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THESIS APPROVAL

The abstract and thesis of Cameron McPherson Smith for the degree of Master of Arts in Anthropology, presented 16 March, 1996, and accepted by the thesis committee and the department.

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ABSTRACT

An abstract of the thesis of Cameron McPherson Smith for the degree of Master of Arts in Anthropology, presented on 16 March, 1996.

Title: **Social Stratification Within a Protohistoric Plankhouse of the Pacific Northwest Coast: Use-Wear and Spatial Distribution Analysis of Chipped Lithic Artifacts.**

The spatial distribution of chipped lithic artifacts excavated at site 35C05, a Chinookan plankhouse of the protohistoric period, was observed to test the hypothesis that a gradient of material culture -- reflecting social status -- should be evident within the plankhouse, ranging from the highest to the lowest social rank. Prior to the spatial analysis, use-wear analysis was used to evaluate the classificatory labels used to describe the assemblage by a previous researcher.

The use-wear analysis largely confirmed the functional classification of chipped lithic artifacts used by the previous researcher. The spatial analyses revealed that while most tool types were rather evenly distributed throughout the plankhouse interior (taphonomic factors having been considered), cutting, graving and scraping tools (as well as some characteristics of these tools, such as raw material quality) were significantly unevenly distributed, correlating with the hypothesized gradient of social rank aligned with the long axis of the plankhouse. Further analyses strongly suggested that one or more labor

specialists, using high frequencies of graving tools, were inhabitants of the elite portion of the plankhouse.

Most domestic activities reflected by the stone tools of this assemblage were engaged in by plankhouse inhabitants of all social ranks. Knowing that this is the case, as well as that in some instances there is compelling evidence for status-determined labor specialization, aids in our understanding of the character of aboriginal social structure on the Pacific Northwest Coast.

SOCIAL STRATIFICATION WITHIN A PROTOHISTORIC
PLANKHOUSE OF THE PACIFIC NORTHWEST COAST:
USE-WEAR AND SPATIAL DISTRIBUTION ANALYSIS
OF
CHIPPED LITHIC ARTIFACTS

by

CAMERON MCPHERSON SMITH

A Thesis submitted in partial fulfillment of the
requirements for the degree of

MASTER of ARTS
in
ANTHROPOLOGY

Portland State University
1996

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collections, and Steve Hamilton and Bill Cornett both were excellent conversation partners.

Dr. Kofi Agorsah, though he was unable to act on my defense committee, was particularly helpful in guiding the final draft, and I thank him for his assistance.

Because the Meier data needed to be coded by hand from original field notebooks and excavation forms, I spent at least a year simply collecting the data I required. During this time, and during the year of analysis and synthesis following, I was employed at various computer labs at Portland State University, where I had much help and input from various co-workers on the mechanics of getting my data onto disk, backed up and printed out. I would like to thank the staff of the Faculty Resource Center here at PSU, as well as my co-workers, for their assistance.

In 1996 I lost my last grandparent, grandmother Hazel Rush, my Father's mother. I wish that she could have seen this tangible result of my seemingly endless work, which she supported again and again.

TABLE OF CONTENTS

ACKNOWLEDGMENTS.....	ii
LIST OF TABLES.....	viii
LIST OF FIGURES.....	xi
CHAPTER 1 INTRODUCTION.....	1
CHAPTER 2 LITERATURE REVIEW and HYPOTHESIS.....	4
Aboriginal Housing and Social Structure on the Lower Columbia River.....	4
The Character of Social Status Differentiation on the Northwest Coast: Rank and Activities.....	8
The Meier Site, 35C05.....	12
Formal Statement of Problem and Hypothesis.....	14
CHAPTER 3 HOUSEHOLD ARCHAEOLOGY and SITE-FORMATION PROCESSES of the MEIER SITEPLANKHOUSE.....	16
Household Archaeology: Facilities and Semiotics.....	16
Utility and Symbolism of the Meier Site Plankhouse.....	18
The Utilitarian Plankhouse: Facilities.....	18
The Semiotic Plankhouse: The 'Gradient'.....	22
Heuristic Reconstruction of the Meier Site Plankhouse.....	23
Site Formation Processes of the Meier Site.....	23
Discrete Clean-up Activities at the Plankhouse.....	23

Comparison of House and Midden Chipped Lithic Assemblages.....	24
---	----

Cleaning and Storage Within the Plankhouse.....	26
--	----

Post-Depositional Movement of Artifacts.....	28
---	----

HAPTER 4

USE-WEAR ANALYSIS OF CHIPPED STONE TOOLS....32

Rationale for Use-Wear Analysis in this Study.....	32
---	----

Use-Wear Analysis: Theory, Methodology and Objective of This Study.....	33
--	----

Evaluation of Use-Wear Evidence: Use- Wear Holotypes for Seven Tool Motions.....	34
--	----

The Experimental Tool Set.....	35
--------------------------------	----

The Blind Test.....	36
---------------------	----

Methods and Materials Employed in Use-Wear Analysis of This Study.....	37
---	----

The Use-Wear Sample.....	39
--------------------------	----

Observed Use-Wear Characteristics.....	39
--	----

Microflake Scars.....	40
-----------------------	----

Polish.....	43
-------------	----

Description of Use-Wear Observed on Artifacts Classified According to the Hamilton Morphofunctional Scheme.....	46
--	----

Summary Results of the Use-Wear Analysis.....	56
--	----

CHAPTER 5	FUNCTIONAL CLASSIFICATION OF THE MEIER SITE CHIPPED LITHIC ASSEMBLAGE.....	59
	Addition of the 1991 Field Season Assemblage to the Meier Site Lithic Database.....	59
	Hamilton Energy Type.....	61
	Raw Material Quality.....	62
	General Remarks on the Meier Site Chipped Lithic Assemblage.....	64
CHAPTER 6	SPATIAL DISTRIBUTIONS: DATA GROUPING, PARTITIONING and STATISTICAL TESTING.....	66
	Objectives, Methods and Data.....	66
	Analytical Area Definitions.....	68
	Sample Selection.....	69
	Test Series.....	70
	Tests of Significance of Distributions.....	70
	Correlation Tests.....	72
	Cluster Generation.....	76
CHAPTER 7	ANALYSIS: RESULTS AND ANALYSES OF THE STATISTICAL TESTS.....	78
	Results.....	78
	Significance Tests 2 and 3.....	79
	Correlation Tests 1 through 7.....	79
	Cluster Generation.....	81
	Analyses.....	82
	Analysis of Correlation Test 7.....	82
	Cluster Analysis.....	87

Analysis of North, Central and South Analytical Units.....	95
---	----

Analysis of Bench, Cellar and Hearth/Periphery Analytical Units Units.....	98
--	----

Energy Type Distributions: A Closer Examination.....	101
---	-----

Synthesis: Inferred Activities Within the Plankhouse.....	103
--	-----

CHAPTER 8 SUMMARY AND CONCLUSIONS.....111

Use-Wear Analysis of Chipped Stone Tools.....	111
--	-----

Spatial Distribution of Chipped Stone Tool Types: Inferences Regarding the Spatial Segregation of Social Classes.....	111
--	-----

REFERENCES.....	115
------------------------	------------

TABLES.....	124
--------------------	------------

FIGURES.....	169
---------------------	------------

APPENDICES

I 533 Artifacts Classified in This Study, Including Those Examined for Use-Wear Traces.....	213
II 1,093 Non-Projectile-Point Chipped Lithic Artifacts From Which the Use-Wear Samples Were Drawn.....	230
	Key to Appendix II.....261
III 1,099 Artifacts With 3-Point Provenience.....	262
	Key to Appendix III.....288
IV Site Map Showing Schematic Overlay of Features.....	289
V Curriculum Vitae of the Author.....	290

LIST OF TABLES

1.	Use-Wear Holotypes For Seven Tool Motions.....	125
2.	The Experimental Tool Set.....	126-127
3.	Results of Nine Blind Tests.....	128
4.	Use-Wear Sampling of Functional Classes.....	129
5.	Summary Results of the Use-Wear Analysis.....	130
6.	Hamilton Functional Classes Converted to Smith Functional Classes.....	131
7.	Incidence of Multifunctional Tools.....	132
8.	Selection Process for Spatial Distribution Sample....	133
9.	Meier Site Functional Class Assemblage Structure.....	134
10.	Meier Site Hamilton Energy Type Assemblage Structure(Percentages).....	135
11.	Count of Functional Classes Per Excavation Unit.....	136
12.	Count of Energy Types and Raw Material Qualities Per Excavation Unit.....	137
13.	Count of Lithic Projectile Points, Chipped Stone Tools, Chipped Stone Tool Types, Bone and Antler Debitage and Excavation Volume Per Excavation Unit.....	138
14.	Count of Hamilton Energy Types Per Functional Class Per Excavation Unit.....	139
15.	Assignment of Excavation Units to House and Midden Analytical Units.....	140
16.	Assignment of Excavation Units to Bench, Cellar and Hearth/Periphery Analytical Units.....	141
17.	Assignment of Excavation Units to North, Central and South Analytical Units.....	142
18.	Purposes and Data of Statistical Tests Conducted.....	143

19.	Results of Significance Tests 1, 2 and 3.....	144
20.	Results of Correlation Test 1: All Units on Gradient.....	145
21.	Results of Correlation Test 2: Bench.....	146
22.	Results of Correlation Test 3: Cellar.....	147
23.	Results of Correlation Test 4: Hearth/Periphery.....	148
24.	Results of Correlation Test 5: Correlation Matrix for North Area.....	149
25.	Results of Correlation Test 5: Probability Matrix for North Area.....	150
26.	Results of Correlation Test 5: Correlation Matrix for Central Area.....	151
27.	Results of Correlation Test 5: Probability Matrix for Central Area.....	152
28.	Results of Correlation Test 5: Correlation Matrix for South Area.....	153
29.	Results of Correlation Test 5: Probability Matrix for South Area.....	154
30.	Results of Correlation Test 6: Correlation Matrix for Bench Area.....	155
31.	Results of Correlation Test 6: Probability Matrix for Bench Area.....	156
32.	Results of Correlation Test 6: Correlation Matrix for Cellar Area.....	157
33.	Results of Correlation Test 6: Probability Matrix for Cellar Area.....	158
34.	Results of Correlation Test 6: Correlation Matrix for Hearth/Periphery Area.....	159
35.	Results of Correlation Test 6: Probability Matrix for Hearth/Periphery Area.....	160

36.	Results of Correlation Test 7: Correlation Matrix for Energy Types I-IV.....	161-162
37.	Results of Correlation Test 7: Probability Matrix for Energy Types I-IV.....	163-164
38.	Summary Results of Correlation Test 5.....	165
39.	Summary Results of Correlation Test 6.....	166
40.	Summary Results of Correlation Test 7.....	167
41.	Summary Results of Cluster Generation.....	168

LIST OF FIGURES

..	The Meier Site, 35CO5, on the South Shore of the Columbia River, Oregon.....	170
1.	Hypothetical Reconstruction of the Plankhouse by K.M. Ames.....	171
2.	Hypothetical Reconstruction of the Plankhouse by Darin Molnar.....	172
3.	Illustrations of Southern Northwest Coast Houses from the Ethnographic Literature.....	173
4.	Site Map and Letter Coding of Excavation Units.....	174
5.	Artifact Distribution Illustrating Bench, Cellar and Hearth Areas, Looking North.....	175
6.	Artifact Distribution Illustrating Cellars Looking East.....	176
7.	Author's Hueristic Conception of the Plankhouse.....	177
8.	Functional Assemblage Structure of the House and Midden Assemblages.....	178
9.	Energy Type Assemblage Structure of the House and Midden Assemblages.....	179
10.	Raw Material Assemblage Structure of the House and Midden Assemblages.....	180
11.	Stone Tool and Tool Type Density of the House and Midden Assemblages.....	181
12.	Density of Projectile Points of the House and Midden Assemblages.....	182
13.	Tool Motions Used in the Experimental Set.....	183
14.	Sample of Experimental Tools.....	184
15.	Holotypical Use-Wear for Seven Tool Motions.....	185
16.	Holotypical Use-Wear for Worked Material Density....	186
17.	Functional Class Assemblage Structure of the Meier Site Assemblage.....	187

9.	Percentage Composition of Functional Classes, by Hamilton Energy Type.....	188
10.	Sample of Meier Site Tools.....	189
11.	Method for Obtaining GRADIENT Variable Scores.....	190
12.	Cluster Dendrogram.....	191
13.	Spatial Distribution of Cutting, Graving, Perforating and Scraping Tools on Gradient.....	192
14.	Spatial Distribution of Shaving, Wedging and Sawing Tools on Gradient.....	193
15.	Spatial Distribution of Artifacts of Hamilton Energy Types I-IV on Gradient.....	194
16.	Spatial Distribution of Artifacts of Raw Material Quality on Gradient.....	195
17.	Spatial Distribution of Cutter Types I-IV on Gradient.....	196
18.	Spatial Distribution of Graver Types I-IV on Gradient.....	197
19.	Spatial Distribution of Perforator Types I-IV on Gradient.....	198
20.	Spatial Distribution of Scraper Types I-IV on Gradient.....	199
21.	Spatial Distribution of Shaver Types I-IV on Gradient.....	200
22.	Spatial Distribution of Wedge Types I-IV on Gradient.....	201
23.	Spatial Distribution of Saw Types I-IV on Gradient.....	202
24.	Functional Class Assemblage Structure in North, Central and South Areas.....	203
25.	Hamilton Energy Type Assemblage Structure in North, Central and South Areas.....	204

36.	Raw Material Quality Assemblage Structure in North, Central and South Areas.....	205
37.	Functional Class Assemblage Structure in Bench, Cellar and Hearth/Periphery Areas.....	206
38.	Hamilton Energy Type Assemblage Structure in Bench, Cellar and Hearth/Periphery Areas.....	207
39.	Raw Material Quality Assemblage Structure in Bench, Cellar and Hearth/Periphery Areas.....	208
40.	Distribution of Lithic Debitage in Bench, Cellar and Hearth/Periphery areas.....	209
41.	Correlation of n Chipped Lithic Artifacts and Excavation Volume for All Excavation Units at 35C05.....	210
42.	Correlation of n Chipped Lithic Artifacts and Excavation Volume for Excavation Units Within the Plankhouse Only.....	211

CHAPTER 1

INTRODUCTION

It is commonly acknowledged that some form of social stratification was practiced on the Pacific Northwest Coast before European contact. However, the character of that stratification, in terms such as differential access to resources and status-dependent labor specialization, has yet to be determined and demonstrated archaeologically. Some workers feel that slaves were primarily status display items of the elite class, while others feel that slaves were critical to the subsistence economy of some Northwest Coast groups. It is likely that stratification was manifested in many ways and on different scales, but that the most important and widespread of these manifestations should vary little on the scale most important to the aboriginal peoples of the Northwest Coast. The fundamental scale in this region was that of the plankhouse, a large wooden structure that housed extended families and their slaves, and served as an autonomous political and economic unit. It is on this scale that we may seek a better understanding of labor organization, subsistence economy and the evolution of cultural complexity on the Northwest Coast.

This thesis examines the intra-site activities within a protohistoric southern Northwest Coast aboriginal plankhouse by analyzing the spatial distribution of chipped lithic artifacts used in a variety of domestic activities. It is proposed that these artifacts were used in different frequencies by people of different social ranks. On the Northwest Coast, as I will demonstrate below, the fundamental social distinction was between free and non-free people. It

is this distinction that I wished to identify through the material remains of these groups' activities within the plankhouse. The cardinal proposition of this thesis is that if domestic activities were dramatically different between free and non-free peer groups, material culture should differ between areas of the plankhouse inhabited by these mutually exclusive social classes.

The data I examine in this study are the spatial distribution of chipped lithic artifacts of known function within the boundaries of a plankhouse partially excavated at site 35C05, Oregon. These artifacts are hypothesized to reflect common maintenance and extractive behaviors important in the domestic activities of the plankhouse inhabitants -- activities that reflect fundamental modes of life. The frequencies of artifact classes at certain locations within the plankhouse are, then, the raw data of this study.

Generating these data was a two-stage process. First, the chipped lithic assemblage was classified to reflect specific activities of the plankhouse inhabitants. The functional classification was based on use-wear observed on a sample of the chipped lithic artifacts. Use-wear analysis, while still in a developmental stage as archaeological method, has generated internally consistent and analytically fruitful results and was selected for use in this study as it remains the most accurate method available for determination of the past use of chipped lithic artifacts.

After assemblage classification, the spatial distribution of the classified artifacts was observed to identify the distribution of activities within the plankhouse as reflected by varying frequencies of data classes. Assessing the continuity between the use and deposition of

artifacts in the past and the location at which they are excavated in the present is radically more complicated and difficult than use-wear analysis. In very few cases is it possible to prove that the spatial distribution of any given distribution represents a specific depositional act. Rather, taphonomic studies are a sort of damage control. In this report I present the results of my attempt to identify the main taphonomic agents affecting stone tool distributions, as well as control for them by adjusting my scales of observation accordingly. Thus, consideration of site-formation processes was the method of continuity assessment for spatial data.

After evaluating both of these data types, I go on to test my suggestion that the spatial distribution of chipped lithics at the Meier site can yield information regarding social structure within the plankhouse. In **Chapter 2** I review the literature regarding Northwest Coast domestic architecture and social stratification, reporting on the current state of understanding of these important and intimately related topics. I also present the formal hypothesis tested in this study. In **Chapter 3** I discuss the philosophy and methodology of household archaeology, how such philosophy can aid in the consideration of site-formation processes, and introduce what I consider to be the site-formation factors most relevant to this study. **Chapter 4** presents the methods and results of the use-wear analysis, and **Chapter 5** specifies the classification of the chipped stone artifacts that are the primary data of this study. **Chapter 6** discusses the specific research design and statistical tests run on the spatial distribution data. In **Chapter 7** I analyze the statistical test results and discuss the activities inferred from the use-wear and spatial distribution data. **Chapter 8** presents my conclusions.

CHAPTER 2

LITERATURE REVIEW and HYPOTHESIS

This chapter reviews the current understanding of social and political scale and social stratification on the Northwest Coast. The domestic architecture of the Chinook people who occupied the Meier site plankhouse is examined, and excavations at site 35C05 (Meier) are summarized. I conclude the chapter by stating the formal hypothesis of this study.

Aboriginal Housing and Social Structure on the Lower Columbia River

For the Chinook of the Lower Columbia, as well as for the rest of the indigenous peoples of the Pacific Northwest Coast, the house or lodge was the fundamental economic and political entity (Chatters 1989, Mitchell and Donald 1988, Silverstein 1990). Although confederations of house leaders commonly formed for political and economic reasons, these were opportunistic alliances and the relative autonomy of plankhouse groups was always maintained (Drucker 1983, Panowski 1985). Similarly, while house size and form varied geographically, the communal, extended-family household remained a regional constant (Jorgensen 1980, Nabokov and Eastman 1990).

Ethnographic accounts indicate that most Chinook plankhouses were between five and nine meters in width and between six and 15 meters in length (Ames et al. 1992), supporting populations of roughly 20-100 people, though this number could change seasonally and, for example, with the

arrival of long-term guests. The plankhouse excavated at the Meier site was atypically large, therefore, being roughly 30 meters long, though Hajda reports some houses of more than 100 meters in length (Hajda n.d. in Ames et al. 1992:277). Chinook plankhouses were generally constructed of cedar planks fixed to a superstructure of large pilings. Gable roofs were common on the southern Northwest Coast (Silverstein 1990).

Figure 1 locates the Meier site in the Wapato Valley. Figure 2 depicts the hypothetical reconstruction, based on excavation data and Ray (1938), of the Meier site plankhouse, by K.M. Ames (Ames, 1992). Figure 3 depicts a perspective illustration of the plankhouse generated by D. Molnar, a graduate student at Portland State University, Department of Anthropology. This illustration, generated using a large body of excavation and ethnographic data, clearly indicates the great size and import of this structure. Figure 4 presents a number of renderings of southern Northwest Coast houses from ethnographic sources (cited in the illustration); I would ask the reader to note the spacious quality, internal organization and use of space within these structures; these are factors which likely influenced site formation, and will be discussed further in Chapter 3.

Lower Columbia plankhouses, of the types described above, were often grouped together to form villages which may have been occupied only for the winter season (Mitchell 1983). In some cases, one, or perhaps two plankhouses would be considered a village; it is possible that this was the case at Meier, where there are indications that another plankhouse may have existed within 20 meters of the excavated plankhouse (Ames, pers. comm., Hamilton pers. comm.). Based on a variety of faunal and botanical data, the Meier

plankhouse appears to have been a year-round occupation (Ames, pers. comm.).

In addition to its social and political functions, the plankhouse was also the locus of many production, extraction and maintenance activities. At the Meier site this is evidenced by the great diversity of artifact types and features encountered. These include chipped lithics, ground stone, worked horn, bone and antler, basketry, fishing gear, fire pits, clay items, pipe stems, fragments of metal and shell deposits, among others (Ames et al. 1992).

Central to this thesis is the concept that the internal distribution of activities within the plankhouse -- where many of these materials were produced, used, discarded, repaired and lost -- was not random. Rather, we may confidently and for good reason assume that the interior of the Meier plankhouse was organized and geared towards both the comfort of the inhabitants and the efficiency of important economic activities such as food preservation and storage; such activities are included in what Rappoport terms 'activity systems', which are organized in space and time (Rappoport 1990). Additionally, there is a large body of ethnographic data which indicates that occupants of the Northwest Coast plankhouses were spatially segregated according to 'status' or 'rank' (terms which are further discussed below). While regional architecture differed, on the southern Northwest coast elites were located in the rear of the plankhouse, furthest from the main entrance, while commoners (or 'freemen') were assigned positions in the middle of the structure, and slaves, captives and the like occupied the location farthest from the elites and nearest the main entrance (Drucker 1951, 1953, 1965, Goddard 1972,

abokov and Eastman 1990, Ray 1938, Ruby and Brown 1976, Marshall 1989, Vastokas 1966).

In summary, then, we may consider the Chinook plankhouse to be at once an economic entity, in which production was scheduled (and in many cases, executed), a political entity, with which social peers were allied and identified, and a social entity, within which enculturation of successive generations and the enduring, redundant processes of everyday life were carried out on both conscious and subconscious levels.

It is within this social and material plankhouse environment that each of these three fundamental and overlapping spheres of activity generated spatial distributions of durable material culture. The initial spatial distribution of these artifacts was not random, but a result of organized behavior. If that behavior was significantly different between peer groups (groups of individuals of the same rank) its results may be manifest in the spatial patterns of artifacts and features we expose during excavation.

This premise, with appropriate cautions, has been investigated on the Northwest Coast by Huelsbeck (1986) and Chatters (1985) with results discussed variously throughout this thesis. We may begin investigating the possibility of activity differentiation at the Meier site by seeking information on how behavior differed between peer groups of differing social rank on the Northwest Coast in general as well as among the Chinook in particular.

The Character of Social Status Differentiation on the Northwest Coast: Rank and Activities

Social stratification, *sensu* Fried (1967), was an aboriginal institution on the Northwest coast; this much is clear (Donald 1985, Drucker 1951, 1983, Fried 1974, Mitchell 1983, 1984, Panowski 1985, Todd-Bresnick 1984, Townsend 1983). Ames has addressed this academically generic 'stratification' with an examination of concepts of stratification and power (Ames 1995). Ames indicates that at the (fundamental) household level, the distinction between the elite and the commoner (grouped as 'free people') and the slave (or anyone not considered free) was socially maintained by a variety of interpersonal and peer-group behaviors. These symbolic and pragmatic behaviors occurred on a number of scales, including that of the household. How these behaviors effected status groups' participation in various economic and domestic activities, which formed the archaeological record, was highly variable.

Elites

Elites exercised various forms of power in order to maintain their rank, propagate the elite class, schedule and control critical aspects of the plankhouse economy (Ames 1995). In some cases, these elites were empowered to avoid mundane maintenance activities (Drucker 1951, Oberg 1973, Samuels 1989). In other cases, elites may have been engaged in hunting and other subsistence activities as a matter of necessity, choice or convenience (Ames 1995). Finally, the elite rank may have included labor specialists whose domestic activities would likely have been constrained.

How would elites 'appear' archaeologically, in terms of their utilitarian tools, the items they used in daily life?

In some cases, elites may be represented by an absence of tool types found in other areas of the house, areas occupied by commoners and slaves who were more intensely engaged in subsistence and maintenance activities, perhaps activities organized and supervised by the elite for the purpose of maintaining elite power. On the other hand, economic and domestic activity may be evenly distributed throughout the household, with all peer groups engaged in some similar forms of work, as mentioned above, as a result of choice, necessity or convenience.

I suggest, however, that the binary **free / not free** relationship that was crucial to the maintenance of elite power, and was thus reiterated in a number of ways in daily life, was complimented by some distinctions of material life between these classes. Elites should be represented by material remains that include some of the range of domestic activities in a plankhouse, but also by some activities which were carried out to a greater extent by the elite -- perhaps exclusively -- as a means of reproducing their own ranks (Ames 1995) and/or distinguishing them symbolically or economically from the *not free* (Chatters 1989, Marshall 1989).

Commoners

Common folk, grouped with elites for some purposes (because they were free rather than enslaved) were often clients of the elites and would have been engaged in a wide variety of maintenance and subsistence activities important to the local economy. Commoners might have engaged in the entire range of domestic activities, for example, during periods between elite-directed projects requiring specialized labor. On the other hand, they may have been engaged in specific activities such as carving, painting and tool

production (Ames 1995) that would require unusual tools or perhaps unusual frequencies of particular tools. Chatters (1989) presents an attempt to identify such activity differentiation through chipped lithic distributions, concluding that at least one specialist, a 'harpooner', occupied a particular area of the Sbabadid longhouse. Archaeologically, then, it is difficult to say how commoners may have differed from elites in terms of chipped stone tool frequencies. Both may have been engaged in common as well as specialized activities.

Slaves

Slaves were first and foremost considered property (Mitchell 1984, Panowski 1985). Slaves, the *not free*, served both as a relatively cheap and eminently controllable work force (slaves could be killed or mutilated for escape or attempts to escape), as well as mobile status symbols (Fried 1974). In a review of Northwest Coast slavery in general, Panowski mentions that slaves were used as bridewealth payments, payment in settlements for death or property damage, gifts (e.g. in potlatch or at house dedications), bargaining chips in negotiations to redeem captured members of the masters' descent group, directed assassins, and as sacrifice in ritual contexts (Panowski 1985:190). The more slaves a master could call upon for any particular task or activity, the greater his social status among his peers. Slave labor was often the foundation of elite power (Donald 1983, 1985), providing the manual labor required for plankhouse chiefs to accumulate wealth and prestige. While slaves may have been engaged in specific activities, it seems that they would also be archaeologically represented by higher frequencies of common artifacts used in the mundane processes of economic growth, and lower frequencies of specialist tools.

Curtis (1911), discussing the Chinook of the Columbia River below The Dalles, mentions some of the social and material distinctions that characterized slavery;

"Slaves comprised the lowest stratum of the social order, and their possession was an index of the social station of their owners...An ordinary family of the better class would have two or three [slaves], and the wealthiest as many as ten. **Occupying the same house as their masters, slaves were treated kindly and given plenty of food, eating at the same time as the others, but apart by themselves....**Male slaves were used mainly to paddle the canoe of the master and in fishing, hunting and carrying wood, and occasionally as assassin in avenging wrongs. Female slaves were the drudges of women, digging roots, gathering berries, curing fish, carrying water."

(Curtis 1911:88-89 **my emphasis**)

Here we have one of many ethnographic reports suggesting that slaves might be archaeologically 'visible' in terms of stone tool frequency distributions. It is clear that the difference between *free* and *not free* was reiterated in the everyday behaviors, such as interpersonal proxemics, which would likely effect material culture distributions. Sanders stresses the importance of such reiteration (see citation; page 17 this manuscript) and Marshall (1989) suggests that this was an important aspect of household organization on the Northwest Coast.

It is the spatial and material result of such behaviors that I sought to observe in this research. While I could not be certain which tool types (=activities) would be associated with different social classes, I began with the assumption that some significant differences between the material culture of *free* and *not free* should be evident in spatial distribution of the Meier site chipped lithic assemblage.

The chipped lithic assemblage is described below, in **Chapter 5: Functional Classification of the Chipped Lithic Assemblage**. For the moment, however, it is sufficient to say that the data of this study were the entire range of fine-grained chipped lithics recovered from the household, with the exception of lithic projectile points. The ubiquitous non-projectile point artifacts must represent the activities commonly carried out within the plankhouse, or storage of items for use outside the plankhouse. Ground stone tools from the site have been examined in Wolf (1994), but the heavy tool industry (cobble tools), as well as the debitage and the parent material, await study.

The Meier Site, 35C05

The Meier plankhouse was excavated by the Portland State University Summer Archaeological Field School from 1987 to 1991 (inclusive) under the direction of Prof. K.M. Ames of Portland State University, Department of Anthropology. By my calculations, roughly 35% of the interior of the plankhouse was exposed in these excavations. Excavation units were strategically placed to expose architectural features as well as portions of the north, central and southern areas of the plankhouse. Additionally, excavation units were placed to the east of the house to investigate the midden, as well as at hypothesized activity areas arrayed within 50 meters of the plankhouse. Figure 5 illustrates the plankhouse boundaries, the superimposed excavation units and the letter codes used to identify these units throughout this report.

Radiocarbon dating indicates that the plankhouse was occupied between A.D. 1400 and c.1830 (Ames et al 1992), meaning that the successive generations of inhabitants experienced pre-European contact times as well as the contact

(protohistoric) period and, finally, the depopulation of the Chinook, primarily by disease (Ruby & Brown 1976). Throughout this period, the plankhouse was refurbished and perhaps reconstructed a number of times, including at least one episode in which the entire long axis of the structure was shifted a few degrees eastward; these maintenance activities are evidenced by features encountered during excavation (Ames et. al. op cit).

Since plankhouse rebuilding episodes extensively re-worked the excavated matrix (Ames et al 1992), stratigraphic details are extremely difficult to relate beyond the macro scale at present. Detailed matrix analysis is forthcoming (Ames, pers comm), but for the moment we must simply consider the assemblage to be time-averaged over roughly four centuries (Ames pers. comm.). We must consider that the character of social stratification may have changed considerably during this occupation. It is particularly likely that the character of slavery on the Columbia changed radically shortly after European contact, resulting in increased maintenance and menial labor activities undertaken by slaves (Panowski 1985). Because of the lack of discrete occupation phase data at this site, however, this cannot be controlled for and must simply be kept in mind.

As I will demonstrate in **Chapter 4, Use-Wear Analysis of Chipped Stone Tools**, the assemblage I studied represents a variety of domestic behaviors, activities which would likely be part of the daily routine of plankhouse inhabitants; food processing, tool production and repair, and so on. I select these artifacts as the primary data because they reflect activities of daily life -- the commonplace behaviors which conceptually and materially represent the most basic cultural values, options and responsibilities of a

given peer group (Binford 1983, Schiffer 1976, Stevenson 1985, Wilk & Rathje 1982, Yerkes 1987). In much the same way, one could infer a great deal about modern Americans simply by studying the types of writing instruments they use, from the Bic disposable to the Parker PocketMate to the Mont Blanc Diplomat. Each is a writing instrument, a common artifact class in the urban sphere; however, each is rich with cultural cues (which may be recognized in design as well as engineering analysis) which may suggest our social rank, 'disposable income' and so on.

Formal Statement of Problem and Hypothesis

I have established that in terms of domestic behavior, which may reflect peer-group economy and other variables, the character of aboriginal social stratification on the Northwest Coast is rather poorly understood. As Ames (1995) has pointed out, understanding the organization of labor at the scale of the plankhouse is critical to our understanding of the bases of social inequality on the Northwest coast. This is because the plankhouse was the fundamental unit of production and consumption in this region.

Excavation of more than a third of the interior of a Chinookan plankhouse has yielded a chipped lithic assemblage of artifacts likely to reflect specific maintenance and extraction activities. Importantly, this assemblage was recovered from areas throughout the plankhouse interior, including the symbolically important long axis, on which we may safely assume a spectrum of social rank was organized,

from highest to lowest. We may also assume that activities within the plankhouse were not randomly distributed but to some degree effected by this social gradient, and that these activities generated, at the time of occupation, a corresponding gradient of material culture which would reflect this ranking and its associated behaviours.

The formal hypothesis for testing in this study, then, was as follows: **The frequency of a given artifact or data type, at a given point on the long axis of the plankhouse, should be dependent on that position on the long axis of the plankhouse.** I suggest this to be the case as a result of the following, related assumptions based on our current knowledge as outlined above: (a) status determined activity, (b) activity is reflected in the material results of that activity and (c), social status was indicated and reiterated by peer-group position on the ranking gradient of the plankhouse.

CHAPTER 3

HOUSEHOLD ARCHAEOLOGY and SITE-FORMATION PROCESSES of the MEIER SITE PLANKHOUSE

Having noted our current understanding of Northwest coast slavery and defined the problem addressed in this study, I now introduce some concepts of household archaeology which guided the research design. In this chapter I discuss the utilitarian and symbolic 'functions' of domestic architecture and suggest the most important such phenomena at the Meier site (in terms of site formation). Finally, I introduce the ways in which I believe these phenomena affected the spatial distribution of the chipped lithic assemblage.

Household Archaeology: Facilities and Semiotics

Critical to understanding household archaeology is the concept of the residence as a semiotic, as well as functional/utilitarian entity (Marshall 1989, Rappoport 1990). Sanders makes this clear:

"A building is a cultural unit of meaning before it is an object of practical function. Thus, a structure's 'function' has two basic and different components - primary (pure denoted function) and secondary (connoted, conceptual function)...Behavioral responses seem to be based on a preconceived and expected secondary function and its symbols. **A building as a set of symbols for cueing expected behavior tends to be more important to a user than its utilitarian function. Cognition studies confirm this conclusion...**Therefore, because of the importance of architecture's role in cueing conventionalized behavior and because the definition of 'function' has varied over the

years, semioticians, in particular, have been critical of theories of analysis or design that emphasize a building's utilitarian function. Such criticism implies that the oft-cited precept 'form follows (utilitarian) function' is naive...and has consequences affecting the traditional process of interpretation of architectural remains..."

(Sanders 1990:45 in Kent, S (ed). 1990: Domestic Architecture and the Use of Space. Cambridge, Cambridge University Press.)

my emphasis

Clearly, the behavior generated by the symbolism 'built into' the architecture of residences must be considered as a potential taphonomic agent. Not all is utility and economy. At the same time, however, one must not lose sight of the utilitarian aspect of residence, which can often be reflected in the spatial arrangement of what Binford terms 'facilities', quoting geographer P.L. Wagner:

"[facilities are]...containers like baskets, and pottery, vessels, boxes, buildings...bases like roads and platforms, and barriers like fences, dams and walls...[which function to] control...the movement of solid, liquid or gaseous material and animate beings."

(Wagner, P.L. 1960:91 in Binford 1983:145)

Binford considers such facilities to be as important to the understanding of archaeological remains as Sanders does the semiotics encoded in the distribution and embellishment of these facilities. In this study, I suggest that both are observable and important, and that considering each is key to interpreting the spatial distribution of the data we observe; in this case, that of the spatial distribution of non-projectile-point chipped lithic implements.

Utility and Symbolism of the Meier Site Plankhouse

At the Meier site, architectural aspects of the plankhouse may be considered facilities, and the long axis of the house may be considered an important cultural symbol. These material and social phenomena must have effected the distribution of material culture within the plankhouse (see below), and, thus, both must be considered taphonomic agents of variable importance. In the following section, I present my arguments for these phenomena and describe how they were considered in the spatial analysis.

The Utilitarian Plankhouse: Facilities

The interior of the Meier plankhouse may be viewed as an arrangement of surfaces, frames, excavations and activity foci which were geared towards the efficiency of production activities and the comfort of the inhabitants. I suggest that the many diverse facilities employed may be grouped under the following labels to form analytical units.

The first facility group I recognize is the **bench**. Ample ethnographic evidence indicates that areas immediately adjacent to walls of Southern Northwest Coast plankhouses were used as a 'sleeping bench' (Nabokov & Eastman 1992), though this is somewhat of a misnomer when one considers that a variety of bunk-beds and other raised platforms were built here to taste and requirement. Regardless, bench areas were where people slept, stored personal goods, and sought privacy; in the otherwise relatively open and expansive plankhouse, the sleeping area, normally divided from others by wooden or bark screens (e.g. Figure 4), was very likely

both symbolically and functionally different from other facilities.

The second facility group I recognize is the **cellar**, clearly evidenced during excavation by roughly 2m wide arrangements of large pit features aligned with the long axis of the house (see plan view of these features in Appendix IV) (Ames et. al 1992). Arrangements of pits in the larger cellar areas were apparently used as storage and rubbish containers (Ames et. al. op cit), and I suggest these facilities were distinct from the bench and hearth facilities (discussed below) in both the utilitarian and perceptual 'worlds' of the plankhouse inhabitants. Cellar features such as those of the Meier site are unknown in other Northwest Coast houses.

The third and fourth facility groups I recognize are the **hearth** and **hearth/periphery**. Ethnographic evidence strongly suggests that among the Chinook, hearths were aligned on the long axis of the house, with one hearth or hearth group per family or peer group (Drucker 1951, Hajda 1984, Ray 1938). At least five distinct hearth features were encountered at the Meier site in this arrangement (Ames et. al. 1992). The hearth was, at least in the utilitarian sense, an energy trap, within which relatively intense heat could be controlled to a number of ends. The area immediately adjacent to the hearth (the hearth periphery) was likely the site of a variety of cooking, consumption and maintenance activities, such as tool production and repair.

In addition to the ethnographic suggestion for these facilities, features encountered during excavation of the site, as well as the gross spatial distribution of artifacts, clearly indicate that these were real facilities of the Meier

plankhouse. In order to clearly demonstrate these facilities, as well as generate basic data on artifacts with three-dimensional provenience data, I recorded the three-point provenience for 1,093 assorted artifacts from 21 of the 25 excavation units within the plankhouse boundaries (these are tabulated in Appendix III; note that 967 are from below the plowzone). Producing three-dimensional spinning plots of the distributions in SYSTAT (as well as two-dimensional plots) generated clear indications of the bench, cellar and hearth area facilities. Figure 6 illustrates the horizontal and vertical distribution of artifacts with three-dimensional provenience, looking north from the south end of the plankhouse. Artifacts are found relatively high in the profile to the left (the bench), then dip dramatically (and increase in density) to the right, representing the cellar below the hypothesized plank floor. Moving further right, artifacts are again found higher in the profile, roughly indicating the hearth pedestal. The plot extends no further due to under-representation of the east side of the plankhouse in excavation, though we may safely assume, given the symmetry observed in the rest of the excavations, that it is similar to the western side.

A 'band' of low artifact density may be seen running through this distribution, most clearly at roughly 90-100cm BSD (below site datum) in the center of the cellar area. It is possible that this represents an occupational hiatus or a cellar-refilling episode (it is also seen when looking eastward; see Figure 7) (Ames pers. comm.). Further investigation of this phenomenon is suggested.

An additional plot of artifacts with three-dimensional provenience is seen in Figure 7, which looks to the East. To the left is the north end of the house, to the right, the

south end. Across the profile, a number of clear 'troughs and crests' at the lower margins represent pits forming the cellars. Again, at roughly 90-100cm BSD, an undulating band of low artifact density (or complete absence) is seen, most clearly in the high-density southern region of the plankhouse; perhaps this is further evidence for a major occupational hiatus or re-building episode. Investigation of soil samples and excavators' notes and level drawings for these levels should be fruitful.

While the artifacts with three-dimensional data are primarily large and attractive items, such as hammerstones, bifaces and projectile points, and are thus most likely a reflection of excavator bias, the plots in Figures 6 and 7 are instructive and clearly indicate the artifact density characteristics of the bench, cellar and hearth/periphery facilities hypothesized above.

As mentioned earlier, I take these facilities to be important in the understanding of the spatial distribution of artifacts of all types at this site. In the statistical tests, the cluster analysis and the ensuing discussions thereof (see **Chapters 7 and 8**), it will become clear that recognizing these architectural features is important to the understanding of spatial distribution of all material culture at the Meier site.

Analytically, I considered each excavation unit to represent either bench, cellar, or hearth/periphery facilities. Table 16 indicates the grouping of excavation units for analytical purposes. It will be demonstrated in **Chapter 7, Analysis; Results and Analysis of the Statistical Tests**, that such labeling was useful and reflective of past behavior.

The Semiotic Plankhouse: The 'Gradient'

While the facilities described above were likely embedded with their own symbolic meanings, I consider them most importantly to be functional phenomena in the domestic sense -- places where people engaged in labor and stored its results and associated tools. What labor was carried out, however, in my model should depend on the location of a peer group on the plankhouse long axis. It seems clear that the length of the house was used to physically and cognitively segregate peer groups of differing social status. Such an assertion is well supported ethnographically for the Northwest Coast in general (Drucker 1951, Goddard 1972, Marshall 1989, Panowski 1985, Suttles 1990, Vastokas 1966). As we have seen above, a clear picture of what such segregation would mean in material terms is lacking at present. I therefore did not propose that any specific type of tool would be found to vary with social status. Rather, I proposed that if any class of artifact were found to vary with location on the house long axis, this variation would most likely be a reflection of different activity, which, in turn, would be a reflection of social status -- so long as taphonomic effects had been considered.

Analytically, the concept of the gradient was realized by recording the position of each excavation unit on the 'gradient'. Each unit received a gradient score (the method is discussed in **Chapter 5** and illustrated in Figure 21) which reflected its distance south of a baseline at the northern plankhouse boundary as demonstrated in Ames et. al. (1992). I could easily have measured the gradient score from the south of the plankhouse; the information content of the score (the unit's position within the plankhouse) would of

course be the same. Measuring from the north was an arbitrary decision.

Heuristic Reconstruction of the Meier Site Plankhouse

From all of the evidence, suggestions and illustrations presented above, I submit, in Figure 8, a reconstruction of the Meier site plankhouse interior, indicating the general facility areas. It is this generalized model that I used in arranging data for analysis. There are four main components to be considered: the bench facility, the cellar facility and the hearth/periphery facility, and the long axis of the plankhouse on which these facilities are arrayed.

I will refrain from the usual disclaimer regarding this heuristic device. I feel that a graphic representation of my concept of the house will be of use to the reader throughout this thesis.

Site Formation Processes of the Meier Site

Having some knowledge of the symbolic and utilitarian aspect of Northwest coast plankhouses, we may now examine the processes which transformed these imposing structures into the archaeological phenomena we encounter. In particular, I am interested in describing those behaviors and factors which effected the distribution of the primary data of this study, the chipped lithic tools.

Discrete Clean-up Activities at the Plankhouse

Clean-up activities at the Meier site are evidenced by both features and artifact distributions. Features representing such activities include thin shell refuse

deposits and hearth matrix deposits in the midden to the east of the plankhouse (Ames et al. 1992). The integrity of these features, their regular occurrence and the generic 'reworked fill' matrix which separates them in time have all been interpreted as evidence of conscious, organized refuse-disposal events (Ames, pers. comm.).

An hypothetical framework for identifying stone tool distribution factors is suggested by Keeley (1982, 1991), who proposes that intensely-occupied areas, such as the interiors of habitation sites, should be areas of most vigorous clean-up activity. Such activities should (a) homogenize the disposal area assemblages (e.g. the midden and cellars in this case) in terms of types of artifacts represented and (b), generate areas of low typological variety where cleanup was most vigorous and where activities actually took place (Keeley op cit.). We may examine the Meier site midden and intra-house assemblages in order to evaluate these propositions.

Comparison of the Plankhouse and Midden Chipped Lithic Assemblages

Figures 9 through 11 show that in several important cases the distribution of data classes, which are described in **Chapter 5** (functional tool classes, Hamilton energy types and raw material qualities) are greater in the midden assemblage than in the plankhouse assemblage (the excavation units assigned to the plankhouse and midden analytical groups are tabulated in Table 15). In particular, the overall density of chipped lithics in the midden is greater than in the house (Figure 12). Column 1 of Table 19 (significance test 1, a chi-square test of significance based on counts of data types in the house and midden assemblages) indicates

that the density of chipped tools, projectile points and bone and antler shavings are all significantly unevenly distributed between the house and midden assemblages. Methods and data of the significance tests performed in this study are discussed in **Chapter 6**.

There are more chipped tools in the midden assemblage than would be expected by chance alone. Additionally, there are more projectile points in the house than in the midden. Bone and antler shavings are found less often in the midden than one would expect, however. Keeley suggests that a greater density of stone tools is to be expected in middens than in residences (Keeley 1991), probably due to conscious, repetitive disposal of artifacts in a specific refuse area; my data reflect this for domestic tools, but not for special hunting tools (projectile points). Considering the value of these small bifaces, it makes sense that they would be less often discarded than 'everyday', domestic tools. Points would more likely be used until exhaustion, and then perhaps recycled into graving or perforation tools.

The distribution of items of differing value, as indicated by energy investment in those items, may also be investigated. In **Chapter 5, Functional Classification of the Chipped Lithic Assemblage**, I discuss a measure of energy investment in the production of tools. For the moment, I shall say that a range of Energy Types, from I (lowest investment) to IV (greatest investment) was observed for each tool in this study. Figure 10 demonstrates that Hamilton Energy Types I and II (less valuable tools) are more common in the midden than in the house, and that Types III and IV (more valuable tools) are more common in the house than in the midden (this is the distribution of artifacts which are not projectile points, but are energy type IV).

Though random processes cannot be ruled out as generating these distributions, as significance test 1 indicates, they are consistent with an hypothesis in which more valuable items (e.g. Type III and IV tools) were kept in the house and less valuable items (e.g. Type I and II tools) were more commonly discarded. Again, this would suggest that discrete clean-up and/or curation activities are important site-formation processes at Meier.

While Keeley has a number of other suggestions for the 'tracking' of factors of chipped lithic assemblage formation (Keeley 1992), they were considered beyond the scope of this project. Specifically, examining the distribution of whole, exhausted and broken items should be rewarding.

Cleaning and Storage Within the Plankhouse

Organized storage and/or disposal of stone tools within the house is also a likelihood because a wooden plank floor, strongly suggested ethnographically (Ray 1938, Curtis 1911, Nabokov & Eastman 1992) and archaeologically (Ames et al 1992), would have to be kept clear of sharp debitage. Sweeping is ethnographically documented (Ray 1938) and it seems reasonable that sweeping would have been directed at small and potentially injurious artifacts such as lithic debitage. This behavior is reported archaeologically for similar architecture at the Ozette site (Huelsbeck 1983, Mauger 1978). Debitage which escaped sweeping might have fallen through spaces between floor planks to end up in the cellar; indeed, this is the area with the highest density of chipped lithic artifacts and debitage. High densities of 'debitage' (which may well be raw material rather than 'waste') found in the cellars also likely represents stockpiling of raw material (Hamilton 1994). A comparison of

debitage from the midden and plankhouse assemblages would be very interesting.

Considering the large number of bone and antler tools in the Meier assemblage,debitage from production of these items is also of interest. Excavations yielded 631 of these items, best described as chips and shavings of bone and antler usually 2-5cm in maximum dimension. These are very likely by-products of working bone and antler with metal knives (see explanation in **Chapter 4, Use-Wear Analysis of Chipped Stone Tools**, in the discussion of saws). Figure 13 illustrates that far more of these are encountered near hearths than in either cellars or bench deposits. Table 19 indicates that this uneven distribution is statistically significant. Because these items are prone to decay, there may be considerable taphonomic bias here, though we should remember that many bone and antler tools were recovered from all architectural areas. The distribution of this bone and antlerdebitage is further discussed in **Chapter 7: Analysis: Results and Analyses of the Statistical Tests**.

Larger artifacts, such as hafted tools, would likely have been stored (rather than 'cleaned up'), probably in a variety of boxes, chests, baskets, bags and hanging frames (Gunther 1966, Johnson 1975, Mauger 1978, Minor 1983). The most valuable items -- such as hafted tools, small items which could easily be lost and artifacts made of rare raw material -- may well have been stored in chests specifically built for this purpose (Gunther 1966). In **Chapter 7** I present evidence for differential storage of valuable items. For the moment it is sufficient to say that we should expect that tools might be treated (stored) differentially depending

on their value, as is suggested in the comparison of the house and midden assemblages.

Post-Depositional Movement of Artifacts

Post-depositional agents at the Meier site include bioturbation, primarily from burrowing rodents that riddled much of the site matrix and whose activities certainly moved many artifacts within the site (Ames et. al. 1992, Hamilton pers. comm.. 1994, excavators' field notes 1987-1991). Rodent burrows were most common in the upper meter of deposits at Meier and were found more or less equally across all excavation units, though those with softer fill, such as the units with the most pits -- the cellar units -- were likely favored by rodents. Features such as post-molds were often followed by rodents, making identification of these features difficult in many cases. While rodents very likely moved relatively small artifacts (such as the stone tools considered in this study), their burrows are often less than two or three meters in length and are not noticeably aligned with the long axis of the house (excavators' field notes, 1987-1991).

I suggest that the movement of artifacts attributable to rodent activity was likely limited to two or three meters in any direction at this site. Such movement can be a problem when lines are drawn between immediately adjacent units for analytical purposes. For this reason, larger-scale comparison of 'area assemblages', such as comparing the northern units with the southern units, may be more relevant and sensitive to fundamental differences in material culture of the populations occupying these areas of the house.

Agricultural ploughing took place at the site, and the upper 30cm or so of the site were considered 'plough-zone'. Artifacts found in this zone are very likely to have been moved many times and over distances relatively large compared to the scale of the original plankhouse. For these reasons, artifacts from the plough-zone (n=225, or c.20% of the site total) were eliminated from the artifact population subjected to spatial analysis in this study.

Looting by pot hunters also disturbed the site, and at least once during excavations pot hunters used shovels and screens in attempts to find artifacts (Hamilton pers. comm.). Pot hunter damage was mapped and considered in the placement of subsequent excavation units. Artifacts discovered within the pot hunter spoil heap were eliminated from spatial analysis in this study.

