MAN AND MOUNTAIN: AN ARCHAEOLOGICAL OVERVIEW OF THE SHENANDOAH NATIONAL PARK

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TABLE OF CONTENTS

List of Tables

List of Figures

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Numerous students at the University provided hours of assistance in the classification of the lithics. Robert

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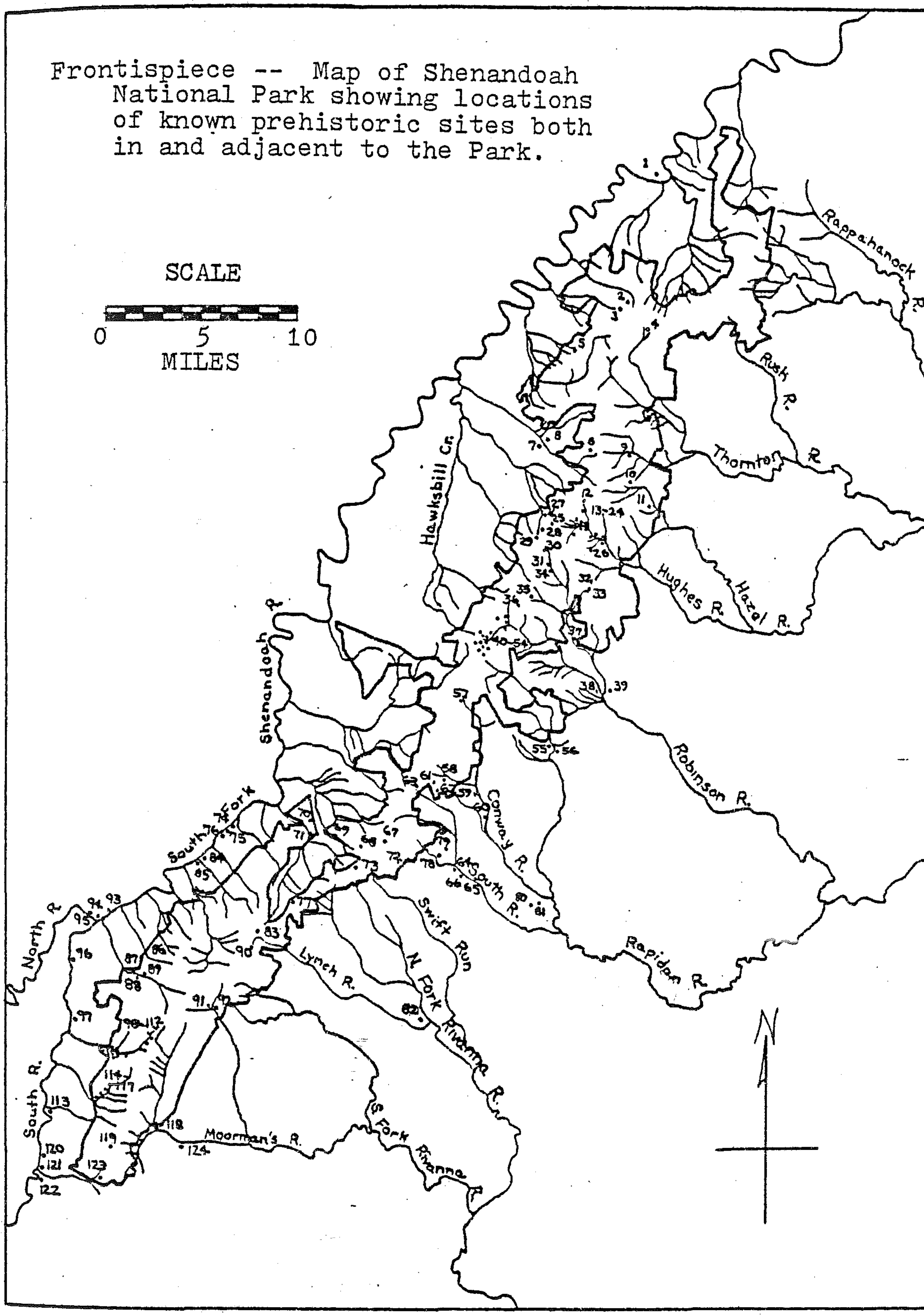


Frontispiece -- Map of Shenandoah National Park showing locations of known prehistoric sites both in and adjacent to the Park.

Key to Frontispiece

1. Flint Run Complex
2. PA-101
3. PA-100
4. RK-100
5. PA-105
6. PA-106
7. PA-107
8. PA-108
9. RK-102
10. RK-103
11. RK-101
12. MD-114
13. MD-122
14. MD-123
15. MD-124
16. MD-129
17. MD-130
18. MD-131
21. MD-132
22. MD-133
23. MD-134
24. MD-135
25. PA-110
26. MD-115
27. PA-103
28. PA-102
29. PA-109
30. MD-117
31. MD-116
32. MD-145
33. MD-146
34. MD-151
35. MD-118
36. MD-119
37. MD-106
38. MD-108
39. MD-110
40. MD-112
41. MD-121
42. MD-127
43. MD-128
44. PA-111
45. PA-112
46. PA-113
47. PA-114
48. MD-138
49. MD-139
50. MD-140
51. MD-141
52. MD-142
53. MD-143
54. MD-144
55. MD-109
56. MD-1
57. GR-127
58. GR-130
59. GR-6
60. GR-5
61. GR-129
62. GR-128
63. GR-131
64. GR-113
65. GR-114
66. GR-115
67. GR-134
68. RM-117
69. RM-122
70. RM-125
71. RM-124
72. GR-132
73. GR-137
74. RM-5
75. RM-8
76. RM-6
77. RM-115
78. GR-4
79. GR-122
80. GR-116
81. GR-124
82. locality of 20 sites:

