
		Type V	-1.06	0.24	0.002
		Type VI	-0.57	0.37	0.548
	Type IV	Type II	0.01	0.26	1.000
		Type III	-0.31	0.27	0.783
		Type V	-1.37	0.28	0.000
		Type VI	-0.88	0.39	0.200
	Type V	Type II	1.38	0.24	0.000
		Type III	1.06	0.24	0.002
		Type IV	1.37	0.28	0.000
		Type VI	0.49	0.38	0.690
	Type VI	Type II	0.89	0.37	0.140
		Type III	0.57	0.37	0.548
		Type IV	0.88	0.39	0.200
		Type V	-0.49	0.38	0.690
Width of Bit Edge (cm)	Type II	Type III	-0.02	0.49	1.000
		Type IV	0.30	0.55	0.981
		Type V	-0.62	0.52	0.757
		Type VI	-0.51	0.77	0.962
	Type III	Type II	0.02	0.49	1.000
		Type IV	0.33	0.55	0.975
		Type V	-0.60	0.52	0.780
		Type VI	-0.49	0.77	0.967
	Type IV	Type II	-0.30	0.55	0.981
		Type III	-0.33	0.55	0.975
		Type V	-0.93	0.59	0.525
		Type VI	-0.82	0.81	0.851
	Type V	Type II	0.62	0.52	0.757
		Type III	0.60	0.52	0.780
		Type IV	0.93	0.59	0.525
		Type VI	0.11	0.79	1.000
	Type VI	Type II	0.51	0.77	0.962
		Type III	0.49	0.77	0.967
		Type IV	0.82	0.81	0.851
		Type V	-0.11	0.79	1.000
Width of First Groove (cm)	Type II	Type III	-0.49	0.34	0.611
		Type IV	0.36	0.36	0.850
		Type V	0.46	0.34	0.674
		Type VI	0.29	0.39	0.950
	Type III	Type II	0.49	0.34	0.611

		Type IV	0.85	0.34	0.112
		Type V	0.95	0.33	0.043
		Type VI	0.78	0.38	0.264
	Type IV	Type II	-0.36	0.36	0.850
		Type III	-0.85	0.34	0.112
		Type V	0.10	0.34	0.999
		Type VI	-0.07	0.39	1.000
	Type V	Type II	-0.46	0.34	0.674
		Type III	-0.95	0.33	0.043
		Type IV	-0.10	0.34	0.999
		Type VI	-0.17	0.38	0.991
	Type VI	Type II	-0.29	0.39	0.950
		Type III	-0.78	0.38	0.264
		Type IV	0.07	0.39	1.000
		Type V	0.17	0.38	0.991
Depth of First Groove (cm)	Type II	Type III	-0.02	0.17	1.000
		Type IV	0.52	0.17	0.036
		Type V	0.57	0.17	0.011
		Type VI	0.43	0.19	0.190
	Type III	Type II	0.02	0.17	1.000
		Type IV	0.54	0.17	0.018
		Type V	0.59	0.16	0.005
		Type VI	0.45	0.19	0.126
	Type IV	Type II	-0.52	0.17	0.036
		Type III	-0.54	0.17	0.018
		Type V	0.05	0.17	0.998
		Type VI	-0.09	0.19	0.990
	Type V	Type II	-0.57	0.17	0.011
		Type III	-0.59	0.16	0.005
		Type IV	-0.05	0.17	0.998
		Type VI	-0.14	0.19	0.939
	Type VI	Type II	-0.43	0.19	0.190
		Type III	-0.45	0.19	0.126
		Type IV	0.09	0.19	0.990
		Type V	0.14	0.19	0.939
First Groove Width/Depth	Type II	Type III	-0.16	0.65	0.999
		Type IV	-1.90	0.68	0.056
		Type V	-1.50	0.65	0.164
		Type VI	-1.07	0.75	0.617
	Type III	Type II	.16	0.65	0.999
		Type IV	-1.75	0.65	0.073
		Type V	-1.34	0.62	0.214
		Type VI	-0.91	0.72	0.719
	Type IV	Type II	1.90	0.68	0.056
		Type III	1.75	0.65	0.073
		Type V	0.40	0.65	0.971
		Type VI	0.84	0.75	0.798
	Type V	Type II	1.50	0.65	0.164

	Type III	1.34	0.62	0.214
	Type IV	-0.40	0.65	0.971
	Type VI	0.43	0.72	0.975
Type VI	Type II	1.07	0.75	0.617
	Type III	0.91	0.72	0.719
	Type IV	-0.84	0.75	0.798
	Type V	-0.43	0.72	0.975

Table 48 Results of G-Test between Drucker's Sub-Types with Poll Shape side to side

Crosstab

			pollshape			
			Straight Poll	Convex Poll	Pointed Poll	Total
Drucker	Type II	Count	0	5	6	11
		Expected Count	2.8	5.4	2.8	11.0
	Type III	Count	1	8	5	14
		Expected Count	3.6	6.9	3.6	14.0
	Type IV	Count	5	2	0	7
		Expected Count	1.8	3.4	1.8	7.0
	Type V	Count	4	6	0	10
		Expected Count	2.5	4.9	2.5	10.0
	Type VI	Count	2	3	2	7
		Expected Count	1.8	3.4	1.8	7.0
	Type VII	Count	1	1	0	2
		Expected Count	.5	1.0	.5	2.0
Total		Count	13	25	13	51
		Expected Count	13.0	25.0	13.0	51.0

	Value	df	Asymp. Sig. (2-sided)
Pearson Chi-Square	21.972(a)	10	0.015
Likelihood Ratio	27.324	10	0.002
Linear-by-Linear Association	8.979	1	0.003
N of Valid Cases	51		

Table 49 Results of G-Test between Drucker's Sub-Types with Poll Shape front to back
Crosstab

			polldetail		Total
			heavy-squared	rounded	
Drucker	Type II	Count	8	2	10
		Expected Count	4.6	5.4	10.0
	Type III	Count	3	11	14
		Expected Count	6.5	7.5	14.0
	Type IV	Count	9	0	9
		Expected Count	4.2	4.8	9.0
	Type V	Count	1	10	11
		Expected Count	5.1	5.9	11.0
	Type VI	Count	1	5	6
		Expected Count	2.8	3.2	6.0
	Type VII	Count	2	0	2
		Expected Count	.9	1.1	2.0
Total		Count	24	28	52
		Expected Count	24.0	28.0	52.0

	Value	df	Asymp. Sig. (2-sided)
Pearson Chi-Square	29.066(a)	5	0.000
Likelihood Ratio	35.114	5	0.000
Linear-by-Linear Association	2.192	1	0.139
N of Valid Cases	52		

Table 50 Results of G-Test between Drucker's Sub-Types with Direction of Taper

Crosstab

			taperbitpoll				
			No Taper	Taper Towards Bit Edge	Taper Towards Poll	Taper Towards Bit Edge and Poll	Total
Drucker	Type II	Count	1	0	6	4	11
		Expected Count	1.9	1.2	5.8	2.1	11.0
	Type III	Count	2	0	9	3	14
		Expected Count	2.5	1.5	7.4	2.7	14.0
	Type IV	Count	2	5	2	1	10
		Expected Count	1.8	1.1	5.3	1.9	10.0
	Type V	Count	2	1	6	3	12
		Expected Count	2.1	1.3	6.3	2.3	12.0
	Type VI	Count	0	0	7	0	7
		Expected Count	1.2	.7	3.7	1.4	7.0
	Type VII	Count	3	0	0	0	3
		Expected Count	.5	.3	1.6	.6	3.0
Total		Count	10	6	30	11	57
		Expected Count	10.0	6.0	30.0	11.0	57.0

	Value	df	Asymp. Sig. (2-sided)
Pearson Chi-Square	43.212(a)	15	0.000
Likelihood Ratio	38.203	15	0.001
Linear-by-Linear Association	4.571	1	0.033
N of Valid Cases	57		

Table 51 Drucker's Data on Splitting Adzes

	Length (cm)	Width (cm)	Height/Thickness (cm)
Range	11.68 to 27.94	3.81 to 7.62	3.05 to 12.7
Mean Range	15.24 to 20.32	5.08 to 7.59	5.08 to 7.59

(Source Drucker 1943:44)

Table 52 Ames' Data on Splitting Adzes

	Length (mm)	Width (mm)	Height/Thickness (mm)	Weight (mm)
N	27	27	27	27
Mean	68	37	24	351
Std. Deviation	47	20	16	823

(Source Ames 2005:162)

Table 53 Results of T-Test Comparing Tsimshian and Tlingit Splitting Adzes
Group Statistics

	comparison	N	Mean	Std. Deviation	Std. Error Mean
Length (cm)	Tsimshian	33	20.31	4.66	0.81
	Tlingit	5	24.06	9.71	4.34
Width (cm)	Tsimshian	73	4.73	0.68	0.08
	Tlingit	4	3.83	0.24	0.12
Thickness (cm)	Tsimshian	67	6.21	1.59	0.19
	Tlingit	3	7.00	0.50	0.29
Width/Thickness	Tsimshian	66	0.80	0.22	0.03
	Tlingit	3	0.56	0.03	0.02

		Levene's Test for Equality of Variances				
		F	Sig.	t	df	Sig. (2-tailed)
Length (cm)	Equal variances assumed	3.934	0.055	-1.433	36	0.160
Width (cm)	Equal variances assumed	1.929	0.169	2.624	75	0.011
Thickness (cm)	Equal variances assumed	2.916	0.092	-0.853	68	0.396
Width/Thickness	Equal variances assumed	4.202	0.044	1.852	67	0.068

Table 54 Results of Kruskal-Wallace Test Comparing Tsimshian and Tlingit Splitting Adzes
Ranks

	comparison	N	Mean Rank
Length (cm)	Tsimshian	33	18.88
	Tlingit	5	23.60
	Total	38	
Width/Thickness	Tsimshian	66	36.21
	Tlingit	3	8.33
	Total	69	

	Length (cm)	Width/Thickness
Chi-Square	0.784	5.548
Df	1	1
Asymp. Sig.	0.376	0.018

Table 55 Results of T-Test Comparing Tsimshian and Eskimoan Splitting Adzes
Group Statistics

	comparison	N	Mean	Std. Deviation	Std. Error Mean
Length (cm)	Tsimshian	33	20.31	4.66	0.81
	Eskimoan	22	22.87	6.22	1.33
Width (cm)	Tsimshian	73	4.73	0.68	0.08
	Eskimoan	8	5.11	2.01	0.71
Thickness (cm)	Tsimshian	67	6.21	1.59	0.19
	Eskimoan	7	7.53	1.75	0.66
Width/Thickness	Tsimshian	66	0.80	0.22	0.03
	Eskimoan	6	0.58	0.21	0.08
Length/Width	Tsimshian	33	4.42	1.09	0.19
	Eskimoan	7	5.42	1.47	0.56
Length/Thickness	Tsimshian	33	3.27	0.70	0.12
	Eskimoan	7	4.27	1.56	0.59

		Levene's Test for Equality of Variances				
		F	Sig.	t	df	Sig. (2-tailed)
Length (cm)	Equal variances assumed	3.400	0.071	-1.749	53	0.086
Width (cm)	Equal variances assumed	21.670	0.000	-1.163	79	0.248
Thickness (cm)	Equal variances assumed	0.052	0.820	-2.069	72	0.042
Width/Thickness	Equal variances assumed	0.242	0.624	2.375	70	0.020
Length/Width	Equal variances assumed	1.046	0.313	-2.078	38	0.045
Length/Thickness	Equal variances assumed	11.157	0.002	-2.692	38	0.011

Table 56 Results of Kruskal-Wallace Test Comparing Tsimshian and Eskimoan Splitting Adzes
Ranks

	comparison	N	Mean Rank
Width (cm)	Tsimshian	73	41.14
	Eskimoan	8	39.75
	Total	81	
Length/Thickness	Tsimshian	33	18.79
	Eskimoan	7	28.57
	Total	40	

	Width (cm)	Length/Thickness
Chi-Square	0.025	4.045
df	1	1
Asymp. Sig.	0.874	0.044

Table 57 Summary Statistics for Ground Slate Pencils

Variable	N	Minimum	Maximum	Mean	St. Deviation
Weight	2	9.90	15.70	12.80	4.10
Length	2	10.09	14.23	12.16	2.93
Width	26	0.97	1.66	1.33	0.21
Thickness	30	0.61	1.15	0.86	0.13
Width/Thickness	25	1.06	2.18	1.53	0.33

Table 58 Results of T-Test Comparing Ground Slate Pencils and Ground Projectile Points
Group Statistics

	pntpen	N	Mean	Std. Deviation	Std. Error Mean
Width (cm)	Point	86	2.11	0.38	0.04
	Pencil	26	1.33	0.21	0.04
Thickness (cm)	Point	94	0.64	0.15	0.02
	Pencil	30	0.86	0.13	0.02
Width/Thickness	Point	86	3.42	0.96	0.10
	Pencil	25	1.53	0.33	0.07

		Levene's Test for Equality of Variances				
		F	Sig.	t	df	Sig. (2-tailed)
Width (cm)	Equal variances assumed	5.093	0.026	9.805	110	0.000
Thickness (cm)	Equal variances assumed	0.812	0.369	-6.769	122	0.000
Width/Thickness	Equal variances assumed	13.951	0.000	9.635	109	0.000

Table 59 Results of Kruskal-Wallace Test Comparing Ground Slate Pencils and Ground Projectile Points
Ranks

	pntpen	N	Mean Rank
Width (cm)	Point	86	68.58
	Pencil	26	16.54
	Total	112	
Width/Thickness	Point	86	68.10
	Pencil	25	14.36
	Total	111	

	Width (cm)	Width/Thickness
Chi-Square	51.280	54.006
df	1	1
Asymp. Sig.	0.000	0.000

Table 60 Results of T-Test Comparing Ground and Chipped Projectile Points/Bifaces
Group Statistics

	grndchp	N	Mean	Std. Deviation	Std. Error Mean
weight	Ground Projectile Points	17	15.28	6.11	1.48
	Chipped Projectile Points	18	13.38	6.76	1.59
length	Ground Projectile Points	24	10.06	2.68	0.55
	Chipped Projectile Points	20	8.10	2.30	0.51
width	Ground Projectile Points	90	2.08	0.39	0.04
	Chipped Projectile Points	25	2.45	0.52	0.10
thickness	Ground Projectile Points	98	0.65	0.16	0.02
	Chipped Projectile Points	25	0.91	0.23	0.05
widthk	Ground Projectile Points	90	3.36	0.99	0.10
	Chipped Projectile Points	25	2.84	0.87	0.17
lenwid	Ground Projectile Points	24	4.99	1.52	0.31
	Chipped Projectile Points	20	3.50	1.17	0.26
lenthk	Ground Projectile Points	24	15.99	3.76	0.77
	Chipped Projectile Points	20	8.71	1.83	0.41
basalwid	Ground Projectile Points	33	1.23	0.45	0.08
	Chipped Projectile Points	19	1.61	0.85	0.19
widbaswid	Ground Projectile Points	31	1.82	0.67	0.12
	Chipped Projectile Points	19	1.73	0.61	0.14

		Levene's Test for Equality of Variances				
		F	Sig.	t	df	Sig. (2-tailed)
weight	Equal variances assumed	0.023	0.880	0.874	33	0.389
length	Equal variances assumed	0.418	0.522	2.582	42	0.013
width	Equal variances assumed	1.923	0.168	-3.834	113	0.000
thickness	Equal variances assumed	7.069	0.009	-6.729	121	0.000
widthk	Equal variances assumed	0.200	0.656	2.378	113	0.019
lenwid	Equal variances assumed	0.257	0.615	3.574	42	0.001
lenthk	Equal variances assumed	8.457	0.006	7.908	42	0.000
basalwid	Equal variances assumed	4.316	0.043	-2.141	50	0.037
widbaswid	Equal variances assumed	0.073	0.788	0.483	48	0.632

Table 61 Results of Kruskal-Wallace Test Comparing Chipped and Ground Projectile Points/Bifaces Ranks

	grndchp	N	Mean Rank
thickness	Ground Projectile Points	98	53.83
	Chipped Projectile Points	25	94.04
	Total	123	
lenthk	Ground Projectile Points	24	32.08
	Chipped Projectile Points	20	11.00
	Total	44	
basalwid	Ground Projectile Points	33	23.67
	Chipped Projectile Points	19	31.42
	Total	52	

	thickness	lenthk	basalwid
Chi-Square	25.362	29.389	3.158
df	1	1	1
Asymp. Sig.	0.000	0.000	0.076

Table 62 Summary Statistics for Chipped Projectile Points/Bifaces

Variable	N	Minimum	Maximum	Mean	Median	St. Deviation
Weight	18	2.50	26.70	13.38	12.8	6.76
Length	20	4.60	11.90	8.10	8.26	2.30
Width	25	1.87	4.08	2.45	2.27	0.52
Thickness	25	0.54	1.35	0.91	0.88	0.23
Width/Thickness	25	1.66	4.80	2.84	2.83	0.87
Length/Width	20	2.03	5.43	3.50	3.40	1.17
Length/Thickness	20	4.46	12.35	8.71	8.64	1.83
Basal Width	19	0.68	4.08	1.61	1.48	0.85
Width/Basal Width	19	1.00	2.87	1.73	1.60	0.61

Table 63 Results of T-Test Comparing Chipped Points According to Shape of Cross-Section
Group Statistics

	Shape of Cross-Sectrion	N	Mean	Std. Deviation	Std. Error Mean
Weight (grams)	biconvex/hexagonal	8	10.69	8.13	2.88
	diamond	9	15.84	5.01	1.67
Length (cm)	biconvex/hexagonal	9	6.36	1.76	0.59
	diamond	10	9.62	1.67	0.53
Width (cm)	biconvex/hexagonal	14	2.66	0.61	0.16
	diamond	10	2.16	0.16	0.05
Thickness (cm)	biconvex/hexagonal	14	0.80	0.21	0.06
	diamond	10	1.07	0.17	0.05
Width/Thickness	biconvex/hexagonal	14	3.41	0.71	0.19
	diamond	10	2.04	0.26	0.08
Length/Width	biconvex/hexagonal	9	2.45	0.37	0.12
	diamond	10	4.47	0.78	0.25
Length/Thickness	biconvex/hexagonal	9	8.26	2.32	0.77
	diamond	10	9.02	1.36	0.43
Basal Width	biconvex/hexagonal	10	1.87	1.10	0.35
	diamond	8	1.30	0.28	0.10
Width/Basalwidth	biconvex/hexagonal	10	1.71	0.78	0.25
	diamond	8	1.76	0.41	0.15

		Levene's Test for Equality of Variances				
		F	Sig.	t	df	Sig. (2-tailed)
Weight (grams)	Equal variances assumed	1.211	0.288	-1.596	15	0.131
Length (cm)	Equal variances assumed	0.209	0.653	-4.140	17	0.001
Width (cm)	Equal variances assumed	9.668	0.005	2.496	22	0.021
Thickness (cm)	Equal variances assumed	0.216	0.647	-3.365	22	0.003
Width/Thickness	Equal variances assumed	6.134	0.021	5.795	22	0.000
Length/Width	Equal variances assumed	10.315	0.005	-7.040	17	0.000
Length/Thickness	Equal variances assumed	1.358	0.260	-0.884	17	0.389
Basal Width	Equal variances assumed	9.643	0.007	1.416	16	0.176
Width/Basalwidth	Equal variances assumed	7.744	0.013	-0.165	16	0.871

Table 64 Results of Kruskal-Wallace Test Comparing Chipped Projectile Points/Bifaces According to Shape of Cross-Section

Ranks

	Shape of Cross-Sectrion	N	Mean Rank
Width (cm)	biconvex/hexagonal	14	15.18
	diamond	10	8.75
	Total	24	
Width/Thickness	biconvex/hexagonal	14	17.25
	diamond	10	5.85
	Total	24	
Length/Width	biconvex/hexagonal	9	5.00
	diamond	10	14.50
	Total	19	
Basal Width	biconvex/hexagonal	10	10.20
	diamond	8	8.63
	Total	18	
Width/Basalwidth	biconvex/hexagonal	10	8.90
	diamond	8	10.25
	Total	18	

	Width (cm)	Width/Thickness	Length/Width	Basal Width	Width/Basalwidth
Chi-Square	4.826	15.175	13.500	0.387	0.285
df	1	1	1	1	1
Asymp. Sig.	0.028	0.000	0.000	0.534	0.594

Table 65 Results of T-Test Comparing Tsimshian and Eskimoan Chipped Projectile Points/Bifaces Group Statistics

	site2	N	Mean	Std. Deviation	Std. Error Mean
Length (cm)	PRH	19	7.97	2.29	9.53
	Eskimoan	10	7.62	3.36	1.06
Width (cm)	PRH	21	2.31	9.36	0.08
	Eskimoan	9	3.29	1.68	0.56
Length/Width	PRH	19	3.55	1.18	0.27
	Eskimoan	9	2.77	1.42	0.47

		Levene's Test for Equality of Variances				
		F	Sig.	t	df	Sig. (2-tailed)
Length (cm)	Equal variances assumed	0.512	0.480	0.335	27	0.740
Width (cm)	Equal variances assumed	25.032	0.000	-2.598	28	0.015
Length/Width	Equal variances assumed	0.814	0.375	1.537	26	0.136

Table 66 Results of Kruskal-Wallace Test Comparing Tsimshian and Eskimoan Chipped Projectile Points/Bifaces Ranks

	site2	N	Mean Rank
Width (cm)	PRH	21	14.00
	Eskimoan	9	19.00
	Total	30	

	Width (cm)
Chi-Square	2.033
Df	1
Asymp. Sig.	0.154

Table 67 Results of T-Test Comparing Tsimshian and Tlingit Chipped Projectile Points/Bifaces Group Statistics

	site2	N	Mean	Std. Deviation	Std. Error Mean
Length (cm)	PRH	19	7.97	2.29	0.53
	Tlingit	4	7.13	2.14	1.07
Width (cm)	PRH	21	2.31	0.36	0.08
	Tlingit	5	2.92	1.71	0.77
Thickness (cm)	PRH	21	0.93	0.25	0.05
	Tlingit	2	0.65	0.21	0.15
Width/Thickness	PRH	21	2.64	0.76	0.17
	Tlingit	2	2.95	0.64	0.45
Length/Width	PRH	19	3.55	1.18	0.27
	Tlingit	4	2.54	0.74	0.37
Length/Thickness	PRH	19	8.52	1.66	0.38
	Tlingit	1	12.00	.	.

		Levene's Test for Equality of Variances				
		F	Sig.	t	df	Sig. (2-tailed)
Length (cm)	Equal variances assumed	0.288	0.597	0.680	21	0.504
Width (cm)	Equal variances assumed	14.395	0.001	-1.591	24	0.125
Thickness (cm)	Equal variances assumed	0.260	0.615	1.531	21	0.141
Width/Thickness	Equal variances assumed	0.307	0.585	-0.548	21	0.590
Length/Width	Equal variances assumed	2.117	0.160	1.628	21	0.118
Length/Thickness	Equal variances assumed	.	.	-2.043	18	0.056

Table 68 Results of T-Test Comparing Tsimshian and Coast Salishan Chipped Projectile Points/Bifaces Group Statistics

	site2	N	Mean	Std. Deviation	Std. Error Mean
Length (cm)	PRH	19	7.97	2.29	0.53
	Coast Salishan	8	5.30	1.89	0.67
Width (cm)	PRH	21	2.31	0.36	0.08
	Coast Salishan	8	2.42	0.81	0.28
Thickness (cm)	PRH	21	0.93	0.25	0.05
	Coast Salishan	8	0.87	0.63	0.22
Width/Thickness	PRH	21	2.64	0.76	0.17
	Coast Salishan	8	3.41	1.22	0.43
Length/Width	PRH	19	3.55	1.18	0.27
	Coast Salishan	8	2.20	0.31	0.11
Length/Thickness	PRH	19	8.52	1.66	0.38
	Coast Salishan	8	7.50	3.07	1.08

		Levene's Test for Equality of Variances				
		F	Sig.	t	df	Sig. (2-tailed)
Length (cm)	Equal variances assumed	0.248	0.623	2.900	25	0.008
Width (cm)	Equal variances assumed	8.045	0.009	-0.521	27	0.607
Thickness (cm)	Equal variances assumed	3.090	0.090	0.334	27	0.741
Width/Thickness	Equal variances assumed	2.260	0.144	-2.054	27	0.050
Length/Width	Equal variances assumed	10.391	0.004	3.168	25	0.004
Length/Thickness	Equal variances assumed	4.851	0.037	1.134	25	0.268

Table 69 Results of Kruskal-Wallace Test Comparing Tsimshian and Coast Salishan Chipped Projectile Points/Bifaces **Ranks**

	site2	N	Mean Rank
Width (cm)	PRH	21	14.74
	Coast Salishan	8	15.69
	Total	29	
Length/Width	PRH	19	16.84
	Coast Salishan	8	7.25
	Total	27	
Length/Thickness	PRH	19	15.32
	Coast Salishan	8	10.88
	Total	27	

	Width (cm)	Length/Width	Length/Thickness
Chi-Square	0.072	8.222	1.762
df	1	1	1
Asymp. Sig.	0.788	0.004	0.184

Table 70 Summary Statistics for Ground Projectile Points/Bifaces

Variable	N	Minimum	Maximum	Mean	Median	St. Deviation
Weight	16	3.70	25.00	14.85	13.32	6.02
Length	23	5.67	15.19	9.94	10.02	2.66
Width	87	1.19	3.06	2.10	2.07	0.38
Thickness	99	0.33	1.10	0.65	0.62	0.15
Width/Thickness	86	1.58	6.81	3.42	3.34	0.96
Length/Width	23	2.61	7.83	4.81	4.78	1.27
Length/Thickness	23	9.61	25.32	16.07	15.46	3.83
Basal Width	32	0.55	2.49	1.24	1.17	0.46
Width/Basal Width	30	1.00	3.63	1.83	1.70	0.68

Table 71 Results of T-Test Comparing Ground Projectile Points/Bifaces with Biconvex/Flat and Non-Biconvex Cross-Sections

Group Statistics

	xsectemp	N	Mean	Std. Deviation	Std. Error Mean
Width (cm)	biconvex	70	2.15	0.38	0.05
	diamond, rectangular, polygonal, square	10	1.82	0.36	0.11
Thickness (cm)	biconvex	74	0.63	0.14	0.02
	diamond, rectangular, polygonal, square	14	0.77	0.16	0.04
Width/Thickness	biconvex	70	3.54	0.95	0.11
	diamond, rectangular, polygonal, square	9	2.36	0.58	0.19

		Levene's Test for Equality of Variances				
		F	Sig.	t	df	Sig. (2-tailed)
Width (cm)	Equal variances assumed	0.599	0.441	2.540	78	0.013
Thickness (cm)	Equal variances assumed	0.277	0.600	-3.341	86	0.001
Width/Thickness	Equal variances assumed	1.799	0.184	3.634	77	0.001

Table 72 Results of T-Test Comparing Ground Projectile Points/Bifaces with and without Basal Thinning
Group Statistics

	Presence/Absence of Basal Thinning	N	Mean	Std. Deviation	Std. Error Mean
Weight (grams)	No Basal Thinning	5	17.92	6.92	3.09
	Basal Thinning	7	13.24	5.63	2.13
Length (cm)	No Basal Thinning	9	10.06	3.05	1.02
	Basal Thinning	7	9.98	1.78	0.67
Width (cm)	No Basal Thinning	25	2.26	0.41	0.08
	Basal Thinning	16	1.87	0.31	0.08
Thickness (cm)	No Basal Thinning	28	0.61	0.15	0.03
	Basal Thinning	17	0.72	0.16	0.04
Width/Thickness	No Basal Thinning	25	3.89	01.00	0.20
	Basal Thinning	15	2.79	0.73	0.19
Length/Width	No Basal Thinning	9	4.18	0.95	0.32
	Basal Thinning	7	5.54	1.08	0.41
Length/Thickness	No Basal Thinning	9	16.62	3.98	1.33
	Basal Thinning	7	14.65	2.00	0.76
Basal Width	No Basal Thinning	15	1.35	0.56	0.14
	Basal Thinning	10	1.10	0.35	0.11
Width/Basalwidth	No Basal Thinning	14	1.99	0.84	0.22
	Basal Thinning	9	1.62	0.39	0.13

		Levene's Test for Equality of Variances				
		F	Sig.	t	df	Sig. (2-tailed)
Weight (grams)	Equal variances assumed	0.243	0.633	1.293	10	0.225
Length (cm)	Equal variances assumed	4.144	0.061	0.058	14	0.954
Width (cm)	Equal variances assumed	1.462	0.234	3.302	39	0.002
Thickness (cm)	Equal variances assumed	0.050	0.825	-2.196	43	0.034
Width/Thickness	Equal variances assumed	1.434	0.238	3.700	38	0.001
Length/Width	Equal variances assumed	0.079	0.783	-2.663	14	0.019
Length/Thickness	Equal variances assumed	2.533	0.134	1.188	14	0.255
Basal Width	Equal variances assumed	1.634	0.214	1.269	23	0.217
Width/Basalwidth	Equal variances assumed	3.947	0.060	1.244	21	0.227

Table 73 Results of T-Test Comparing Ground Projectile Points/Bifaces with and without Dulled Lateral Edges
Group Statistics

	Presence/Absence of Dulled Lateral Edges	N	Mean	Std. Deviation	Std. Error Mean
Weight (grams)	No Dulled Lateral Edges	4	16.40	8.64	4.32
	Dulled Lateral Edges	8	14.59	5.52	1.95
Length (cm)	No Dulled Lateral Edges	6	8.70	2.95	1.20
	Dulled Lateral Edges	10	10.83	1.91	0.60
Width (cm)	No Dulled Lateral Edges	11	2.08	0.44	0.13
	Dulled Lateral Edges	30	2.12	0.42	0.08
Thickness (cm)	No Dulled Lateral Edges	11	0.63	0.15	0.04
	Dulled Lateral Edges	34	0.66	0.16	0.03
Width/Thickness	No Dulled Lateral Edges	10	3.60	1.04	0.33
	Dulled Lateral Edges	30	3.43	1.06	0.19
Length/Width	No Dulled Lateral Edges	6	4.29	1.50	0.61
	Dulled Lateral Edges	10	5.07	0.94	0.30
Length/Thickness	No Dulled Lateral Edges	6	14.64	3.94	1.61
	Dulled Lateral Edges	10	16.43	2.92	0.92
Basal Width	No Dulled Lateral Edges	8	1.70	0.58	0.20
	Dulled Lateral Edges	17	1.03	0.26	0.06
Width/Basalwidth	No Dulled Lateral Edges	8	1.32	0.31	0.11
	Dulled Lateral Edges	15	2.13	0.71	0.18

		Levene's Test for Equality of Variances				
		F	Sig.	t	df	Sig. (2-tailed)
Weight (grams)	Equal variances assumed	3.021	0.113	0.448	10	0.664
Length (cm)	Equal variances assumed	2.267	0.154	-1.764	14	0.099
Width (cm)	Equal variances assumed	0.177	0.677	-0.237	39	0.814
Thickness (cm)	Equal variances assumed	0.484	0.491	-0.475	43	0.637
Width/Thickness	Equal variances assumed	0.250	0.620	0.437	38	0.665
Length/Width	Equal variances assumed	1.951	0.184	-1.292	14	0.217
Length/Thickness	Equal variances assumed	0.970	0.341	-1.040	14	0.316
Basal Width	Equal variances assumed	7.010	0.014	4.090	23	0.000
Width/Basalwidth	Equal variances assumed	3.320	0.083	-3.045	21	0.006

Table 74 Results of Kruskal-Wallace Test Comparing Ground Projectile Points/Bifaces with and without Dulled Lateral Edges

Ranks

	Presence/Absence of Dulled Lateral Edges	N	Mean Rank
Basal Width	No Dulled Lateral Edges	8	19.00
	Dulled Lateral Edges	17	10.18
	Total	25	

	Basal Width
Chi-Square	7.822
Df	1
Asymp. Sig.	0.005

Table 75 Results of G-Test between Cross-Section Shape and Presence/Absence of Basal Thinning

Crosstab

			Presence/Absence of Basal Thinning		
			No Basal Thinning	Basal Thinning	Total
xsectemp	biconvex	Count	26	14	40
		Expected Count	23.5	16.5	40.0
	diamond, rectangular, polygonal, square	Count	1	5	6
		Expected Count	3.5	2.5	6.0
Total		Count	27	19	46
		Expected Count	27.0	19.0	46.0

	Value	df	Asymp. Sig. (2-sided)	Exact Sig. (2-sided)	Exact Sig. (1-sided)
Pearson Chi-Square	5.027(b)	1	0.025		
Continuity Correction(a)	3.231	1	0.072		
Likelihood Ratio	5.169	1	0.023		
Fisher's Exact Test				0.068	0.036
Linear-by-Linear Association	4.918	1	0.027		
N of Valid Cases	46				

Table 76 Results of ANOVA Comparing Ground Projectile Points/Bifaces Classified According to Strong *et al.'s* Typology

Test of Homogeneity of Variances

	Levene Statistic	df1	df2	Sig.
Width (cm)	0.844	4	26	0.510
Thickness (cm)	1.845	4	26	0.150
Width/Thickness	2.306	4	26	0.085
Basal Width	1.326	4	18	0.298
Width/Basalwidth	6.112	4	18	0.003

		Sum of Squares	df	Mean Square	F	Sig.
Width (cm)	Between Groups	1.382	6	0.230	1.517	0.212
	Within Groups	3.949	26	0.152		
	Total	5.332	32			
Thickness (cm)	Between Groups	0.175	6	0.029	1.274	0.303
	Within Groups	0.596	26	0.023		
	Total	0.771	32			
Width/Thickness	Between Groups	13.886	6	2.314	3.507	0.011
	Within Groups	17.156	26	0.660		
	Total	31.043	32			
Basal Width	Between Groups	2.123	6	0.354	2.008	0.118
	Within Groups	3.172	18	0.176		
	Total	5.296	24			
Width/Basalwidth	Between Groups	2.687	6	0.448	1.057	0.423
	Within Groups	7.623	18	0.424		
	Total	10.310	24			

Table 77 Results of G-Test between Presence/Absence of Stem Element and Presence/Absence of Basal Thinning
strongtemp * Presence/Absence of Basal Thinning Crosstabulation

			Presence/Absence of Basal Thinning		
			No Basal Thinning	Basal Thinning	Total
strongtemp	Non-Stemmed (NA's and NB's)	Count	6	9	15
		Expected Count	8.6	6.4	15.0
	Stemmed (SB's)	Count	6	0	6
		Expected Count	3.4	2.6	6.0
Total		Count	12	9	21
		Expected Count	12.0	9.0	21.0

	Value	df	Asymp. Sig. (2-sided)	Exact Sig. (2-sided)	Exact Sig. (1-sided)
Pearson Chi-Square	6.300(b)	1	0.012		
Continuity Correction(a)	4.088	1	0.043		
Likelihood Ratio	8.492	1	0.004		
Fisher's Exact Test				0.019	0.017
Linear-by-Linear Association	6.000	1	0.014		
N of Valid Cases	21				

Table 78 Results of T-Test Comparing Tsimshian and Eskimoan Ground Projectile Points/Bifaces Group Statistics

	site2	N	Mean	Std. Deviation	Std. Error Mean
Length (cm)	PRH	17	10.55	2.62	0.63
	Eskimoan	3	9.40	3.20	1.85
Width (cm)	PRH	26	2.04	0.41	0.08
	Eskimoan	2	2.35	1.63	1.15
Length/Width	PRH	17	5.08	1.15	0.28
	Eskimoan	2	5.65	2.867	2.02

		Levene's Test for Equality of Variances				
		F	Sig.	t	df	Sig. (2-tailed)
Length (cm)	Equal variances assumed	0.003	0.954	0.683	18	0.503
Width (cm)	Equal variances assumed	19.491	0.000	-0.809	26	0.426
Length/Width	Equal variances assumed	4.404	0.051	-0.577	17	0.572

Table79 Results of T-Test Comparing Tsimshian and Coast Salishan Ground Projectile Points/Bifaces Group Statistics

	site2	N	Mean	Std. Deviation	Std. Error Mean
Length (cm)	PRH	17	10.55	2.62	0.63
	Coast Salishan	14	11.29	5.20	1.39
Width (cm)	PRH	26	2.04	0.41	0.08
	Coast Salishan	15	2.31	0.43	0.11
Thickness (cm)	PRH	26	0.64	0.16	0.03
	Coast Salishan	15	0.66	0.23	0.06
Width/Thickness	PRH	26	3.32	0.75	0.15
	Coast Salishan	15	3.94	1.83	0.47
Length/Width	PRH	17	5.08	1.15	0.28
	Coast Salishan	14	4.71	1.69	0.45
Length/Thickness	PRH	17	16.60	3.77	0.91
	Coast Salishan	14	17.25	5.00	1.34

		Levene's Test for Equality of Variances				
		F	Sig.	t	df	Sig. (2-tailed)
Length (cm)	Equal variances assumed	3.748	0.063	-0.511	29	0.613
Width (cm)	Equal variances assumed	0.698	0.408	-1.944	39	0.059
Thickness (cm)	Equal variances assumed	4.853	0.034	-0.368	39	0.715
Width/Thickness	Equal variances assumed	5.518	0.024	-1.527	39	0.135
Length/Width	Equal variances assumed	1.798	0.190	0.740	29	0.465
Length/Thickness	Equal variances assumed	0.772	0.387	-0.411	29	0.684

Table 80 Results of T-Test Comparing Tsimshian and Tlingit Ground Projectile Points/Bifaces Group Statistics

	site2	N	Mean	Std. Deviation	Std. Error Mean
Length (cm)	PRH	17	10.55	2.62	0.63
	Tlingit	3	15.63	7.62	4.40
Width (cm)	PRH	26	2.04	0.41	0.08
	Tlingit	2	2.80	0.42	0.30
Length/Width	PRH	17	5.08	1.15	0.28
	Tlingit	2	5.83	2.81	1.99

		Levene's Test for Equality of Variances				
		F	Sig.	t	df	Sig. (2-tailed)
Length (cm)	Equal variances assumed	11.775	0.003	-2.292	18	0.034
Width (cm)	Equal variances assumed	0.003	0.954	-2.492	26	0.019
Length/Width	Equal variances assumed	4.157	0.057	-0.759	17	0.458

Table 81 Frequency Table of Celts from Known and Unknown Provenience

		Frequency	Percent	Valid Percent	Cumulative Percent
Valid	Known Provenience	49	61.3	61.3	61.3
	Unknown Provenience	31	38.8	38.8	100.0
	Total	80	100.0	100.0	

Table 82: Frequency Table of Celts from Different Time-Periods

		Frequency	Percent	Valid Percent	Cumulative Percent
Valid	Middle to Late Middle Period	7	8.8	24.1	24.1
	Late Middle to Late Period	9	11.3	31.0	55.2
	Late Period	13	16.3	44.8	100.0
	Total	29	36.3	100.0	
Missing	System	51	63.8		
Total		80	100.0		

Table 83: Frequency Table of Celts with Different Cross-Section Shapes

		Frequency	Percent	Valid Percent	Cumulative Percent
Valid	Oval Cross-Section	37	46.3	50.0	50.0
	Rectangular Cross-Section	37	46.3	50.0	100.0
	Total	74	92.5	100.0	
Missing	System	6	7.5		
Total		80	100.0		

Table 84: Frequency Table of Celts with Different Bit Edge Shapes

		Frequency	Percent	Valid Percent	Cumulative Percent
Valid	Straight Bit Edge	8	10.0	13.3	13.3
	Convex Bit Edge	52	65.0	86.7	100.0
	Total	60	75.0	100.0	
Missing	System	20	25.0		
Total		80	100.0		

Table 85: Frequency Table of Celts with Different Poll Shapes

		Frequency	Percent	Valid Percent	Cumulative Percent
Valid	Straight Poll	30	37.5	46.2	46.2
	Convex Poll	35	43.8	53.8	100.0
	Total	65	81.3	100.0	
Missing	System	15	18.8		
Total		80	100.0		

Table 86: Frequency Table of Celts with Different Amounts of Taper

		Frequency	Percent	Valid Percent	Cumulative Percent
Valid	No Taper	17	21.3	21.8	21.8
	Slight Taper	44	55.0	56.4	78.2
	Sharp Taper	17	21.3	21.8	100.0
	Total	78	97.5	100.0	
Missing	System	2	2.5		
Total		80	100.0		

Table 87: Frequency Table of Celts Tapering in Different Directions

		Frequency	Percent	Valid Percent	Cumulative Percent
Valid	No Taper	17	21.3	21.8	21.8
	Taper Towards Bit Edge	5	6.3	6.4	28.2
	Taper Towards Poll	53	66.3	67.9	96.2
	Taper Towards Both Ends	3	3.8	3.8	100.0
	Total	78	97.5	100.0	
Missing	System	2	2.5		
Total		80	100.0		

Table 88: Frequency Table of Celts Classified According to Drucker's Typology

		Frequency	Percent	Valid Percent	Cumulative Percent
Valid	Type 1a	25	31.3	54.3	54.3
	Type 1b	3	3.8	6.5	60.9
	Type 1c	15	18.8	32.6	93.5
	Type 2a	3	3.8	6.5	100.0
	Total	46	57.5	100.0	
Missing	System	34	42.5		
Total		80	100.0		