By eliminating the artifacts found in the plough-zone and the looter tailings we eliminate much of the post-depositional movement of artifacts at this site that can be controlled for. How the site came to be abandoned -- slowly or quickly -- has yet to be determined and cannot be usefully speculated upon here. Rodent activity was so common that identifying artifacts moved by this agent is impossible, although rodents are unlikely to have moved the artifacts in question on a scale relevant to that investigated in this study. In one case, I am concerned with the general distribution of artifacts within roughly 10-meter long areas of the site -- discussed in **Chapter 6** in the section **Objectives, Methods and Materials** -- and I believe these are not effected significantly by rodent activity. In other analyses I am concerned with architectural areas (the aforementioned facilities) which are clearly defined, though sometimes overlapping, and in these cases rodent disturbance

may have effected distributions. In these cases, however, I found enough redundancy in the distributions to be confident of the value of these analytical areas, and I largely discount rodent activity as a crucial factor in these cases.

At the time of this analysis there was insufficient stratigraphic and matrix characteristic data for me to claim control for the reworked fill at the site, which represents repeated refurbishment and re-excavation of cellars, various buttressing and post-setting activities and other, unknown activities (Ames, pers. comm., Ames et al 1992). For the moment, this must simply be considered a confounding circumstance of an unknown quantity.

Finally, I should mention that while at many archaeological sites the problem of lithic artifact movement and use-wear modification by trampling is an important consideration (see Shea and Klenck 1993), at the Meier site I feel that these are negligible concerns. It is hard to imagine plankhouse inhabitants, most likely with bare feet, carelessly discarding hard, sharp chipped stone tools on a cedar plank floor, and, further, kicking them about or grinding them into the flooring barefoot; artifacts must have been stored in containers or at least swept away from high traffic areas such as the bench (the living quarter) and the hearth/periphery (an area of intense activity).

It seems clear that discrete storage and discard locations for stone tools were a reality at the Meier plankhouse. The architectural features I recognize in this study -- the bench, cellar and hearth/periphery -- are of a relevant scale to investigate such activity, and serve as my control for site-formation processes. As I will explain in

Chapter 7, Analyses: Results and Analysis of the Statistical Tests, this control proved fruitful.

CHAPTER 4

USE-WEAR ANALYSIS of CHIPPED STONE TOOLS

In the previous chapters I outlined the types of data to be used to evaluate the hypothesis and discussed how I proposed to control for the continuity of information between past behavior and modern observations for the first type of data, that of the spatial distribution of artifacts. In the following chapter I discuss the rationale, methodology, data and results of the use-wear analysis that was conducted in order to evaluate the integrity of the second class of data of this study -- that of the utilitarian function of the artifacts, the spatial distribution of which is being observed.

Rationale For Use-Wear Analysis in this Study

Previous to this study, most of the chipped lithic artifacts recovered from the Meier site were classified by Hamilton, who employed a generalized morphofunctional typology which was intended to indicate the motion of tool use, such as scraping or cutting (Hamilton 1994). Before observing the spatial distribution of this assemblage in order to evaluate my hypothesis, it was necessary to (a) complete the chipped lithic data set by classifying the lithics excavated in the 1991 field season and (b) test the Hamilton morphofunctional typology to ensure continuity between original use of the artifact and typological labels used to describe the assemblage. The completion of the chipped lithic database is discussed in **Chapter 5, Functional Classification of the Chipped Lithic Assemblage.**

To test the Hamilton typology I used use-wear analysis (the observation and interpretation of macro- and microscopic effects of artifact use) because it is the most accurate method known of determining the past use of stone implements (Keeley 1980, Shea 1992). In the following sections I describe the theory and methodology of use-wear analysis in general, and the specific aims and methods used in this study.

Use-Wear Analysis:

Theory, Methodology and Objective of This Study

Use-wear analysis is based on the observation that suites of use-wear characteristics observed to form on experimental tools may be correlated with similar characteristics on archaeological material (Semenov 1962). In order to make such correlations, the analyst must be immediately familiar with such use-wear characteristics as are relevant to the archaeological context in question. In order to achieve this familiarity, analysts create and use experimental tools and observe the use-wear characteristics which develop on their utilized surfaces (Keeley 1980). In some cases, experimental tool sets are produced specifically to reproduce wear likely to be observed within an archaeological lithic assemblage, based on some knowledge of the site economy and availability of various raw materials (Shea 1990). In other cases, and in this study, no such specific tools are produced, the analyst relying on knowledge derived from observation of a generalized experimental tool dataset.

Because Hamilton's classification is based primarily on the motion of tool use (e.g. CUT, GRAVE, etc.), I was

interested only in use-wear which reflects such motions. Use-wear traces which reflect tool motion are relatively easy to observe and interpret (as will be seen below) and I felt confident (for reasons outlined below) in my capacity to evaluate this level of data without a customized experimental tool set. The objective of the use-wear analysis I conducted in this study, then, was evaluation of the accuracy of typological labels (intended to indicate general tool motion) by comparison the observed use-wear characteristics of a sample of classified tools with the expected use-wear characteristics for the tool motion indicated by the typological label.

Evaluation of Use-Wear Evidence:

Use-Wear Holotypes for Seven Tool Motions

To evaluate the integrity of the Hamilton classification, I generated use-wear 'holotypes' for seven functional classes, based on tool motion. The seven tool motions are CUT, GRAVE, PERFORATE, SCRAPE, SHAVE, WEDGE and SAW. These are all tool motions which are ethnographically reported for the Pacific Northwest and may reasonably be expected to have been employed on the Lower Columbia in pre-contact periods as well (Minor 1983, Stewart 1975). I considered artifacts to be tools when they exhibited the use-wear characteristics predicted by these holotypical motions. I use the term 'tool', then, to denote items exhibiting suites of use-wear characteristics.

Table 1 indicates the general characteristics expected for each of the seven tool motions. These use-wear holotypes are based on my own observations (the experimental tool set) and a consideration of the results reported in Grace (1989), Keeley (1980), Moss (1983), Newcomer, Grace & Unger-Hamilton

(1986), Odell (1981), Semenov (1962), Shea (1991), Shea & Klenck (1993), Vaughan (1985) and Yerkes (1987). Figure 16 illustrates the holotypes for suites of characteristics expected of each functional class. Figure 17 illustrates the holotypical use-wear expected for tool use on yielding, medium resistant worked materials.

In general, these holotypes represent functionally specific and sometimes mutually exclusive tool motions, although the problem of multifunctional artifacts is not addressed here. While I recognize that multifunctional implements may be dealt with by consideration of the *employed unit* of the item (any surface or edge found to bear use-wear traces, *sensu* Shea 1990), it was not considered for this study; what was intended was to generate a basic idea of the validity of the Hamilton morphofunctional classification. Further use-wear analysis, as will be seen, to determine the specific function and material worked by each artifact would certainly generate more fine-grained results than this study.

In the following sections I describe the experimental tool set (which is my empirical reference) and the blind test (employed to test my capacity for observation and interpretation of use-wear), both of which are detailed in Smith (1990).

The Experimental Tool Set

The experimental set I refer to in this study is that which I produced between 1989 and 1990. This experimental assemblage was produced as a part of my BA thesis project, in which my aim was to become familiar with the generation,

observation and interpretation of use-wear on fine-grained chipped stone tools.

In that project, I observed the use-wear on 84 lithic tools, 78 of which I personally used and six of which were used by my colleague, Yin Man Lam (at this writing a doctoral student at SUNY-Stony Brook). Most of these implements are unmodified flakes of cryptocrystalline silica and flint, from various locations in the British Isles, which are quite similar in density and flaking characteristics to the raw material at the Meier site. These tools were used to work wood, antler, fresh meat, cartilage, bone, leather and vegetal matter. The tools were used for periods between three minutes and two hours, for a total of 30.28 hours. Work actions included all those postulated in Hamilton's morphofunctional classification except wedging. A tabulation of worked materials, work actions and work durations for the experimental tools is presented in Table 2 (Figure 14 illustrates the work actions used with the experimental tools and Figure 15 illustrates a variety of the experimental tools). Additionally, 24 lithics, used by an accomplice (Yin Man Lam) for the blind test (discussed below), were examined, bringing the total number of formally examined lithics in my experimental sample to 108.

Since the completion of my B.A. thesis project (in 1990) I have continued to produce and use stone tools and have informally observed the wear on roughly 50 additional tools used for a variety of tasks. The sum of the observations I have made, in addition to the results reported by other workers, constitute the empirical basis for my evaluation of use-wear traces.

The Blind Test

In order to evaluate the analytical capacity of specific investigators, 'blind tests' have been commonly employed in use-wear analyses (for recent debate on such tests see Bamforth 1988 and the ensuing debate in the same journal). These tests generally involve the use of a number of lithic tools by one researcher and the subsequent observation of these tools by the use-wear analyst, who attempts to derive functional information from the observed use-wear patterns or absence thereof. While there are usually differences in the detail of information sought by researchers, most analysts attempt to determine three key variables for each examined item: the utilized region of the item (if used), the work action (e.g. scraping, slicing) and the worked material (e.g. flesh, wood).

The results of nine blind tests, including the one conducted in my BA thesis (Smith 1990), are summarized in Table 3. Note that the type of data sought clearly effects the percentage of correct interpretation. In six of the seven tests, the most commonly correctly identified variable was that of 'utilized region'. Investigators were less successful at identifying work action (tool motion, the data I focus on in this study), though scores here are quite good and, in any case, are well above those for correctly interpreting the material worked by the tool. It may take a decade or more of observation for a use-wear analyst to become 'expert' (Newcomer 1989, pers comm). Nonetheless, Table 3 indicates that for the purposes of this study, my skill in the location and interpretation of use-wear on par with other published studies, and may be considered reliable.

Methods and Materials Employed in Use-Wear Analysis of This Study

The rationale for, and objective of, the use-wear analysis I conducted in this study have been discussed, as well as the experimental tool set that represents my practical experience and the blind test which indicates that I am, at least, competent in the interpretation of the use-wear evidence (tool motion) required by the objective of this study.

At present, there is no standardized methodology or data recording procedure recognized by all use-wear analysts. Although some observation techniques are commonly employed, and some steps towards mechanical quantification of use-wear phenomena have been taken in attempts to reduce the acknowledged subjectivity of use-wear analysis (Grace 1989, Levi-Sala 1989), individual procedures vary according to research motives and investigators' intellectual histories. In this project I closely followed the observation and classification procedures detailed in Shea (1991) and Shea & Klenck (1993). I selected these works as guides because they include thoughtful and (importantly) solutions-oriented consideration of many past methodologies. The procedural guidelines suggested by these works are inferentially conservative, focus primarily on the most informative use-wear phenomena and can result in clear, parsimonious interpretations.

I recorded use-wear observations on a recording sheet of my own design. I used a Wild 5-60X binocular microscope for most observations, and a Leitz Laborlux 12-POL mineralogical light microscope with incident fiber-optic lighting for examinations at magnifications of 60-120X. All data were encoded to my customized use-wear software for storage and later analysis.

The Use-Wear Sample

I observed use-wear on a total of 278 artifacts. This number represents 24.86% of the non-projectile point, fine-grained chipped lithic assemblage classified by Hamilton (1994) and by myself in the course of this study. This sample was examined for tactical purposes; the time required to examine more items would have been prohibitive, and the current sample represents at least 40 hours before the microscope. Within the sample I examined a stratified sample of the artifacts assigned to each of the seven tool motions recognized by Hamilton in his analysis. Table 4 indicates the examined percentages of each Hamilton functional class. I examined between 10% and 78% of each functional class sub-assemblage. I examined larger samples of tool types where the use-wear was more difficult to qualify and smaller samples where wear was more uniform. The provenience of examined artifacts was not an issue; the aim was to generate an estimation of the validity of the Hamilton classification, not to examine use-wear from different areas of the plankhouse.

Observed Use-Wear Characteristics

I used two types of use-wear data to guide most of my functional decisions; microflake scars and polish, following the strategies employed by Shea (1990). I strongly feel that making functional classification decisions based on use-wear traces alone is inadequate procedure. The overall impression of each artifact must be used in conjunction with the use-wear evidence to make realistic conclusions regarding function (Shea 1990, Yerkes 1986). The observed characteristics of microflake scarring and abrasive polish of the utilized areas observed are detailed below.

1. Microflake Scars

Several characteristics of microflaking scars generated by use of the tool (as opposed to those generated in sharpening and resharpening activity) were observed. Use-related scars are generally smaller and less evenly distributed than sharpening scars, though this distinction is not always easy to make.

Microflake Scar Size

Microflake scar size can generally be used as indicator of the density of worked material and the relative dynamism of work actions; larger scars are often the result of dynamic action (e.g. percussive wedging and chopping) or work on very dense material (such as antler), while smaller scars normally result from less dynamic action (such as slicing or cutting) and work on less resistant worked material (such as fresh meat or reeds). It must be emphasized again that these are general rules and that this class of evidence, as well as all others, was used in conjunction with other evidence in the evaluation of tool motion/function. Three microflake scar sizes were observed; **Small** (less than 1mm), **Medium** (less than 2mm) and **Large** (between 2 and 5 mm).

Microflake Scar Distribution

As with abrasive wear (polish), the distribution of microflake scars on the utilized element of the artifact was observed. Unifacial microflaking is normally a result of a uni-directional work action and is often seen on tools used for a specific purpose rather than on general-purpose edges. A good example is the hafted scraper, which is often repetitively used in one direction. Bifacial distribution of microflakes is often seen on tool used in a longitudinal manner (such as blades and incising tools), where inadvertent

lateral movement of the tool -- while embedded in the worked material -- fractures both surfaces flanking the working edge. Scars on flake ridges and other unusual projections away from the working edge of the tool are often a result of hafting or use as a wedge. Thus, the distribution of microflake scars is a valuable criterion in the determination, in particular, of tool motion.

Unifacial

Microflake scars were considered unifacial when they were observed on only one surface (dorsal or ventral) of the utilized element.

Bifacial

Scars were recorded as bifacial when they occurred on both ventral and dorsal surfaces of the working element.

Surfaces / Flake Ridges

Scars distributed on scars and flake ridges were recorded as they occurred.

Microflaking Distribution Continuity

I also observed the spatial continuity of microflake scars. Scars found uniformly distributed across utilized elements are often a result of repetitive work actions, such as uni-directional scraping. In contrast, microflake scars distributed unevenly are often the result of less formalized and repetitive work actions, such as shaving and some types of cutting, where the tool is liable to damage from inadvertent stresses during use. The distribution continuity variable requires further research, though I have found it to be useful in the overall assessment of implement function.

Even

Microflake scar series which were contiguously distributed across working elements (with flake scars overlapping and a large portion of the utilized element scarred) were considered even.

Uneven

In contrast to even microflake series, more or less randomly distributed scars were recorded as uneven when they exhibited no discernible pattern or reflection of repetitive activity. Repetitive activity generally reduces a working element to some stable state and then produces patterned wear on that element: uneven wear is generally opposite of these conditions.

Microflake Termination Type

The termination of microflake scars (basically, the shape and angle of the distal margin of the microflake scar) is a prime criterion for determining the stresses encountered by the working element. Generally, three terminations are recognized by use-wear analysts working at the medium-scale level of observation employed in this study. Feather terminations are the result of relatively low stresses such as those generated by cutting meat. Hinge terminations result from slightly higher stresses; shaving wood, for example. Step terminations normally result from relatively high stress. Such terminations are common on tools used to work bone and antler, dense materials requiring considerable force in most work activities.

Feather

Feather terminations are characterized by a low angle and harmonious transition between microflake scar and the parent material.

Hinge

Hinge terminations exhibit a more abrupt distal scar margin than feather terminations, though less acute than step terminations.

Step

Step terminations are characterized by an abrupt break, usually at a relatively high angle relative to the parent material, at the distal margin of the flake scar.

2. Polish

Though the precise mechanics of abrasive polish generation on stone tool are currently debated, all workers agree that polish can be generated by use (Bamforth 1988). The polish characteristics observed in this study are noted below.

Polish Distribution

The distribution of polish resulting from use (as opposed to that resulting from hafting or prehension) can aid considerably in the determination of both worked material density and work action of the tool. Unifacially distributed polish is normally a result of uni-directional use, such as that on a dedicated scraping tool. Bifacially distributed polish is usually the result of work on more yielding matter, such as soft wood and fresh meat, which parts under the efforts of the utilized edge and abrades the flanks of the utilized element. Tools such as perforators, which may be used to work dense raw matter such as bone and which have roughly cylindrical elements in addition to the pointed elements, may exhibit 'bifacial' distribution due to precisely this immersion of the tool within the worked matter. Where surfaces and flake ridges, or other

projections, are polished, clues to tool motion (e.g. wedging) or hafting may be available.

Unifacial

Unifacial polish is distributed on only one surface of the tool. Strictly speaking, this is a rather rare occurrence (as is entirely unifacial microflaking) and often incidental polish was observed. Nevertheless, the modal distribution was considered most important.

Bifacial

Bifacial polish occurs on the dorsal and ventral surfaces of a utilized edge element.

Surfaces / Flake Ridges

Surfaces include flake scars and inter-scar ridges as well as non-flaked parent material. A positive record of this variable indicates that much of the implement came into contact with the worked material.

Polish Distribution Continuity

As with the spatial continuity of microflake scars, the distribution of polish may aid in the interpretation of tool motion. Isolated polish patches develop, for example, when flake ridges or other rugosities on the surface of a sawing tool make incidental contact with the worked material. Hafting polish is often isolated, distributed unevenly on surfaces which came into most direct contact with the hafting material (e.g. bone or wood). Slight movement of the tool bit within the haft polish these surfaces, producing rather large 'islands' of polish which are rather easily identified. Uniformly distributed polish, however, indicates a tool edge used more than any other, and generally in a standardized work action, such as shaving.

Random / Isolated

Polish was considered isolated when it appeared in patches, often on flake ridges or scars, rather than in continuous bands along the utilized margin of the tool.

Uniform

Polish was considered uniform when it was evenly distributed on the most commonly used working edge of the tool, rather than in spots or patches incidental to this edge.

Polish Invasiveness

One of Shea's contributions to recent work has been the observation of the relationship between worked material density and the distance which polish 'invades' beyond the working element of a stone tool (Shea 1991). Invasive polish is normally generated when yielding matter is worked; the tool edge is immersed in the worked matter and polish develops far beyond the utilized margin. Marginal polish often develops as a result of working hard matter, when a stone tool is used with relatively great force and in one particular manner.

Invasive

Polish was recorded as invasive if it extended to or beyond the margins of the largest microflake scars. In cases where microflake scars were very small, polish was considered invasive if it exceeded c.5mm inward from the utilized margin. This 'sliding scale' of measuring polish invasiveness generally attempts to account for the relationship between the density of a given worked material and the size of microflake scars produced when material of such density.

Moderate

Moderately invasive polish was recorded if the polish extended inward from the utilized edge to a point roughly equal with the moderately sized flake scars.

Marginal

Polish was considered marginal if it was isolated to the extreme edge of the working element of the implement.

Description of Use-Wear

Observed on Artifacts Classified

According to the Hamilton Morphofunctional Scheme

Each tool type in my seven-motion classification represents a functionally distinct kinetic action. While overlap between categories certainly exists (e.g. between 'shaver' and 'scraper'; see Table 1), some clear distinctions have been made. For example, cutting tools are distinct from perforation tools in a number of distinct characteristics. Similarly, I can be rather confident that gravers are not scrapers, and that a delicately shaped cutter is not a wedge used to split antler. In this respect, my classifications reflect some true distinction, in the mind of the tool user, of the utilitarian function of these implements. If near-total functional overlap existed, I estimate that only two or three tool all-purpose forms would have been required. As it is, I have partitioned all tools according to the work action most evident in the use-wear and form of the artifacts, and I feel these types represent 'real-world' functional differences.

Below I describe the observed characteristics of each functional type. I also comment on the likely worked material, based on my experimental observations and those of

other use-wear analysts. I also discuss two types recognized by Hamilton (KNIFE and HIDE SCRAPE {'end scraper' in Hamilton 1994}) which I assigned to more inclusive categories.

Scraper (n=449) Next to lithic projectile points, these are the most common tools in the Meier site assemblage. These tools are characterized by step and hinge microflake scars (resulting from high work loads, as on dense worked materials), rather marginal polish distributions (the result of a high angle of attack and/or a resistant worked material) and unifacial microflaking, in which flake scars are nearly always on the surface opposite that bearing most of the polish, indicating uni-directional kinetic action.

These characteristics are consistent with those reported by many lithic analysts (Keeley 1981, Shea 1990). My own experiments have illustrated that, in general, scraping action on material more dense than leather generally produces rather uniform results; unifacial microflaking distributed on the tool surface opposite the worked material, a period of massive utilized-edge attrition followed by utilized-edge stabilization and systematic high-load flaking of the utilized edge, marginal polish distribution and relatively steep microflaking (Smith 1990). Since the use-wear on these tools is consistent with my own experimental results and those published by other analysts, and since bone, wood and antler were common raw materials in the Chinook economy (Ames et al 1992, Davis 1995, pers. comm.), I suspect that these are the materials most often worked by the Meier scraping tools. One clear exception is that of the hide scraper, which is discussed below.

The large number of artifacts assigned to the scraper category is probably partially a result of the wide variety of unrecognized functional variation within the 'scraper' class. As seen below, one scraper category which stands clearly aside from all others is that of 'hide scraper'; this group accounts for c.16% of all scrapers. If it were possible to recognize other such diagnostic functional classes, elements of the scraper category would be likely be partitioned out to other, more meaningful, functional classes. The same is likely for most other functional classes in this study.

Hide Scraper (n=69) These tools are generally end- or thumbnail-scrapers in form (Hamilton 1994), though morphology was not used as an indicator of function in this examination. These tools are characterized by stepped microflaking (limited to the convex working edge and indicating high work loads) as well as uniformly bright and marginally-distributed polish on the ventral surface of the working edge, indicating repetitive work action and a rather dense worked material, respectively.

These characteristics, as well as the tool morphology, are identical to most of those described in Hayden (1979), in his treatment of the 'end-scraper problem'. The stepped (high-load) microflaking and bright, marginally-distributed polish are curious when one considers the relatively yielding worked material; animal hide. These use-wear characteristics are easily explained, however; hide-working requires a great deal of repetitive motion and relatively high stress is incurred on the tool edge, especially when used with a haft, as many hide-scrapers are. The motion and stress are sufficient, according to Hayden, to produce these diagnostic results (Hayden 1979, op. cit.). Based on these

characteristics, I suggest that the items classified as 'hide scrapers' were, in fact, tools used in the processing (specifically, scraping) of animal hide.

Hafting use-wear (generally, flaking, crushing and polish spots on ridges and surfaces not associated with the used margin of the tool), as well as the small size of some of these tools and the abrupt termination of use-wear on utilized edges (indicating the former presence of a haft) all indicate that these tools were, in most cases, hafted. Following the advice of Keeley (1988), further study needs to be conducted to determine the spatial distribution of exhausted and complete hide scrapers and other tools, as these may aid in identification site-formation processes. Certainly such finer-grained analyses will provide some meaningful results and better our knowledge of site formation processes at Meier. In order to maintain typological continuity, I group these items in the scraper category.

Knife (n=34) These are elongate artifacts with delicate, low-angle use margins, small-to-medium microflake scars (suggesting a non-resistant worked material), feather and hinge microflake terminations (again indicating a yielding worked material) and invasive polish which indicates a relatively non-resistant worked material. The distribution of these characteristics indicates cutting activity with the long margin of the tool. While it may be argued that the pointed end of these tools may have been used for graving, the generally delicate nature of the Meier site knives makes this unlikely.

All indications strongly suggest that these tools were used to cut or incise a rather yielding material. Such a material may have been animal or vegetal. However, the lack

of characteristically bright and easily observable 'harvest polish' on these tools makes it very unlikely that they were used for significant amounts of plant processing. It is most likely, then, that yielding animal matter, such as flesh and hide, were being cut with these tools. It is possible that these items were hafted, curated knives used for a variety of purposes; Chatters (1984) and Minor (1983) consider these to be associated with hunting expeditions.

I briefly examined these elongated, pointed artifacts for use-wear attributable to projectile point use, as outlined in Shea (1988, 1991). Though I am not immediately familiar with this use-wear, I concluded that these were not projectile points (e.g. spear points), or at least that the primary function was cutting.

While this use-wear investigation was conducted in order to evaluate Hamilton's morphofunctional categories, knives are classed in another, more generalized group ('cut') for purposes of continuity in this analysis.

Graver (n=51) Graving tools come in a variety of forms, the common characteristic being a robust tip bearing most, if not all, of the observable use-wear on the tool. The characteristics common to these tools are high-energy, stepped or hinged microflaking scars (indicating a relatively dense worked material) and polish patches distributed primarily on flake ridges and the distal tip of the tool (again, indicating a rather unyielding raw material being worked). While most use-wear traces on the Meier gravers are distributed on one side of the tool or another, typically indicating uni-directional use and thus typically distinguishing gravers from rotary perforation tools, some gravers had wear on many surfaces. This is likely the result of incidental or occasional rotary use. These tools were not

assigned to the perforator category because most of the wear indicated graving.

The massive microflaking attrition of Meier site graver bits is very similar to the use-wear I have generated and observed in bone- and antler-working experiments (Smith 1990). Graving antler with stone requires relatively high working pressure, even when the antler has been softened beforehand, for example by soaking in water, and the tools used in this activity are relatively easy to identify. I suggest that the most likely worked material of the Meier site gravers is antler, followed by bone and, finally, wood.

Wedge (n=39). These tools are characterized by massive crushing and step-type microflaking of the working element (indicating high energy use and a dense raw material) and isolated spots of polish distributed on both dorsal and ventral surfaces.

Wedging activity, much like sawing, puts much of the tool surface in contact with the worked material, in time generating polish which is distributed on flake ridges and other surfaces of the tool. In the case of the wedge, where the function of splitting matter by driving the wedge into a plane of weakness, both the working bit (the distal margin) and the flanking surfaces must be considered working edges, as these surfaces provide the wedge action required. Thus, the spotty (uneven) distribution of polish on wedge surfaces is explained by their being driven wholly into the worked material, and not by hafting.

Isolated patches of polish commonly develop when the raw material being worked is very dense and unintentional contact is made between some tool surface and the worked material; in

bone saws, for example, surfaces flanking the working edge demonstrated polish on raised surfaces after only a few minutes of work (Smith 1990). I suggest that much the same is seen on these tools, and that hard woods, antler and bone were the materials most often worked by these wedges.

It should be noted that many wedges were made from apparently exhausted bipolar cores, as observed by Hamilton (Hamilton 1994); these 'pieces esquilles' are recycled tools. Hamilton states that many wedges probably remain to be identified and that a survey of the core and parent assemblages needs to be undertaken in order to identify these tools. I agree with this evaluation, and I recognize that the number of these tools are likely under-represented in this analysis.

Saw (n=13) This class contains a variety of artifacts with robust working elements, marginal and widely dispersed polish (very similar in distribution to that on wedges) and massive microflaking and utilized edge attrition with step, feather and hinge flake scars which are bifacially distributed.

These use-wear characteristics are very similar to those generated in my experiments with sawing wood, bone and antler, in which I have observed an initial period of massive destruction of the working element followed by stabilization of the employed edge in terms of material attrition. Continued use commonly generates snapping of the tool edge when unintentional lateral movement occurs while the tool is deep in a groove (generating high-energy, step and hinge microflaking terminations). Unevenly distributed polish develops on raised surfaces flanking the sawing edge, but the

employed edge itself is so often damaged that there is little time for polish to develop (Smith 1990).

The use-wear characteristics of these tools strongly suggest that they were used to saw material of medium to high density, such as wood and bone. In an informal examination of a number of bone and antler artifacts from the Meier site, I noted that many of the cut / sawn edges exhibited very narrow and parallel-sided incision marks which are very likely the result of metal knives. Since bone and antler are much more difficult to saw than most woods, I suggest that most Meier site saws were used to saw wood. Formal examination of the tool marks on bone and antler tools and debitage is needed to positively identify the tools used to work these important Chinook resources.

Perforate (n=89) Morphologically often similar to gravers, though generally with longer working bits, Meier site perforators are characterized by a pattern of continuous microflake scars around the use-margin (generally tubular or roughly faceted) and a conspicuous variety of microflaking types and polish distributions. There are no other common elements aside from those morphological features made necessary by the work undertaken with these tools. Polish distributions are not uniform on these tools. Some exhibit bright polish isolated on flake- or facet-ridges while other tools are uniformly polished across the entire surface working cylinder. This indicates that these perforators were used to work both resistant and yielding matter, respectively. Some perforators appear to have been used primarily as piercing tools, and demonstrate little use-wear on the bit margins.

In my own experiments I have noted that during drilling exercises, dense matter, such as bone or antler, tend to produce 'islands' of polish on prominent flake ridges (Smith 1990). Drilling and piercing more yielding matter (such as cured leather) tend to produce a more uniformly distributed polish (Smith op. cit.). I suggest that the Meier site perforators were used to process both relatively yielding and resistant matter, such as hide and bone, respectively. Certainly, further work to distinguish between perforator uses would be valuable.

Cut (n=246) Cutters are characterized by delicate working edges with small- to medium-sized flake scars with feather and hinge terminations (indicating a rather yielding worked material) and invasive polish (a result of a yielding worked material). These tools are often expedient (Hamilton 1994); many are unmodified flakes.

My own experiments in cutting meat and various types of leather suggest that, for cutting/incising these yielding materials, unmodified flakes are generally satisfactory or excellent tools (Smith 1990). While small serrations may aid in cutting some matter, an unmodified flake of fair, good or excellent raw material is generally sufficient for many tasks, including butchery of fowl and small mammals, activities which produce invasive polish, bifacially distributed microflaking of the hinge and feather variety and occasional crushing and high-energy use-wear during accidental contact with bone or wood (as in butchery on a wooden platform) (Smith 1990). In contrast, cutting leather generated more marginal polish and more massive and frequent microflaking of the utilized edge.

My own experiments, the reports of other use-wear analysts and the use-wear traces on the Meier site tools all suggest to me that (a) most were used on yielding raw material such as meat and (b), few were used for cutting vegetal matter (none were observed to exhibit 'harvest polish').

Shave (n=231) Shavers are characterized by a wide variety of step-, hinge- and feather-termination microflake scars distributed, in most cases, unifacially (indicating a diversity of worked material densities and work loads), relatively invasive, unifacially distributed polish (indicating a low angle of attack and/or a yielding worked material) and a rather low utilized edge angle (indicating a work action with an angle of attack between that of a cutting/incision and scraping).

At first glance these characteristics seem not as diagnostic as those for some other tool categories. Since shaving and scraping are so similar, and are often conducted on the same worked materials, a diversity of flaking and abrasion wear is to be expected, and has indeed been observed. This variety of wear patterns, when observed and considered with other evidence (e.g. item morphology), can be used as a positive indicator of activity and may be used to distinguish shaving tools from scraping tools.

I have observed that shaving (some term this 'whittling') with a stone blade can occasionally produce use-wear that could be confusing to the analyst. For example, when raw material with an uneven surface, such as wood with small knots, is whittled or shaved, it tends to produce 'snags', in which the tool is momentarily jammed on some rugosity on the surface of the worked material. This may

last for only an instant, but can generate bifacial, high-energy (step and hinge) flaking which would be otherwise unexpected on 'shaving' tools, and which is, indeed, rare on tools used to shave more uniform raw material (Smith 1990). Thus, while scraping tools are often characterized by patterned chipping and abrasion, due to the more strenuous nature of their use and resulting lesser sensitivity to small flaws in worked material, shaving tools can appear to be 'worse for wear' in comparison, exhibiting a variety of nicks, chips and abrasions.

The use-wear evidence suggests to me that these tools were primarily used for shaving of medium to hard raw material, such as wood, bone and antler. The tips of some shavers are also likely to have been used for incision or graving.

Summary Results of the Use-Wear Analysis

Having observed these variables for each examined artifact, I considered all variables in addition to the shape of the artifact. If the use-wear fit the hypothesized wear patterns, or if I could reasonably explain deviations from the 'wear holotypes' for a particular tool class, I recorded that I agreed with the Hamilton morphofunctional classification. Otherwise, I disagreed with the classification and assigned the artifact to the appropriate functional holotype.

Appendix I presents the 533 items (of the 1991 excavations, which include 'indeterminate items; see discussion in **Chapter 5**) that I classified in this study. This appendix also includes brief comments regarding these observations as well as an 'agree/disagree' score and both

the Hamilton classification and my own for each artifact. The results of the use-wear observations are presented in Tables 5 through 7. Table 5 indicates that in 238 of 278 cases (86%), the use-wear I observed on the morphofunctionally classified artifact was consistent with the use-wear holotype which represented that tool class. In 40 cases (14%), the use-wear was not consistent with the expected holotype.

Table 6 indicates how many of the artifacts with Hamilton classification labels were converted to my own classes based on use-wear which did not meet the holotype expectations. Table 7 indicates the occurrence of use-wear encountered which indicated multifunctional work actions. In 34 cases (c.10% of the total examined assemblage) I noted that more than one function was apparent. This strongly supports my belief (and that of Hamilton) that many of the Meier site tools are multifunctional, particularly the morphologically-delineated 'side-shaver' sub-class of the Hamilton classification. These shaving tools often were marked with graving wear on the sharp and delicate tip (see Figure 20 for an example of the 'side-shaver').

In summary, the use-wear examination I conducted confirms Hamilton's morphofunctional classification scheme. No dramatic classificatory re-assignments were necessary, although it is clear that multifunctional tools are common in the assemblage, and require further study. In general, however, one may say that most artifacts classified as cutters are, indeed, cutters, and so on; although some may have occasionally been used for other functions, and some may have been designed as multifunctional tools, most appear designed for a specific purpose.

I suggest we may learn from an analogy in many cases here; even though most people use a screwdriver to drive and remove screws, few (normal) people have not used a screwdriver to pry the lid from a tin of paint, or the butt of the handle to pound on something. Use-wear analysis of the screwdriver would indicate a multifunctional implement, though it is clear that the most common use of the tool is reflected in its overall design and most common use-wear.

This use-wear study fortifies the foundations for the following spatial distribution analysis and demonstrates some continuity between past behavior and the interpretation of that behavior in the present. I may be confident that my classificatory data are sound at the stated limits.

CHAPTER 5

FUNCTIONAL CLASSIFICATION of the CHIPPED LITHIC ASSEMBLAGE

Addition of the 1991 Field Season Assemblage to the Meier Site Lithic Database

Hamilton assigned 806 non-projectile point chipped lithic artifacts to specific functional classes in his treatment of the Meier site assemblage (Hamilton 1994). These lithic tools were dominated in number by scrapers (n=395, or 49% of the total) and shavers (n=151, or 18% of the total).

Hamilton's classified tools are only a part of the site assemblage, however. Lithic material from the 1991 excavations had yet to be classified at the time that I began this investigation. Since many of these tools came from units excavated in the north end of the house, it was critical for me to classify these lithics in order to complete the site database and provide a full north-south range of lithic tool representation from within the plankhouse.

Because part of the aim of this investigation was to test Hamilton's morphofunctional types, I needed to classify the tools -- initially -- according to the Hamilton system. For this reason, I spent a number of classification sessions with Mr. Hamilton, in which he taught me his criteria for making classification decisions. In the final session, Mr. Hamilton observed as I assigned a number of chipped lithics to his morphofunctional types. Mr. Hamilton considered my

classification of these artifacts to be acceptable (Hamilton, pers. comm.). I then went on to classify the artifacts from the 1991 excavations.

I classified a total of 533 chipped lithic artifacts. These are listed in Appendix I. All of Hamilton's morphofunctional types were represented in this assemblage. Of these artifacts, I determined that 221 specimens were indeterminate uniface fragments, indeterminate biface fragments, core fragments, debitage pieces or simply were not artifacts. 'Indeterminate' fragments are pieces so small that they preserve only a small portion of the artifact's utilized region(s) and their function is impossible to discern.

The remaining 312 artifacts could be assigned to functional classes, although 45 had to be removed from the spatial data sample because they were from auger tests (n=31) or had poor spatial data for various other reasons. Following this subtraction, 267 artifacts with functional classifications were added to Hamilton's count of 806 artifacts, to produce the sum of 1,073 non-projectile point chipped lithic tools, assigned to functional classes, with good spatial data. Table 8 indicates the selection process used to achieve this count, as well as the data for the spatial distribution analyses..

Table 9 shows the count and percentage breakdown of this assemblage. Table 10 breaks down the assemblage into Hamilton energy types, data which will be consulted often. Table 11 lists the count of functional classes per excavation unit. Table 12 presents the number of Hamilton energy types and raw material qualities for each excavation unit. Table

13 counts a number of data types used in significance tests, per excavation unit.

Figure 18 graphically illustrates the functional class assemblage structure for the Meier assemblage, and Figure 19 the energy type structure for each of the seven functional classes. Finally, Appendix II lists the 1,073 artifacts indicated here as well as the 45 items from auger tests, for a total of 1,118 non-projectile point chipped lithic artifacts.

In order to maintain uniformity between my data and those of Hamilton, I recorded (in addition to the standard data on provenience, etc.) two variables for each of the 1991 items I classified; the Hamilton Energy Type and the Raw Material Quality. These variables are described below. The spatial distribution of these data types was to be examined in addition to the functional data because energy type yields information on tool function, as well as energy investment per tool, and the distribution of different raw material qualities may indicate status-dependent differential access to resources.

Hamilton Energy Type

The Hamilton Energy Type variable reflects the amount of energy expended in the production and/or maintenance of a chipped lithic artifact. In short, the scale measures the value of a chipped lithic implement in terms of time and energy expenditure. I term this the 'Hamilton' energy type because it is that used by Hamilton (1994) in his earlier treatment of this assemblage.

Type I: Low Energy Input

Tools of Type I are not shaped previous to use, though some retouch (e.g. unifacial flaking) may be present. These are tools used expediently and opportunistically and are often classified in the field as 'utilized flakes'.

Type II: Low Energy Input

Type II tools are shaped by percussion, pressure or abrasion previous to use, though at least some significant portion (generally, c.3mm) of the working edge is left unmodified. Some end-scrapers, some bifaces and some bipolar-core tools are included in this category.

Type III: Medium Energy Input

Medium-energy input tools exhibit contiguous shaping around the tool, though not contiguous bifacial flaking. Some uniface (those flaked, for example, unifacially along an entire edge) are assigned to this category.

Type IV: High Energy Input

These tools exhibit contiguous bifacial flaking around the entire tool. Large knives (possibly hafted), lithic projectile points and perforators are the most common members of this category. Some tools were considered to be of type IV as they represented maximum energy investment, though they were not always contiguously bifacially flaked; these were likely hafted tools.

Raw Material Quality

The quality of the raw material was observed, using adjectives ranging from 'Excellent' to 'Poor'. These descriptors addressed the flaking properties of the raw material, but also account for the type of implement

manufactured. For example, while basalt may be considered a 'Poor' raw material for producing small projectile points, it is 'Excellent' for production of chopping tools. In such cases, the raw material quality *for the apparent intended use* (based on tool morphology and use-wear) is considered. For example, a chopper made of basalt would be recorded as having an 'Excellent' raw material quality, while a projectile point made of grainy quartzite would clearly be described as 'Poor'.

The spatial distribution of different grades of raw material might indicate differential ownership -- or at least storage and use -- of different raw grades of raw material. This, in turn, may indicate status differentiation in terms of access to, and use of, particular resources.

Excellent

Excellent raw material has no flaws which would be apparent to the tool-maker. This is quite rare, and would likely indicate a rather valuable and costly raw material. If so, excellent raw material may be reserved for special tool production.

Good

Good raw material has flaws, though these flaws do not prevent the production of a functional tool.

Fair

Fair raw material is slightly below average -- it is acceptable and can be used to produce a tool, though the effectiveness of that tool will be compromised because of flaws in the raw material.

Poor

Poor-quality raw material is so flawed that the tool produced may be useless for the designated task. In many cases, it is likely that the knapper will have discerned this during tool production and abandon the project, leaving in the archaeological record an unused, uncompleted artifact.

General Remarks on the Meier Site Chipped Lithic Assemblage

The average number of shaped lithics per unit is 30, though the standard deviation is 13.5, indicating a wide variety artifact densities per excavation unit. Units H2 and L2 (both representing cellar deposits) yielded very high numbers of tools; 59 and 56 shaped lithics, respectively. On the low end, unit S produced only 11 shaped tools and units Y and I2 yielded only 15 and 10 shaped lithics, respectively; these excavation units represent hearth or hearth periphery deposits. Such differences between cellar and hearth area deposits will be investigated in detail later in this report.

Density figures are also important, as will be discussed in Chapter 6. A total of 98.90 cubic meters were excavated in the selected 'house' units, with an average density of 7.37 chipped lithic artifacts per cubic meter. The greatest excavation volume from a house unit is 5.52 cubic meters from unit Q (near the longitudinal center of the house), while the least is 2.04 cubic meters, from unit M2, at the far south end of the house. The average excavation volume of the house units is 3.97 cubic meters.

A few more general figures to familiarize the reader with the data are of value here. Figure 41 indicates that, site-wide, the number of tools excavated does correlate

somewhat with the volume of sediment excavated; this is somewhat to be expected, or at least is unsurprising. However, Figure 42 indicates that when we consider only the units within the plankhouse, this moderate positive correlation fails. Within the plankhouse, then, the number of artifacts excavated is not directly related to the volume of sediment excavated, and thus we may assume that some other agents are responsible for the widely variable numbers (and densities) of artifacts and artifact types observed in different areas of the plankhouse. One aim of this project was to address the question of what phenomena generated these variable densities.

Typologically, the Meier site chipped lithics are common artifacts on the Northwest Coast and on the Lower Columbia (Johnson 1975, Minor 1983, Pettigrew 1990, Silverstein 1990). We may assume that they represent common activities within the plankhouse, or production and storage of items used outside the plankhouse, such as projectile points.

CHAPTER 6

SPATIAL DISTRIBUTIONS: DATA GROUPING, PARTITIONING and STATISTICAL TESTING

The philosophy and method of intra-site spatial analysis of chipped stone tools has been treated in numerous reports (Cahen, Keeley & VanNoten 1979, Juel 1988, Keeley 1982, Keeley 1991, Kroll & Price 1991, Odel 1980, Speth and Johnson 1976). In most cases, caution has been expressed and exercised in the observation and analytical processes used to generate inference regarding past human behavior. Statistical results are, of course, only a curiosity unless they are discussed in context; thus, in this chapter I identify the particular questions I asked and why they were relevant, and the methods used to answer these questions. **Chapter 7, Analysis: Results and Discussions of the Statistical Tests**, presents the results and the analysis of these results.

Objectives, Methods and Data

Early in this thesis I submitted the hypothesis that if social status determined people's activities in the Meier plankhouse, the material residues of these activities should be distributed differentially in space, according to the location of these activities. Specifically, I hypothesized that the frequency of any particular tool class found within the plankhouse should be proportionate to its location on the social gradient running on the long axis of the plankhouse, provided that the frequency of the activity reflected by the tool was determined by social status.

Having investigated site taphonomy and the validity of functional classes of artifacts to be observed, I concluded that the continuity between past behavior and modern observation was reasonable and that the data to be generated as a result of this continuity were acceptable for evaluation of the hypothesis. It was then necessary to test the hypothesis statistically, the process of which I describe below.

A number of important methodological issues in correlation and spatial analysis are addressed in Speth and Johnson (1976). In particular, these authors address the use of correlation matrices in the identification of 'tool kits' and 'activity areas'. While they focus on Palaeolithic assemblages, Speth and Johnson make a number of suggestions which are clearly applicable to this study. First, raw tool counts are inadequate when the volume excavated per excavation area is variable. Thus, low numbers of artifacts of a certain class may simply be the result of low excavation volume. This is intuitively obvious and conversion of counts to densities is a commonly employed data transform which I employed even though the positive correlation between excavated volume and chipped lithic counts -- within the plankhouse -- was shown to be weak. Second, percentage frequencies of artifact types, used as data for correlation studies, are at best imprecise and at worst, inadequate; because increase in percentage of one variable in an assemblage must be accompanied by decrease in percentage of another variable in that assemblage, percentage component scores can skew results, or at least reduce the information content of the comparative data (Speth and Johnson op cit:48-53). I therefore used density figures in the correlation tests (as well as in the significance tests when applicable).

Analytical Area Definitions

I grouped excavation units, as suggested by Johnson and Speth (1976), into aggregates which most clearly represent different taphonomic factors. Similar analytical grouping was employed by Huelsbeck (1989) in an investigation similar to my own. The first grouping was that of the house and midden excavation units, as tabulated in Table 15 and discussed in **Chapter 3**. The second grouping represented architectural facilities as mentioned early in this report; excavation units were partitioned into groups representing the bench, cellar, and hearth/periphery areas. Table 16 indicates this grouping, which was based primarily on feature data, excavators' field notes and the synthesis presented in Ames et al. (1991).

Three other analytical units were recognized. These are the north, central and south analytical areas. Excavation units assigned to these areas are found in Table 17. The demarcation of these areas is arbitrary, of course, based on roughly equal representation of third of the house gradient by each area. These areas were intended to reflect broad differences between the household extremities as well as the finer distinction between the three classes (elite, commoner and slave) which would have occupied the house. As explained in **Chapter 2**, we may assert that the northern extremity of the house was occupied by the elite, the highest rank of the free/not free stratification system. The other (south) extremity of the house would have been occupied by the lowest rank, the non-free slave. Between these extremities resided the commoners, considered free but not elite.

This tripartite division of the household interior, in terms of social status, was intended to be reflected by the

north, south and central analytical areas. Since we do not know the ratio of free to not-free individuals in the household, and cannot accurately reconstruct this from the ethnographic data (which are highly variable in this respect: see Panowski 1985), we cannot assess whether, for instance, the elites would have occupied a far smaller portion of the house than the slaves. We must therefore keep in mind the arbitrary nature of these divisions, although they do differ significantly in a number of respects, as I shall demonstrate below.

Finally, we must recognize that a lesser range of the gradient of the southern end of the plankhouse was excavated than in the central and northern areas. Again, this must simply be kept in mind, and again, I will demonstrate below that significant distributions were still discovered and that these are predicted by the hypothesis.

The method for quantifying the location on the plankhouse gradient of each excavation unit is discussed below, in the section **Correlation Tests**. It is enough to say for the moment that the distance between the most northerly and southerly excavation units was divided in three, and that 1/3 distance markers were used as cut-off points for the north, central and south analytical areas. Table 17, viewed with Figure 5, should clarify matters.

Sample Selection

As mentioned in **Chapter 5**, a total of 1,073 fine-grained, non-projectile point chipped lithic tools, each assigned to one of the seven tool motion classes, compose Meier site database. It is from this population that artifacts from the plough-zone and artifacts from outside the

plankhouse were removed to generate the population examined in the statistical tests I performed. Table 8 indicates the selection process used to generate this observed population of 544 artifacts.

Test Series

Two sets of statistical tests were conducted. First, I wished to determine whether the apparently uneven spatial distributions I observed in exploratory data analysis were statistically significant; that is, whether these distributions might have arisen by chance or whether they were non-random. These tests are discussed below, in the section **Tests for Significance of Distributions**. Second, I wanted to test the hypothesis that densities of tool types, Hamilton Energy Types and raw material quality were correlated with position on the plankhouse gradient. These tests are discussed in the section **Correlation Tests**, which also discusses the *inter-assemblage* correlations I observed for North, Central and South areas of the plankhouse, as well as those in the Bench, Cellar and Hearth/Periphery areas. Table 18 summarizes the rationale, data, degrees of freedom and significance level for all tests in this study, and will be a useful reference for the reader throughout the following discussion.

Tests of Significance of Distributions

To determine whether the spatial distributions I observed were statistically significant I conducted chi-square tests of significance. In these tests, the raw counts of data types (functional class, raw material quality and Hamilton Energy Type) per analytical area were used to calculate chi-square values, as only raw counts are acceptable in chi-square tests (Shennan 1988). Pooling

artifact counts from the analytical areas generated expected values equal to or greater than five, a requirement of the chi-square test (Shennan 1988). This was not simply a tactical decision, of course, as the analytical areas do reflect both the gradient and the architectural features, as I demonstrated in **Chapter 3**. Unfortunately, expected counts of five or greater were usually unavailable when I attempted to analyze North, Central and South area architectural facilities separately, such that we cannot be sure of the significance of distributions between, for example, north area benches and those of the south area.

In the chi-square tests, expected values were derived from an assumption of even distribution of data types between the analytical areas. Tables 16 and 17 indicate that the same number of architectural facilities are not represented in the north, central and south areas, however, and I had to evaluate the possibility that some artifact types would be unevenly distributed simply because, for example, more hearth/periphery areas are sampled in the south analytical area than in the north. Significance test 3 (which will be discussed further below, as will all the cases I mention in this and the next paragraph) indicates that the only primary data types to be significantly unevenly distributed between the architectural facilities are scrapers, type I tools and fair quality raw material (Table 19). These are all related to scraping tools and thus I may say that type I, fair raw material quality scrapers are more common in the cellars than in other architectural facilities. Therefore, we may expect a greater frequency of scrapers in areas where cellars are over-represented. Tables 16 and 17 indicate that the north area has only one less cellar represented than the south or central areas. I therefore considered the cellars rather

evenly represented in all areas and did not adjust the calculation of expected values.

Tables 16 and 17 further show that rather less hearth/periphery units are sampled from the south analytical area than in the central or northern areas. However, since there is no significant correlation of the main data types (functional classes, energy types and raw material quality) with the hearth/periphery facilities, I did not consider this to be a significant sampling problem. Additionally, since the benches, more frequently sampled in the south than in the north, were generally found to contain more valuable tools than other facilities (though not significantly more), I suspected that there was sufficient chance for valuables to be sampled in the south as well as in the north. As in the case of the cellars, then, I did not adjust the calculation of expected values and tested an assumed even distribution.

Three significance tests were conducted, referred to as significance tests 1, 2 and 3. Summary results of these tests are presented in Table 19. Figures in boldface indicate those χ^2 values which are considered significant, for the appropriate degrees of freedom, at the .05 significance level.

Correlation Tests

A set of correlation tests were conducted in order to determine whether data types (tool types, Hamilton Energy Types and raw material quality) were correlated with location on the plankhouse gradient. Two types of data were required for these tests. A measure of the frequency of each functional class per excavation unit was needed; this density figure was derived simply by dividing the number of a

particular tool type found in a particular excavation unit by the excavation volume of that excavation unit. I also required a measure of the location of the density value for each tool type per excavation unit; this value was derived by locating each excavation unit on the hypothetical gradient in the manner described below.