GR-100	AB-103
GR-101	AB-104
GR-103	AB-105
GR-104	AB-106
GR-105	AB-108
GR-106	AB-109
GR-107	AB-111
GR-108	AB-112
GR-125	AB-113
	AB-114
	AB-115

83. GR-126
84. RM-12
85. RM-11
86. RM-116
87. RM-3
88. RM-127
89. RM-128
90. AB-154
91. AB-155
92. AB-164
93. RM-4
    RM-4A
94. RM-1
    RM-1A
95. RM-2
96. RM-10
97. AU-16
98. AU-152
99. AU-153
100. AU-154
101. AU-155
102. AU-156
103. AU-157
104. AU-158
105. AU-159
106. AU-160
107. AU-161
108. AU-162
109. AU-163
110. AU-164
111. AU-166
112. AU-167
113. AU-18
114. AU-169
115. AU-170
116. AU-171
117. AU-172
118. AB-165
119. AB-158
120. AU-15
121. AU-14
122. AU-11
123. AU-12
124. AB-137

Introduction

Extending for 107 miles along the northern end of the Blue Ridge Mountains, the Shenandoah National Park has presented archaeologists at the University of Virginia with a unique opportunity to study the evidence for prehistoric occupation in a heavily wooded, montane environment. It is the primary purpose of the present study to present the findings of two years of archaeological survey and testing in this region. Because of the relative paucity of information on the archaeology of the mountains and numerous methodological problems encountered during the work, one of the main aims of the following report will be to demonstrate how our experience has been a learning process, not only in terms of discovering and interpreting new archaeological data, but also in terms of the development of new surveying techniques and sampling methods for dealing with an archaeologically little known area where topographic and biotic conditions make recognition of prehistoric sites difficult.

The present paper has three closely related goals.

(1) To provide a comprehensive account of the prehistoric data recovered during the field survey of the Park, including the description of the sites in terms of their geographic location, chronological placement, cultural affiliation, and inferences drawn concerning their function.

(2) To consider these data as components of a cultural-ecological system through a correlation of each site's geographic location with respect to potentially exploitable

resources and the nature of the artifact assemblage.
(3) To use these data in order to formulate a preliminary model for the explanation of site distribution. In conjunction with this last aspect of the research, emphasis will be placed upon the development of systematic sampling procedures which will ensure the recovery of data reflecting the full range of variation in prehistoric activities in the montane region, and can be used in any further intensive archaeological exploration of the Shenandoah National Park.

In the following chapters of this paper consideration will be given to a number of factors. As set forth in the introductory paragraphs, the purpose of this project is to evaluate the data recovered during two years of fieldwork within the framework of a cultural-ecological system in an attempt to understand how prehistoric man related to his physical environment. In the following chapter detailed consideration is given to the many limitations with which we have had to deal in our attempts to establish a meaningful model of exploitation for the montane region. In Chapter III, the various environmental variables which have been used in order to systematically stratify the sampling universe are defined. Chapter IV sets forth some of the necessary assumptions which have been made concerning the socio-cultural aspects of the prehistoric populations whose remains and activities are the subject of this thesis. It is also within this section that the classificatory sytem used in the analysis of the lithic assemblages is described, giving both the logic for each category and some of the problems raised by such an approach. Both Chapters III and IV together set the stage for the analysis which follows in Chapters V, VI, and VII. As stated in Chapter II, the only two sources of data available to the archaeologist are geographic site location (and other physical aspects of the site) and the artifact assemblages. Chapters III and IV serve to define the variables used to describe the sites in the Park. The data analysis in the later chapters moves from a consideration of the variation within each site (Intra-site Variation--Chapter V), to an analysis of the variation between sites within each of the environmental strata as defined in Chapter III (Inter-site Variation--Chapter VI), and on to a consideration of variability within the entire montane region (Regional Variation--Chapter VII). The final chapter brings together these analyses, and hypotheses are proposed to explain the distribution of prehistoric sites.

History of Project

The data base for this thesis is the result of approximately two and a half years of field survey and laboratory research in the Shenandoah National Park. In February, 1975, Dr. Michael A. Hoffman, Director of the Laboratory of Archaeology of the University of Virginia, was contracted by the Denver Service Center of the National Park Service to conduct reconnaisance survey in three areas of the Park where proposed sewage treatment facilities were to be built. Hampered by unfavorable Winter weather, the survey unearthed nothing of archaeological interest in two of the proposed areas (Loft Mountain and Panorama), but did reveal two previously unknown prehistoric sites in the Matthews Arm locality (PA-100 and PA-101; Hoffman, Cleland, and Funk 1975). The sampling procedures utilized in this project, restricted by the limits of the areas to be tested and the inclement weather, consisted of systematic clearance of approximately one meter square areas at scattered intervals and the excavation of controlled test pits. Few artifacts were recovered from the two sites, though their presence indicated conclusively that prehistoric groups were making use of the upland areas. In addition, the fragile nature of these two sites further exemplified the need for rigorously systematic methods for the recovery of data.

This reconnaisance was followed by the compilation of a major background paper concerning the status of archaeological work both in and around the Shenandoah National Park, The Shenandoah National Park as a Cultural Resource: An Evaluation of Past Archaeological Surveys and Work in the Shenandoah National Park (Hoffman et. al. 1975). In this report a full review of all known archaeological sites, both historic and prehistoric, was undertaken with specific consideration given to the formulation of a cultural-ecological framework for interpreting these data. Because an overwhelming majority of the sites dealt with, however, were known only from information in Park files, the authors of that study were unable to arrive at a quantitatively detailed statement of prehistoric man-land relations (Hoffman et. al. 1975:16).