Table 89: Frequency Table of Single and Double-Grooved Splitting Adzes

		Frequency	Percent	Valid Percent	Cumulative Percent
Valid	single-grooved adze	51	65.4	83.6	83.6
	double-grooved adze	10	12.8	16.4	100.0
	Total	61	78.2	100.0	
Missing	System	17	21.8		
Total		78	100.0		

Table 90: Frequency Table of Splitting Adzes with Different Cross-Section Shapes

		Frequency	Percent	Valid Percent	Cumulative Percent
Valid	Oval Cross-Section	5	6.4	20.0	20.0
	Rectangular Cross-Section	20	25.6	80.0	100.0
	Total	25	32.1	100.0	
Missing	System	53	67.9		
Total		78	100.0		

Table 91: Frequency Table of Splitting Adzes with Different Bit Edge Shapes

		Frequency	Percent	Valid Percent	Cumulative Percent
Valid	Straight Bit Edge	12	15.4	27.3	27.3
	Convex Bit Edge	32	41.0	72.7	100.0
	Total	44	56.4	100.0	
Missing	System	34	43.6		
Total		78	100.0		

Table 92: Frequency Table of Splitting Adzes with Different Poll Shapes (Side to Side)

		Frequency	Percent	Valid Percent	Cumulative Percent
Valid	Straight Poll	15	19.2	25.9	25.9
	Convex Poll	30	38.5	51.7	77.6
	Pointed Poll	13	16.7	22.4	100.0
	Total	58	74.4	100.0	
Missing	System	20	25.6		
Total		78	100.0		

Table 93: Frequency Table of Splitting Adzes with Different Poll Shapes (Front to Back)

		Frequency	Percent	Valid Percent	Cumulative Percent
Valid	Heavy-Squared	25	32.1	41.7	41.7
	Rounded	35	44.9	58.3	100.0
	Total	60	76.9	100.0	
Missing	System	18	23.1		
Total		78	100.0		

Table 94: Frequency Table of Splitting Adzes with Different Amounts of Taper

		Frequency	Percent	Valid Percent	Cumulative Percent
Valid	No Taper	14	17.9	18.7	18.7
	Slight Taper	59	75.6	78.7	97.3
	Sharp Taper	2	2.6	2.7	100.0
	Total	75	96.2	100.0	
Missing	System	3	3.8		
Total		78	100.0		

Table 95: Frequency Table of Splitting Adzes According to Location of Taper

		Frequency	Percent	Valid Percent	Cumulative Percent
Valid	No Taper	14	17.9	22.2	22.2
	Taper Behind Groove	24	30.8	38.1	60.3
	Taper in Front of Groove	25	32.1	39.7	100.0
	Total	63	80.8	100.0	
Missing	System	15	19.2		
Total		78	100.0		

Table 96: Frequency Table of Splitting Adzes Tapering in Different Directions

		Frequency	Percent	Valid Percent	Cumulative Percent
Valid	No Taper	14	17.9	18.7	18.7
	Taper Towards Bit Edge	14	17.9	18.7	37.3
	Taper Towards Poll	35	44.9	46.7	84.0
	Taper Towards Bit Edge and Poll	12	15.4	16.0	100.0
	Total	75	96.2	100.0	
Missing	System	3	3.8		
Total		78	100.0		

Table 97: Frequency Table of Splitting Adzes Classified According to Drucker's Typology

		Frequency	Percent	Valid Percent	Cumulative Percent
Valid	Type II	11	14.1	19.3	19.3
	Type III	14	17.9	24.6	43.9
	Type IV	10	12.8	17.5	61.4
	Type V	12	15.4	21.1	82.5
	Type VI	7	9.0	12.3	94.7
	Type VII	3	3.8	5.3	100.0
	Total	57	73.1	100.0	
Missing	System	21	26.9		
Total		78	100.0		

Table 98: Frequency Table of Ground Slate Pencils from Different Time-Periods

		Frequency	Percent	Valid Percent	Cumulative Percent
Valid	Middle to Late Middle Period	9	27.3	30.0	30.0
	Late Middle to Late Period	10	30.3	33.3	63.3
	Late Period	11	33.3	36.7	100.0
	Total	30	90.9	100.0	
Missing	System	3	9.1		
Total		33	100.0		

Table 99: Frequency Table of Ground Slate Pencils with Different Cross-Sections

		Frequency	Percent	Valid Percent	Cumulative Percent
Valid	diamond/polygonal	8	24.2	29.6	29.6
	square/rectangular	19	57.6	70.4	100.0
	Total	27	81.8	100.0	
Missing	System	6	18.2		
Total		33	100.0		

Table 100: Frequency Table of Ground Slate Pencils with and without Basal Thinning

		Frequency	Percent	Valid Percent	Cumulative Percent
Valid	No Basal Thinning	14	42.4	42.4	42.4
	Basal Thinning	19	57.6	57.6	100.0
	Total	33	100.0	100.0	

Table 101: Frequency Table of Ground Slate Pencils with and without Dulled Lateral Edges

		Frequency	Percent	Valid Percent	Cumulative Percent
Valid	No Dulled Lateral Edges	29	87.9	87.9	87.9
	Dulled Lateral Edges	4	12.1	12.1	100.0
	Total	33	100.0	100.0	

Table 102: Frequency Table of Chipped Projectile Points/Bifaces from Different Time-Periods

		Frequency	Percent	Valid Percent	Cumulative Percent
Valid	Middle Period to Late Middle Period	4	14.3	21.1	21.1
	Late Middle Period to Late Period	9	32.1	47.4	68.4
	Late Period	6	21.4	31.6	100.0
	Total	19	67.9	100.0	
Missing	System	9	32.1		
Total		28	100.0		

Table 103: Frequency Table of Chipped Projectile Points/Bifaces Classified According to Strong *et al.'s* Typology

		Frequency	Percent	Valid Percent	Cumulative Percent
Valid	NA a	3	10.7	13.6	13.6
	NA b1	3	10.7	13.6	27.3
	NA b2	14	50.0	63.6	90.9
	NA b3	1	3.6	4.5	95.5
	NB a1	1	3.6	4.5	100.0
	Total	22	78.6	100.0	
Missing	System	6	21.4		
Total		28	100.0		

Table 104: Frequency Table of Chipped Projectile Points/Bifaces with Different Cross-Section Shapes

		Frequency	Percent	Valid Percent	Cumulative Percent
Valid	biconvex/hexagonal	16	57.1	59.3	59.3
	diamond	11	39.3	40.7	100.0
	Total	27	96.4	100.0	
Missing	System	1	3.6		
Total		28	100.0		

Table 105: Frequency Table of Chipped Projectile Points/Bifaces with and without Stem Elements

		Frequency	Percent	Valid Percent	Cumulative Percent
Valid	No Stem	26	92.9	92.9	92.9
	Stemmed	2	7.1	7.1	100.0
	Total	28	100.0	100.0	

Table 106: Frequency Table of Chipped Projectile Points/Bifaces with and without Basal Thinning

		Frequency	Percent	Valid Percent	Cumulative Percent
Valid	No Basal Thinning	15	53.6	53.6	53.6
	Basal Thinning	13	46.4	46.4	100.0
	Total	28	100.0	100.0	

Table 107: Frequency Table of Chipped Projectile Points/Bifaces with and without Notches

		Frequency	Percent	Valid Percent	Cumulative Percent
Valid	No Notches	27	96.4	96.4	96.4
	Notches	1	3.6	3.6	100.0
	Total	28	100.0	100.0	

Table 108: Frequency Table of Chipped Projectile Points/Bifaces with Different Base Shapes

		Frequency	Percent	Valid Percent	Cumulative Percent
Valid	straight	12	42.9	50.0	50.0
	convex	8	28.6	33.3	83.3
	concave	4	14.3	16.7	100.0
	Total	24	85.7	100.0	
Missing	System	4	14.3		
Total		28	100.0		

Table 109: Frequency Table of Ground Projectile Points/Bifaces from Different Sites

		Frequency	Percent	Valid Percent	Cumulative Percent
Valid	Baldwin	7	6.7	6.7	6.7
	Boardwal	45	43.3	43.3	50.0
	Dodge Is	3	2.9	2.9	52.9
	Garden I	3	2.9	2.9	55.8
	Kitandic	6	5.8	5.8	61.5
	Knu	2	1.9	1.9	63.5
	Lachane	20	19.2	19.2	82.7
	McNichol	9	8.7	8.7	91.3
	Parizeau	5	4.8	4.8	96.2
	PRH	4	3.8	3.8	100.0
	Total	104	100.0	100.0	

Table 110: Frequency Table of Ground Projectile Points/Bifaces from Different Time-Periods

		Frequency	Percent	Valid Percent	Cumulative Percent
Valid	Middle to Late Middle Period	18	17.3	23.4	23.4
	Late Middle to Late Period	27	26.0	35.1	58.4
	Late Period	32	30.8	41.6	100.0
	Total	77	74.0	100.0	
Missing	System	27	26.0		
Total		104	100.0		

Table 111: Frequency Table of Tsimshian Ground Projectile Points/Bifaces Classified According to Strong *et al.*'s Typology

		Frequency	Percent	Valid Percent	Cumulative Percent
Valid	NAb?	8	7.7	24.2	24.2
	NAb1	5	4.8	15.2	39.4
	NAb2	13	12.5	39.4	78.8
	NB?	1	1.0	3.0	81.8
	NBa1	1	1.0	3.0	84.8
	SBa	2	1.9	6.1	90.9
	SBc	3	2.9	9.1	100.0
	Total	33	31.7	100.0	
Missing	System	71	68.3		
Total		104	100.0		

Table 112: Frequency Table of Ground Projectile Points/Bifaces with Different Cross-Section Shapes

		Frequency	Percent	Valid Percent	Cumulative Percent
Valid	biconvex/hexagonal	75	72.1	81.5	81.5
	diamond	12	11.5	13.0	94.6
	square/rectangular	5	4.8	5.4	100.0
	Total	92	88.5	100.0	
Missing	System	12	11.5		
Total		104	100.0		

Table 113: Frequency Table of Ground Projectile Points/Bifaces with and without Stem Elements

		Frequency	Percent	Valid Percent	Cumulative Percent
Valid	No Stem	43	41.3	87.8	87.8
	Stemmed	6	5.8	12.2	100.0
	Total	49	47.1	100.0	
Missing	System	55	52.9		
Total		104	100.0		

Table 114: Frequency Table of Ground Projectile Points/Bifaces with and without Basal Thinning

		Frequency	Percent	Valid Percent	Cumulative Percent
Valid	No Basal Thinning	30	28.8	61.2	61.2
	Basal Thinning	19	18.3	38.8	100.0
	Total	49	47.1	100.0	
Missing	System	55	52.9		
Total		104	100.0		

Table 115: Frequency Table of Ground Projectile Points/Bifaces with and without Notches

		Frequency	Percent	Valid Percent	Cumulative Percent
Valid	No Notches	44	42.3	89.8	89.8
	Notches	5	4.8	10.2	100.0
	Total	49	47.1	100.0	
Missing	System	55	52.9		
Total		104	100.0		

Table 116: Frequency Table of Ground Projectile Points/Bifaces with and without Dulled Lateral Edges

		Frequency	Percent	Valid Percent	Cumulative Percent
Valid	No Dulled Lateral Edges	13	12.5	26.5	26.5
	Dulled Lateral Edges	36	34.6	73.5	100.0
	Total	49	47.1	100.0	
Missing	System	55	52.9		
Total		104	100.0		

Table 117: Frequency Table of Ground Projectile Points/Bifaces with Different Base Shapes

		Frequency	Percent	Valid Percent	Cumulative Percent
Valid	straight	23	22.1	65.7	65.7
	convex	11	10.6	31.4	97.1
	pointed	1	1.0	2.9	100.0
	Total	35	33.7	100.0	
Missing	System	69	66.3		
Total		104	100.0		

Table 118 Morphological Tendencies of Tsimshian Splitting Adzes Classified According to Drucker's Typology

Drucker's Types	N	Thickness	Width/ Thickness Ratio	Length/ Thickness Ratio	Groove Depth	Shape of Poll – side to side	Shape of Poll – front to back	Direction of Taper
Type II	11	> 6 cm	< 0.8	< 3.5	> 1 cm	Convex or pointed	Heavy-Squared	Towards poll or both ends
Type III	14	> 6 cm	< 0.8	< 3.5	> 0.8 cm	Convex or pointed	Rounded	Towards poll or both ends
Type IV	10	< 6.5 cm	> 0.75	< 3	< 0.9 cm	Straight or convex	Heavy-squared	All directions but tends towards bit edge
Type V	12	< 6 cm	> 0.75	> 3.5	< 0.8 cm	Straight or convex	Rounded	All directions but tends towards poll
Type VI	7	> 5 cm	< 1	N/A	N/A	All shapes	Rounded	Towards poll
Type VII	3	< 5 cm	> 1	N/A	< 0.35 cm	Straight or convex	Heavy-Squared	No taper