The hypothetical gradient is aligned with the long axis of the plankhouse. Each excavation unit was assigned a gradient score which reflected its distance from an arbitrary baseline which I established at the northern end of the plankhouse boundaries. From this baseline, I measured the distance in meters, on a ray perpendicular to the baseline, to the centroid of each excavation unit. The measurement was encoded as the unit's GRADIENT variable score. This method uses all available information and allows each unit to be considered a separate entity on the house axis, such that 25 observations are made for each statistical test. Excavation units immediately adjacent to one another on the excavation grid are, naturally, given very close values. Units occupying the same north/south location on the excavation grid, but which are far apart laterally (as in the case of units X and A2, see Figure 5), are given values which reflect the true location of the unit on the plankhouse axis. Figure 21 illustrates the method of obtaining gradient scores for excavation units.

Having generated these spatial and frequency data, I was able to go on to conduct the correlation tests. In all cases I was interested in the relationship between the density of a given functional class found within an excavation unit and the position on the gradient of that density figure. To explore this hypothesized relationship I used tests of correlation of two variables.

While I first conducted a number of linear regression tests, I eventually realized that this method was inappropriate for this analysis. Linear regression analysis attempts to describe a hypothesized *linear* relationship between variables (Shennan 1988). The data in this study are stone tool types with discrete, interval-level spatial measurements, but the nature of activities within the plankhouse was not likely to be so continuous; I suspect that different activities took place in different areas, and thus some areas may have no tools of a certain type, although this absence may have nothing to do with social status, but may well be more a reflection of depositional factors. Scores of 'zero' were information and were not deleted from analysis. The postulated taphonomic effects of different facilities (see section above in **Chapter 3**) -- as well as the cluster analysis discussed below -- strongly suggest that this is the case. For these reasons, after attempting many line-fittings, I turned away from regression testing and towards simple correlation tests which were better suited to my data.

In all correlation tests I generated Pearson's r to indicate the strength of relationship between data type density and position on the gradient. I also generated the coefficient of determination, or r^2 , which indicates the percentage of variation from the mean which is explained by the independent variable. I set the confidence interval for all tests at the standard 95th percentile, such that the generated p values, if at or below .05, would indicate that only 5% or less of the observed variation would be a result of random processes.

The final correlation figure generated in these tests was Spearman's rank correlation coefficient. This test was clearly appropriate for some instances in this dataset

because not all excavation units contained every type of tool, and thus zero values were encountered which could skew the calculated relationship between variables. This is significant because my hypothesis does not suggest that in each case (in each excavation unit), every variable must necessarily have a value (some density of tool type [x]). What is hypothesized is that where a tool type is encountered, the value (density of that tool type per cubic meter excavated) of that type should be dependent upon its location on the long-axis gradient of the plankhouse. Although this is something I understood only after some deliberation, we can recognize that:

"From a logical point of view, the strength of the support a hypothesis receives from a given body of data should depend only on what the hypothesis asserts and what the data are: the question of whether the hypothesis or the data were presented first, being a purely historical matter, should not count as affecting the confirmation of the hypothesis."

(Hempel, 1966:38)

To carry out the Spearman test I assigned each excavation unit a rank from 1 (highest density of artifact type [x] of those units exhibiting tool type [x]) to (n), where n was the count of units exhibiting tool type [x]. For example, if a unit had a value of .44 for a certain tool type, and if of the 12 units exhibiting this tool type .44 was the third highest value, the unit would be ranked '3' to indicate that it is the third highest density for that tool type. In short, this is done in order to ordinalize the data and reduce the effect of zero values on correlation scores (Shennan 1988, Snedecor and Cochran 1967).

Correlation test 1 was intended to indicate the general relationship between the density of tool types per excavation unit and the location of that unit on the gradient. In this

test, density figures for each functional class for each excavation unit within the plankhouse (n=25) were entered as data, as well as the gradient score for each excavation unit. The results of this test are found in Table 20.

I conducted correlation tests 2, 3 and 4 in order to discern the same relationship as sought in test 1, but with data partitioned into bench, cellar and hearth/hearth periphery groups. In these tests, again, density figures and gradient scores were entered as the raw data. Tables 21, 22 and 23 present the results of these correlation tests.

A final series of correlation tests was carried out to examine the inter-assemblage data type correlations which occur in the north, central and south areas, as well as the bench, cellar and hearth/periphery facilities. These tests were conducted using average density figures per analytical unit (as suggested in Speth and Johnson 1976). Analytical units are the north, central and south, and bench, cellar and hearth/periphery analytical units -- as tabulated in Tables 16 and 17 -- for tests 5 and 6, while in correlation test 7 I did not divide the samples and all house excavation units were analyzed together. Tables 24 through 37 present the correlation and associated probability matrices for correlation tests 5 through 7. Tables 38, 39 and 40 summarize the results of tests.

Cluster Generation

In an attempt to isolate the causes of radical variance I observed in the distribution of tool type densities on the gradient, I conducted a cluster analysis. Cluster generation is a useful method for identifying aggregate similarities (and differences) in data sets with numerous variables

(Wilkinson 1989). In this case, 25 excavation units, each with seven variable values (the density of tool type [x]) yield 175 discrete data entities (25×7). While this array could be manually analyzed, cluster generation on the computer is much faster and, likely, more accurate.

The density of artifacts per cubic meter excavated for each tool type per excavation unit was encoded as raw data. Thus, each excavation unit within the plankhouse boundaries was considered a case with seven variable scores (one density figure for each tool type). Importantly, neither the architectural feature thought to be represented by each excavation unit, nor data concerning the unit's location within the plankhouse, were encoded.

The Euclidean distance coefficient, most sensitive to proportional differences between cases, was employed as the distance measure. The most conservative linkage clustering, Average linkage, was employed in this cluster generation. Combined, these methods will closely cluster assemblages with similar variable scores (in this case, density of tool type [x]).

The dendrogram generated representing this clustering is shown in Figure 22. The cluster run generated very interesting results, reflecting both architectural features and broad intra-house tool type density patterns.

CHAPTER 7

ANALYSIS: RESULTS AND ANALYSES OF THE STATISTICAL TESTS

Results

Significance tests basically evaluate the question "How likely is it that the observed distribution is simply a product of random processes?". This evaluation is conducted by comparing the observed distributions with those one would expect if chance alone were generating the distribution. Chi-square tests, conducted in this study, are significance tests which work in this manner.

Correlation tests generate values between -1 and +1, inclusive. These values describe the strength and, to an extent, the shape of the relationship between variables. A +1 score indicates a perfect, 1:1 ratio of incremental increase in both variables, while a score of -1 indicates the opposite; as one variable decreases, the other increases. A score between these values indicates some lesser relationship, and a perfect 0 score indicates that there is no relationship between the variables. When confronted with a correlation score, one must first assess the value of p . This value indicates the percentage of variant data that can be explained by chance alone. Thus, a correlation score of -.99 indicates a nearly perfect negative relationship between variables, in which both variables decrease at nearly the same rate. If p for this correlation were .05, we could state that the strong negative correlation (-.99) would account for 95% of all variation from any predicted value, while 5% (.05) of that variation could be explained by chance

alone. Therefore, p-values are critical to the interpretation of correlation scores. These values are presented in tables where necessary.

Significance Tests 2 and 3

Significance test 1, which addressed the distribution of artifacts between the midden and the plankhouse assemblages, was discussed in Chapter 3. Column 1 of Table 19 presents the results of that test, which were also discussed in Chapter 3.

Column 2 of Table 19 presents the results of significance test 2. The x^2 values we see here indicate that cutters, gravers, scrapers, each Hamilton energy type and the 'excellent' raw material category are all significantly unevenly distributed between the North, Central and South analytical areas. Column 3 of Table 19, representing significance test 3, indicates that scrapers, Hamilton energy type I and the 'fair' raw material category are all significantly unevenly distributed between the bench, cellar and hearth/periphery facilities.

Correlation Tests 1 through 7

Table 20 presents the results of correlation test 1, in which all excavation units within the plankhouse boundaries were included. In this table we observe that significant negative correlation exists between gravers, excellent raw material, poor raw material and Hamilton Energy Types III and IV, indicating that (with the exception of excellent raw material) drop off as one moves southward from the north end of the plankhouse (excellent raw material is more frequent in the north end of the house). In these cases, the p value

indicates that chance alone could account for only between 1% and 5% of the spatial distribution of gravers, excellent raw material quality, poor raw material and Hamilton Energy Types III and IV.

Table 21, representing correlation test 2, demonstrates that in the bench areas, cutters, gravers and Hamilton Energy Type III tools are all strongly negatively correlated with gradient scores; note the strong correlations here (from $-.87$ for gravers to $-.76$ for cutters) and p values. We shall see below that not only are these tools more common in the north area, they are more common in the bench and hearth/periphery areas than in the cellars; this distribution is likely a result of curation and clean-up activities.

Correlation test 3, tabulated in Table 22, tested the cellar units. In no case are there significant correlations. This is an important theme which occurs again in correlation test 7 (to be discussed below) as well as in follow-up investigations; a discussion follows in the section **Synthesis**. In short, the theme is a lack of significant outstanding characteristics within the cellar units, aside from their being 'traps' for low quality tools (in terms of raw material quality and energy investment) such as scrapers.

Table 23 presents the results of correlation test 4, in which the hearth and hearth/periphery units were the population. In this test, only the cut functional class is strongly correlated with the gradient, here indicating that as one moves southward, cutters are less common in the plankhouse.

Table 38 summarizes the results of the test for inter-assemblage correlation between data classes of the north,

central and south areas (correlation test 5), and Table 39 the same correlations for the bench, cellar and hearth/periphery facilities (correlation test 6). In these tables I simply indicate correlations which are significant at the .05 level; the correlation matrices in Tables 24 through 35 present the calculated figures. Here we find that several patterns of correlation distinguish the northern area from the southern and central, as well as the hearth/periphery and bench from the cellar. These results are complex, however, and are best discussed with other results in the section **Analysis**.

Table 40 summarizes the results of correlation test 7, in which I wished to identify correlations between tools of each of the Hamilton Energy Types on a (within-house) site-wide basis. Tables 36 and 37 are the raw correlation matrices and the associated probability matrices for this test. While there are a large number of positive correlations significant at the .05 level, I discuss here only those with r values equal to or greater than .70, yielding r^2 (proportionate reduction in error) values of roughly 50% or so. This means that in the cases I discuss in the analysis, at least about 50% of the tools are found in the same excavation unit. In summary, correlation test 7 revealed significant positive correlations between high energy types and high and low energy types, and significant negative correlation between the type IV and type I functional class. These results are examined in detail in the section **Analysis of Correlation Test 7**.

Cluster Generation

Figure 22 presents the cluster dendrogram generated by comparison of excavation unit assemblage densities of each of

the seven tool types. In short, three distinct clusters are seen here, clearly grouping certain architectural features and excavation units of the plankhouse. The section **Cluster Analysis** further discusses these results.

Analyses

In this section I discuss the results presented above and in the various tables with the ultimate aim of reconstructing the spatial distribution of activities within the plankhouse. Correlation test 7 and the cluster generation are analyzed first. The results of the significance tests (1-3) and the correlation tests (1-7) are employed in an analysis of recurring patterns seen in the north, central and south and bench, cellar and hearth/periphery areas

Following these analyses, I combine all data, in the section **Synthesis**, in an attempt to reconstruct the spatial distribution of activities within the plankhouse.

In the following analyses, details of the spatial distributions are crucial. Scatterplots of the relevant data are presented in Figures 23 through 39. These indicate (a) the density of data classes per excavation unit, (b) the location of the unit on the gradient and (c) the architectural facility represented by the excavation unit. These plots, therefore, are rich with information and were invaluable during the analytical process.

Analysis of Correlation Test 7

Correlation test 7 was executed in order to identify inter-assemblage correlations of tools of each of the

Hamilton energy types. Looking at Table 40 and Figures 28 and 30, we see that the first positive correlation, between type III gravers and type IV scrapers, occurs in two distinct locations in the plankhouse; the north and the south. Type III gravers and type IV scrapers are found in relatively high densities in a single northern area periphery unit. Ten meters southward, type III gravers and type IV scrapers are found -- in lower densities than in the north -- in periphery and bench units near the analytical border between the south and central areas. It is clear that these rare and valuable graving and scraping tools, at least half of which are found within one excavation unit of the other, were curated separately from the cellar units. Because the most logical reason for shaping graving and scraping tools to the extent of type III and IV tools is to produce very precise or very durable work elements, I suggest that precision graving and scraping of hard materials (such as antler) are the activities represented here for the north and central bench and periphery units.

Type III scrapers and type III shavers are also strongly positively correlated. All of these artifacts are found in the northern analytical area, again in bench and hearth periphery units only. These tools occur in relatively low densities (less than one per cubic meter), though in both cases they are the only occurrences of the tools in the household; that is, these associated artifacts are found only in the bench and periphery areas of the northern analytical area, and nowhere else in the house. Because more flaking on tools with these functions is most likely an attempt to make more durable and/or more precise tools, I suggest that hard materials were worked in final production stages in these areas with these tools. Antler scraping and hard wood shaving (and, perhaps, graving with the shaver tip, as

suggested earlier in this thesis) are likely activities in the northern bench and periphery units.

The correlation of 'opposite' Hamilton energy types is also interesting. In the first case, most of the correlation between type IV shavers and type I wedges is explained by their occurrence in unit M2, the bench at the far southern end of the plankhouse. In this unit both tool types occur in the highest densities for those tool types. The Hamilton energy type says little about wedges, as they are usually recycled bipolar cores which require little reworking to be functional, so we may say that wedges of all types generally represent wedging activity. High energy-type shavers, on the other hand, are most likely to have been used on hard raw materials or for precision work (as explained above). I suggest, then, that in the southern bench area represented by unit M2, shaving and wedging (splitting) of hard matter, such as bone, antler and hardwood, were undertaken.

The second case of opposite energy type correlation is seen between type IV scrapers and type I perforators. Figures 29 and 30 illustrate that these tools occur in two distinct locations; a periphery unit in the northern area with relatively high density of both of these tools, and a bench unit on the analytical central/south area border, in a somewhat lower density of these tools than in the north. Again, the correlation is not seen in cellar deposits. Type I perforators are expedient items probably used on a variety of materials, but not likely for either precision work or for work on the hardest raw materials, work for which more delicately shaped and more robust tools are more useful, respectively. Type IV scrapers were likely used on the hardest raw materials, such as seasoned woods, bone and antler (unless they were hide scrapers). I suggest that perforation of more yielding matter such as hide and soft

wood, as well as scraping of hard materials such as bone and antler, occurred in these living and domestic activity areas.

Table 40 also indicates that type II cutters and type IV gravers are strongly positively correlated. These correlations all occur in relatively high densities of the respective tool energy types in bench or periphery areas of the northern third of the plankhouse (two cases within the northern area and one case on the north/central border: see Figures 27 and 28). Type II cutters are rather common site-wide and were likely used for a variety of cutting purposes, such as the processing of meat, hide and vegetal matter. These are versatile tools for which specific functions are very difficult to determine without detailed use-wear analysis. Type IV gravers, as mentioned above, were likely used for precision work and/or work on the hardest raw materials, such as antler and bone.

The final positive correlation is between type II cutters and type III shavers (see Figures 27 and 31, respectively). When occurring together in significant densities, these tools are found only in bench and periphery facilities of the northern third of the plankhouse, an occurrence we have encountered frequently. Type II cutters, as mentioned above, are generalized tools, the function of which is hard to determine (possibly because they were multifunctional). Type III shavers, also discussed above, were likely used for shaving rather hard materials such as bone and antler. Why these rather mundane and rather specialized tool types are found together is unclear, unless this is simply a function of depositional factors; perhaps the tools were not used together but were both consciously stored separately from the cellar.

The significant negative correlation between type IV perforators and type I scrapers indicates that these items are rarely found in the same context. This suggests that they were either used or stored (or discarded and/or lost) in different areas of the household. Figure 29 illustrates that type IV perforators, those likely used for the most precise work and on the most dense raw materials, such as antler and bone, are found in highest densities in the north end of the plankhouse (and in three cases of five above average in the north, in bench and hearth/periphery units). A significant cluster of type IV perforators in the central/south border and south area are of lower densities than in the north; nevertheless, in four of six cases above average here, these southerly perforators are found in hearth and periphery units, as we have noted previously. Type I scrapers, on the other hand, as we have also previously noted, are most common (a) in the southern and central areas of the house and (b) in cellar deposits (in five of seven cases where scraper type I is present in greater than average densities, they occur in cellar deposits). The negative correlation between these mundane and valuable tools (cheap scrapers and expensive perforators, respectively) is explained not only by the location of the artifacts within the household, but also by architectural features and the depositional behaviors, such as storage and discard.

The main conclusion I draw from correlation test 7 is that energy type, rather than tool function, may be the most important factor in determining area of deposition for stone tools at the Meier site. This suggests that storage of items was a more important depositional factor than area-specific use of the item. Benches and hearth/periphery areas contain more valuable tools in terms of energy investment per tool, and in cases where tool densities correlate in space, they

almost always occur in bench and hearth facilities. Significantly, where low- and high-energy input tools correlate, the correlation is negative and the tools are not found together; rather, they are found in different contexts -- the cellar and the bench or hearth/periphery. While perforators appear to be more common in the hearth/periphery areas than elsewhere, most tools are found in most other architectural facilities.

The fact that cellar deposits are almost unrepresented in the correlation tests, and that most of the strongly correlating artifacts are of high energy types, suggests that cellars were traps for a rather random assortment of items and were not used for storage of valuable tools. In turn, this suggests that those high energy type tools which are found in the cellars are lost or discarded artifacts. Further analysis of the distribution of preforms, intact tools, and exhausted and broken items, may aid in more specific determination of site-formation processes.

Cluster Analysis

Clustering generated by the comparison of assemblage structure, represented by tool type density per excavation unit, yielded important information regarding activities and site formation processes. Figure 22 is the cluster dendrogram generated by the methods outlined in the section **Cluster Generation**. Table 41 summarizes the characteristics of these clusters. In the following analysis I often refer to the unit's rank, for particular data classes, as generated for Spearman's ranked correlation coefficients. Note, however, that this rank was not entered as data for the generation of the following clusters; only

the density of each functional class per excavation unit was used for this cluster generation.

CLUSTER 1

Cluster 1a

C: Unit C, from the northernmost portion of the plankhouse, is separated from all other clusters by its extremely high density of cutters, shavers, gravers and saws (ranks=1,2,3 and 1 of 22, 23, 15 and 7, respectively). Equally important here is the low density of perforators and scrapers. As the unit contains the highest density figures for two of seven tool types, and has densities within the upper 1/4 of three other tool types, it is to be expected that this assemblage would 'cluster' far from most others.

Cluster 1b

J, F: Both are hearth/periphery units. These are characterized by quite high densities of cutters, gravers, shavers and perforators. In contrast, they each exhibit a relatively low density of scrapers. Both units are in the North grouping.

L, H: Unit L is coded as a bench unit, but roughly 1/2 of the unit represents cellar deposits. Unit H is the best representative of a North grouping cellar. These units each have relatively high densities of cutters and gravers, average densities of scrapers and shavers and low densities of perforators.

E: This hearth unit stands aside from these other units of the cluster. Unit E is characterized by a high density of cutters, a low density of scrapers an average number of perforators. A quite high density of shavers (within the upper 1/3 of all shaver densities) is found in unit E, likely

the reason for its separation from the other (otherwise similar) units of this cluster.

Cluster 1c, then, reflects assemblages characterized by relatively high frequencies of cutters and gravers (both rather common in the North grouping) and average to low frequencies of scrapers and shavers, with the exception of a high density in unit E, which stands alone in this cluster for this reason. While the cutters and gravers are evenly distributed between across the bench, cellar and hearth/periphery, perforators are more common in the bench and cellar units in this cluster. All units in this cluster fall within the North area grouping, likely a reflection of the unit assemblage structure similarities between units of the same architectural facility.

Cluster 1c

Y, G2: These hearth and bench units, respectively, are characterized by moderately high densities of cutters and perforators, very low densities of scrapers and shavers (both are ranked within the lower 1/4 of the scrapers and shavers of the house assemblage) and a complete absence of gravers. No wedges or saws are found in these units. Both units fall within the South grouping.

Q: This cellar unit (which also likely represents some bench deposits) is characterized by low densities of cutters, gravers, scrapers and shavers. The lack of any high or even moderate density of any tool type likely sets this unit aside from others of the cluster.

W+E2, A2: These bench units are characterized by very low densities of all tool types, particularly cutters (ranks are 17 and 19 of 22, respectively), perforators and shavers

(ranks are 19 and 22 of 23, respectively). In contrast, each has a moderate number of scrapers. Neither has wedges or saws. It seems significant that both are bench units from the South grouping.

P: Unit P is considered a bench unit, though the western 1/3 of most of the unit lies outside the household, with the dramatic wall feature clearly evident in Appendix IV. The unit has a relatively high frequency of saws (rank=3 of 7). As with most bench units, the unit is characterized by low densities of most tool types. Most tools here are scrapers, though only a moderate density is represented. I suspect that the uncommon density of saws is what distances unit P from other units of the sub-cluster.

R: This hearth periphery unit is characterized by a moderately high density of gravers (rank=8 of 15) and wedges (rank=4 of 9). Equally significantly, the unit has no cutters and a very low density of perforators. Shaver and scraper densities are moderate, and saws and wedges are absent. The high density of wedges (relatively rare in the house assemblage) is likely what separates this unit from others of the sub-cluster.

S, I2: These units are coded as hearth and hearth/periphery units, respectively, although in unit I2 hearth features are evident in the northern 1/3 of the unit. These units have in common a complete absence of cutters, gravers, wedges and saws. In both units, scrapers and shavers are uncommon (each unit has ranks within the lower 1/4 of the house total for scraper and shavers). Perforators are relatively common in unit S (rank=7 of 22) and uncommon in unit I2 (rank=18 of 22).

D: This hearth/periphery unit is undoubtedly linked to units S and I2 because of its uncommonly low density of chipped tool types; in fact, the unit is an outlier in any analysis as it contains no chipped tools whatever. This may be a function of its being both a hearth/periphery unit and a bench unit (the unit is likely part of the northern bench), both of which commonly have low densities of chipped tools. While the unit is from the North grouping, it is clearly an outlier and this must be considered; in fact, this is the only unit from outside the Central and South groups in sub-cluster 1c.

Cluster 1c, in summary, is characterized first and foremost by moderate to low densities of most tool types. Two important variations exist; the relatively high density of perforators in unit Y (hearth) and the high density of saws in unit P. Nevertheless, it should be noted that of the ten excavation units in this grouping, five have extremely low densities of some tool types and complete absence of others. Thus, a relatively low density of tools per unit is the most common characteristic of this cluster. It is equally important that nine of these ten units lie within the South and Central unit groups, and that the only exception (unit D) is an anomaly in any case, having no chipped tools of the categories examined here. Finally, it should be noted that all units of this cluster represent either hearth/periphery or bench architectural features; where cellar deposits are represented the unit overlaps with one of these other architectural facilities.

CLUSTER 2**Cluster 2a**

X,K: These are both cellar units, though X lies within the South group and K is from the Central unit group. Each is quite well positioned to expose primarily cellar deposits. The units are clearly characterized by low (nearly identical) densities of cutters, very low densities of gravers and perforators and, in contrast, moderately high densities of scraping tools (ranks=8 and 9, respectively, of 25). Wedges are present in relatively low density in unit K and are absent in unit X. Neither unit has sawing tools.

I: This cellar unit, from the Northern group (the unit is immediately grid north of unit K), is split from the X,K sub-cluster primarily due to its extremely high densities of perforators (ranked first of 22), gravers (rank=5 of 15), wedges (rank=2 of 9) and scrapers (rank=7 of 25). It is likely that these generally high densities which group this Northern group assemblage with the South- and Central-group dominated Cluster 2a.

H2,L2: Both are 'classic' cellar units, H2 being positioned directly between a good bench unit (G2) and a good hearth/periphery unit (I2). The units are clearly characterized primarily by very high densities of scrapers (ranks=4 and 3 of 25, respectively) and moderately high to high densities of perforators (ranks=9 and 5 of 22, respectively). Shavers are rather more dense in unit H2 than L2, and both units exhibit a moderate density of wedges. Note that both units have a relatively high density of all tool types.

Cluster 2a, in summary, is clearly characterized by cellar units with high densities of scraping tools. Shavers

are moderately represented, and very low densities of cutters and gravers are encountered. One anomalous case of a high density of perforators is seen (the stand-alone unit I). Additionally, a rather wide variety of tool types is represented in each unit, with the relatively rare saw and wedge types represented.

Cluster 2b

O: This Central-group cellar unit has a very high density of cutters (rank=2 of 22) and scrapers and a moderate density of saws, though these are very rare tools. The uncommonly high densities of saws and the cutters, combined with the cellar-common high scraper density, are clearly what set this unit assemblage aside from others of its general class according to the cluster analysis.

Cluster 2c

Z,N: While unit N is considered a hearth unit, it does exhibit periphery deposits; unit Z also contains these deposits as well as some few cellar features. Both may be considered hearth/periphery units. These units clearly cluster because of their very high densities of perforators (ranks=3 and 2, respectively), scrapers (ranks=2 and 5, respectively) and shavers (ranks=4 and 4, respectively). In contrast, moderate to low densities of gravers are exhibited, respectively, in these units. Unit Z exhibits some saws.

M2: This unit, likely representing the south-western extremity of the plankhouse (corner post features were found in this unit) represents bench deposits. The unit assemblage is characterized by extremely high densities of scrapers, shavers and wedges (ranks=1, 1, and 1 of 25, 23 and 9, respectively). In contrast, gravers and saws are absent. A moderate density of cutters is exhibited in this unusual

unit. The high densities of scrapers, combined with the high density of the uncommon wedge class, likely set this unit aside from others.

Cluster 2c is most strikingly characterized by hearth/periphery and bench units with relatively high densities of scrapers and shavers. Moderate to low densities of cutters and other types are represented in this cluster, aside from the unusual unit M2.

In summary, I can say that three basic clusters were generated when I compared the assemblage structures of the 25 house units expressed as density figures for each tool class per unit. The first cluster consists of units in the North group with high densities of cutters and gravers and low densities of scrapers and shavers. This is more support for earlier observations suggesting that in the north, cutting and graving were more common activities than anywhere else in the house. These distinct differences are common to bench, cellar and hearth/periphery deposits of the North unit group.

A second, larger cluster is characterized by moderate to low densities of all tool types, primarily in bench and hearth/periphery deposits from the Central grouping. Here we perhaps see evidence for cleanup activities, or at least storage of certain types of artifacts. Further evidence of such activity is discussed in the section

A third major cluster is characterized by high densities of scrapers and conspicuously low densities of cutters and gravers, all from cellar units spread between the North, Central and South unit groups. A final cluster is characterized by relatively high densities of scrapers and shavers and low densities of cutters and other tool types

from hearth/periphery and bench deposits in the Central and South groups.

The most important result of this analysis is the finding that architectural features were clearly sorted in this clustering. Six of the eight cellar units -- and six of the ten hearth/periphery units -- are immediately linked in this clustering. Units which overlap architectural features (e.g. unit Z, with both cellar and hearth periphery deposits, and L with bench and cellar deposits) link closely with their nearest architectural feature. Importantly, cellar units stand out, linking directly in four of eight cases and being distanced from other cellars by only one link in most other cases. Similarly, clusters of excavation units from the same areas of the plankhouse (north, central and south) are common. The fact that these internally consistent clusters were generated solely by the density of functional classes per excavation unit reinforces their validity.

Analysis of North, Central and South Analytical Units

In this section I synthesize the results of the various tests and observations I conducted on the plankhouse gradient, as expressed by the northern, central and southern analytical areas.

North

Figure 34 illustrates the assemblage structure of functional tool classes in the north, central and south analytical areas. In conjunction with the results of significance test 2 (Table 19), we may say that the northern area is clearly characterized by high frequencies of cutters and gravers, and a low frequency of scrapers. Additionally, in Figure 35 we see that significantly high densities of

energy types III and IV are found in the north, with significantly low frequencies of type I. Correlation test 5 (Table 38) indicates that cutters and type IV tools occur together in the northern area; this is likely auto-correlation in which the type IV tools are the cutters, though type IV gravers are also common in the north and may add to this correlation. Finally, Figure 36 and Table 19 indicate that excellent raw material is significantly more common in the north than elsewhere on the plankhouse gradient. In sum, we may say that valuable tools (in terms of stages of manufacture and raw material quality), representing at least one rather specialized activity (graving) are more common in the northern end of the plankhouse than elsewhere. Table 20 (correlation test 1) indicates that gravers are significantly negatively correlated with the plankhouse gradient, such that less are encountered as one moves southward, towards the low-status end of the house. These distributions confirm the hypothesis, for one of seven tool classes (the graver), that a gradient of material culture reflecting activity should be evident in some functional tool class.

Central

The central area functional class assemblage structure is seen in Figure 34. Significantly low densities of cutters and gravers are found in the central area. Significantly high densities of scrapers are found in the central area. The central assemblage is very similar to the southern assemblage; significantly similar enough, in several cases, to distinguish it from the northern area. In terms of energy type and raw material quality distribution (Figures 35 and 36), the central area is also similar to the south, being characterized by significantly low densities of excellent raw material and type III and IV tools, as well as high densities

of type I tools. Correlation test 5 (Table 38) shows that in the central area, cutters are correlated with type I tools, many of which are likely scrapers. Scrapers, also noted in correlation test 5, are correlated in the central area with shavers, type I tools and good and fair quality raw material. Such moderate, common materials and tools are commonly correlated with one another in the central and southern areas, a pattern quite different from the correlation of more valuable items in the northern area.

I believe that activities in the central area were very similar to those of the southern area, which is described below. The most striking characters of the central area, then, are its similarity to the southern area and its dissimilarity from the northern area.

South

The south area assemblage is most similar to that of the central area in several characteristics of functional class, raw material quality and energy type assemblage structure. Figures 34, 35 and 36, and significance test 2 (Table 19) indicate that the high frequencies of scrapers and type I tools, and low frequencies of excellent raw material and type III and IV tools, are a result of factors other than chance. The possibility that these distributions (as well as those characterizing the north area of the house) are the result of sampling has been discussed above (section **Tests For Significance of Distributions**) and considered negligible. Correlation test 5 indicates that, as in the central area, fair quality raw materials, low energy type tools and common tools (scrape and shave) have more correlations with one another than in the northern area.

In summary, I believe that in the southern area (as well as the central area) scraping was more common, and cutting and graving were less common, than in the north. Cutting in the north was likely of a different sort than in the south (to be explained in **Synthesis: Inferred Activities Within the Plankhouse**).

Analysis of Bench, Cellar and Hearth/Periphery Analytical Units

In this section I discuss the distribution of artifacts and activities across the recognized architectural facilities, the bench, cellar and hearth/periphery. Again, these specific analyses will be combined in the section **Synthesis**.

Significance test 3, Table 19, indicates that scrapers, Type I tools and fair quality raw material are all significantly unevenly distributed between the bench, cellar and hearth/periphery facilities. Figures 37, 38 and 39 illustrate that in each of these cases, more are found in the cellar deposits than elsewhere. While the assemblage structure differences we see between the various architectural facilities are interesting (for example, more perforators in the hearth/periphery than elsewhere, but only between the .25 and .10 significance intervals), these are not statistically significant at the .05 significance level and not much can be read from them. Statistical tests appear to indicate that the distribution of energy types tells us little (aside from the aforementioned type I) about deposition in the architectural facilities. However, on closer investigation, as I explain in the section **Energy Type Distribution: A Closer Examination**, there are clear

indications that energy type is an important depositional factor.

Benches

Despite the complexities I mention above, for the moment we may say that the bench is characterized by a low density of scrapers, most of which are type I tools of fair quality raw material. The range of activities (or artifact storage) in the bench areas does not seem to be very different from that of the hearth, though scrapers were not stored here in large numbers. At rather lower confidence intervals (between .10 and .25, Snedecor and Cochran 1967), there do appear to be less perforators and more wedges in the benches, however.

Correlation test 6 (Table 39) indicates that in the bench deposits, cutters and gravers are positively correlated with Type IV tools; I believe this is auto-correlation in which the Type IV tools are, in fact, mostly cutters and gravers. Correlation test 6 also indicates that cutters and gravers (which are most common in the north area of the house) which are stored in the bench facilities are generally of high value. Scrapers and shavers, on the other hand, correlate in the benches with Type I artifacts. Again, I believe this is an auto-correlation, meaning that scrapers in the bench areas are generally of Type I, and are cheap, expedient tools. Hamilton energy type III and IV tools correlate in the benches with excellent quality raw material, highlighting the value of these items (correlation test 6). Finally, many results of correlation test 7 indicate that high energy type tools are more common in the bench and periphery areas than elsewhere. Correlation test 2 (Table 21) clearly shows that, in the benches, the frequency of cutters and gravers (many of which are of energy type III and

IV in the benches) decreases as one moves southward on the plankhouse gradient.

Benches were likely living spaces in which valuable items and materials were stored between activities. Figure 40 indicates that less lithic debitage is found in the bench areas than elsewhere, suggesting that either these areas were intensely cleaned or that relatively little lithic tool production and/or resharpening (as during use) occurred here.

Cellars

Cellars may be seen as storage and refuse facilities, though how refuse and stored items were separated is unknown at present. We must note once again that scrapers are significantly more common in the cellars than in the benches or hearth/periphery areas (significance test 3, Table 19 and Figure 37). Significance test 3 and correlation tests 3 and 6 all indicate that aside from this important characteristic, cellars are rather nondescript. Cluster analysis indicates that cellars share, throughout the house, the characteristic of rather high densities of artifacts. I suggest that cellars were areas where most low-value items were stored, lost or discarded. Note that cellar deposits are the most re-worked deposits of the site and that one would not expect to store valuables in areas commonly cleaned and/or refurbished, where valuables might easily be lost during these activities.

Hearth/Periphery

The hearth/periphery functional class assemblage is structurally very similar to that of the cellar (Figure 37). As mentioned above, perforators are more common in the hearth/periphery than elsewhere, but only between the .25 and .10 significance intervals. Significance test 3 (Table 19)

and Figure 13 indicate that there is significantly more bone and antler debitage in the hearth/periphery than in any other area. Small peg-molds and post-molds are also significantly more common in the hearth/periphery area (significance test 3), suggesting that a variety of racks and other ephemeral facilities were erected near the hearths, perhaps for drying or curing (such correlation is reported in a similar context in Huelsbeck 1989). Correlation test 6 indicates that in the hearth/periphery areas, cutters are correlated with type IV tools; this correlation is likely a reflection of the aforementioned density of perforators in the hearth/periphery (22.7% of perforators are type IV: see Table 10) as well as auto-correlation of type IV cutters. In the hearth/periphery areas, then, there are some indications that valuable cutters and perforators were used, perhaps in conjunction with activities utilizing the racks and frames evidenced by peg- and post-molds.

Energy Type Distributions: A Closer Examination

It became clear in observing the various distributions that energy type was a factor in deposition between the architectural facilities. Figures 27 through 33 indicate the distribution of the Hamilton energy types of each functional tool class on both the gradient and among the benches, cellars and hearth/periphery areas. In 44 cases where the distribution of energy type I tools are found in higher densities than the average, 11 cases occur in bench areas, 21 occur in cellars and 12 occur in hearth/periphery areas. This is to be expected from the various tests conducted. Looking at the other end of the energy type spectrum, we see that in 32 cases where the density of energy type IV tools is greater than the average, 8 cases occur in benches, 12 occur in cellars and 12 occur in the hearth/periphery areas. On the

surface, this appears to nullify my proposition that high energy types should be found less often in cellars than elsewhere.

Looking more closely, however, we observe from Table 10 that tool classes with the highest proportions of type IV representatives are cut, grave and perforate. If we look at the distribution of type IV cutters, gravers and perforators (Figures 27, 28 and 29) we see that the cutters are rather evenly distributed, but that type IV gravers (as well as type III gravers) are found exclusively in bench and hearth/periphery areas. Similarly, type III and IV perforators are far more common in the benches and hearth/periphery areas than in the cellar. We may say that in most cases where type IV tools are found they are found in the bench and hearth/periphery areas, though this pattern was not identified in the significance test.

Knowing this, we may say that the best place to observe the distribution of cutters and gravers, as well as high energy type tools, is in the areas where they were most commonly found, the bench and hearth/periphery areas. Indeed, correlation test 2, addressing the relationship between the frequency of data types in benches only, and their location on the gradient, produced very strong negative correlations of cutters, gravers, type III and type IV tools (-.76, -.87, -.78 and -.78, respectively). In the hearth/periphery (correlation test 4, Table 23), cutters are found to correlate negatively with the gradient at $r = -.71$, another strong correlation. Significantly, in the cellars there are no such correlations (correlation test 3, Table 22). Identifying that energy types were differentially deposited, during my exploratory data analyses, created the opportunity for me to make more relevant tests of the

hypothesis, as well as to question the moderate results of correlation test 1, which was insensitive to some finer aspects of distributions.

The energy invested in a tool appears to be the dominant factor in determining where the tool was used, stored and/or deposited. While most energy types are found in all areas, low energy types are found more commonly in the cellar deposits and high energy types are found more commonly in the bench and hearth/periphery areas. In particular, many valuable tools which correlate with one another (and were thus likely stored and/or used together) are found in bench and periphery areas rather than in cellars.

Synthesis: Inferred Activities Within the Plankhouse

In the following section I attempt a synthetic reconstruction of the spatial distribution and specific nature of the activities represented by the data distributions I observed. I draw on all spatial distributions observed as well as the use-wear evidence and area assemblage structure data, reflected in the cluster analysis, in order to produce conservative but meaningful reconstructions. I present inferred activities by discussing the characteristics and distributions observed for each of the seven tool classes.

Scrapers are almost always Energy Type I or Type II tools, made of Good or Fair raw material; they are also the most numerous items in the Meier non-projectile point assemblage. These facts indicate that scrapers were common, cheap items used in daily maintenance activities. The fact that scrapers are most commonly found in the plankhouse cellars, where refuse was deposited (Ames et al 1992, Lyman

1994) further supports the concept of the expedient scraper as an inexpensive utility item. Significantly more scrapers are found in the central and southern portions of the plankhouse than in the northern portion. These data indicate that inhabitants of the central and southern areas of the plankhouse were using these common, cheap scraping tools more often than people in the north, probably for shaping of a variety of wood, bone and antler raw materials.

Cutters are the second most common item in the Meier non-projectile point lithic tool assemblage. Cutters are most often Type I tools, though Types II, III and IV are well represented. Equating Type I with expedient is not always accurate here, as an unmodified Type I edge is best for many cutting or slicing activities, such as butchery, and it is conceivable that very sharp flakes were curated for some cutting tasks. Cutters are found in all architectural areas of the house, though Type I and II cutters are concentrated in cellars and Type III and IV cutters are more common in the bench and hearth/periphery areas. These facts suggest that while most cutters (types I and II) were common tools, some cutters (Types III and IV) were considered more valuable and were curated away from the cellars. Cutting tools are significantly unevenly distributed on the gradient; lower densities of these tools occur as one moves southward. Type II, III and IV cutters are rather evenly distributed on the gradient, suggesting that all people within the plankhouse used and/or created these valuable items. I suggest that Type I and II cutters were common tools of daily life, but that type III and IV cutters were used in hunting expeditions and/or on-site processing of the most resistant yielding matter, such as hides. Interestingly, the most valuable cutters are found throughout the household, but the cheaper cutters are far more common as one moves northward in the

plankhouse. This suggests to me that people of the north end were engaged in more cutting activities within the plankhouse, usually with low energy type tools. Many of these are unmodified flakes which are often razor sharp and are the best butchery tools. General-purpose curated knives of high value were stored throughout the household, perhaps indicating that hunting and/or foraging expeditions were undertaken by all plankhouse inhabitants.

Gravers are somewhat rare items (accounting for c.5% of the Meier assemblage), and are usually Energy Type II tools, though Energy Type III and IV gravers are not uncommon in comparison to other functional types. These tools are significantly unevenly distributed on the plankhouse gradient, the density decreasing as one moves southward. The most valuable of these tools -- the Type IV gravers -- represent hafted tools which required a good deal of energy to produce; these items are found only in the bench and hearth/periphery areas of the northern third of the plankhouse. These facts strongly indicate that although people throughout the house used gravers, more intense use of more controllable and robust gravers was concentrated in the north. The best gravers were likely used for detail work on various medium-hard to hard raw materials, such as antler and bone, and were used or stored in relatively large numbers by people of the northern end of the household.

Perforators, accounting for 8% of the Meier assemblage, are roughly as uncommon as gravers. The perforator class has the highest percentage of Type IV tools of any other, a reflection of the amount of shaping required to produce a robust, though slender, perforation bit. These tools are not statistically unevenly distributed either on the plankhouse gradient between the bench, cellar or hearth

areas (at least at the .05 significance level), though it seems telling that there are fewer perforators in the cellars than in the bench or hearth areas; these are somewhat uncommon tools, many of which were likely hafted. I feel these tools were carefully curated; indeed, in eight of 12 cases in which the density of Type III and IV perforators exceeds the average density of these items, perforators are found in hearth, periphery or bench areas, rather than in cellars. Perforators of Type I and II are far more common in the southern portion of the plankhouse, while Type IV perforators are found in the highest densities in the north. I suggest that this indicates that harder materials, such as bone and antler, were being worked with perforators in the north end of the house, as Type IV perforators represent more flaking and probably the desire for a working bit that was more robust than that on an expedient (Type I or II) perforator. In turn, this may suggest that the perforation of less resistant matter, such as animal hide, was more common in the central and southern end of the plankhouse.

Shavers are roughly as common as cutters (c.22% of the assemblage) and are normally Type I or II tools. No significantly uneven distribution of these tools was discovered in the statistical tests at the .05 level. Type III and IV shavers are far more common in the northern third of the house than anywhere else, with the exception of unit M2, at the far southern end, which has a (relatively) very high density of Type IV shavers (c. .05 per cubic meter). Shavers were probably common items, as evidenced by their frequency in the Meier assemblage and the low frequency of Type III and IV shavers. These tools were likely used for a variety of shaving and light scraping tasks, and a moderate number of the shavers I examined were also likely used for graving or incising. While Type I shavers are common in the

cellars, Type II shavers are, in seven out of nine cases where their density exceeds the average, found in bench, periphery and hearth areas (Figure 31); this indicates to me that although expedient Type I shavers were common tools of everyday life, Type II shavers were more carefully curated. I suggest that Type I shavers were used for standard activities such as wood shaving and that the more shaped (Type II) shavers, with more robust working elements a logical result of more shaping, were used on more dense materials such as wood and antler. Note that these are more common in the northern third of the plankhouse than anywhere else.

Wedges are an important and rare item, accounting for c.3% of the Meier assemblage. Most are Type II tools, and, as we have seen before, where more energy input was used in their production (as in Types III and IV), these tools are more often found in the northern third of the plankhouse. However, Hamilton Energy Type is not very instructive when we look at wedges, as many of these tools were produced from exhausted bipolar cores (Hamilton 1994) in which the production of the core generated the proper wedge shape and further flaking is unnecessary, though the entire tool is flaked, sometimes bifacially, because of the battering during its use-life as a core. Nearly all wedges are found in cellar deposits; this is also where many cores, debitage and other parent materials are found in high densities (Hickey 1991, Haidar 1991); perhaps wedges were stored with the parent material from which they were produced. It is possible that some wedges are actually mis-classified bipolar cores, though the wedges I examined did exhibit polishing which is not consistent with work as a core. I suggest that Meier site wedges were relatively important items used in the splitting of hard, relatively small pieces of antler and

bone: far larger wedges than those I observed (which were usually c.2-5cm in length and width) would be required, for example, for splitting wood for planks. Splitting bone (mainly metapodial diaphyses, as suggested by the bone tools from Meier) and antler (mainly tine and base elements) are early stages in the manufacture of bone and antler artifacts (Semenov 1962), and it is possible that this activity was more common in the south of the plankhouse than in the north. If we consider that gravers -- items used for much finishing work on bone and antler artifacts -- are far more common in the north than in the south, we may see here traces of a production process in which bone and antler were initially processed by lower-status individuals and later 'finished' by persons farther north on the plankhouse gradient.

Saws are an unusual category at Meier, composing only about 2% of the non-projectile point lithic tool assemblage. All saws are Type I tools, flakes used expediently to cut rather dense material in a vigorous fashion. There are so few saws at Meier that little may be gleaned from their distributions, they occur in north, central and south areas and in all facilities but the hearth. Considering the amount of bone and antler tools at Meier, many of which required extensive sawing action to produce, the lack of saws is initially mystifying. However, an examination of the bone and antler tools and debitage quickly solves the puzzle, as previously mentioned in **Chapter 4**; on these tools and debitage there are numerous indications of the use of metal knives. Many of these marks are identical to those created in bone-working experiments by Hamilton and A. Camlann (Hamilton, pers. comm.). Metal artifacts, few of which could be identified because of corrosion, were rather common at Meier (Hamilton pers. comm.); this, combined with the lack of saws, suggests to me that the assemblage from Meier may

represent, more than any other period, the proto-historic, as more saws would be necessary for the bone and antler industry in pre-contact times. In sum, I suggest that Meier site saws were relatively rare tools used expediently and opportunistically for cutting matter less dense than bone and antler -- probably wood -- because bone and antler would have been much more easily worked with metal.

A number of recurring themes are seen in the distributions of data on the gradient, between the architectural facilities and in the clusters which reflect assemblage structure. First, we may say that people in the northern area of the plankhouse were engaged in less mundane maintenance activities, such as scraping, than persons southward, including free commoners and, very likely, slaves. Although they were engaged in commonplace activities which occurred throughout the household, people in the north were more often engaged in cutting of non-vegetal matter, such as meat and hide, and graving of dense raw materials, such as antler. These activities were executed with tools which were valuable in terms of energy investment in shaping, many of which were likely hafted, adding to their value.

Cellars throughout the household were used as storage or discard loci for common tools such as scrapers. Benches and hearth areas were probably regularly cleaned, such that the remaining artifacts in these areas -- often valuable tools such as Type III and IV gravers, cutters and perforators -- are likely the result of storage, loss or use of these items in these areas. Peg and post features suggest that a variety of racks and stands, perhaps used in food-processing, are found near the hearth/periphery areas. Bone and antler debitage is clearly concentrated away from benches and

cellars, and strongly suggests bone and antler working near the hearths.

We also find that rather than observing a smooth gradient of material culture from north to south, we see distinct northern characteristics and a somewhat homogenous south/central area. Variation from average distributions in all areas is generally the result of different activities, storage and disposal of artifacts in the bench, cellar and hearth facilities. Specialized activities, such as bone and antler splitting (with wedges and low-value gravers) and precision graving of hard materials (as on small, valuable pieces of highly shaped antler) appear in the south and north, respectively. Evidence for such work is far more convincing in the north than in the south.

Of the 15 primary data types employed to test the hypothesis that material culture densities should vary predictably on the plankhouse long axis, eight data types were found to do so (Table 19, Significance Test #2). While the relationship of data type density to location on the plankhouse axis is never perfect, considering site taphonomy and the nature of rebuilding and refurbishment activities at the Meier house, these are encouraging results which suggest further work would be of value. Certainly, finer taphonomic control would be the best starting point for further research.

CHAPTER 8

CONCLUSIONS

Use-Wear Analysis of Chipped Stone Tools

Use-wear observation of the characteristics of nearly a quarter of all non-projectile point chipped lithic artifacts from the Meier site largely confirmed the reliability of the morphofunctional classification scheme used by Hamilton in his earlier treatment of this assemblage (Hamilton 1994). While a minority of artifacts were re-assigned to mutually exclusive functional classes, most artifacts exhibited use-wear consistent with that expected of the functional class to which they were assigned by Hamilton.

Spatial Distribution of Chipped Stone Tool Types: Inferences Regarding the Spatial Segregation of Social Classes

I have shown that many chipped lithic tool types -- the basic functions of which have been at least partially confirmed by use-wear study -- are, in general, rather evenly distributed on the long axis of the plankhouse. While some types exhibit rather weak correlations with position on the gradient, others exhibit no such correlation. This may be taken as evidence that the activities reflected by these artifacts (generally being mundane, daily maintenance and extraction activities) occurred throughout the plankhouse interior. This being the case, if we simultaneously propose that a social hierarchy existed within the plankhouse and that this hierarchy was physically manifested by spatial segregation of populations on the long axis of the structure, we may suggest with some confidence that the frequency of

commonplace, domestic, intra-site activities of peer groups, whether slave, commoner or elite, were rather similar within this household.

We know that slave and elite distinctions existed in Chinook society (Suttles 1990, Hajda 1984). The uniformity of domestic behavior indicated in this study aids in our understanding of the character of the *free/not free* dichotomy on the Lower Columbia. It may well be that at this site, slaves were more indicators of wealth of the elite class than economic specialists productively indentured to their masters. The presence of specialized, rather costly curated stone knives (most likely used in hunting and foraging expeditions), throughout the household further suggests that all inhabitants engaged in some similar subsistence activities, such as hunting and food processing.

There are several of important exceptions to the general statements made above; these contradictions characterize the material culture of the north end of the plankhouse. Graving tools are both significantly unevenly distributed on, and negatively correlated with, the long axis of the house, the social gradient hypothesized early in this thesis; significantly less gravers are found as one moves southward in the plankhouse. Use-wear analysis has confirmed the validity of the graver tool class for this site, and several observations indicate that many gravers were quite valuable tools.

Gravers are used to work moderately resistant to very resistant raw materials such as wood, bone and antler. Narrow, deep channels, grooves and other such intricate features are produced with these tools. Northwest coast artifacts requiring such features may be grouped into

artistic and utilitarian items. Artistic items fashioned or decorated with gravers include decorated bone and wood spoons, masks, bone and antler pendants and a variety of decorated wooden boxes (Curtis 1911, Drucker 1963, Goddard 1972, Johnson 1975). Utilitarian items produced with gravers include bone and antler points (Johnson 1975).

Thus, specialized tools used in the production and fine-finishing stages of artwork and some hunting gear are found more commonly in the northern residence of the plankhouse, very likely an area occupied by the elite. It may be proposed that elites -- a group perhaps including some labor specialists -- exercised power to control the production of such items on the primary, household level. The southerly-trending distribution of wedges (though not statistically significant), likely used for bone- and antler-splitting work which may have been finished with gravers found in the north, supports the proposition of 'embedded specialists' (Ames 1995) within elite ranks on the Northwest coast. I suggest that in the northern area of the Meier plankhouse, one or more antler-working specialists were engaged in the finishing stages of production of valuable items. Further research into the production process of bone and antler tools should be able to evaluate this proposition.