Aside from these unfortunate deficiencies in the available archaeological, cultural-ecological, historical and ethnographic information, several hypothesis were suggested in an effort to meaningfully interpret what was known. Perhaps the single-most important methodological outcome of the study was the realization that, due to rugged topography and dense vegetative cover as well as the complex mosaic structure of the environment, any large scale survey of the Park would require the formulation of statistically significant sampling procedures in order to insure that a representative segment of each "environmental stratum" was tested (ibid.;25). Although in retrospect, the zonation suggested in that report was too gross for a fine-grained analysis of cultural-ecological variation, the overall program of systematically sampling a variety of ecological zones formed the core of subsequent survey and testing and serves as the foundation for the current research.

During the summer of 1975, Hoffman was contracted to conduct a salvage survey at Swift Run Gap (Hoffman 1975). With the lessons of the earlier reconnaisance in mind, this survey utilized a more rigorous application of topographic mapping and surface and subsurface testing in order to recover potentially obscured artifactual material. Site RM-117 was located during this survey in a topographic saddle to the south of present U. S. 33. Material from this site attested to intermittent prehistoric usage, perhaps for several millennia. Of particular note was the location of an apparent in situ cluster of artifacts indicating, perhaps, a single campsite. Although all surface material from this area was recovered, it was noted in the report that other such areas were probably present though obscured by the dense understory vegetation of the locality (ibid:5). Once again, however, it was apparent that the prehistoric remains were fragilely preserved and were, in fact, eroding out of context.

Having received a grant from the Mid-Atlantic Region of the National Park Service to conduct a full cultural resource survey of the Park, in the Fall of 1975 the Laboratory of Archaeology commenced an intensive field survey. Utilizing the general sampling method proposed in the background survey (Hoffman et. al. 1975:25), and encouraged by the findings of the Swift Run Gap testing, a transect of the Blue Ridge was chosen by selecting the Swift Run Gap quadrangle (USGS 7.5 Minute Topographic Series) as a sampling universe. A major aim of this project was the investigation of numerous historic sites and structures to be compiled as a List of Classified Structures (LCS) for the Park (Hoffman and Vernon 1976). During the Fall months, survey crews walked the western areas of the transect, testing several historic sites, one prehistoric site (RM-122 see Chapter V), and locating several others. Because of the major emphasis on historic survey imposed by the LCS research and the small staff working on the project, the prehistoric survey during this period was minimal. At the same time, however, the LCS research was instrumental in the formulation of the next stage of the prehistoric survey. During fieldwork in various regions of the Park, a large number of prehistoric sites were located, particularly in Nicholson Hollow where Vernon discovered twelve prehistoric sites during an on-foot reconnaisance of the numerous historic structures in that locality (see Chapter VI).

During the period of the LCS fieldwork, the Laboratory was again contracted by the Denver Service Center to investigate the cultural resources of three plats of land at Loft Mountain. Testing consisted of scattered test pits in the three areas. Although two of the areas were culturally sterile, the third near the head of Ivy Creek, yielded a small scatter of artifacts. A small greenstone "hoe" was located on the side of Loft Mountain which may have been used for digging root plants. Because very little information was recovered from this site, and it was deemed to be severely disturbed (Hoffman 1975b), in the following paper, no detailed consideration is given to it.

One of the major lessons of this period of the project was that confining our research sample to Swift Run Gap may have been interjecting an unwanted bias into the findings, because Swift Run Gap represents only one of several Gaps along the Blue Ridge. Due to its relatively low elevation, vis a vis the remainder of the ridge, this gap had possibly served as a transmontane crossing point in prehistory and would, therefore, not reflect the cultural differences which were being hypothesized for the eastern and western slopes (Hoffman et. al. 1975:17-18). In addition, restricting the intensive survey to one geographic locality would tend to overlook possible cultural variability existing between more widely separated areas. Out of the lessons learned in the initial reconnaisance in Swift Run Gap, and increases in Park Service funding and personnel acquired by the laboratory, a more comprehensive approach was generated that involved the testing of a number of isolated river valleys (hollows) on both the east and the west side of the main ridge. In conjunction with this approach, a detailed survey of "unique ecological zones", such as Big Meadows, was undertaken in order to insure representative sampling of ecological variance.

In the Spring of 1976, this new, environmentally stratified method of survey was implemented. A review of the techniques used can be found in reports by McLearen (1976) and Miller (1976). The location of fifteen prehistoric sites along Paine Run on the western slopes and the subsequent testing of four of them; and the location of eleven sites at Big Meadows and testing of three of them and another large site located below Big Meadows along the Rose River on the eastern slopes, have provided the bulk of the data upon which the current research is based. In addition, further testing was conducted during the Fall of 1976 at a large Archaic site located in a peripheral saddle on the eastern escarpment of the Blue Ridge at Old Rag Mountain.

During this two year survey a total of 71 prehistoric sites were located by personnel from the Laboratory. Although this number would be sufficient for making statistically significant statements concerning site locations, due to a number of factors (explicitly set forth in the following chapter), not the least of which was the pattern of the development of our sampling strategy (i.e., the "discovery" of the pertinent environmental strata), a majority of these sites have not yielded the sorts of information needed to make quantitative statements about site function and cultural-ecological adaptation. Certainly one of the most important factors related to this problem is the current status of knowledge of Virginia prehistory. Because in approaching questions of man-land relationships through time the archaeologist must look beyond the limits of his specific research universe, consideration must be given to what is known about the prehistory of the region in which the Shenandoah National Park is located.