FIGURES

Figure 1

Distribution of Bark Shredder Weight

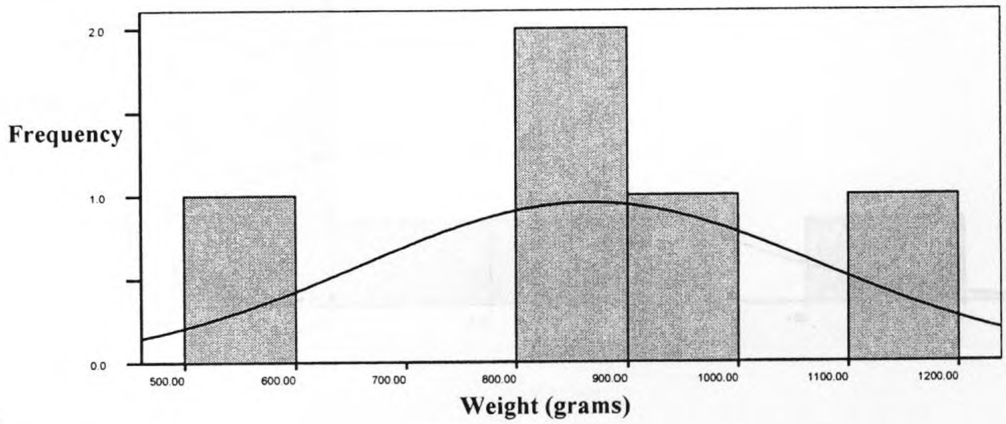


Figure 2

Distribution of Bark Shredder Length

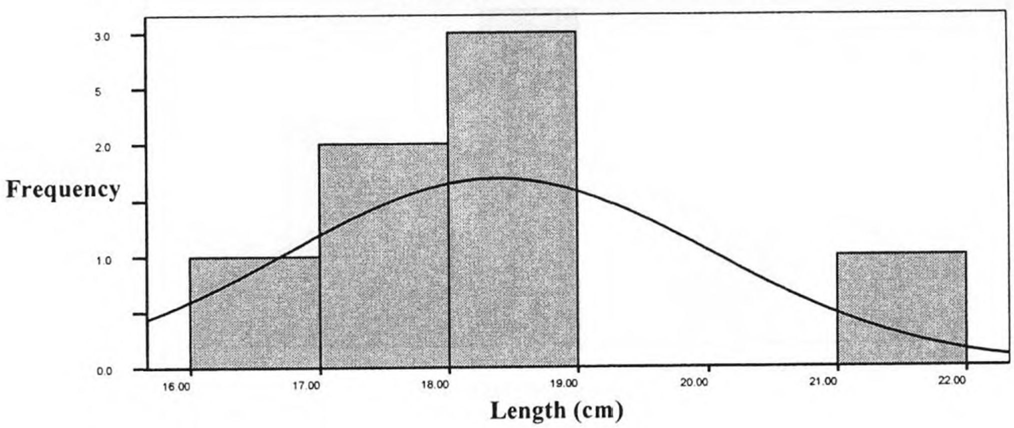


Figure 3

Distribution of Bark Shredder Width

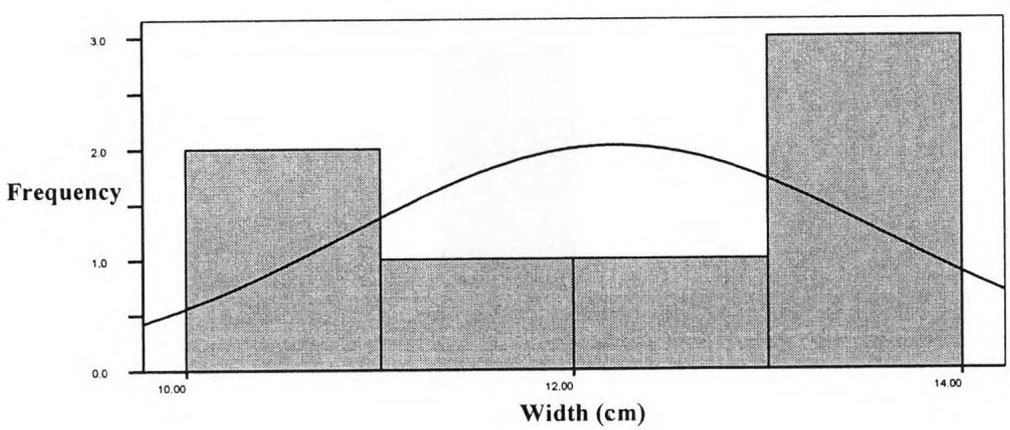


Figure 4

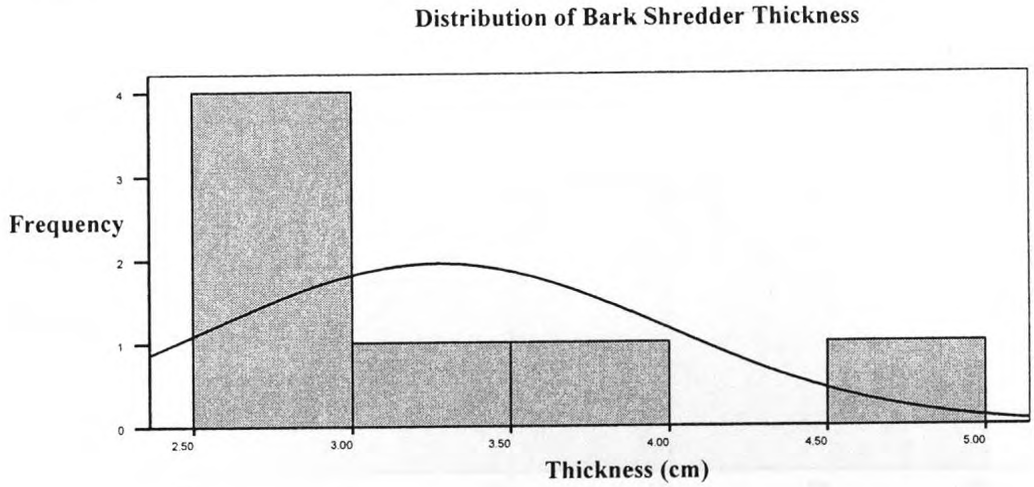


Figure 5

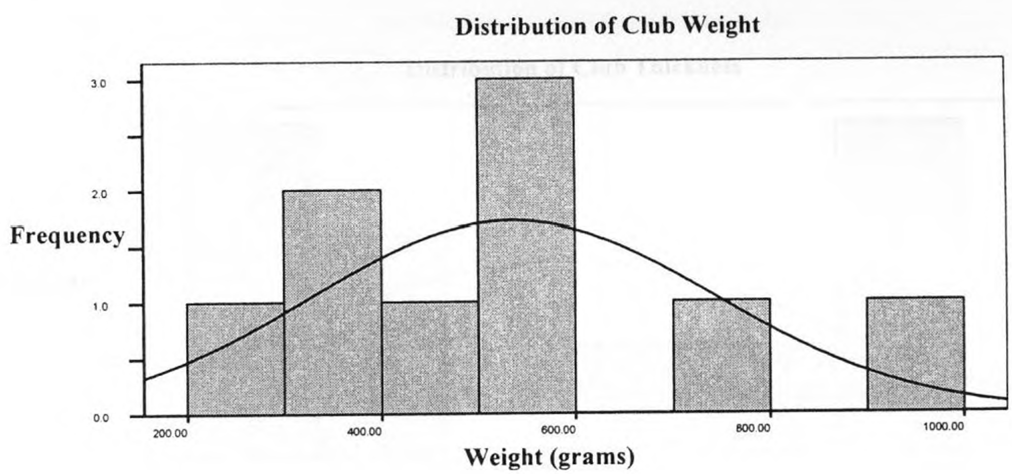


Figure 6

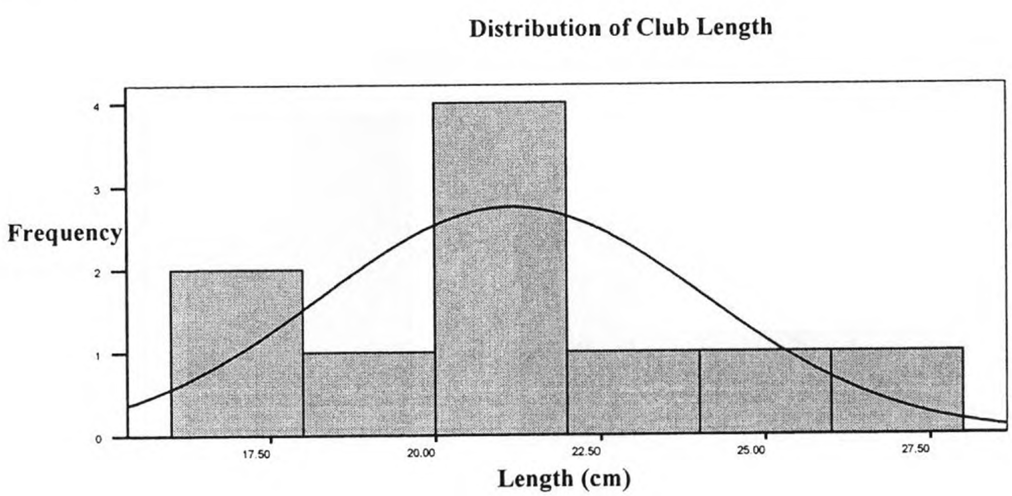


Figure 7

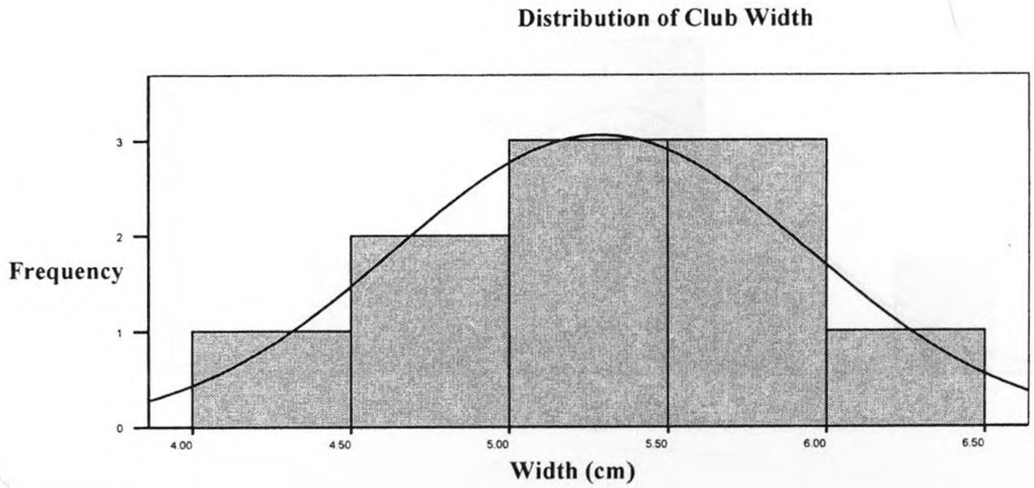


Figure 8

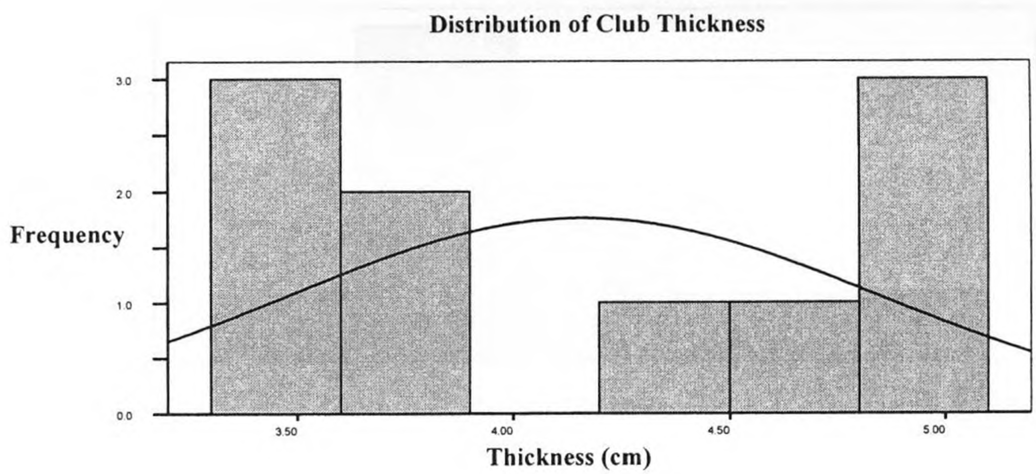


Figure 9

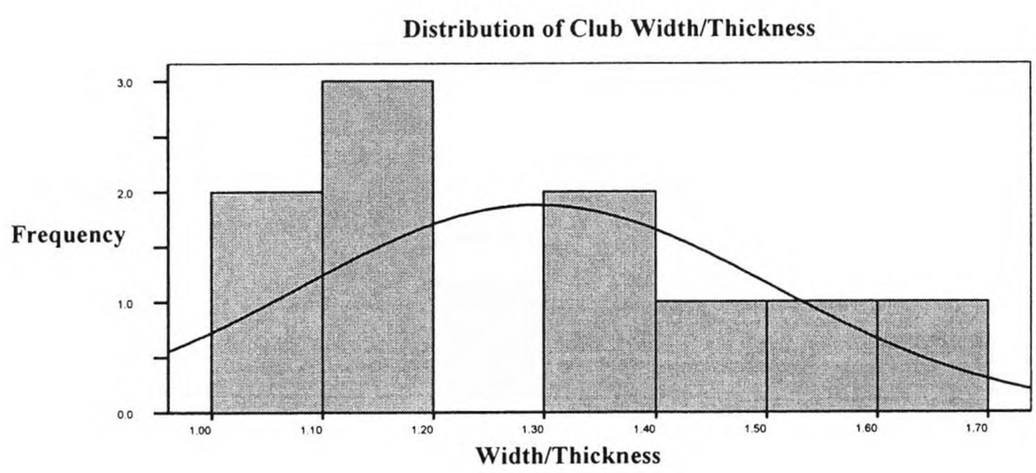


Figure 10

Distribution of Club Length/Width

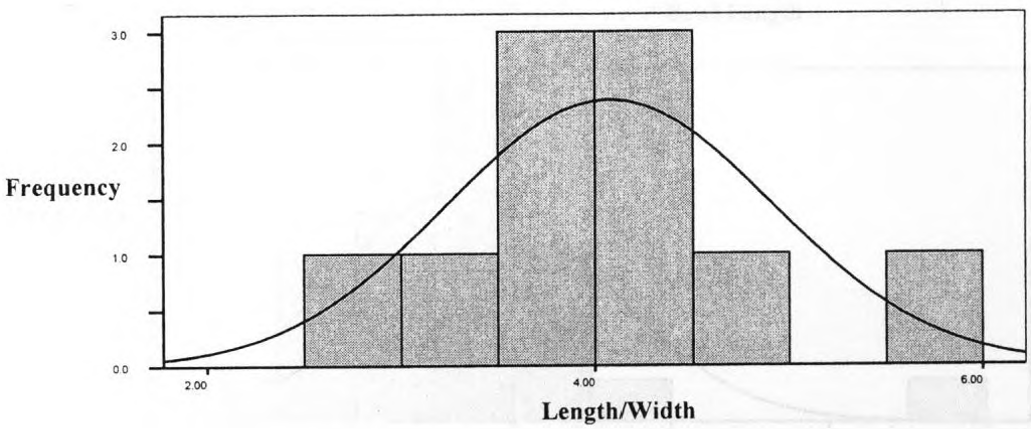


Figure 11

Distribution of Club Length/Thickness

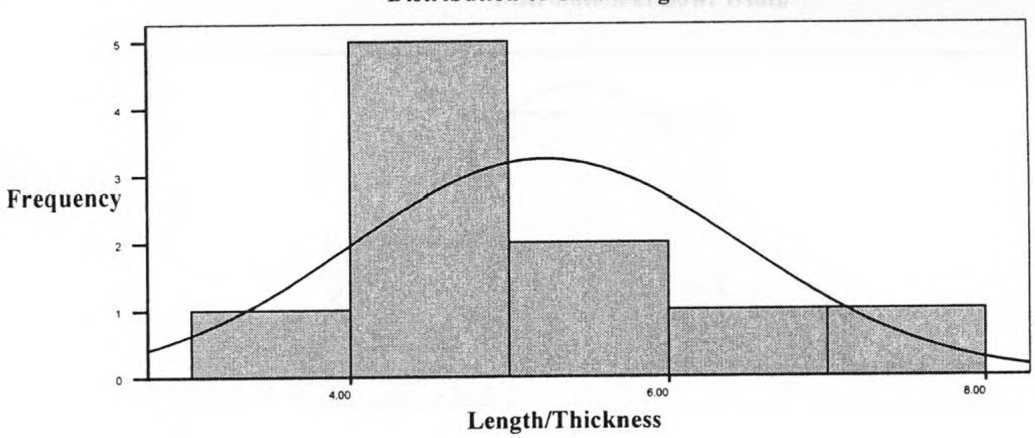


Figure 12

Distribution of Bowl Weights

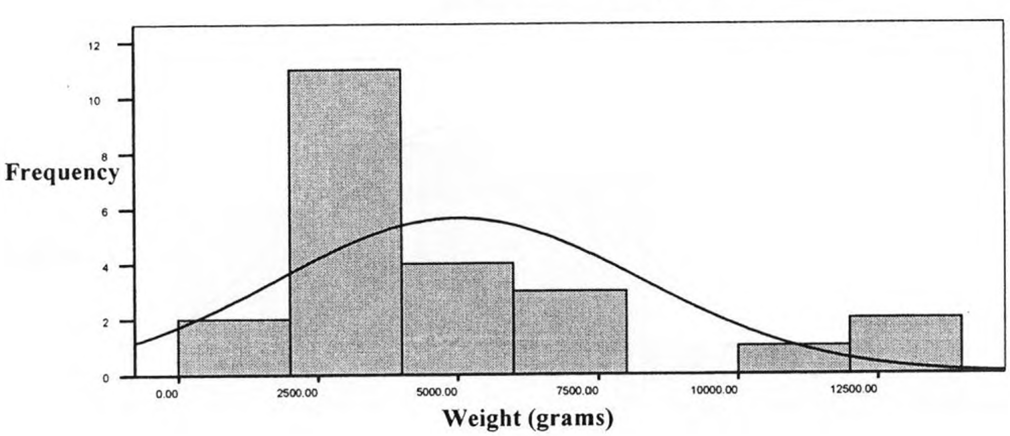


Figure 13

Distribution of Bowl Length

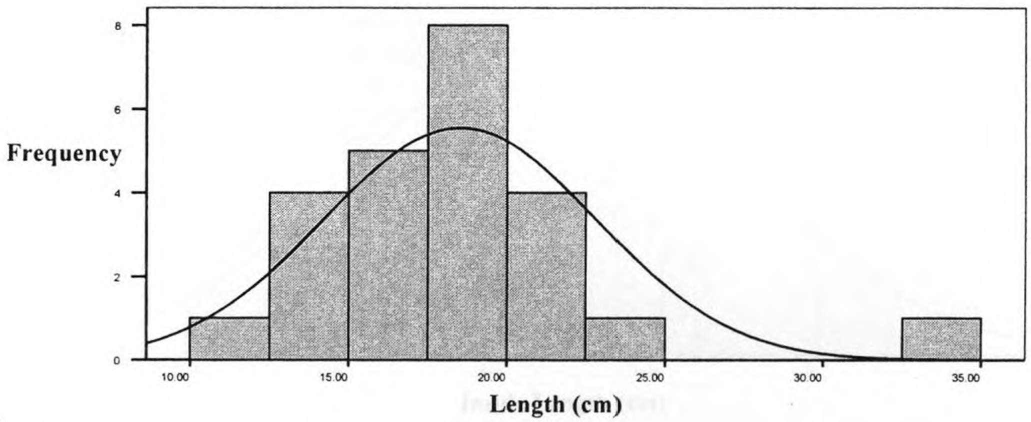


Figure 14

Distribution of Bowl Width

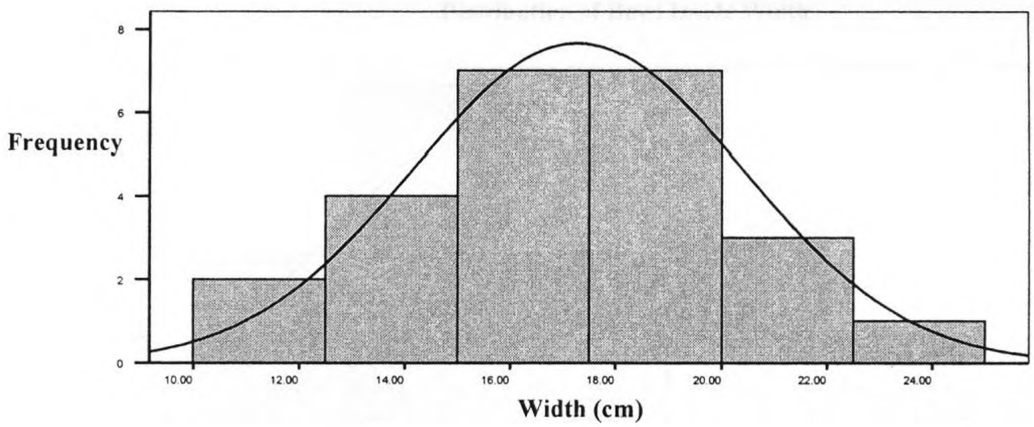


Figure 15

Distribution of Bowl Height

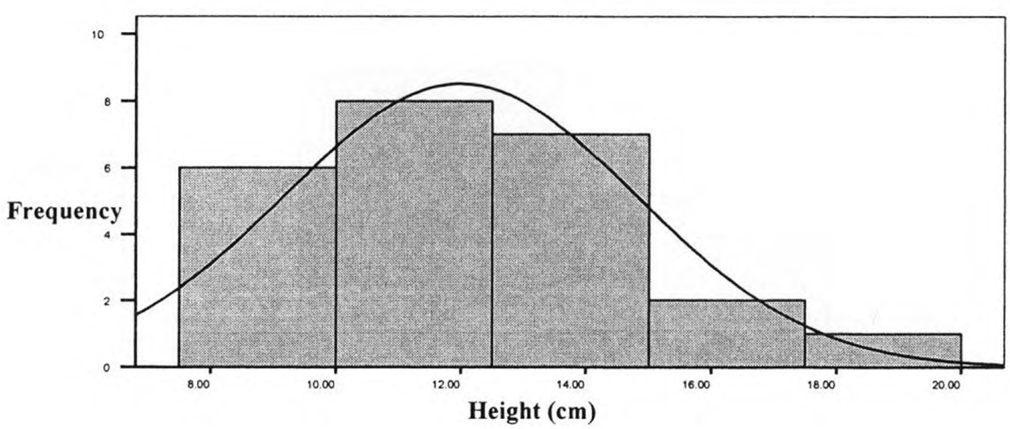


Figure 16

Distribution of Bowl Inside Length

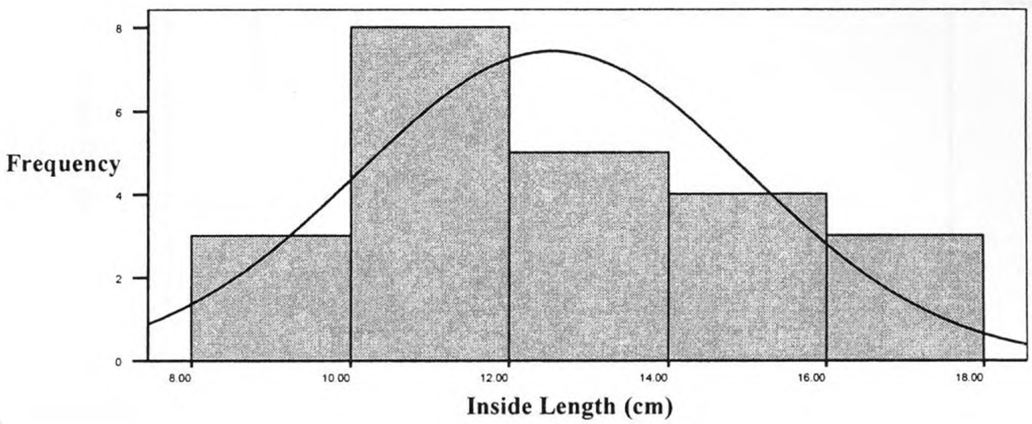


Figure 17

Distribution of Bowl Inside Width

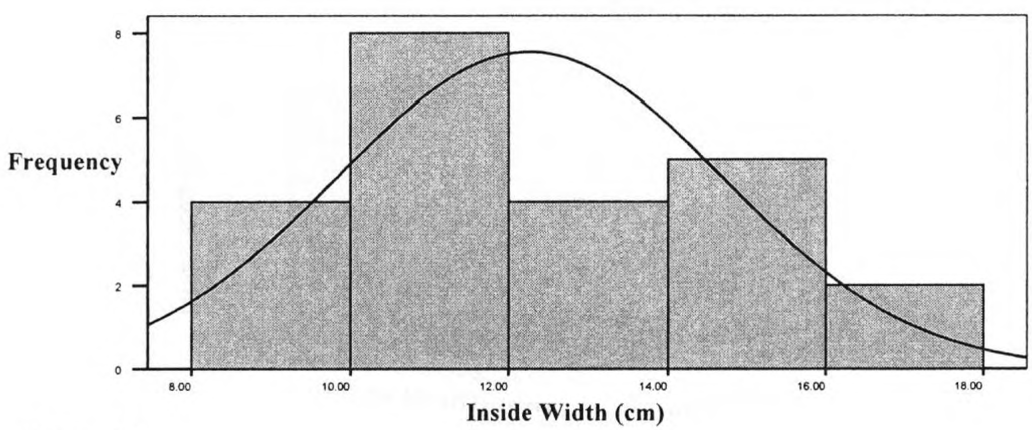


Figure 18

Distribution of Bowl Inside Depth

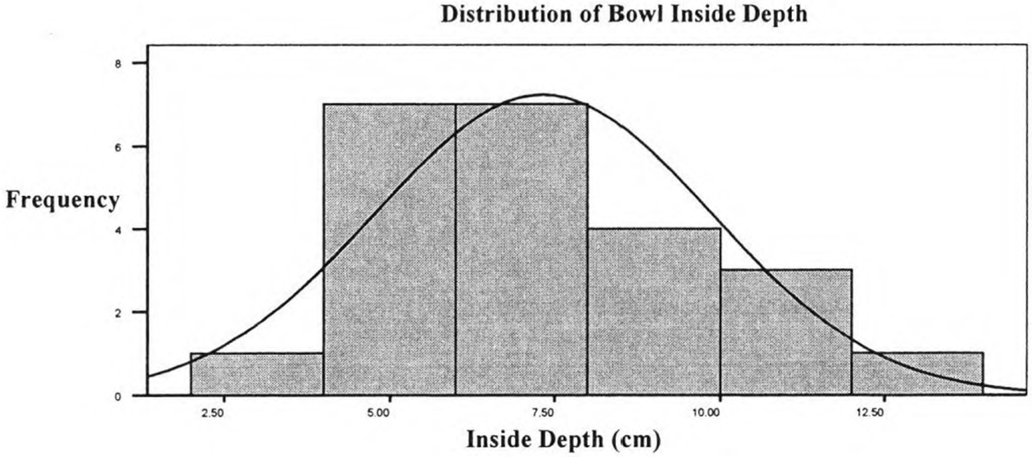


Figure 19

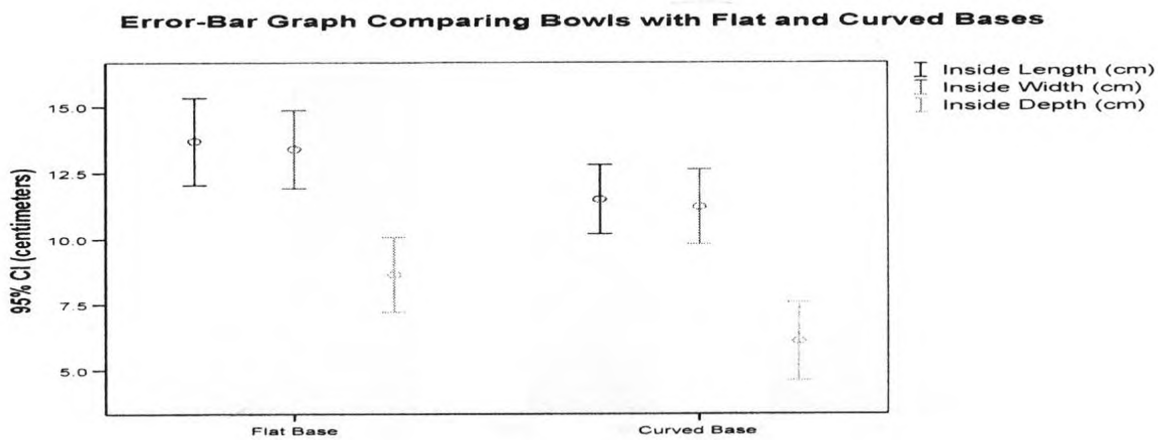


Figure 20

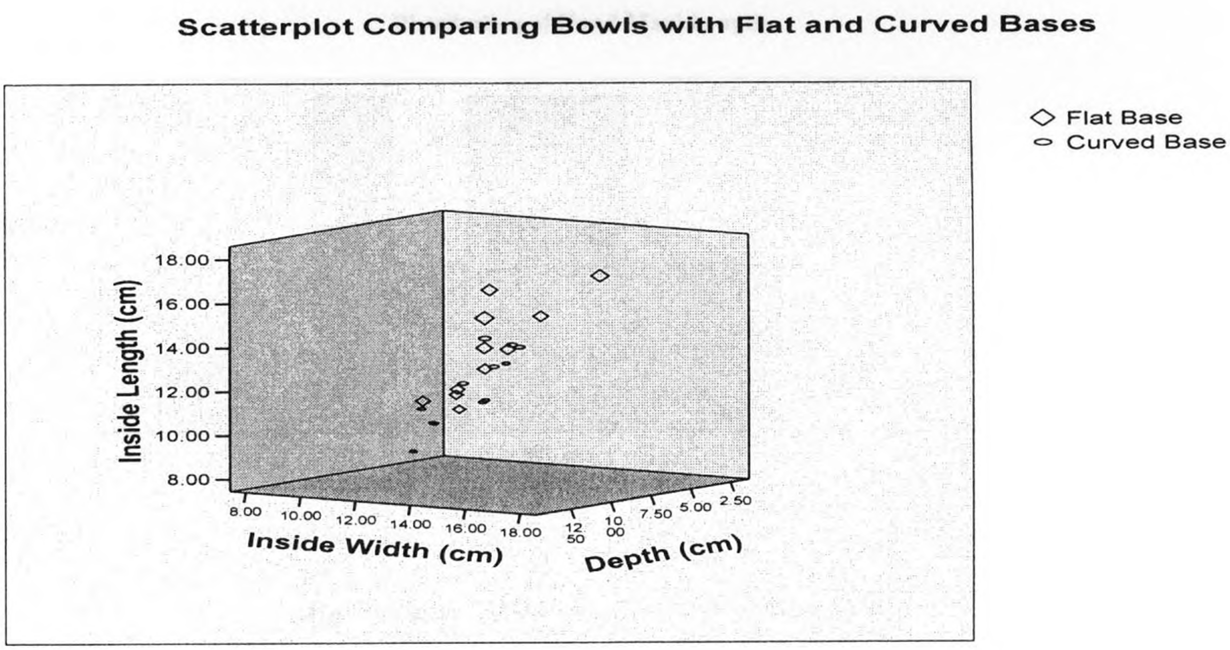


Figure 21

Distribution of Hand Maul Weight

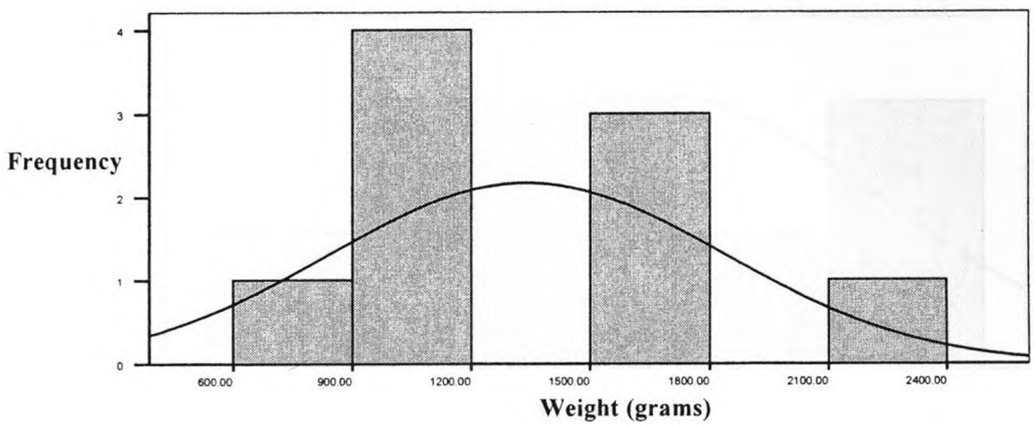


Figure 22

Distribution of Hand Maul Length

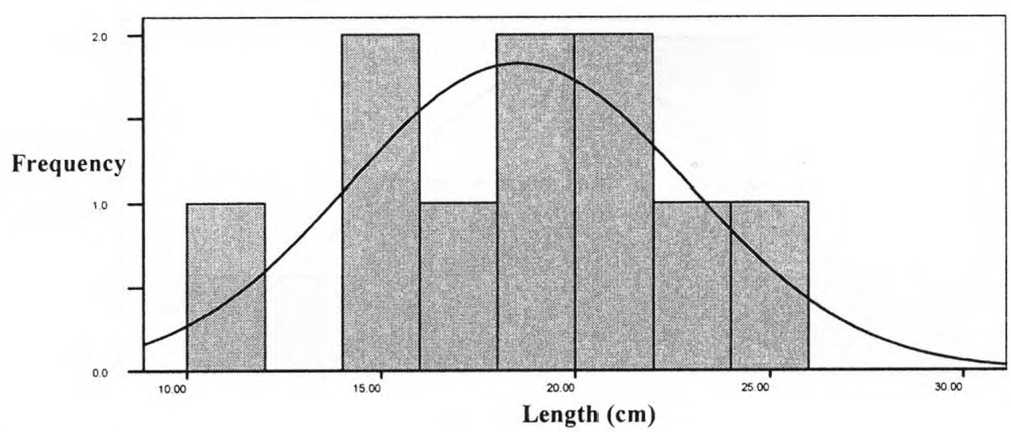


Figure 23

Distribution of Hand Maul Ring Diameter

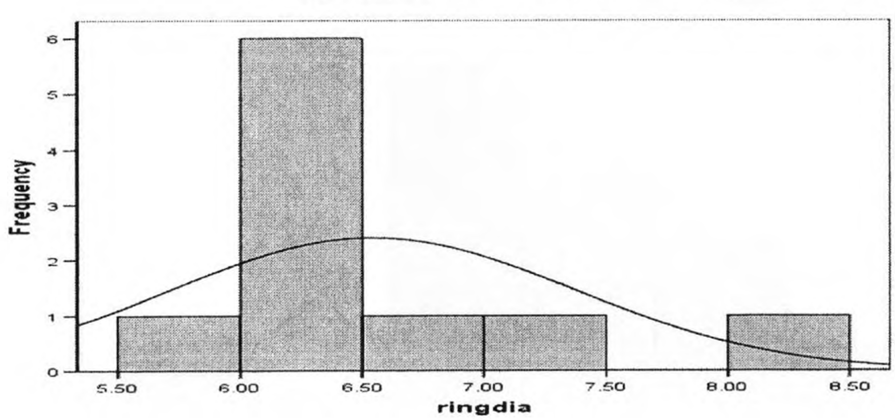


Figure 24

Distribution of Hand Maul Base Diameter

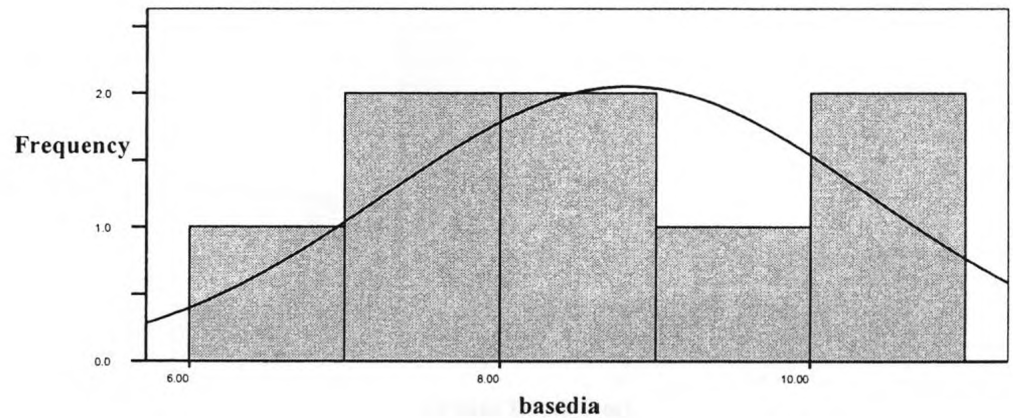


Figure 25

Distribution of Hafted Maul Weight

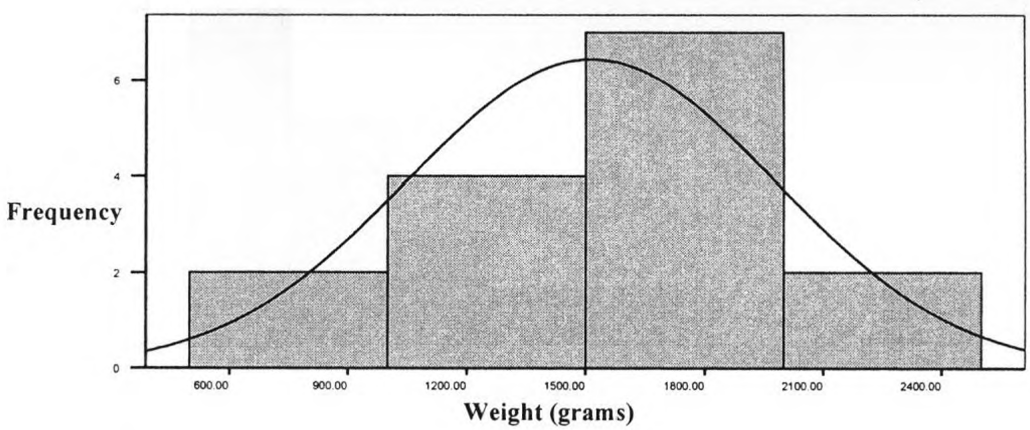


Figure 26

Distribution of Hafted Maul Groove Width