There is further suggestion for elite control of some production activities. Gero proposes that the capacity for cultural information to be encoded into a material object is dependent the stages of manufacture of that object (Gero 1989). While the ideotechnic (*sensu* Binford 1962) aspect of the Meier tools has yet to be examined, we may say that energy types III and IV have greater capacity for encoding cultural information than type I and II tools. Cultural information may have been more commonly encoded into tools in

the northern end of the plankhouse than elsewhere, perhaps reflecting elite control over production of valued, symbolically loaded items.

Finally, I have shown that energy expenditure per item is not evenly distributed within the plankhouse; more 'expensive' tools are found towards the northern, elite end of the household. Similarly, high-quality raw material is found in the greatest densities in the northern end of the plankhouse.

In summary, this study has contributed to the understanding of the character of social status differentiation on the Lower Columbia in the proto-historic period. I have presented empirical data demonstrating that most activities within the Meier plankhouse were carried out throughout the household, but that some activities were far more common in the northern, probably elite, end of the structure.

My results lend support to the idea that Northwest coast slavery was more a facility of status display (those elites displaying the largest numbers of slaves generating the greatest status, respect and power) than of direct, subsistence-level economic importance. My findings also strongly suggest that some elites were engaged in specific production activities and that their power may have derived at least in part from control of certain production activities.

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TABLES AND FIGURES

TABLES

USE-WEAR CATEGORY	CUT	SHAVE	SCRAPE	GRAVE	PERF	WEDGE	SAW
Microflake Scar Size							
Small	X						
Medium		X		X	X		
Large			X	-	X	X	X
Microflake Scar Distribution							
Unifacial			X				
Bifacial	X	X		X		X	X
Flake Ridges				-	X	X	-
Microflake Scar Distribution Continuity							
Even							
Uneven							
Microflake Scar Termination Type							
Feather	X						
Hinge		X		-	X		X
Step			X	X	X	X	X
Polish Distribution							
Unifacial			X				
Bifacial	X	X	-	X		X	X
Flake Ridges	X	X		-	X	X	-
Polish Distribution Continuity							
Even							
Uneven							
Polish Invasiveness							
Invasive	X			X	X	X	X
Moderate		X		-			-
Marginal			X		-	-	

Note that microflake scar and polish distribution continuity on the utilised element are more indicators of the continuity redundancy of tool motion than indicators of work action.

TABLE 1. USE-WEAR HOLOTYPES FOR SEVEN TOOL MOTIONS.

'X' indicates most common wear.

'-' indicates wear which often occurs with most common wear.

Tool #	WORKED MATERIAL	WORK ACTION	MINUTES USED
1	Wood	Scrape	15
2	Wood	Shave	45
3	Wood	Notch	20
4	Wood	Scrape	20
5	Wood	Shave	25
6	Wood	Saw	25
7	Wood	Scrape + Grave	25
8	Meat, Cartilage, Bone	Cut	58
9	Bone	Scrape	4
10	Antler	Saw	8
11	Antler	Saw	9
12	Antler	Scrape	35
13	Antler	Perforate(R)	15
14	Antler	Scrape	25
15	Antler	Scrape	20
16	Antler	Scrape	17
17	Antler	Scrape	20
18	Wood	Shave	20
19	Wood	Scrape	120
20	Wood	Shave	30
21	Vegetal	Saw	60
22	Vegetal	Saw	30
23	Meat, Cartilage, Bone	Cut	32
24	Meat, Cartilage, Bone	Cut	17
25	Meat, Cartilage, Bone	Cut	7
26	Vegetal	Saw	120
27	Wood	Shave	15
28	Leather	Grave	30
29	Leather	Scrape	30
30	Leather	Scrape	25
31	Leather	Cut	45
32	Leather	Saw	15
33	Wood	Perforate(R)	17
34	Antler	Grave	15
35	Wood	Perforate(R)	20
36	Leather	Cut	14
37	Leather	Saw	15
38	Leather	Grave	17
39	Wood	Grave	22
40	Leather	Perforate(R)	26
41	Leather	Perforate(R)	31
42	Antler	Saw	9
43	Antler	Grave	15
44	Wood	Perforate(R)	15
45	Wood	Notch	22
46	Antler	Perforate(R)	19
47	Antler	Grave	15
48	Antler	Grave	15
49	Leather	Cut	15
50	Leather	Cut	15
51	Leather	Cut	15
52	Leather	Cut	15
53	Wood	Grave	15
54	Wood	Grave	15
55	Leather	Perforate(R)	17
56	Leather	Perforate(R)	25

(TABLE 2 CONCLUDES NEXT PAGE)
(KEY TO CODES ON NEXT PAGE)

TABLE 2. THE EXPERIMENTAL TOOL SET

Tool #	WORKED MATERIAL	WORK ACTION	MINUTES USED
57	Leather	Saw	22
58	Wood	Notch	9
59	Wood	Grave	13
60	Leather	Perforate(R)	17
61	Wood	Grave	26
62	Antler	Perforate(R)	19
63	Antler	Grave	22
64	Wood	Scrape	30
65	Bone	Scrape	22
66	Bone	Scrape	13
67	Bone	Saw	11
68	Bone	Scrape	10
69	Bone	Scrape	15
70	Antler	Saw	9
71	Antler	Grave	16
72	Bone	Perforate(R)	21
73	Bone	Grave	18
74	Wood	Grave	15
75	Wood	Saw	12
76	Antler	Grave	14
77	Leather	Saw	16
78	Antler	Saw	13
79	Bone	Perforate(R)	16
80	Bone	Perforate(R)	3
81	Bone	Grave	11
82	Bone	Grave	6
83	Bone	Perforate(R)	14
84	Bone	Grave	3
BT1	Vegetal	Saw	60
BT2	-	ELIMINATED	-
BT3	Antler	Saw	35
BT4	Antler	Scrape	30
BT5	Wood + Leather	Shave, Scrape	30
BT6	Leather	Scrape	30
BT7	Leather	Scrape	30
BT8	Wood	Scrape	30
BT9	Vegetal	Saw	30
BT10	Wood	Notch	30
BT11	Vegetal	Saw	60
BT12	Leather	Saw	30
BT13	-	unused	-
BT14	Wood	Saw	30
BT15	Leather	Scrape	30
BT16	Leather	Saw, Cut	30
BT17	Vegetal	Saw	60
BT18	Wood, Vegetal	Notch, Saw	30
BT19	Wood, Antler	Grave, Scrape	30
BT20	Meat, Cartilage, Bone, Wood	Cut, Scrape, Shave	30, 30
BT21	Meat, Cartilage, Bone	Cut, Scrape	40
BT22	Wood, Leather	Shave, Scrape, Saw	15, 30
BT23	Antler	Saw	30
BT24	Meat	Cut, Scrape	30
BT25	Wood	Shave, Scrape	30

(CONCLUDES TABLE 2)

(R) = Rotary action

BT = Tools used in blind test: see text for discussion.

TABLE 2. THE EXPERIMENTAL TOOL SET

SOURCE / ANALYST	USE REGION	WORK ACTION	WORKED MATERIAL
Driskell (1986)	90	56	52
Odell & Odell-Vreecken (1980)	79	69	38
Odell & Odell-Vreecken (1980)	80	75	36
Keeley & Newcomer (1977)	87	75	62
Gendel & Pirnay (1982)	91	82	73
Richards (1988)	90	90	40
Bamforth et al. (1990)	83	78	66
Shea (1991)	92-100	75-89	69-79
Smith & Lam (1990)	84	62	46
AVERAGE:	85.5	73.4	52.0
STANDARD DEVIATION:	4.7	10.9	14.0

Scores are percentage values indicating proportion of examined tools correctly identified.

TABLE 3. RESULTS OF NINE BLIND TESTS.

SAMPLE	SCRAPE	CUT	SHAVE	PERF	GRAVE	WEDGE	SAW
n	40	70	80	30	40	10	8
PERCENT	10%	30%	35%	34%	78%	29%	47%

TABLE 4. USE-WEAR SAMPLING OF FUNCTIONAL CLASSES

EVALUATION	n	%
Agree	238	86%
Disagree	40	14%
SUM	278	100%

Scores indicate the number and proportion of examined samples where the *expected* use-wear was confirmed, or not confirmed, based on the Hamilton morphofunctional classification for that sample.

TABLE 5. SUMMARY RESULTS OF USE-WEAR ANALYSIS

HAMILTON TYPE	CUT	SHAVE	SCRAPE	WEDGE	GRAVE	SAW	PERF.	indet
KNIFE	ALL							1
CUT		2	1					12
SHAVE	2		4		1		1	7
SCRAPE	1	3						3
PERFORATE					1			
WEDGE								
GRAVE								
SAW								1
debitage								
SUM	3	5	5	0	2	0	1	24
% of EXAMINED ARTIFACTS	1%	2%	2%	0%	1%	0%	0%	9%

PERF= PERFORATE

indet = indeterminate: designation could
not be made based on available
use-wear characteristics

**TABLE 6. HAMILTON FUNCTIONAL CLASSES CONVERTED
TO SMITH FUNCTIONAL CLASSES BASED ON USE-WEAR STUDY**

HAMILTON TYPE	CUT	SHAVE	SCRAPE	PERF.	WEDGE	GRAVE	SAW	indet
CUT		1	4	1		1		
SHAVE	4		7			7		
SCRAPE	1					1		
PERFORATE	1							
WEDGE								
GRAVE		1	4			1		
SAW								
debitage								
SUM	6	2	15	1	0	10	0	0
% of EXAMINED ARTIFACTS	2%	1%	5%	0%	0%	4%	0%	0%

TABLE 7. INCIDENCE OF MULTIFUNCTIONAL TOOLS.

	533	Items in the 1991 assemblage examined by Smith (this study)
-	221	Items classified as 'indet', 'core frag', 'deartifact' etc. by Smith (this study)
	312	Non-Projectile-Point chipped lithic artifacts classified by Smith (this study)
-	45	Classified tools with poor spatial data, no data, or from Auger tests (identified in this study)
	267	Non-Projectile-Point chipped lithic artifacts classified by Smith, this study, with good spatial data
+	806	Non-Projectile-Point chipped lithic artifacts classified by Hamilton (1994)
	1073	Total of non-Projectile-Point chipped lithic artifacts classified by Hamilton and Smith
-	374	Tools outside plankhouse boundaries
	699	Tools within plankhouse boundaries
-	155	Tools in plowzone
	544	NON-PROJECTILE POINT CHIPPED LITHIC TOOLS WITHIN PLANKHOUSE and BELOW PLOWZONE with ACCPETABLE PROVENIENCE DATA

TABLE 8. SELECTION PROCESS FOR SPATIAL DISTRIBUTION SAMPLE.

SMITH FUNCTIONAL CLASS	n	%
SCRAPE	417	0.39
CUT	236	0.22
SHAVE	231	0.22
PERFORATE	87	0.08
GRAVE	51	0.05
WEDGE	34	0.03
SAW	17	0.02
SUM	1,073	100

TABLE 9. MEIER SITE FUNCTIONAL ASSEMBLAGE STRUCTURE

SMITH FUNCTIONAL TYPE	Type I	Type II	Type III	Type IV
CUT	62.00%	19.80%	6.60%	11.6%
GRAVE	23.50%	58.80%	5.90%	11.8%
PERFORATE	23.90%	47.70%	5.70%	22.7%
SCRAPE	56.30%	40.70%	1.50%	1.50%
SHAVE	59.40%	32.30%	3.90%	4.40%
WEDGE	22.90%	60.00%	11.40%	5.70%
SAW	58.80%	23.50%	11.80%	5.90%
TOTAL % OF ASSEMBLAGE	53.00%	36.00%	4.20%	6.80%

TABLE 10. MEIER SITE HAMILTON ENERGY TYPE ASSEMBLAGE
STRUCTURE, BY SMITH FUNCTIONAL TYPE

UNIT	CUT	GRAVE	PERF	SCRAPE	SHAVE	WEDGE	SAW
A	17	5	5	8	9	1	0
B	0	0	0	1	0	0	0
C	15	4	1	5	16	1	2
D	0	0	0	0	0	0	0
E	10	0	2	3	5	0	0
F	6	2	2	3	5	0	0
G	3	0	1	10	6	4	1
H	9	4	1	6	2	2	0
I	4	2	4	13	4	2	0
J	8	6	3	7	8	0	1
K	2	1	0	10	4	1	0
L	9	2	0	6	3	0	0
M	1	2	1	13	3	0	0
N	1	1	2	12	6	0	0
O	12	0	2	15	5	0	1
P	3	0	0	6	3	0	1
Q	5	0	2	5	4	0	0
R	0	2	1	7	5	2	0
S	0	0	2	2	1	0	0
T	7	1	1	15	6	2	0
U	5	0	5	8	6	1	1
V	0	0	4	3	1	0	0
W	0	0	1	4	2	0	0
X	2	1	2	13	4	0	0
Y	6	0	3	3	0	0	0
Z	5	1	4	16	13	0	1
A2	2	1	1	5	1	0	0
B2	1	0	0	3	0	0	0
C2	2	1	1	4	4	0	0
D2	3	0	1	8	3	1	0
E2	3	0	0	4	0	0	0
F2a	0	0	0	1	0	1	0
F2b	0	0	0	0	0	0	0
G2	5	0	2	3	1	0	0
H2	10	2	3	22	7	2	0
I2	0	0	1	3	0	0	0
J2	0	0	0	2	0	0	0
K2	6	1	1	4	5	0	0
L2	7	2	4	25	5	2	2
M2	3	0	1	11	7	2	0
N2	0	0	2	3	7	2	0
O2	1	1	1	8	8	0	1
P2	5	2	3	8	6	0	0
Q2	1	0	0	1	2	0	0

TABLE 11. COUNT OF FUNCTIONAL CLASSES PER
EXCAVATION UNIT
(n=816 items, including 117 in plowzone)

UNIT	ENERGY TYPE				RAW MATERIAL QUAL.			
	I	II	III	IV	EXC	GOOD	FAIR	POOR
A	19	11	7	8	4	42	6	1
B	0	0	0	0	0	0	0	2
C	7	20	9	5	7	5	3	0
D	1	0	0	0	0	0	1	0
E	10	6	0	4	2	12	6	0
F	2	11	2	3	5	7	3	0
G	15	6	1	2	3	2	6	2
H	11	8	3	2	2	16	8	0
I	8	17	0	3	2	2	12	0
J	20	6	4	4	9	15	5	3
K	12	4	0	2	2	7	5	1
L	13	4	0	3	1	14	5	0
M	12	8	0	0	3	9	7	0
N	10	11	0	0	1	10	9	0
O	27	6	0	2	4	13	15	0
P	11	1	1	0	0	5	7	1
Q	12	3	0	1	2	8	5	0
R	8	8	1	0	1	8	6	2
S	2	2	0	1	0	2	3	0
T	20	10	0	2	5	14	12	1
U	10	13	1	2	3	6	7	1
V	3	4	0	1	1	3	2	0
W	4	4	0	0	1	2	1	0
X	13	8	0	1	0	4	16	0
Y	3	4	2	2	2	5	4	0
Z	13	21	2	4	4	12	13	3
A2	4	5	0	1	1	2	3	0
B2	0	4	0	0	0	2	1	1
C2	7	5	0	0	1	3	0	0
D2	9	7	0	0	0	3	3	0
E2	4	1	1	1	1	4	1	0
F2a	1	1	0	0	0	1	0	0
F2b	0	0	0	0	0	0	0	0
G2	6	5	0	0	0	6	5	0
H2	26	16	0	4	3	16	11	1
I2	2	1	0	1	0	3	1	0
J2	0	1	0	0	1	1	0	0
K2	10	7	1	0	2	5	6	0
L2	26	17	0	1	3	8	14	2
M2	17	6	0	1	1	7	3	2
N2	8	5	0	1	3	0	3	0
O2	12	7	0	1	3	4	3	0
P2	11	12	1	0	2	10	5	0
Q2	1	2	0	0	0	2	1	1

TABLE 12. COUNT OF ENERGY TYPES AND RAW MATERIAL QUALITY
PER EXCAVATION UNIT

EXC. UNIT	LITHIC POINTS	n CHIPPED	n TYPES	n BN/ANT DEB.	EXC. VOL. (m3)
A	15	45	7	74	4.20
B	3	1	3	0	1.84
C	30	44	7	24	4.76
D	25	0	1	0	3.48
E	0	20	3	2	3.56
F	17	18	5	62	2.96
G	60	25	6	1	2.52
H	24	24	6	3	3.72
I	36	29	7	26	3.60
J	32	33	6	35	4.96
K	28	18	6	15	3.20
L	33	20	4	2	4.16
M	23	20	6	19	3.24
N	47	22	5	11	2.28
O	56	35	6	1	3.92
P	25	13	6	15	2.95
Q	45	16	6	0	5.52
R	54	17	5	34	4.56
S	21	5	5	3	3.28
T	41	32	6	0	3.80
U	42	26	6	19	4.32
V	7	8	4	7	2.36
W	13	7	4	5	2.26
X	81	22	5	23	4.92
Y	37	12	4	40	4.04
Z	61	40	6	60	4.16
A2	26	10	6	8	3.80
B2	2	4	5	5	0.76
C2	8	12	5	12	3.92
D2	5	16	5	5	2.40
E2	8	7	2	2	2.28
F2a	0	2	2	0	0.32
F2b	0	0	2	0	0.43
G2	12	11	6	5	3.76
H2	58	46	5	62	5.20
I2	31	4	3	20	4.12
J2	6	2	4	1	1.78
K2	8	17	6	16	2.37
L2	92	47	7	0	5.40
M2	28	24	6	0	2.04
N2	9	14	4	10	1.26
O2	43	20	6	0	3.88
P2	9	24	5	4	5.40
Q2	0	4	3	0	1.16

TABLE 13. COUNT OF LITHIC PROJECTILE POINTS, CHIPPED STONE TOOLS (EXCLUDING POINTS), CHIPPED STONE TOOL TYPES, BONE AND ANTLER DEBITAGE AND EXCAVATION VOLUME PER EXCAVATION UNIT

EXC. UNIT	CUT				GRAVE				PERFORATE				SCRAPE				SHAVE				WEDGE				SAW			
	I	II	III	IV	I	II	III	IV	I	II	III	IV	I	II	III	IV	I	II	III	IV	I	II	III	IV	I	II	III	IV
A	11	1	4	1	1	3	0	1	0	2	1	2	4	2	1	1	3	3	1	2	0	0	0	1	0	0	0	0
B	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
C	5	5	3	2	0	2	0	2	0	0	0	1	0	2	3	0	2	10	3	0	0	1	0	0	0	0	0	0
D	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	1	0	0	0	0	0	0	0	0	0	0	0
E	7	2	0	1	0	0	0	0	0	0	0	2	1	2	0	0	2	2	0	1	0	0	0	0	0	0	0	0
F	1	4	1	0	0	1	0	1	0	0	0	2	1	2	0	0	0	4	1	0	0	0	0	0	0	0	0	0
G	1	0	0	2	0	0	0	0	1	0	0	0	5	4	0	0	7	2	1	0	0	0	0	0	1	0	0	0
H	6	1	2	0	1	3	0	0	0	0	0	1	4	2	0	0	0	2	0	0	0	0	1	1	0	0	0	0
I	2	1	0	1	0	2	0	0	0	2	0	2	4	8	0	0	2	2	0	0	0	2	0	0	0	0	0	0
J	7	2	0	0	1	2	3	0	3	0	0	0	4	0	1	2	4	2	0	2	0	0	0	0	1	0	0	0
K	1	0	0	1	0	1	0	0	0	0	0	0	7	3	0	0	3	0	0	1	1	0	0	0	0	0	0	0
L	6	1	0	2	1	0	0	1	0	0	0	0	4	2	0	0	2	1	0	0	0	0	0	0	0	0	0	0
M	1	0	0	0	0	2	0	0	0	1	0	0	9	4	0	0	2	1	0	0	0	0	0	0	0	0	0	0
N	0	1	0	0	0	0	0	0	0	2	0	0	8	4	0	0	2	4	0	0	0	0	0	0	0	0	0	0
O	9	1	0	2	0	0	0	0	0	2	0	0	13	2	0	0	4	1	0	0	0	0	0	0	1	0	0	0
P	2	0	1	0	0	0	0	0	0	0	0	0	6	0	0	0	2	1	0	0	0	0	0	0	1	0	0	0
Q	5	0	0	0	0	0	0	0	1	0	0	1	4	1	0	0	2	2	0	0	0	0	0	0	0	0	0	0
R	0	0	0	0	0	1	1	0	0	1	0	0	4	3	0	0	4	1	0	0	0	2	0	0	0	0	0	0
S	0	0	0	0	0	0	0	0	0	1	0	1	1	1	0	0	1	0	0	0	0	0	0	0	0	0	0	0
T	4	1	0	2	0	1	0	0	1	0	0	0	8	7	0	0	6	0	0	0	1	1	0	0	0	0	0	0
U	3	2	0	0	0	0	0	0	0	3	1	1	3	5	0	0	4	1	0	1	0	1	0	0	0	1	0	0
V	0	0	0	0	0	0	0	0	1	2	0	1	2	1	0	0	0	1	0	0	0	0	0	0	0	0	0	0
W	0	0	0	0	0	1	0	0	1	0	0	0	3	1	0	0	0	2	0	0	0	0	0	0	0	0	0	0
X	1	0	0	1	0	1	0	0	0	2	0	0	9	4	0	0	3	1	0	0	0	0	0	0	0	0	0	0
Y	1	1	2	1	0	0	0	0	0	2	0	1	2	1	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Z	1	0	0	4	0	1	0	0	1	1	2	0	2	14	0	0	8	5	0	0	0	0	0	0	1	0	0	0
A2	1	1	0	0	0	1	0	0	0	0	0	1	2	3	0	0	1	0	0	0	0	0	0	0	0	0	0	0
B2	0	1	0	0	0	0	0	0	0	0	0	0	0	3	0	0	0	0	0	0	0	0	0	0	0	0	0	0
C2	2	0	0	0	0	1	0	0	1	0	0	0	2	2	0	0	2	2	0	0	0	0	0	0	0	0	0	0
D2	1	2	0	0	1	0	0	0	0	0	0	0	5	3	0	0	2	1	0	0	0	1	0	0	0	0	0	0
E2	2	0	1	0	0	0	0	0	0	0	0	0	2	1	0	1	0	0	0	0	0	0	0	0	0	0	0	0
F2a	0	0	0	0	0	0	0	0	0	0	0	0	1	0	0	0	0	0	0	0	1	0	0	0	0	0	0	0
F2b	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
G2	2	3	0	0	0	0	0	0	0	2	0	0	4	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
H2	5	3	0	2	1	1	0	0	1	0	0	2	13	9	0	0	6	1	0	0	0	2	0	0	0	0	0	0
I2	0	0	0	0	0	0	0	0	0	0	0	1	2	1	0	0	0	0	0	0	0	0	0	0	0	0	0	0
J2	0	0	0	0	0	0	0	0	0	0	0	0	0	1	0	0	0	0	0	0	0	0	0	0	0	0	0	0
K2	5	1	0	0	0	1	0	0	0	1	0	0	3	1	1	0	2	3	0	0	0	0	0	0	0	0	0	0
L2	4	2	0	1	0	1	0	0	2	2	0	0	14	11	0	0	5	0	0	0	1	1	0	0	0	0	0	0
M2	3	0	0	0	0	0	0	0	0	1	0	0	8	3	0	0	4	2	0	1	2	0	0	0	0	0	0	0
N2	0	0	0	0	0	0	0	0	0	1	0	1	0	3	0	0	7	0	0	0	1	1	0	0	0	0	0	0
O2	1	0	0	0	0	1	0	0	0	1	0	0	4	4	0	0	6	1	0	1	0	0	0	0	1	0	0	0
P2	4	1	0	0	2	0	0	0	0	3	0	0	3	5	0	0	2	3	1	0	0	0	0	0	0	0	0	0
Q2	0	0	0	0	0	0	0	0	0	0	0	0	0	1	0	0	1	1	0	0	0	0	0	0	0	0	0	0

TABLE 14. COUNT OF HAMILTON ENERGY TYPES
PER FUNCTIONAL CLASS PER EXCAVATION UNIT

HOUSE	MIDDEN
C, D, E, F, H, I, J, K, L, N, O, P, Q, R, S, W, X, Y, Z, A2, G2, H2, I2, L2, M2	T, U, V, C2, D2
n=25	n=5

**TABLE 15. ASSIGNMENT OF EXCAVATION UNITS
TO HOUSE AND MIDDEN ANALYTICAL UNITS**

BENCH	CELLAR	HEARTH / PERIPHERY
C	H	D
L	I	R
P	K	Z
W+E2	O	I2
A2	Q	E
G2	X	J
M2	H2	N
	L2	S
		Y
		F
n=7	n=8	n=10

TABLE 16. ASSIGNMENT OF EXCAVATION UNITS
TO BENCH, CELLAR AND
HEARTH/PERIPHERY ANALYTICAL UNITS

NORTH	CENTRAL	SOUTH
C	K	W+E2
D	L	X
E	N	Y
F	O	Z
H	P	A2
I	Q	G2
J	R	H2
	S	I2
		L2
		M2
n=7	n=8	n=10
2.60- 9.00m	10.40- 17.90m	19.10- 28.40m

Minimum and maximum gradient scores
are noted per area: See Figure 21.

**TABLE 17. ASSIGNMENT OF EXCAVATION UNITS
TO NORTH, CENTRAL AND
SOUTH ANALYTICAL UNITS**

TEST SERIES	PURPOSE OF, OR QUESTION TO BE ANSWERED BY, TEST	TEST #	ANALYTICAL UNITS TESTED	DF	SIGNIF. LEVEL OBSERVED	RESULTS IN TABLE:
SIGNIFICANCE	Is spatial distribution statistically significant, or could it have occurred by chance alone?	1	House, Midden	1	0.05	19
		2	North, Central, South	2	0.05	19
		3	Bench, Cellar, Hearth	2	0.05	19
CORRELATION	Evaluate null hypothesis that value of data class [x] is not dependent upon gradient value [y].	1	Gradient	23	0.05	20
		2	Bench	6	0.05	21
		3	Cellar	7	0.05	22
		4	Hearth/Periph	9	0.05	23
	Identify interassemblage correlations of various data types.	5	North, Central, South	2	0.05	24-29, 38
		6	Bench, Cellar, Hearth	2	0.05	30-35, 39
		7	House Assemblage	23	0.05	36, 37, 40

DF = Degrees of Freedom for statistical procedure

TABLE 18.
PURPOSES AND DATA OF STATISTICAL TESTS CONDUCTED

VARIABLE	Significance	Significance	Significance
	Test #1 House, Midden	Test #2 North, Central, South	Test #3 Bench, Cellar, Hearth/Periph
CUT	1.39	11.01	2.68
GRAVE	0.54	12.83	0.76
PERFORATE	1.96	1.64	3.63
SCRAPE	2.52	12.00	13.53
SHAVE	0.13	5.79	2.03
WEDGE	0.52	2.71	4.76
SAW	0.16	0.90	0.61
ENERGY TYPE I	1.33	8.27	16.68
ENERGY TYPE II	2.20	7.49	1.98
ENERGY TYPE III	2.86	20.47	4.61
ENERGY TYPE IV	1.46	8.02	0.69
EXCELLENT	0.58	12.13	1.78
GOOD	0.00	3.52	1.02
FAIR	0.01	2.88	14.15
POOR	0.23	2.05	0.98
n Chipped Tools	12.43	5.24	3.64
n Chipped Tool Types	1.50	0.24	2.36
Projectile Points	15.78	53.11	21.91
Post and Pegmold Features	not tested	4.36	16.85
Bone and Antler Shavings	6.44	39.79	113.61

TABLE 19.
RESULTS OF SIGNIFICANCE TEST 1, 2 AND 3

VARIABLE	Pearson's r	p	r squared	Spearman's C.C.
CUT	-0.39	0.06	0.15	-0.32
GRAVE	-0.48	0.01	0.23	-0.57
PERFORATE	0.14	0.50	0.02	0.17
SCRAPE	0.38	0.06	0.14	0.27
SHAVE	-0.07	0.73	0.00	-0.24
WEDGE	0.18	0.38	0.03	0.35
SAW	-0.05	0.82	0.00	-0.60
EXCELLENT	-0.42	0.04	0.18	-0.32
GOOD	-0.12	0.58	0.01	-0.09
FAIR	0.08	0.72	0.01	0.00
POOR	0.39	0.05	0.15	0.35
TYPE I	0.29	0.16	0.08	0.20
TYPE II	-0.09	0.67	0.01	-0.10
TYPE III	-0.44	0.03	0.19	-0.32
TYPE IV	-0.45	0.02	0.20	-0.37

Independent variable in all cases is GRADIENT score.

**TABLE 20. RESULTS OF CORRELATION TEST 1:
ALL UNITS ON GRADIENT**

VARIABLE	Pearson's r	p	r squared	Spearman's C.C.
CUT	-0.76	0.05	0.58	-0.54
GRAVE	-0.87	0.01	0.76	-0.61
PERFORATE	0.57	0.18	0.32	0.77
SCRAPE	0.61	0.14	0.37	0.29
SHAVE	-0.17	0.72	0.03	-0.21
WEDGE	0.44	0.33	0.19	0.13
SAW	-0.65	0.11	0.42	-0.67
EXCELLENT	-0.62	0.14	0.38	-0.04
GOOD	0.22	0.64	0.05	0.14
FAIR	0.27	0.56	0.07	0.29
POOR	0.60	0.16	0.36	0.40
TYPE I	0.52	0.23	0.27	0.14
TYPE II	-0.32	0.48	0.10	0.18
TYPE III	-0.78	0.04	0.61	-0.67
TYPE IV	-0.67	0.10	0.45	-0.36

Independent variable in all cases is GRADIENT score.

TABLE 21. RESULTS OF CORRELATION TEST 2:
BENCH

VARIABLE	Pearson's r	p	r squared	Spearman's C.C.
CUT	-0.19	0.66	0.04	-0.14
GRAVE	-0.53	0.18	0.28	-0.35
PERFORATE	0.14	0.74	0.02	0.38
SCRAPE	0.39	0.34	0.15	0.52
SHAVE	0.15	0.71	0.02	0.26
WEDGE	-0.41	0.31	0.17	-0.37
SAW	0.44	0.28	0.19	0.44
TYPE I	0.32	0.45	0.10	0.31
TYPE II	-0.06	0.89	0.00	0.10
TYPE III	-0.55	0.16	0.30	-0.58
TYPE IV	-0.52	0.19	0.27	-0.45
EXCELLENT	-0.26	0.53	0.07	-0.07
GOOD	-0.27	0.51	0.07	-0.19
FAIR	-0.02	0.96	0.00	-0.10
POOR	0.41	0.32	0.17	0.52

Independent variable in all cases is GRADIENT score.

**TABLE 22. RESULTS OF CORRELATION TEST 3:
CELLAR**

VARIABLE	Pearson's r	p	r squared	Spearman's C.C.
CUT	-0.71	0.05	0.50	-0.56
GRAVE	-0.34	0.41	0.12	-0.40
PERFORATE	-0.08	0.85	0.01	0.17
SCRAPE	0.00	0.99	0.00	-0.29
SHAVE	-0.28	0.50	0.08	-0.38
WEDGE	0.13	0.75	0.02	-0.08
SAW	-0.01	0.98	0.00	0.08
TYPE I	-0.60	0.11	0.36	-0.60
TYPE II	-0.03	0.95	0.00	-0.29
TYPE III	0.01	0.98	0.00	0.01
TYPE IV	-0.47	0.24	0.22	-0.20
EXCELLENT	-0.43	0.29	0.18	-0.42
GOOD	-0.66	0.08	0.44	-0.69
FAIR	-0.17	0.68	0.03	-0.45
POOR	0.06	0.89	0.00	0.03

Independent variable in all cases is GRADIENT score.

**TABLE 23. RESULTS OF CORRELATION TEST 4:
HEARTH / PERIPHERY**

	GRADIENT	CUT	GRAVE	PERFORATE	SCRAPE
GRADIENT	0.00				
CUT	0.68	0.00			
GRAVE	0.12	0.47	0.00		
PERFORAT	0.12	0.98	0.78	0.00	
SCRAPE	0.07	0.99	0.46	0.03	0.00
SHAVE	0.71	0.07	0.44	0.84	0.92
WEDGE	0.33	0.86	0.46	0.52	0.05
SAW	0.75	0.31	0.32	0.57	0.81
TYPE1	0.12	0.46	0.23	0.47	0.40
TYPE2	0.75	0.35	0.57	0.18	0.11
TYPE3	0.79	0.14	0.11	0.48	0.78
TYPE4	0.90	0.04	0.64	0.21	0.52
EXC	0.55	0.31	0.11	0.60	0.95
GOOD	0.57	0.18	0.34	0.94	0.93
FAIR	0.17	0.91	0.83	0.06	0.01
POOR	0.16	0.82	0.21	0.77	0.97
	SHAVE	WEDGE	SAW	TYPE1	TYPE2
SHAVE	0.00				
WEDGE	0.80	0.00			
SAW	0.02	0.82	0.00		
TYPE1	0.89	0.64	0.81	0.00	
TYPE2	0.17	0.24	0.61	0.79	0.00
TYPE3	0.04	0.92	0.01	0.93	0.44
TYPE4	0.05	0.93	0.47	0.48	0.13
EXC	0.07	0.51	0.18	0.61	0.47
GOOD	0.95	0.92	0.73	0.10	0.72
FAIR	0.66	0.04	0.35	0.37	0.26
POOR	0.84	0.49	0.51	0.11	0.41
	TYPE3	TYPE4	EXC	GOOD	FAIR
TYPE3	0.00				
TYPE4	0.45	0.00			
EXC	0.12	0.14	0.00		
GOOD	0.81	0.46	0.59	0.00	
FAIR	0.41	0.61	0.57	0.71	0.00
POOR	0.77	0.92	0.20	0.58	0.69
	POOR				
POOR	0.00				

TABLE 24.
RESULTS OF CORRELATION TEST 5:
CORRELATION MATRIX FOR NORTH AREA

	GRADIENT	CUT	GRAVE	PERFORATE	SCRAPE
GRADIENT	0.00				
CUT	0.68	0.00			
GRAVE	0.12	0.47	0.00		
PERFORAT	0.12	0.98	0.78	0.00	
SCRAPE	0.07	0.99	0.46	0.03	0.00
SHAVE	0.71	0.07	0.44	0.84	0.92
WEDGE	0.33	0.86	0.46	0.52	0.05
SAW	0.75	0.31	0.32	0.57	0.81
TYPE1	0.12	0.46	0.23	0.47	0.40
TYPE2	0.75	0.35	0.57	0.18	0.11
TYPE3	0.79	0.14	0.11	0.48	0.78
TYPE4	0.90	0.04	0.64	0.21	0.52
EXC	0.55	0.31	0.11	0.60	0.95
GOOD	0.57	0.18	0.34	0.94	0.93
FAIR	0.17	0.91	0.83	0.06	0.01
POOR	0.16	0.82	0.21	0.77	0.97
	SHAVE	WEDGE	SAW	TYPE1	TYPE2
SHAVE	0.00				
WEDGE	0.80	0.00			
SAW	0.02	0.82	0.00		
TYPE1	0.89	0.64	0.81	0.00	
TYPE2	0.17	0.24	0.61	0.79	0.00
TYPE3	0.04	0.92	0.01	0.93	0.44
TYPE4	0.05	0.93	0.47	0.48	0.13
EXC	0.07	0.51	0.18	0.61	0.47
GOOD	0.95	0.92	0.73	0.10	0.72
FAIR	0.66	0.04	0.35	0.37	0.26
POOR	0.84	0.49	0.51	0.11	0.41
	TYPE3	TYPE4	EXC	GOOD	FAIR
TYPE3	0.00				
TYPE4	0.45	0.00			
EXC	0.12	0.14	0.00		
GOOD	0.81	0.46	0.59	0.00	
FAIR	0.41	0.61	0.57	0.71	0.00
POOR	0.77	0.92	0.20	0.58	0.69
	POOR				
POOR	0.00				

TABLE 25.
RESULTS OF CORRELATION TEST 5:
PROBABILITY MATRIX FOR NORTH AREA

	GRADIENT	CUT	GRAVE	PERFORATE	SCRAPE
GRADIENT	1.00				
CUT	-0.39	1.00			
GRAVE	-0.59	-0.17	1.00		
PERFORAT	0.19	-0.15	-0.11	1.00	
SCRAPE	-0.52	0.23	0.29	0.43	1.00
SHAVE	-0.40	-0.03	0.44	0.47	0.92
WEDGE	-0.03	-0.43	0.47	-0.36	-0.06
SAW	0.24	0.49	-0.56	-0.19	0.18
TYPE1	-0.48	0.75	-0.05	0.09	0.77
TYPE2	-0.35	-0.15	0.55	0.65	0.81
TYPE3	0.50	-0.23	-0.10	-0.43	-0.19
TYPE4	-0.68	0.57	0.11	-0.36	-0.06
EXC	-0.49	0.62	-0.01	0.19	0.62
GOOD	-0.70	0.48	0.54	0.27	0.82
FAIR	-0.25	0.40	0.01	0.49	0.90
POOR	0.18	-0.40	0.20	-0.58	-0.10
	SHAVE	WEDGE	SAW	TYPE1	TYPE2
SHAVE	1.00				
WEDGE	0.03	1.00			
SAW	0.00	-0.32	1.00		
TYPE1	0.54	-0.23	0.57	1.00	
TYPE2	0.93	0.03	-0.26	0.33	1.00
TYPE3	-0.07	0.26	0.57	-0.11	-0.24
TYPE4	-0.33	-0.07	-0.15	0.24	-0.31
EXC	0.39	0.04	0.13	0.80	0.29
GOOD	0.78	-0.20	0.02	0.71	0.75
FAIR	0.79	-0.28	0.48	0.84	0.67
POOR	-0.01	0.79	0.18	-0.15	-0.17
	TYPE3	TYPE4	EXC	GOOD	FAIR
TYPE3	1.00				
TYPE4	-0.59	1.00			
EXC	-0.49	0.43	1.00		
GOOD	-0.30	0.17	0.54	1.00	
FAIR	-0.02	-0.18	0.57	0.74	1.00
POOR	0.76	-0.31	-0.23	-0.32	-0.19
	POOR				
POOR	1.00				

TABLE 26.
RESULTS OF CORRELATION TEST 5:
CORRELATION MATRIX FOR CENTRAL AREA

	GRADIENT	CUT	GRAVE	PERFORATE	SCRAPE
GRADIENT	0.00				
CUT	0.34	0.00			
GRAVE	0.12	0.69	0.00		
PERFORAT	0.65	0.72	0.80	0.00	
SCRAPE	0.18	0.59	0.49	0.29	0.00
SHAVE	0.33	0.94	0.27	0.24	0.00
WEDGE	0.94	0.28	0.24	0.38	0.90
SAW	0.57	0.21	0.15	0.65	0.68
TYPE1	0.23	0.03	0.91	0.83	0.03
TYPE2	0.40	0.72	0.16	0.08	0.01
TYPE3	0.21	0.59	0.82	0.28	0.65
TYPE4	0.06	0.14	0.79	0.38	0.89
EXC	0.22	0.10	0.98	0.65	0.10
GOOD	0.05	0.23	0.16	0.51	0.01
FAIR	0.55	0.32	0.98	0.21	0.00
POOR	0.68	0.32	0.63	0.13	0.81

	SHAVE	WEDGE	SAW	TYPE1	TYPE2
SHAVE	0.00				
WEDGE	0.95	0.00			
SAW	1.00	0.44	0.00		
TYPE1	0.17	0.59	0.14	0.00	
TYPE2	0.00	0.95	0.53	0.43	0.00
TYPE3	0.87	0.53	0.14	0.80	0.56
TYPE4	0.43	0.87	0.72	0.56	0.46
EXC	0.34	0.92	0.75	0.02	0.49
GOOD	0.02	0.63	0.96	0.05	0.03
FAIR	0.02	0.49	0.23	0.01	0.07
POOR	0.97	0.02	0.67	0.71	0.68

	TYPE3	TYPE4	EXC	GOOD	FAIR
TYPE3	0.00				
TYPE4	0.12	0.00			
EXC	0.22	0.29	0.00		
GOOD	0.47	0.68	0.17	0.00	
FAIR	0.96	0.67	0.14	0.04	0.00
POOR	0.03	0.45	0.58	0.44	0.65

	POOR
POOR	0.00

TABLE 27.
RESULTS OF CORRELATION TEST 5:
PROBABILITY MATRIX FOR CENTRAL AREA

	GRADIENT	CUT	GRAVE	PERFORATE	SCRAPE
GRADIENT	1.00				
CUT	0.30	1.00			
GRAVE	-0.06	0.26	1.00		
PERFORAT	0.04	0.66	0.34	1.00	
SCRAPE	0.63	0.51	0.51	0.42	1.00
SHAVE	0.59	0.41	0.16	0.47	0.82
WEDGE	0.92	0.50	0.07	0.11	0.79
SAW	0.12	0.20	0.54	0.65	0.49
TYPE1	0.80	0.56	0.26	0.28	0.93
TYPE2	0.27	0.55	0.57	0.75	0.80
TYPE3	-0.40	0.20	-0.20	0.57	-0.16
TYPE4	0.06	0.47	0.34	0.60	0.48
EXC	0.13	0.58	0.38	0.70	0.59
GOOD	0.53	0.74	0.15	0.51	0.76
FAIR	-0.02	0.30	0.63	0.64	0.61
POOR	0.74	0.43	0.10	0.49	0.82
	SHAVE	WEDGE	SAW	TYPE1	TYPE2
SHAVE	1.00				
WEDGE	0.66	1.00			
SAW	0.30	0.08	1.00		
TYPE1	0.79	0.94	0.25	1.00	
TYPE2	0.83	0.39	0.65	0.63	1.00
TYPE3	0.14	-0.35	0.17	-0.28	0.25
TYPE4	0.65	0.21	0.19	0.33	0.72
EXC	0.63	0.28	0.55	0.42	0.81
GOOD	0.85	0.70	0.16	0.80	0.75
FAIR	0.50	0.12	0.55	0.41	0.74
POOR	0.96	0.75	0.41	0.82	0.77
	TYPE3	TYPE4	EXC	GOOD	FAIR
TYPE3	1.00				
TYPE4	0.54	1.00			
EXC	0.61	0.81	1.00		
GOOD	0.13	0.70	0.65	1.00	
FAIR	0.07	0.38	0.36	0.36	1.00
POOR	0.12	0.55	0.63	0.81	0.39
	POOR				
POOR	1.00				

TABLE 28.
RESULTS OF CORRELATION TEST 5:
CORRELATION MATRIX FOR SOUTH AREA

	GRADIENT	CUT	GRAVE	PERFORATE	SCRAPE
GRADIENT	0.00				
CUT	0.41	0.00			
GRAVE	0.87	0.48	0.00		
PERFORAT	0.91	0.04	0.34	0.00	
SCRAPE	0.05	0.13	0.13	0.22	0.00
SHAVE	0.08	0.23	0.66	0.17	0.00
WEDGE	0.00	0.14	0.86	0.76	0.01
SAW	0.75	0.59	0.10	0.04	0.15
TYPE1	0.01	0.09	0.46	0.44	0.00
TYPE2	0.44	0.10	0.09	0.01	0.01
TYPE3	0.25	0.57	0.59	0.09	0.67
TYPE4	0.87	0.17	0.34	0.07	0.16
EXC	0.72	0.08	0.28	0.02	0.07
GOOD	0.11	0.01	0.68	0.13	0.01
FAIR	0.95	0.39	0.05	0.05	0.06
POOR	0.01	0.21	0.78	0.15	0.00
	SHAVE	WEDGE	SAW	TYPE1	TYPE2
SHAVE	0.00				
WEDGE	0.04	0.00			
SAW	0.40	0.82	0.00		
TYPE1	0.01	0.00	0.49	0.00	
TYPE2	0.00	0.27	0.04	0.05	0.00
TYPE3	0.69	0.33	0.63	0.43	0.48
TYPE4	0.04	0.56	0.61	0.34	0.02
EXC	0.05	0.44	0.10	0.23	0.00
GOOD	0.00	0.02	0.66	0.01	0.01
FAIR	0.14	0.74	0.10	0.24	0.01
POOR	0.00	0.01	0.24	0.00	0.01
	TYPE3	TYPE4	EXC	GOOD	FAIR
TYPE3	0.00				
TYPE4	0.10	0.00			
EXC	0.06	0.00	0.00		
GOOD	0.73	0.03	0.04	0.00	
FAIR	0.85	0.28	0.31	0.31	0.00
POOR	0.75	0.10	0.05	0.00	0.26
	POOR				
POOR	0.00				

TABLE 29.
RESULTS OF CORRELATION TEST 5:
PROBABILITY MATRIX FOR SOUTH AREA

	GRADIENT	CUT	GRAVE	PERFORATE	SCRAPE
GRADIENT	1.00				
CUT	-0.76	1.00			
GRAVE	-0.87	0.82	1.00		
PERFORAT	0.57	-0.13	-0.34	1.00	
SCRAPE	0.61	-0.11	-0.39	0.33	1.00
SHAVE	-0.17	0.64	0.39	0.21	0.58
WEDGE	0.44	0.17	-0.13	0.51	0.92
SAW	-0.65	0.53	0.49	-0.42	-0.21
TYPE1	0.52	0.02	-0.35	0.23	0.96
TYPE2	-0.32	0.70	0.60	0.37	0.24
TYPE3	-0.78	0.74	0.76	-0.18	-0.27
TYPE4	-0.67	0.85	0.88	-0.19	0.03
EXC	-0.62	0.73	0.77	0.01	-0.01
GOOD	0.22	0.24	-0.14	-0.00	0.63
FAIR	0.27	-0.14	-0.43	-0.19	0.30
POOR	0.60	-0.08	-0.41	0.34	0.97
	SHAVE	WEDGE	SAW	TYPE1	TYPE2
SHAVE	1.00				
WEDGE	0.79	1.00			
SAW	0.46	-0.10	1.00		
TYPE1	0.58	0.88	-0.14	1.00	
TYPE2	0.87	0.57	0.37	0.18	1.00
TYPE3	0.59	-0.01	0.83	-0.28	0.72
TYPE4	0.66	0.27	0.33	0.05	0.75
EXC	0.73	0.27	0.54	-0.09	0.89
GOOD	0.31	0.56	-0.31	0.78	-0.00
FAIR	0.00	0.12	0.24	0.48	-0.40
POOR	0.61	0.90	-0.07	0.97	0.23
	TYPE3	TYPE4	EXC	GOOD	FAIR
TYPE3	1.00				
TYPE4	0.67	1.00			
EXC	0.89	0.84	1.00		
GOOD	-0.36	0.21	-0.19	1.00	
FAIR	-0.29	-0.45	-0.55	0.37	1.00
POOR	-0.22	-0.04	-0.06	0.60	0.48
	POOR				
POOR	1.00				

TABLE 30.
RESULTS OF CORRELATION TEST 6:
CORRELATION MATRIX FOR BENCH AREA

	GRADIENT	CUT	GRAVE	PERFORATE	SCRAPE
GRADIENT	0.00				
CUT	0.05	0.00			
GRAVE	0.01	0.02	0.00		
PERFORAT	0.18	0.78	0.45	0.00	
SCRAPE	0.14	0.81	0.39	0.48	0.00
SHAVE	0.72	0.12	0.39	0.66	0.17
WEDGE	0.33	0.71	0.78	0.25	0.00
SAW	0.11	0.22	0.26	0.35	0.65
TYPE1	0.23	0.97	0.44	0.62	0.00
TYPE2	0.48	0.08	0.16	0.41	0.60
TYPE3	0.04	0.06	0.05	0.70	0.56
TYPE4	0.10	0.01	0.01	0.68	0.95
EXC	0.14	0.06	0.04	0.99	0.98
GOOD	0.64	0.60	0.77	1.00	0.13
FAIR	0.56	0.76	0.34	0.69	0.52
POOR	0.16	0.87	0.36	0.46	0.00
	SHAVE	WEDGE	SAW	TYPE1	TYPE2
SHAVE	0.00				
WEDGE	0.04	0.00			
SAW	0.30	0.83	0.00		
TYPE1	0.17	0.01	0.76	0.00	
TYPE2	0.01	0.18	0.41	0.70	0.00
TYPE3	0.16	0.98	0.02	0.54	0.07
TYPE4	0.11	0.55	0.47	0.92	0.05
EXC	0.06	0.56	0.21	0.85	0.01
GOOD	0.50	0.19	0.50	0.04	0.99
FAIR	0.99	0.79	0.60	0.28	0.37
POOR	0.15	0.01	0.89	0.00	0.61
	TYPE3	TYPE4	EXC	GOOD	FAIR
TYPE3	0.00				
TYPE4	0.10	0.00			
EXC	0.01	0.02	0.00		
GOOD	0.42	0.65	0.69	0.00	
FAIR	0.52	0.32	0.20	0.41	0.00
POOR	0.63	0.93	0.90	0.16	0.28
	POOR				
POOR	0.00				

TABLE 31.
RESULTS OF CORRELATION TEST 6:
PROBABILITY MATRIX FOR BENCH AREA

	GRADIENT	CUT	GRAVE	PERFORATE	SCRAPE
GRADIENT	1.00				
CUT	-0.19	1.00			
GRAVE	-0.53	0.20	1.00		
PERFORAT	0.14	0.08	0.05	1.00	
SCRAPE	0.39	0.18	-0.10	0.49	1.00
SHAVE	0.15	0.14	-0.40	0.17	0.73
WEDGE	-0.41	0.10	0.84	0.33	0.26
SAW	0.44	0.36	-0.25	0.27	0.58
TYPE1	0.32	0.68	-0.30	-0.01	0.65
TYPE2	-0.06	0.07	0.45	0.84	0.60
TYPE3	-0.55	0.42	0.83	-0.28	-0.46
TYPE4	-0.52	0.29	0.39	0.24	0.33
EXC	-0.26	0.75	-0.04	0.08	0.42
GOOD	-0.27	0.80	0.40	-0.44	-0.08
FAIR	-0.02	0.35	-0.03	0.53	0.54
POOR	0.41	-0.23	-0.02	-0.14	0.57
	SHAVE	WEDGE	SAW	TYPE1	TYPE2
SHAVE	1.00				
WEDGE	0.00	1.00			
SAW	0.15	-0.13	1.00		
TYPE1	0.61	-0.19	0.68	1.00	
TYPE2	0.25	0.74	0.11	-0.04	1.00
TYPE3	-0.63	0.45	-0.21	-0.21	-0.03
TYPE4	0.58	0.62	-0.37	0.11	0.55
EXC	0.55	0.16	0.46	0.74	0.11
GOOD	-0.01	0.18	0.04	0.49	-0.23
FAIR	0.27	-0.04	0.39	0.39	0.45
POOR	0.37	0.27	0.42	0.32	0.12
	TYPE3	TYPE4	EXC	GOOD	FAIR
TYPE3	1.00				
TYPE4	0.09	1.00			
EXC	0.01	0.46	1.00		
GOOD	0.66	0.27	0.54	1.00	
FAIR	-0.13	0.17	0.22	-0.10	1.00
POOR	-0.28	-0.03	0.16	-0.04	-0.28
	POOR				
POOR	1.00				