Virginia's Position in the Prehistory of the Eastern U.S.

Twenty-two years ago, when writing on the position of Virginia in the prehistory of the Eastern United States, Evans (1955:141-5) was prompted to lament the "present state of knowledge of Virginia archeology" and called for more in-depth analysis of the Middle-Atlantic region. Five years later, Holland wrote (1960:80):

> Although the literature is quite extensive for eastern archaeology as a whole, the number of reports dealing with archaeological materials in Virginia or adjacent regions which seemed pertinent to this detailed study is actually very limited.

Although over the past seventeen years much archaeological work has been done, particularly by the amateur members of the Archaeological Society of Virginia, the author feels that Holland's comments are equally applicable to the present study. Available reports vary in quality, though a majority are purely descriptive accounts with little attempt to synthesize the findings from the particular site being studied with results from other sites in the area.

In the absence of detailed reporting of sites (many important excavated sites have never been published) the impression is received that Virginia was somewhat of a "cultural backwater" in eastern prehistory. This estimation is rather unfair, however, for as noted by Evans (1955:142) Virginia is perhaps best seen as a "transitional zone between the cultural complexes of the Southeast, the Northeast, and the Ohio area."

Traditionally, the prehistory of the Eastern United States is broken into three chronological and cultural periods: Paleo-Indian, Archaic (Early, Middle, and Late) and Woodland (Early, Middle, and Late). In the following consideration, these periods have been slightly revised to adapt the sequence to the current information available for Virginia. The major revisions are towards the later end of this scheme in which I have considered the traditional "Early Woodland" period as a transitional time between the Archaic hunting and gathering period and the later Woodland or Mississippian horticultural period. Basically, the prehistory of Virginia lagged behind the developments in the surrounding areas. This is particularly true in the period after ca. 1000 BC which I have used as an arbitrary division for the beginning of the Transitional Period. Available Carbon-14 dates for this period in Virginia are few, but support the idea that an "Archaic" based subsistence continued considerably later than in other regions of the Eastern United States, with horticultural villages not appearing much earlier than AD 1000.

Returning to the earliest period, the Paleo-Indian Tradition was not represented by any of the sites in the present sample. In Virginia two of these early sites have been studied including the Williamson Site in Dinwiddie County (McCary 1951) and the Thunderbird Site near Front Royal (Gardner 1974). The period corresponds with the end of the Wisconsin glaciation or roughly 9000BC to 7000BC, the terminal date chosen being rather arbitrary. What little evidence that is available indicates that these peoples were primarily hunters, traditionally thought to have exploited the megafauna abundant in North America during the glacial period. Sites of this period are widely distributed in the Eastern United States though most are identified typologically by the presence of large fluted projectile points.

The following period, the Early Archaic, is arbitrarily assigned to a time span from ca. 7000BC to ca. 5000BC. The author tends to follow the argument presented by Willey (1966:61) and Gardner (1974:40-1) that this period can be seen as an adjustment to changing environments. The evidence for this is partially based on a broader range of projectile points and other tools, perhaps indicative of an increased subsistence base. One distinct possibility is that the populations began to exploit the smaller animal species as the megafauna dwindled in number. There is, so far as I could ascertain, little evidence for the total subsistence and settlement systems of this period. Like the Paleo-Indian Tradition, the Early Archaic is widespread throughout most of the Eastern United States, though interestingly, Ritchie (1965) reports no Early Archaic examples for New York. This absence may indicate that Archaic influences moved northwards and eastwards from centers in the Tennessee, Alabama, and Kentucky regions. Important Early Archaic sites in the Middle-Atlantic region include St. Albans in West Virginia (Broyles 1966), the Hardaway Site in North Carolina (Coe 1964), and the Flint Run Complex in the Shenandoah Valley of Virginia (Gardner 1974). Several projectile point types have been typologically associated with the Early Archaic, including Dalton, Hardaway, Palmer, St. Albans, Lecroy, and variants of Kirk. Examples of St. Albans and Kirk points were located on Park sites, indicating that exploitation of the Blue Ridge can be dated as early as ca. 6000BC.

The Middle Archaic, 5000BC-2000BC, represents what can be considered the "climax" of the Archaic tradition. The most important change in the tool kit is the addition of grinding stones and ground stone objects indicating that exploitation of plant resources was becoming more important. Interestingly, this period is associated with the Altithermal climatic episode, or in the terminology used in this paper, with the Atlantic and Sub-Boreal Episodes, which was a period of warm and dry climate (see discussion in Chapters III and VII). Evidence for this period demonstrates that seasonal exploitation of resources was occurring, with populations shifting their sites from area to area as the resources became available (e.g. Lewis and Lewis 1961). Further evidence for this "seasonal round" is provided by Ritchie (1965:76) with relation to the Lamoka phase, a Middle Archaic culture in New York.

Although one excavated site indicated sedentism in the form of post constructed houses and a wide variety of food remains,

> The normal community pattern for the Lamoka culture seems rather to have been restricted wandering, probably within a specific territory, by small bands of approximately twenty-five individuals, following a seasonal cycle, as judged from the scores of little camp sites.

Later indications are that this pattern became centrally based as the groups began to return to the same sites periodically.

Projectile points of the Middle Archaic are generally large broad bladed stemmed types, though there is considerable variation. Evidence in Virginia indicated that influences may have been felt from both the North, with the occurrence of Lamoka points as far as Southwest Virginia (Holland 1970), and the South, as evidenced by such forms as Morrow Mountain, Guilford, and later, Halifax (Coe 1964).