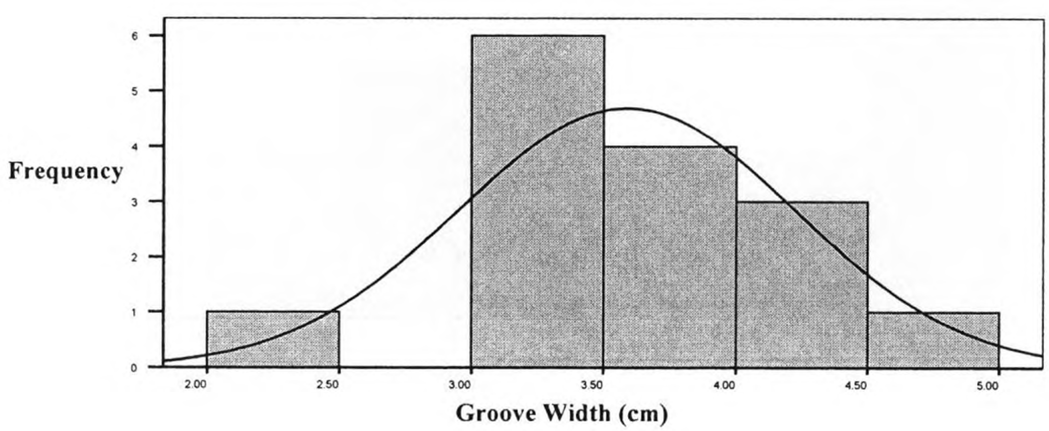


Figure 27

Distribution of Hafted Maul Groove Depth

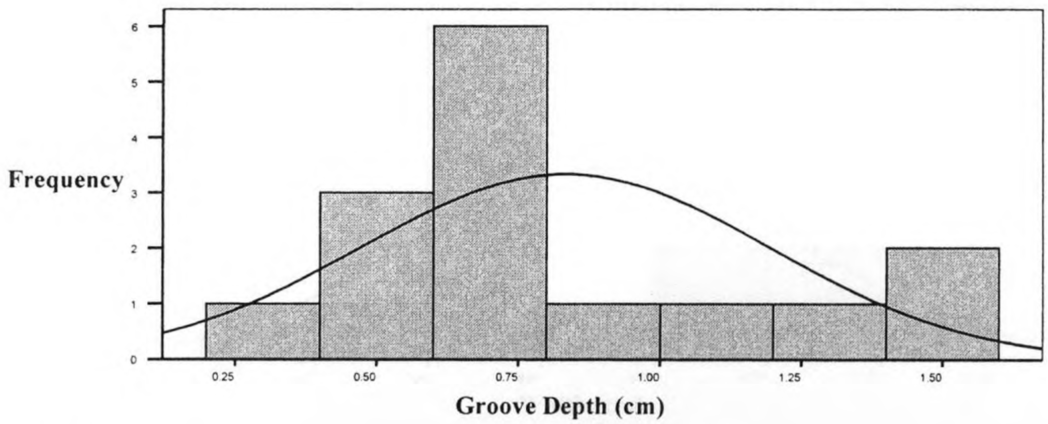


Figure 28

Distribution of Hafted Maul Length/Thickness Ratio

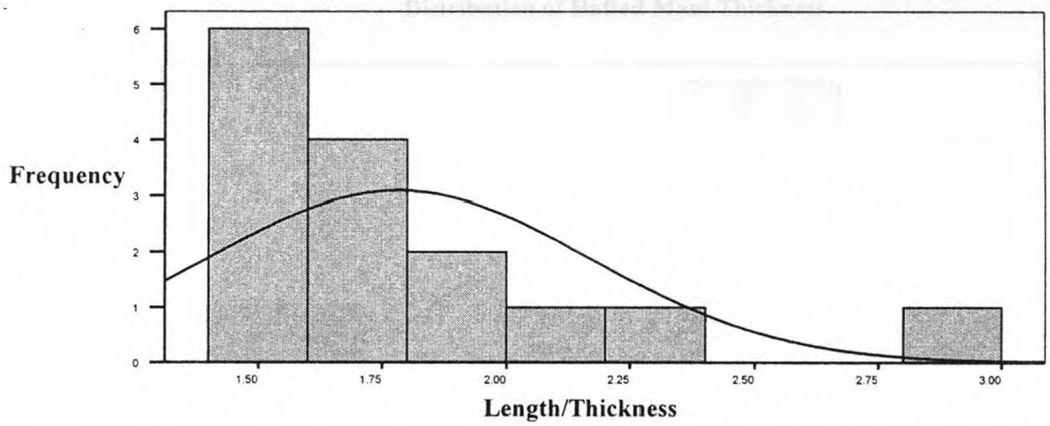


Figure 29

Distribution of Hafted Maul Length

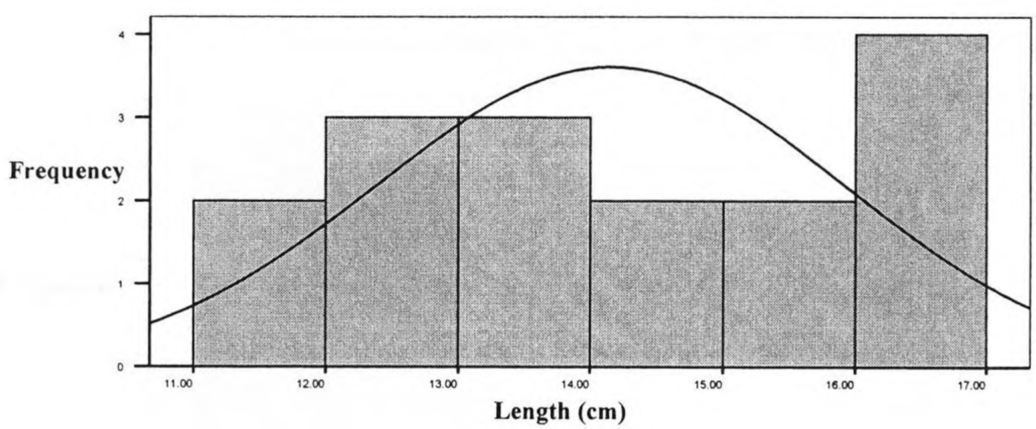


Figure 30

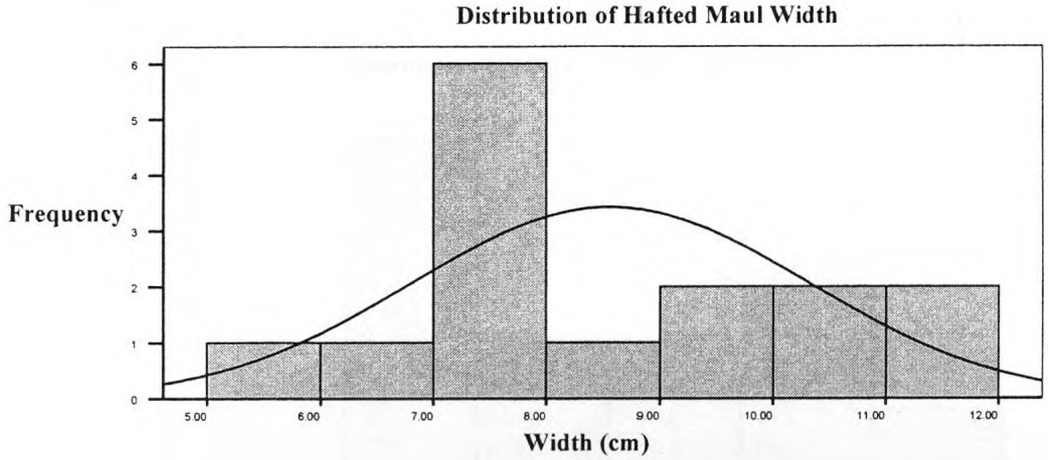


Figure 31

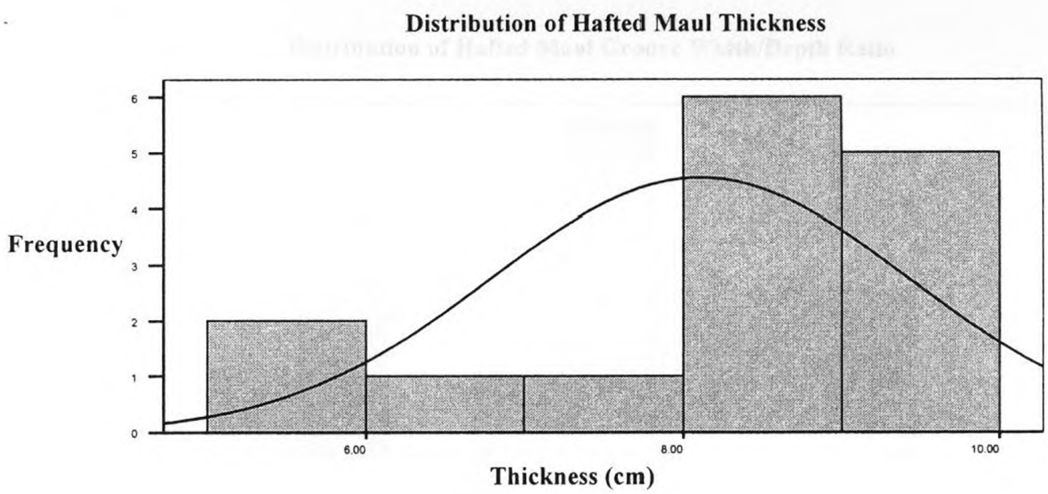


Figure 32

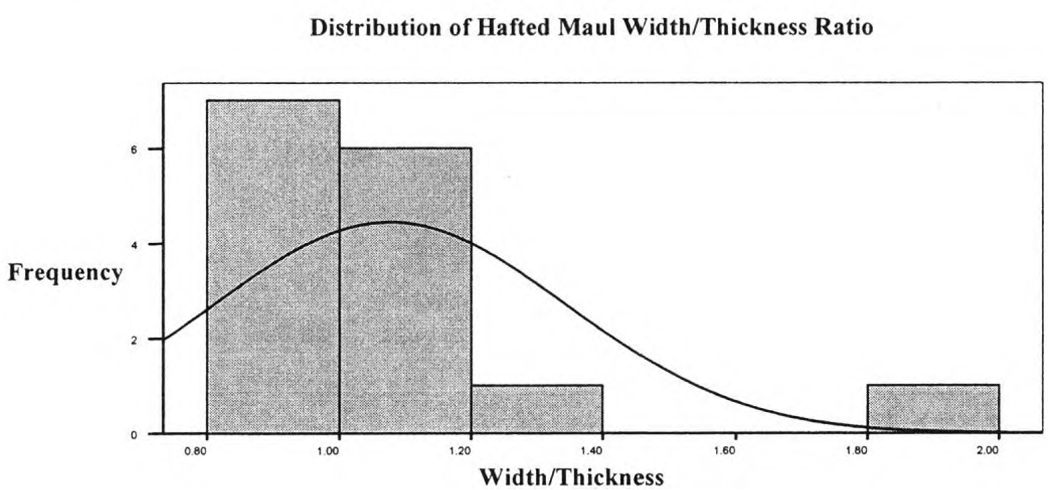


Figure 33

Distribution of Hafted Maul Length/Width Ratio

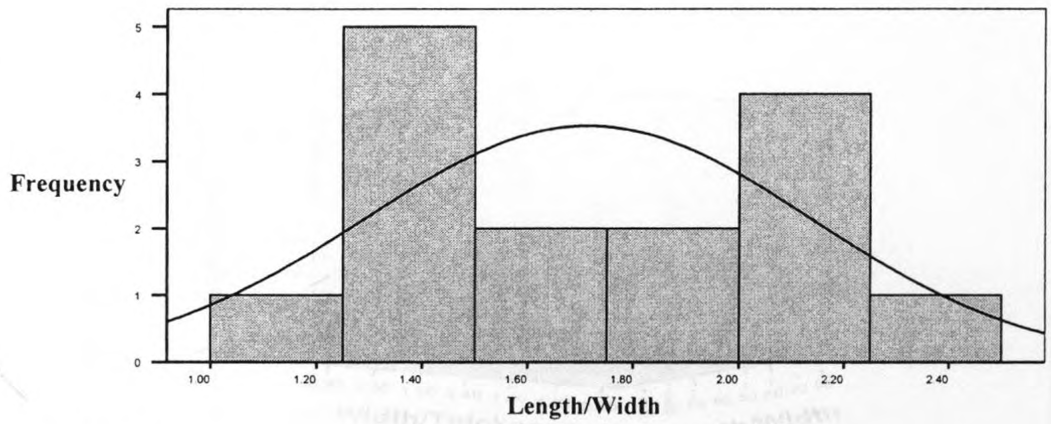


Figure 34

Distribution of Hafted Maul Groove Width/Depth Ratio

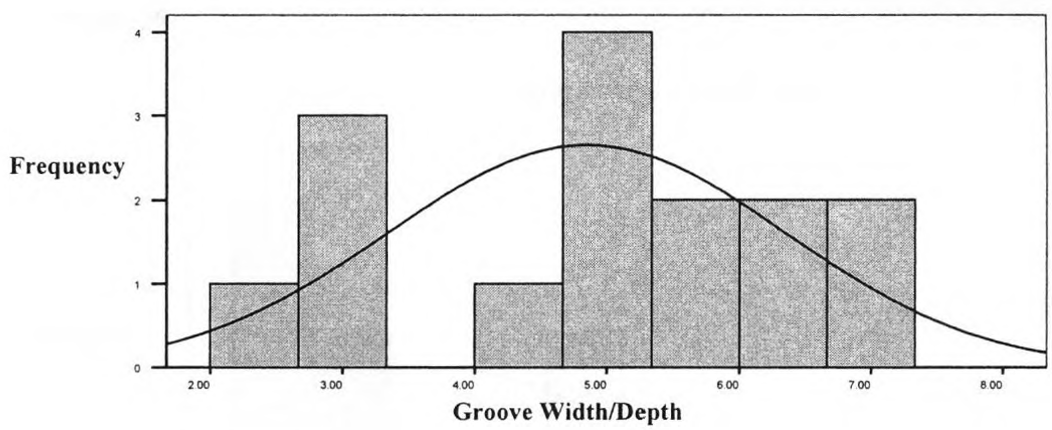


Figure 35

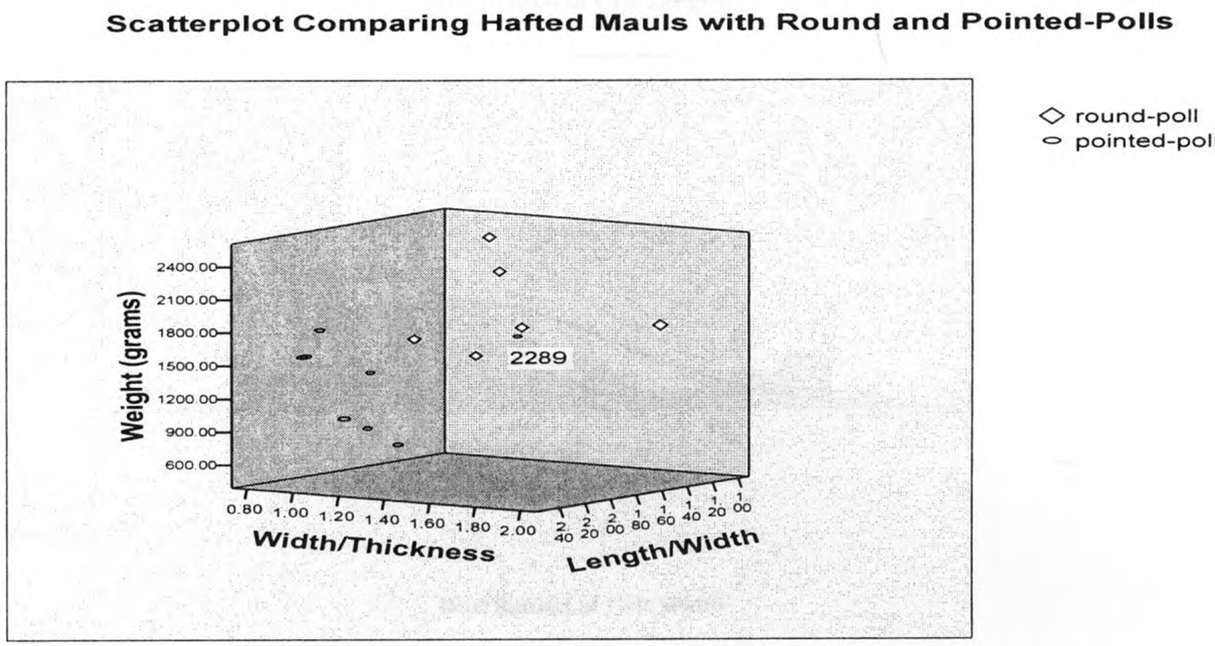


Figure 36

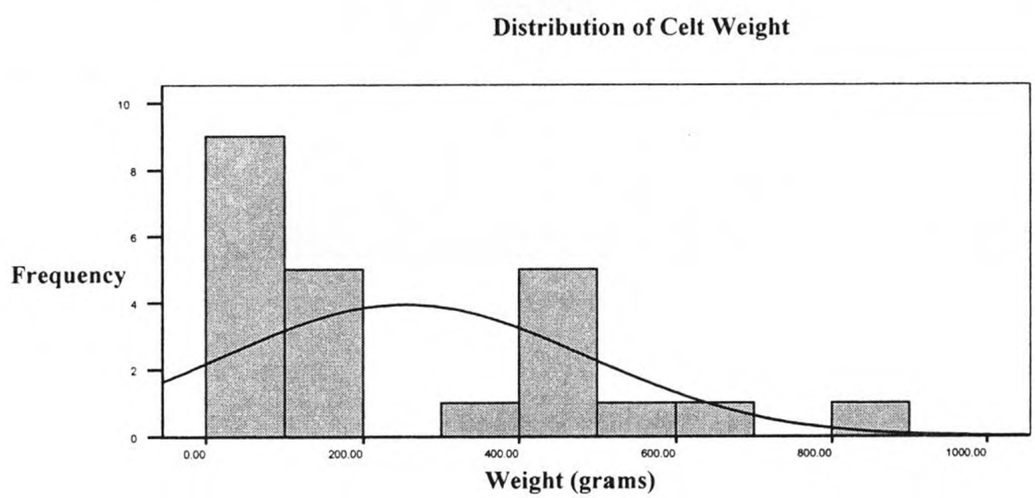


Figure 37

Distribution of Celt Length

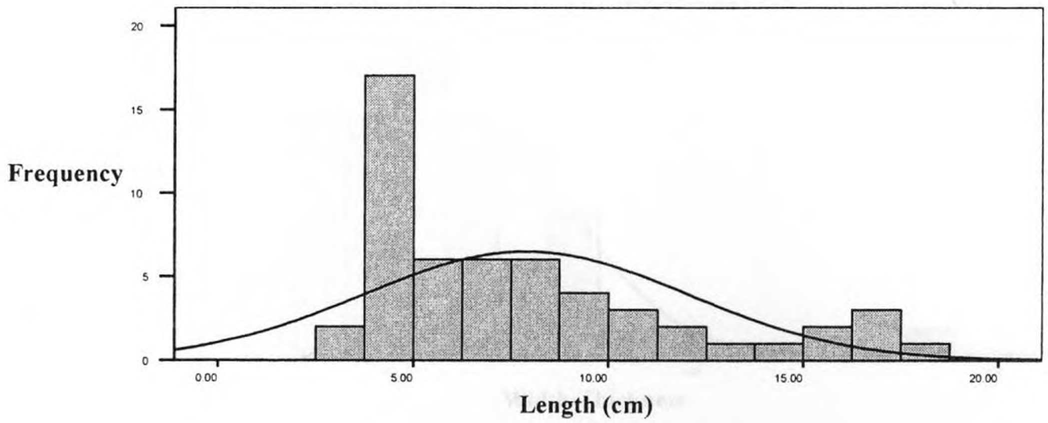


Figure 38

Distribution of Celt Width

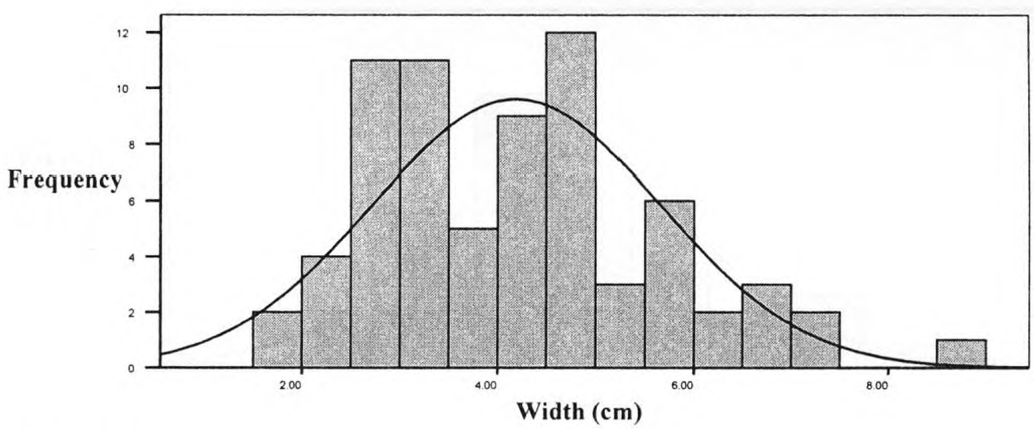


Figure 39

Distribution of Celt Thickness

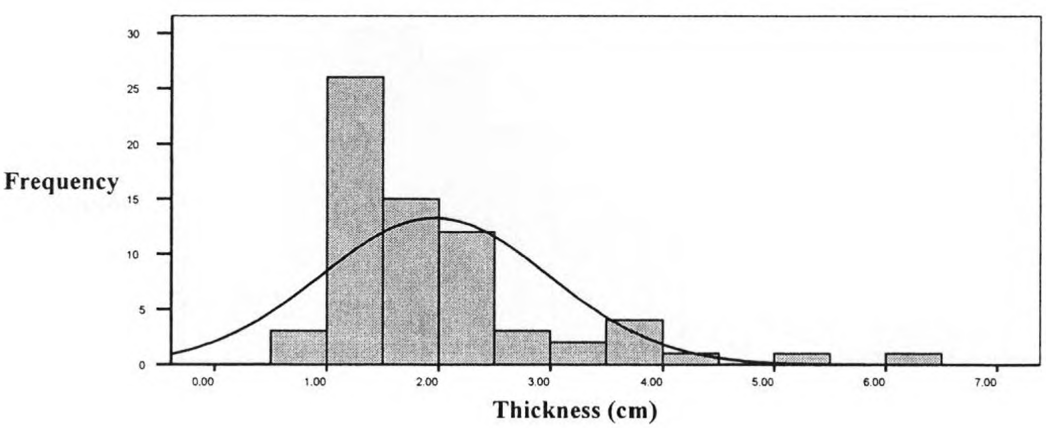


Figure 40

Distribution of Celt Width/Thickness

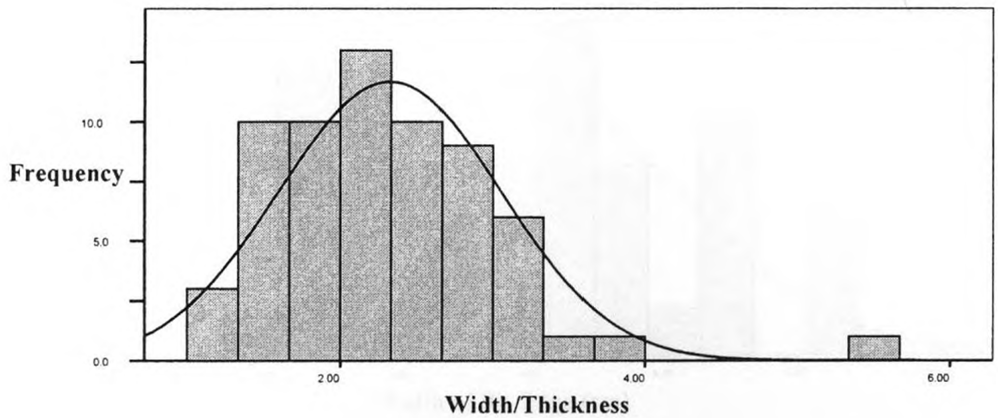


Figure 41

Distribution of Celt Length/Width

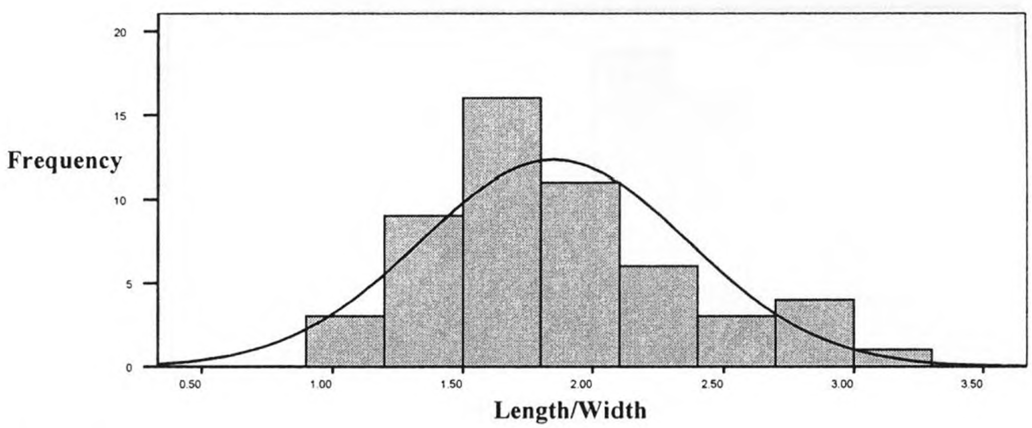


Figure 42

Distribution of Celt Length/Thickness

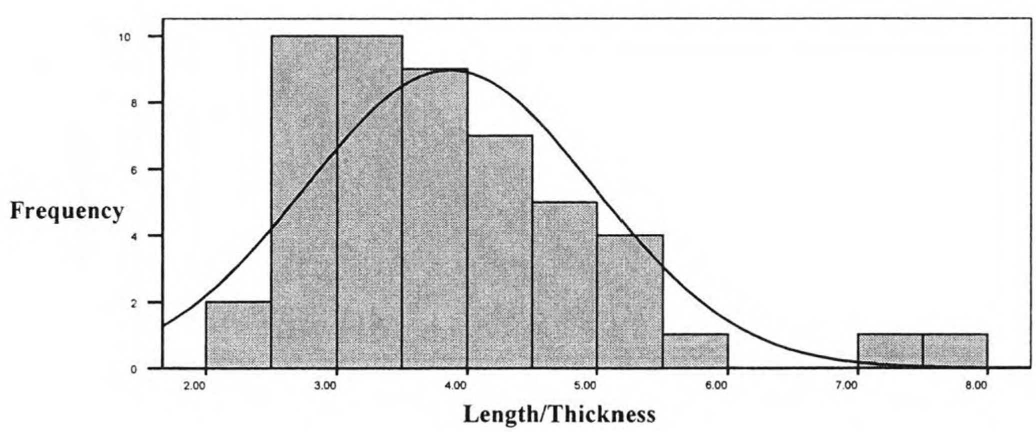


Figure 43

Distribution of Celt Bit Edge Width

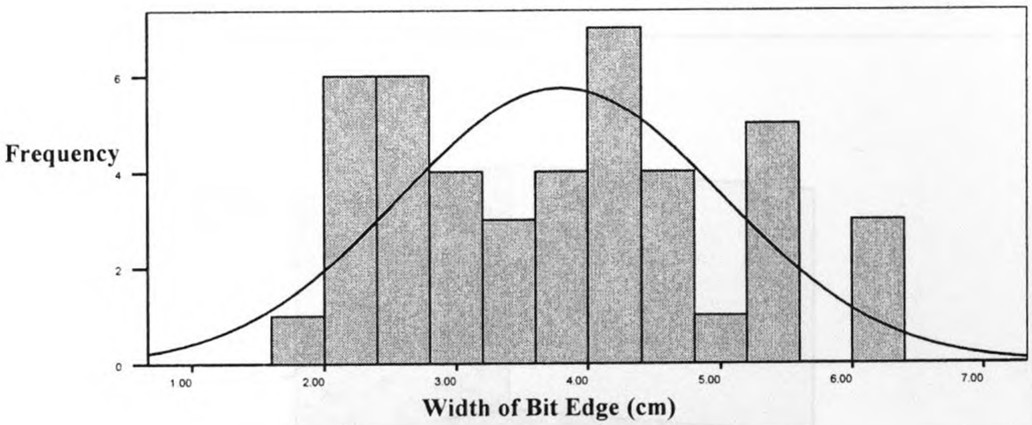


Figure 44

Distribution of Celt Poll Width

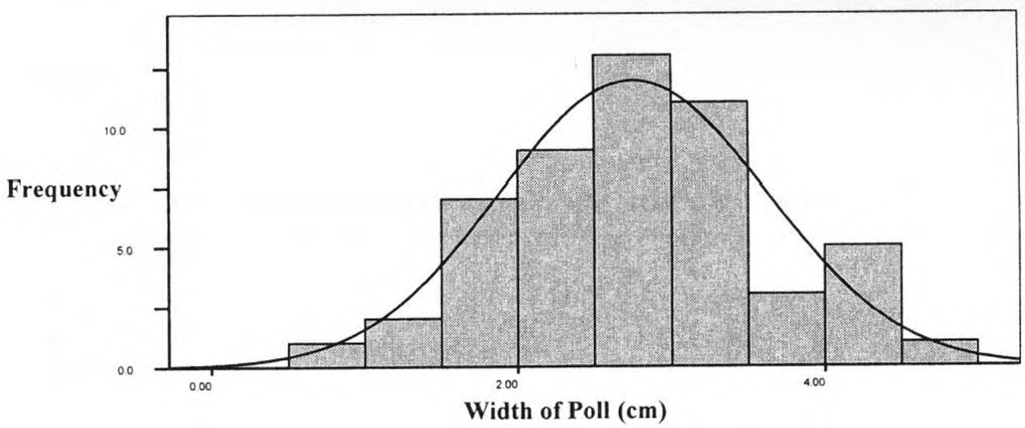


Figure 45

Error-Bar Graph Comparing Celts with Oval and Rectangular Cross-Sections

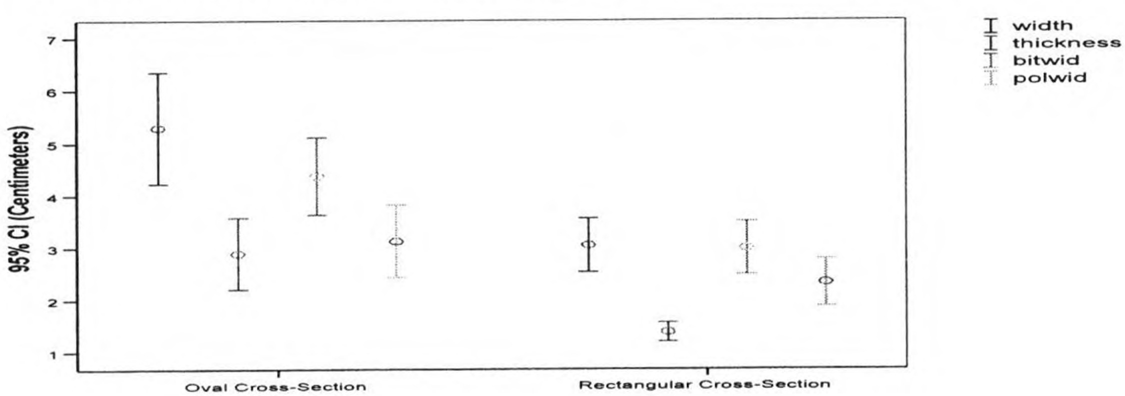


Figure 46

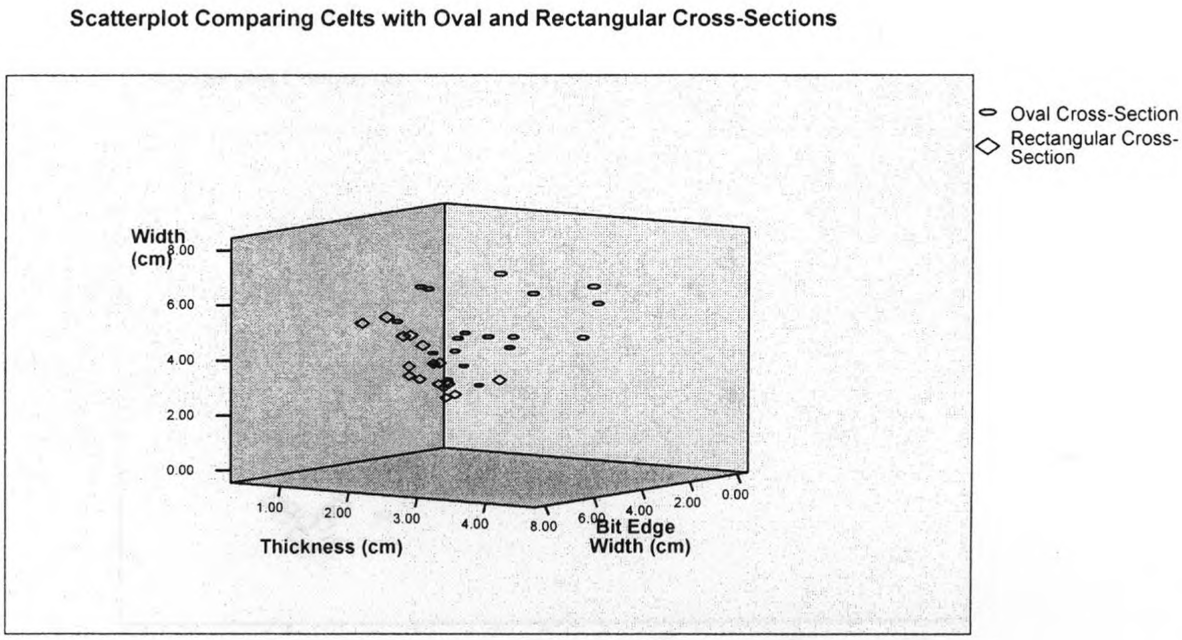


Figure 47

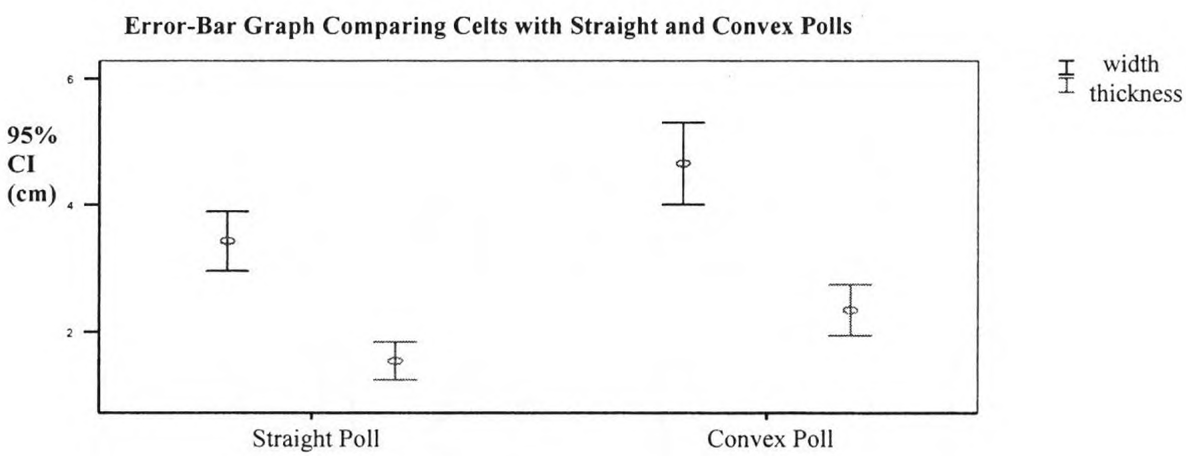


Figure 48

Scatterplot Comparing Celts with Straight and Convex Polls

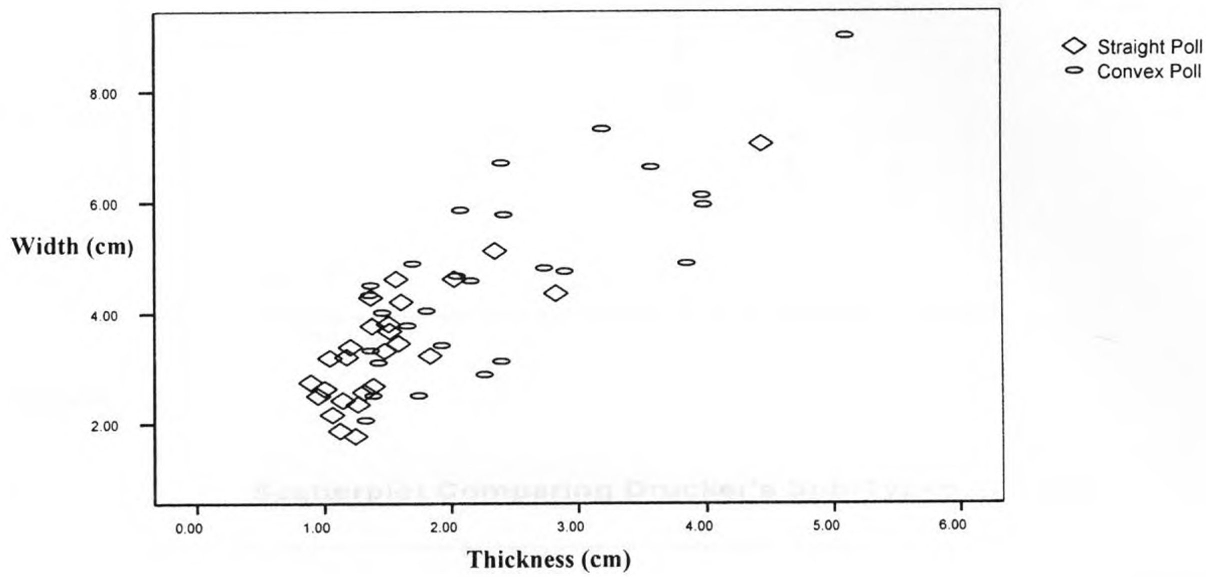


Figure 49 Sketch of Drucker's (1943) Sub-Types of Celts

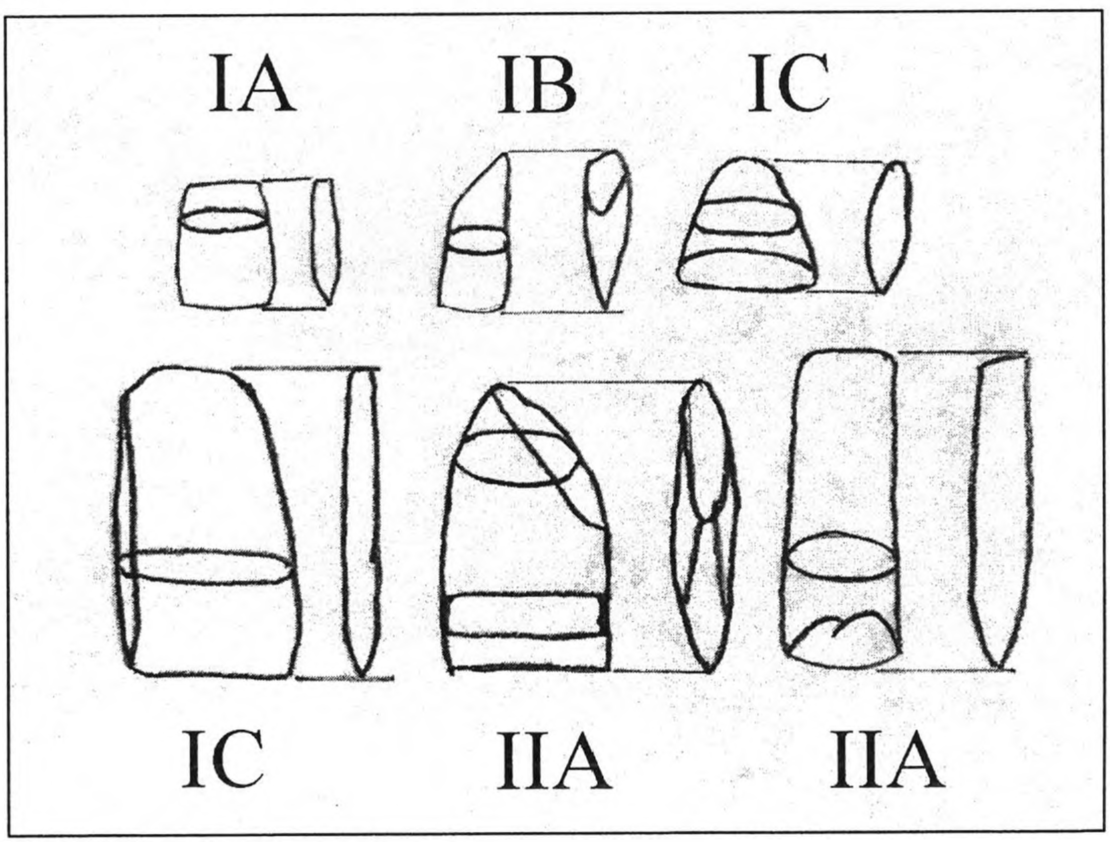