TABLE 32.
RESULTS OF CORRELATION TEST 6:
CORRELATION MATRIX FOR CELLAR AREA

	GRADIENT	CUT	GRAVE	PERFORATE	SCRAPE
GRADIENT	0.00				
CUT	0.66	0.00			
GRAVE	0.18	0.63	0.00		
PERFORAT	0.74	0.85	0.90	0.00	
SCRAPE	0.34	0.67	0.81	0.22	0.00
SHAVE	0.71	0.73	0.33	0.68	0.04
WEDGE	0.31	0.81	0.01	0.42	0.54
SAW	0.28	0.38	0.55	0.51	0.14
TYPE1	0.45	0.07	0.47	0.98	0.08
TYPE2	0.89	0.88	0.26	0.01	0.12
TYPE3	0.16	0.30	0.01	0.50	0.25
TYPE4	0.19	0.48	0.34	0.56	0.43
EXC	0.53	0.03	0.93	0.85	0.31
GOOD	0.51	0.02	0.32	0.27	0.84
FAIR	0.96	0.40	0.94	0.17	0.17
POOR	0.32	0.58	0.96	0.75	0.14
	SHAVE	WEDGE	SAW	TYPE1	TYPE2
SHAVE	0.00				
WEDGE	1.00	0.00			
SAW	0.73	0.76	0.00		
TYPE1	0.11	0.65	0.07	0.00	
TYPE2	0.55	0.04	0.80	0.93	0.00
TYPE3	0.09	0.26	0.61	0.62	0.94
TYPE4	0.13	0.10	0.36	0.80	0.16
EXC	0.16	0.70	0.25	0.04	0.79
GOOD	0.98	0.67	0.93	0.22	0.58
FAIR	0.52	0.93	0.34	0.33	0.27
POOR	0.37	0.51	0.30	0.44	0.78
	TYPE3	TYPE4	EXC	GOOD	FAIR
TYPE3	0.00				
TYPE4	0.84	0.00			
EXC	0.98	0.25	0.00		
GOOD	0.07	0.52	0.17	0.00	
FAIR	0.76	0.69	0.60	0.82	0.00
POOR	0.50	0.94	0.71	0.93	0.50
	POOR				
POOR	0.00				

TABLE 33.
RESULTS OF CORRELATION TEST 6:
PROBABILITY MATRIX FOR CELLAR AREA

	GRADIENT	CUT	GRAVE	PERFORATE	SCRAPE
GRADIENT	1.00				
CUT	-0.71	1.00			
GRAVE	-0.34	0.08	1.00		
PERFORAT	-0.08	0.34	0.05	1.00	
SCRAPE	-0.00	-0.12	0.25	0.63	1.00
SHAVE	-0.28	0.22	0.40	0.62	0.86
WEDGE	0.13	-0.38	0.14	-0.58	-0.08
SAW	-0.01	0.27	0.57	0.45	0.31
TYPE1	-0.60	0.38	0.68	0.51	0.71
TYPE2	-0.03	0.06	0.11	0.70	0.94
TYPE3	0.01	0.33	0.66	0.28	-0.01
TYPE4	-0.47	0.86	0.05	0.35	-0.16
EXC	-0.43	0.55	0.80	0.39	0.18
GOOD	-0.66	0.47	0.45	0.53	0.73
FAIR	-0.17	0.09	0.12	0.72	0.95
POOR	0.06	0.08	0.63	0.16	0.26
	SHAVE	WEDGE	SAW	TYPE1	TYPE2
SHAVE	1.00				
WEDGE	-0.06	1.00			
SAW	0.61	-0.22	1.00		
TYPE1	0.86	-0.13	0.51	1.00	
TYPE2	0.91	-0.06	0.39	0.67	1.00
TYPE3	0.20	-0.04	0.75	0.30	0.02
TYPE4	0.28	-0.46	0.57	0.27	0.06
EXC	0.49	-0.23	0.81	0.69	0.20
GOOD	0.84	-0.15	0.31	0.95	0.72
FAIR	0.88	-0.11	0.25	0.72	0.97
POOR	0.57	0.28	0.88	0.44	0.35
	TYPE3	TYPE4	EXC	GOOD	FAIR
TYPE3	1.00				
TYPE4	0.40	1.00			
EXC	0.84	0.59	1.00		
GOOD	0.11	0.27	0.52	1.00	
FAIR	-0.08	0.01	0.17	0.80	1.00
POOR	0.72	0.33	0.68	0.24	0.19
	POOR				
POOR	1.00				

TABLE 34.
RESULTS OF CORRELATION TEST 6:
CORRELATION MATRIX FOR HEARTH/PERIPHERY AREA

	GRADIENT	CUT	GRAVE	PERFORATE	SCRAPE
GRADIENT	0.00				
CUT	0.05	0.00			
GRAVE	0.41	0.85	0.00		
PERFORAT	0.85	0.41	0.90	0.00	
SCRAPE	0.99	0.78	0.55	0.09	0.00
SHAVE	0.50	0.60	0.33	0.10	0.01
WEDGE	0.75	0.36	0.74	0.13	0.85
SAW	0.98	0.52	0.14	0.26	0.46
TYPE1	0.11	0.35	0.07	0.20	0.05
TYPE2	0.95	0.89	0.79	0.05	0.00
TYPE3	0.98	0.43	0.07	0.51	0.97
TYPE4	0.24	0.01	0.91	0.39	0.70
EXC	0.29	0.15	0.02	0.34	0.66
GOOD	0.08	0.24	0.26	0.18	0.04
FAIR	0.68	0.82	0.78	0.04	0.00
POOR	0.89	0.85	0.09	0.71	0.53
	SHAVE	WEDGE	SAW	TYPE1	TYPE2
SHAVE	0.00				
WEDGE	0.89	0.00			
SAW	0.11	0.61	0.00		
TYPE1	0.01	0.77	0.20	0.00	
TYPE2	0.00	0.89	0.34	0.07	0.00
TYPE3	0.64	0.92	0.03	0.47	0.97
TYPE4	0.51	0.25	0.14	0.52	0.88
EXC	0.22	0.58	0.01	0.06	0.64
GOOD	0.01	0.73	0.45	0.00	0.04
FAIR	0.00	0.80	0.55	0.04	0.00
POOR	0.14	0.50	0.00	0.28	0.39
	TYPE3	TYPE4	EXC	GOOD	FAIR
TYPE3	0.00				
TYPE4	0.33	0.00			
EXC	0.01	0.13	0.00		
GOOD	0.80	0.51	0.19	0.00	
FAIR	0.85	0.98	0.70	0.02	0.00
POOR	0.04	0.42	0.06	0.57	0.65
	POOR				
POOR	0.00				

TABLE 35.
RESULTS OF CORRELATION TEST 6:
PROBABILITY MATRIX FOR HEARTH/PERIPHERY AREA

	CUT1	CUT2	CUT3	CUT4	GRAVE1
CUT1	1.000				
CUT2	0.171	1.000			
CUT3	0.090	0.397	1.000		
CUT4	0.243	0.046	-0.043	1.000	
GRAVE1	0.450	0.044	0.128	0.071	1.000
GRAVE2	0.100	0.216	0.409	0.053	0.408
GRAVE3	0.134	-0.096	-0.139	-0.191	0.355
GRAVE4	0.109	0.697	0.512	0.185	0.093
PERF1	0.147	-0.099	-0.190	0.074	0.303
PERF2	-0.125	-0.012	-0.217	0.044	-0.341
PERF3	-0.147	-0.161	-0.107	0.681	-0.088
PERF4	0.062	0.529	0.229	-0.045	0.013
SCR1	0.266	-0.152	-0.272	0.012	-0.005
SCR2	-0.108	-0.022	-0.272	0.569	-0.084
SCR3	0.172	0.420	0.500	0.162	0.040
SCR4	0.157	-0.117	-0.036	-0.203	0.319
SHAV1	0.213	-0.264	-0.403	0.496	-0.038
SHAV2	0.096	0.503	0.393	0.213	-0.086
SHAV3	0.041	0.704	0.615	0.122	-0.121
SHAV4	0.390	-0.139	-0.223	-0.092	0.094
WG1	0.194	-0.193	-0.155	-0.101	-0.127
WG2	-0.086	0.129	-0.065	0.133	0.030
WG3	0.284	-0.004	0.457	-0.147	0.568
WG4	0.284	-0.004	0.457	-0.147	0.568
SAW1	0.270	-0.212	0.019	0.320	0.017
SAW2	.	.	.	.	.
SAW3	.	.	.	.	.
SAW4	.	.	.	.	.
	GRAVE2	GRAVE3	GRAVE4	PERF1	PERF2
GRAVE2	1.000				
GRAVE3	0.229	1.000			
GRAVE4	0.202	-0.095	1.000		
PERF1	0.181	0.666	-0.176	1.000	
PERF2	-0.232	-0.148	-0.284	-0.178	1.000
PERF3	0.064	-0.054	-0.073	0.231	0.032
PERF4	0.286	-0.201	0.282	-0.231	-0.196
SCR1	-0.181	-0.114	-0.311	0.016	0.531
SCR2	0.221	-0.207	-0.129	0.181	0.371
SCR3	0.301	0.238	0.651	0.131	-0.205
SCR4	0.222	0.812	-0.101	0.756	-0.222
SHAV1	-0.098	0.112	-0.208	0.251	0.265
SHAV2	0.243	-0.053	0.591	-0.055	0.150
SHAV3	0.293	-0.075	0.890	-0.137	-0.222
SHAV4	0.002	0.447	-0.153	0.263	-0.065
WG1	-0.120	-0.078	-0.106	-0.052	0.199
WG2	0.361	0.078	0.040	0.024	0.121
WG3	0.619	-0.054	-0.073	-0.100	-0.161
WG4	0.619	-0.054	-0.073	-0.100	-0.161
SAW1	-0.082	0.292	-0.153	0.292	-0.032
SAW2	.	.	.	.	.
SAW3	.	.	.	.	.
SAW4	.	.	.	.	.

TABLE 36.
RESULTS OF CORRELATION TEST 7:
CORRELATION MATRIX ENERGY TYPES I - IV
Table concludes next page.

	PERF3	PERF4	SCR1	SCR2	SCR3
PERF3	1.000				
PERF4	-0.155	1.000			
SCR1	-0.152	-0.390	1.000		
SCR2	0.635	0.044	0.340	1.000	
SCR3	-0.053	0.004	-0.260	-0.158	1.000
SCR4	-0.058	-0.214	-0.100	-0.227	0.214
SHAV1	0.508	-0.350	0.581	0.674	-0.042
SHAV2	0.265	0.151	0.067	0.328	0.560
SHAV3	-0.057	0.297	-0.301	-0.105	0.828
SHAV4	-0.087	-0.103	0.278	-0.014	0.071
WG1	-0.060	-0.224	0.557	0.221	-0.077
WG2	-0.093	0.282	0.032	0.380	0.147
WG3	-0.042	0.112	-0.042	-0.069	-0.053
WG4	-0.042	0.112	-0.042	-0.069	-0.053
SAW1	0.418	-0.324	0.174	0.047	0.020
SAW2	.	.	.	.	.
SAW3	.	.	.	.	.
SAW4	.	.	.	.	.
	SCR4	SHAV1	SHAV2	SHAV3	SHAV4
SCR4	1.000				
SHAV1	-0.042	1.000			
SHAV2	-0.026	0.247	1.000		
SHAV3	-0.079	-0.173	0.681	1.000	
SHAV4	0.405	0.453	0.053	-0.119	1.000
WG1	-0.083	0.562	0.095	-0.083	0.698
WG2	-0.129	0.161	0.041	0.119	-0.194
WG3	-0.058	-0.230	0.025	-0.057	-0.087
WG4	-0.058	-0.230	0.025	-0.057	-0.087
SAW1	0.259	0.382	0.047	-0.120	0.058
SAW2	.	.	.	.	.
SAW3	.	.	.	.	.
SAW4	.	.	.	.	.
	WG1	WG2	WG3	WG4	SAW1
WG1	1.000				
WG2	-0.091	1.000			
WG3	-0.060	-0.093	1.000		
WG4	-0.060	-0.093	1.000	1.000	
SAW1	-0.126	-0.195	-0.087	-0.087	1.000
SAW2	.	.	.	.	.
SAW3	.	.	.	.	.
SAW4	.	.	.	.	.
	SAW2	SAW3	SAW4		
SAW2	1.000				
SAW3	.	1.000			
SAW4	.	.	1.000		

TABLE 36 (concluding page).
RESULTS OF CORRELATION TEST 7:
CORRELATION MATRIX ENERGY TYPES I - IV

	CUT1	CUT2	CUT3	CUT4	GRAVE1
CUT1	0.000				
CUT2	0.414	0.000			
CUT3	0.670	0.049	0.000		
CUT4	0.242	0.827	0.839	0.000	
GRAVE1	0.024	0.835	0.541	0.735	0.000
GRAVE2	0.635	0.299	0.042	0.801	0.043
GRAVE3	0.523	0.647	0.506	0.361	0.081
GRAVE4	0.606	0.000	0.009	0.377	0.659
PERF1	0.484	0.636	0.363	0.726	0.141
PERF2	0.553	0.954	0.299	0.835	0.096
PERF3	0.485	0.443	0.609	0.000	0.675
PERF4	0.769	0.007	0.270	0.831	0.952
SCR1	0.198	0.468	0.189	0.956	0.981
SCR2	0.609	0.917	0.188	0.003	0.690
SCR3	0.410	0.036	0.011	0.440	0.849
SCR4	0.454	0.578	0.865	0.331	0.121
SHAV1	0.308	0.203	0.046	0.012	0.857
SHAV2	0.648	0.010	0.052	0.306	0.682
SHAV3	0.846	0.000	0.001	0.562	0.563
SHAV4	0.054	0.507	0.283	0.660	0.653
WG1	0.353	0.355	0.459	0.631	0.544
WG2	0.682	0.539	0.756	0.526	0.886
WG3	0.168	0.984	0.022	0.483	0.003
WG4	0.168	0.984	0.022	0.483	0.003
SAW1	0.192	0.310	0.929	0.119	0.937
SAW2	.	.	.	.	.
SAW3	.	.	.	.	.
SAW4	.	.	.	.	.

	GRAVE2	GRAVE3	GRAVE4	PERF1	PERF2
GRAVE2	0.000				
GRAVE3	0.272	0.000			
GRAVE4	0.334	0.651	0.000		
PERF1	0.385	0.000	0.401	0.000	
PERF2	0.265	0.480	0.170	0.394	0.000
PERF3	0.760	0.797	0.727	0.266	0.879
PERF4	0.165	0.335	0.171	0.268	0.348
SCR1	0.386	0.587	0.131	0.941	0.006
SCR2	0.288	0.321	0.539	0.386	0.068
SCR3	0.143	0.252	0.000	0.533	0.326
SCR4	0.286	0.000	0.630	0.000	0.285
SHAV1	0.640	0.594	0.318	0.227	0.200
SHAV2	0.242	0.800	0.002	0.796	0.476
SHAV3	0.155	0.723	0.000	0.512	0.286
SHAV4	0.994	0.025	0.467	0.204	0.759
WG1	0.567	0.711	0.614	0.806	0.340
WG2	0.076	0.711	0.849	0.908	0.566
WG3	0.001	0.797	0.727	0.635	0.442
WG4	0.001	0.797	0.727	0.635	0.442
SAW1	0.696	0.157	0.464	0.157	0.880
SAW2	.	.	.	.	.
SAW3	.	.	.	.	.
SAW4	.	.	.	.	.

TABLE 37.
RESULTS OF CORRELATION TEST 7:
PROBABILITY MATRIX ENERGY TYPES I - IV
Table concludes next page.

	PERF3	PERF4	SCR1	SCR2	SCR3
PERF3	0.000				
PERF4	0.459	0.000			
SCR1	0.470	0.054	0.000		
SCR2	0.001	0.836	0.096	0.000	
SCR3	0.801	0.985	0.209	0.452	0.000
SCR4	0.785	0.304	0.635	0.275	0.303
SHAV1	0.010	0.087	0.002	0.000	0.841
SHAV2	0.201	0.470	0.749	0.109	0.004
SHAV3	0.785	0.149	0.143	0.617	0.000
SHAV4	0.681	0.625	0.178	0.947	0.735
WG1	0.775	0.282	0.004	0.289	0.716
WG2	0.657	0.172	0.881	0.061	0.482
WG3	0.843	0.593	0.843	0.743	0.801
WG4	0.843	0.593	0.843	0.743	0.801
SAW1	0.038	0.114	0.406	0.824	0.923
SAW2	.	.	.	.	.
SAW3	.	.	.	.	.
SAW4	.	.	.	.	.
	SCR4	SHAV1	SHAV2	SHAV3	SHAV4
SCR4	0.000				
SHAV1	0.843	0.000			
SHAV2	0.903	0.235	0.000		
SHAV3	0.706	0.409	0.000	0.000	
SHAV4	0.045	0.023	0.802	0.570	0.000
WG1	0.693	0.003	0.652	0.693	0.000
WG2	0.539	0.442	0.846	0.571	0.352
WG3	0.785	0.268	0.905	0.785	0.681
WG4	0.785	0.268	0.905	0.785	0.681
SAW1	0.211	0.060	0.822	0.567	0.782
SAW2	.	.	.	.	.
SAW3	.	.	.	.	.
SAW4	.	.	.	.	.
	WG1	WG2	WG3	WG4	SAW1
WG1	0.000				
WG2	0.666	0.000			
WG3	0.775	0.657	0.000		
WG4	0.775	0.657	0.000	0.000	
SAW1	0.549	0.349	0.679	0.679	0.000
SAW2	.	.	.	.	.
SAW3	.	.	.	.	.
SAW4	.	.	.	.	.
	SAW2	SAW3	SAW4		
SAW2	0.000				
SAW3	.	0.000			
SAW4	.	.	0.000		

TABLE 37 (concluding page).
RESULTS OF CORRELATION TEST 7:
PROBABILITY MATRIX ENERGY TYPES I - IV

AREA	CUT	GR.	PERF.	SCRAPE	SHAVE	WEDGE	SAW	I	II	III	IV	E	G	F	P
NORTH	IV		Scrape	Wedge	Saw III	F	III								
CEN- TRAL	I			Shave I G F	II G F	P		E G F	G	P			F		
SOUTH	G			I II G P	IV G F	I	I								

ABBREVIATIONS:

E = EXCELLENT

G = GOOD

F = FAIR

P = POOR

GR. = GRAVE

PERF. = PERFORATE

I = HAMILTON ENERGY TYPE I

II = HAMILTON ENERGY TYPE II

III = HAMILTON ENERGY TYPE III

IV = HAMILTON ENERGY TYPE IV

Significant correlations are indicated: see Tables 24 - 29 for strength and p values for these correlations.

TABLE 38. SUMMARY RESULTS OF CORRELATION TEST 5.

AREA	CUT	GR.	PERF.	SCRAPE	SHAVE	WEDGE	SAW	I	II	III	IV	E	G	F	P
BENCH	Gr. IV	IV		Wg. I	Wg. II	I	III	G P	E	E	E				
CELLAR	E G	Wg. III	II					E							
HEARTH/ PERIPH.	IV		F	Shave I II G, F	I II G F		III E P	E G F	G F	E P			F		

ABBREVIATIONS:

E = EXCELLENT

G = GOOD

F = FAIR

P = POOR

GR. = GRAVE

PERF. = PERFORATE

Wg. = WEDGE

I = HAMILTON ENERGY TYPE I

II = HAMILTON ENERGY TYPE II

III = HAMILTON ENERGY TYPE III

IV = HAMILTON ENERGY TYPE IV

Significant correlations are indicated: see Tables 30 - 35 for strength and p values for these correlations.

TABLE 39. SUMMARY RESULTS OF CORRELATION TEST 6.

Correlation	r	r²	p
Grave III : Scrape IV	0.81	0.66	0.00
Scrape III : Shave III	0.83	0.69	0.00
Shave IV : Wedge I	0.70	0.49	0.00
Perforate I : Scrape IV	0.76	0.58	0.00
Cut II : Grave IV	0.70	0.49	0.00
Cut II : Shave III	0.70	0.49	0.00
Perforate I : Scrape IV	-0.39	0.15	0.05

TABLE 40. SUMMARY RESULTS OF CORRELATION TEST 7.

CLUSTER	COMMON FACILITY	COMMON AREA	HIGH DENSITY	MODERATE DENSITY	LOW DENSITY
1a	Bench	(one North unit only)	Cut, Shave, Grave, Saw	-	Scrape, Perforate
1b	Benches & Hearth/Per.	North	Cut, Grave	Scrape, Shave	Scrape, Shave
1c	Benches & Hearth/Per.	South and Central	Perforators (in one case)	Most tool types	Most tool types
2a	Cellars	Mixed; Central, South	Scrape	Shave	Cut, Grave
2b	Cellar	(one Central unit only)	Cut, Scrape	Saw	All others
2c	Benches & Hearth/Per.	Mixed; Central, South	Scrape, Shave	Cut	Cut

TABLE 41. SUMMARY RESULTS OF CLUSTER ANALYSIS

FIGURES

FIGURE 1. THE MEIER SITE, 35C05, ON THE LOWER COLUMBIA RIVER, U.S.A.

FIGURE 2. HYPOTHETICAL RECONSTRUCTION OF THE MEIER PLANKHOUSE, BY PROF. K.M. AMES

Detail

- Figures within the plankhouse stand 5' 5" tall.
- Note the hearth boxes aligned on the long axis.
- Detail illustrates circular doorway at the Southern end of the plankhouse.

This rendering was produced at the PSU Laboratory of Archaeology, using AUTOCAD software, by anthropology graduate student Darin Molnar.

FIGURE 3. HYPOTHETICAL RECONSTRUCTION OF THE PLANKHOUSE BY DARIN MOLNAR.

A Chinook house of the Lower Columbia. Note (a) the plank flooring, (b) the storage shelves above the sleeping benches, (c) the fish and other meats drying on a rack over the hearth, which is contained. From Nabokov and Easton, 1990:237.

A Salish house interior on the Southern tip of Vancouver Island. Note (a) the rough symmetry of the architectural features, (b) the discrete partitioning of space with screens and (c) the storage of items near sleeping areas. The bundles suspended from curved poles are cribs. From Nabokov and Easton, 1990:235.

**FIGURE 4. ILLUSTRATIONS OF SOUTHERN NORTHWEST COAST
PLANKHOUSES FROM THE ETHNOGRAPHIC LITERATURE**

**FIGURE 5: MEIER SITE MAP
AND LETTER CODING OF EXCAVATION UNITS.**

UNITS NOT SHOWN:

02 (S30-32, E30-32)

P2 (S40-41, E15-20)

Q2 (S2-N0, E8-10)

Vertical alignments of artifacts are a result
of computer output rounding error, but are
insignificant compared to the pattern
observed here.

**FIGURE 6. ARTIFACT DISTRIBUTION ILLUSTRATING
BENCH, CELLAR AND HEARTH AREAS
(Looking North)**

Vertical alignments of artifacts are result of the same process mentioned in Figure 6.

Note here the 'spikes and troughs' which reflect storage pits at somewhat similar intervals along the long axis of the plankhouse. Such spacing may indicate rough distinctions between family units and their respective storage areas.

**FIGURE 7. ARTIFACT DISTRIBUTION ILLUSTRATING CELLAR / PIT FEATURES.
(Looking East)**

I prepared this illustration as a result of many lines of evidence, including ethnographic references and features encountered during excavation. Whether floor planks ran perpendicular to the house long axis (as seen here) or otherwise is unknown.

- Note the plank-lined pit in the left cellar: there is evidence for this in the Meier excavation features.
- Note that frames for drying near hearths, which are evidenced at Meier, are not shown here.

FIGURE 8. AUTHOR'S HEURISTIC RECONSTRUCTION OF THE MEIER PLANKHOUSE.

For each case, column 1 = HOUSE, 2=MIDDEN,
from left to right

**FIGURE 9. FUNCTIONAL ASSEMBLAGE STRUCTURE
OF THE HOUSE and MIDDEN ASSEMBLAGES.**

For each data type, column 1 = HOUSE, 2=MIDDEN,
from left to right

FIGURE 10. HAMILTON ENERGY TYPE
ASSEMBLAGE STRUCTURE of the HOUSE and
MIDDEN.

For each data type, column 1 = HOUSE, 2=MIDDEN,
from left to right

**FIGURE 11. RAW MATERIAL QUALITY
ASSEMBLAGES STRUCTURE for the HOUSE and
MIDDEN.**

For each data type, column 1 = HOUSE, 2=MIDDEN,
from left to right

FIGURE 12. DENSITY of NUMBER of TOOLS and
NUMBER of TOOL TYPES for HOUSE and MIDDEN.

Column 1 (left) = HOUSE, 2 (right) =MIDDEN

**FIGURE 13. DENSITY OF PROJECTILE POINTS
for HOUSE and MIDDEN.**

FIGURE 14. TOOL MOTIONS USED IN THE EXPERIMENTAL SET. Note that the seventh tool motion recognized in this study, WEDGE, is not represented here.

Modified from Smith 1990:Figure 3.

FIGURE 15. SAMPLES OF THE EXPERIMENTAL TOOLS.
Dots on margins indicate utilized region.

Note the various most common locations of polish and its spatial relation to use-related microflaking.

FIGURE 16. HOLOTYPICAL USE-WEAR FOR SEVEN TOOL MOTIONS.

YIELDING WORKED MATERIAL
(e.g. raw flesh, soft vegetal matter)

1. Microflake scars are small and non-invasive.
2. Polish is invasive and extends beyond microflake scars.

MODERATELY RESISTANT WORKED MATERIAL
(e.g. soft to medium-density wood, tanned hide)

1. Microflake scars are medium-sized and moderately invasive.
2. Polish is moderately invasive but does not often extend beyond microflake scars.

RESISTANT WORKED MATERIAL
(e.g. antler, bone)

1. Microflake scars are large and invasive.
2. Polish is marginal.

= polish

FIGURE 17. HOLOTYPICAL USE-WEAR FOR IDENTIFICATION OF DENSITY OF WORKED MATERIAL. Adapted from Shea, 1991:405.

**FIGURE 18. FUNCTIONAL CLASS STRUCTURE OF
THE MEIER SITE NON-PROJECTILE POINT,
FINE-GRAINED CHIPPED LITHIC ASSEMBLAGE.**

In each case, column 1= Type I, column 2= Type II,
column 3=Type III, column 4=Type IV,
from left to right.

**FIGURE 19. PERCENTAGE COMPOSITION OF
FUNCTIONAL CLASSES BY HAMILTON ENERGY
TYPE.**

FIGURE 20. SAMPLE OF MEIER SITE TOOLS.
(polish indicated where visible in this illustration)

FIGURE 21. METHOD OF OBTAINING GRADIENT SCORES FOR EXCAVATION UNITS.

FIGURE 22.
CLUSTER DENDROGRAM BASED ON DENSITIES OF
SEVEN TOOL TYPES PER EXCAVATION UNIT. See
Figure 5 for excavation unit letter codes.

FIGURE 23.
SPATIAL DISTRIBUTION OF CUT, GRAVE,
PERFORATE AND SCRAPE FUNCTIONAL CLASSES
ON THE PLANKHOUSE GRADIENT.
Excavation Unit Key:
B=Bench, C=Cellar, H=Hearth, P=Periphery

FIGURE 24.
SPATIAL DISTRIBUTION OF SHAVE, WEDGE AND
SAW FUNCTIONAL CLASSES ON THE PLANKHOUSE
GRADIENT.

Excavation Unit Key:
B=Bench, C=Cellar, H=Hearth, P=Periphery.

FIGURE 25.
 SPATIAL DISTRIBUTION OF HAMILTON ENERGY
 TYPES I-IV ON THE
 PLANKHOUSE GRADIENT.
 Excavation Unit Key:
 B=Bench, C=Cellar, H=Hearth, P=Periphery.

FIGURE 26.
SPATIAL DISTRIBUTION OF RAW MATERIAL
QUALITY ON THE PLANKHOUSE GRADIENT.

Excavation Unit Key:
B=Bench, C=Cellar, H=Hearth,
P=Periphery.

FIGURE 27.
SPATIAL DISTRIBUTION OF CUT FUNCTIONAL CLASS,
HAMILTON ENERGY TYPES I-IV, ON THE
PLANKHOUSE GRADIENT.

Excavation Unit Key:

B=Bench, C=Cellar, H=Hearth, P=Periphery.

FIGURE 28.
SPATIAL DISTRIBUTION OF GRAVE FUNCTIONAL CLASS,
HAMILTON ENERGY TYPES I-IV, ON THE
PLANKHOUSE GRADIENT.

Excavation Unit Key:

B=bench, C=Cellar, H=Hearth, P=Periphery.

FIGURE 29.
SPATIAL DISTRIBUTION OF PERFORATE FUNCTIONAL
CLASS, HAMILTON ENERGY TYPES I-IV, ON THE
PLANKHOUSE GRADIENT.

Excavation Unit key:

B=Bench, C=Cellar, H=Hearth, P=Periphery.

FIGURE 30.
SPATIAL DISTRIBUTION OF SCRAPE FUNCTIONAL
CLASS, HAMILTON ENERGY TYPES I-IV, ON
PLANKHOUSE GRADIENT.

Excavation Unit Key:

B=Bench, C=Cellar, H=Hearth, P=Periphery.

FIGURE 31.
SPATIAL DISTRIBUTION OF SHAVE FUNCTIONAL CLASS,
HAMILTON ENERGY TYPES I-IV, ON THE PLANKHOUSE
GRADIENT. Excavation Unit Key:
B=Bench, C=Cellar, H=Hearth, P=Periphery.

FIGURE 32.
SPATIAL DISTRIBUTION OF WEDGE FUNCTIONAL CLASS,
HAMILTON ENERGY TYPES I-IV, ON
THE PLANKHOUSE GRADIENT.

Excavation Unit Key:
B=Bench, C=Cellar, H=Hearth, P=Periphery.

FIGURE 33.
SPATIAL DISTRIBUTION OF SAW FUNCTIONAL CLASS,
HAMILTON ENERGY TYPES I-IV, ON THE
PLANKHOUSE GRADIENT.

Excavation Unit Key:

B=Bench, C=Cellar, H=Hearth, P=Periphery.

In each area, column 1=CUT, 2=GRAVE, 3=PERFORATE, 4=SCRAPE, 5=SHAVE, 6=WEDGE, 7=SAW, from left to right.

FIGURE 34. FUNCTIONAL CLASS ASSEMBLAGE STRUCTURE IN NORTH, CENTRAL AND SOUTH ANALYTICAL AREAS.

In each area, column 1=TYPE I, 2=TYPE II, 3=TYPE III,
4=TYPE IV, from left to right.

**FIGURE 35. HAMILTON ENERGY TYPE ASSEMBLAGE
STRUCTURE IN NORTH, CENTRAL AND SOUTH
ANALYTICAL AREAS.**

In each area, column 1=EXCELLENT, 2=GOOD, 3=FAIR, 4=POOR, from left to right.

**FIGURE 36. RAW MATERIAL QUALITY ASSEMBLAGE
STRUCTURE IN NORTH, CENTRAL AND SOUTH
ANALYTICAL AREAS.**

In each area, column 1=CUT, 2=GRAVE, 3=PERFORATE, 4=SCRAPE, 5=SHAVE, 6=WEDGE, 7=SAW, from left to right.

**FIGURE 37. FUNCTIONAL ASSEMBLAGE STRUCTURE
IN BENCH, CELLAR AND HEARTH/PERIPHERY
ANALYTICAL AREAS.**

In each area, column 1=TYPE I, 2=TYPE II, 3=TYPE III,
4=TYPE IV, from left to right.

**FIGURE 38. HAMILTON ENERGY TYPE ASSEMBLAGE
STRUCTURE IN BENCH, CELLAR AND
HEARTH/PERIPHERY ANALYTICAL AREAS.**

In each area, column 1=EXCELLENT, 2=GOOD, 3=FAIR, 4=POOR,
from left to right.

**FIGURE 39. RAW MATERIAL QUALITY ASSEMBLAGE
STRUCTURE IN BENCH, CELLAR AND
HEARTH/PERIPHERY ANALYTICAL AREAS.**

Note that while these are preliminary count data -- representing only the large southern excavation area -- it is clear that the same general distribution occurred in the northern area of the plankhouse.

FIGURE 40. DISTRIBUTION OF DEBITAGE IN BENCH, CELLAR AND HEARTH/PERIPHERY AREAS

FIGURE 41. CORRELATION OF n CHIPPED LITHICS
and EXCAVATION VOLUME, for ALL EXCAVATION
UNITS.

FIGURE 42. CORRELATION OF n CHIPPED LITHICS and EXCAVATION VOLUME, for EXCAVATION UNITS WITHIN THE PLANKHOUSE ONLY.

APPENDICES

APPENDIX I

533 Artifacts Classified, Including
Artifacts Observed for Use-Wear Traces,
With General Comments

CATALOG #	HAMILTON TYPE	SMITH TYPE	GENERAL USE-WEAR COMMENTS
12798	SD. SHAV	SHAVE	-
12799	IUF	-	-
12800	CUT	CUT	-
12802	SHAV	SHAVE	also perforation wear
12803	SHAV	SCRAPE	scrape hard animal likely
12804	GRAV	GRAVE	heavily worn
12805	PRF	PEROFRATE	broken, some scraping wear
12806	SHAV	SHAVE	also scrape likely, probably wood
12807	SHAV	SHAVE	heavy use, rounding
12808	CUT	CUT	cut medium to yielding
12809	SD.SCR	SCRAPE	-
12810	IUF	-	-
12811	KNIF	KNIFE	cut medium animal likely
12812	E.SCR	SCRAPE	hafted likely
12813	SHAV	SHAVE	-
12814	SAW	SAW	-
12815	E.SCR	SCRAPE	broken, hafted end scraper
12816	GRAV	GRAVE	also some scrape
12817	GRAV	GRAVE	also some shave
12818	SHAV	SHAVE	very little use
12819	ST.SCR	SCRAPE	heavy duty work; bone / antler?
12820	PRF	PERFORATE	-
12821	SHAV	SHAVE	rounded; heavy use
12822	CUT	CUT	polish faint
12823	CUT	CUT	cut medium / yielding
12824	SDSHAV	SHAVE	-
12825	CUT	CUT	Type I unmodified flake
12826	SHAV	SHAVE	-
12827	SHAV	SHAVE	also cut/incise medium animal?
12828	CUT	CUT	-
12829	CUT	CUT	also light shave?
12830	IBF	-	-
12831	SHAV	SHAVE	-
12832	PRF	PERFORATE	very little use
12833	CUT	indet.	possible but wear inconclusive
12834	E.SCR	SCRAPE	exhausted end scraper, haft marks
12835	GRAV	GRAVE	nice example of graver
12836	IBF	-	-

APPENDIX I
533 Artifacts Classified, Including Artifacts
Observed for
Use-Wear Traces, with General Comments

CATALOG #	HAMILTON TYPE	SMITH TYPE	GENERAL USE-WEAR COMMENTS
12837	IBF	-	-
12839	GRAV	GRAVE	preform
12840	IBF	-	-
12841	GRAV	GRAVE	-
12842	IBF	-	-
12843	E.SCR	SCRAPE	light use only
12846	ST.SCR	SCRAPE	good example of Type I scraper
12852	IUF	-	-
12853	CUT	CUT	-
12854	ST.SCR	SCRAPE	also shave
12855	SHAV	SCRAPE	angular core frag, opportunistic use
12856	IUF	-	-
12857	IBF	-	-
12867	SHAV	SHAV	-
12868	IUF	-	-
12871	IBF	-	-
12872	IBF	-	-
12873	IBF	-	-
12874	IUF	-	-
12875	IUF	-	-
12876	IUF	-	-
12877	COR.FRQ	-	-
12878	IUF	-	-
12879	CUT	CUT	-
12880	CUT	CUT	-
12881	KNIF	CUT	-
12882	KNIF	CUT	good example of invasive polish
12883	IUF	-	-
12884	ST.SCR	SCRAPE	expedient scraper
12885	E.SCR	SCRAPER	hafted, not exhausted
12886	PRF	PERFORATE	-
12891	CUT	CUT	-
12892	SDSHAV	SHAVE	-
12892	IUF	-	-
12893	PRF	PERFORATE	-
12894	ST.SCR	SCRAPE	-
12895	SHAV	SHAVE	-
12896	IUF	-	-
12897	CUT	indet	-
12898	IUF	-	-
12899	IBF	-	-

APPENDIX I
533 Artifacts Classified, Including Artifacts
Observed for
Use-Wear Traces, with General Comments

CATALOG #	HAMILTON TYPE	SMITH TYPE	GENERAL USE-WEAR COMMENTS
12900	SHAV	SHAVE	broken
12951	CUT	CUT	resharpened
12955	IUF	-	-
12956	CUT	CUT	-
12957	CUT	CUT	-
12958	CUT	CUT	good invasive polish
12963	IBF	-	-
12964	SAW	SAW	broken
12965	COR.FRG	-	-
12967	SHAV	SHAV	also cut
12968	PRF	PERFORATE	also cut?
12969	SHAV	SHAVE	good example of Type I expedient
12970	IBF	-	-
12976	IBF	-	-
12977	SHAV	SHAVE	also perforate and some grave/incise
12978	CUT	CUT	-
12979	IUF	-	-
12980	SHAV	SHAVE	-
12981	CUT	CUT	-
12989	CUT	CUT	-
13013	SDSHAV	SHAVE	also scrape
13037	SDSHAV	SHAVE	excellent example of shaving+polish
13038	IBF	-	-
13040	IBF	-	-
13139	IBF	-	-
13750	COR.FRG	-	-
13751	SHAV	SHAV	thin, delicate blade
13752	KNIF	CUT	broken
13753	GRAV	GRAVE	good polish example
13754	COR.FRG	-	-
13755	WG	WEDGE	also saw possible? but unlikely
13756	CUT	CUT	-
13757	COR.FRG	-	-
13758	SDSHAV	SHAVE	also grave
13759	CUT	CUT	polish faint
13761	ST.SCR	SCRAPE	light use
13765	GRAV	GRAVE	-
13766	IBF	-	-
13767	IUF	-	-
13768	GRAV	GRAVE	broken grave bit

APPENDIX I
533 Artifacts Classified, Including Artifacts
Observed for
Use-Wear Traces, with General Comments

CATALOG #	HAMILTON TYPE	SMITH TYPE	GENERAL USE-WEAR COMMENTS
13769	ST.SCR	CUT	incision / cutting medium to yielding
13770	SHAV	SCRAPE	expedient scraping tool
13771	PRF	PERFORATE	interesting, multifunctional
13774	CUT	CUT	also light scrape?
13775	IBF	-	-
13777	ST.SCR	SCRAPE	-
13778	IBF	-	-
13780	SHAV	SHAVE	also some scrape
13781	IBF	-	-
13782	CUT	CUT	-
13783	SR.SCR	SCRAPE	serrated; interesting piece
13785	ST.SCR	SCRAPE	-
13786	WG	WEDGE	good wedge polish on many surfaces
13787	CUT	CUT	-
13791	GRAV	GRAVE	also shave on long edge; multifunctional
13792	IBF	-	-
13793	IBF	-	-
13796	KNIF	indet	use-wear difficult; reworked?
13797	IBF	-	-
13798	E.SCR	SCRAPE	excellent use- and haft-polish
13800	ST.SCR	SCRAPE	-
13801	ST.SCR	SCRAPE	also graver preform?
13802	IBF	-	-
13805	ST.SCR	SCRAPE	-
13806	debitage	CUT	light cutting wear
13810	CUT	CUT	scrape also probable
13811	GRAV	indet	preform likely but use-wear poor
13812	CUT	CUT	blade-like
13813	IUF	-	-
13814	ST.SCR	SCRAPE	nice eample
13816	IBF	-	-
13839	IBF	-	-
13845	IBF	-	-
13890	IBF	-	-
13892	E.SCR	SCRAPE	exhausted end-scraper bit
13893	SHAV	SHAVE	-
13894	CUT	indet	heat treatment; any wear obliterated

APPENDIX I
533 Artifacts Classified, Including Artifacts
Observed for
Use-Wear Traces, with General Comments

CATALOG #	HAMILTON TYPE	SMITH TYPE	GENERAL USE-WEAR COMMENTS
13895	ST.SCR	SCRAPE	heavy scrape on hard animal
13896	IUF	-	-
13897	SHAV	SHAVE	-
13898	IUF	-	-
13903	IUF	-	-
13905	IBF	-	-
13906	debitage	SCRAPE	bipolar core splinter
13910	IBF	-	-
13911	IBF	-	-
13912	IBF	-	-
13913	IUF	-	-
13914	CUT	indet	detect no use-wear; LPP frag?
13915	CUT	CUT	light use
13916	IBF	-	-
13917	CUT	indet	quartzite; poor for use-wear
13918	CUT	CUT	also light scrape
13919	GRAV	GRAVE	also light scrape; diverse wear
13920	IBF	-	-
13921	SHAV	SHAVE	quartzite; poor use-wear, but is shaver
13922	COR.FRG	-	-
13923	IUF	-	-
13924	IUF	-	-
13926	PRF	PERFORATE	recycled biface (LPP?) probable
13927	ST.SCR	SCRAPE	very light duty scrape, or scrape yielding
13963	GRAV	GRAVE	-
13965	IBF	-	-
13966	IBF	-	-
13967	IBF	-	-
14022	IBF	-	-
14023	IBF	-	-
14042	IBF	-	-
14043	IBF	-	-
14045	GRAV	GRAVE	good example of expedient graving tool
14046	IBF	-	-
14047	IUF	-	-
14048	CUT	CUT	light cut of yielding animal; likely flesh

APPENDIX I
533 Artifacts Classified, Including Artifacts
Observed for
Use-Wear Traces, with General Comments

CATALOG #	HAMILTON TYPE	SMITH TYPE	GENERAL USE-WEAR COMMENTS
14049	CUT	indet	raw material poor for use- wear
14050	IBF	-	-
14051	IBF	-	-
14052	IBF	-	-
14053	IBF	-	-
14054	IBF	-	-
14055	KNIF	CUT	nice Type IV cutter / knife example
14056	ST.SCR	SCRAPE	steep microflake scars; dynamic action?
14057	E.SCR	SCRAPE	broken, exhausted end- scraper
14058	IBF	-	-
14059	E.SCR	SCRAPE	broken, exhausted end- scraper
14060	SDSHAV	SHAVE	-
14061	CUT	CUT	good example of invasive polish
14062	IUF	-	-
14063	IUF	-	-
14064	IUF	-	-
14065	SHAV	SHAVE	-
14066	CUT	CUT	-
14067	IUF	-	-
14068	ST.SCR	SCRAPE	scrape hard animal
14069	IBF	-	-
14070	IBF	-	-
14071	ST.SCR	SCRAPE	single occurrence of use?
14072	KNIF	CUT	recycled LPP?
14073	CUT	CUT	scrape also
14074	ST.SCR	SCRAPE	cut also with long element
14075	IBF	-	-
14076	GRAV	GRAVE	-
14077	CUT	CUT	excellent invasive polish, yielding cutter
14078	IBF	-	-
14079	ST.SCR	SCRAPE	-
14080	IUF	-	-
14081	IBF	-	-
14082	IUF	-	-
14083	SHAVE	CUT	cut medium animal; leather / hide?
14084	IUF	-	-

APPENDIX I
533 Artifacts Classified, Including Artifacts
Observed for
Use-Wear Traces, with General Comments

CATALOG #	HAMILTON TYPE	SMITH TYPE	GENERAL USE-WEAR COMMENTS
14085	SHAV	SHAVE	-
14086	IUF	-	-
14087	SHAV	indet	possible expedient use as wedge? indet.
14088	CUT	CUT	thin blade
14089	IBF	-	-
14090	CUT	CUT	prominent polish stripes as from leather
14091	IBF	-	-
14092	IBF	-	-
14093	IUF	-	-
14094	IUF	-	-
14095	SHAV	SHAVE	cut also likely; highly developed polish
14096	IUF	-	-
14097	IBF	-	-
14098	IBF	-	-
14099	IBF	-	-
14100	CUT	CUT	-
14102	IBF	-	-
14104	ST.SCR	SCRAPE	developed unifacial polish
14105	SHAV	SHAVE	heavily rounded and polished as wood tool
14106	CUT	CUT	nice bifacial microflake scars
14107	IBF	-	-
14108	CUT	CUT	cut yielding
14109	IUF	-	-
14110	ST.SCR	SCRAPE	notch / spokeshave form; scrape
14111	IUF	-	-
14112	IUF	-	-
14113	IBF	-	-
14114	IBF	-	-
14115	IBF	-	-
14116	SHAV	SHAVE	also light scrape
14117	E.SCR	SCRAPE	reduced end-scraper? pointed working end
14118	CUT	CUT	heavily polished, cut medium, leather?
14120	IUF	-	-
14124	SHAV	CUT	cut and possible light scrape
14125	CUT	CUT	very prominent polish

APPENDIX I
533 Artifacts Classified, Including Artifacts
Observed for
Use-Wear Traces, with General Comments

CATALOG #	HAMILTON TYPE	SMITH TYPE	GENERAL USE-WEAR COMMENTS
14126	IUF	-	-
14127	SHAV	CUT	prominent longitudinal polish as from leather
14128	IBF	-	-
14129	SDSHAV	SHAVE	-
14130	IUF	-	-
14133	IUF	-	-
14163	KNIF	CUT	large biface
14190	IBF	-	-
14191	IBF	-	-
14194	IBF	-	-
14195	SHAV	SHAVE	-
14196	IBF	-	-
14197	IBF	-	-
14198	E.SCR	SCR	exhausted end scraper, snapped at haft likely
14199	ST.SCR	SCR	-
14209	SHAV	SHAVE	-
14210	IBF	-	-
14211	IBF	-	-
14212	SHAV	SHAVE	invasive / flake-ridge polish = yielding material
14214	PRF	PERFORATE	good polish example
14215	IUF	-	-
14216	CUT	CUT	prominent invasive bifacial polish
14217	CUT	CUT	prominent bifacial polish + rounding = cut medium
14218	IBF	-	-
14219	IBF	-	-
14220	CUT	indet	
14221	CUT	indet	
14222	CUT	CUT	invasive polish
14223	CUT	CUT	-
14224	CUT	SCRAPE	delicate, but with scraping wear and polish
14225	SHAV	SHAVE	also some scraping
14226	IBF	-	-
14227	E.SCR	SCRAPE	
14228	IBF	-	-
14231	SHAV	SHAVE	highly developed polish, some scraping also
14232	SDSCR	SCRAPE	also shave
14233	COR.FRG	-	-

APPENDIX I
533 Artifacts Classified, Including Artifacts
Observed for
Use-Wear Traces, with General Comments

CATALOG #	HAMILTON TYPE	SMITH TYPE	GENERAL USE-WEAR COMMENTS
14234	COR.FRG	-	-
14235	IBF	-	-
14238	IBF	-	-
14239	IBF	-	-
14240	IBF	-	-
14242	PRF	PERFORATE	punch / awl as well as some rotary action
14243	GRAV	GRAVE	-
14245	CUT	CUT	also grave / incise
14246	SDSCR	SCRAPE	prominent polish; also some graving / incision work
14247	CUT	CUT	serrated, delicate blade, some incision work
14248	SDSHAV	SHAVE	prominent polish, also grave / incise with tip
14249	CUT	CUT	possible graver preform used expediently as cutter
14250	GRAV	GRAVE	prominent polish, some scrape also likely
14251	SHAV	SHAVE	good polish and prominent rounding
14252	IBF	-	-
14255	GRAV	GRAVE	relatively large, possibly two graving bits
14258	SHAV	SHAVE	also graving / incision; prominent polish
14260	SHAV	SHAVE	unique form; 'end-shaver'?, prominent polish
14261	IBF	-	-
14266	IBF	-	-
14268	GRAV	GRAVE	perforation also?
14269	GRAV	GRAVE	-
14271	IUF	-	-
14273	ST.SCR	SHAVE	prehension polish apparent; grave also with tip
14274	SHAV	SHAVE	scrape also; made from bipolar core flake
14275	SDSHAV	SHAVE	also cut; possible tip detached from shaver
14293	CUT	CUT	very large; wear suggests to wood tool
14297	CUT	CUT	faint invasive polish

APPENDIX I
533 Artifacts Classified, Including Artifacts
Observed for
Use-Wear Traces, with General Comments

CATALOG #	HAMILTON TYPE	SMITH TYPE	GENERAL USE-WEAR COMMENTS
14300	SHAV	SHAVE	work @ low angle (e.g. planing); isolated polish = antler?
14303	SHAV	indet	heat treatment obliterates any possible use-wear
14305	SHAV	SHAVE	-
14306	WG	WEDGE	prominent polish
14310	CUT	CUT	also incise / light grave with tip
14312	ST.SCR	SCRAPE	marginal polish suggests rather hard worked material
14313	SHAV	SHAVE	also expedient grave / incision work
14314	SHAV	SHAVE	bipolar core blade; also some light graving / incision
14315	SHAV	SHAVE	also graver work
14316	CUT	CUT	cut yielding animal, e.g. flesh
14317	SDSHAV	SHAVE	-
14318	SDSHAV	SHAVE	-
14319	SHAV	indet	small piece of larger tool likely, no use-wear present
14320	SHAV	SHAVE	also light graving / incision work
14321	PRF	PERFORATE	-
14322	IBF	-	-
14324	CUT	CUT	highly developed moderately invasive polish
14326	ST.SCR	SCRAPE	-
14328	SAW	SAW	prominent rounding
14329	COR.FRG	-	-
14330	CUT	CUT	-
14331	WG	WEDGE	-
14332	IBF	-	-
14333	IUF	-	-
14334	IUF	-	-
14336	CUT	CUT	-
14337	CUT	CUT	-
14338	SDSHAV	SHAVE	small piece likely broken from larger complete shaver
14339	SHAV	SHAVE	-
14340	CUT	CUT	invasive polish indicating yielding worked material