The Late Archaic, 2000BC to ca. 1000BC is marked by the presence of large stemmed Savannah River projectile points and occasionally, steatite vessels. In Georgia, early fiber-tempered pottery has been dated to ca. 2000BC, though its influence was not immediately felt in Virginia. Subsistence strategies were probably unchanged so that in Virginia this period is rather arbitrary. By about 1000BC, significant innovations were occurring in most of the Eastern United States marking the end of this period.

The Transitional period, though identified by other writers (e.g. Ritchie 1965 and Willey 1966), was somewhat longer in Virginia than other areas where it is known as Early Woodland and Adena-Hopewell. As mentioned above, the main reason for extending the transitional period in Virginia is the lack of good evidence to the contrary. Basically, it is assumed that the Archaic subsistence strategies persisted in the mid-Atlantic region and only minor influences were received from other areas. Steatite tempered and pottery sherd tempered ceramics have been dated at Virginia sites as early as ca. 1000BC (Holland: Personal Communication) though the low frequencies and lack of continuity indicate that no ceramic tradition developed in Virginia for several hundred years after this date.

There is limited evidence in the Shenandoah Valley for Hopewell influence between ca. 700BC and AD 700, in the form of small burial mounds associated with copper ornaments, mica, and gorgets, but no pottery (Holland: Personal Communication). Although no projectile points are definitely associated with this period it is probable that the Savannah River continued in Virginia. The parallel sided stem point (Holland 1955:Type L), seriates to a relative position above the large Savannah River and below the later Levanna triangular type, and may be associated with this transitional period. On typological grounds this seems probable as there are numerous affinities between the Savannah River and the smaller straight stemmed Type L point.

A date of ca. AD700 has been used to mark the end of the transitional period in Virginia. By some opinions (e.g. Holland: Personal Communication) this may be slightly early and by others (e.g. Boyer: Personal Communication) too late. The date was chosen because of Carbon-14 dates from the Lewis Creek Cement Plant Site, Augusta County which fell around this date. The site was associated with Levanna triangular points and Albemarle Fabric-Impressed pottery, and is the earliest dated site in Virginia with evidence for a local ceramic tradition. The date is used to delineate the beginning of the Woodland period. The author feels that this later period could be further subdivided into "pure" Woodland and Mississippian based upon evidence for horticultural village settlements and large burial mounds. This division has not been made, in large part due to the lack of evidence for horticulture in the Park, so that these two periods are considered the same. Dates as early as AD 900 (East Mound, Augusta County) have been obtained for sites demonstrating possible Mississippian influence, although this date may be for earlier contexts at the site (Holland: Personal Communication). Generally, however, good evidence is available for Mississippian village complexes dating from ca. AD 1200 to the time of European contact. In addition, there is some evidence that during this later period, the exploitation of natural resources continued, again demonstrating a possibility of seasonal exploitation.

Inevitably the sites of the Woodland period are associated with triangular projectile points and ceramics. Holland's seriational studies (1955 and 1960) indicate that there was a gradual decrease in the size of these points so that the Levanna triangular was probably earlier, followed by Madison and Clarksville Small.

This brief overview provides a basic temporal and developmental picture of Virginia's position in eastern prehistory. Generally, though the evidence is notably shallow, Virginia served as an important zone through which cultural ideas passed. Some of the attributes were adapted, such as projectile points and settlement systems, but others, for instance ceramics and horticulture, experienced a considerable delay before acceptance. In Chapter VII more detailed consideration is given to the areas immediately adjacent to the Park and a review of the prehistoric chronology of Park sites is presented in the concluding chapter.

Chapter II

Limitations on Data Interpretation

Because much of the interpretation which comprises the bulk of the present paper is limited by a number of factors, it is necessary to outline the present limitations of our research before considering its broader cultural-ecological implications. Four particular problem areas are considered: (1) sampling bias, (2) chronological problems, (3) preservation, and (4) vegetation and topography.

Sampling Bias -- The need for a systematic program of probability sampling was realized from the beginning of the project (Hoffman et. al. 1975). Although the Shenandoah National Park is not large in absolute area (ca. 300 square miles), its form is such that it extends in a narrow strip (no greater than 7 miles wide) along the Blue Ridge for a distance of 107 miles (see Frontispiece). Within this sampling universe there is significant ecological variation which must be representatively sampled in order to understand the full range of variation in man-land relationships (Binford 1964). Awareness of the need to sample systematically and the actual implementation of logical sampling procedures are like two sides of the same coin. Whereas in many archaeological regions, for example the American Southwest, decades of archaeological work have simplified the task of establishing sampling procedures (see for example Gumerman 1971 and Mueller 1974). In our experience, however, when dealing with an area where ecological conditions are not as clearly defined and where only limited archaeological data is available to aid in the formulation of cultural-ecological models, it has been found that the sampling units had to be defined by initial field research into cultural-ecological variations.

In addition, unlike the situation in many other areas, ecological variation in the montane zone is complex and not easily differentiated. This situation can be contrasted to the river valleys of the midwest (see for example Wood and McMillan 1976) where the biotic environment is relatively easily divided between forest and prairie, or to arid regions where the biotic environments are clearly distinct. In the Blue Ridge, however, such a clear distinction cannot be drawn, and as a result it becomes increasingly difficult to evaluate the relative importance of variation in floral cover. Disagreement between botanical researchers on the distribution of floral communities undermined the potential usefulness of forest type as a basis for sampling units. (Berg and Moore 1941, Shelton 1975, Wilhelm 1972, and Hanawalt n.d.).