Figure 50

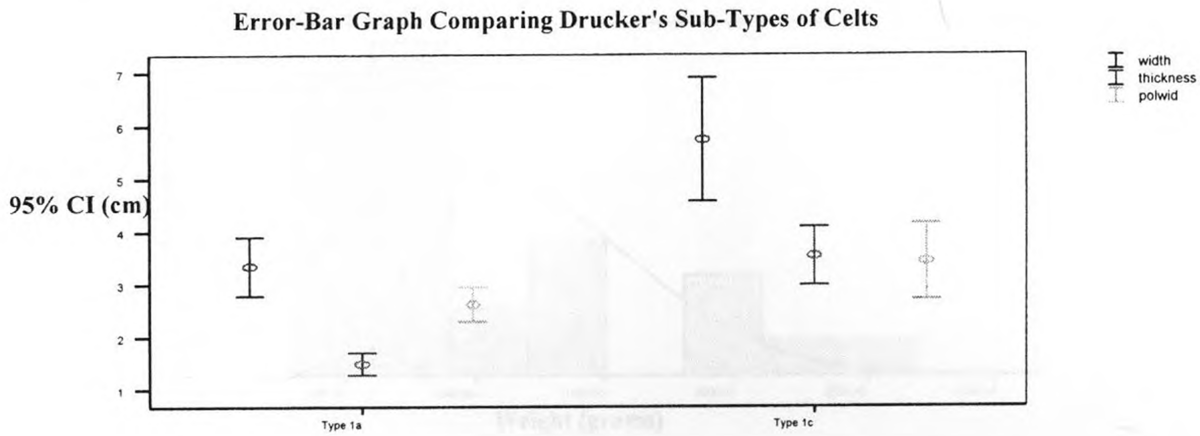


Figure 51

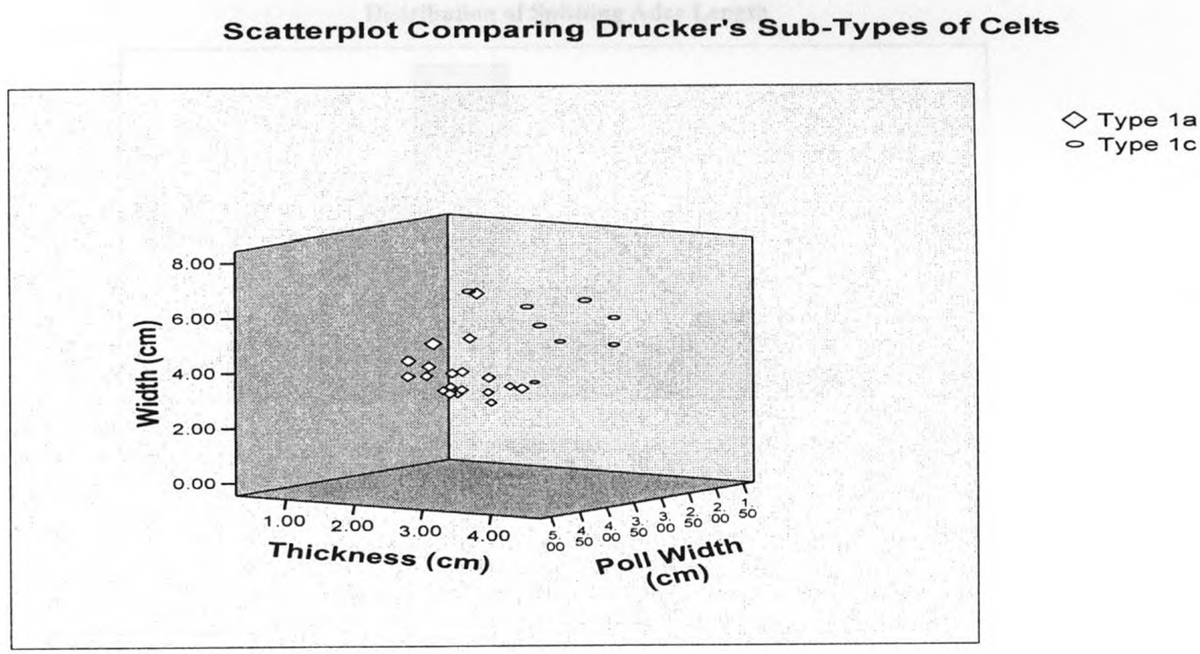


Figure 52

Distribution of Splitting Adze Weight

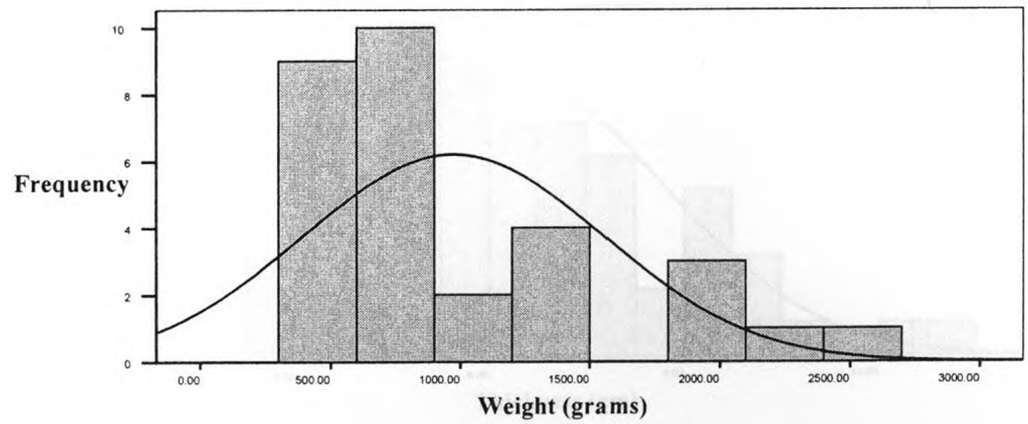


Figure 53

Distribution of Splitting Adze Length

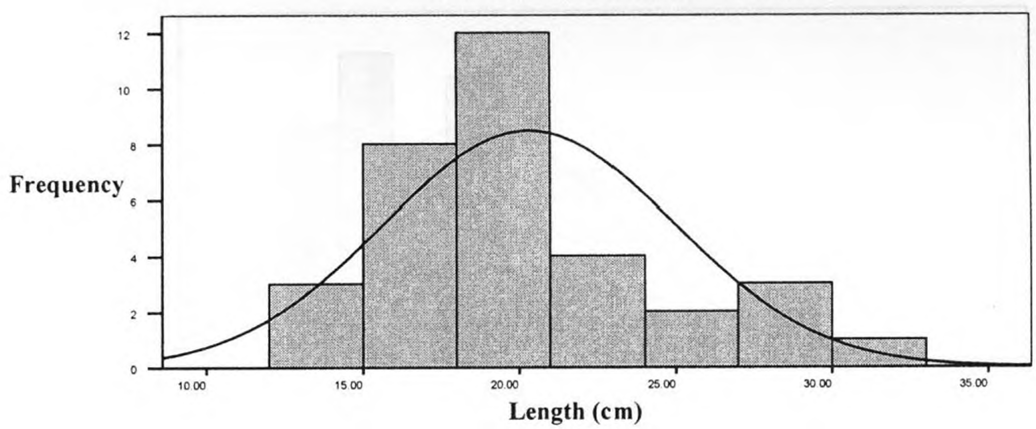


Figure 54

Distribution of Splitting Adze Width

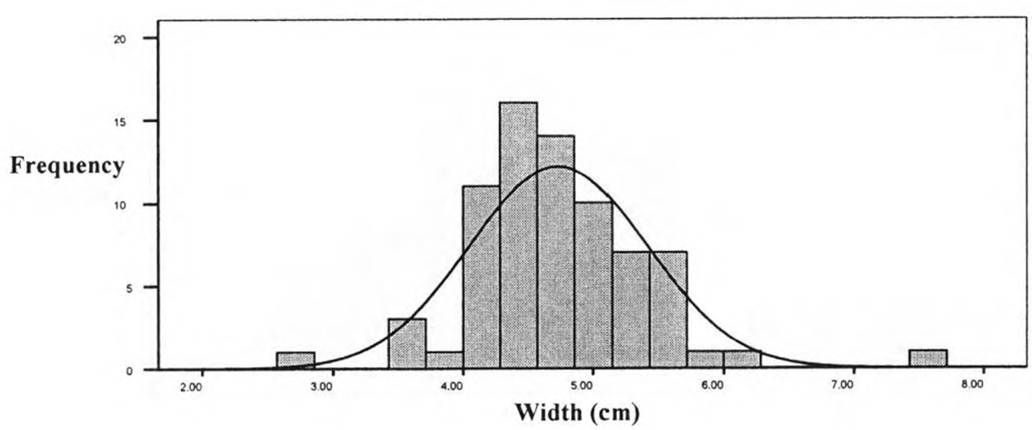


Figure 55

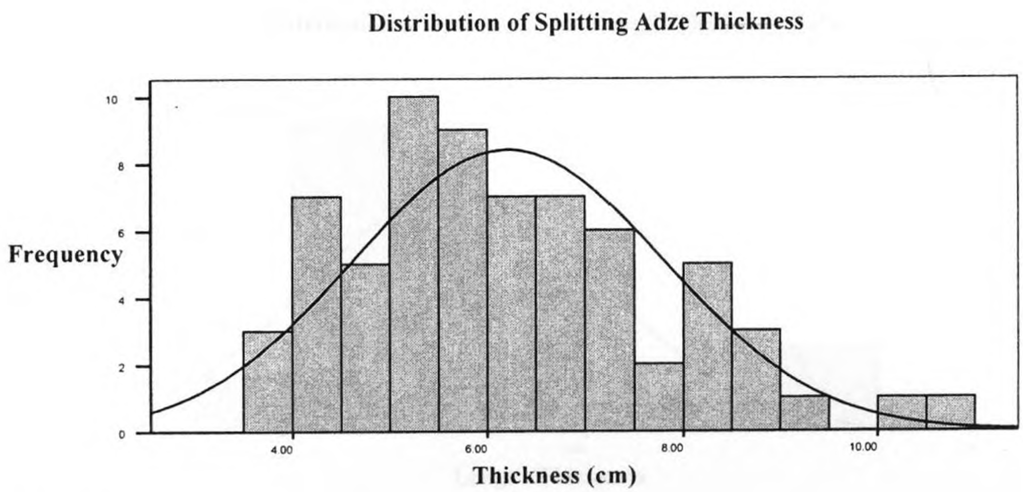


Figure 56

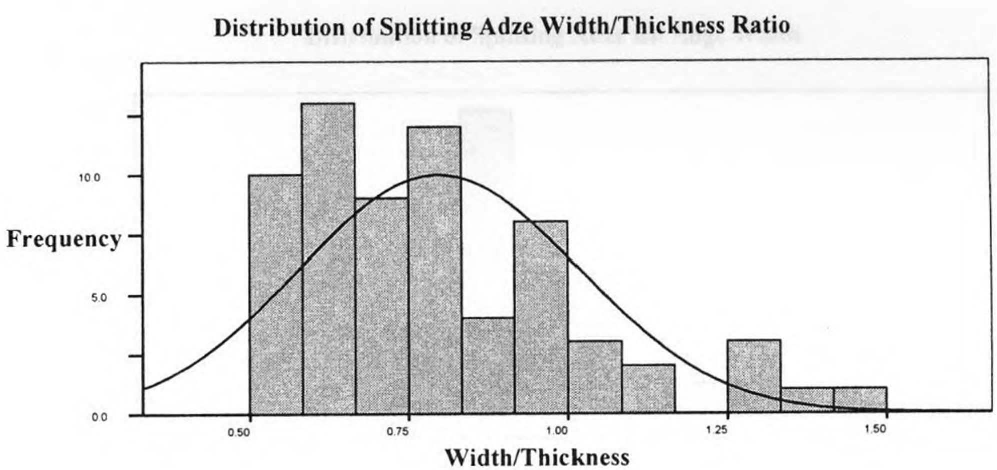


Figure 57

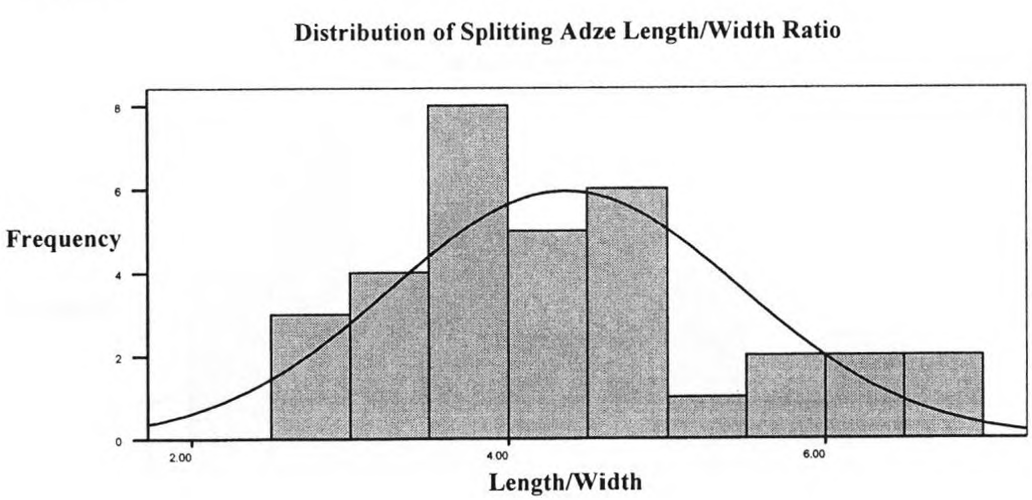


Figure 58

Distribution of Splitting Adze Length/Thickness Ratio

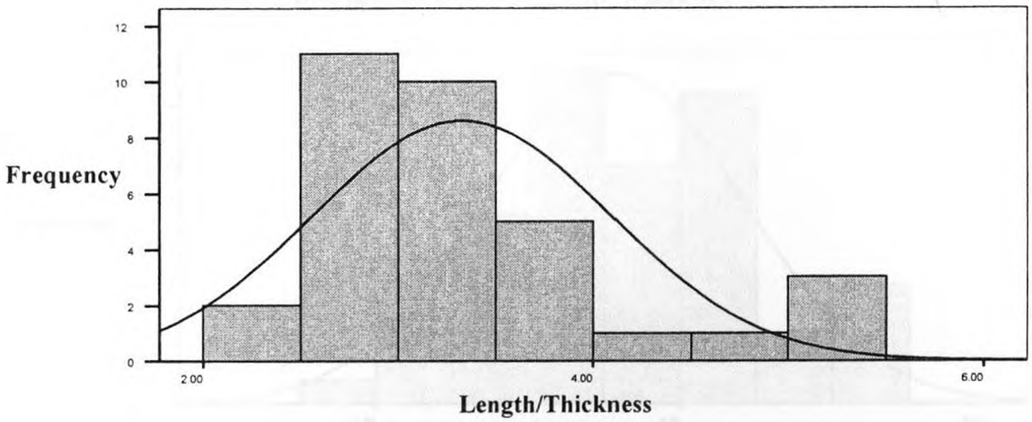


Figure 59

Distribution of Splitting Adze Bit Edge Width

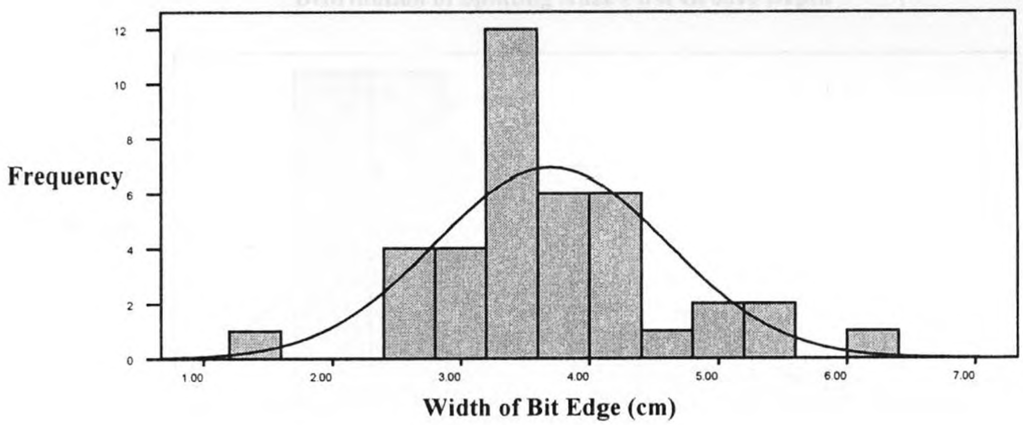


Figure 60

Distribution of Splitting Adze Poll Width

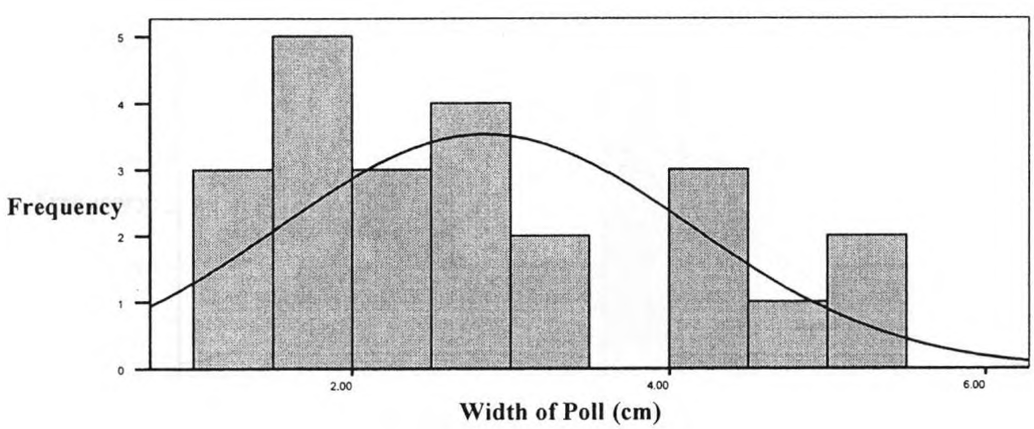


Figure 61

Distribution of Splitting Adze Width of First Groove

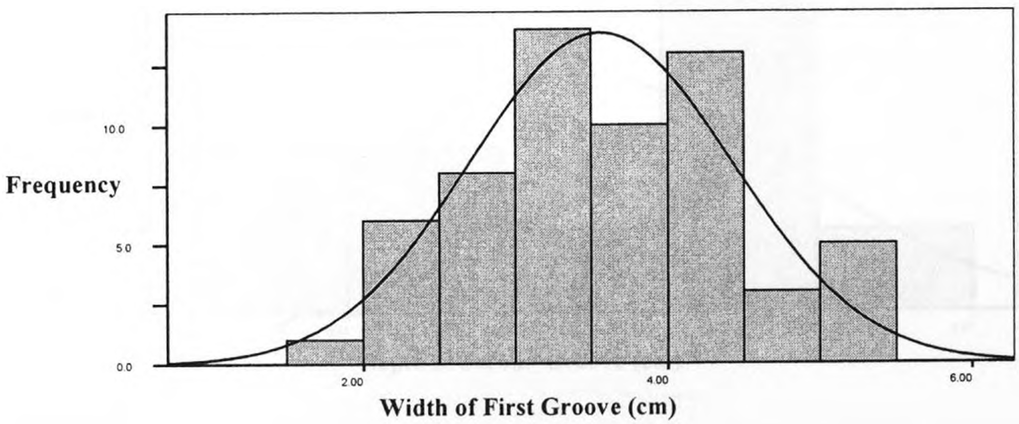


Figure 62

Distribution of Splitting Adze First Groove Depth

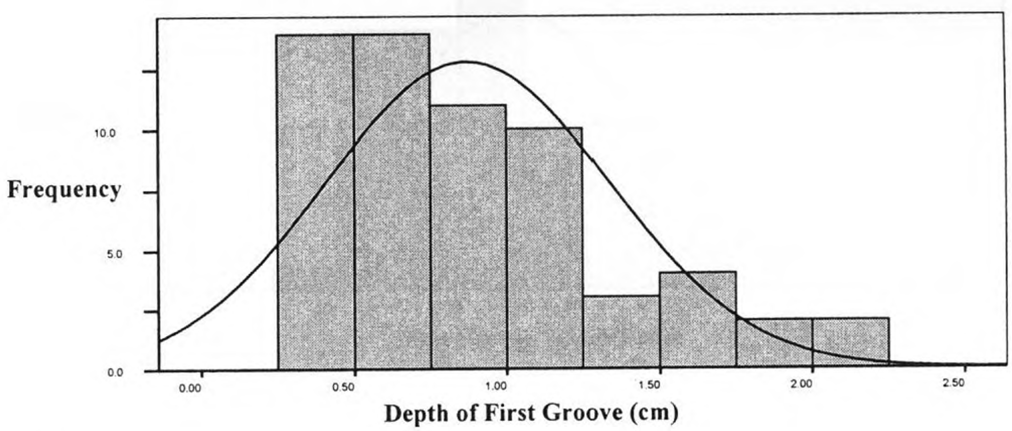


Figure 63

Distribution of Splitting Adze Width of Second Groove

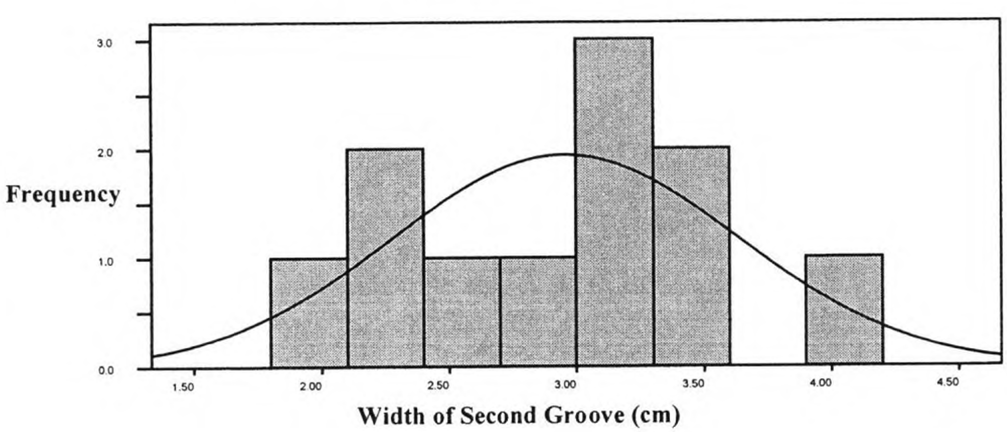


Figure 64

Distribution of Splitting Adze Depth of Second Groove

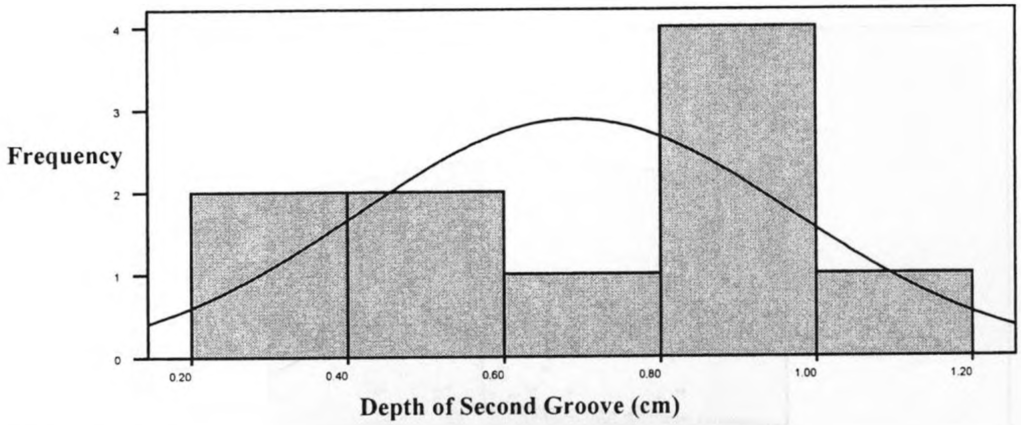


Figure 65

Distribution of Splitting Adze Groove Width/Depth

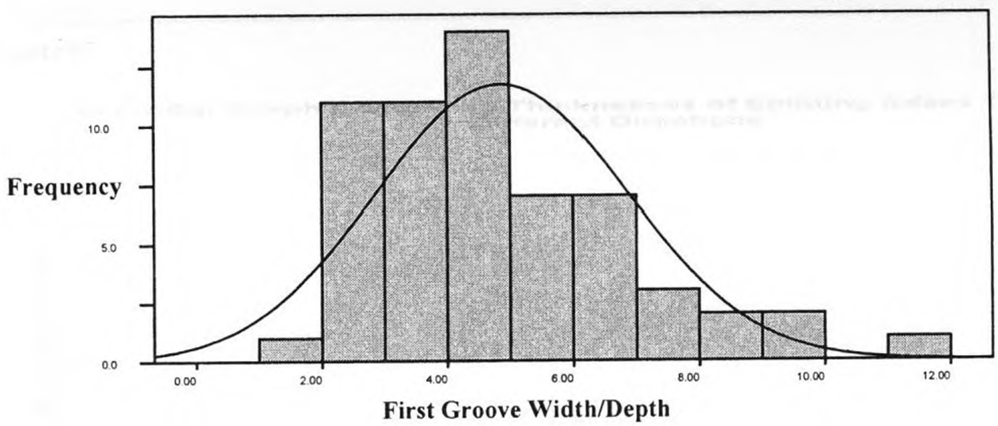


Figure 66

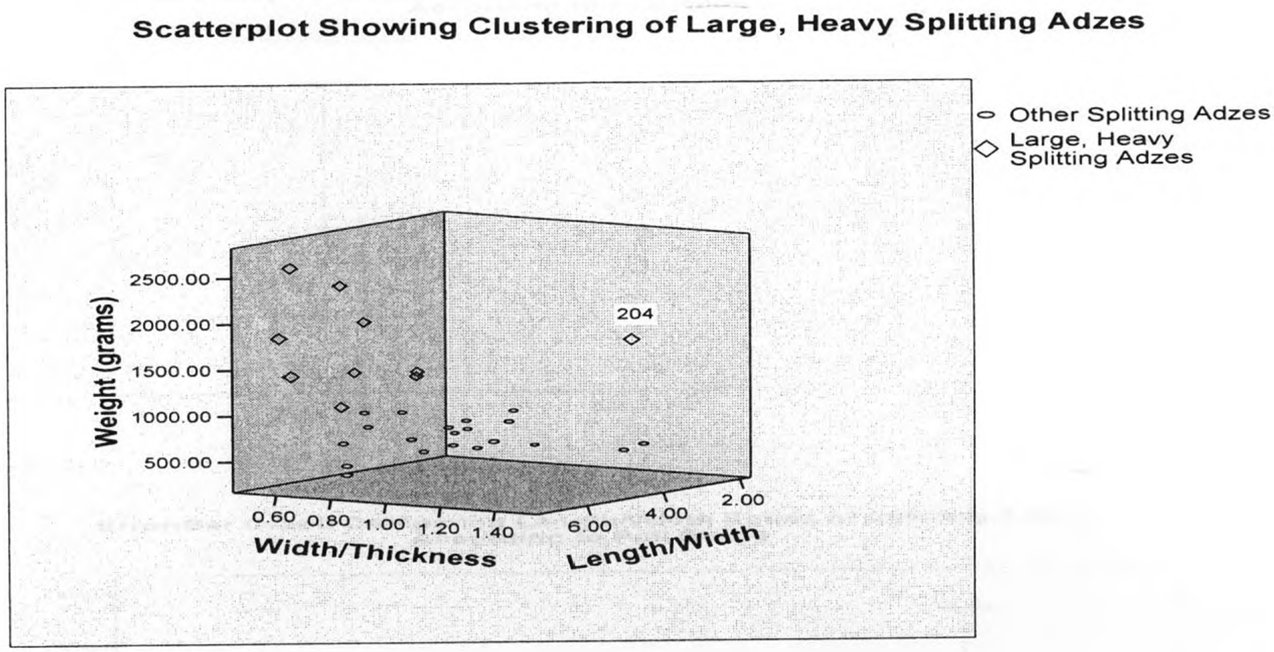


Figure 67

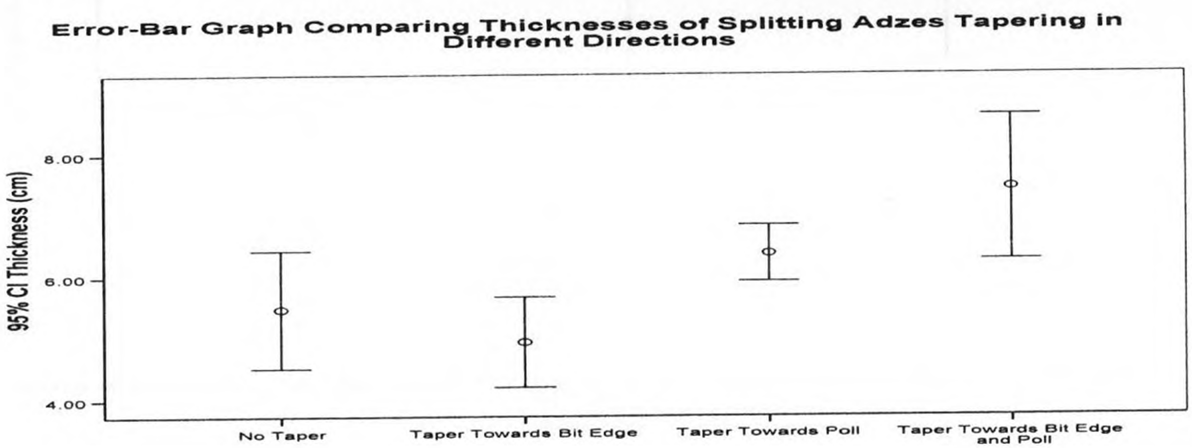


Figure 68

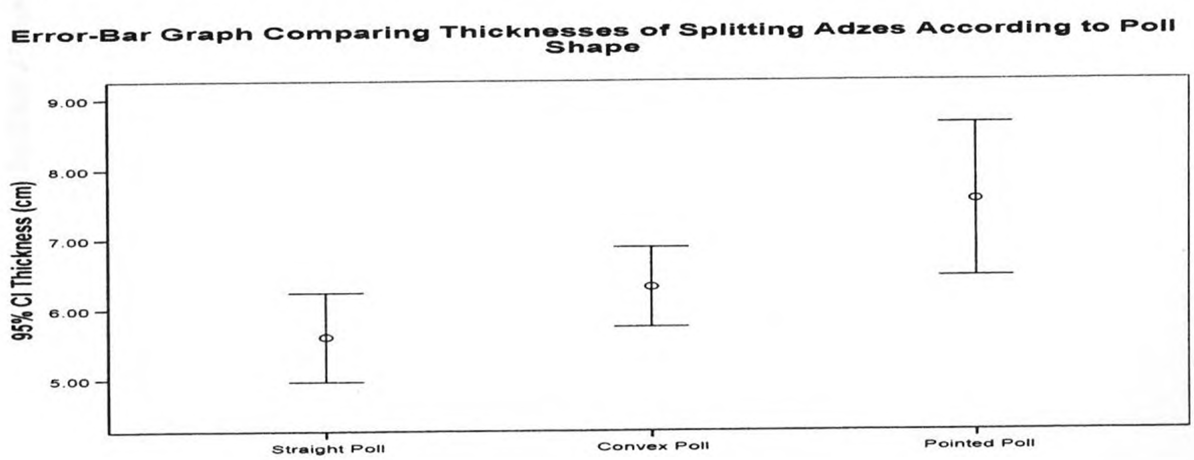


Figure 69

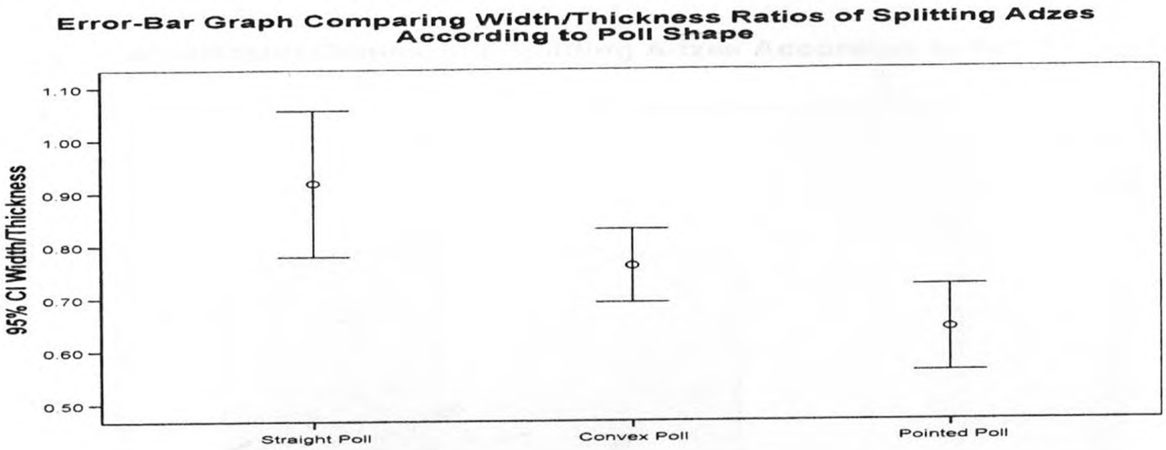


Figure 70

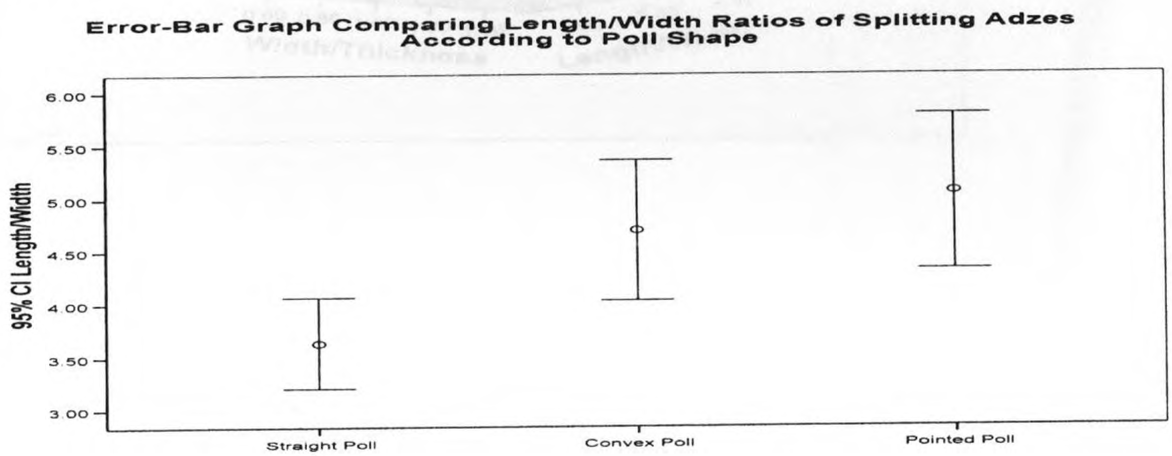


Figure 71

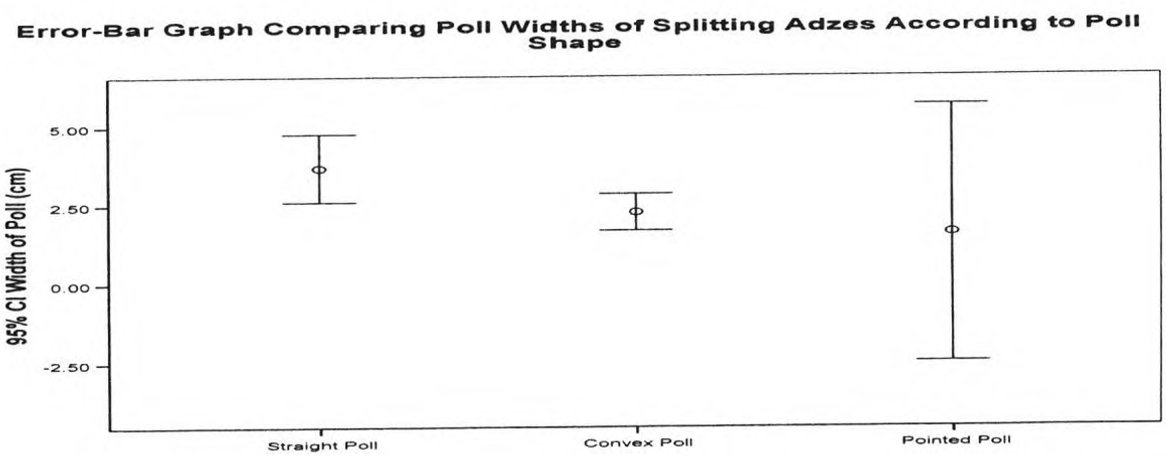
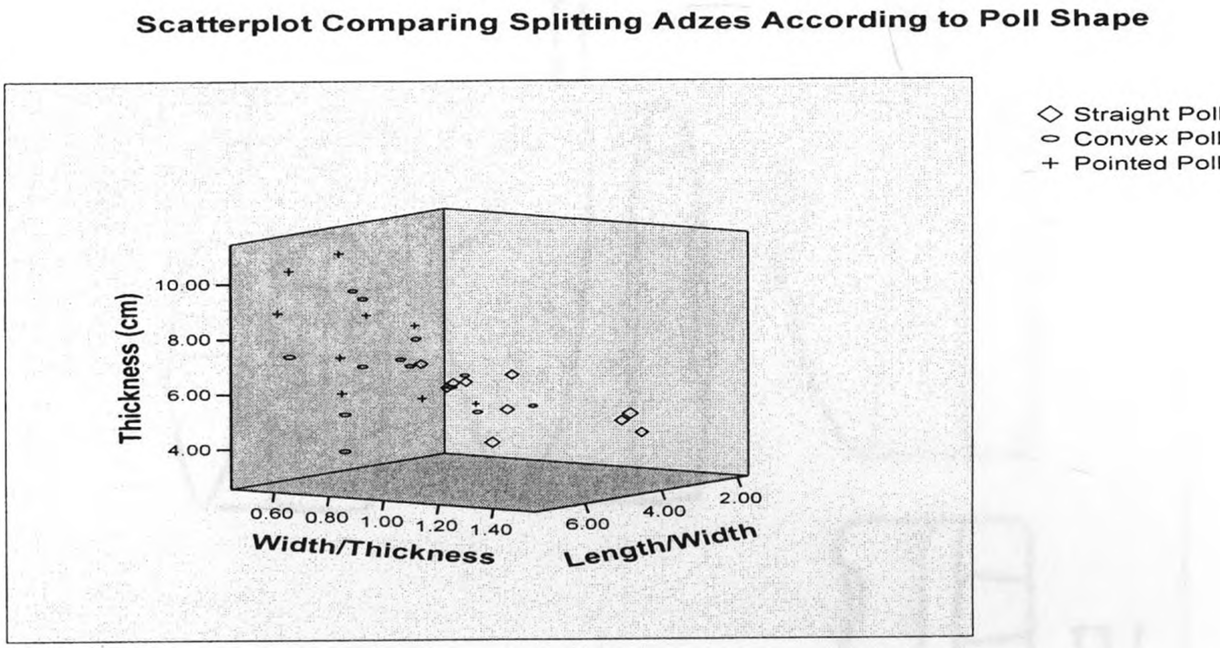


Figure 72



Scatterplot Comparing Splitting Adzes According to Poll Shape
Straight Poll
Convex Poll
Pointed Poll
Thickness (cm)
10.00
8.00
6.00
4.00
0.60
0.80
1.00
1.20
1.40
Width/Thickness
6.00
4.00
2.00
Length/Width