APPENDIX I
533 Artifacts Classified, Including Artifacts
Observed for
Use-Wear Traces, with General Comments

CATALOG #	HAMILTON TYPE	SMITH TYPE	GENERAL USE-WEAR COMMENTS
14341	IBF	-	-
14342	IUF	-	-
14343	SDSHAV	SHAVE	prominent polishing; hafting or prehension traces obvious
14344	IUF	-	-
14345	IBF	-	-
14346	IBF	-	-
14347	IUF	-	-
14348	CUT	CUT	-
14349	CUT	CUT	-
14350	SHAV	indet	late retouch may have eliminated use-wear
14351	CUT	CUT	some rounding suggests medium density worked material
14352	SHAV	indet	basalt raw material makes identification impossible
14353	SHAV	SHAVE	-
14354	CUT	CUT	-
14355	SHAV	-	deartifact
14356	CUT	CUT	-
14358	ST.SCR	SCRAPE	-
14359	WG	WEDGE	prominent polish on many facets
14360	SDSHAV	SHAVE	also perforation tool with invasive polish on many facets
14361	CUT	CUT	-
14363	CUT	CUT	broken cutting / incising tool
14366	SDSHAV	SCRAPER	also perforation work
14367	SHAV	SHAV	-
14368	CUT	CUT	-
14371	WG	WEDGE	excellent example of wedge
14372	SHAV	SHAVE	broken
14373	IUF	-	-
14374	CUT	indet	no use-wear evident
14375	WG	indet	no conclusive use-wear evident, though possible preform
14376	IUF	-	-
14377	SHAV	SHAVE	hafting traces, moderately invasive polish

APPENDIX I
533 Artifacts Classified, Including Artifacts
Observed for
Use-Wear Traces, with General Comments

CATALOG #	HAMILTON TYPE	SMITH TYPE	GENERAL USE-WEAR COMMENTS
14404	E.SCR	SCRAPE	also wedging wear, or hafting wear mimics wedge- wear
14405	IBF	-	-
14406	CUT	CUT	-
14407	CUT	CUT	-
14408	SHAV	SHAVE	-
14409	PRF	PERFORATE	broken non-rotary perforation tool bit
14410	E.SCR	SCRAPE	broken, exhausted bit of hafted tool; rounding
14411	SHAV	SHAVE	some graving / incision with tip also
14412	CUT	SHAVE	moderately invasive and prominent polish
14413	SHAV	SHAVE	possible hafting or prehension traces
14414	CUT	CUT	-
14415	CUT	CUT	-
14416	CUT	CUT	'fluidic' polish + rounding suggest yielding vegetal cutting
14417	CUT	CUT	-
14418	CUT	CUT	faint, very invasive polish suggests yielding animal
14419	IBF	-	-
14420	CUT	CUT	marginal polish suggests rather resistant worked material
14421	PRF	PERFORATE	rotary action
14425	IBF	-	-
14427	GRAV	GRAV	-
14428	KNIF	CUT	large bifacial cutting tool with point and incision wear
14429	IBF	-	-
14430	IBF	-	-
14431	CUT	CUT	invasive bifacial polish prominent
14432	IBF	-	-
14433	CUT	indet	likely trampling mimics use- wear; no polish
14434	E.SCR	indet	very small (2cm) end-scraper shape; toy? or exhausted?
14435	IBF	-	-

APPENDIX I
533 Artifacts Classified, Including Artifacts
Observed for
Use-Wear Traces, with General Comments

CATALOG #	HAMILTON TYPE	SMITH TYPE	GENERAL USE-WEAR COMMENTS
14436	CUT	CUT	-
14437	SDSHAV	SHAVE	prominent polish
14438	PRF	PERFORATE	-
14439	E.SCR	indet	highly developed polish but small size = indeterminate use
14440	CUT	CUT	-
14441	IBF	-	-
14443	IBF	-	-
14444	IBF	-	-
14444	KNIF	CUT	-
14445	CUT	CUT	-
14446	SDSHAV	SHAVE	some organic residue remains
14447	CUT	CUT	-
14448	IBF	-	-
14449	IBF	-	-
14450	CUT	CUT	-
14451	CUT	indet	trampling wear likely mimcs use-wear
14452	CUT	CUT	also light grave or incise, highly developed polish
14453	CUT	CUT	-
14454	CUT	CUT	-
14455	GRAV	GRAVE	multifunctional: includes scraping and sawing traces
14456	E.SCR	SCRAPE	whole, exhausted end-scraper bit
14457	CUT	CUT	-
14458	SHAV	SHAVE	-
14459	CUT	SHAVE	delicate but shave, not cut
14460	SAW	SAW	-
14461	IBF	-	-
14463	ST.SCR	SHAVE	-
14464	KNIF	CUT	-
14465	HF.SCR	SHAVE	steep utilized edge, but shaving very likely; hafted, whole
14466	CUT	CUT	-
14467	CUT	CUT	-
14468	KNIF	CUT	very nice example of large Type IV cutting tool (knife)
14469	SHAVER	CUT	prominent invasive polish
14470	IBF	-	-
14471	CUT	CUT	-

APPENDIX I
533 Artifacts Classified, Including Artifacts
Observed for
Use-Wear Traces, with General Comments

CATALOG #	HAMILTON TYPE	SMITH TYPE	GENERAL USE-WEAR COMMENTS
14472	IBF	-	-
14473	E.SCR	SCRAPE	-
14474	IBF	-	-
14475	CUT	indet	trampling may mimic use-wear here
14476	PRF	PERFORATE	small (2cm), good Type III perforator example
14477	ST.SCR	SCRAPE	light-duty use, scrape yielding vegetal, e.g. soft wood?
14478	KNIF	CUT	-
14480	GRAV	GRAVE	recycled piece, excellent example
14481	SHAV	SHAVE	also light saw possible; cut yielding vegetal likely
14482	CUT	CUT	-
14483	SHAVE	GRAVE	also light duty wedging and sawing likely
14484	PRF	PERFORATE	also some cutting on elongate edge
14485	KNIF	CUT	delicate blade; likely cut yielding, polish suggests animal
14486	IUF	-	-
14487	CUT	CUT	-
14488	SHAV	indet	large, unmodified; use-wear not present, possible preform
14490	CUT	CUT	-
14491	ST.SCR	SCRAPE	isolated, marginal polish spots suggest scrape dense
14492	IBF	-	-
14493	ST.SCR	SCRAPE	possibly recycled wedge
14495	ST.SCR	SCRAPE	light duty scrape, e.g. soft wood, fish or bark?
14496	CUT	CUT	hafting traces, microblade form, very invasive polish
14497	IBF	-	-
14498	CUT	CUT	-
14499	SHAV	SHAVE	hafting polish and use-wear polish
14500	IBF	-	-
14501	CUT	CUT	-

APPENDIX I
533 Artifacts Classified, Including Artifacts
Observed for
Use-Wear Traces, with General Comments

CATALOG #	HAMILTON TYPE	SMITH TYPE	GENERAL USE-WEAR COMMENTS
14502	SDSHAV	SHAVE	moderately invasive polish similar to wood polish
14503	SHAV	PERF	shaver recycled into perforator
14504	IBF	-	-
14505	CUT	indet	no use-wear
14506	IBF	-	-
14507	CUT	CUT	-
14508	CUT	indet	no use-wear evident; microflaking is incidental
14509	SHAV	SHAVE	-
14510	IBF	-	-
14511	IBF	-	-
14512	IBF	-	-
14514	SHAV	indet	possible LPP fragment; no apparent use-wear
14515	IBF	-	-
14516	CUT	CUT	diagnostic invasive polish; also some 'bone strike' polish?
14517	SR.SCR	indet	unique use-wear; longitudinal abrasion?
14518	IBF	-	-
14519	PRF	GRAVE	some perforation, but mostly graving based on microflaking
14520	IBF	-	-
14521	CUT	CUT	multifunctional; also non- rotary perforation and scraping
14522	ST.SCR	indet	possibly battered core frag / angular waste
14523	CUT	CUT	hafting or prehension wear; rounding
14524	CUT	indet	use-wear absent
14525	GRAV	GRAVE	grave medium-hard; likel wood or bone; excellent example
14526	WG	WEDGE	bipolar core product
14527	IBF	-	-
14528	GRAV	GRAVE	heavy duty graving, likely hard animal e.g. antler
14529	PRF	PERFORATE	-

APPENDIX I
533 Artifacts Classified, Including Artifacts
Observed for
Use-Wear Traces, with General Comments

CATALOG #	HAMILTON TYPE	SMITH TYPE	GENERAL USE-WEAR COMMENTS
14530	ST.SCR	SCRAPE	rhomboid bladelet; rounding suggests resistant material
14531	SDSHAV	SHAVE	-
14532	ST.SCR	SCRAPE	light duty
14533	IBF	-	-
14534	CUT	indet	use-wear absent
14535	CUT	CUT	bladelet-like; both invasive and isolated patches of polish
14536	IBF	-	-
14537	CUT	CUT	also light grave suggests incision with tip; invasive polish
14538	CUT	indet	heat treatment obliterates any use-wear
14539	CUT	CUT	-
14540	SHAV	indet	small piece of larger shaver? no use-wear, however
14541	indet	indet	too small for useful usw-wear traces, or none existed
14542	SDSHAV	SHAVE	shave at relatively high angle; marginal polish evident
14543	SHAV	SHAVE	-
14545	CUT	CUT	-
14546	CUT	CUT	delicate blade; also marginal polish and scrape flaking
14547	COR.FRG	-	-
14548	COR.FRG	-	-
14549	PRF	PERFORATE	-
14550	CUT	CUT	-
14551	SHAV	SHAVE	also some perforation
14552	CUT	CUT	-
14553	COR.FRG	-	-
14554	PRF	PERFORATE	-
14556	IBF	-	-
14557	KNIF	CUT	-
14558	IBF	-	-
14559	SHAV	SHAVE	-

APPENDIX I
533 Artifacts Classified, Including Artifacts
Observed for
Use-Wear Traces, with General Comments

APPENDIX II

List of 1,093 Non-Projectile Point,
Fine-Grained Chipped Lithic Atrifacts
From Which
Use-Wear Samples Were Drawn

EXC. UNIT	CATALOG #	HAMILTON TYPE	SMITH THPE	LEVEL	QUAD/ FEATURE	E. T.	R. Q.
a	14498	CUT	CUT	2	se	1	2
a	14496	CUT	CUT	2	se	2	2
a	14475	CUT	CUT	3	nw	1	3
a	14487	CUT	CUT	3	ne	1	2
a	14490	CUT	CUT	3	ne	1	2
a	14536	CUT	CUT	3	se	3	2
a	14516	CUT	CUT	4	se	1	2
a	14521	CUT	CUT	4	sw	1	1
a	14535	CUT	CUT	4	sw	1	2
a	14501	CUT	CUT	4	se	3	2
a	14471	CUT	CUT	5	f379	1	1
a	14507	CUT	CUT	5	se	1	2
a	14485	KNIF	CUT	5	sw	3	2
a	14478	KNIF	CUT	5	nw	4	2
a	14407	CUT	CUT	6	sw/f461	1	2
a	14482	CUT	CUT	6	se	3	2
a	14406	CUT	CUT	7	sw	1	2
a	14523	CUT	CUT	p	nw	2	2
a	14537	CUT	CUT	p	sw	2	1
a	14480	GRAV	GRAVE	2	sw	2	2
a	14519	PRF	GRAVE	7	se	2	3
a	14528	GRAV	GRAVE	7	ne	2	2
a	14525	GRAV	GRAVE	8	se/f450	1	2
a	14483	SHAVE	GRAVE	8	se/f450	4	2
a	14505	CUT	indet	2	sw	2	1
a	14508	CUT	indet	3	nw	1	2
a	14534	CUT	indet	3	se	1	2
a	14538	CUT	indet	3	se	1	2
a	14517	SR.SCR	indet	3	ne	4	2
a	14488	SHAV	indet	4	nw	1	2
a	14522	ST.SCR	indet	5	nw	2	2
a	14524	CUT	indet	8	ne/f453	4	2
a	14514	SHAV	indet	p	sw	4	2
a	14476	PRF	PERFORA	4	se	2	2
		TE					
a	14529	PRF	PERFORA	4	sw	4	2
		TE					
a	14484	PRF	PERFORA	5	sw	3	2
		TE					
a	14409	PRF	PERFORA	6	ne	2	2
		TE					
a	14503	SHAV	PERFORA	7	se	4	2
		TE					
a	14532	ST.SCR	SCRAPE	2	se	1	2

APPENDIX II

List of 1,093 Non-Projectile Point Fine-Grained
Chipped Lithic Artifacts From Which Use-Wear Samples
Were Drawn

EXC. UNIT	CATALOG #	HAMILTON TYPE	SMITH THPE	LEVEL	QUAD/ FEATURE	E. T.	R. Q.
a	14491	ST.SCR	SCRAPE	2	nw	2	2
a	14493	ST.SCR	SCRAPE	2	sw	3	1
a	14477	ST.SCR	SCRAPE	3	ne	1	4
a	14410	E.SCR	SCRAPE	3	ne	2	3
a	14473	E.SCR	SCRAPE	3	ne	4	3
a	14495	ST.SCR	SCRAPE	5	nw	1	2
a	14530	ST.SCR	SCRAPE	5	ne	1	2
a	14499	SHAV	SHAVE	2	sw	1	2
a	14502	SDSHAV	SHAVE	3	sw	2	2
a	14411	SHAV	SHAVE	4	se	2	2
a	14531	SDSHAV	SHAVE	4	nw	3	2
a	14509	SHAV	SHAVE	4	ne	4	2
a	14412	CUT	SHAVE	5	se	1	2
a	14413	SHAV	SHAVE	5	sw	4	3
a	14481	SHAV	SHAVE	6	se	2	2
a	14408	SHAV	SHAVE	7	se	1	2
a	14526	WG	WEDGE	6	ne	4	3
a2	4223	CUT	CUT	3	*	1	2
a2	5044	CUT	CUT	3	*	2	2
a2	8566	CUT	CUT	p	*	1	
a2	8567	CUT	CUT	p	*	1	
a2	8577	CUT	CUT	p	*	1	
a2	3261	CUT	CUT	pz	*	1	1
a2	8544	GRAV	GRAVE	2	*	2	
a2	3164	GRAV	GRAVE	p	*	2	2
a2	3166	GRAV	GRAVE	p	*	2	
a2	3674	PRF	PERFORA TE	30.5- 50.5	ne	4	
a2	13926	PRF	PERFORA TE	p	*	3	2
a2	8547	PFM.SCR	SCRAPE	2	*	1	3
a2	4326	E.SCR	SCRAPE	2	*	2	2
a2	4425	ST.SCR	SCRAPE	2	nw	2	3
a2	8530	PFM.SCR	SCRAPE	3	*	1	
a2	5045	ST.SCR	SCRAPE	3	*	2	1
a2	3165	HF.SCR	SCRAPE	p	*	1	
a2	3794	PFM.SCR	SCRAPE	p	*	1	
a2	8558	ST.SCR	SCRAPE	p	*	2	
a2	8565	HF.SCR	SCRAPE	p	*	2	2
a2	8573	E.SCR	SCRAPE	p	*	1	
a2	8666	ST.SCR	SCRAPE	p	*	2	
a2	8529	SHAV	SHAVE	3	*	1	3
a/11/12 m	14354	CUT	CUT	0-60	*	1	1

APPENDIX II

List of 1,093 Non-Projectile Point Fine-Grained
Chipped Lithic Artifacts From Which Use-Wear Samples
Were Drawn

EXC. UNIT	CATALOG #	HAMILTON TYPE	SMITH THPE	LEVEL	QUAD/ FEATURE	E. T.	R. Q.
a/l1/14 m	14348	CUT	CUT	0-110	*	3	2
a/n0/ e21.5	14452	CUT	CUT	0-65	*	3	2
a/n10/ e22.5	14445	CUT	CUT	0-40	*	2	2
a/n16/ e20.5	14359	WG	WEDGE	0+	*	1	1
a/n4/ e18.5	14439	E.SCR	indet	0-60	*	3	1
a/n6/ e21.5	14451	CUT	CUT	0-40	*	1	2
a/n6/ e22.5	14469	CUT	CUT	0-50	*	2	2
a/n6/ e22.5	14444	KNIF	CUT	0-50	*	4	2
a/n6/ e22.5	14350	SHAV	indet	0-50	*	3	1
a/n7/ e21.5	14415	CUT	CUT	0-45	*	1	2
a/s1/ e23.5	14416	CUT	CUT	0-70	*	1	2
a/s12/e 26	14440	CUT	CUT	0-73	*	1	2
ag/s14/ e23.5	14421	PRF	PERFORA TE	0-67	*	4	3
a/s16/ e23.5	14404	E.SCR	SCRAPE	0-80	*	4	2
a/s17/ e27.5	14438	PRF	PERFORA TE	0-90	*	2	2
a/s18/ e24.5	14349	CUT	CUT	0+	*	4	1
a/s18/ e26.5	14414	CUT	CUT	0-100	*	1	2
a/s18/ e28.5	14446	SDSHAV	SHAVE	0-80	*	2	2
a/s18/ e29.5	14437	SDSHAV	SHAVE	0-80	*	3	2
a/s19/ e23.5	14358	ST.SCR	SCRAPE	0-80	*	1	1
a/s19/ e26.5	14297	CUT	CUT	no, da ta	*	1	
a/s20/e 22	14351	CUT	CUT	0-40	*	2	1

APPENDIX II

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EXC. UNIT	CATALOG #	HAMILTON TYPE	SMITH THPE	LEVEL	QUAD/ FEATURE	E. T.	R. Q.
a/s24/ e22	14306	WG	WEDGE	0-47	*	3	2
a/s3/ e21.5	14453	CUT	CUT	0-90	*	1	1
a/s3/ e23.5	14377	SHAV	SHAVE	0-61	*	4	2
a/s33/ e22	14305	SHAV	SHAVE	0-?	*	1	2
a/s36/ e28	14450	CUT	CUT	0-72	*	1	2
a/s4/ e23.5	14454	CUT	CUT	0-60	*	1	2
a/s67/ e35-37	14557	KNIF	CUT	130	f11	4	2
b	13915	CUT	CUT	p	ne	1	2
b	13918	CUT	CUT	p	ne	1	2
b	13919	GRAV	GRAVE	p	ne	1	2
b	13914	CUT	indet	3	ne	1	4
b	13917	CUT	indet	3b/c	se	2	4
b	13927	ST.SCR	SCRAPE	2	se	1	4
b2	8016	CUT	CUT	2	*	2	4
b2	8015	SAW	SAW	p	*	1	3
b2	3502	HF.SCR	SCRAPE	2	*	2	2
b2	4150	ST.SCR	SCRAPE	2	*	2	3
b2	8010	E.SCR	SCRAPE	2	*	2	2
b2	8005	ST.SCR	SCRAPE	p	*	1	2
b2	3248	SHAV	SHAVE	p	*	1	
b2	4151	SHAV	SHAVE	p	*	2	2
b2	4140	WG	WEDGE	p	*	2	3
backdir t	5750	E.SCR	SCRAPE	-	*	1	
c	14340	CUT	CUT	4	sw	2	1
c	14337	CUT	CUT	4	nw	3	2
c	14336	CUT	CUT	5	sw	1	2
c	14324	CUT	CUT	5	se	3	1
c	14361	CUT	CUT	5	ne	3	3
c	14436	CUT	CUT	6	ne	1	2
c	14464	KNIF	CUT	6	se	4	1
c	14468	KNIF	CUT	6	se	4	3
c	14431	CUT	CUT	7	ne	1	2
c	14466	CUT	CUT	7	sw	2	2
c	14467	CUT	CUT	7	ne	2	1
c	14316	CUT	CUT	2 & 3	nw	1	1
c	14363	CUT	CUT	2 & 3	se	1	1

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List of 1,093 Non-Projectile Point Fine-Grained
Chipped Lithic Artifacts From Which Use-Wear Samples
Were Drawn

EXC. UNIT	CATALOG #	HAMILTON TYPE	SMITH THPE	LEVEL	QUAD/ FEATURE	E. T.	R. Q.
c	14330	CUT	CUT	2 & 3	se	2	3
c	14457	CUT	CUT	8b	ne	2	1
c	14310	CUT	CUT	p	ne	1	1
c	14433	CUT	CUT	0-65	nw	1	2
c	14258	GRAV	GRAVE	4	nw	2	1
c	14455	GRAV	GRAVE	7	sw	4	2
c	14255	GRAV	GRAVE	2 & 3	sw	2	3
c	14269	GRAV	GRAVE	2 & 3	*	4	3
c	14268	GRAV	GRAVE	p	nw	4	3
c	14319	SHAV	indet	4	se	1	3
c	14303	SHAV	indet	5	sw	2	2
c	14374	CUT	indet	2 & 3	ne	4	2
c	14321	PRF	PERFORA TE	5	sw	4	1
c	14328	SAW	SAW	7	ne	3	2
c	14460	SAW	SAW	2 & 3	ne	4	2
c	14326	ST.SCR	SCRAPE	5	sw	2	1
c	14434	E.SCR	SCRAPE	6	ne	3	3
c	14312	ST.SCR	SCRAPE	7	ne	2	2
c	14366	SDSHAV	SCRAPE	2 & 3	se	3	2
c	14456	E.SCR	SCRAPE	2 & 3	se	3	2
c	14273	ST.SCR	SHAVE	3	ne	1	3
c	14314	SHAV	SHAVE	4	sw	2	2
c	14360	SDSHAV	SHAVE	4	se	2	2
c	14465	HF.SCR	SHAVE	4	nw	2	2
c	14463	ST.SCR	SHAVE	4	sw	3	2
c	14320	SHAV	SHAVE	5	sw	1	2
c	14260	SHAV	SHAVE	5	ne	2	3
c	14339	SHAV	SHAVE	5	sw	2	4
c	14355	SHAV	SHAVE	5	all		
c	14274	SHAV	SHAVE	6	ne	2	1
c	14275	SDSHAV	SHAVE	6	se	2	1
c	14372	SHAV	SHAVE	7	ne	3	4
c	14317	SDSHAV	SHAVE	8	*	2	2
c	14300	SHAV	SHAVE	2 & 3	se	2	2
c	14318	SDSHAV	SHAVE	2 & 3	se	2	2
c	14343	SDSHAV	SHAVE	2 & 3	se	3	2
c	14313	SHAV	SHAVE	p	sw	1	1
c	14315	SHAV	SHAVE	p	sw	2	2
c	14338	SDSHAV	SHAVE	p	ne	3	2
c	14458	SHAV	SHAVE	p	se	3	2
c	14459	CUT	SHAVE	p	se	2	1
c	14331	WG	WEDGE	6	se	2	2
c	14371	WG	WEDGE	p	ne	3	2

APPENDIX II

List of 1,093 Non-Projectile Point Fine-Grained
Chipped Lithic Artifacts From Which Use-Wear Samples
Were Drawn

EXC. UNIT	CATALOG #	HAMILTON TYPE	SMITH THPE	LEVEL	QUAD/ FEATURE	E. T.	R. Q.
c2	7152	CUT	CUT	3	*	1	
c2	411	CUT	CUT	35.7	nw	1	1
c2	7156	CUT	CUT	p	*	1	
c2	7168	CUT	CUT	p	*	1	2
c2	7191	GRAV	GRAVE	4	*	2	
c2	7198	D. PRF	PERFORA TE	4	*	1	
c2	7160	D. PRF	PERFORA TE	p	*	1	3
c2	7176	D. PRF	PERFORA TE	p	*	2	3
c2	7201	ST. SCR	SCRAPE	4	*	1	
c2	7197	ST. SCR	SCRAPE	6	*	1	
c2	927	ST. SCR	SCRAPE	7	se	2	2
c2	862	E. SCR	SCRAPE	95- 105	se	2	
c2	455	HF. SCR	SCRAPE	p	ne		
c2	465	E. SCR	SCRAPE	p	ne	2	3
c2	7157	ST. SCR	SCRAPE	p	*	1	
c2	7193	SHAV	SHAVE	4	*	2	
c2	1139	SDSHAV	SHAVE	5	f15	1	2
c2	7205	SHAV	SHAVE	7	*	2	
c2	1180	SHAV	SHAVE	75	*	1	2
c2	505	SHAV	SHAVE	p	nw	1	
c2	7149	SHAV	SHAVE	p	*	1	
c2	7186	SHAV	SHAVE		*	1	2
d	14352	SHAV	indet	4	sw	1	3
d	14353	SHAV	SHAVE	p	*	2	1
d2	7134	CUT	CUT	4	*	2	2
d2	1127	CUT	CUT	18	*	1	
d2	1123	CUT	CUT	18	*	2	4
d2	7082	CUT	CUT	pz	*	1	
d2	1129	D. PRF	PERFORA TE	18	*	1	
d2	102	D. PRF	PERFORA TE	p	nw	1	3
d2	1193	ST. SCR	SCRAPE	3	*	1	
d2	1217	ST. SCR	SCRAPE	3	*	2	
d2	7132	ST. SCR	SCRAPE	4	*	1	
d2	7141	ST. SCR	SCRAPE	4	*	1	3
d2	7238	E. SCR	SCRAPE	4	*	1	
d2	7119	ST. SCR	SCRAPE	4	*	2	3
d2	7124	E. SCR	SCRAPE	4	*	2	3
d2	1208	PFM. SCR	SCRAPE	57-89	*	1	2

APPENDIX II

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EXC. UNIT	CATALOG #	HAMILTON TYPE	SMITH THPE	LEVEL	QUAD/ FEATURE	E. T.	R. Q.
d2	1114	E.SCR	SCRAPE	p	*	2	
d2	7080	ST.SCR	SCRAPE	p	*	1	2
d2	7084	ST.SCR	SCRAPE	p	*	1	
d2	7111	ST.SCR	SCRAPE	p	*	1	
d2	7090	SHAV	SHAVE	2	*	2	3
d2	7123	SHAV	SHAVE	4	*	1	3
d2	1116	SHAV	SHAVE	18	*	1	2
d2	7110	WG	WEDGE	3	*	2	3
e	14124	SHAV	CUT	1	se	1	3
e	14127	SHAV	CUT	1	nw	1	2
e	14552	CUT	CUT	1	se	1	2
e	14118	CUT	CUT	1	sw	2	1
e	14550	CUT	CUT	1	ne	2	2
e	14163	KNIF	CUT	1	nw	4	3
e	14090	CUT	CUT	2	sw	1	3
e	14108	CUT	CUT	2	sw	1	2
e	14539	CUT	CUT	2	sw	1	2
e	14545	CUT	CUT	2	se	1	2
e	14100	CUT	CUT	p	*	1	2
e	14125	CUT	CUT	p	all	1	2
e	14549	PRF	PERFORA TE	2	sw	4	3
e	14554	PRF	PERFORA TE	3	ne	4	2
e	14110	ST.SCR	SCRAPE	1	se	1	1
e	14104	ST.SCR	SCRAPE	1	ne	2	2
e	14117	E.SCR	SCRAPE	1	sw	2	2
e	14095	SHAV	SHAVE	1	se	2	2
e	14129	SDSHAV	SHAVE	1	sw	2	2
e	14551	SHAV	SHAVE	1	nw	4	2
e	14105	SHAV	SHAVE	2	sw	1	3
e	14116	SHAV	SHAVE	2	sw	1	3
e2	4021	CUT	CUT	2	f47	1	
e2	5207	CUT	CUT	5	*	1	
e2	12853	CUT	CUT	8	*	3	2
e2	3789	CUT	CUT	pz	*	1	2
e2	3914	ST.SCR	SCRAPE	3	*	1	
e2	12854	ST.SCR	SCRAPE	3	*	4	2
e2	12855	SHAV	SCRAPE	8	*	1	3
e2	1292	HF.SCR	SCRAPE	90- 100	*	2	1
e2	3788	ST.SCR	SCRAPE	p	*	2	2
e2	3790	HF.SCR	SCRAPE	p	*	2	
f	14247	CUT	CUT	2	ne	3	2

APPENDIX II

List of 1,093 Non-Projectile Point Fine-Grained
Chipped Lithic Artifacts From Which Use-Wear Samples
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EXC. UNIT	CATALOG #	HAMILTON TYPE	SMITH THPE	LEVEL	QUAD/ FEATURE	E. T.	R. Q.
f	14216	CUT	CUT	3	se	1	1
f	14217	CUT	CUT	3	se	2	1
f	14223	CUT	CUT	3	se	2	3
f	14420	CUT	CUT	4	nw	2	2
f	14245	CUT	CUT	5	nw	2	1
f	14222	CUT	CUT	p	ne	1	1
f	14249	CUT	CUT	p	ne	2	1
f	14243	GRAV	GRAVE	2	ne	4	2
f	14250	GRAV	GRAVE	3	ne	2	1
f	14220	CUT	indet	4	nw	2	3
f	14221	CUT	indet	6	f447	2	2
f	14242	PRF	PERFORA TE	4	ne	4	2
f	14214	PRF	PERFORA TE	5	sw/f444	4	2
f	14199	ST.SCR	SCRAPE	2	se	1	3
f	14224	CUT	SCRAPE	3	se	2	2
f	14227	E.SCR	SCRAPE	6	wall	2	1
f	14198	E.SCR	SCRAPE	p	sw	4	2
f	14232	ST.SCR	SCRAPE	p	se	2	1
f	14246	ST.SCR	SCRAPE	p	sw	2	2
f	14212	SHAV	SHAVE	3	se	2	2
f	14231	SHAV	SHAVE	3	nw	2	2
f	14225	SHAV	SHAVE	4	sw	2	3
f	14251	SHAV	SHAVE	4	sw	2	2
f	14195	SHAV	SHAVE	5	ne	3	2
f	14209	SHAV	SHAVE	p	sw	2	3
f	14248	SHAV	SHAVE	p	sw	4	2
f2a	8503	ST.SCR	SCRAPE	2	*	1	
f2a	3759	HF.SCR	SCRAPE	p	*	2	
f2a	8667	ST.SCR	SCRAPE	p	*	1	
f2a	8670	SHAV	SHAVE	p	*	1	2
f2a	12867	SHAV	SHAVE	p	*	1	4
f2a	8499	WG	WEDGE	2	*	2	2
f2b	4794	SHAV	SHAVE	p	*	1	3
f2b	4868	SHAV	SHAVE	p	*	1	2
g	292	KNIF	CUT	69	nw/f293	4	
g	767	KNIF	CUT	146- 148	ne/f8c	4	4
g	651	CUT	CUT	8b	*	1	2
g	7813	D.PRIF	PERFORA TE	3	*	1	3
g	991	SAW	SAW	50-60	*	1	
g	1061	ST.SCR	SCRAPE	2	*	2	3

APPENDIX II

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Chipped Lithic Artifacts From Which Use-Wear Samples
Were Drawn

EXC. UNIT	CATALOG #	HAMILTON TYPE	SMITH THPE	LEVEL	QUAD/ FEATURE	E. T.	R. Q.
g	201	HF.SCR	SCRAPE	3	*	2	
g	453	ST.SCR	SCRAPE	6	nw	1	
g	8449	ST.SCR	SCRAPE	6	f8b	1	
g	8467	ST.SCR	SCRAPE	6	*	1	2
g	482	E.SCR	SCRAPE	6	80-90	2	0
g	1100	T.SCR	SCRAPE	60-70	historic	1	
g	1101	T.SCR	SCRAPE	60-70	historic	1	
g	3226	HF.SCR	SCRAPE	60-70	historic		
g	1088	HF.SCR	SCRAPE	70-80	*	2	
g	1019	HF.SCR	SCRAPE	p	*	1	
g	195	SDSHAV	SHAVE	3	*	1	1
g	8473	SHAV	SHAVE	6	*	1	2
g	638	SHAV	SHAVE	98	nw/f8b	1	3
g	1090	SDSHAV	SHAVE	70-80	*	1	3
g	1171	SDSHAV	SHAVE	80-90	*	1	3
g	1234	SHAV	SHAVE	90+	*	1	2
g	1184	WG	WEDGE	3	f8b	3	1
g	8471	WG	WEDGE	6	*	2	3
g	962	WG	WEDGE	40-50	f2a	2	3
g	1087	WG	WEDGE	70-80	*	1	
g2	3996	CUT	CUT	2	ne	1	
g2	3948	CUT	CUT	2	se	2	2
g2	4087	CUT	CUT	2	*	2	
g2	3772	KNIF	CUT	2	sw		
g2	4321	CUT	CUT	3	se	1	2
g2	3228	GRAV	GRAVE	p	*	2	3
g2	3862	D.PRF	PERFORA TE	2	nw	2	3
g2	3901	D.PRF	PERFORA TE	2	se	2	2
g2	3443	D.PRF	PERFORA TE	p	*	2	
g2	4237	ST.SCR	SCRAPE	3	nw	1	
g2	4240	PFM.SCR	SCRAPE	3	nw	1	3
g2	4339	PFM.SCR	SCRAPE	3	sw	1	3
g2	1310	HF.SCR	SCRAPE	p	*	2	3
g2	3303	E.SCR	SCRAPE	p	*	2	3
g2	3400	ST.SCR	SCRAPE	p	*	2	3
g2	3622	ST.SCR	SCRAPE	p	*	1	
g2	7027	ST.SCR	SCRAPE	p	*	1	
g2	4220	SHAV	SHAVE	29.5	nw	1	3
h	13759	CUT	CUT	2	nw	1	2
h	13769	ST.SCR	CUT	2	se	1	2
h	13787	CUT	CUT	4	nw	1	2

APPENDIX II

List of 1,093 Non-Projectile Point Fine-Grained
Chipped Lithic Artifacts From Which Use-Wear Samples
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EXC. UNIT	CATALOG #	HAMILTON TYPE	SMITH THPE	LEVEL	QUAD/ FEATURE	E. T.	R. Q.
h	13756	CUT	CUT	4	ne	2	1
h	13810	CUT	CUT	5	sw	1	3
h	13806	debitag e	CUT	6	ne	1	3
h	13752	KNIF	CUT	6	nw	3	2
h	13812	CUT	CUT	7b	f425	1	3
h	13782	CUT	CUT	7c	f425	3	2
h	13774	CUT	CUT	p	sw	1	3
h	13791	GRAV	GRAVE	2	ne	1	2
h	13768	GRAV	GRAVE	2	ne	2	2
h	13765	GRAV	GRAVE	4	nw	2	2
h	13753	GRAV	GRAVE	0-100	wall	2	2
h	13796	KNIF	indet	2	ne	2	2
h	13811	GRAV	indet	4	ne	2	3
h	13771	PRF	PERFORA TE	7	nw	4	3
h	13761	ST.SCR	SCRAPE	3	nw	1	2
h	13785	ST.SCR	SCRAPE	4	sw/f355	2	1
h	13770	SHAV	SCRAPE	5	nw	1	2
h	13783	SR.SCR	SCRAPE	6	ne	1	2
h	13805	ST.SCR	SCRAPE	6	sw	1	3
h	13814	ST.SCR	SCRAPE	4b	se/f355	2	2
h	13777	ST.SCR	SCRAPE	p	sw	1	3
h	13798	E.SCR	SCRAPE	p	ne	2	2
h	13800	ST.SCR	SCRAPE	p	sw	1	2
h	13801	ST.SCR	SCRAPE	p	se	1	3
h	13758	SDSHAV	SHAVE	3	ne	2	3
h	13751	SHAV	SHAVE	0-110	wall	2	2
h	13780	SHAV	SHAVE	p	ne	2	2
h	13755	WG	WEDGE	3	sw	3	3
h	13786	WG	WEDGE	4b	sw/f355	4	2
h2	1630	CUT	CUT	2	sw	1	
h2	1688	CUT	CUT	2	nw	1	
h2	1842	CUT	CUT	2	*	2	3
h2	2442	CUT	CUT	6	*	1	
h2	2444	CUT	CUT	6	*	2	2
h2	2854	CUT	CUT	11	f36	2	1
h2	1971	KNIF	CUT	61	ne	4	
h2	2992	CUT	CUT	106	f35	1	
h2	2900	CUT	CUT	95- 105	f29a	1	
h2	12989	CUT	CUT	none	rodent	4	2
h2	3459	KNIF	CUT	p	*	2	3
h2	1441	CUT	CUT	pz	ne	1	

APPENDIX II

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EXC. UNIT	CATALOG #	HAMILTON TYPE	SMITH THPE	LEVEL	QUAD/ FEATURE	E. T.	R. Q.
h2	1503	CUT	CUT	pz	se	1	
h2	1525	CUT	CUT	pz	nw	1	1
h2	3048	CUT	CUT	z	*	1	
h2	3026	GRAV	GRAVE	10	f30	1	2
h2	2898	GRAV	GRAVE	102- 112	f36	2	3
h2	2323	PRF	PERFORA TE	6	ne	4	
h2	2558	D. PRF	PERFORA TE	109	se/f31	1	2
h2	2491	HD. PRF	PERFORA TE	90- 100	nw	4	2
h2	2096	ST. SCR	SCRAPE	2	*	1	
h2	1886	HF. SCR	SCRAPE	3	nw	2	
h2	2320	ST. SCR	SCRAPE	4	ne	1	3
h2	6742	HF. SCR	SCRAPE	4	*		
h2	2067	E. SCR	SCRAPE	5	nw	1	
h2	2011	HF. SCR	SCRAPE	5	sw	2	2
h2	7398	HF. SCR	SCRAPE	5	*	2	
h2	2242	ST. SCR	SCRAPE	6	se	1	
h2	2677	ST. SCR	SCRAPE	6	f31	1	3
h2	2872	ST. SCR	SCRAPE	7	nw	1	3
h2	2616	ST. SCR	SCRAPE	9	f36	1	
h2	2627	ST. SCR	SCRAPE	9	f35	1	
h2	2725	HF. SCR	SCRAPE	9	f30	1	3
h2	2765	HF. SCR	SCRAPE	10	sw	2	4
h2	2866	PFM. SCR	SCRAPE	12	f35	1	
h2	2512	E. SCR	SCRAPE	94	nw/f36	2	3
h2	2849	HF. SCR	SCRAPE	134	ne	2	2
h2	3010	PFM. SCR	SCRAPE	100- 110	f11	1	3
h2	2888	E. SCR	SCRAPE	100- 110/f 30	*	1	3
h2	2800	HF. SCR	SCRAPE	130- 140	30	2	1
h2	2421	PFM. SCR	SCRAPE	65-75	*	1	2
h2	2278	HF. SCR	SCRAPE	75-90	sw	2	2
h2	1408	PFM. SCR	SCRAPE	p	ne	1	
h2	1411	PFM. SCR	SCRAPE	p	ne	1	
h2	1807	ST. SCR	SCRAPE	p	*		2
h2	6708	HF. SCR	SCRAPE	p	*	2	
h2	1997	SHAV	SHAVE	4	se	1	
h2	3055	SHAV	SHAVE	5	*	2	

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EXC. UNIT	CATALOG #	HAMILTON TYPE	SMITH THPE	LEVEL	QUAD/ FEATURE	E. T.	R. Q.
h2	2344	SHAV	SHAVE	6	ne	1	2
h2	2628	SHAV	SHAVE	9	f35	1	
h2	1968	SDSHAV	SHAVE	63	*	1	1
h2	2515	SDSHAV	SHAVE	97	f36	1	1
h2	2618	SHAV	SHAVE	114	se	1	
h2	1439	SDSHAV	SHAVE	p	ne	1	1
h2	1485	SHAV	SHAVE	p	sw	1	1
h2	1522	SHAV	SHAVE	p	nw	1	2
h2	1578	SHAV	SHAVE	p	nw	1	2
h2	2808	WG	WEDGE	6	*	2	2
h2	2878	WG	WEDGE	90- 100	f30	2	2
i	1977	CUT	CUT	3	sw	1	
i	1874	KNIF	CUT	3	ne	4	2
i	8428	CUT	CUT	5	*	1	
i	2584	CUT	CUT	?	*	2	3
i	1436	CUT	CUT	pz	*	2	2
i	1491	CUT	CUT	pz	*	1	2
i	8414	GRAV	GRAVE	4	*	2	
i	13963	GRAVE	GRAVE	no, da ta	*	2	
i	1623	HD.PRF	PERFORA TE	2	ne	2	3
i	1763	HD.PRF	PERFORA TE	3	se	4	3
i	1763	HD.PRF	PERFORA TE	3	se	4	3
i	8413	D.PRF	PERFORA TE	4	*	2	3
i	8351	SAW	SAW	p	*	2	3
i	8367	ST.SCR	SCRAPE	2	*	1	
i	8375	ST.SCR	SCRAPE	2	*	1	3
i	8376	ST.SCR	SCRAPE	2	*	2	
i	8390	ST.SCR	SCRAPE	2	*	2	3
i	8369	ST.SCR	SCRAPE	2	*		
i	1943	HF.SCR	SCRAPE	3	sw	2	
i	1978	HF.SCR	SCRAPE	3	sw	2	3
i	8157	ST.SCR	SCRAPE	3	*	2	
i	8403	ST.SCR	SCRAPE	3	*	2	
i	8407	HF.SCR	SCRAPE	3	*	2	
i	8415	PFM.SCR	SCRAPE	4	*	1	
i	2078	SR.SCR	SCRAPE	4	se	2	3
i	8447	PFM.SCR	SCRAPE	6	*	1	3
i	1495	HF.SCR	SCRAPE	p	*	2	2

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EXC. UNIT	CATALOG #	HAMILTON TYPE	SMITH THPE	LEVEL	QUAD/ FEATURE	E. T.	R. Q.
i	8352	PFM.SCR	SCRAPE	p	*	1	
i	8368	SHAV	SHAVE	2	*	1	1
i	1566	SDSHAV	SHAVE	2	se	2	2
i	8429	SHAV	SHAVE	5	*	1	3
i	2312	SDSHAV	SHAVE	78	f29	2	1
i	8381	WG	WEDGE	2	*	2	2
i	8399	WG	WEDGE	3	*	2	3
i2	3446	KNIF	CUT	p	*	4	3
i2	5154	PRF	PERFORA TE	7	*	4	
i2	7954	ST.SCR	SCRAPE	2	*	1	
i2	7957	ST.SCR	SCRAPE	2	*	1	3
i2	8475	E.SCR	SCRAPE	2	*	2	
i2	3225	E.SCR	SCRAPE	p	*	1	2
i2	3335	HF.SCR	SCRAPE	p	*	2	
i2	3476	HF.SCR	SCRAPE	p	*	2	
i2	7953	E.SCR	SCRAPE	pz	*	1	2
i2	3177	WG	WEDGE	p	*	1	0
j	12811	KNIF	CUT	3	ne	1	2
j	12823	CUT	CUT	3	sw	1	2
j	12825	CUT	CUT	4	nw	1	2
j	12800	CUT	CUT	5	se		
j	12822	CUT	CUT	6	sw	1	1
j	12808	CUT	CUT	7	sw	1	1
j	12829	CUT	CUT	7	sw	1	1
j	12828	CUT	CUT	9	f460	1	1
j	14106	CUT	CUT	p	all,q	2	
j	12817	GRAV	GRAVE	4	sw	1	2
j	12839	GRAV	GRAVE	7	nw	2	4
j	12841	GRAV	GRAVE	8	sw	3	1
j	12804	GRAV	GRAVE	8	nw		
j	12816	GRAV	GRAVE	9	f460	2	1
j	12835	GRAV	GRAVE	9	nw	3	1
j	12833	CUT	indet	3	nw	1	4
j	12832	PRF	PERFORA TE	3	nw	1	4
j	12805	PRF	PERFORA TE	3	ne		
j	12820	PRF	PERFORA TE	7	sw	1	2
j	12814	SAW	SAW	8	se	1	2
j	12809	ST.SCR	SCRAPE	4	*	1	2
j	12819	ST.SCR	SCRAPE	5	sw	1	2

APPENDIX II

List of 1,093 Non-Projectile Point Fine-Grained
Chipped Lithic Artifacts From Which Use-Wear Samples
Were Drawn

EXC. UNIT	CATALOG #	HAMILTON TYPE	SMITH THPE	LEVEL	QUAD/ FEATURE	E. T.	R. Q.
j	12843	E.SCR	SCRAPE	5	sw	1	2
j	12834	E.SCR	SCRAPE	5	nw	3	2
j	12812	E.SCR	SCRAPE	6	sw	4	2
j	12815	E.SCR	SCRAPE	7	sw	4	3
j	12803	SHAV	SCRAPE	8	se	1	
j	12826	SHAV	SHAVE	4	nw	1	2
j	12827	SHAV	SHAVE	4	ne	2	1
j	12831	SHAV	SHAVE	6	ne	1	2
j	12802	SHAV	SHAVE	6	se		
j	12813	SHAV	SHAVE	8	nw	1	3
j	12818	SHAV	SHAVE	8	se	1	2
j	12821	SHAV	SHAVE	8	ne	4	1
j	12807	SHAV	SHAVE	9	wall scrape	2	2
j	12798	SHAV	SHAVE	p	se		
j	12806	SHAV	SHAVE	p	sw	1	2
j	12824	SDSHAV	SHAVE	p	se	2	2
j2	12879	CUT	CUT	p	*	1	2
j2	12880	CUT	CUT	p	*	1	2
j2	12881	KNIF	CUT	p	*	3	2
j2	12882	KNIF	CUT	p	*	2	2
j2	8657	PRF	PERFORA TE	p	*	1	
j2	12886	PRF	PERFORA TE	p	*	1	3
j2	12884	ST.SCR	SCRAPE	2	*	3	1
j2	12885	E.SCR	SCRAPE	?	f141/wall	2	2
j2	4536	HF.SCR	SCRAPE	p	*	2	1
k	1494	KNIF	CUT	1	se	4	2
k	1517	KNIF	CUT	2	sw	1	2
k	2405	GRAV	GRAVE	85-95	f29	2	2
k	1795	D.PRIF	PERFORA TE	p	*	2	
k	2110	E.SCR	SCRAPE	2	*	1	3
k	8141	E.SCR	SCRAPE	2	*	1	
k	8145	ST.SCR	SCRAPE	2	*	1	
k	1507	HF.SCR	SCRAPE	2	se	2	3
k	1744	ST.SCR	SCRAPE	4	ne	1	2
k	2074	ST.SCR	SCRAPE	4	ne	1	2
k	2155	PFM.SCR	SCRAPE	4	nw	1	
k	7749	E.SCR	SCRAPE	5	*	1	3
k	1927	HF.SCR	SCRAPE	65	nw	2	4
k	2970	HF.SCR	SCRAPE	105- 115	*	2	

APPENDIX II

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Chipped Lithic Artifacts From Which Use-Wear Samples
Were Drawn

EXC. UNIT	CATALOG #	HAMILTON TYPE	SMITH THPE	LEVEL	QUAD/ FEATURE	E. T.	R. Q.
k	1458	ST.SCR	SCRAPE	p	nw	1	2
k	2604	HF.SCR	SCRAPE	pz	sw	2	1
k	8171	SDSHAV	SHAVE	4	*	1	
k	2870	SHAV	SHAVE	75-85	*	1	
k	2291	SHAV	SHAVE	75-85	sw/f29	4	2
k	2365	SHAV	SHAVE	85-95	sw/f29	1	1
k	8117	WG	WEDGE	6	*		
k2	8624	CUT	CUT	2	*	1	
k2	12981	CUT	CUT	3	sw	1	2
k2	12983	CUT	CUT	4	f55	1	2
k2	12987	CUT	CUT	4	se, f72	2	2
k2	12978	CUT	CUT	5	center	1	3
k2	5123	CUT	CUT	49	ne	1	1
k2	8625	GRAV	GRAVE	2	*	2	
k2	5059	D. PRF	PERFORA TE	2	*	2	3
k2	8627	PFM.SCR	SCRAPE	3	*	1	
k2	12894	ST.SCR	SCRAPE	4	f55	1	3
k2	12984	ST.SCR	SCRAPE	4	f55	1	3
k2	4312	ST.SCR	SCRAPE	4	*	2	
k2	8648	PFM.SCR	SCRAPE	p	*	1	3
k2	8650	PFM.SCR	SCRAPE	p	*	1	
k2	3930	SDSHAV	SHAVE	2	*	2	1
k2	12982	SD.SHAV	SHAVE	4	sw, f72	2	2
k2	12980	SHAV	SHAVE	4	se/f65/f72	1	3
k2	12985	SHAV	SHAVE	4	center, f55	1	3
k2	12977	SHAV	SHAVE	5	sw	2	2
k2	3748	SHAV	SHAVE	p	*	1	3
k2	4435	SDSHAV	SHAVE	p	*	1	1
k2	4538	SDSHAV	SHAVE	p	*	1	2
1	14061	CUT	CUT	2	sw	1	2
1	14077	CUT	CUT	2	sw	1	2
1	14066	CUT	CUT	2	ne	2	2
1	14055	KNIF	CUT	2	ne	4	2
1	14072	KNIF	CUT	2	ne	4	2
1	14083	CUT	CUT	3	se	1	3
1	14417	CUT	CUT	4	se	1	2
1	14418	CUT	CUT	4	se	1	2
1	14073	CUT	CUT	3a	se/f358	1	1
1	14048	CUT	CUT	p	sw	1	2
1	14088	CUT	CUT	p	ne	2	1
1	14045	GRAV	GRAVE	2	ne	1	2
1	14076	GRAV	GRAVE	2	sw	4	3
1	14087	SHAV	indet	4b	f375	1	3