An attempt was also made to associate site distribution with soil type. This also resulted in inconclusive results partially because of differential sources on soil distribution. Soil surveys are not available for all of the counties adjacent to the Park and those which are available were conducted at widely separated times. It was felt that it may be possible to cull useful information from these reports, but due to shortage of time this was not attempted. In any future research, the potential importance of soil association should be considered.

These two factors, flora and soils, are examples of environmental attributes which have been profitably used in similar survey endeavors in other areas but which have not proven useful to our attempts. On the other hand, the montane region does provide natural stratification in its physical structure or landform. The following chapter will define the pertinent landform variables in depth, but the purpose here is to relate how our current data may be biased with relation to these variables. As our research strategy has developed during the two and a half years, we have become increasingly aware of the potential for differential utilization of various landforms in shaping prehistoric cultural-ecological adaptations. The landforms considered pertinent were hollows, gaps, ridges, peripheral saddles, upland basins, foothills, and mountain slopes (see Chapter III for definitions). Because it was not until the Spring of 1976 that this environmentally stratified survey method could be initiated, however, we had insufficient time, money, and trained personnel to insure the systematic implementation of a major research project. Anticipating continued funding of the project at some point in the future, we limited intensive exploration to two topographic areas--Hollows and Upland Basins--represented respectively by Paine Run and Big Meadows. When we add to these our previous surveys at Swift Run Gap and subsequent testing in a peripheral saddle at Old Rag Mountain and it can be seen that we have been able to test a sample of four of the seven major landform zones. The question which plagues the current research, however, is whether or not these samples are representative of the range of variation. As will be seen in the quantitative breakdown in the following chapter, there exists in the sample of sites surveyed by the Laboratory a definite skewing towards the Hollows. Although this may in fact be a true representation of the actual pattern of prehistoric settlement, it does raise the question of sampling bias.

Another sampling bias which has presented problems to the current research is the use of differential methods of artifact recovery. In large part, this problem can be attributed to lack of sustained funding and the consequent inability to maintain systematic exploration at anticipated levels. Basically, four different artifact recovery methods were used during the survey: (1) controlled surface excavation, (2) test pits, (3) surface collection, and (4) no collection.

The most comprehensive (and least utilized) was a method of controlled surface excavation. This entailed a great deal of time for the layout of a grid system and the collection of materials from horizontally defined areas.

With this method we achieved a high degree of horizontal control over the spatial distribution of the finds. It was particularly useful on sites where material was abundant on the surface and soil development was minimal. The second type of collection consisted of the excavation of either one or two meter squares scattered at random about the site. The squares were then excavated in either 5, 10, or 20 centimeter arbitrary levels to depths ranging from 20 to 90 centimeters. All soil was either passed through a 1/4 inch mesh in order to recover small flakes or, as in the earlier tests, trowel sorted for materials. Though this procedure was excellent for sites where material was heavily obscured or buried, it was extremely time consuming and, because of untrained student labor, was less practical than originally envisioned. The third sampling method was simple surface collection. This was generally utilized during the initial reconnaisance of an area so that some indication of the site's potential could be gained. Because of a desire to preserve delicate pre-historic sites until sampling techniques were carefully developed, most of these collections were made from gulleys, fire roads, and trails where prior disturbance and removal of ground cover had facilitated site location and already altered the horizontal provenience of artifacts. When the material was brought to the laboratory for analysis, however, it was found that, unless there were chronologically or functionally diagnostic specimens, without exact proveniences the artifacts were of little interpretive value. For this reason, our survey entered a period in which we merely recorded the location of the sites and made notes on the types of materials encountered. At some of these sites, the more diagnostically useful artifacts were recovered, but only after having been accurately located with relation to some significant landmark at the site. In order to quantitatively express the impact of these differential testing methods, Table 1 gives the breakdown of the number of sites tested with each.

TABLE 1 Tabulation of Sampling Techniques

Controlled surface excavation	2
Test Pits	11
Surface Collection	35
No Collection	23
Total Surveyed Sites	71
Additional sites from bibliographic research	27
TOTAL Prehistoric Sites Known	98

As this distribution indicates, therefore, even though the Laboratory has recovered varying degrees of information from 71 prehistoric sites, of these only 13 were sufficiently tested to use in any detailed analysis. Each of these sites is dealt with in detail in Chapter V.

<u>Chronological Problems</u> -- As noted in Chapter I, one of the primary goals of this analysis was to establish a chronological sequence for the prehistoric occupation of the

Shenandoah National Park. This attempt has been severely hampered by the lack of a well established local chronology. This problem, as noted earlier, is particularly acute in the period from ca. 1000BC to ca. AD 700. Because of the lack of reliable chronological sequence for the immediate area, temporal placement has been accomplished through the use of diagnostic artifacts or "fossil" types. Generally, these are well established projectile points types which have wide-areal distribution and have been consistently dated to a particular span of time. In Chapter I, a review of some of the fossil types used in evaluating the Park assemblages was presented.

During our survey in the Park, however, there has been a relative paucity of such "diagnostic" forms. Although this could be a result of inadequate site testing, as noted above, even from those sites where large samples of artifacts were recovered systematically, few, if any, datable tools were discovered. This situation is most probably related to the function of the sites and as such will be dealt with in greater detail in later chapters. It is mentioned here in order to clarify the reason why our attempts to establish a chronology for the region have enjoyed limited success.

A final reason for our inability to establish a reliable sequence is the complete lack of features which could have yielded charcoal for Carbon-14 dating. Because of this, we have no absolute dates for any of the sites from which to begin the formulation of a local chronology. Again, this factor could be a result of inadequate testing, though the fact that no features were located during extensive surface excavation at site AU-167 (see Chapter V) raised the possibility that poor preservation may be an important factor in their absence.