Figure 73 Sketch of Drucker's (1943) Sub-Types of Splitting Adzes

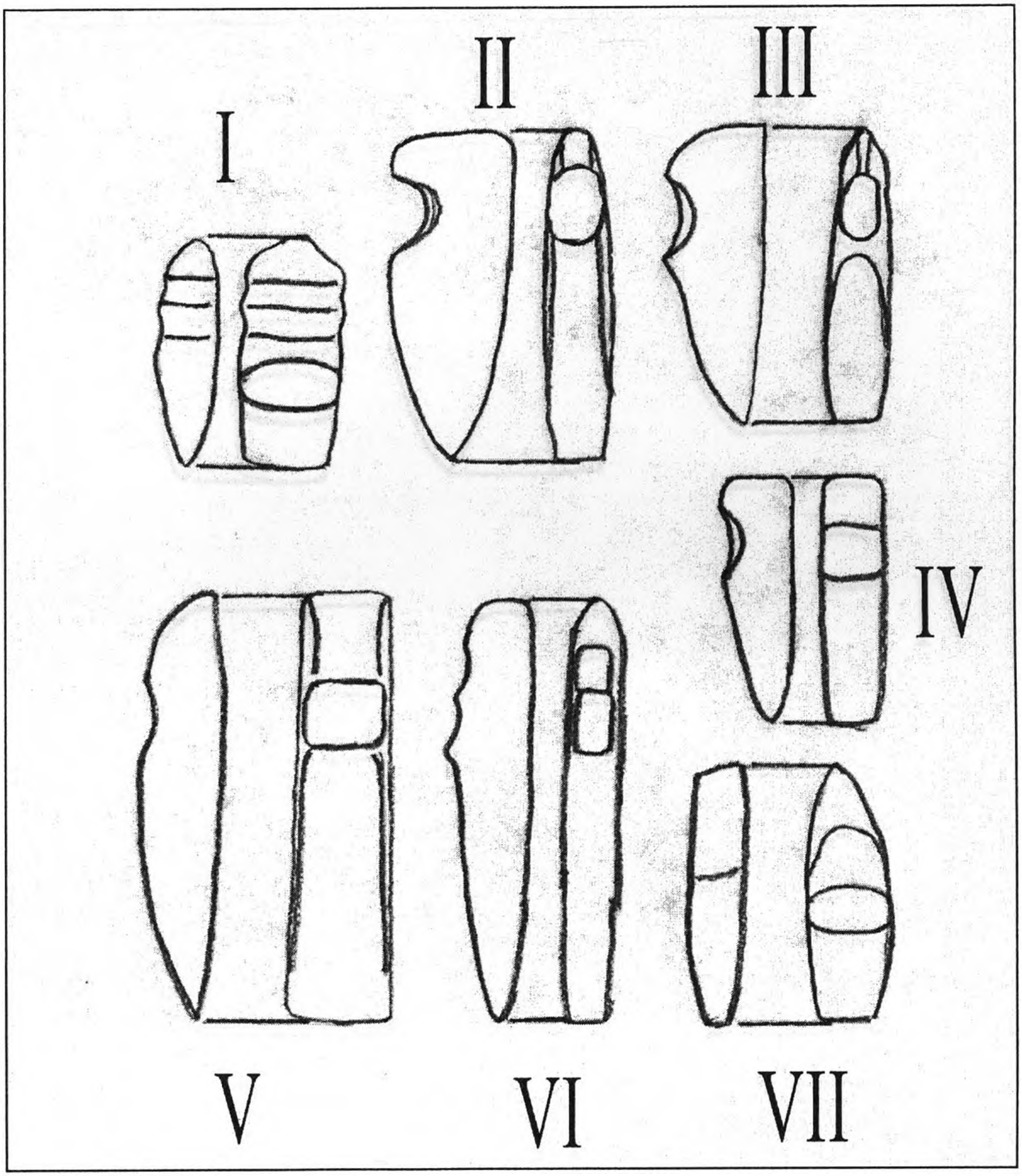


Figure 74

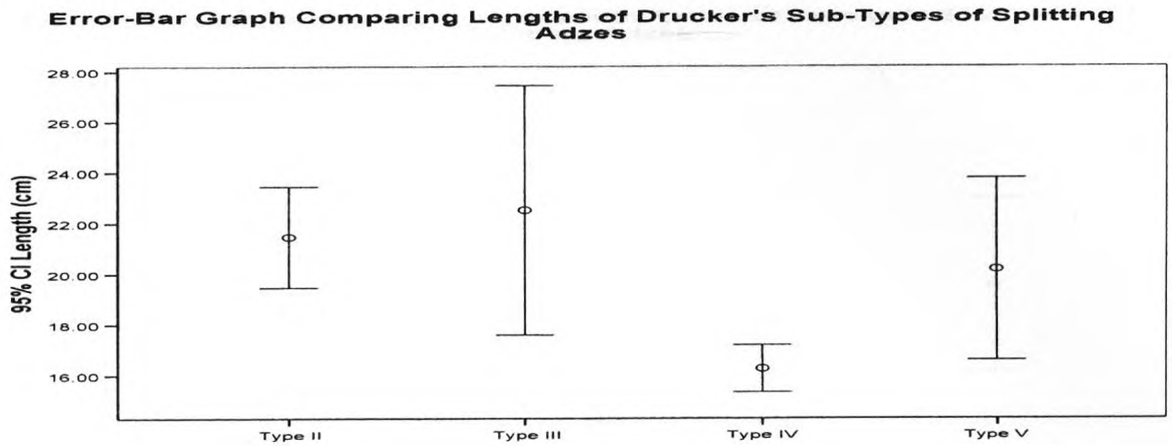


Figure 75

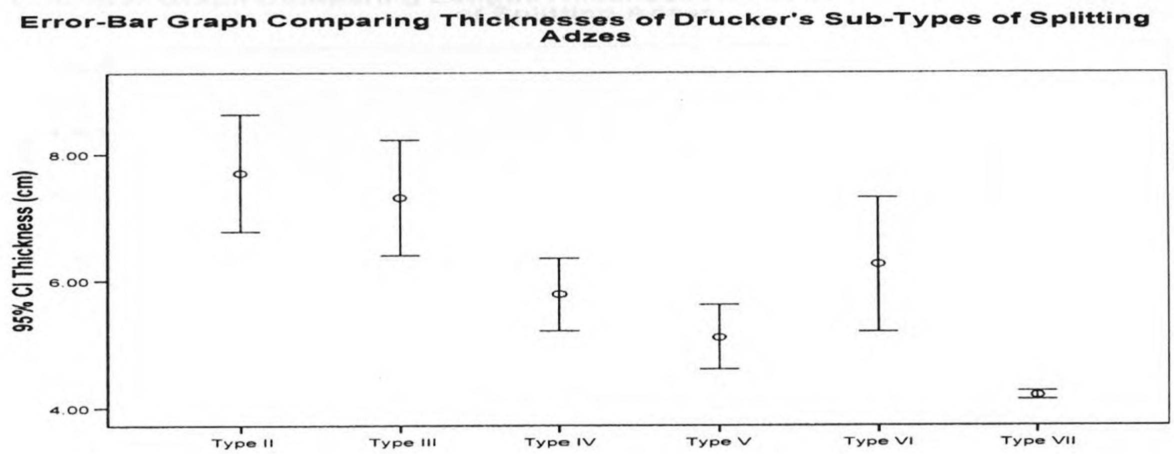


Figure 76

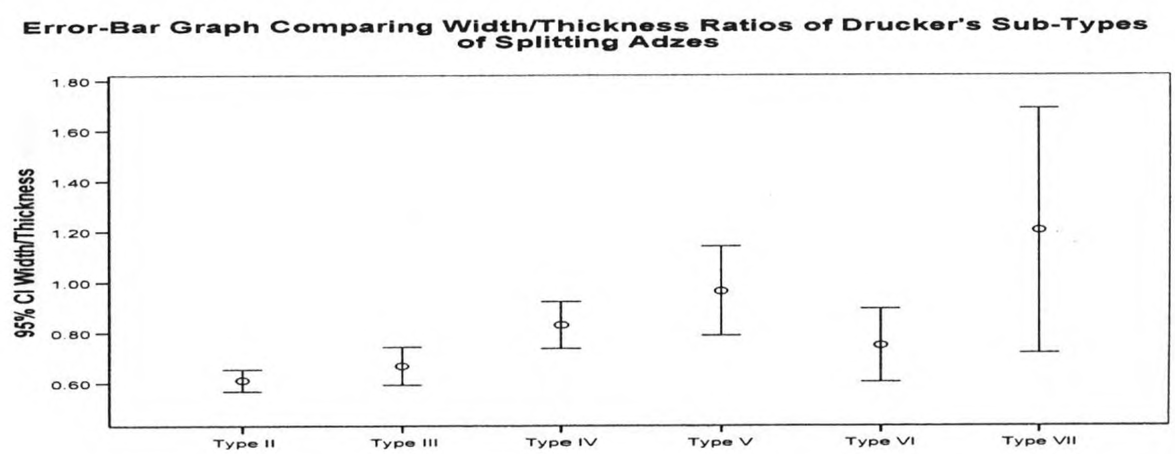


Figure 77

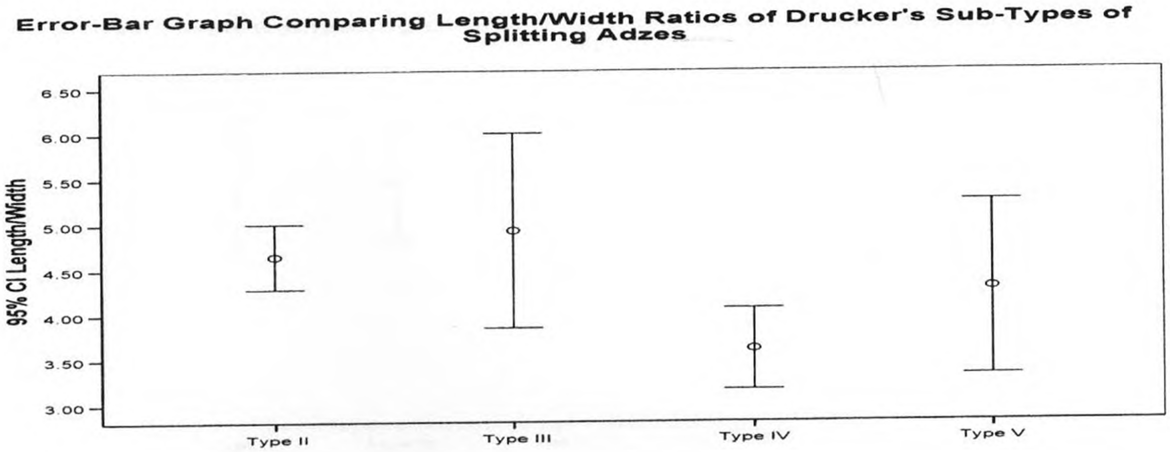


Figure 78

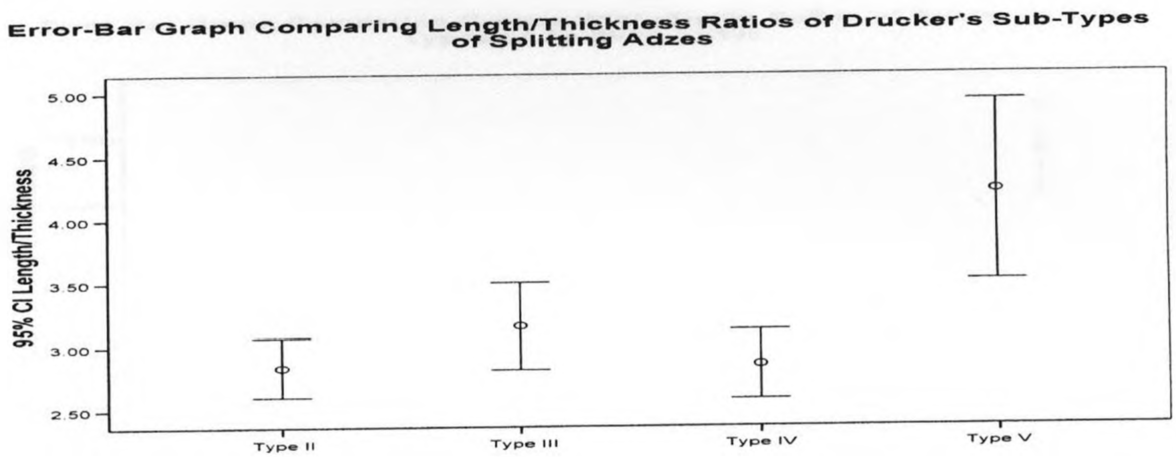


Figure 79

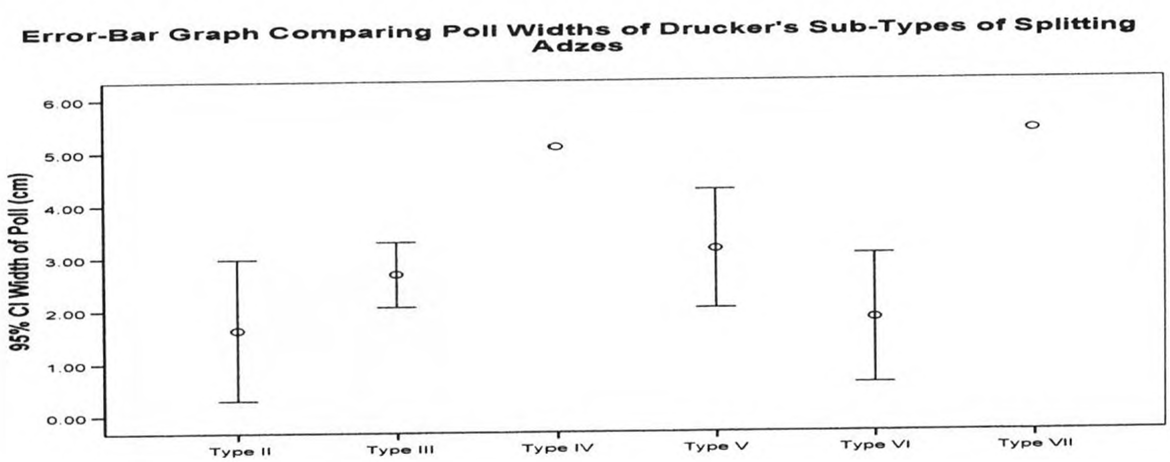


Figure 80

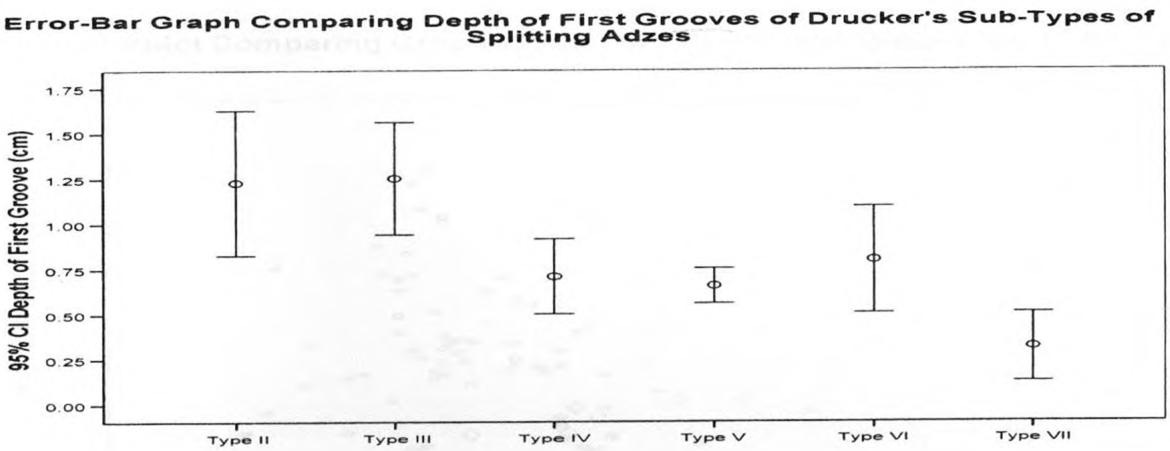


Figure 81

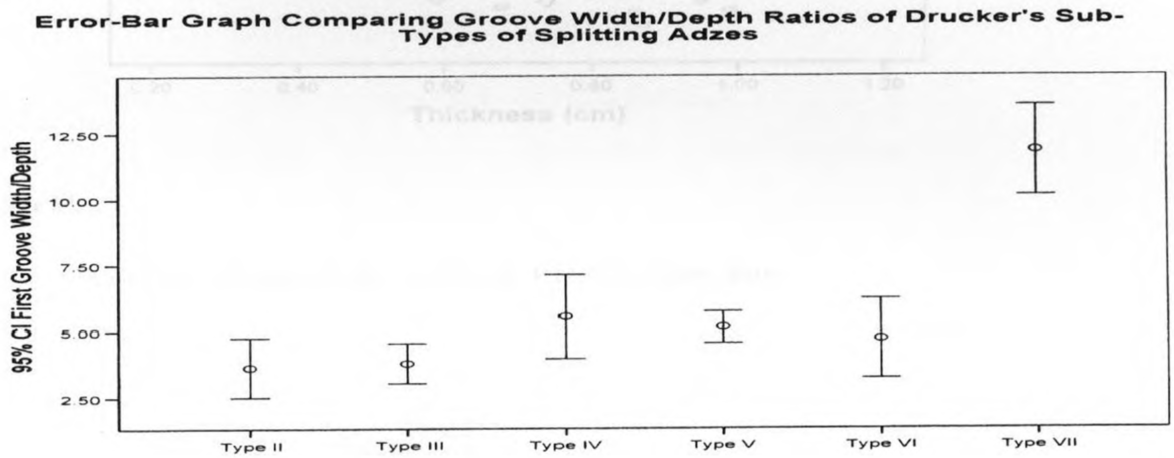


Figure 82

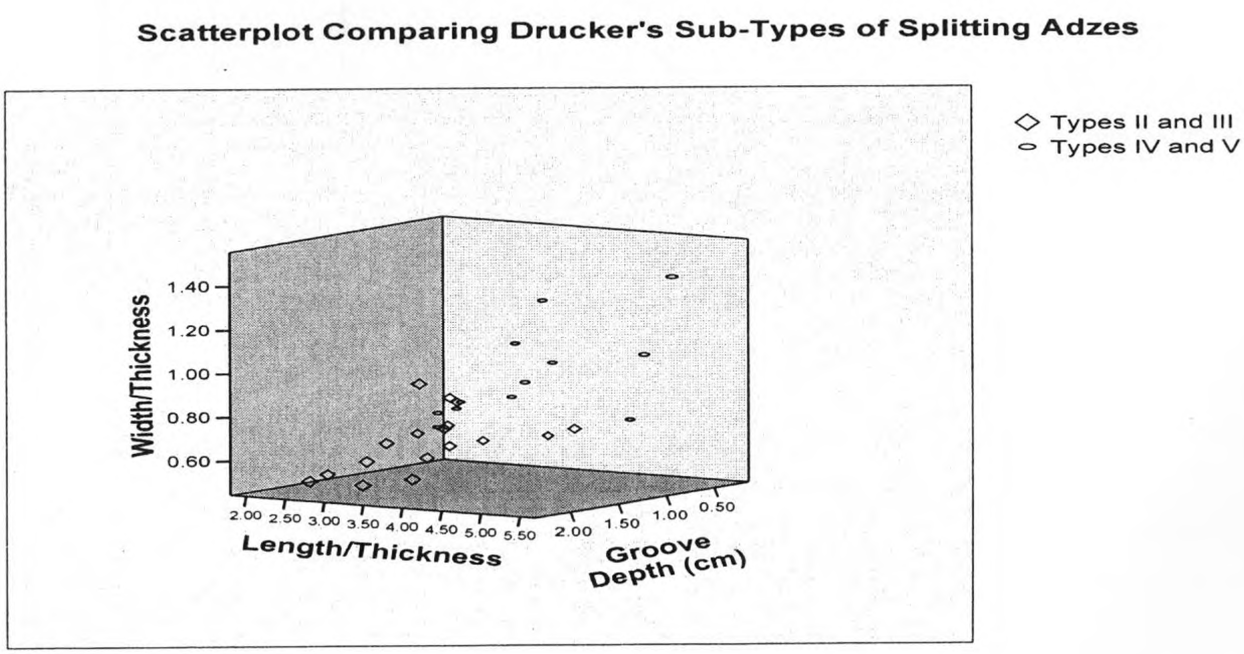


Figure 83

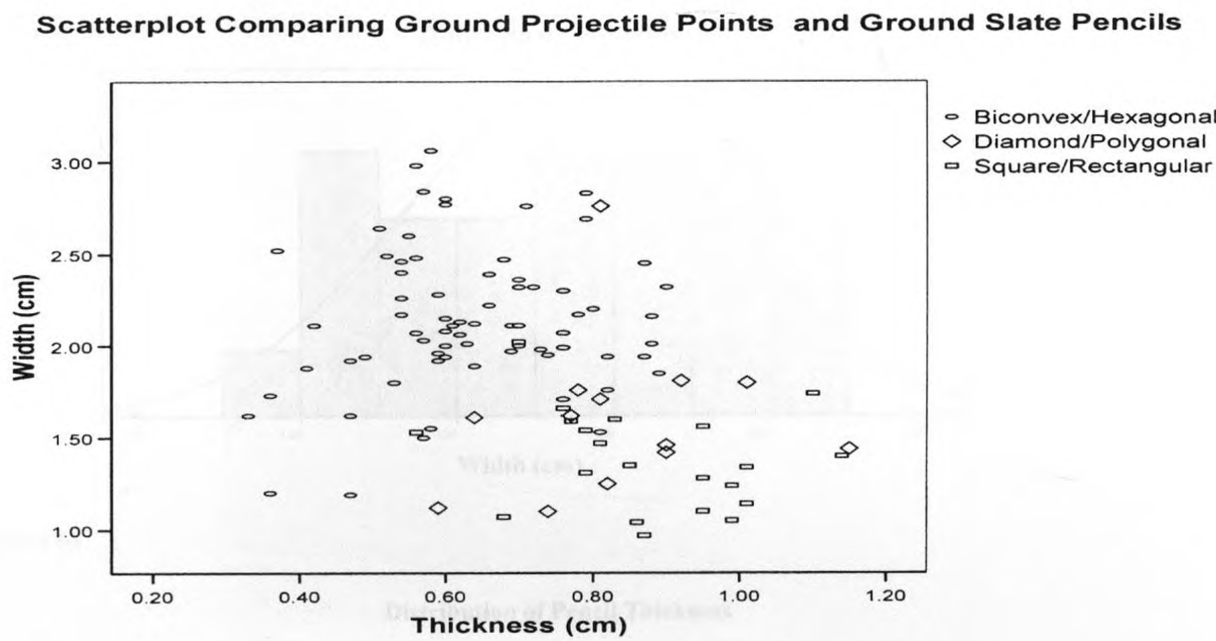


Figure 84

Distribution of Ground Points and Pencils Width/Thickness Ratio

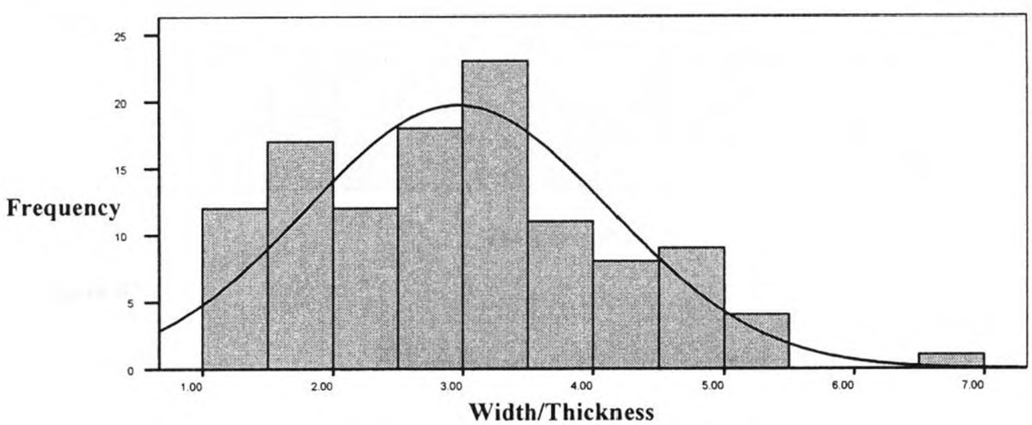


Figure 85

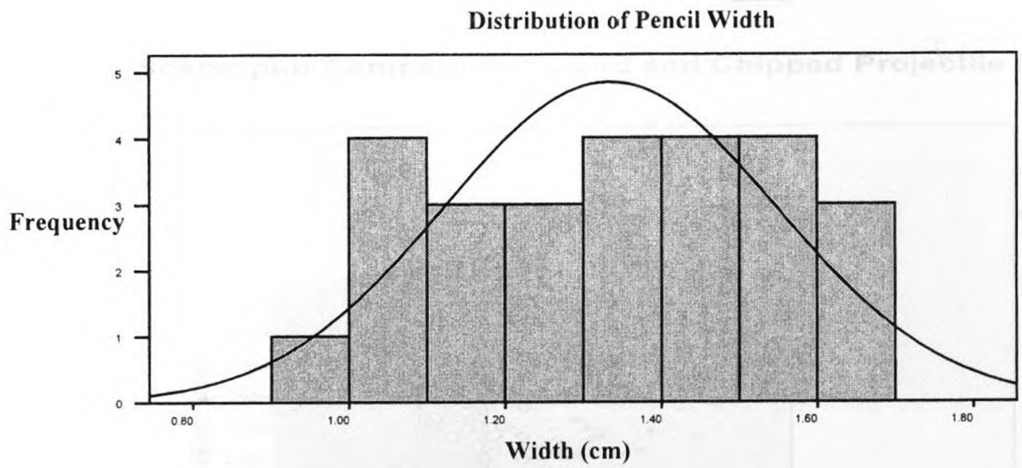


Figure 86

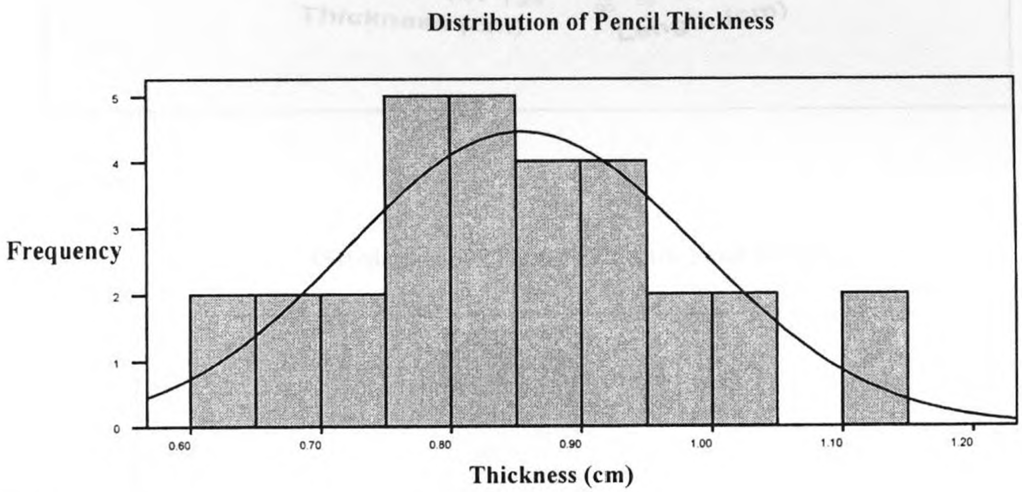


Figure 87

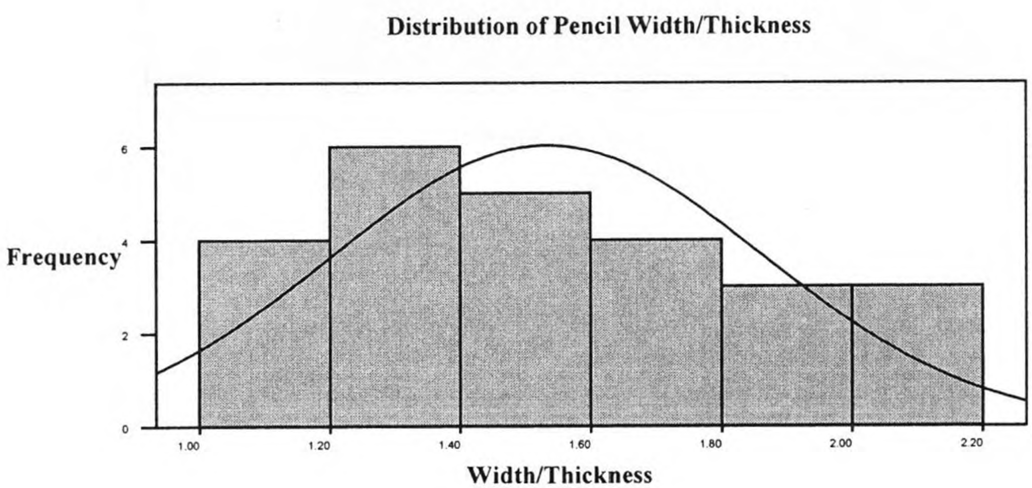


Figure 88

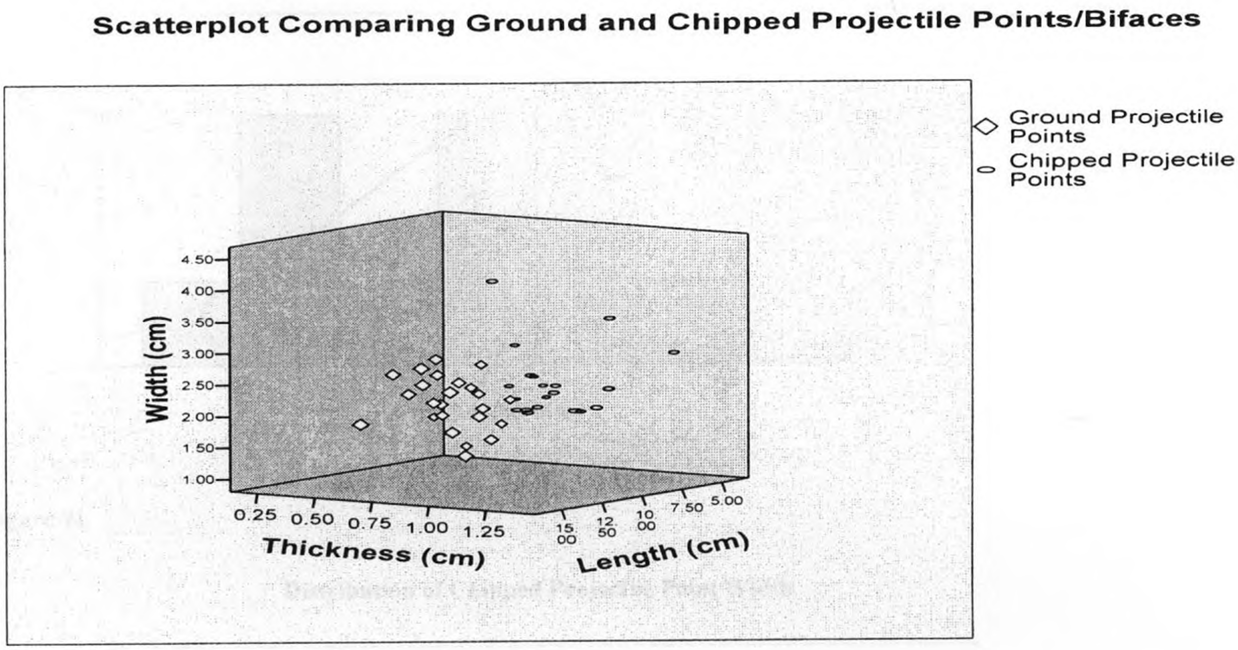


Figure 89

Distribution of Chipped Projectile Point Weight

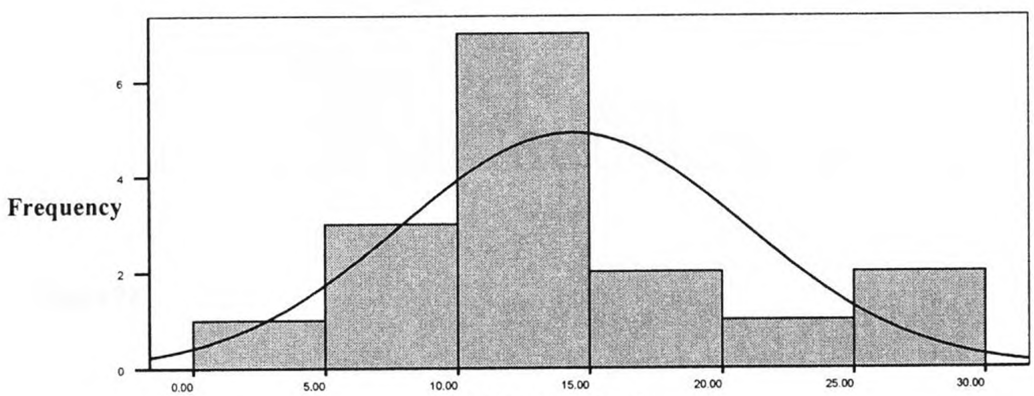


Figure 90

Distribution of Chipped Projectile Point Length

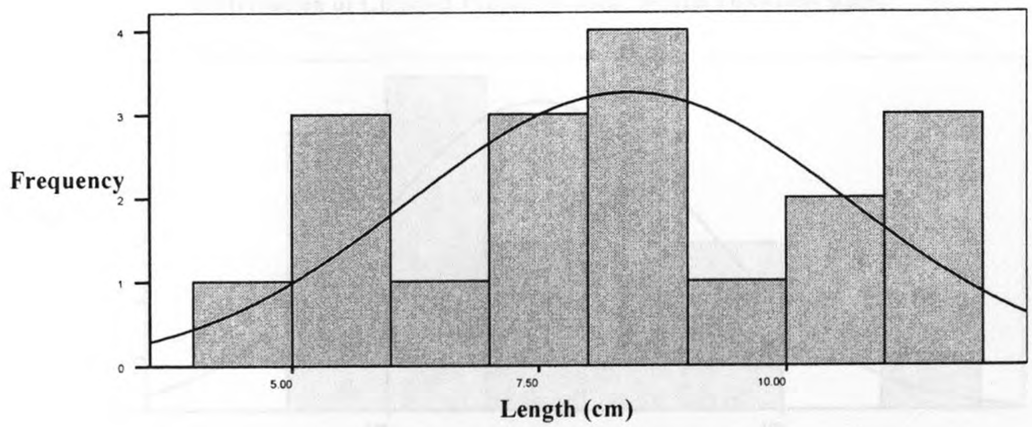


Figure 91

Distribution of Chipped Projectile Point Width

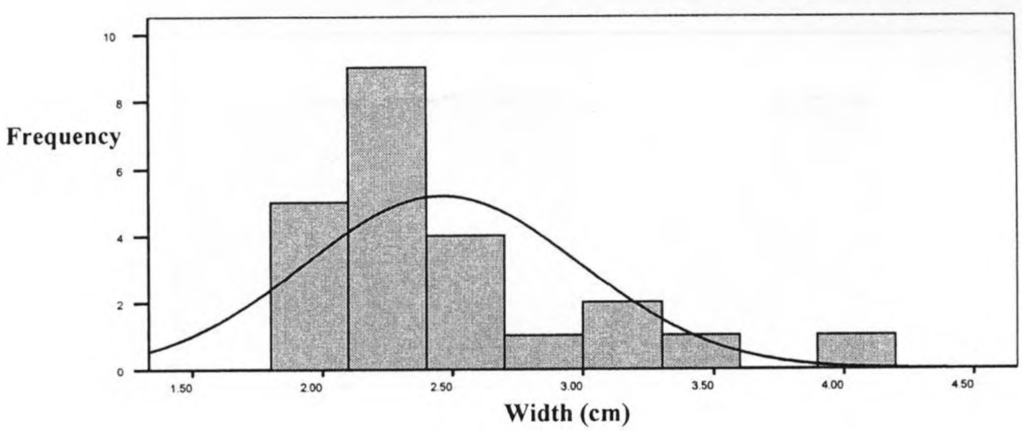


Figure 92

Distribution of Chipped Projectile Point Thickness

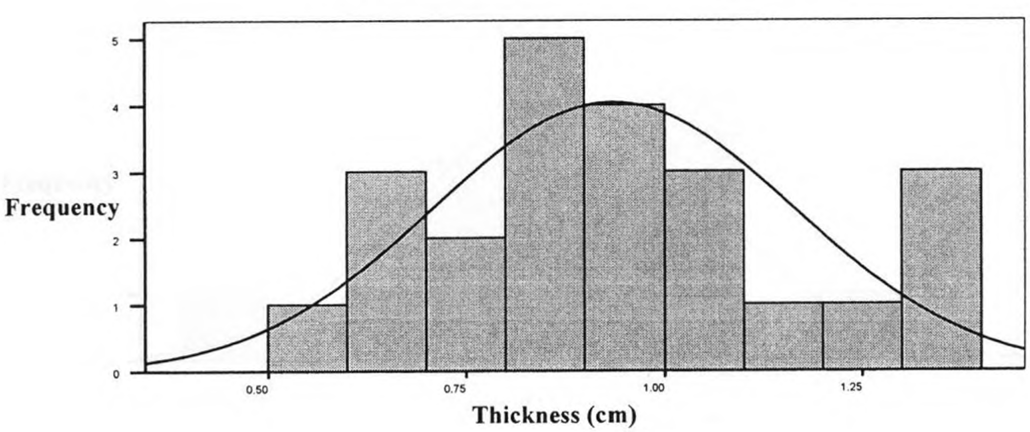


Figure 93

Distribution of Chipped Projectile Point Width/Thickness Ratio

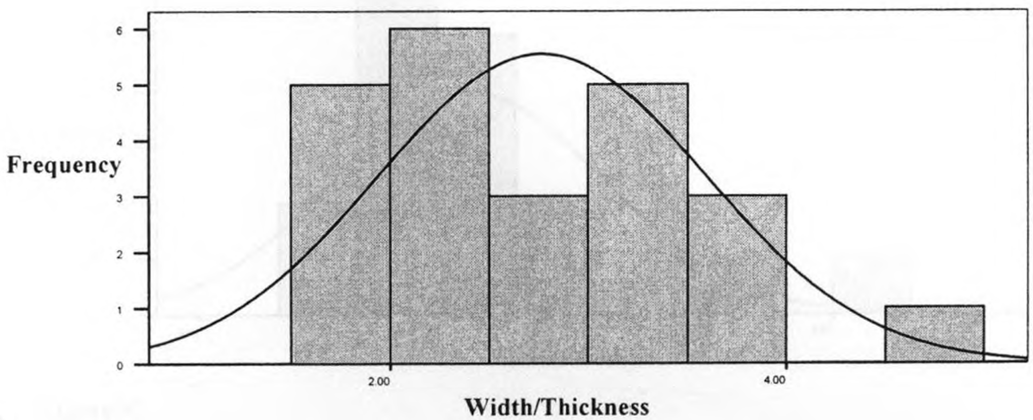


Figure 94

Distribution of Chipped Projectile Point Length/Width Ratios

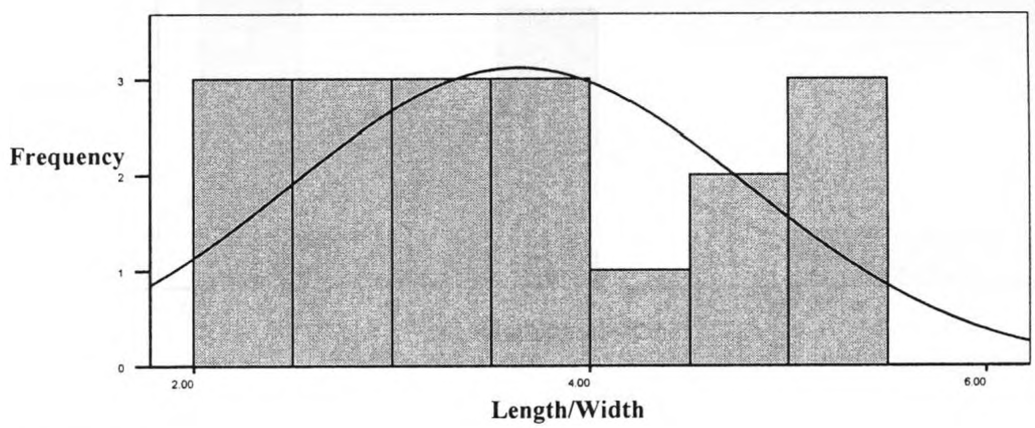


Figure 95

Distribution of Chipped Projectile Point Length/Thickness Ratio

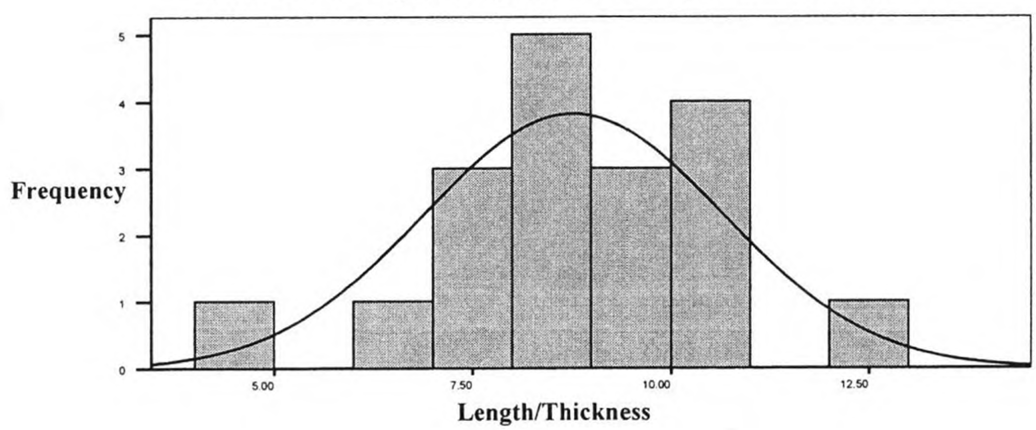


Figure 96

Distribution of Chipped Projectile Point Basal Widths

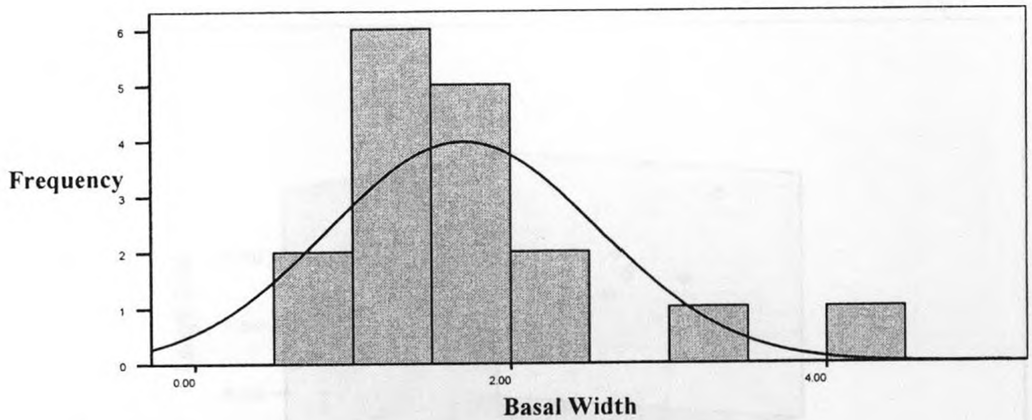


Figure 97

Distribution of Chipped Projectile Point Width/Basalwidth Ratios

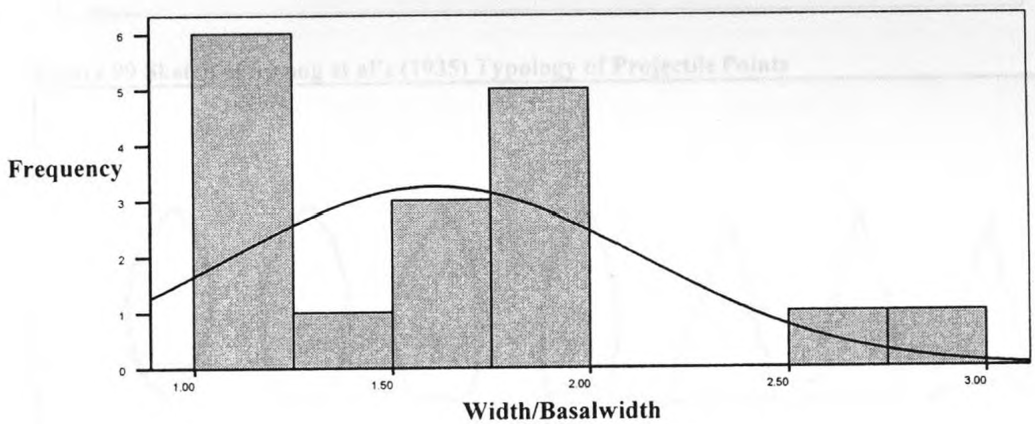


Figure 98

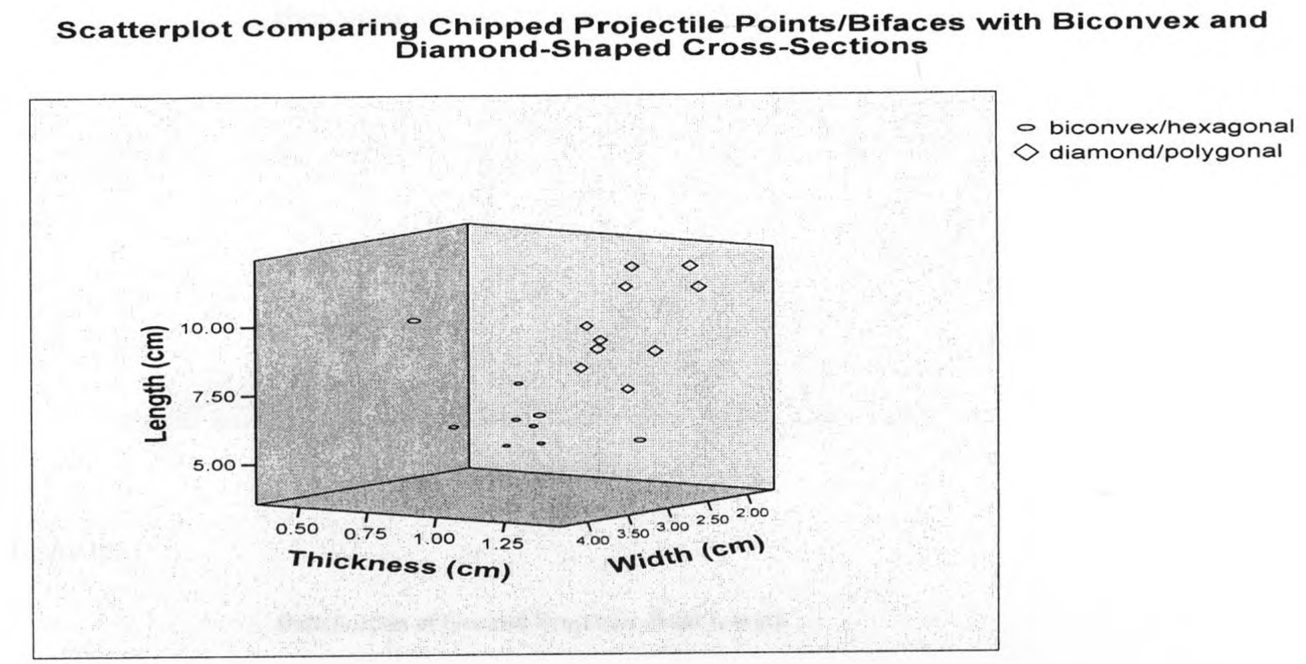


Figure 99 Sketch of Strong et al's (1935) Typology of Projectile Points

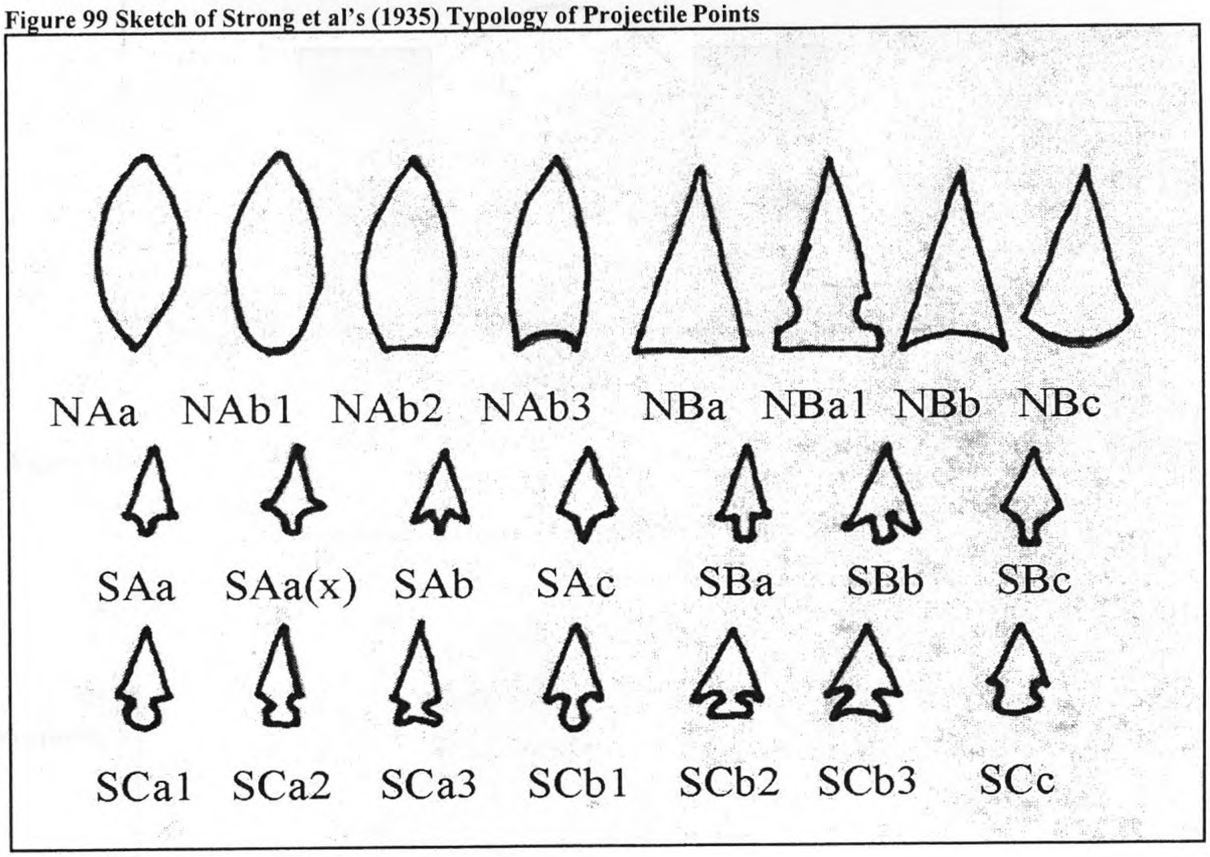


Figure 100

Distribution of Ground Projectile Point Weight

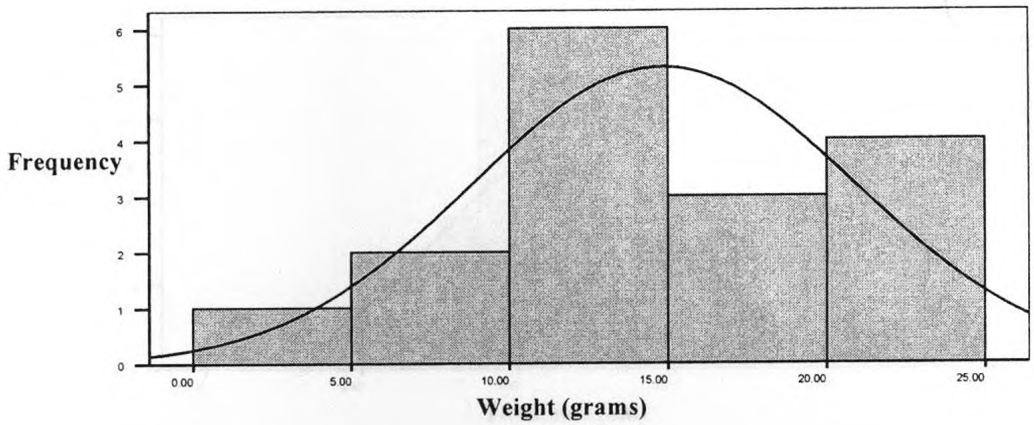


Figure 101

Distribution of Ground Projectile Point Length

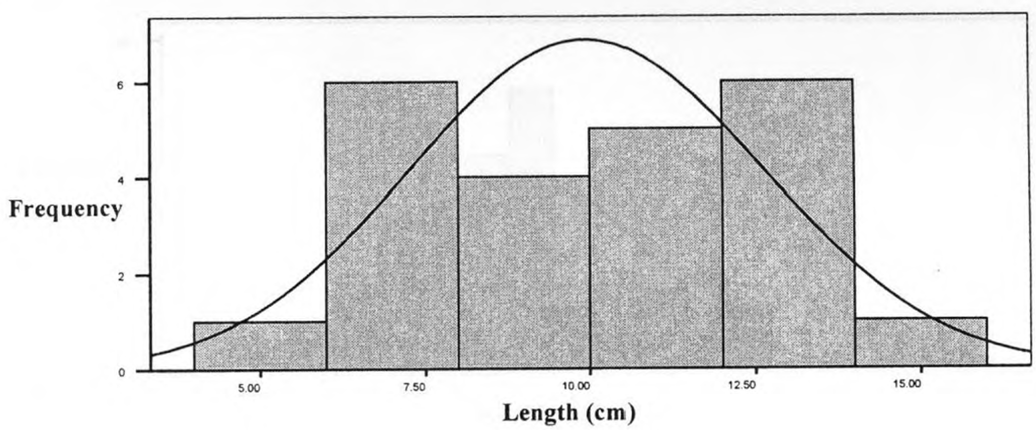


Figure 102

Distribution of Ground Projectile Point Width

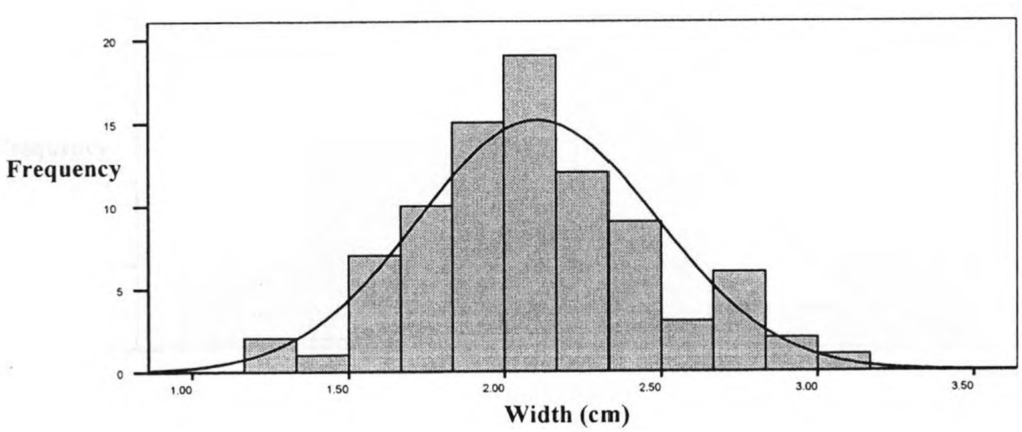