APPENDIX II

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Chipped Lithic Artifacts From Which Use-Wear Samples
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EXC. UNIT	CATALOG #	HAMILTON TYPE	SMITH THPE	LEVEL	QUAD/ FEATURE	E. T.	R. Q.
1	14049	CUT	indet	p	sw	1	3
1	14068	ST.SCR	SCRAPE	2	se	1	2
1	14071	ST.SCR	SCRAPE	2	nw	1	3
1	14079	ST.SCR	SCRAPE	2	ne	1	3
1	14057	E.SCR	SCRAPE	2	ne	2	2
1	14059	E.SCR	SCRAPE	2	se	2	2
1	14074	ST.SCR	SCRAPE	4b	f375	1	3
1	14056	ST.SCR	SCRAPE	p	nw	1	2
1	14065	SHAV	SHAVE	2	sw	1	2
1	14085	SHAV	SHAVE	2	se	1	2
1	14060	SDSHAV	SHAVE	2	se	2	2
12	4129	KNIF	CUT	3	*	4	3
12	7641	CUT	CUT	8	*	1	
12	7647	CUT	CUT	9	*	1	
12	7659	CUT	CUT	9	*	1	2
12	7657	CUT	CUT	9	*	2	2
12	4970	CUT	CUT	10	ne	1	
12	7668	CUT	CUT	10	*	2	3
12	3891	GRAV	GRAVE	3	nw	1	3
12	7440	GRAV	GRAVE	3	*	2	
12	7410	D. PRF	PERFORA TE	6	f88	1	3
12	4646	D. PRF	PERFORA TE	7	sw	1	
12	7665	D. PRF	PERFORA TE	9	*	2	4
12	5090	D. PRF	PERFORA TE	11	f252	2	
12	3817	D. PRF	PERFORA TE	p	*	2	2
12	3919	SAW	SAW	3	sw	1	
12	4429	SAW	SAW	6	*	1	3
12	3670	ST.SCR	SCRAPE	2	*	1	3
12	7457	ST.SCR	SCRAPE	2	*	1	2
12	3841	ST.SCR	SCRAPE	2	ne	2	3
12	7433	E.SCR	SCRAPE	3	*	1	3
12	7437	PFM.SCR	SCRAPE	3	*	1	
12	3892	HF.SCR	SCRAPE	3	nw	2	
12	3926	ST.SCR	SCRAPE	3	se	2	
12	4125	HF.SCR	SCRAPE	3	*	2	3
12	7392	ST.SCR	SCRAPE	4	*	2	
12	7423	PFM.SCR	SCRAPE	5	*	1	
12	4215	HF.SCR	SCRAPE	5	nw	2	3
12	7403	E.SCR	SCRAPE	6	*	1	2

APPENDIX II

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EXC. UNIT	CATALOG #	HAMILTON TYPE	SMITH THPE	LEVEL	QUAD/ FEATURE	E. T.	R. Q.
12	7416	ST.SCR	SCRAPE	6	f88	1	
12	8262	PFM.SCR	SCRAPE	6	*	1	
12	4417	HF.SCR	SCRAPE	6	sw	2	2
12	7413	ST.SCR	SCRAPE	6	f88		
12	7633	ST.SCR	SCRAPE	7	rodent	1	0
12	7636	E.SCR	SCRAPE	7	*	1	3
12	7361	E.SCR	SCRAPE	7	rodent		
12	4953	HF.SCR	SCRAPE	9	ne	2	1
12	7661	HF.SCR	SCRAPE	9	*	2	
12	4977	HF.SCR	SCRAPE	10	ne	1	
12	5028	ST.SCR	SCRAPE	10	nw	1	
12	7669	PFM.SCR	SCRAPE	10	*	1	
12	7670	PFM.SCR	SCRAPE	10	*	1	2
12	3429	HF.SCR	SCRAPE	p	*	2	
12	3553	ST.SCR	SCRAPE	p	*	2	2
12	7446	E.SCR	SCRAPE	p	*	2	2
12	7452	PFM.SCR	SCRAPE	p	*	1	
12	7466	HF.SCR	SCRAPE	p	*	2	3
12	3640	SHAV	SHAVE	2	nw	1	
12	7464	SHAV	SHAVE	2	*	1	3
12	7427	SHAV	SHAVE	3	*	1	3
12	7439	SHAV	SHAVE	3	*	1	2
12	7445	SHAV	SHAVE	3	*	1	1
12	3408	SHAV	SHAVE	p	*	1	
12	7460	SHAV	SHAVE	p	*	1	
12	7625	WG	WEDGE	7	*	1	3
12	7638	WG	WEDGE	8	*	2	2
12	3192	WG	WEDGE	p	*	2	1
m	7695	CUT	CUT	3	*	1	
m	7679	CUT	CUT	p	*	1	3
m	7702	GRAV	GRAVE	3	*	2	
m	7746	GRAV	GRAVE	4	historic	2	3
m	1154	D.PRF	PERFORA TE	80- 100	*	2	1
m	947	SAW	SAW	p	*	1	2
m	7697	PFM.SCR	SCRAPE	3	*	1	
m	7729	PFM.SCR	SCRAPE	4	*	1	3
m	7754	ST.SCR	SCRAPE	4	*	1	3
m	7758	E.SCR	SCRAPE	4	*	1	2
m	7739	PFM.SCR	SCRAPE	5	*	1	
m	7791	ST.SCR	SCRAPE	6	*	1	2
m	459	ST.SCR	SCRAPE	6	*	2	
m	987	HF.SCR	SCRAPE	40-50	*	2	
m	1034	HF.SCR	SCRAPE	40-50	*	2	

APPENDIX II

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Chipped Lithic Artifacts From Which Use-Wear Samples
Were Drawn

EXC. UNIT	CATALOG #	HAMILTON TYPE	SMITH THPE	LEVEL	QUAD/ FEATURE	E. T.	R. Q.
m	1075	PFM.SCR	SCRAPE	50-60	*	1	
m	1077	PFM.SCR	SCRAPE	50-60	*	1	
m	1072	E.SCR	SCRAPE	50-60	*	2	3
m	1150	E.SCR	SCRAPE	80- 100	*	1	3
m	978	E.SCR	SCRAPE	p	*	1	2
m	7675	ST.SCR	SCRAPE	pz	*	1	
m	7682	ST.SCR	SCRAPE	pz	*	1	
m	7694	SHAV	SHAVE	3	*	1	2
m	13037	SDSHAV	SHAVE	3	bone, bag	2	2
m	988	SHAV	SHAVE	30-40	*	1	1
m2	8314	CUT	CUT	2	south	1	2
m2	5976	CUT	CUT	3	center	1	
m2	8276	CUT	CUT	3	north	1	
m2	5348	CUT	CUT	pz	center	2	2
m2	7975	GRAV	GRAVE	p	d	2	3
m2	6205	D. PRF	PERFORA TE	3	north	2	2
m2	7970	SAW	SAW	p	south	2	3
m2	989	ST.SCR	SCRAPE	2	*	1	2
m2	5604	ST.SCR	SCRAPE	2	south	1	
m2	5606	ST.SCR	SCRAPE	2	s	1	
m2	5616	HF.SCR	SCRAPE	2	south	1	3
m2	5668	ST.SCR	SCRAPE	2	center	1	4
m2	5708	HF.SCR	SCRAPE	2	south	2	
m2	8300	E.SCR	SCRAPE	2	*	2	2
m2	5903	PFM.SCR	SCRAPE	3	s	1	
m2	8274	PFM.SCR	SCRAPE	3	middle	1	
m2	8277	PFM.SCR	SCRAPE	3	south	1	
m2	8270	HF.SCR	SCRAPE	3	*	2	3
m2	5310	ST.SCR	SCRAPE	p	a	1	
m2	8296	HF.SCR	SCRAPE	p	*	2	3
m2	8796	PFM.SCR	SCRAPE	p	middle	2	
m2	5360	ST.SCR	SCRAPE	pz	center	1	
m2	5361	ST.SCR	SCRAPE	pz	center	1	
m2	5596	SHAV	SHAVE	2	south	1	2
m2	5630	SHAV	SHAVE	2	south	1	
m2	5787	SDSHAV	SHAVE	2	center	1	1
m2	5811	SHAV	SHAVE	2	north	2	
m2	6203	SHAV	SHAVE	3	north	2	3
m2	8285	SDSHAV	SHAVE	4	*	1	
m2	14559	SHAV	SHAVE	3b	f360/f262	4	2
m2	8303	WG	WEDGE	2	north	1	2
m2	8208	WG	WEDGE	3b	f306	1	2

APPENDIX II

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Chipped Lithic Artifacts From Which Use-Wear Samples
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EXC. UNIT	CATALOG #	HAMILTON TYPE	SMITH THPE	LEVEL	QUAD/ FEATURE	E. T.	R. Q.
n	8041	CUT	CUT	3	se	2	3
n	5355	KNIF	CUT	p	sw	4	2
n	5322	CUT	CUT	pz	se	1	1
n	8037	GRAV	GRAVE	3	sw	1	
n	8032	D.PRF	PERFORA TE	2	sw	2	2
n	5842	D.PRF	PERFORA TE	4	ne	2	2
n	5586	ST.SCR	SCRAPE	2	se	1	2
n	5585	ST.SCR	SCRAPE	2	se	2	3
n	8040	ST.SCR	SCRAPE	3	ne	1	3
n	5675	E.SCR	SCRAPE	3	se	2	
n	5804	ST.SCR	SCRAPE	4	se	1	3
n	5816	ST.SCR	SCRAPE	4	se	1	10
n	5841	ST.SCR	SCRAPE	4	ne	1	3
n	8049	ST.SCR	SCRAPE	4	nw	2	2
n	8081	E.SCR	SCRAPE	6	*	1	
n	6304	E.SCR	SCRAPE	6a	ne/f331	1	2
n	6305	HF.SCR	SCRAPE	6a	f321	1	2
n	6276	HF.SCR	SCRAPE	6a	f32	2	
n	5269	ST.SCR	SCRAPE	p	ne	1	2
n	5317	ST.SCR	SCRAPE	p	se	1	3
n	5356	PFM.SCR	SCRAPE	p	sw	1	3
n	5414	ST.SCR	SCRAPE	p	nw	1	
n	5506	SHAV	SHAVE	2	sw	2	2
n	5649	SHAV	SHAVE	3	ne	1	3
n	6096	SHAV	SHAVE	5	se	2	3
n	6233	SHAV	SHAVE	6	se	2	2
n	6545	SHAV	SHAVE	7	f340	1	2
n	6227	SDSHAV	SHAVE	6a	se/f319	2	
n2	8511	CUT	CUT	p	*	2	2
n2	12891	CUT	CUT	p	*	1	3
n2	1221	D.PRF	PERFORA TE	1.05	*	2	
n2	925	D.PRF	PERFORA TE	115- 120	east	4	
n2	12893	PRF	PERFORA TE	p-63	*	1	1
n2	12895	PRF	PERFORA TE	p-63	*	1	3
n2	1223	HF.SCR	SCRAPE	1.05	*	2	3
n2	1245	ST.SCR	SCRAPE	4	*	2	3
n2	763	HF.SCR	SCRAPE	50	*	2	
n2	822	HF.SCR	SCRAPE	p	*	2	3

APPENDIX II

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EXC. UNIT	CATALOG #	HAMILTON TYPE	SMITH THPE	LEVEL	QUAD/ FEATURE	E. T.	R. Q.
n2	8513	PFM.SCR	SCRAPE	p	*	1	
n2	8521	ST.SCR	SCRAPE	p	*	2	2
n2	1222	SHAV	SHAVE	1.05	*	1	2
n2	12900	SHAV	SHAVE	2	*	1	2
n2	1238	SHAV	SHAVE	85	*	1	1
n2	1239	SHAV	SHAVE	85	*	1	1
n2	1240	SHAV	SHAVE	85	*	1	3
n2	1251	SHAV	SHAVE	85	*	1	0
n2	1259	SHAV	SHAVE	85- 105	*	1	2
n2	1248	WG	WEDGE	85	*	1	2
n2	1258	WG	WEDGE	85- 105	*	2	2
no data	2834	CUT	CUT	no data	no data	no da	no da
no data	10754	GRAV	GRAVE	no data	no data	no da	no da
no data	10738	no data	no data	no data	no data	no da	no da
no data	10741	no data	no data	no data	no data	no da	no da
no data	10752	no data	no data	no data	no data	no da	no da
no data	4440	D.PRF	PERFORA TE	?	*	2	2
no data	710	SDSHAV	SCRAPE	no data	no data	no da	no da
no data	711	HF.SCR	SCRAPE	no data	no data	no da	no da
no data	716	HF.SCR	SCRAPE	no data	no data	no da	no da
no data	4483	SDSHAV	SHAVE	?	*	1	3
no data	743	SDSHAV	SHAVE	no data	no data	no da	no da
o	7845	CUT	CUT	2	ne	1	ta

APPENDIX II

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EXC. UNIT	CATALOG #	HAMILTON TYPE	SMITH THPE	LEVEL	QUAD/ FEATURE	E. T.	R. Q.
o	5642	KNIF	CUT	2	se	2	2
o	5488	KNIF	CUT	2	sw	4	2
o	7861	CUT	CUT	4	ne	1	3
o	7864	CUT	CUT	4	ne	1	
o	5951	KNIF	CUT	4	nw	4	2
o	6037	CUT	CUT	5	sw	1	3
o	6173	CUT	CUT	5	nw	1	2
o	6176	CUT	CUT	5	nw	1	
o	7891	CUT	CUT	5	nw	1	
o	7925	CUT	CUT	7	ne	1	
o	7937	CUT	CUT	8	nw	1	
o	7826	CUT	CUT	p	se	1	3
o	5405	CUT	CUT	pz	ne	2	2
o	5981	D. PRF	PERFORA TE	4	ne	2	3
o	7895	D. PRF	PERFORA TE	6	ne	2	2
o	5417	D. PRF	PERFORA TE	p	ne	1	2
o	7480	D. PRF	PERFORA TE	p	*	1	
o	7852	SAW	SAW	3	ne	1	3
o	5526	ST. SCR	SCRAPE	2	sw	1	3
o	7844	ST. SCR	SCRAPE	2	nw	1	
o	5796	ST. SCR	SCRAPE	3	se	2	3
o	7863	ST. SCR	SCRAPE	4	ne	1	2
o	7878	E. SCR	SCRAPE	5	se	1	
o	7884	ST. SCR	SCRAPE	5	ne	1	
o	7892	E. SCR	SCRAPE	5	nw	1	2
o	6342	HF. SCR	SCRAPE	6	nw	1	
o	7907	ST. SCR	SCRAPE	6	ne	1	
o	7911	ST. SCR	SCRAPE	6	nw	1	
o	7913	ST. SCR	SCRAPE	6	nw	1	
o	7914	E. SCR	SCRAPE	6	*	1	
o	7926	PFM. SCR	SCRAPE	7	se	1	
o	6424	HF. SCR	SCRAPE	7	ne	2	
o	6534	ST. SCR	SCRAPE	6a	f339	1	
o	5299	ST. SCR	SCRAPE	p	sw	2	4
o	5330	HF. SCR	SCRAPE	p	nw	2	
o	5335	E. SCR	SCRAPE	p	nw	1	
o	7828	ST. SCR	SCRAPE	p	sw	1	3
o	5934	SDSHAV	SHAVE	4	se	1	1
o	6038	SHAV	SHAVE	5	sw	2	3
o	6238	SHAV	SHAVE	6	se	1	2

APPENDIX II

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EXC. UNIT	CATALOG #	HAMILTON TYPE	SMITH THPE	LEVEL	QUAD/ FEATURE	E. T.	R. Q.
o	6255	SHAV	SHAVE	6	se	1	
o	7935	SHAV	SHAVE	8	nw	1	
o	5419	SHAV	SHAVE	p	ne	1	3
o	5392	WG	WEDGE	p	ne	2	
o2	8124	CUT	CUT	6	ne		
o2	5673	GRAV	GRAVE	2	*	2	3
o2	6099	D.PRF	PERFORA	4	nw	2	2
		TE					
o2	5771	SAW	SAW	2	se	1	4
o2	5713	HF.SCR	SCRAPE	2	ne	2	
o2	8102	E.SCR	SCRAPE	4	*	1	
o2	6073	HF.SCR	SCRAPE	4	nw	2	
o2	6201	HF.SCR	SCRAPE	4	sw	2	
o2	8111	ST.SCR	SCRAPE	5	nw	1	
o2	8112	PFM.SCR	SCRAPE	5	nw	1	2
o2	8113	ST.SCR	SCRAPE	5	nw	1	
o2	6400	HF.SCR	SCRAPE	5	se	2	3
o2	5268	HF.SCR	SCRAPE	p	sw	2	2
o2	5334	HF.SCR	SCRAPE	p	ne	2	3
o2	5342	E.SCR	SCRAPE	p	ne	1	2
o2	5390	HF.SCR	SCRAPE	p	se	2	2
o2	5415	E.SCR	SCRAPE	pz	se	1	3
o2	5712	SDSHAV	SHAVE	2	ne	1	
o2	5938	SHAV	SHAVE	3	ne	2	
o2	6074	SDSHAV	SHAVE	4	nw	1	
o2	6401	SDSHAV	SHAVE	5	se	1	2
o2	8109	SHAV	SHAVE	5	se	1	1
o2	8120	SHAV	SHAVE	5	se	1	3
o2	6543	SDSHAV	SHAVE	6	ne	1	
o2	6549	SHAV	SHAVE	6	ne	4	2
p	5534	CUT	CUT	2	center	1	3
p	8235	CUT	CUT	2	center	1	3
p	5514	KNIF	CUT	2	center	3	
p	8245	no data	no data	3	south, 1/3		
p	5374	D.PRF	PERFORA	pz	middle	2	
		TE					
p	5533	SAW	SAW	2	center	1	2
p	5496	HF.SCR	SCRAPE	2	north	1	
p	8238	ST.SCR	SCRAPE	2	south, 1/3	1	3
p	8240	ST.SCR	SCRAPE	3	center	1	
p	12846	ST.SCR	SCRAPE	3	*	1	3
p	6574	PFM.SCR	SCRAPE	4	f325	1	
p	5825	E.SCR	SCRAPE	32-52	north	1	3
p	5379	PFM.SCR	SCRAPE	p	center	1	

APPENDIX II

List of 1,093 Non-Projectile Point Fine-Grained
Chipped Lithic Artifacts From Which Use-Wear Samples
Were Drawn

EXC. UNIT	CATALOG #	HAMILTON TYPE	SMITH THPE	LEVEL	QUAD/ FEATURE	E. T.	R. Q.
p	5437	HF.SCR	SCRAPE	p	south	2	2
p	8220	ST.SCR	SCRAPE	p	south, 1/3	1	
p	5402	E.SCR	SCRAPE	pz	south	1	2
p	5762	SDSHAV	SHAVE	3	south	1	2
p	8242	SHAV	SHAVE	3	south, 1/3	1	
p	8249	SHAV	SHAVE	4	*	2	2
p	5372	SDSHAV	SHAVE	p	center	2	10
p	5380	SHAV	SHAVE	p	center	1	2
p	5424	SDSHAV	SHAVE	p	south	1	2
p	13013	SDSHAV	SHAVE	p	*	2	2
p	5420	WG	WEDGE	p	south	2	1
p2	7300	CUT	CUT	2	*	1	
p2	14541	CUT	CUT	2	*	1	2
p2	7534	CUT	CUT	3	*	1	2
p2	14368	CUT	CUT	3	*	2	1
p2	14546	CUT	CUT	4	*	1	2
p2	1165	CUT	CUT	pz2	*	1	1
p2	7301	GRAV	GRAVE	2	*	1	3
p2	14427	GRAV	GRAVE	3	*	1	2
p2	14540	SHAV	indet	3	*	3	2
p2	14375	WG	indet	4	*	2	2
p2	7256	D.PRF	PERFORA TE	4	s	2	
p2	7268	D.PRF	PERFORA TE	5	*	2	
p2	1200	D.PRF	PERFORA TE	120- 140	*	2	
p2	7310	HF.SCR	SCRAPE	1	*	2	3
p2	1158	HF.SCR	SCRAPE	2	south	1	3
p2	1167	ST.SCR	SCRAPE	2	*	1	1
p2	1163	ST.SCR	SCRAPE	2	*		
p2	7535	ST.SCR	SCRAPE	3	*	1	
p2	7533	ST.SCR	SCRAPE	3	*	2	4
p2	781	ST.SCR	SCRAPE	5	*	2	3
p2	782	HF.SCR	SCRAPE	5	*	2	4
p2	1205	SR.SCR	SCRAPE	p	*	2	3
p2	7488	ST.SCR	SCRAPE	p	*	1	
p2	7506	ST.SCR	SCRAPE	p	*	2	2
p2	14543	SHAV	SHAVE	2	*	1	2
p2	7528	SHAV	SHAVE	3	*	2	2
p2	14367	SHAV	SHAVE	4	*	2	2
p2	14542	SDSHAV	SHAVE	4	*	3	2
p2	7271	SHAVE	SHAVE	5	'fire, pit'	2	2
p2	1204	SHAV	SHAVE	135	south	1	3

APPENDIX II

List of 1,093 Non-Projectile Point Fine-Grained
Chipped Lithic Artifacts From Which Use-Wear Samples
Were Drawn

EXC. UNIT	CATALOG #	HAMILTON TYPE	SMITH THPE	LEVEL	QUAD/ FEATURE	E. T.	R. Q.
p2	576	SHAV	SHAVE	p	*	2	1
p2	7501	SHAV	SHAVE	pz2	south	2	2
pothunt	14447	CUT	CUT	no, da	*	1	
er				ta			
pothunt	8206	SDSHAV	SHAVE		*	2	2
er							
q	3897	CUT	CUT	3	*	1	2
q	4407	CUT	CUT	4	*	1	
q	7073	CUT	CUT	9	*	1	
q	7064	CUT	CUT	11	f216	1	
q	7065	CUT	CUT	11	f216	1	
q	8347	CUT	CUT	phunt	phunt	1	3
q	3233	GRAV	GRAVE	p	*	1	3
q	4273	HD. PRF	PERFORA	4	nw	4	
			TE				
q	7063	D. PRF	PERFORA	8	f156	1	3
			TE				
q	3184	D. PRF	PERFORA	p	*	2	3
			TE				
q	3235	SAW	SAW	p	sw	2	3
q	7039	ST. SCR	SCRAPE	4	*	1	3
q	7041	E. SCR	SCRAPE	4	*	2	1
q	7040	ST. SCR	SCRAPE	5	*	1	3
q	7068	ST. SCR	SCRAPE	6	*	1	
q	4761	ST. SCR	SCRAPE	9	ne	1	
q	3398	PFM. SCR	SCRAPE	pothu	*	1	
				nt			
q	589	HF. SCR	SCRAPE	pz2	center	2	
q	4114	SDSHAV	SHAVE	3	*	2	
q	4741	SDSHAV	SHAVE	9	f93	1	3
q	4962	SHAV	SHAVE	10	*	2	
q	4986	SDSHAV	SHAVE	11	f93	1	
q	7055	SHAV	SHAVE	p	*	1	
q2	13894	CUT	CUT	2a	sw	1	4
q2	13892	E. SCR	SCRAPE	4a	se/f351	2	2
q2	13895	ST. SCR	SCRAPE	p	sw	1	4
q2	13906	ST. SCR	SCRAPE	p	se	1	1
q2	13893	SHAV	SHAVE	2	se	1	2
q2	13897	SHAV	SHAVE	2a	sw	2	3
q2	13921	SHAV	SHAVE	p	sw	2	3
r	6894	GRAV	GRAVE	8	27	2	2
r	6891	GRAV	GRAVE	8	f27	3	2
r	6848	D. PRF	PERFORA	6	*	2	
			TE				

APPENDIX II

List of 1,093 Non-Projectile Point Fine-Grained
Chipped Lithic Artifacts From Which Use-Wear Samples
Were Drawn

EXC. UNIT	CATALOG #	HAMILTON TYPE	SMITH THPE	LEVEL	QUAD/ FEATURE	E. T.	R. Q.
r	6837	PFM.SCR	SCRAPE	2	*	1	3
r	6886	ST.SCR	SCRAPE	2	*	1	
r	1614	E.SCR	SCRAPE	2	sw	2	1
r	6878	ST.SCR	SCRAPE	4	*	1	2
r	2177	T.SCR	SCRAPE	4	sw/f21	2	
r	6893	PFM.SCR	SCRAPE	8	f27	1	
r	2819	HF.SCR	SCRAPE	0-20	ne	2	3
r	1498	E.SCR	SCRAPE	p	*	2	3
r	1827	PFM.SCR	SCRAPE	p	*	1	3
r	6852	ST.SCR	SCRAPE	p	*	1	
r	6853	HF.SCR	SCRAPE	p	*	2	1
r	6889	E.SCR	SCRAPE	p	*	2	
r	7045	SHAV	SHAVE	3	*	2	2
r	1787	SDSHAV	SHAVE	60	sw	1	2
r	2249	SDSHAV	SHAVE	77	*	1	3
r	2925	SDSHAV	SHAVE	120- 130	*	1	
r	2047	SDSHAV	SHAVE	60-70	wall	1	3
r	1479	SHAV	SHAVE	p	se	1	
r	1826	SDSHAV	SHAVE	p	*	1	1
r	6879	WG	WEDGE	4	*	2	2
r	2465	WG	WEDGE	nw	*	2	4
s	5198	CUT	CUT	pz	*	1	
s	3806	D.PRF	PERFORA TE	1	*	2	
s	4963	D.PRF	PERFORA TE	5	*	4	3
s	3740	ST.SCR	SCRAPE	1	*	2	2
s	5175	ST.SCR	SCRAPE	3	*	1	
s	3171	ST.SCR	SCRAPE	p	*	1	3
s	5185	ST.SCR	SCRAPE	p	*	1	
s	5186	ST.SCR	SCRAPE	p	*	2	
s	5188	ST.SCR	SCRAPE	p	*	1	
s	4560	SHAV	SHAVE	3	f43	1	3
s	3481	WG	WEDGE	p	*	2	3
t	7573	CUT	CUT	3	*	1	
t	7568	CUT	CUT	3	*	2	2
t	418	CUT	CUT	4	se	1	2
t	7599	CUT	CUT	5	*	1	
t	7604	CUT	CUT	6	*	1	
t	380	KNIF	CUT	60-70	sw	4	2
t	1051	KNIF	CUT	80-90	*	4	
t	970	CUT	CUT	p	*	1	2
t	7545	CUT	CUT	p	*	1	

APPENDIX II

List of 1,093 Non-Projectile Point Fine-Grained
Chipped Lithic Artifacts From Which Use-Wear Samples
Were Drawn

EXC. UNIT	CATALOG #	HAMILTON TYPE	SMITH THPE	LEVEL	QUAD/ FEATURE	E. T.	R. Q.
t	7592	GRAV	GRAVE	4	*	2	3
t	7544	GRAV	GRAVE	p	*	1	2
t	1014	D.PRF	PERFORA	40-50	*	1	3
			TE				
t	3092	ST.SCR	SCRAPE	2	*	1	
t	7559	PFM.SCR	SCRAPE	2	*	1	
t	7560	HF.SCR	SCRAPE	2	*	2	
t	7569	ST.SCR	SCRAPE	3	*	1	
t	7570	ST.SCR	SCRAPE	3	*	1	
t	7575	HF.SCR	SCRAPE	3	*	2	2
t	7576	HF.SCR	SCRAPE	3	*	2	1
t	7577	ST.SCR	SCRAPE	3	*		2
t	7587	PFM.SCR	SCRAPE	4	*	1	
t	7605	PFM.SCR	SCRAPE	6	*	1	3
t	7606	ST.SCR	SCRAPE	6	*		
t	1011	PFM.SCR	SCRAPE	40-50	*	1	
t	277	HF.SCR	SCRAPE	40-60	sw	2	
t	1049	E.SCR	SCRAPE	80-90	*	1	
t	1057	HF.SCR	SCRAPE	80-90	*	2	2
t	971	PFM.SCR	SCRAPE	p	*	1	3
t	3095	ST.SCR	SCRAPE	p	*	1	1
t	7539	E.SCR	SCRAPE	p	*		
t	7561	SHAV	SHAVE	2	*	1	
t	7600	SDSHAV	SHAVE	6	*	1	10
t	1003	SDSHAV	SHAVE	30-40	*	1	
t	1047	SHAV	SHAVE	70-80	*	1	
t	1048	SHAV	SHAVE	70-80	*	1	
t	1054	SHAV	SHAVE	70-80	*	1	
t	949	SDSHAV	SHAVE	p	*	1	10
t	965	SHAV	SHAVE	p	*	1	2
t	974	SHAV	SHAVE	p	*	1	1
t	1012	WG	WEDGE	40-50	*	2	4
t	313	WG	WEDGE	40-60	se	1	
u	7245	CUT	CUT	2	*	1	3
u	1031	CUT	CUT	4	*	1	1
u	14293	CUT	CUT	120- end	f111	2	3
u	1006	CUT	CUT	40-50	*	1	
u	1017	CUT	CUT	50-60	*	2	2
u	982	D.PRF	PERFORA	2	*	2	2
			TE				
u	7384	D.PRF	PERFORA	4	*	2	2
			TE				

APPENDIX II

List of 1,093 Non-Projectile Point Fine-Grained
Chipped Lithic Artifacts From Which Use-Wear Samples
Were Drawn

EXC. UNIT	CATALOG #	HAMILTON TYPE	SMITH THPE	LEVEL	QUAD/ FEATURE	E. T.	R. Q.
u	863	HD.PRF	PERFORA TE	120	nw/f11	3	10
u	540	HD.PRF	PERFORA TE	105- 110	se	4	
u	314	D.PRF	PERFORA TE	60-80	nw	2	1
u	852	SAW	SAW	110- 120	f11	2	2
u	983	HF.SCR	SCRAPE	2	*	2	
u	7217	ST.SCR	SCRAPE	3	*	1	3
u	7228	ST.SCR	SCRAPE	3	*	1	1
u	7230	ST.SCR	SCRAPE	4	*	1	
u	1030	HF.SCR	SCRAPE	4	*	2	3
u	1063	HF.SCR	SCRAPE	4	*	2	
u	1065	ST.SCR	SCRAPE	4	*	2	3
u	873	HF.SCR	SCRAPE	120	ne/f11	2	2
u	7353	PFM.SCR	SCRAPE	p	*	1	
u	952	SHAV	SHAVE	1	*	4	3
u	7251	SHAV	SHAVE	2	*	1	
u	993	SHAV	SHAVE	3	*	1	2
u	7221	SHAV	SHAVE	3	*	1	
u	7222	SHAV	SHAVE	3	*	2	
u	1062	SDSHAV	SHAVE	4	*	1	
u	7349	SHAV	SHAVE	p	*	1	
u	7378	WG	WEDGE	6	*	2	3
v	7218	D.PRF	PERFORA TE	3	*	1	
v	7219	D.PRF	PERFORA TE	3	*	2	3
v	7325	D.PRF	PERFORA TE	3	*	2	2
v	7337	D.PRF	PERFORA TE	3	*	4	3
v	7330	PFM.SCR	SCRAPE	3	*	1	
v	7312	ST.SCR	SCRAPE	4	se	1	
v	7314	E.SCR	SCRAPE	4	ne	2	
v	15	HF.SCR	SCRAPE	p	sw	2	
v	28	HF.SCR	SCRAPE	p	center	2	3
v	40	ST.SCR	SCRAPE	p	sw	1	3
v	61	HF.SCR	SCRAPE	p	ne	2	
v	7341	SHAV	SHAVE	3	*	2	2
v	958	WG	WEDGE	p	*	2	2

APPENDIX II

List of 1,093 Non-Projectile Point Fine-Grained
Chipped Lithic Artifacts From Which Use-Wear Samples
Were Drawn

EXC. UNIT	CATALOG #	HAMILTON TYPE	SMITH THPE	LEVEL	QUAD/ FEATURE	E. T.	R. Q.
w	1267	D. PRF	PERFORA TE	60-80	*	1	
w	591	D. PRF	PERFORA TE	p	*	2	2
w	12968	PRF	PERFORA TE	pz#2	*	2	2
w	12964	SAW	SAW	p/2	*	3	3
w	1269	ST. SCR	SCRAPE	2	*	2	2
w	645	E. SCR	SCRAPE	3	*	1	2
w	5208	ST. SCR	SCRAPE	3	*	1	
w	5214	ST. SCR	SCRAPE	5	f13	1	
w	590	ST. SCR	SCRAPE	p	center	1	
w	1309	ST. SCR	SCRAPE	p	*	2	3
w	12969	SHAV	SHAVE	4	*	1	3
w	1270	SDSHAV	SHAVE	60-80	*	1	2
w	1311	SDSHAV	SHAVE	p	*	1	
w	12967	SHAV	SHAVE	p2	*	2	3
unknown	223	HF. SCR	SCRAPE	-	*	2	
x	1771	CUT	CUT	5	sw	1	3
x	2124	KNIF	CUT	7	nw	4	2
x	6938	GRAV	GRAVE	5	*	2	3
x	2893	PRF	PERFORA TE	7	*	2	2
x	2928	D. PRF	PERFORA TE	10	f27	2	2
x	3118	PFM. SCR	SCRAPE	3	sw	1	
x	6941	HF. SCR	SCRAPE	5	*	2	3
x	6949	ST. SCR	SCRAPE	6	*	1	
x	6950	HF. SCR	SCRAPE	6	*	2	
x	6908	PFM. SCR	SCRAPE	7	*	1	3
x	6961	HF. SCR	SCRAPE	7	*	1	3
x	6969	HF. SCR	SCRAPE	7	*	1	3
x	6974	E. SCR	SCRAPE	7	*	1	
x	2903	ST. SCR	SCRAPE	8	*	1	
x	2904	HF. SCR	SCRAPE	8	*	1	3
x	6905	ST. SCR	SCRAPE	8	*	2	3
x	2338	E. SCR	SCRAPE	10	*	2	
x	2539	ST. SCR	SCRAPE	11	f27a	1	3
x	1427	HF. SCR	SCRAPE	p	*	2	
x	1798	PFM. SCR	SCRAPE	p	*	1	3
x	2685	SHAV	SHAVE	5	*	1	2
x	6939	SHAV	SHAVE	5	*	1	
x	4084	SHAV	SHAVE	5	se	2	3
x	1674	SDSHAV	SHAVE	55	se	1	3

APPENDIX II

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Chipped Lithic Artifacts From Which Use-Wear Samples
Were Drawn

EXC. UNIT	CATALOG #	HAMILTON TYPE	SMITH THPE	LEVEL	QUAD/ FEATURE	E. T.	R. Q.
Y	3592	CUT	CUT	2	nw	2	3
Y	12951	CUT	CUT	5	f33a	4	1
Y	12956	CUT	CUT	6	sw	1	2
Y	12957	CUT	CUT	6	se	1	2
Y	12958	CUT	CUT	6	f190-192		
Y	5094	KNIF	CUT	7	f178	3	
Y	3687	D.PRF	PERFORA TE	3	hearth	2	3
Y	4553	HD.PRF	PERFORA TE	5	f389g	4	
Y	7010	D.PRF	PERFORA TE	6	ne/f190+19 2	2	
Y	3334	PRF	PERFORA TE	p	*	4	
Y	5034	ST.SCR	SCRAPE	7	*	1	
Y	7005	PFM.SCR	SCRAPE	7	f178	1	3
Y	7002	HF.SCR	SCRAPE	7	se	2	2
Y	5321	ST.SCR	SCRAPE	p	*		
Y	3807	SHAV	SHAVE	p	*	1	2
Z	1858	CUT	CUT	2	*	1	
Z	6797	KNIF	CUT	4	*	4	3
Z	14428	KNIF	CUT	6	*	4	4
Z	2670	CUT	CUT	10	f38b	4	2
Z	2712	KNIF	CUT	10	f38b	4	
Z	1823	CUT	CUT	pz	*	1	1
Z	6796	GRAV	GRAVE	4	*	2	3
Z	6829	D.PRF	PERFORA TE	2	*	1	
Z	6828	PRF	PERFORA TE	6	*	3	
Z	2965	D.PRF	PERFORA TE	8	f38b	2	3
Z	2943	D.PRF	PERFORA TE	8	*	3	1
Z	2646	SAW	SAW	10	f38a	1	2
Z	1849	ST.SCR	SCRAPE	2	*	1	3
Z	1844	HF.SCR	SCRAPE	2	*	2	3
Z	1847	HF.SCR	SCRAPE	2	*	2	2
Z	1848	ST.SCR	SCRAPE	2	*	2	2
Z	6690	HF.SCR	SCRAPE	2	*	2	
Z	6700	HF.SCR	SCRAPE	2	*	2	3
Z	6821	HF.SCR	SCRAPE	2	*	2	
Z	6822	HF.SCR	SCRAPE	2	*	2	3
Z	6780	ST.SCR	SCRAPE	3	*	1	

APPENDIX II

List of 1,093 Non-Projectile Point Fine-Grained
Chipped Lithic Artifacts From Which Use-Wear Samples
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EXC. UNIT	CATALOG #	HAMILTON TYPE	SMITH THPE	LEVEL	QUAD/ FEATURE	E. T.	R. Q.
z	2031	HF.SCR	SCRAPE	4	sw	2	2
z	6798	ST.SCR	SCRAPE	4	*	2	3
z	2316	E.SCR	SCRAPE	6	*	2	4
z	6791	ST.SCR	SCRAPE	7	*	2	3
z	6807	ST.SCR	SCRAPE	7	*		
z	1657	HF.SCR	SCRAPE	38	se	2	2
z	1419	E.SCR	SCRAPE	76	*	2	1
z	6820	HF.SCR	SCRAPE	p	*	2	3
z	1619	SHAV	SHAVE	2	se	2	2
z	6790	SDSHAV	SHAVE	4	*	2	
z	2425	SDSHAV	SHAVE	5	*	1	2
z	2427	SHAV	SHAVE	5	*	1	1
z	2428	SHAV	SHAVE	5	*	1	4
z	2429	SDSHAV	SHAVE	5	*	2	
z	6805	SHAV	SHAVE	7	*	1	
z	2126	SHAV	SHAVE	65	nw	1	2
z	2459	SDSHAV	SHAVE	84	se	1	1
z	2487	SHAV	SHAVE	90	ne	1	
z	2493	SHAV	SHAVE	90	ne	1	2
z	2945	SDSHAV	SHAVE	92	*	2	2
z	2606	SDSHAV	SHAVE	106	f38b	2	2
z	1472	SHAV	SHAVE	p	se	2	2

APPENDIX II

List of 1,093 Non-Projectile Point Fine-Grained
Chipped Lithic Artifacts From Which Use-Wear Samples
Were Drawn

KEY TO APPENDIX II

Exc. Unit	=	Excavation Unit (see Figure 5)
Cat. #	=	Artifact catalog number
Ham. Type	=	Hamilton morphofunctional classification
Smith Type	=	Functional classification based on use-wear sample
Level BSD	=	Provenience by excavation level or cm <u>B</u> elow <u>S</u> ite <u>D</u> atum
Quad/Feature	=	Excavation quad or associated feature number
E.T.	=	Hamilton Energy Type (see discussion in Chapter 5)
R.Q.	=	Raw material quality (see discussion in Chapter 5)

1. Hamilton types contain qualifiers (e.g. **HF.SCR**) to indicate hafting, etc. Smith classification denotes function only. See Hamilton, 1994 for clarification.
2. * and blank cells indicate indicate no data available
3. Excavation unit codes in the form at 'a/11/12m' indicate items recovered from auger tests.

APPENDIX III

List of 967 Atrifacts With Provenience
to the Centimeter Level, Used In
3d Spatial Distribution Study

EXC. UNIT	CATALOG #	TYPE	m SOUTH	m EAST	cm BSD
A	8686	lith.raw	-8.33	14.69	23
A	8723	lith	-9.03	14.94	25
A	8834	flkd.cob	-8.12	15.17	30.5
A	8831	emf	-8.35	15.15	25
A	9136	bif	-8.26	14.4	45
A	9200	at	-9.47	14.68	52
A	9212	wk.bn	-9.9	14.1	46
A	9220	pp	-9.94	14.6	48
A	9268	wk.at	-9.84	15.19	51
A	9279	at	-9.97	15.13	49
A	9308	at	-9.15	15.49	48
A	9449	wk.bn	-9.71	14.67	62
A	9463	cor	-9.35	14.59	63
A	9464	pc.ab	-9	14.78	58
A	9534	wk.bn	-8.64	14.38	56
A	9577	wk.bn	-8.52	14.56	64
A	9809	wk.cob	-9.86	15.68	80
A	9813	wk.at	-9.96	15.97	76
A	9947	pc.ab.fg	-8.92	15.65	75
A	9954	ct.bn	-8.9	15.77	70
A	10088	wk.at	-9.73	14.77	80
A	10110	ab.fg	-8.39	14.84	74
A	9809	wk.cob	-9.86	15.72	80
A	9813	wk.at	-9.93	15.96	76
A	10197	hmr.bip	-9.44	15.01	87
A	10239	ct.bn	-8.9	15.87	89
A	10364	lith	-9.64	15.08	112
A	10409	maul	-9.4	15.53	115
A	10467	wk.at	-9.27	15.54	122
A	10457	wk.bn	-9.62	15	136
A	10476	wk.bn	-9.91	15.09	170
C	8929	wk.bn	-6.71	14.7	47
C	8932	cor	-6.82	14.21	50
C	9071	tine	-7.1	14.73	36
C	9113	tine	-7.4	14.7	49
C	9160	core	-7.43	14.3	43
C	9161	cob.cor	-7.78	15	42
C	9174	bif	-7.87	15.19	38
C	9179	emf	-7.9	15.37	38
C	9211	ntwt.fg	-7.14	15.49	41
C	9217	pp.fg	-7.53	15.07	43
C	9218	hmr	-7.53	15.07	43
C	9222	emf	-7.35	15.97	44
C	9227	cor	-7.59	15.61	44

APPENDIX III

List of 967 Artifacts with Three-Point Provenience to
the Centimeter Level,
Used in 3d Spatial Distribution Study

EXC. UNIT	CATALOG #	TYPE	m SOUTH	m EAST	cm BSD
C	9231	lith	-7.55	15.93	44
C	9232	lith	-7.55	15.95	44
C	9235	cor	-7.46	15.19	48
C	9403	emf	-6.83	15.12	53
C	9401	emf	-6.42	15.19	53
C	9373	emf	-6.8	15.1	48
C	9471	anvil	-6.08	15.43	58
C	9550	wk.bn.	-7.87	14.67	58
C	9603	cor	-7.46	14.25	63
C	9602	cor	-7.47	14.45	62
C	9604	bn.pt.	-7.54	14.32	62
C	9676	wk.bn.	-7.34	15.27	61
C	9613	raw.lith	-7.83	14.52	62
C	9604	bn.pp	-7.54	14.32	62
C	9611	emf	-7.16	14.13	64
C	9688	flk	-7.7	15.74	61
C	9691	flk	-7.2	15.6	58
C	9717	cor	-7.06	14.75	63
C	9718	pp.fg	-7.71	14.2	64
C	9738	pref.	-6.4	14.85	63
C	9794	cor	-7.25	15.42	65
C	10016	swn.bn.	-6.2	16	75
C	10017	cor	-6.53	15.81	70
C	10093	core	-6.75	15.89	66
C	10119	pp	-7.96	15.04	77
C	10145	pc	-7.71	15.87	80
C	10201	scr	-7	14.3	69
C	10220	scr	-7.14	14.44	67
C	9891	bif.fg	-6.84	14.84	66
C	9890	bif.fg	-6.6	14.4	66
C	9904	flk	-6.37	14.06	73
D	9193	bif	-6.85	17.92	52
D	9170	cor	-6.42	17	50
D	9171	iron.pp	-6	17.18	47
D	9223	cor	-7.51	17.12	45
F	9322	scr	-4.83	19.76	44
F	9369	hmr	-5.29	19.86	51.5
F	9419	wk.bn	-5.96	18.71	50
F	9662	ct.rk	-4.58	18.15	71
F	9715	at.wg	-4.72	18.9	72
F	9732	core	-4.43	18.73	63
F	9752	hmr	-5.53	18.1	63
F	100085	charc	-4.2	19.9	60.5
F	9974	bvr.th	-5.02	18.77	78

APPENDIX III

List of 967 Artifacts with Three-Point Provenience to
the Centimeter Level,
Used in 3d Spatial Distribution Study

EXC. UNIT	CATALOG #	TYPE	m SOUTH	m EAST	cm BSD
F	10057	hmr	-5.02	19.7	85
F	10089	wk.at	-5.3	19.78	80
F	10107	at.club	-5.53	19.44	85
F	10170	lpp	-5.83	19.84	82
F	10167	gird.nwt	-5.01	18.06	92
F	10225	hmr	-4.71	18.88	103
F	10227	bd.bn	-4.61	18.64	103
F	10495	raw	-4.58	18.27	117
F	10507	maul	-4.53	18.98	112
F	10515	grd.nwt	-4.61	18.29	125
F	10316	ab	-4.87	18.11	119
F	10533	hmr	-4.74	18.77	111
F	10534	anvil?	-4.64	18.85	123
F	10538	anvil	-4.24	18.87	113
F	10555	anvil.fg	-4.5	18.26	141
F	10556	ab.fg	-4.61	18.15	143
F	10535	lith	-4.32	18.87	123
F	10536	maul	-4.6	18.92	112
F	10537	ab	-4.62	19.01	112
H	8802	bif	-3.92	16.44	28
H	8992	knif	-2.67	16.15	23
H	8902	core	-2.6	17.4	29
H	8906	bn.awl	-2.51	17.45	35
H	9076	at	-2.22	16.61	50
H	9098	raw	-3.67	16.74	46
H	9103	ct.bn	-3.75	16.54	44
H	9102	wk.bn	-3.89	16.58	45
H	9125	ct.bn	-3.55	16.93	49
H	9239	unif	-2.66	16.43	37
H	9240	bif.fg	-2.53	16.4	58
H	9251	emf	-2.08	16.09	57
H	9283	emf	-2.52	16.7	62
H	9310	ct.at	-2.07	16.5	66
H	9296	bif	-2.53	16.67	63
H	9323	ab	-3.45	16.53	53
H	9347	ct.bn	-3.42	16.64	63
H	9355	ct.bn	-3.82	16.57	65
H	9367	bif	-3.63	17.3	54
H	9368	bd.bn.tb	-3.22	17.21	58
H	9387	hmr	-3.6	17.65	58
H	9372	lpp	-3.06	17.91	61
H	9386	wk.bn	-3.63	17.8	65
H	9408	ab	-2.77	16.97	60
H	9555	raw	-2.84	16.19	77

APPENDIX III

List of 967 Artifacts with Three-Point Provenience to
the Centimeter Level,
Used in 3d Spatial Distribution Study

EXC. UNIT	CATALOG #	TYPE	m SOUTH	m EAST	cm BSD
H	9490	lpp	-2.98	16.87	71
H	9491	ct.at	-2.47	17.5	79
H	9496	core	-2.3	17.25	79
H	9498	core	-2.17	17.26	78
H	9511	core	-2.15	17.21	75
H	9708	lpp	-2.16	16.55	80
H	9712	raw	-2.16	16.45	84
H	9713	raw	-2.06	16.3	84
H	9714	raw	-2.07	16.09	85
H	9724	bif.fg	-2.15	16.32	85
H	10111	ct.bn.	-2.7	16.96	107
H	9540	flk.cob	-2.59	16.52	70
H	9541	lpp	-2.87	16.68	68
H	9555	raw	-2.84	16.18	77
H	9585	bn.wg	-3.23	16.56	73
H	9592	at	-2.66	16.7	75
H	9607	lpp	-3.96	16.85	69
H	9608	lpp	-3.68	16.78	75
H	9610	at	-3.72	16.26	78
H	9615	at	-3.63	16.69	81
H	9628	core	-3.48	16.57	80
H	9663	bd	-3.54	17.98	70
H	9754	wk.wood	-2.38	16.83	89
H	9755	lpp	-2.48	16.72	84
H	9756	at	-2.04	16.97	84
H	9783	ct.at	-2.94	16.97	93
H	9784	ml	-2.63	17.62	81
H	9786	ab	-2.3	17.9	84
H	9785	core	-2.41	18	81
H	9790	emf	-2.53	17.43	82
H	9791	ab	-2.38	17.73	82
H	9792	ct.bn	-2.64	17.45	88
H	9793	ct.bn	-2.13	17.37	86
H	9806	ct.bn	-2.26	17.32	94
H	9823	core	-3.68	16.73	85
H	9824	at	-3.67	16.55	82
H	9827	ab	-3.25	16.55	85
H	9829	at	-3.78	16.67	86
H	9858	ab	-3.42	17.16	83
H	9860	ab	-3.35	17.8	91
H	9862	at	-3.2	17.2	93
H	9868	at	-2.95	17.57	95
H	9869	unif	-3.41	16.05	90
H	9880	bn.brb	-2.69	17.04	89

APPENDIX III

List of 967 Artifacts with Three-Point Provenience to
the Centimeter Level,
Used in 3d Spatial Distribution Study

EXC. UNIT	CATALOG #	TYPE	m SOUTH	m EAST	cm BSD
H	9927	lpp	-2.06	16.4	102
H	9941	hmr	-3.42	16.58	97
H	9992	ml	-3.46	17.51	100
H	9993	scr	-3.64	17.66	104
H	10057	ct.at	-2.2	17.94	109
H	10074	wk.bn	-2.19	16.14	112
H	9979	hpn.brb	-3.66	16.4	112
J	8683	hmr	-1.87	18.49	20
J	8816	bif.frag	-0.26	18.23	24
J	8848	bd	-0.2	19.5	0
J	8874	core	-0.06	19.96	27
J	9034	ct.bn	-1.85	18.39	38
J	9116	core	-0.5	18.57	44
J	9301	lpp	-0.8	18.27	52
J	9313	ab	-0.77	18.75	53
J	9316	at	-0.51	18.73	57
J	9588	wk.at	-0.92	18.89	70
J	9666	wk.cob	-0.51	18.03	71
J	9731	pc.ab	-0.55	18.74	79
J	9766	wk.cob	-0.41	19.25	68
J	9771	bd	-0.48	19.43	72
J	9844	maul.hmr	-1.44	19.52	76
J	9892	hmr	-1.67	19.01	80
J	9892	hmr	-0.75	19.07	80
J	9906	anvil	-1.32	18.45	85
J	9938	anvil	-0.56	18.65	88
J	10013	bd	-1.76	19.19	94
J	10086	wk.at	-0.79	18.98	103
J	10112	wk.bn	-0.52	19.55	99
J	10176	lpp	-1.46	19.87	108
J	10314	core	-1.17	18.31	114
J	10328	maul	-1.28	18.79	113
J	10422	wk.at	-0.92	19.08	124
J	10430	gst	-1.58	19.13	129
J	10406	anvil	-0.15	18.81	120
J	10530	hmr	-1.76	19.18	137
J	10470	anvil	-1.34	19.13	130
J	10544	hmr	-1.5	19.5	140
J	10563	ab	-1.9	19.07	142
J	10564	ab	-1.51	19.07	149
J	10578	anvil	-1.6	19.01	144
L	8678	bn.pp	0.73	16.3	8
L	8713	lpp.fg	0.79	17.56	20
L	8740	emf	1.2	17.67	13

APPENDIX III

List of 967 Artifacts with Three-Point Provenience to
the Centimeter Level,
Used in 3d Spatial Distribution Study