<u>Preservation</u> -- One of the major sources of information for archaeologists in formulation of prehistoric life-ways and determination of site function is the presence and analysis of faunal and floral remains. Due to adverse preservational conditions extant in the soils of the montane region, however, our work in the Park has not encountered any skeletal or floral remains which could be reliably associated with prehistoric occupation. There are three factors which detrimentally effect preservation conditions in the Park: (1) soil acidity, (2) shallow, erosion prone soils, and (3) stream braiding.

Acidic soils are characteristic of most of Virginia, including the Shenandoah National Park. Such conditions result in the loss to the archaeological record of virtually all faunal remains, unless protected somehow. It is conceivable that in some of the deeper alluvial soils near the lower ends of hollows or within deeply stratified sites (e.g. AU-158) that the normal soil acidity would be neutralized, though in our work to date there has been no indication that this is occurring.

The second factor, shallow, erosion prone soils, does not occur everywhere in the Park but is most common on ridge tops, mountain slopes, and in the upper portions of hollows where soils are subject to erosion. At present, vegetational cover protects most of the soils from severe erosion though in the late nineteenth century when a majority of the mountain area was opened by agricultural and logging activities erosion must have been severe. Fowke (1894) notes that the great flood of 1870 destroyed a portion of a site located along the western margins of the Park. The extent to which this erosional factor has adversely affected the preservation of sites cannot yet be fully evaluated.

Stream braiding was noted as having an important effect on the preservation of sites. In our survey experience it was noted that in areas where a stream apparently has been shifting back and forth across the hollow, no sites were located. This situation was particularly obvious in Paine Run where the middle section of the hollow was severely braided and consequently no sites were found, though they were numerous on either side of the braided area (see Figure 17). Again, it is impossible to evaluate the significance of this type of stream activity, because it is not known whether such areas were not chosen by prehistoric groups or whether the sites have simply not been preserved.

Vegetation and Topography Factor -- Thick understory vegetation, steep slopes, and poor accessibility are all factors which effect the ability of surveyors to recognize and define the parameters of prehistoric sites. Unlike areas where survey can be conducted in large plowed fields, survey work in the montane zone is severely hampered by poor visibility of remains especially in the late Spring, Summer, and early Fall. In addition, due to the nature of most of the prehistoric sites in the Park which are small and left no hard structural remains it is quite easy to overlook them in a cursory walking survey. In the earlier stages of the project such visual reconnaisance was the method utilized with arbitrary areas chosen for clearance of the ground surface. Systematic reconnaisance methods employed in the most recent survey (Troup 1977) have significantly overcome these problems by the excavation of five shovels full of dirt at five meter intervals. Although this is a time consuming and expensive method, when properly employed it insures that sites of all sizes are located and their boundaries recognized.

Using the reconnaisance and testing methods mentioned earlier, the inability of the archaeologist to adequately define such variables as site size and artifact density has resulted in what may appear to be spotty data. In fact, because a great number of the 71 prehistoric sites dealt with in this report were only cursorily surveyed (see Table 1), it has become impossible to fully evaluate the range of variation in the types of sites located. Although it is not possible to make quantitative statements about site types, it is apparent, on a qualitative level, that there is considerable variation. Because of this serious shortcoming in the available data, however, in the following report I have only been able to suggest the potential significance of empirically noted differences. Such hypotheses need to be thoroughly evaluated through a coordinated program of site testing, taking into consideration the importance of intra-site variability in the deposition of materials.

All in all, the results of being hampered by such a large number of limitations on the data interpretations is that the archaeologist is left with very meager information to manipulate in attempting to understand the complexity of prehistoric man-land relationships. Generally speaking, there are two prime sources of information available -- environmental and cultural. On the environmental side what is available is information concerning geographic site location. Because of poor preservation of organic remains it is not possible to make explicit statements on the actual environmental situation at the site during the past. The definition of the pertinent environmental variables--landform, proximity to water, availability of lithic raw materials, and elevation--will comprise the content of the following chapter. Cultural information is available in the form of artifact assemblages, for the greatest part confined to the recovery of stone tools and lithic debitage. In this realm of data, it is the debitage which comprises the greatest percentage of the assemblages. Although usually neglected by archaeologists, such apparently insignificant material has been of great aid in analyzing the texture of prehistoric settlement and subsistence systems in the Shenandoah National Park.

It is believed that, though the factors covered herein severely limit the comprehensiveness of the possible interpretation, our experience in confronting them directly has led to the formulation of methods for data retrieval and interpretation which circumvent, to a limited degree, the unfortunate loss of information due to natural conditions and prior sampling errors, and offer great potential for understanding a little known and oft neglected aspect of North American prehistory.

Chapter III

The Environmental Variables

One of the basic assumptions of this report is that prehistoric exploitation of the Blue Ridge varied with the resource potential of different areas of the Park. In order to determine environmental variability it is necessary to consider the montane region as a patchwork design of differential resource zones. The ultimate aim of conducting such a classificatory operation is to insure that during survey a representative and proportional sample of each of these areas is tested. With that in mind, it was first necessary to explore the region and discover the pertinent factors affecting site location before an exhaustive sampling procedure was devised.

LANDFORM

From the beginning of the project, the physiographic structure of the montane zone suggested an avenue worthy of further consideration. Among these "natural" categories of environmental stratification the potential importance of landform was quickly realized. In the following pages seven landform categories are defined and discussed with reference to their geomorphological attributes, potential resources, and possible uses for sites within that zone. Also, for each category I have included the numbers of sites found in each. Where possible, the number of such landforms which exist within the Park have been quantified.