Figure 103

Distribution of Ground Projectile Point Thickness

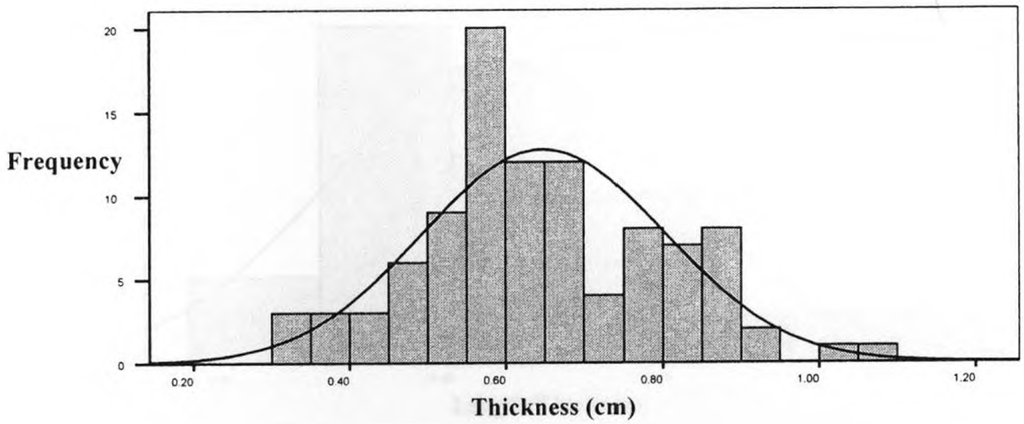


Figure 104

Distribution of Ground Projectile Point Width/Thickness Ratio

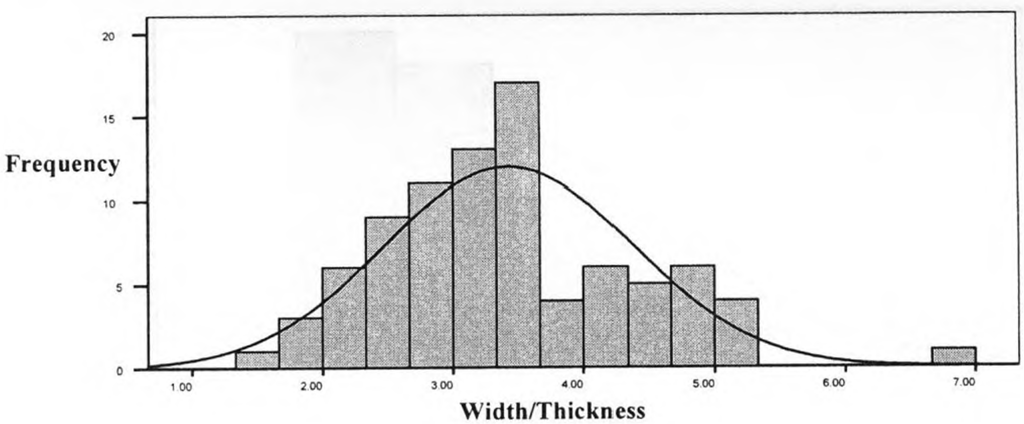


Figure 105

Distribution of Ground Projectile Point Length/Width Ratio

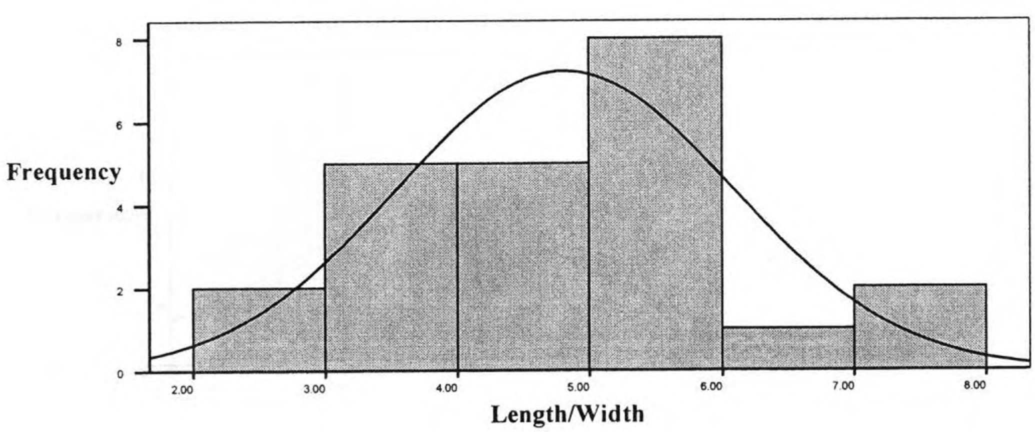


Figure 106

Distribution of Ground Projectile Point Length/Thicknes Ratio

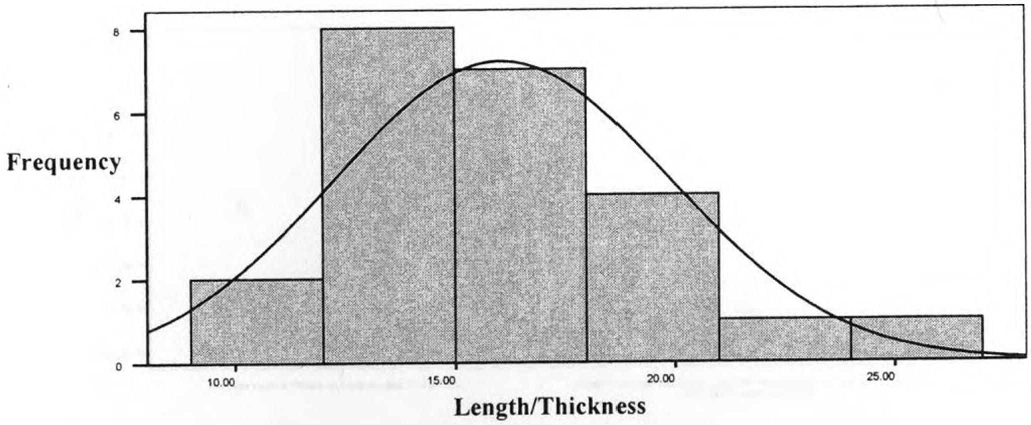


Figure 107

Distribution of Ground Projectile Point Basal Width

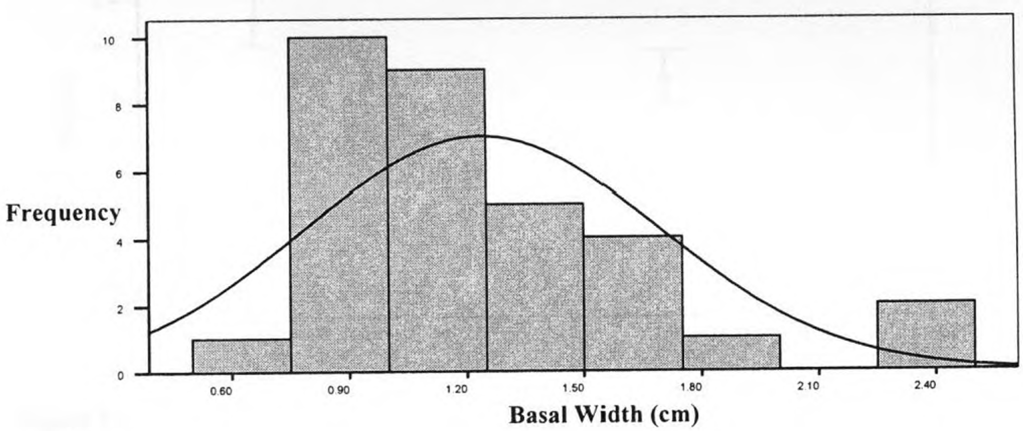


Figure 108

Distribution of Ground Projectile Point Width/Basal Width

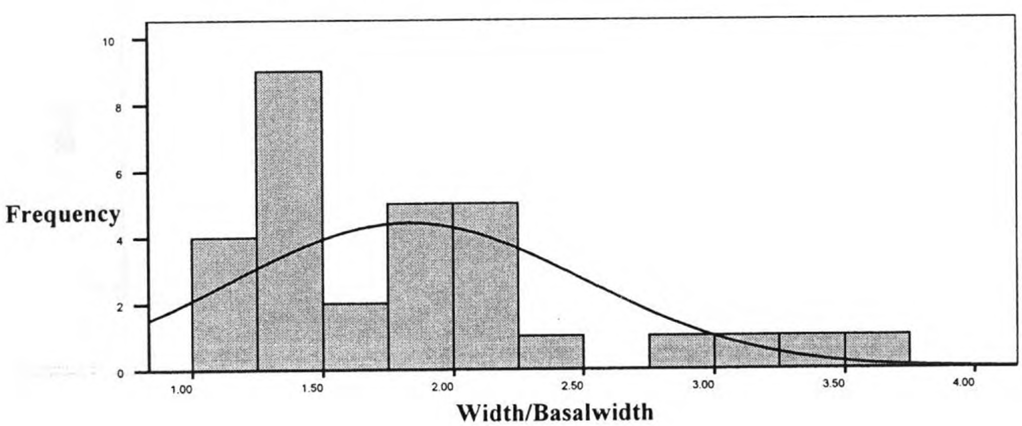


Figure 109

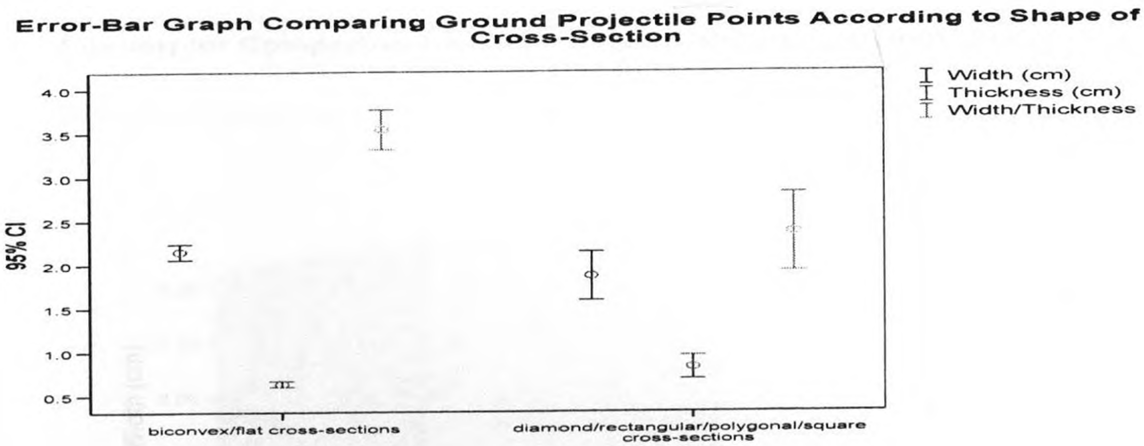


Figure 110

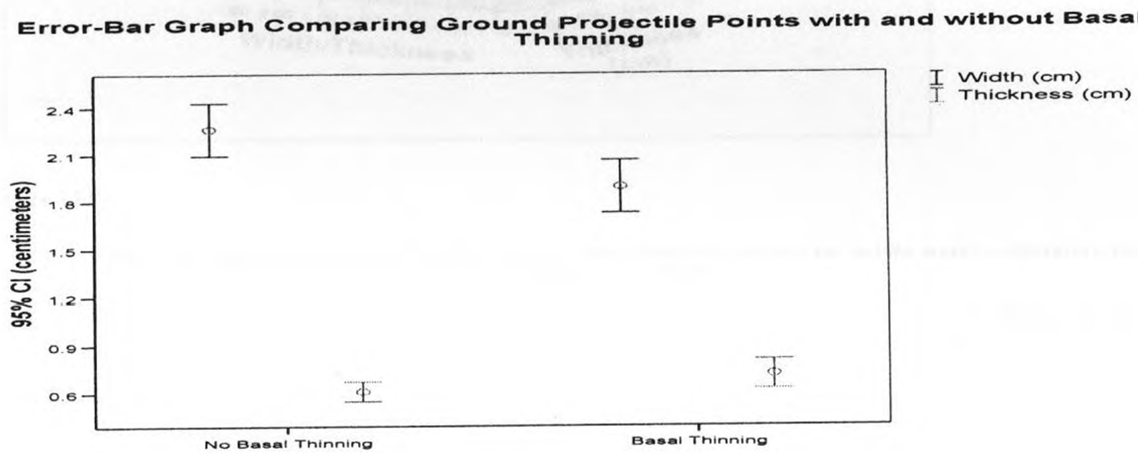


Figure 111

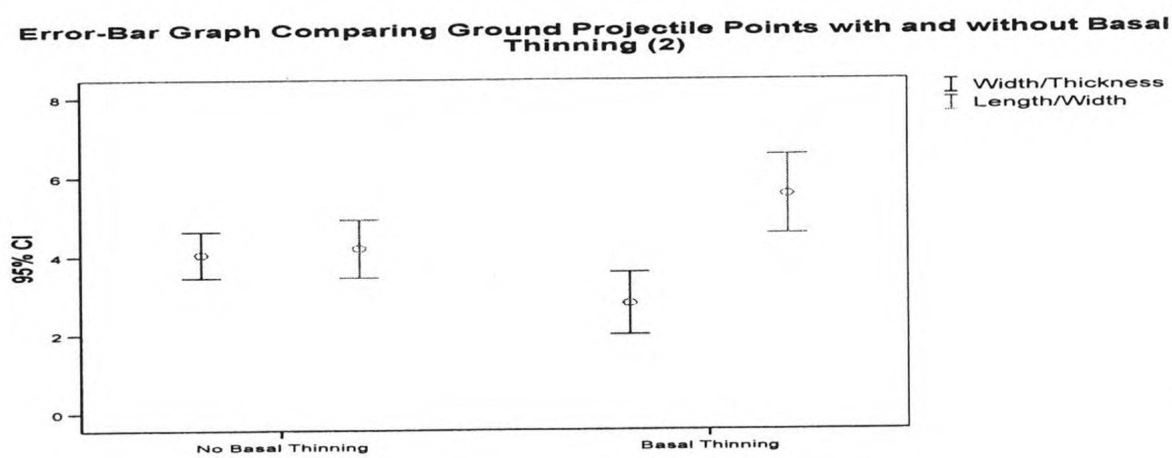


Figure 112

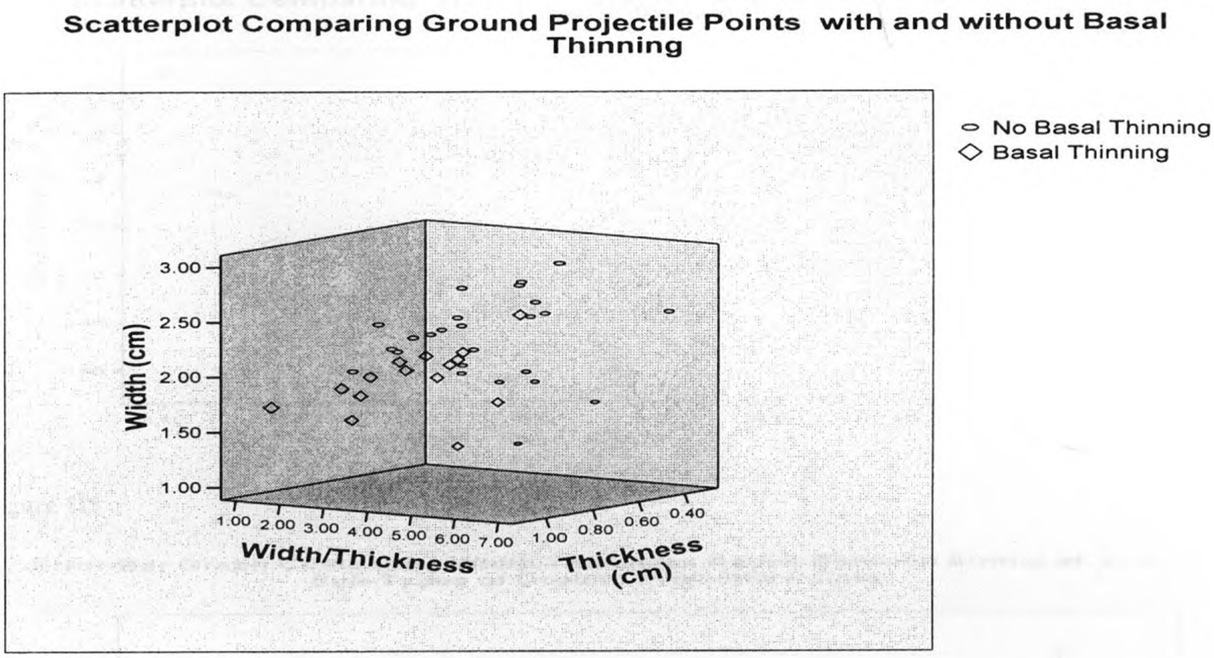


Figure 113

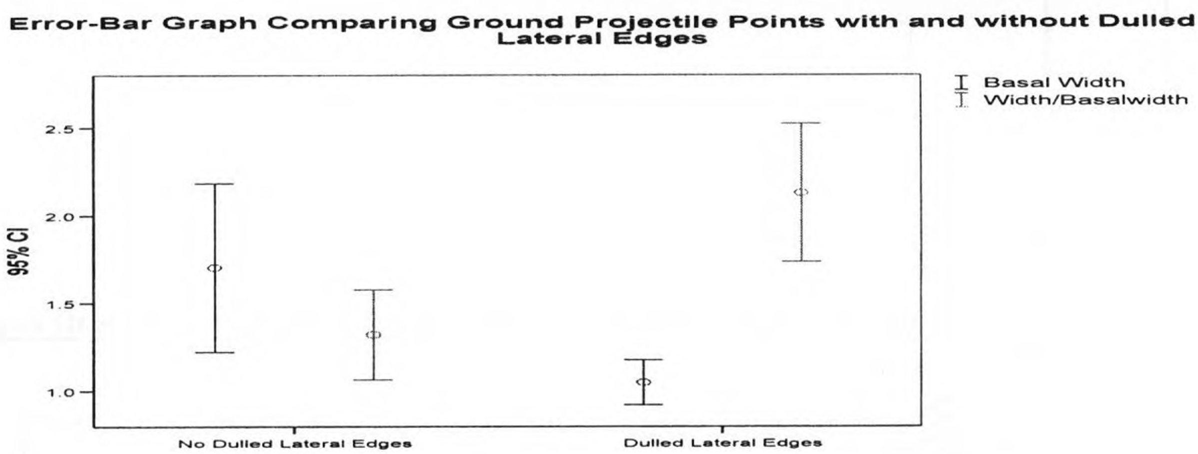


Figure 114

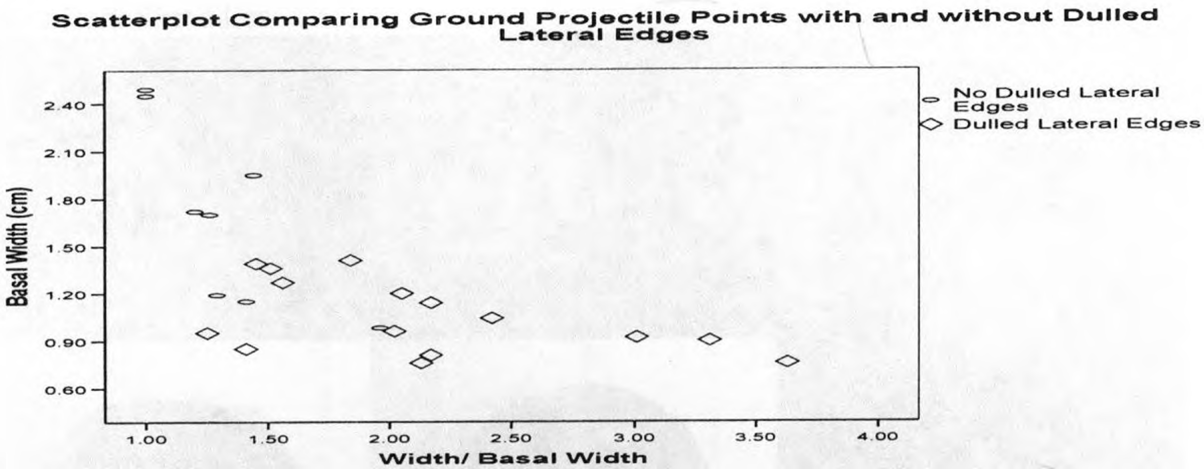


Figure 115

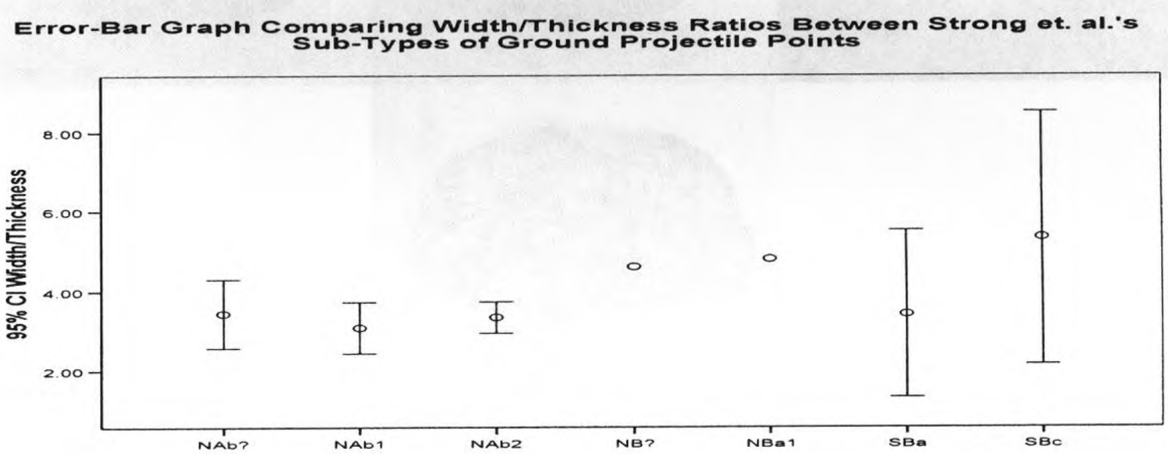
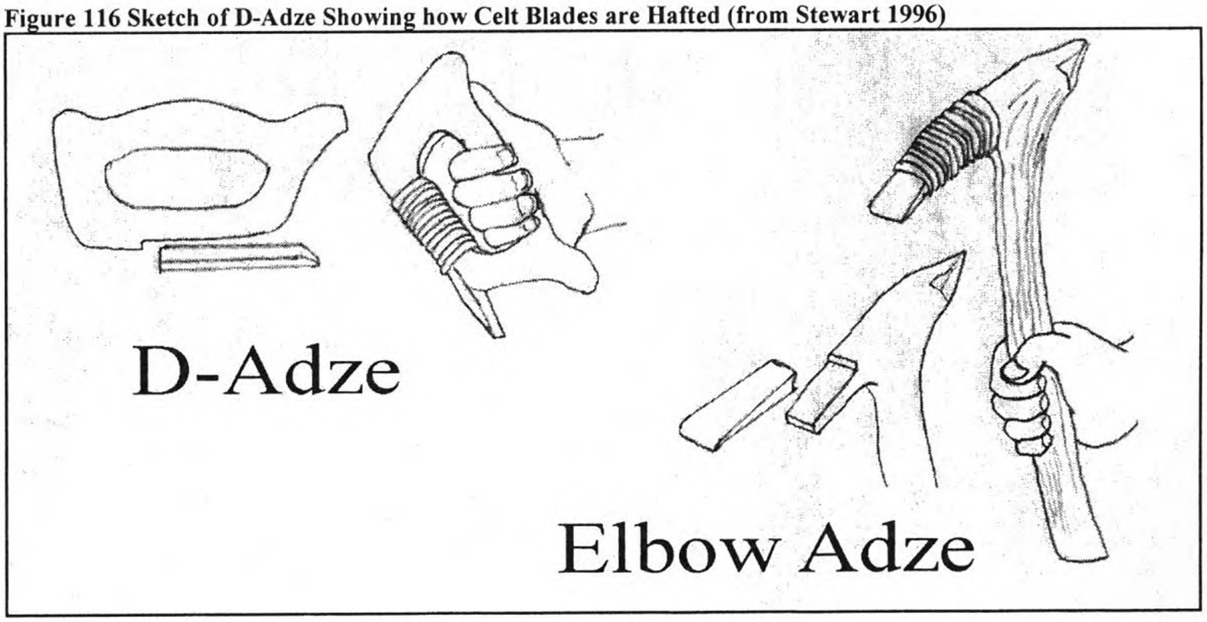
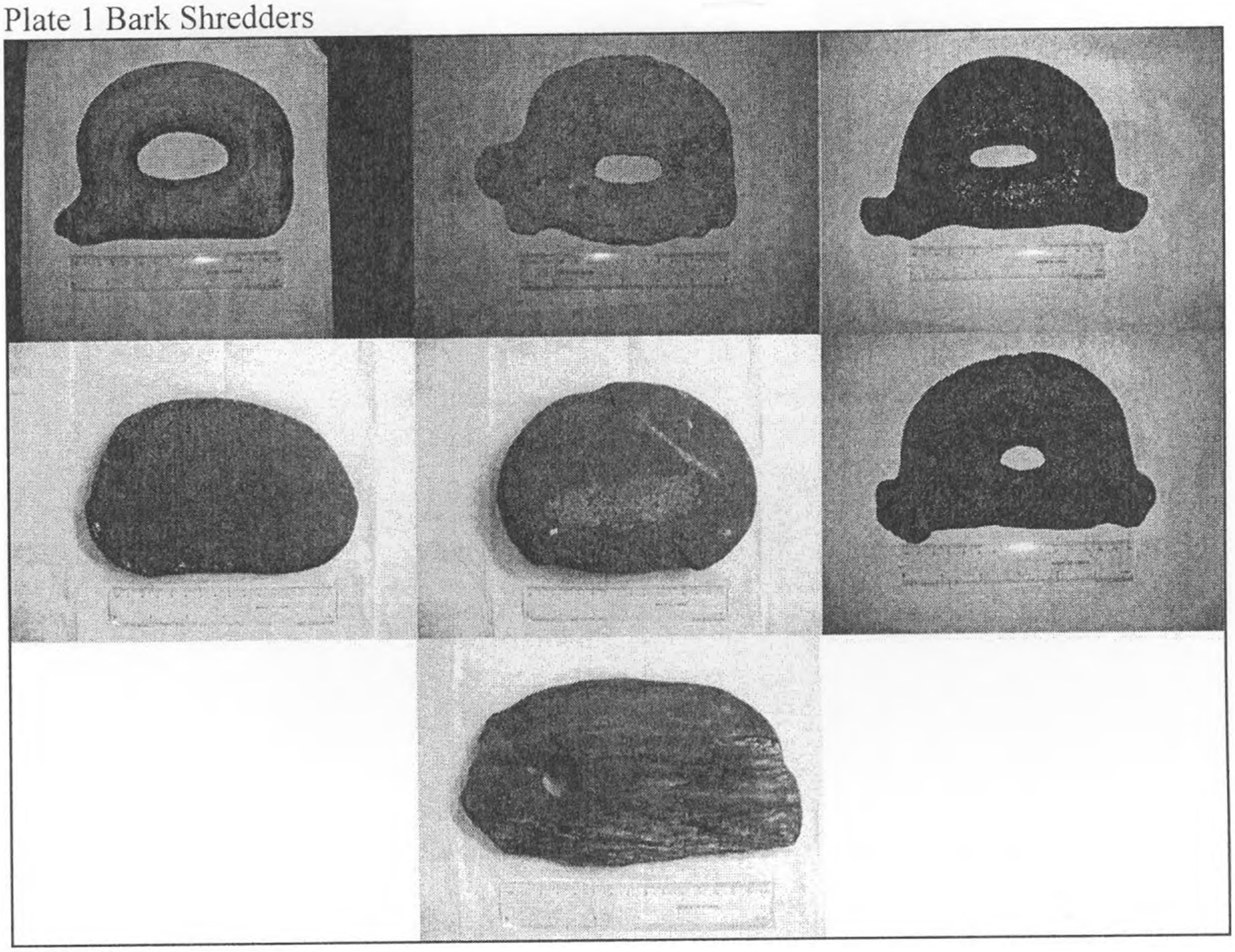


Figure 116 Sketch of D-Adze Showing how Celt Blades are Hafted (from Stewart 1996)



PLATES

Plate 1 Bark Shredders

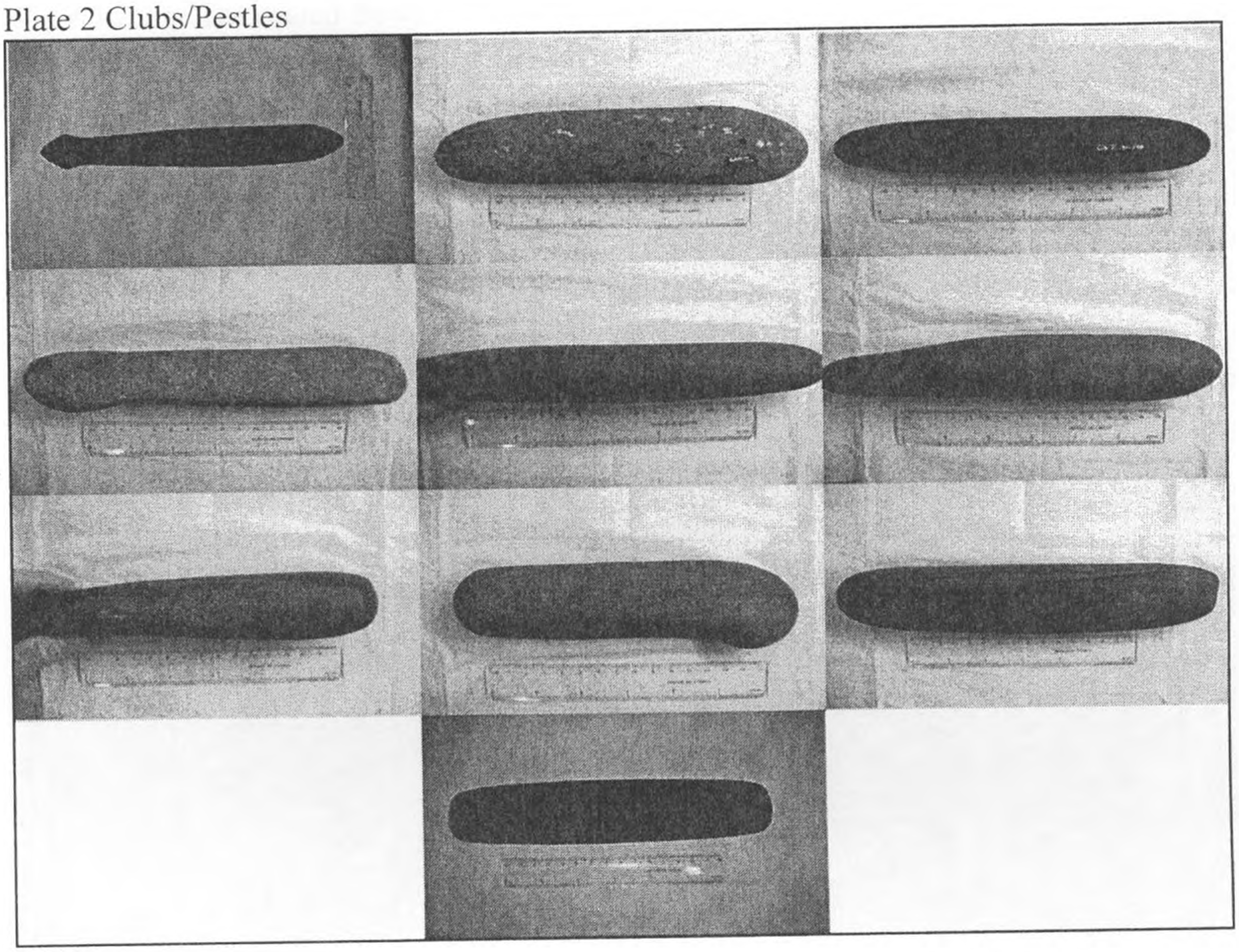


PRH:292 PRH:293 PRH:983.20.20 (cast)

GbTo-23:981 GbTo-33:245 PRH:3149

GbTo-31:x69

Plate 2 Clubs/Pestles



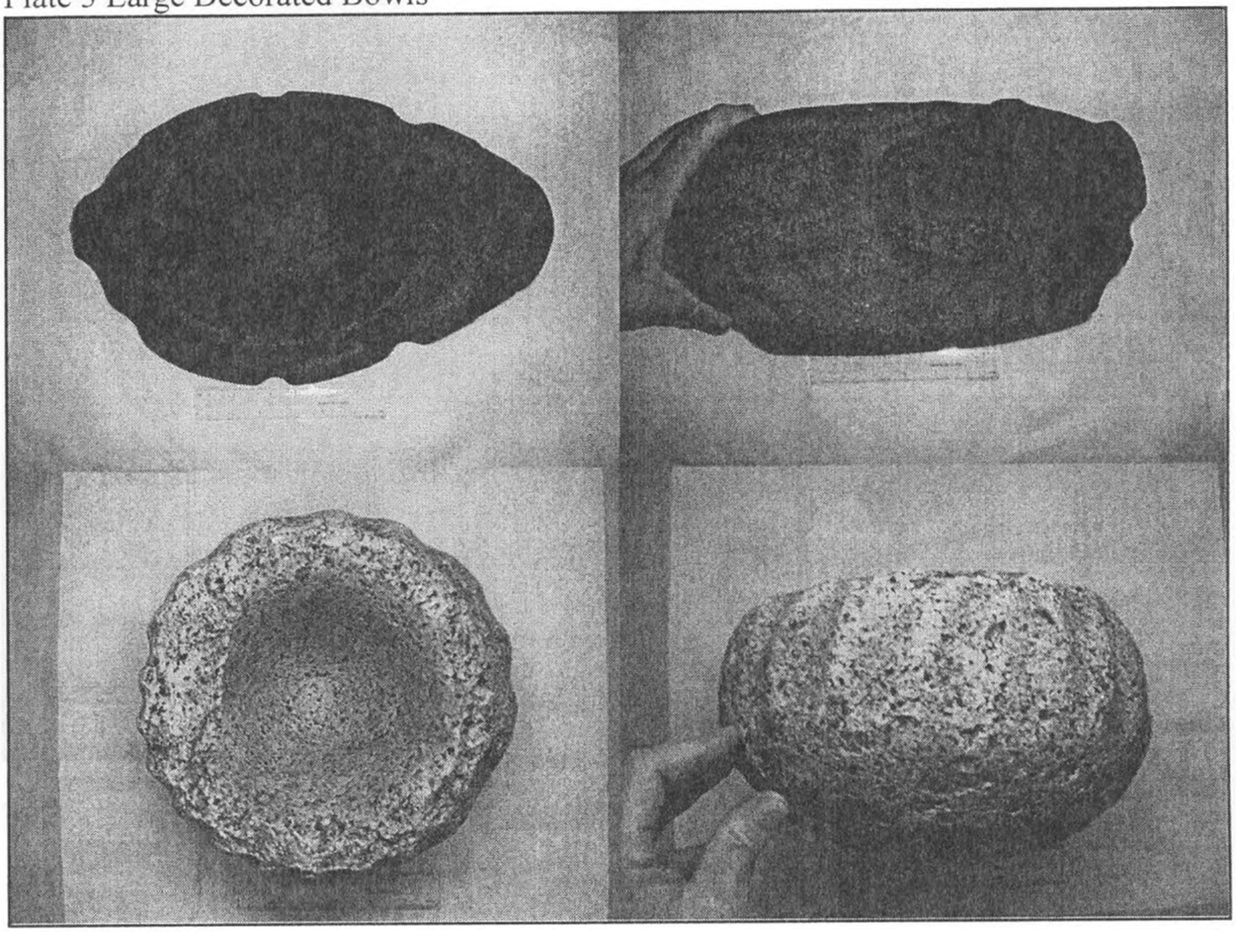
PRH:982.1.122 (cast) GbTo-31:377 GbTo-31:170

GbTo-23:1499 GbTo-23:1628 GcTo-1:837

GbTo-33:2821 GbTo-33:3038 GbTo-30:146

PRH:163

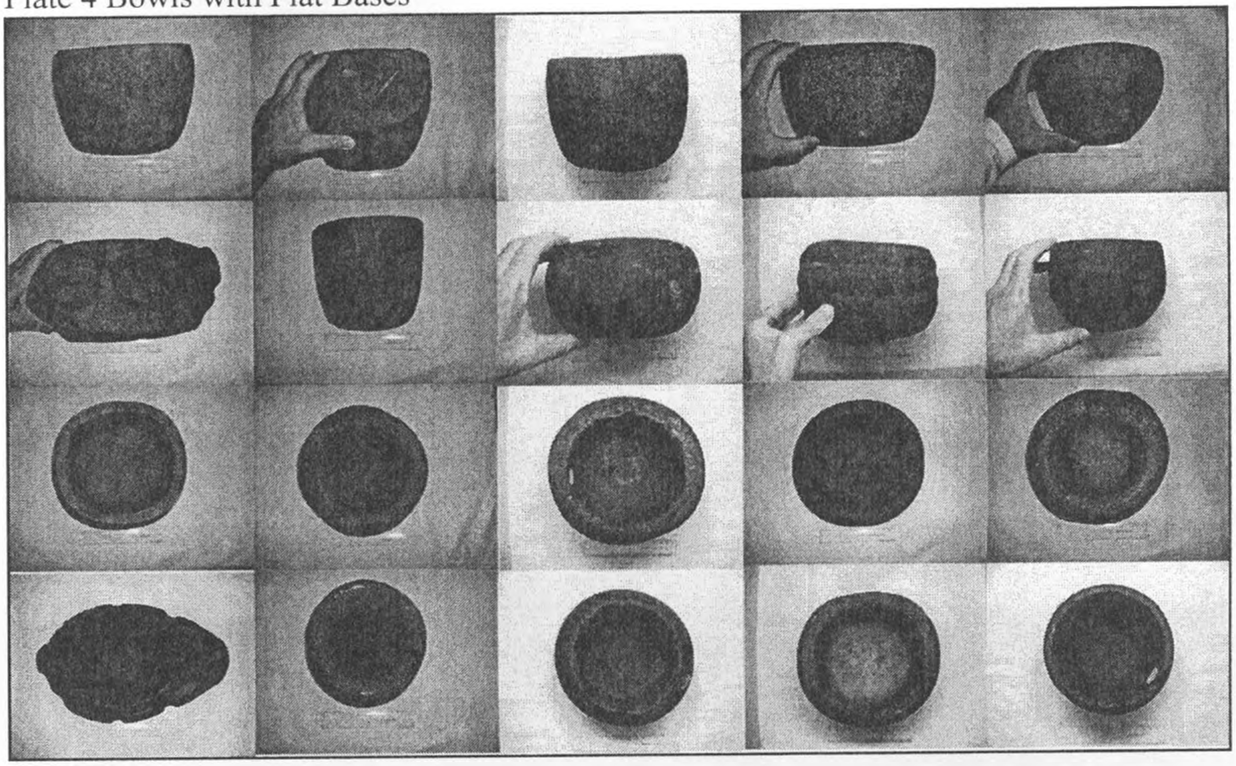
Plate 3 Large Decorated Bowls



PRH:2219

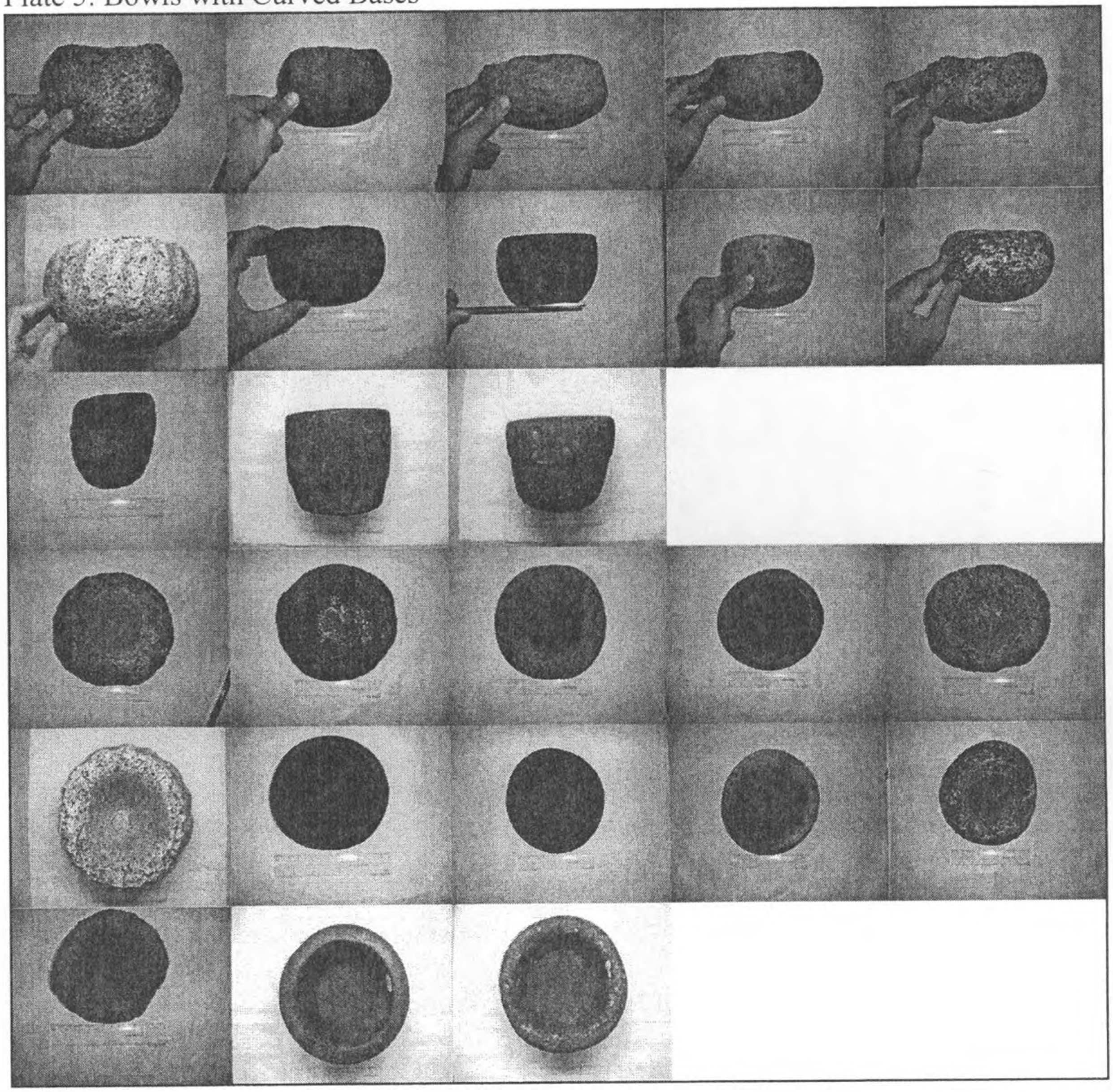
GbTo-30:2000

Plate 4 Bowls with Flat Bases



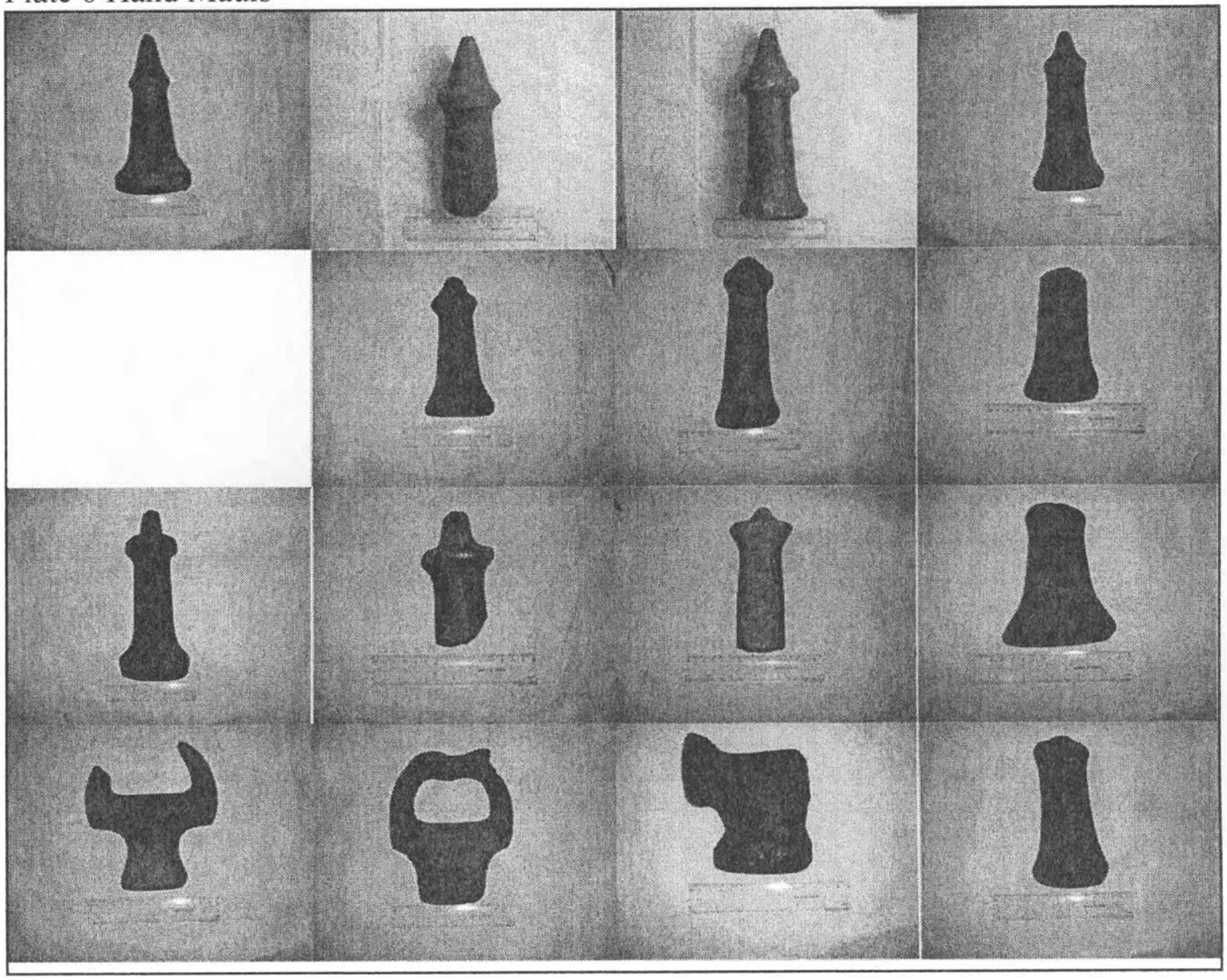
PRH:124	PRH:125	MA:301	PRH:1993	PRH:126
PRH:2219	PRH:127	MA:296	MA:307	MA:302

Plate 5: Bowls with Curved Bases



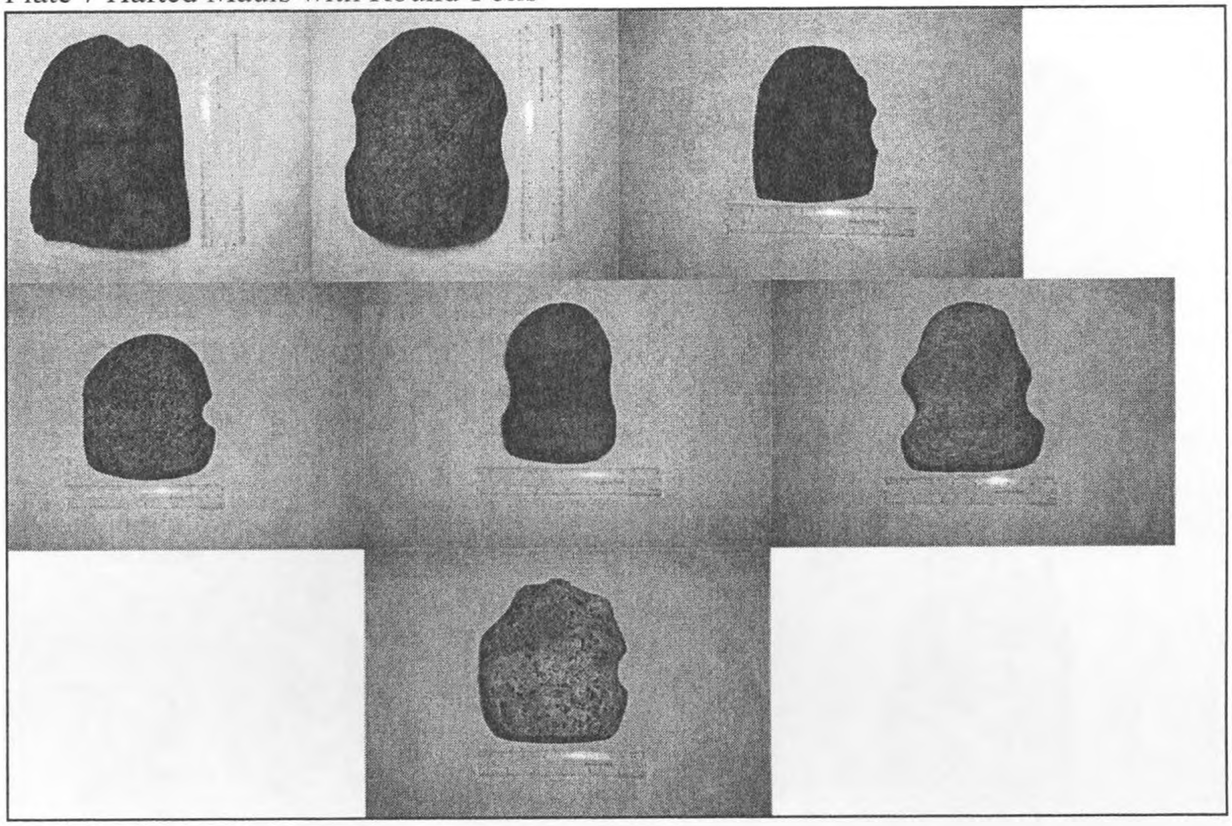
PRH:120	PRH:971	PRH:195	PRH:985.73.1	PRH:2316
GbTo-30:2000	PRH:231	PRH:1987	PRH:304	PRH:2696
PRH:133	MA:306	MA:304		

Plate 6 Hand Mauls



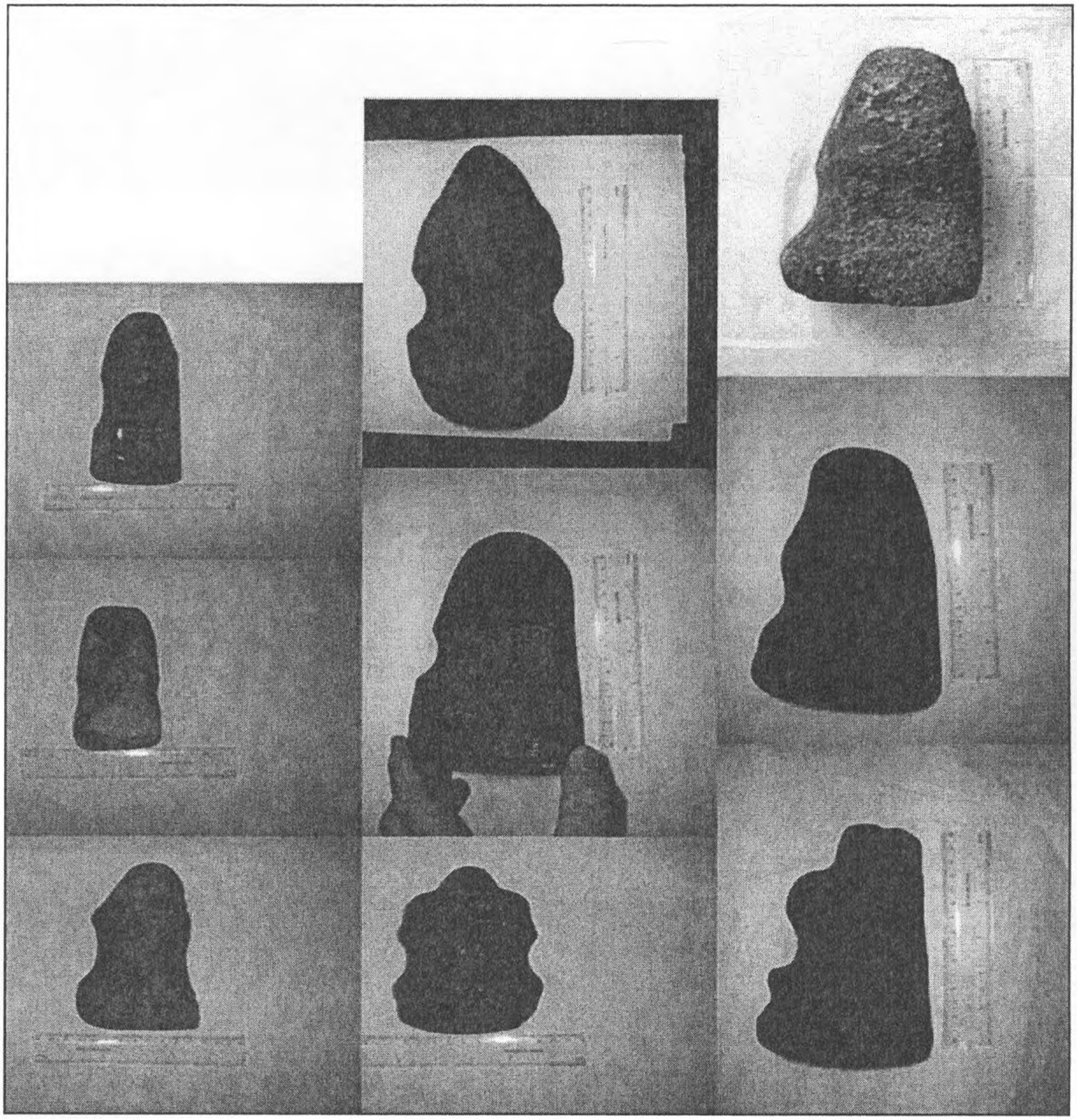
PRH:134	GbTo-31:1582	GbTo-31:2408	PRH:1588
	PRH:unknown	PRH:140	PRH:982.1.81
PRH:135	PRH:982.1.52	PRH:140	PRH:989.9.1
PRH:149	PRH:150	PRH:151	PRH:989.9.10

Plate 7 Hafted Mauls with Round-Polls



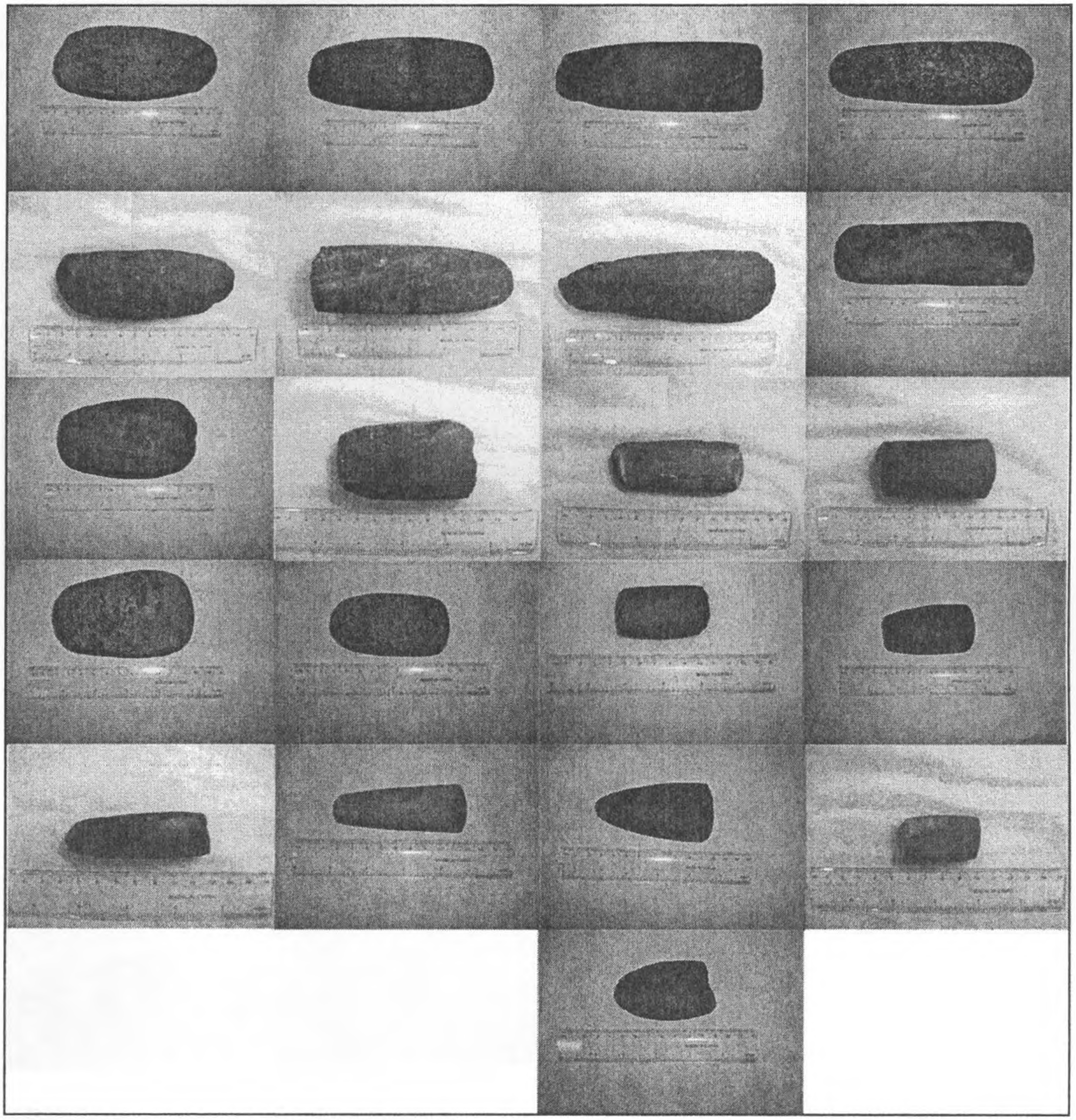
PRH:294	PRH:340	PRH:330
PRH:2546	PRH:982.26.6	PRH:3163
	PRH:341	