EXC. UNIT	CATALOG #	TYPE	m SOUTH	m EAST	cm BSD
L	8746	core	1.21	17.72	14
L	8747	wk.bn	1.07	17.09	11
L	8722	bif.fg	1.04	17.71	0
L	8807	lpp	1.26	17.73	19
L	9012	hmr	0.61	17.8	25
L	9015	nail	0.17	17.13	26
L	8920	lpp.fg	1.56	17.59	38
L	9081	emf	1.9	17.05	21
L	9087	at.wg	1.51	16.44	33
L	9106	hmr	1.72	16.5	28
L	9122	ct.at	1.6	16.24	34
L	9123	maul	1.25	16.27	33
L	9134	ab	1.51	16.33	37
L	9185	ct.at	0.29	16.3	32
L	9336	at.wg	0.08	17.76	49
L	9338	anvil	0.94	17	44
L	9339	core	0.72	17.36	49
L	9475	bif	0.3	17.02	50
L	9478	core	0.05	17.03	53
L	9931	hmr	0.03	17.16	77
L	9548	hmr	0.7	17.22	54
L	9597	lpp.fg	0.74	17.28	63
L	9600	nwt	0.02	17.24	65
L	9638	unif	1.96	17.82	61
L	9669	lpp	1.93	17.62	61
L	9670	lpp	1	17.73	65
L	9687	bif	1.31	16.89	58
L	9762	core	0.74	16.78	66
L	9763	ct.at	0.68	16.7	66
L	9764	ex.lith	0.16	16.2	58
L	9799	spall.cob	0.74	17.26	66
L	9814	core	0.15	17.6	70
L	9815	lpp.fg	0.43	17.74	73
L	9960	nwt	0.75	16.75	75
L	9961	cob	0.4	16.59	73
L	10045	core	0.94	17.94	88
L	10139	bn.chsl	1.39	17.06	85
L	10074	core	1.05	17.73	92
L	10077	nwt	1.44	17.71	80
L	10187	core	0.81	16.9	94
L	10188	emf	0.45	16.85	94
L	10209	hmr	0.32	16.76	95
L	10102	core	1.05	17.5	93
L	10103	core	1.12	17.96	95

APPENDIX III

List of 967 Artifacts with Three-Point Provenience to
the Centimeter Level,
Used in 3d Spatial Distribution Study

EXC. UNIT	CATALOG #	TYPE	m SOUTH	m EAST	cm BSD
L	10274	nwt	0.26	16.97	110
L	10275	emf	0.13	16.92	100
L	10276	ct.at	0.24	16.83	110
L	10277	ct.bn	0.5	16.99	106
N	5453	prefrm	1.9	20.42	54.5
N	5454	lpp	1.89	21.63	55.5
N	5459	at.tine	1.37	20.25	57
N	5460	lpp.fg	1.1	20.32	58
N	5478	wk.rk	1.26	20.04	60
N	5508	maul	2.37	20.15	55
N	5517	anvil	2.49	20.59	57
N	5575	bif	2.09	21.83	54
N	5586	emf	2.68	21.19	54
N	5665	core	2.95	21.47	59
N	5666	core	2.44	21.52	60
N	5675	emf	2.67	21.38	65
N	5676	ab	2.76	21.85	63
N	5679	emf	2.85	21.48	67
N	5704	bd	1.85	21.96	59
N	5705	lpp	1.62	20.28	59
N	5720	hmr	2.42	20.85	65
N	5721	gst	2.86	20.97	50
N	5728	hmr	2.85	20.3	64
N	5729	hmr	2.32	20.39	66
N	5765	hmr	1.65	20.8	60
N	5766	hmr	1.97	20.44	64
N	5789	wk.at	1.92	20.76	73
N	5798	lpp	2.7	21.84	71
N	5800	hmr	2.61	21.85	70
N	5804	scr	2.15	21.81	73
N	5805	lpp.fg	2.63	21.87	72
N	5815	ab	2.25	21.65	76
N	5816	emf	2.12	21.1	73
N	5832	bif	1.58	21.56	70
N	5833	bif.fg	2.77	21.69	78
N	5841	cor.fg	1.66	21.15	71
N	5842	bip.cor	1.58	21.87	72
N	5859	maul	1.67	21.3	76
N	5860	ab	1.68	21.79	74
N	5879	lpp	1.33	20.33	76
N	5889	hmr	1.37	20.47	74
N	5890	bif.fg	1.6	20.6	76
N	5982	maul	2.1	21.95	75
N	6101	at	1.72	20.01	73

APPENDIX III

List of 967 Artifacts with Three-Point Provenience to
the Centimeter Level,
Used in 3d Spatial Distribution Study

EXC. UNIT	CATALOG #	TYPE	m SOUTH	m EAST	cm BSD
N	5986	pc.bowl	1.73	21.5	82
N	5987	emf	1.21	20.48	80
N	6081	hmr	1.52	20.47	85
N	6019	ab	1.53	20.57	90
N	6020	core	1.61	20.75	85
N	5982	maul	2.11	21.98	74
N	6056	ab	1.5	20.7	81
N	6057	ml	1.47	20.63	81
N	6058	at	1.8	20.35	87
N	6088	hmr	2.82	21.11	80
N	6089	hmr	2.84	21.11	81
N	6106	core	2.38	21.73	80
N	6122	lpp	2.46	21.78	81
N	6123	emf	1.86	21.27	91
N	6214	hmr	1.75	22	85
N	6018	hmr	1.53	20.44	95
N	6378	pc.bowl	1.08	20.34	109
N	6334	wk.bn	2.41	21.11	105
N	6335	emf	2.6	21.19	102
N	6338	ab	1.61	20.35	95
N	6339	cob	2.39	20.35	95
N	6357	bn.awl	2.94	20.94	109
N	6365	ab	2.48	20.9	104
N	6396	core	1.12	20.15	105
N	6411	cob	1.74	20.09	109
N	6243	wk.bn	2.37	20.5	100
N	6251	core	1.73	20.3	96
N	6493	bn.chsl	1.3	21.74	127
N	6490	cob	1.26	21.7	132
N	6466	ab	1.1	20.06	125
N	6465	maul	1.26	20.53	110
N	6461	at.tine	1.16	20.48	132
N	6449	wk.bn	1.42	20.2	122
N	6559	hmr	2.64	20.34	120
N	6560	lpp	2.98	20.65	120
O	5492	hammer	4.18	18.88	47
O	5499	lpp	4.66	18.39	50
O	5500	bif	4.89	18.82	51
O	5512	bif	4.21	18.2	51
O	5525	core	4.25	18.67	52
O	5526	unif	4.59	18.2	52
O	5591	core	3.71	18.88	50
O	5593	lpp	3.9	18.41	51
O	5600	core	3.78	19.45	46

APPENDIX III

List of 967 Artifacts with Three-Point Provenience to
the Centimeter Level,
Used in 3d Spatial Distribution Study

EXC. UNIT	CATALOG #	TYPE	m SOUTH	m EAST	cm BSD
0	5607	core	3.58	19.9	46
0	5612	lpp	3.5	18.2	48
0	5613	wk.bn	3.33	19.31	45
0	5615	bif	3.36	19.63	51
0	5628	cor	3.42	19.14	50.5
0	5629	lpp	3.63	19.07	49
0	5680	bn.awl	4.71	18.65	55
0	5681	ct.bn	4.12	18.51	56
0	5682	raw	4.54	18.31	55
0	5683	core	4.72	18.31	55
0	5694	lpp	4.45	18.13	55
0	5700	wk.bn	4.85	18.07	58
0	5716	pk.rk	4.76	18.67	56
0	5730	bif	3.32	18.43	58
0	5731	ab	3.32	18.44	53
0	5737	core	3.4	18.47	59
0	5754	emf	3.1	18.66	61
0	5792	emf	4.57	19.02	61
0	5793	lpp	4.64	19.16	63
0	5794	core	4.81	18.96	61
0	5827	core	3	19.66	56
0	5831	at.tine	3.07	19.42	62.5
0	5835	flk.cob	3.85	19.7	55
0	5867	core	4.19	18.6	68
0	5868	lpp	4.67	18.72	68
0	5877	lpp.fg	4.82	18.99	67
0	5904	hmr	4.6	19.38	66
0	5905	cor.fg	4.77	19.92	66
0	5908	at.blade	4.53	19.37	67
0	5910	ct.at	4.47	19.6	69
0	5918	core	4.27	19.97	66
0	5922	anvil	4.65	19.86	69
0	5944	bif	4.85	19.82	73
0	5949	bvr.th	3.27	18.87	73
0	5951	knif	3.05	18.8	71.5
0	5958	hmr	3.48	19.08	66
0	5965	lpp	3.13	19.28	72
0	5966	core	3.06	18.86	69
0	5977	core	3.97	19.74	72
0	5978	core	4.03	19.77	73
0	5980	core	4.03	19.65	68
0	5981	bif	3.94	19.65	73
0	5983	ml	3.09	19.4	72.5
0	5984	core	3.7	19.73	72

APPENDIX III

List of 967 Artifacts with Three-Point Provenience to
the Centimeter Level,
Used in 3d Spatial Distribution Study

EXC. UNIT	CATALOG #	TYPE	m SOUTH	m EAST	cm BSD
O	6035	ab	4.28	18.17	85
O	6036	ab	4.04	18.78	82
O	6037	emf	4.15	18.2	83
O	6039	core	4.53	18.02	84
O	6041	core	4.92	18.95	77
O	6050	bn.awl	4.41	19	88
O	6052	wk.bn	3.5	18.2	78
O	6063	pipe.bowl	4.31	19.51	78
O	6081	core	4.66	19.72	84
O	6085	pc.ab	4.25	19.07	80
O	6112	hmr.fg	3.36	19.42	79
O	6113	pc.ab	3.73	19.83	86
O	6114	wk.bn	3.8	19.28	81
O	6103	bvr.th	3.81	19.36	76
O	6136	anvil	3.02	19.36	73
O	6138	bip.cor	3.25	18.55	75
O	6167	core	3.27	19.33	77
O	6171	wk.at	3.73	18.9	84
O	6172	core	3.54	18.74	81
O	6174	core	3.66	19.88	82
O	6237	core	4.22	19.13	89
O	6238	core	4.8	19.64	89
O	6239	core	4.76	19.48	90
O	6240	core	4.78	19.95	84
O	6245	bn.adze	4.13	19.2	102
O	6250	core	4.9	19.25	106
O	6288	ab	4.71	19.35	93
O	6292	core	3	19.54	94
O	6309	at.base	4.08	19.58	105
O	6341	ct.at	3.13	18.48	92
O	6356	lith.adz	4.57	19	96
O	6359	core	3	18.32	98
O	6407	hmr	3.54	18.61	114
O	6414	wk.at	3.93	19.88	118
O	6416	hmr	3.56	19.96	119
O	6419	bn.awl	3.5	18.54	123
O	6437	wk.at	3.33	18.71	122
O	6445	pc.ab	3.45	19.92	127
O	6478	wk.at	4.88	19.34	128
O	6479	hmr	4.92	19.78	119
O	6480	unif	4.58	19.88	121
O	6482	core	4.95	19.8	106
O	6483	lpp	4.85	19.82	126
O	6507	core	3.08	19.81	111

APPENDIX III

List of 967 Artifacts with Three-Point Provenience to
the Centimeter Level,
Used in 3d Spatial Distribution Study

EXC. UNIT	CATALOG #	TYPE	m SOUTH	m EAST	cm BSD
O	6564	cp.ring	3.33	18.38	150
Q	3918	core	6.41	18.55	34
Q	3838	anvil	6.4	19.1	31
Q	4014	bd.fg	6.39	19.44	39
Q	3936	bif.fg	7.7	18.66	32
Q	4004	wk.flk	7.7	19.46	31
Q	4206	bif.fg	6.21	19.9	55
Q	4195	chop	6.17	19.43	55
Q	4056	nwt	6.67	19.29	44
Q	4291	pp.fg	6.7	19.27	50
Q	4191	chop	7.65	19.65	44
Q	4205	pc	7.7	19.8	53
Q	4193	hmr	7.85	19.2	53
Q	4306	ab	7.73	18.3	49
Q	4294	hmr	7.3	18.53	54
Q	4173	bp.hmr	7.13	18.91	55
Q	4378	pp	6.45	18.53	66
Q	4370	pp	6.97	18.56	56
Q	4354	wk.bn	7.78	19.53	58
Q	4424	pp	6.56	18.5	75.5
Q	4375	pp	7.06	18.17	71
Q	4597	wk.bn.fg	7.78	19.17	72
Q	4610	cor	7.99	18.71	85
Q	4611	bif.fg	7.5	18.93	74
Q	4505	pp	7.61	19.59	72
Q	4709	pp	7.66	19.01	103
Q	4749	cor	6.98	19.52	104
Q	4761	scr	6.94	19.32	103
Q	4763	hmr	6.92	19.18	104
Q	4764	bn.fg	6.75	19.14	103
Q	4774	cor	6.77	19.87	104
Q	4775	cor	6.74	19.23	99
Q	4828	pp.fg	6.17	19.33	107
Q	4829	pp.fg	6.42	19.43	109
Q	4832	cor	6.13	19.44	104
Q	4842	cor	6.13	19.43	106
Q	4847	bn.wg	6.2	19.8	91
Q	4848	wk.bn.	6.14	19.32	114
Q	4852	bn.wg.	6.75	19.75	113
Q	4858	cor	7.81	19.77	104
Q	4859	cor	7.92	19.73	111
Q	4861	brb.pp	7.73	19.41	113
Q	4873	cor	7.26	19.35	113
Q	4390	bif	7.7	19.8	115

APPENDIX III

List of 967 Artifacts with Three-Point Provenience to
the Centimeter Level,
Used in 3d Spatial Distribution Study

EXC. UNIT	CATALOG #	TYPE	m SOUTH	m EAST	cm BSD
Q	4931	cor	7.6	19.7	119
Q	4925	ct.at	7.55	19.8	113
Q	4926	pc.bwl.fg	7.65	19.85	113
Q	4948	ml.fg	6.59	19.9	116
Q	4950	cor	6.62	19.52	122
Q	5075	cor	7.79	19.28	148
Q	5079	ab.fg	7.84	19.55	149
Q	5080	cor	7.71	19.83	157
R	1440	cor.fg	6.1	20.22	43
R	1614	scr	7.25	21.53	54
R	1953	wkd.spall	6.26	20.13	61
R	1954	hmr	6.3	20.29	65
R	1753	ct.bn	6.5	21.78	56
R	1949	ab	6.44	20.24	65
R	1924	ct.bn	6.5	20.17	60
R	1951	spall	6.53	20.22	63
R	1925	split.cob	6.56	20.31	68
R	1912	ab	6.53	20.38	69
R	1952	cor.fg	6.63	20.14	63
R	1950	pp	6.7	20.03	57
R	1961	ab.fg	7.05	20.17	66
R	1964	at.fg	7.04	20.44	68
R	1750	ct.bn	7.18	20.12	58
R	1962	cor.fg	7.9	20.16	63
R	1728	core	7.81	20.81	58
R	1729	pc.ab	7.55	20.6	60
R	1963	bn.pp.fg	7.5	20.68	58
R	1900	cor.fg	7.5	20.77	66
R	1727	core.fg	7.49	20.96	59
R	1726	ut.scr	7.65	21.29	62
R	1725	hmr	7.54	21.62	64
R	1724	pc.ab	7.69	21.27	64
R	2034	ab	6.97	20.95	69
R	2036	split.cob	7.26	20.34	78
R	2052	maul.fg	6.83	21.34	72
R	2037	wk.bn	6.9	21.34	69
R	2060	hmr	6.04	21.29	69
R	2127	ct.at	6.18	20.67	73
R	2128	wk.bn	6.23	20.62	74
R	2130	hmr	6.9	20.13	73
R	2129	ab	6.95	20.24	74
R	2131	bif	7.35	20.12	73
R	2035	hmr	7.85	20.2	72
R	2302	utf	6.04	20.62	80

APPENDIX III

List of 967 Artifacts with Three-Point Provenience to
the Centimeter Level,
Used in 3d Spatial Distribution Study

EXC. UNIT	CATALOG #	TYPE	m SOUTH	m EAST	cm BSD
R	2303	ab	6.27	20.41	83
R	2301	ut.spall	6.32	20.45	83
R	2298	grd.ntwt	6.42	20.5	88
R	2300	scr.pbl	6.38	20.73	82
R	2299	ut.spall	6.32	20.78	84
R	2297	scr	6.76	20.15	83
R	2269	cor.fg	7.08	20.27	80
R	2268	cor.fg	7.19	20.19	85
R	2260	raw	7.12	20.58	79
R	2200	at.tool	7.49	20	81
R	2191	bif.fg	7.57	20.15	91
R	2250	scr	7.19	20.57	82
R	2273	unif	7.23	20.93	86
R	2249	scr	7.57	20.93	83
R	2240	cor.fg	7.4	21.19	86
R	2267	ab	7.71	20.25	84
R	2181	wk.bn	7.78	20.45	85
R	2463	wdg	6.31	20.39	91
R	2465	scr	7.32	20.02	80
R	2466	big.bif	7.37	20.04	80
R	2384	cor.fg	7.29	21.32	93
R	2335	cor.fg	6.94	21.4	92
R	2349	pp	6.57	21.2	92
R	2385	hmr	7.12	20.88	94
R	2561	pstl.fg	6.04	20.43	99
R	2541	grvd.cob	7.68	21.11	101
R	2542	cob	7.98	20.73	121
R	2574	bif	6.78	20.1	108
R	2608	pstle	7.92	20.14	111
R	2611	pmc.bowl	7.75	20.17	116
R	2612	pndnt	7.78	20.38	111
R	2650	ab	6.81	21.62	111
R	2209	cdr.chrc	7.04	21.54	124
R	2663	bif.fg	7.43	20.68	123
R	2663	bif.fg	7.43	20.68	123
R	2633	cdr.fg	7.87	20.03	130
R	2634	hmr	7.86	20.16	129
R	2635	hmr	7.7	20.03	132
R	2632	cppr.bd	7.64	20.32	136
R	2717	wk.bn.pp	7.7	20.63	133
R	2718	ochre	7.07	21.85	127
R	2819	scr	6.4	20.44	131
S	3661	cp.bd	6.43	23.43	46
S	3909	at.wg	6.61	22.93	63

APPENDIX III

List of 967 Artifacts with Three-Point Provenience to
the Centimeter Level,
Used in 3d Spatial Distribution Study

EXC. UNIT	CATALOG #	TYPE	m SOUTH	m EAST	cm BSD
S	3953	bn.wg	6.86	22.96	69
S	3965	hmr.bip	6.87	23.07	68
S	4559	maul.btrd	7.33	23.29	66
S	5030	btrd.cob	6.94	22.1	86
Z	1731	maul.fg	8.12	25.37	56
Z	1915	pkd.cob	8.27	25.46	63
Z	1918	wk.bn	8.82	25.85	58
Z	1722	bd	8.87	25.73	54
Z	1947	wk.bn	8.88	25.95	61
Z	1930	bn.hpn	8.98	25.94	61
Z	1920	wk.bn	9.08	24.2	56
Z	1820	bn.brb	9.05	25.55	60
Z	1919	at.wdg	9.09	25.53	57
Z	1948	pp	9.19	25.96	56
Z	1931	bn.brb	9.22	25.92	55
Z	1756	at.wg	9.26	24.27	57
Z	1793	pp.fg	9.32	24.06	56
Z	1929	wk.at	9.79	25.48	61
Z	1974	pstl.fg	9.17	25.67	70
Z	1975	pstl	9.42	25.94	62
Z	1980	hmr	9.5	25.85	68
Z	2156	ct.bn	8.3	24.45	81
Z	2158	hmr	8.45	24.39	84
Z	2126	unif	8.56	24.58	73
Z	2159	tine	8.6	24.2	84
Z	2160	tine	8.62	24.28	83
Z	2183	ct.bn	8.47	25.81	83
Z	2231	bn.pt	9.13	25.28	72
Z	2195	awl	9.18	25.39	77
Z	2232	bif.fg	9.2	25.45	80
Z	2059	wk.bn	9.23	24.3	72
Z	2058	wk.bn	9.27	24.26	72
Z	2119	wk.bn	9.28	24.31	74
Z	2093	bn.wg	9.35	24.55	77
Z	2215	pp's	8.02	24.7	85
Z	2217	bif.fg	8.14	24.62	13
Z	2214	hmr	8.17	24.68	85
Z	2286	skull	8.74	24.39	88
Z	2253	at.wg?	9.32	25.21	87
Z	2255	raw.at	9.26	25.6	87
Z	2284	wk.bn	9.34	25.59	88
Z	2254	bif	9.96	25.56	83
Z	2502	bn	8.03	24.57	93
Z	2395	bn.ndl	8.06	24.75	88

APPENDIX III

List of 967 Artifacts with Three-Point Provenience to
the Centimeter Level,
Used in 3d Spatial Distribution Study

EXC. UNIT	CATALOG #	TYPE	m SOUTH	m EAST	cm BSD
Z	2501	wk.bn	8.14	24.72	98
Z	2330	hmr	8.44	24.61	95
Z	2389	btrd.cob	8.64	24.38	96
Z	2390	cor.fg	8.09	25.4	88
Z	2486	ct.bn	8.65	24.72	98
Z	2487	utf	8.68	24.74	98
Z	2359	awl	9.19	24.29	96
Z	2407	pc.ab	9.47	24.96	90
Z	2560	pp	9.61	25.62	93
Z	2459	unif	9.65	25.61	92
Z	2462	pstl	9.72	25.58	94
Z	2456	hmr	9.64	25.86	92
Z	2947	ab	8.2	24.52	106
Z	2946	at	8.23	24.58	108
Z	2945	bif	8.27	24.6	100
Z	2942	bif.fg	8.27	25.03	105
Z	2949	cor	8.64	24.7	100
Z	2948	pkd.cob	8.27	24.54	109
Z	nil	wk.cob	9.12	24.56	101
Z	nil	pkd.cob	9.26	24.77	102
Z	nil	ct.bn	9.29	25.46	103
Z	2544	at.fgtine	9.52	24.89	106
Z	2545	hmr	9.71	24.25	108
Z	2543	hmr	9.75	24.3	108
Z	2546	hmr	9.84	24.26	109
Z	0	hmr	9.95	24.13	106
Z	2586	swn/bn	9.85	24.53	117
Z	2585	hmr	9.96	25.12	68
Z	2607	core.fg	9.58	25.44	114
Z	2606	bif/flk	9.62	25.45	114
Z	2563	ab	8.32	24.84	118
Z	2564	wk.bn	8.05	24.26	110
Z	2642	pp.fg	9.15	24.45	119
Z	2667	bif.fg	9.2	24.47	125
Z	2714	hmr	9.04	24.72	128
Z	2668	hmr	9.56	25.34	121
Z	2669	hmr	9.75	25.25	125
Z	2649	core	9.67	24.51	118
Z	2645	bn.awl	8.3	24.71	122
Z	2739	hmr	9.1	24.44	133
Z	2742	bn.pt	9.11	24.55	138
Y	3592	bif	8.08	22.55	34
Y	3594	core	8.05	22.67	34
Y	3596	bif	8.16	23.93	34

APPENDIX III

List of 967 Artifacts with Three-Point Provenience to
the Centimeter Level,
Used in 3d Spatial Distribution Study

EXC. UNIT	CATALOG #	TYPE	m SOUTH	m EAST	cm BSD
Y	?	pp	8.12	23.03	39
Y	3686	core	9.53	23.42	48
Y	4616	pp	8.58	23.48	68
Y	4620	wk.bn	8.63	23.48	68
Y	4615	pc.ab	9.24	23.85	74
Y	4177	ab	8.32	23.91	58
Y	4031	wk.bn	8.08	22.97	60
Y	4054	pp	8.55	23.37	59
Y	4197	hmr	8.06	22.39	63
Y	4198	ab	8.28	22.88	68
Y	4365	hmr	8.98	23.17	76
Y	4408	at.wdg	8.11	23.16	15
Y	4693	pp	8.31	22.42	74
Y	4695	wk/bn	8.1	22.32	74
Y	4699	anvil	8.08	22.1	78
Y	608	ochre	8.08	22.97	84
Y	4767	hmr	8.66	22.33	87
Y	4778	bif	8.78	22.91	76
Y	4779	ab.fg	9.06	22.58	79
Y	4786	hmr.fg	9.56	22.86	82
Y	4902	pp.fg	9.54	22.76	85
Y	4903	pp.fg	9.89	22.73	79
Y	4946	core	9.16	23.06	89
Y	4947	cob	8.87	23.33	88
Y	4969	bif	9.04	23.23	90
X	1500	pp	8.23	21.59	46
X	1533	pp	9.33	21.89	46
X	1626	at	8.2	21.27	56
X	1615	at wdg	8.48	21.11	59
X	1620	pp	8.73	21.87	55
X	1575	at.tine	9.2	21.44	59
X	1576	hmr	9.63	21.14	57
X	1571	utf	9.33	20.35	47
X	1693	cor.fg	8.27	20.46	61
X	1674	utf	8.36	20.58	59
X	1695	bif.fg	8.38	20.46	60.5
X	1694	pp	8.51	20.49	61
X	1696	wk.bn	8.65	20.73	62
X	1675	pp	8.68	20.79	60
X	1724	ab	8.7	20.03	66
X	1710	wk at	8.84	20.07	65
X	1711	ab	9.23	20.44	65
X	1907	ml	8.05	20.13	70
X	1906	rd.cr.bd	8.03	20.34	73

APPENDIX III

List of 967 Artifacts with Three-Point Provenience to
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Used in 3d Spatial Distribution Study

EXC. UNIT	CATALOG #	TYPE	m SOUTH	m EAST	cm BSD
X	1893	poss ab	8.16	20.43	74
X	1894	at.wg	8.2	21.14	79
X	1775	hmr	9.37	20.56	76
X	1871	cut.bn	9.46	21.2	80
X	1862	pestle	9.57	21.55	73
X	1991	pp	8.66	21.69	87
X	1935	hmr	9.43	20.53	82
X	1958	pc.notch	8.62	20.13	82
X	1959	wk.bn	8.55	20.17	87
X	2122	hpn.pt	8.12	20.14	94
X	2121	bn.barb	8.07	20.69	95
X	2056	wk.bn.pp	9.27	21.17	95
X	2166	wk.bn	8.38	20.27	106
X	2152	manprt	8.9	20.03	108
X	2186	netwt	9.78	20.26	102
X	2220	qzite	9.84	20.19	103
X	2222	bn.pt	9.69	21.2	105
X	2244	raw	8.72	20.32	106
X	2289	hmr	9.62	20.11	112
X	2271	pp	9.26	21.52	110
X	2253	bn.pt	9.31	21.56	111
X	2356	hmr	8.06	20.17	95
X	2477	hmr	8.14	20.28	124
X	2487	grnd.cob	8.22	20.2	119
X	2358	hammer	8.16	20.04	83
X	2355	ab	8.21	20.03	88
X	2479	hmr	8.32	20.44	127
X	2480	ab	8.37	20.46	123
X	2474	cut.bn	8.48	20.25	119
X	2476	bn.wdg	8.6	20.36	121
X	2334	bn.pt	8.38	21.41	116
X	2332	bvr.th	8.43	21.43	132
X	2339	bvr.th	9.92	21.86	120
X	2372	at	9.54	20.02	127
X	2369	bn.pt	9.63	20.02	117
X	2368	at.tin	9.68	20.08	123
X	2951	ab	8.18	20.39	130
X	2956	pp	8.31	20.57	133
X	2958	obs	8.74	20.03	133
X	2954	th	8.79	20.38	134
X	2957	bif	8.84	20.76	134
X	2539	utf	9.58	21.59	129
X	2952	hmr	9.72	20.03	125
X	2599	bn.pndnt	8.25	20.58	142

APPENDIX III

List of 967 Artifacts with Three-Point Provenience to
the Centimeter Level,
Used in 3d Spatial Distribution Study

EXC. UNIT	CATALOG #	TYPE	m SOUTH	m EAST	cm BSD
X	2600	pc.ab	8.18	21.04	138
X	2570	ct.bn	8.68	20.43	141
X	2572	swm.bn	8.75	20.55	140
X	2569	ct.bn	8.8	20.61	137
X	2568	awl	8.81	20.47	142
X	0	at.wdg	8.79	20.35	144.
					5
X	2571	obs.pp	9.05	20.53	138
X	2567	bif	9.09	20.46	138
W	640	at	8.26	19.56	57
W	655	hmr.anvil	8.18	19.78	78
W	685	wg	8.32	19.86	73
W	686	wg	8.71	19.97	77
W	R	ct.bn	8.44	19.45	103
W	FFF	ut.spall	8.12	19.86	108
E2	3970	cor.fg	9.09	18.93	36
E2	3963	pp.fg	9.26	19.02	36
E2	3968	shark.th	9.51	18.8	39
E2	4055	utf	9.2	19.26	46
E2	4084	wk.flk	9.25	19	49
E2	4639	hmr	9.03	19.36	111
E2	4652	bip/hmr	9.08	19.47	111
E2	4716	hmr	9.48	19.77	121
G2	3718	pc.ab	11.73	18.99	21
G2	3722	bif	11.32	18.81	21
G2	3824	glstd	10.57	18.21	24
G2	3837	bp.cor.fg	10.25	18.72	22
G2	3850	bif.fg	10.11	18.84	23
G2	3862	bif.fg	10.47	18.95	22
G2	3872	hmr	11.7	19.59	21
G2	3901	wk.flk.	11.78	19.55	23
G2	3913	ct.bn.	11.46	19.78	24
G2	3951	utf	10.6	19.02	19
G2	3952	pp.fg	10.94	19.02	22
G2	3957	wk.bn.fg	11	19.57	19
G2	3956	utf	10.4	19.14	23
G2	3991	bif	10.57	19.37	21
G2	3995	bif.fg	10.11	19.33	21
G2	3996	utf	10.79	19.34	25
G2	4005	bif.fg	10.42	19.56	23
G2	4074	hmr.fg	10.68	19.22	34
G2	4170	cor	10.4	19.37	36
G2	4168	pc.ab.	10.65	19.54	46
G2	4169	cor	10.8	19.16	36

APPENDIX III

List of 967 Artifacts with Three-Point Provenience to
the Centimeter Level,
Used in 3d Spatial Distribution Study

EXC. UNIT	CATALOG #	TYPE	m SOUTH	m EAST	cm BSD
G2	4189	cor	10.74	19.06	32
G2	4192	pp	10.8	19.1	37
G2	4207	bn.awl.fg	10.59	18.56	28
G2	4220	cor	10.84	18.27	26
G2	4236	bif	10.25	18.77	32
G2	4237	utf	10.31	18.67	34
G2	4238	wk.cob.	10.02	18.38	28
G2	4239	spl	10.5	18.02	10
G2	4240	utf	10.04	18.16	26
G2	4255	utf	10.15	18.92	41
G2	4296	ab.fg	11.05	19.34	45
G2	4309	cor	11.64	18.5	35
G2	4307	at.wg.	11.44	19.32	39
G2	4373	pp.fg	10.62	19.38	47
G2	4372	ab	10.1	19.15	53
G2	4351	ab	11.87	19.79	64
G2	4352	cor	10.34	19.31	54
G2	4353	cor	10.85	19.84	68
G2	4354	scr	10	19.3	64
G2	4356	wk.flk.	10.36	19.32	57
G2	4362	ab.fg	11.01	19.26	49
G2	4376	cor	11.62	20	82
G2	4406	at.tin.	11.26	20	87
G2	4421	wk.at.fg	11.6	19.54	79
G2	4542	bif	11.62	19.85	84
G2	4555	cor	10.36	18.7	106
G2	4567	rd.cpr.bd	10.14	19.64	100
G2	4568	cor	10.02	19.7	104
G2	4594	cor	11.34	19.78	84
G2	4626	egbat.cob	11.42	19.79	116
I2	3624	pp	11.06	23	42
I2	3876	mortr.fg	11.68	22.05	57
I2	3384	bn.point	11.65	23.2	46
I2	3856	bif.fg	11.56	23.1	47
I2	3861	core	11.74	22.48	47
I2	3974	cor.fg	10.71	23.62	54
I2	4083	ab	11.77	22.26	57
I2	4285	hmr	10.15	23.93	73
I2	4335	chop	11.05	23.86	67
I2	4336	bif.fg	10.53	22.23	77
I2	4337	bif.fg	10.39	22.19	77
I2	4341	wk.flk	10.48	23.19	77
I2	4545	pp	11.72	22.05	83
I2	4543	at.wg	11.5	23.42	86

APPENDIX III

List of 967 Artifacts with Three-Point Provenience to
the Centimeter Level,
Used in 3d Spatial Distribution Study

EXC. UNIT	CATALOG #	TYPE	m SOUTH	m EAST	cm BSD
I2	4596	pp	10.73	23.44	88
I2	4691	atler	10.28	23.71	97
H2	1634	core	11.3	21.9	33
H2	1609	bif.fg	11.19	21.71	38
H2	1635	bif.fg	11.33	21.36	43
H2	1633	bif	11.08	21.19	39
H2	1638	lpp	11.9	20.31	34
H2	1662	pp	10.63	21.37	36
H2	1655	cor.fg	10.56	20.6	37
H2	1677	pp	10.54	20.48	38
H2	1689	pp	10.61	20.22	38
H2	1700	chop	10.28	20.4	39
H2	1843	ct.bn	11.5	20.76	38
H2	1781	ml.fg	11.96	21.07	52
H2	1783	ml.wire?	11.14	20.79	57
H2	1785	pp	11.78	20.94	53
H2	1786	ntwt.brkn	11.07	20.38	52
H2	1886	glss.scr	10.82	20.56	55
H2	1887	bif.fg	10.1	21.52	56
H2	1888	cor.fg	10.56	21.05	55
H2	1904	at.fg	11.87	21.88	57
H2	1967	pp	10.16	20.33	64
H2	1972	ab.fg	10.29	20.31	64
H2	1968	utf	10.42	20.36	65
H2	1973	bd.fg	10.1	20.96	67
H2	1970	pp	10.21	20.97	64
H2	1940	wk.flk	10.07	21.46	61
H2	1941	at.wg	10.46	21.49	65
H2	1997	utf	11.08	21.42	65
H2	2000	dent.bd	11.12	21.86	65
H2	1999	bif	11.18	21.94	63
H2	1998	utf	11.08	20.51	65
H2	1969	cor.fg	10.96	20.12	63
H2	2069	sawn.bn	10.28	20.31	68
H2	2064	abd.bn	10.33	20.37	74
H2	2065	bif.fg	10.47	20.7	77
H2	2067	wk.flk	10.14	20.92	77
H2	2062	bif.scr	10.86	20.45	74
H2	2224	pp	10.92	20.9	75
H2	2148	hmr.fg	10.34	21.79	75
H2	2018	cor.fg	10.95	20.22	71
H2	2068	chrd.at	11	20.34	74
H2	2020	pp.fg	11.28	20.29	69
H2	2019	bif.fg	11.22	20.1	71

APPENDIX III

List of 967 Artifacts with Three-Point Provenience to
the Centimeter Level,
Used in 3d Spatial Distribution Study

EXC. UNIT	CATALOG #	TYPE	m SOUTH	m EAST	cm BSD
H2	2174	hmr	11.65	21.11	70
H2	2173	cor.fg	11.83	21.16	69
H2	2168	hmr.fg	11.49	21.37	74
H2	2237	pp	11.4	20.6	85
H2	2226	pkd.cob	11.64	20.37	79
H2	2238	wk.at	11.3	21.45	92
H2	2274	bvr.th	11.78	20.95	88
H2	2275	utf	11.8	21.66	91
H2	2276	lith	11.52	21.28	86
H2	2277	utf	11.52	21.3	87
H2	2313	wk.at.tin	10.95	21.42	88
H2	2328	hmr	11.36	20.15	84
H2	2326	gst.bwl	11.78	20.1	80
H2	2373	ut/cob	10.45	20.18	85
H2	2374	pp	10.8	20.31	87
H2	2377	pp.fg	11.25	20.69	90
H2	2378	bif.fg	11.06	20.57	81
H2	2379	pp	10.28	20.54	91
H2	2380	cor.fg	10.26	21.58	83
H2	2381	cob.chop	10.8	21.04	81
H2	2382	ab	10.47	20.22	90
H2	2383	ab.fg	10.63	20.64	81
H2	2419	pc.ab.fg	10.79	21.45	101
H2	2507	splt.cob	10.14	20.65	93
H2	2509	cut.bn	10.25	20.3	94
H2	2510	ab.fg	10.34	21.34	95
H2	2511	nwt	10.09	21.74	95
H2	2512	utf	10.77	21.91	96
H2	2515	utf	10.22	21.69	99
H2	2516	pp	10.3	21.13	96
H2	2517	ml	10.49	20.39	97
H2	2524	pp	11	20.49	96
H2	2525	cor.fg	11.29	20.79	94
H2	2526	bif	11	21.47	98
H2	2527	cor.fg	10.83	21.04	99
H2	2528	utf	10.93	21.49	98
H2	2529	utf	10.71	20.67	100
H2	2558	utf	11.89	20.26	111
H2	2559	pp	10.48	21.3	111
H2	2560	utf	10.22	20.52	108
H2	2561	ab	10.22	20.96	109
H2	2562	ct.bn	10.21	20.22	114
H2	2891	chop	10.11	20.19	98
H2	2587	utf	11.36	20.16	116

APPENDIX III

List of 967 Artifacts with Three-Point Provenience to
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Used in 3d Spatial Distribution Study

EXC. UNIT	CATALOG #	TYPE	m SOUTH	m EAST	cm BSD
H2	2588	core	11.58	20.06	119
H2	2590	hmr	11.77	20.13	118
H2	2591	hmr	11.75	20.95	114
H2	2592	hmr	11.7	20.3	115
H2	2594	hmr.fg	11.74	20.9	113
H2	2595	hmr	11.91	20.71	115
H2	2596	gst.fg	11.78	21	111
H2	2597	cob	11.77	20.59	119
H2	2618	utf	11.07	21.02	116
H2	2619	utf	10.79	21.52	120
H2	2620	cor.fg	10.54	21.52	119
H2	2621	utf	11.84	21.53	121
H2	2622	hmr	10.71	21.59	115
H2	2623	ab.fg	10.57	21.9	119
H2	2624	ab.fg	10.06	21.45	118
H2	2654	ab.fg	10.23	21.16	121
H2	2657	adz.d.bn	10.3	20.94	117
H2	2662	cor.fg	10.07	21	114
H2	2673	wk.bn	10.56	20.57	120
H2	2730	hmr	10.81	20.17	122
H2	2731	ml	11.07	20.21	121
H2	2732	pipe.fg	10.16	20.44	118
H2	3014	hmr	11.08	20.44	121
H2	2771	ct.bn	10.07	20.47	127
H2	2770	ab.fg	10.04	20.57	128
H2	2772	grnd.pc	10.04	20.7	126
H2	2773	hmr	10.11	20.51	129
H2	2783	hmr	10.41	20.66	126
H2	2784	hmr	10.57	20.41	136
H2	2782	pp	10.61	20.76	126
H2	2746	maul	10.92	21.64	126
H2	2748	cor.fg	11.34	20.73	127
H2	2751	hmr	11.94	20.89	122
H2	2752	hmr	11.64	20.45	120
H2	2753	pc.ab	10.7	20.57	126
H2	2754	pp	11.06	20.31	127
H2	2757	bn.barb	11.33	20.56	125
H2	2761	wk.bn	10.8	21.7	125
H2	2762	cor.fg	11.83	21.53	125
H2	2765	scr	11.68	20.94	130
H2	2766	cob	10.89	20.68	127
H2	2767	wg.fg	11.5	21.3	131
H2	2768	mortar	11.81	20.7	129
H2	2769	nwt	10.83	20.52	127

APPENDIX III

List of 967 Artifacts with Three-Point Provenience to
the Centimeter Level,
Used in 3d Spatial Distribution Study

EXC. UNIT	CATALOG #	TYPE	m SOUTH	m EAST	cm BSD
H2	2775	at.wg	11.04	21.25	127
H2	2788	cor.fg	10.49	21.37	132
H2	2790	bif	10.64	20.95	128
H2	2799	tine	10.4	20.35	139
H2	2805	ab.fg	10.23	20.52	147
H2	2807	pestle	10.2	20.26	148
H2	2802	pstl.fg	10.38	20.43	149
H2	2804	hpn.vlv	10.34	20.47	142
H2	2803	pp	10.08	20.58	142
H2	2806	hmr	10.31	20.22	150
H2	2810	haft	10.96	20.29	135
H2	2812	bn.barb	10.25	20.17	145
H2	2815	wk.at	10.3	20.31	144
H2	2816	core	10.79	20.4	140
H2	2817	cor.fg	10.37	20.55	148
H2	2820	hmr	11.53	20.11	132
H2	2821	bif.fg	11.93	20.56	144
H2	2822	tine	11.22	20.39	139
H2	2823	ab	11.99	21.42	132
H2	2824	pp.fg	11.73	20.66	146
H2	2825	pp	11.8	20.57	144
H2	2826	bif.fg	11.92	20.98	139
H2	2827	unif	11.48	21.25	138
H2	2834	grst.fg	11.18	20.5	135
H2	2835	utf	11.35	20.45	147
H2	2836	bvr.th	11.42	20.6	143
H2	2840	ntwt.bkn	10.98	20.31	143
H2	2841	bn.pt	11.05	20.33	142
H2	2847	hmr	10.87	21.2	136
H2	2848	hmr.flkd	10.76	20.77	143
H2	2849	utf	10.8	21.47	136
H2	2850	bif.fg	11.04	21.22	138
H2	2851	bif.fg	10.8	21.17	140
H2	2852	bn.awl	11.11	20.95	144
H2	2853	cor/fg	10.8	20.61	142
H2	2854	utf	10.85	20.76	144
H2	2855	wk.bn	11	20.85	142
H2	2856	utf	11.17	20.92	136
H2	2862	anvil	11.9	20.76	129
H2	2861	utf	11.93	20.05	149
H2	2863	tine.tip	11.84	20.18	151
H2	2837	pp	10.26	20.26	158
H2	2838	cor.fg	10.3	20.24	158
I2	3624	pp	11.06	23	42

APPENDIX III

List of 967 Artifacts with Three-Point Provenience to
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Used in 3d Spatial Distribution Study

EXC. UNIT	CATALOG #	TYPE	m SOUTH	m EAST	cm BSD
I2	3876	mortar.fg	11.68	22.05	57
I2	3384	bn.point	11.65	23.2	46
I2	3856	bif.fg	11.56	23.1	47
I2	3861	core	11.74	22.48	47
I2	3974	cor.fg	10.71	23.62	54
I2	4083	ab	11.77	22.26	57
I2	4285	hmr	10.15	23.93	73
I2	4335	chop	11.05	23.86	67
I2	4336	bif.fg	10.53	22.23	77
I2	4337	bif.fg	10.39	22.19	77
I2	4341	wk.flk	10.48	23.19	77
I2	4545	pp	11.72	22.05	83
I2	4543	at.wg	11.5	23.42	86
I2	4596	pp	10.73	23.44	88
I2	4691	atler	10.28	23.71	97
L2	3894	nwt.fg	13.72	20.9	33.5
L2	3919	gst.fg	13.71	20.71	32
L2	3923	pp	13.94	20.35	40
L2	3928	rld.cppr	13.74	21.03	38
L2	3929	cor.fg	13.98	21.46	34
L2	3006	hmr	12.78	20.14	46
L2	3007	pc.ab.fg	12.58	20.18	46
L2	3008	bif.fg	12.47	20.05	45
L2	4051	bif.fg	13.65	20	46
L2	4065	ml.fg	12.44	20.93	50
L2	4180	rld.cp.bd	14	20.48	42
L2	4181	anvil.fg	13.03	20.57	50
L2	4182	pp.unif	12.5	20.86	50
L2	4267	pp	13.47	20.36	63
L2	4272	hmr	13.51	20.55	52
L2	4271	bn.wg	13.08	20.71	61
L2	4281	ml.fg	13.72	20.4	57
L2	4298	cor	13.62	21.58	56
L2	4325	bif.fg	13.45	21.64	57
L2	4326	cor	12.78	21.84	59
L2	4327	scr	13.68	21.22	51
L2	4328	at	12.38	21.38	60
L2	4391	at	13.07	21.9	67
L2	4565	cor	14	20.38	63
L2	4374	hmr	12.31	21.7	76
L2	4378	at	12.12	20.62	69
L2	4414	pp	13.14	20.63	75
L2	4415	wk.bn	13.19	20.48	73
L2	4417	cor	13.55	20.74	71

APPENDIX III

List of 967 Artifacts with Three-Point Provenience to
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EXC. UNIT	CATALOG #	TYPE	m SOUTH	m EAST	cm BSD
L2	4418	cor	13.8	21.04	66
L2	4429	cor	12.8	21.17	80
L2	4433	wk.at	13.64	21.3	77
L2	4598	hmr	13.39	21.36	85
L2	4600	cor	13.28	21.72	82
L2	4637	cor	13.54	21.11	85
L2	4642	anvil	13.75	20.94	92
L2	4675	at	13.49	20.25	90
L2	4726	wk.bn	13.15	21.69	100
L2	4754	hmr	13.45	21.68	100
L2	4722	hpn.vlv	13.23	21.66	90
L2	4756	pc	12.87	21.59	104
L2	4757	at.wg.fg	12.03	21.3	107
L2	4771	pp.fg	12.34	20.76	99
L2	4782	bskt.fg	13.62	21.47	103
L2	4784	wk.bn	12.99	20.96	103
L2	4814	at	13.5	21.5	112
L2	4815	ct.at	13.52	21.6	100
L2	4833	ct.at	13.12	20.71	115
L2	4835	ct.bn	13.62	20.76	106
L2	4843	ct.bn	13.64	21.46	102
L2	4855	clay	13.14	21.85	103
L2	4854	bn.pt	13.49	21.75	100
L2	4887	bn.wg	12.71	20.9	122
L2	4888	at.wg	12.76	20.9	120
L2	4891	hmr	12.25	20.39	122
L2	4904	anvil	12.97	20.63	124
L2	4905	wk.at	13.42	20.62	120
L2	4961	hmr	13.88	20.81	111
L2	4960	pp	13.44	20.77	125
L2	4980	cor	12.42	20.15	132
L2	4981	raw.jspr	12.61	20.55	139
L2	4985	hmr	13.7	21	122
L2	4990	cor	12.41	20.37	131
L2	5000	bif.fg	12.4	20.13	131
L2	5003	cpr.bd	12.16	20.56	138
L2	5092	pc.ab	12.23	21.04	147
L2	5126	raw	12.3	20.49	156

APPENDIX III

List of 967 Artifacts with Three-Point Provenience to
the Centimeter Level,
Used in 3d Spatial Distribution Study

KEY TO APPENDIX III

Artifacts are described as they were recorded in the site catalog.

RAW MATERIAL DESCRIPTION

bn = bone, **at** = antler, **ml** = metal, **pc** = pumice, **japr** = jasper, **clay** = clay, **cp** = copper, **bvr** = beaver tooth, **glass** = glass, **shark th** = shark tooth, **spall** = cobble spall, **obs** = obsidian, **ochre** = ochre, **cdr** = cedar, **raw** = any raw material, **lith** = lithic, **wood** = wood, **bd.bn** = bird bone, **iron** = iron

FUNCTIONAL DESCRIPTION **hmr** = hammer, **lpp** = lithic projectile point, **pp** = projectile point, **cor or core** = core, **ab** = abrader, **anvil** = anvil, **bakt** = basketry, **wg** = wedge, **vlv** = valve, **scr** = scraper, **bd** = bead, **nwt** = net weight, **chop** = chopper, **mortar** = mortar, **point and pt** = point, **anvil** = anvil, **utf** = utilized flake, **awl** = awl, **heft** = heft, **chal** = chisel, **barb or brb** = barbed item, **pstl or pestle** = pestle, **pipe** = pipestem, **hpn** = harpoon, **pudut** = pendant, **bowl or bwl** = bowl, **ring** = ring, **adz** = adze, **eaf** = edge modified flake, **blade** = blade, **maul** = maul, **nail** = nail, **club** = club

OTHERS / MODIFIERS

wk = worked, **ct** = cut, **fg** = frag, **unif** = uniface, **bif** = biface, **rd** = rolled, **tine** = antler tine, **tip** = antler tine tip, **flkd** = flaked, **grnd** = ground, **adzd** = adzed, **get** = ground stone, **spit** = split, **pkd** = pecked, **sawn** = sawn, **egbat** = edge battered, **ut** = utilized, **manprt** = manuport, **notch** = notched, **grvd** = grooved, **chrc** = charcoal, **th** = tooth, **bip** = bipolar, **ex** = exotic

APPENDIX IV.
SITE MAP WITH SCHEMATIC OVERLAY OF FEATURES

Cameron McPherson Smith
Curriculum Vitae

Academic Record

1991-1996 M.A. Anthropology

Portland State University, Portland, Oregon, USA

1987-1990 B.A. (Joint Hons) Archaeology/Anthropology,

University of Durham, Durham, England, U.K.

1986-1987 Institute of Archaeology

One year Non Degree Study, University College, London.

1984-1987 A.A. General Studies

United States International University

London, England and Nairobi, Kenya Campuses

Academic Organizations

1992 Elected Fellow, Royal Geographical Society, London

1994 Elected Student Member, Explorer's Club of New York

Field Experience

1992-1996 Survey, Excavation and Crew Chief at 45CL1, Cathlapottle Chinook Village, Washington. In 1997, will act as Field Director at this site.

1987-1996 Excavations in Scotland (Dark Age cemetery), Kenya (1987 and 1988; palaeoanthropological and geological fieldwork), South England (Early Medieval castle site), North England (Bronze Age ring cairn), California (palaeo-Indian site) and Oregon (Cathlapottle).

Publications and Papers Delivered

1996. *Aspects of Household Archaeology at the Meier Site, 35C05.* Paper delivered at the 61st Annual Meeting of the Society for American Archaeology.

1996. Spatial Distribution of Material Culture Within a Proto-Historic Chinookan Plankhouse in preparation.

1996. Chin Morphology and Sexual Dimorphism in the Fossil Hominid Mandible Sample from Klasies River Mouth. With Y. M. Lam and O. M. Pearson: American Journal of Physical Anthropology 100:545-557(1996)

EXTRACURRICULAR

Mountaineering actively since 1984. Ascents in Canada, Scotland, California, Oregon, Washington, Nevada and S.E. Alaska. Author and Illustrator of Technical Alpine Climbing for Two-Person Teams 60,000 word manuscript: currently seeking publisher.