Plate 8 Hafted Mauls with Pointed Polls



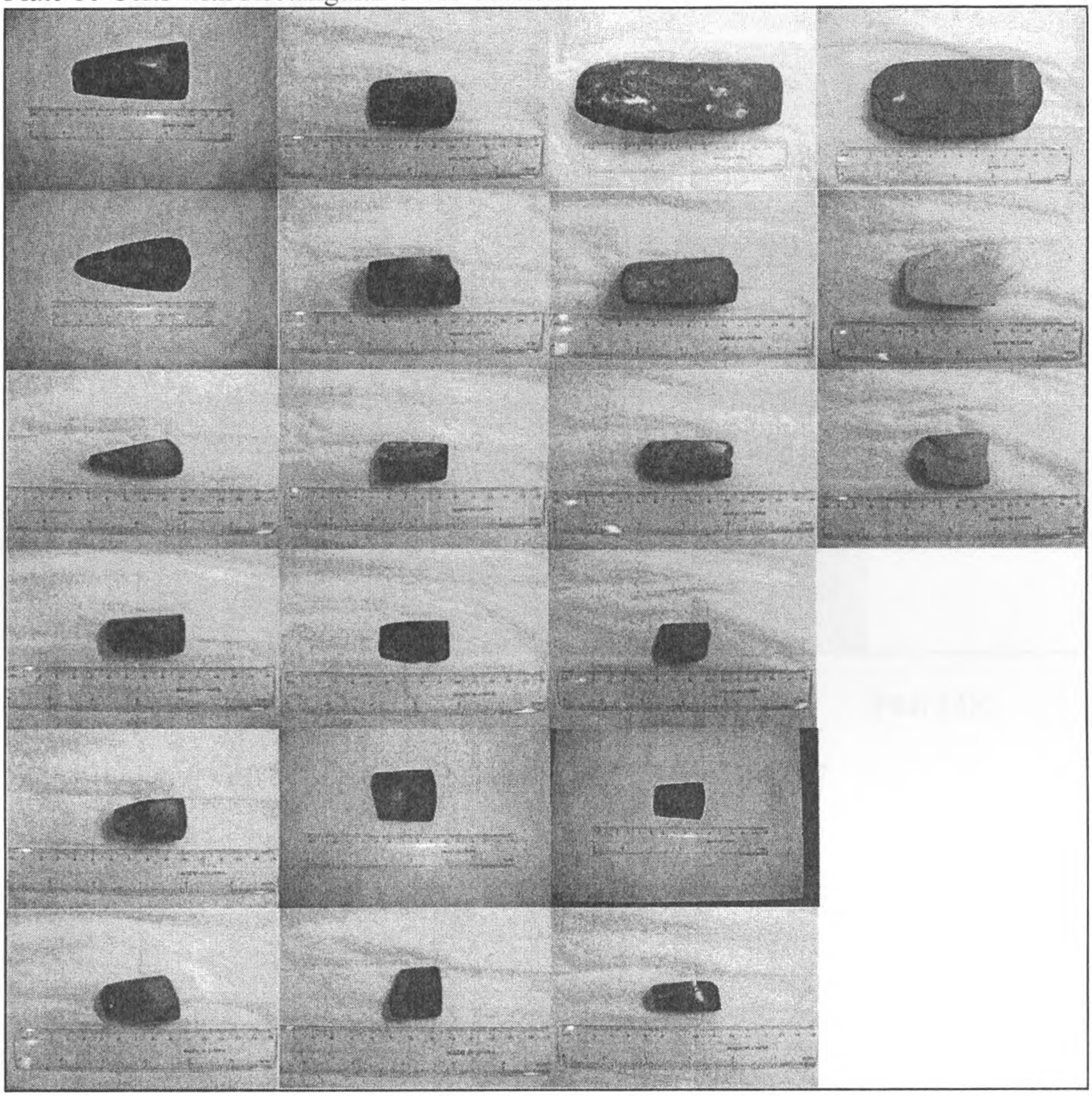
PRH:329	PRH:295	GbTo-23:118
PRH:351	PRH:1943	PRH:296
PRH:329	PRH:2289	PRH:982.1.117

Plate 9 Celts with Oval Cross-Sections



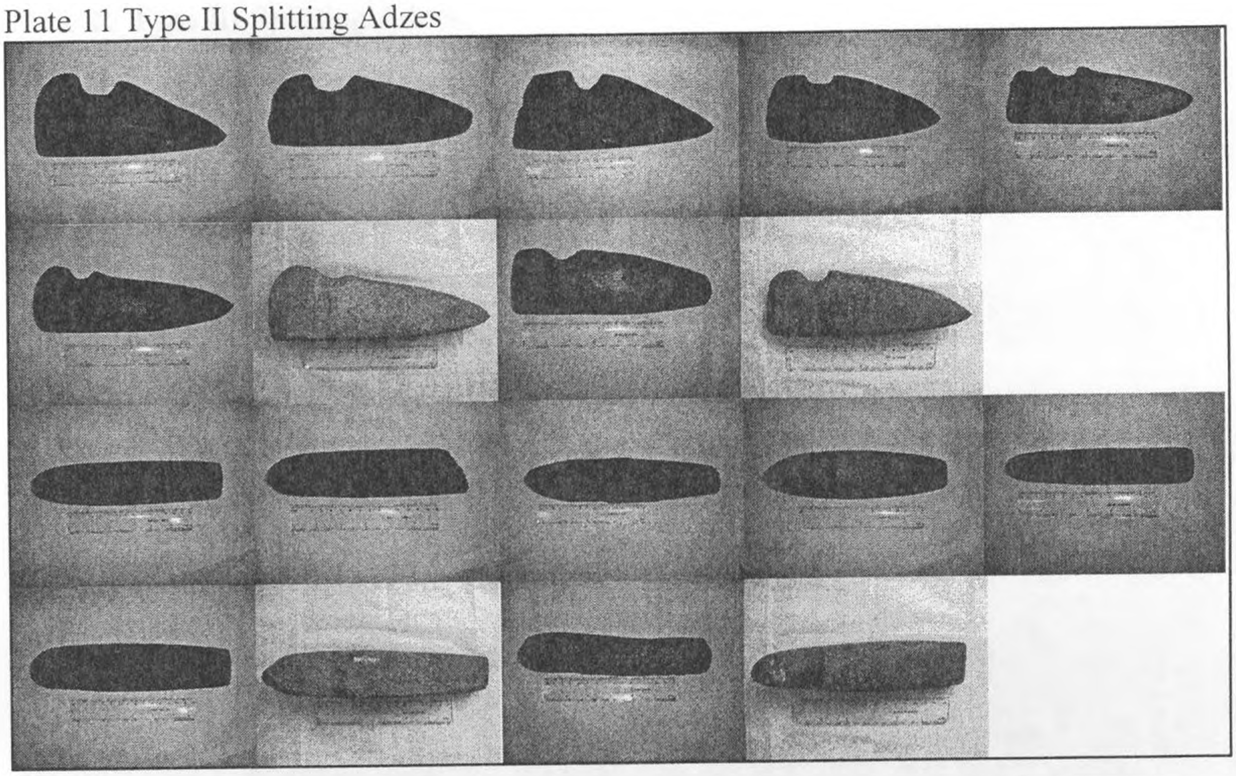
PRH:233	PRH:259	PRH:1425	PRH:2946
GbTo-23:168	GbTo-33:501	GbTo-33:2091	PRH:p28
PRH:235	GbTo-33:2264	GbTo-30:355	GbTo-30:356
PRH:239	PRH:234	GbTo-31:4624	PRH:240
GbTo-33:3674	PRH:1645	PRH:241	GbTo-23:1083
		PRH:236	

Plate 10 Celts with Rectangular Cross-Sections



PRH:236	GbTo-23:1029	GbTo-18:16	GbTo-34:817
PRH:237	GbTo-33:1080	GbTo-36:900	GbTo-33:c370
GbTo-33:1143	GbTo-31:1580	GcTo-1:1127	GbTo-33:c658
GbTo-36:317	GbTo-31:x979	GbTo-33:c383	
GbTo-33:3888	GbTo-31:4572	PRH:983.20.33	
GbTo-36:672	GbTo-33:1101	GbTo-31:1285	

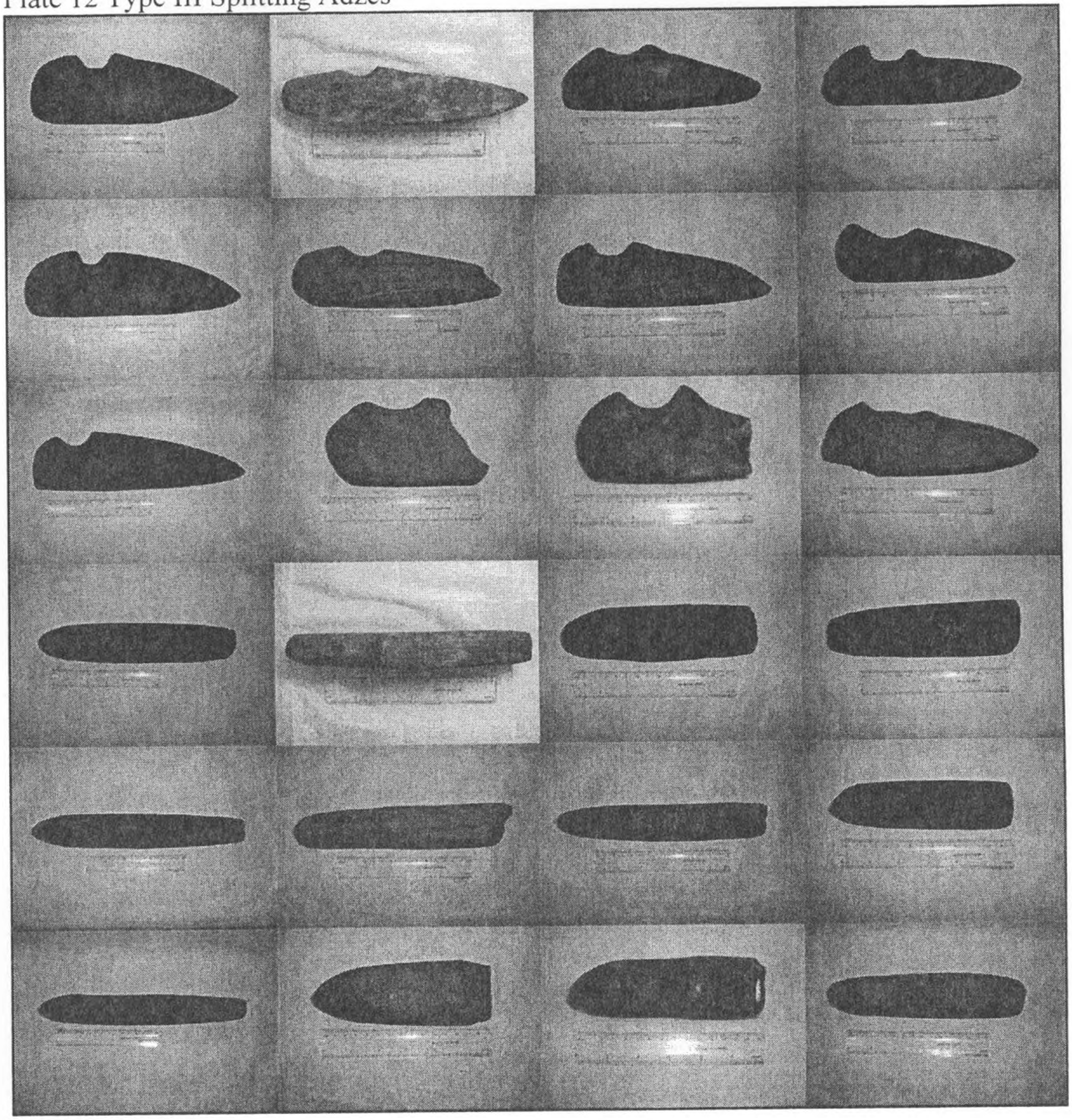
Plate 11 Type II Splitting Adzes



PRH:216 PRH:193 PRH:217 PRH:207 PRH:1453

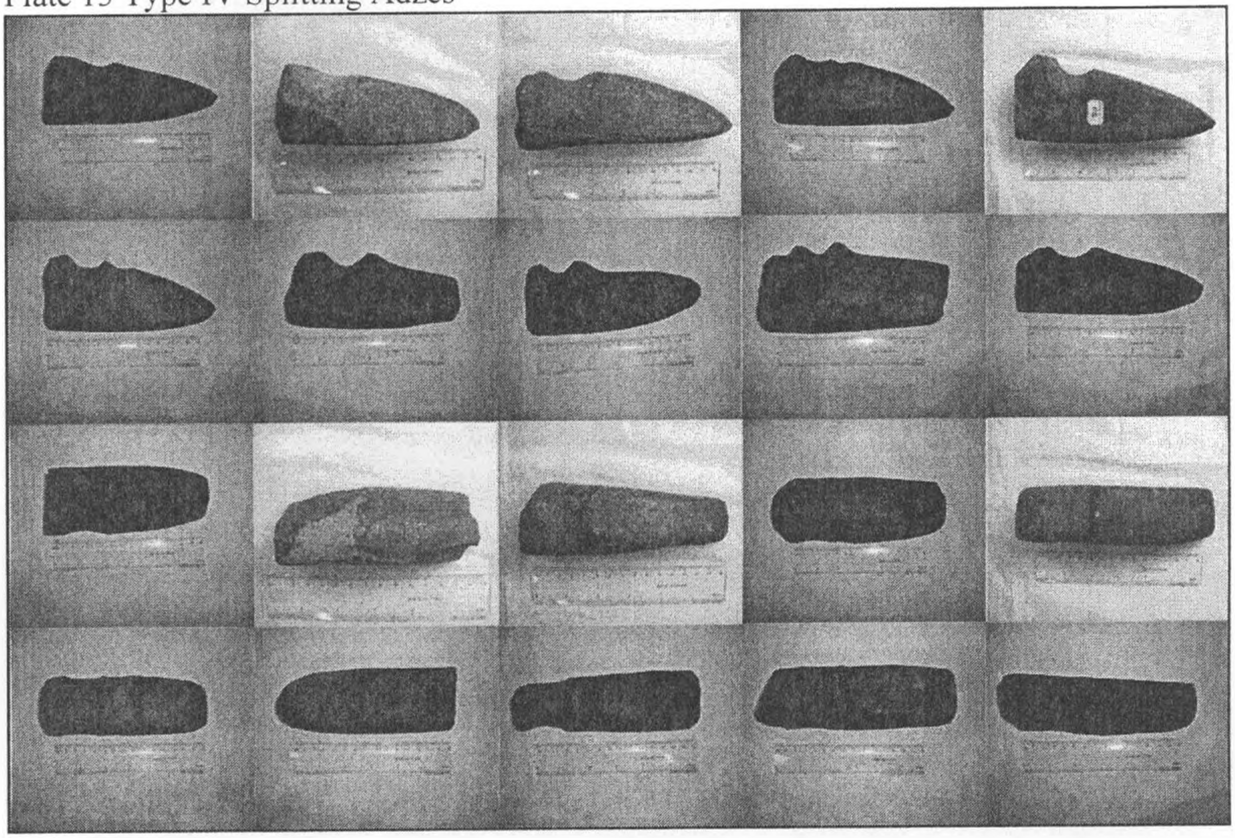
PRH:301 GbTo-31:2185 PRH:206 MA:XII-B517

Plate 12 Type III Splitting Adzes



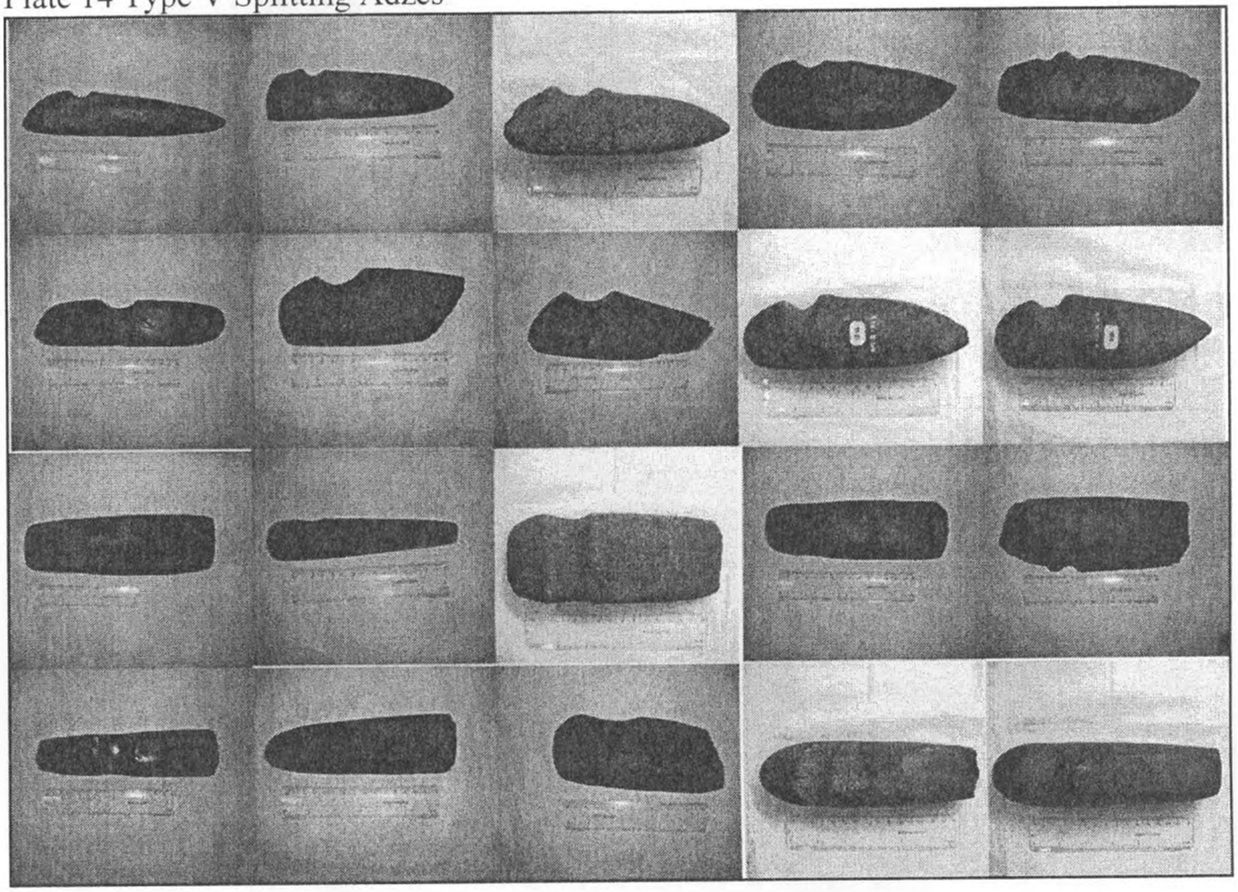
PRH:1345	GbTo-34:1	PRH:223	PRH:1946
PRH:k59	PRH:994.13.120	PRH:994.13.118	PRH:p29
PRH:302	PRH:994.13.90	GcTo-6:357	PRH:209

Plate 13 Type IV Splitting Adzes



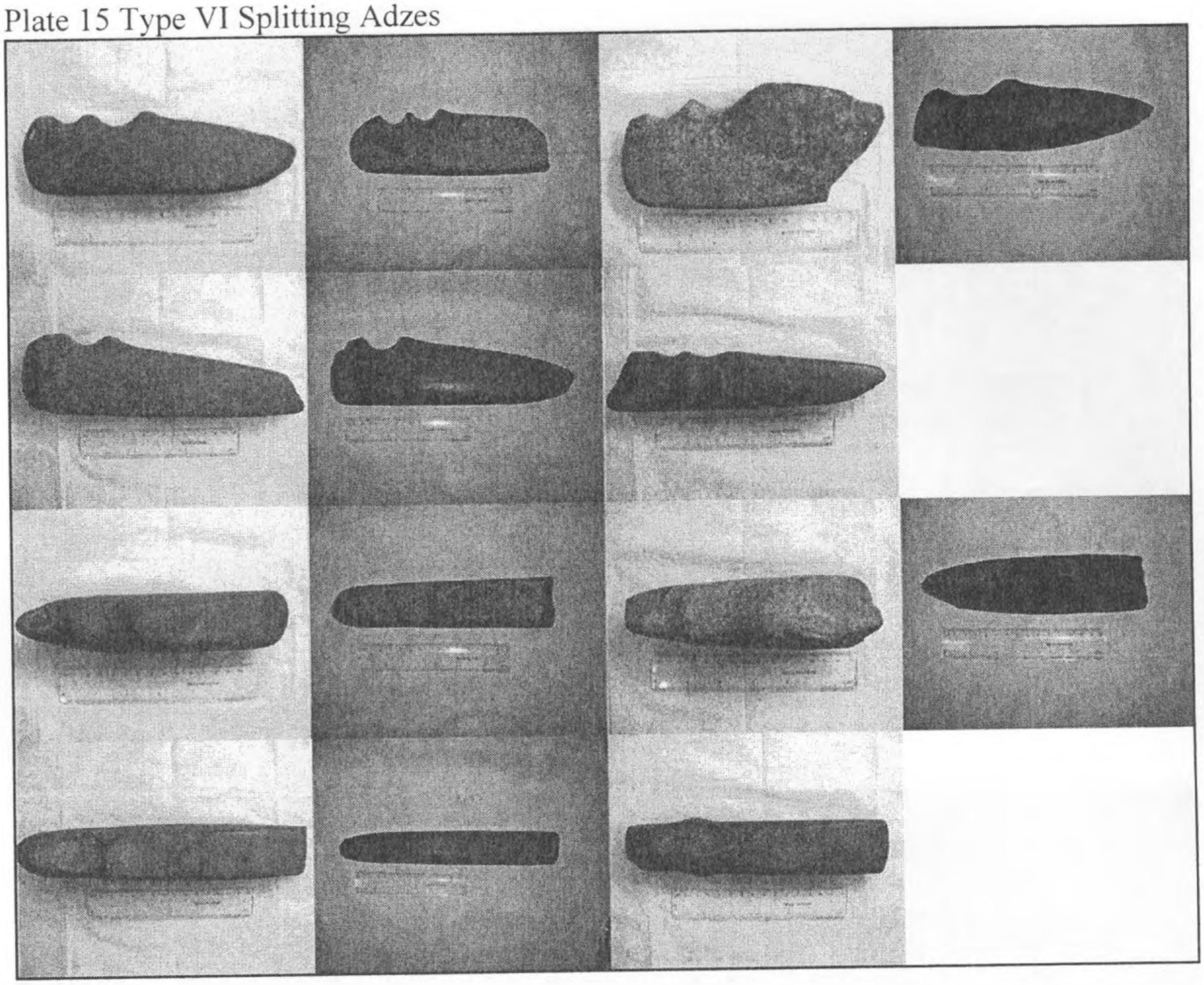
PRH:3573	GcTo-1:773	GcTo-1:1	PRH:218	MA:XII-B525
PRH:982.1.54	PRH:997.6.1	PRH:p30	PRH:374	PRH:205

Plate 14 Type V Splitting Adzes



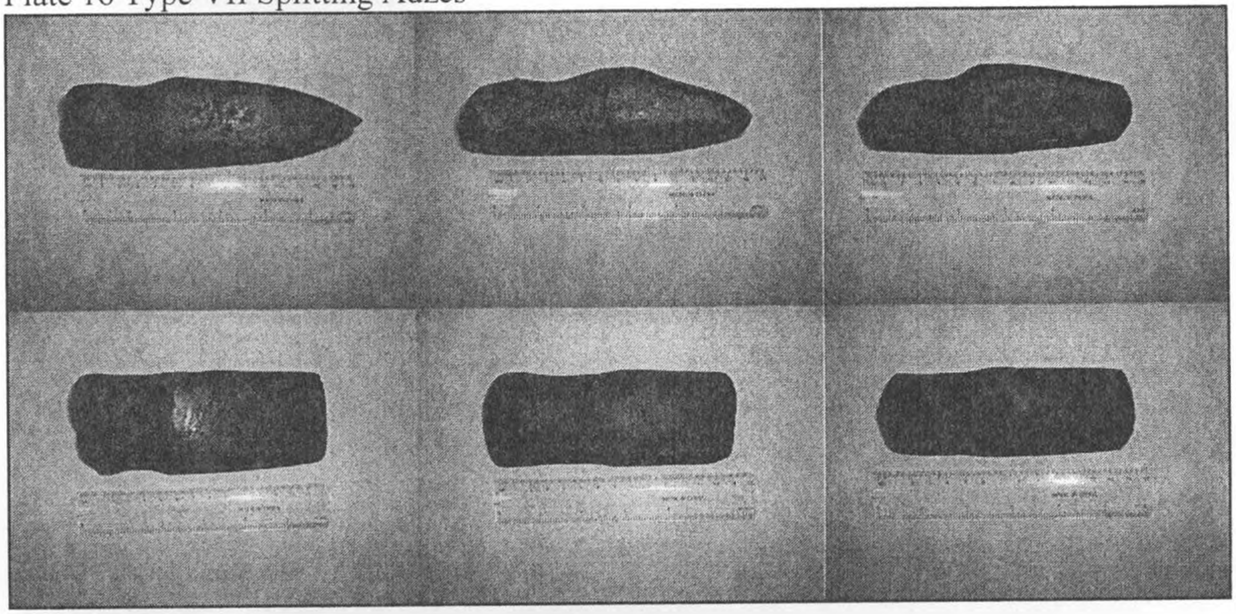
PRH:204	PRH:2291	MA:XII-B523	PRH:219	PRH:2213
PRH:222	PRH:994.13.85	PRH:982.1.69	MA:XII-B518	MA:XII-B524

Plate 15 Type VI Splitting Adzes



GbTo-30:7	PRH:992.21.1	GbTo-34:7	PRH:unknownadze
GcTo-1:1131	PRH:203	MA:XII-B529	

Plate 16 Type VII Splitting Adzes



PRH:300 PRH:1345 PRH:2422

Plate 17 Splitting Adze 214 from the Queen Charlotte Islands

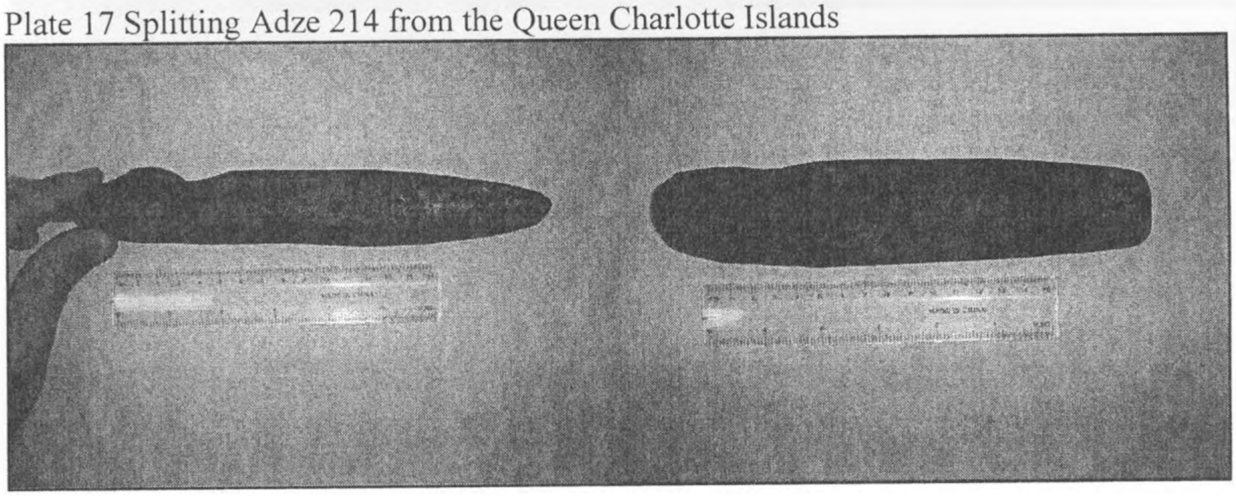
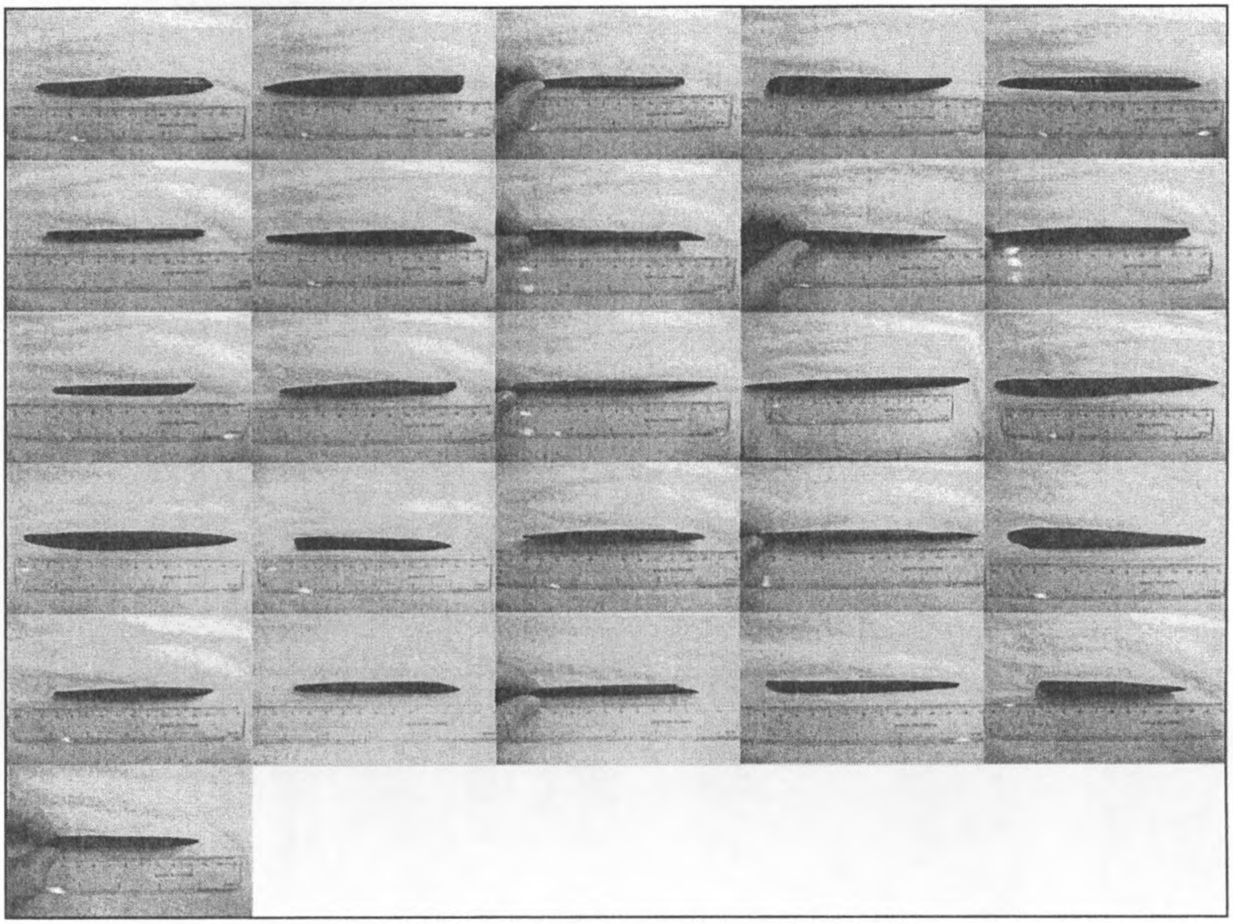
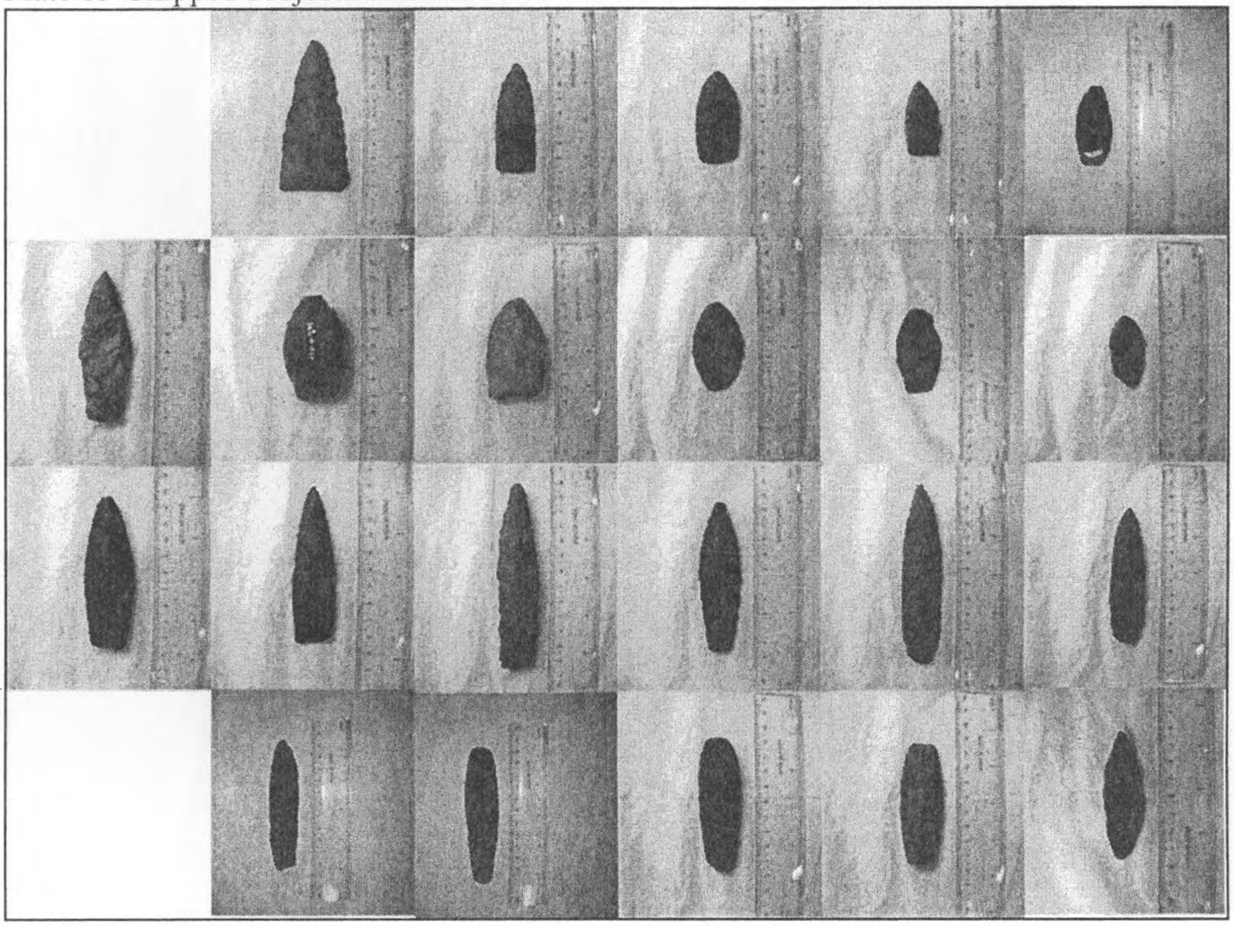


Plate 18 Ground Slate Pencils



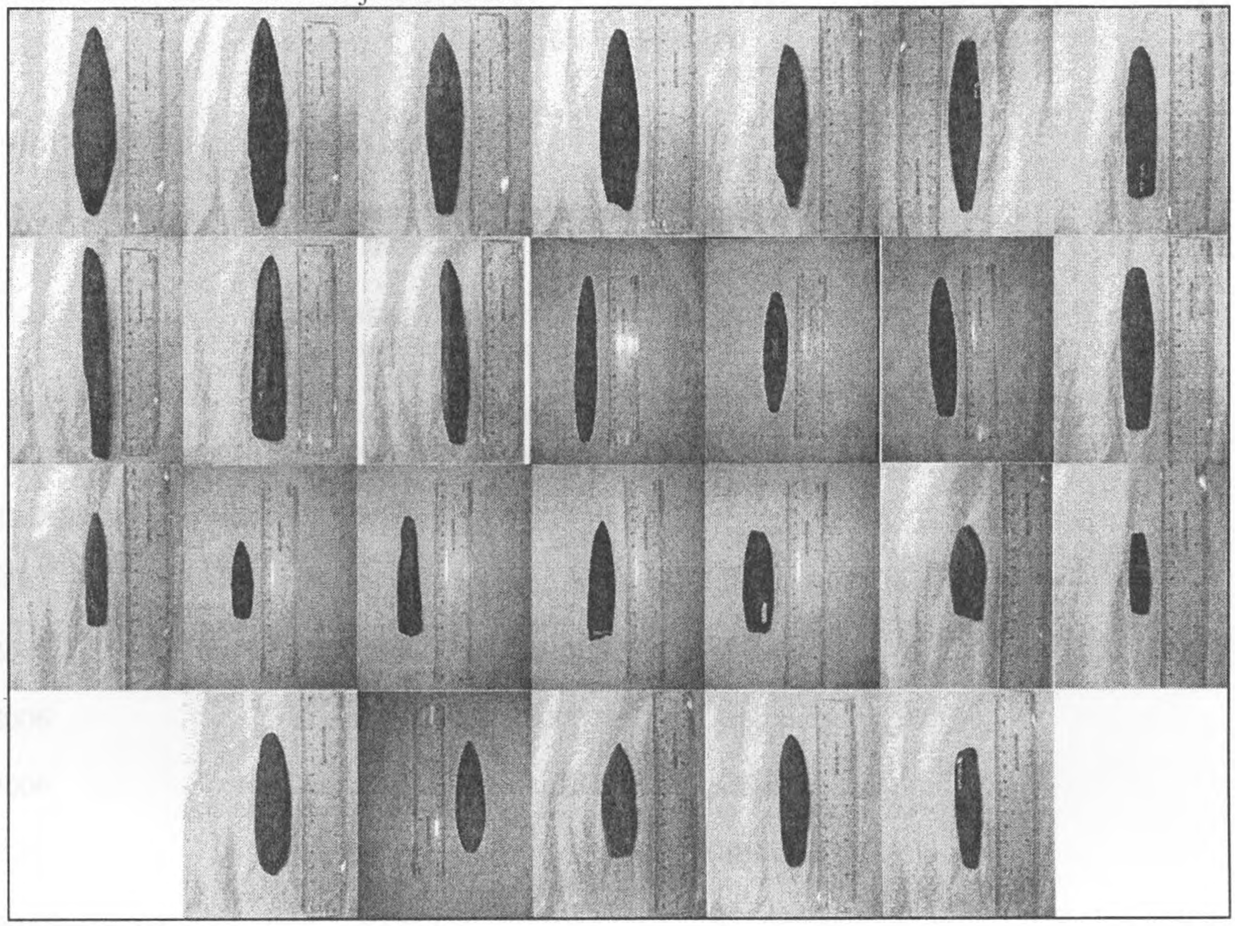
GbTo-31:1395	GbTo-31:1409	GbTo-31:1552	GbTo-31:1611	GbTo-31:1774
GbTo-31:1821	GbTo-31:2025	GbTo-31:2118	GbTo-31:2127	GbTo-31:2135
GbTo-31:2250	GbTo-31:2297	GbTo-31:2536	GbTo-31:x163	GbTo-31:x164
GbTo-23:254	GbTo-23:926	GbTo-23:1668	GbTo-31:1669	GcTo-1:327
GbTo-33:1226	GbTo-33:1808	GbTo-33:1809	GbTo-33:2528	GbTo-33:c398
GbTo-30:353				

Plate 19 Chipped Projectile Points



	(NB a) GbTo-36:245	(NA b2) GcTo -6:34	(NA b2) GbTo-31:472	(NA b2) GbTo-23:800	(NA b2) GbTo-34:538
(NA b2) GbTo-31:2026	(NA b3) GbTo-31:1830	((NA b2) GbTo-18:193	(NA a) GbTo-31:x711	(NA b2) GbTo-31:1604	(NA a) GbTo-31:x290
(NA b2) GbTo-33:574	(NA b2) GbTo-34:1360	(NA b2) GbTo-34:1589	(NA b2) GbTo-18:224	(NA b2) GbTo-33:777	(NA b1) GbTo-34:1023
	(NA b1) PRH:983.20.38	(NA b2) PRH:983.20.24	(NA b1) GbTo-34:1858	(NA b2) GbTo-34:1385	(NA a) GbTo-31:1683

Plate 20 Ground Slate Projectile Points



(NA b1) GbTo-34:1969 | (NA b?) GbTo-31:x239 | (NA b2) GbTo-23:1656 | (NA b?) GbTo-31:2258 | (NA b?) GbTo-31:287 | (NA b2) GbTo-36:249 | ((NA b?) GbTo-18:20

(NA b?) GbTo-31:x407 | (NA b2) PRH:982.1.118 | (NA b2) GbTo-31:x165 | (NA b1) GbTo-31:1272c | (NA b1) GbTo-31:56 | (NA b2) PRH:1635 | (NA b2) GbTo-36:611

(NA b1) GbTo-34:853 | (NA b2) GbTo-31:2210 | (NA b2) GcTo-6:119 | (NA b?) GcTo-6:104 | (NA b2) GcTo-6:405 | (NA b?) GbTo-31:1219 | (NA b2) GbTo-33:1272

(NA b?) GbTo-31:2138 | (NA b2) PRH:2300 | (NA b2) GbTo-31:x528 | (NA b1) GbTo-18:639 | (NA b2) GbTo-31:2517