Each of the seven landforms considered represents only a refined level of abstraction, which seeks to break down the broad physiographic zone to which the Blue Ridge is assigned--the mountain zone. In other words, rather than considering the Blue Ridge as an undifferentiated zone of mountains, it has been divided into a series of smaller physiographic units. These divisions could be further refined and consideration given to specific landform categories which could, conceivably, cross cut the seven which are defined here. To a certain extent this has been unconsciously done by the establishment of a unit which is referred to as "potentially habitable". This term deserves further treatment as it will constantly recur throughout the remainder of the paper.

An area which is considered "potentially habitable" is primarily defined by the extent of the land's slope. It is assumed, and the survey data confirms (see Table 2), that prehistoric populations were limited in their choice of habitation sites by the steepness of much of the Park land. Thus, what is inferred by the term potentially habitable is an area where there is a "sufficient area" of level ground for setting up a camp. Not all "potentially habitable" areas were, in fact, inhabited which raises questions about site selection. Within each of the seven zones considered below, potentially habitable areas may take several different forms. It is possible that were more substantial and systematically recovered data available that functional differences between these areas could be demonstrated. For instance, in considering hollows, several varieties of potentially habitable land are present, such as rockshelters, floodplains, and colluvial or alluvial terraces. Fortunately, the data does provide some indication of variance in the utilization of these areas (Chapter VI).

The seven landform variables to be used in the following consideration of man-land relationships are: (1) Hollows, (2) Ridges, (3) Upland Basins, (4) Gaps, (5) Peripheral Saddles, (6) Foothills, and (7) Mountain Slopes. As with any attempt to divide a natural system, where the line is drawn between one category and the next is somewhat arbitrary, particularly in those inevitable fringe areas where two landforms join one another.

Hollows -- The term "hollow" has been used often in reference to many of the stream valleys that channel the water runoff from the mountains to adjacent drainage systems. The 24 drainage basins on the eastern slopes of the Blue Ridge provide the headwaters for major tributaries of the Rappahannock and James Rivers while 38 drainage basins along the western escarpment are associated with the watershed for the South Fork of the Shenandoah River and ultimately the Potomac River. The sizes of these basins are variable from the largest, Big Run, to the numerous small secondary streams which originate in the mountains and empty their runoff directly into the Shenandoah River. Each of these drainage basins is associated with the landform "hollow". It should also be noted that due to the arbitrary, political boundaries of the Park that many of these drainage basins are truncated, resulting in the loss of the potentially lucrative flood plains at the mouths of hollows.

The word "hollow" has two levels of meaning, the first referring in the very general sense to the entire drainage basin (or a major portion of it), as in "Nicholson Hollow". In terms of the present discussion, "hollow" refers specifically to the relatively level surface flanking the valley streams (Hack and Goodlet 1960:6). It is by making this distinction that it becomes possible to isolate hollows as "potentially habitable" and to distinguish them from other landforms.

During the survey of the Park, several hollows were investigated. Intensive survey was conducted in Paine Run in the Southern Section, resulting in the location of 17 sites along the course of the stream. Others investigated were Nicholson Hollow, Rip Rap Hollow, West Swift Run, the Rose River, White Oak Canyon, Doyles River, and Madison Run. A total of forty-five (45) hollow sites were located during the survey.

The resource potential of hollows is rich and varied. The dominant forest type associated with hollows is Cove Hardwoods which provide sources for nuts and wood. Fauna found in hollows would be deer, bear, various small mammals, reptiles, and, in the larger streams, fish. The river beds also would provide a nearby source for river cobbles for the production of stone tools, though this would depend largely upon the geologic associations of the valley and the lithic preferences of the prehistoric groups (see below--"Lithic Resources").

Perhaps one of the more crucial aspects of hollows which makes them so important is that they provide an easy avenue for access into the mountain zone. Sites located deep within a hollow would be in close proximity to a variety of resource areas. In addition, use of hollows as a means of access to the main ridge and to the other side must be considered as a potential use for the landform.

Ridges -- A ridge may be defined simply as an area of high elevation separating two hollows. There are two varieties of ridges in the Shenandoah National Park -- the main "backbone ridge" angling along a northeast-southwest trend and numerous finger ridges which extend outward from the main ridge to separate the drainage basins. In terms of "potentially habitable" areas ridges are considerably variable though many present the necessary flat areas for habitation. During the survey, no ridges were fully and systematically checked for sites though four (4) such sites were located by Laboratory crews and an additional ten (10) are known from bibliographic research (Hoffman *et*. *al*. 1975). The number of ridges in the Park is enormous and have not been quantified for the present paper. There remains a need to more carefully evaluate the variations in this landform in order to determine how it is to be logically quantified.

Due to shallow soils and exposed position, ridges are considerably drier than the hollows. Chestnut-Oak and Yellow Pine forests are associated with the ridge tops, blending with the Cove Hardwoods on the steep side slopes. Because of the lack of a constant water supply (with the exception of areas adjacent to springs) sites located on ridges in the mountains would probably be short term single activity camps. If this assumption is true, then the recognition of ridge sites becomes doubly difficult as probably very little debris would have accumulated and, possibly, a good deal eroded.

Upland Basins -- This landform category was specifically created in order to deal with topographic regions at high elevations which are distinguished by large level areas surrounding a basin-like depression. At the present, in the Shenandoah National Park only Big Meadows, at an elevation of ca. 3400 feet, fits into this category, and has been intensively surveyed. Although many Park historians have hypothesized that the Indians once controlled this area by burning it periodically, the current data neither supports nor refutes this possibility. But even aside from that particular activity, the Upland Basin represents a unique bio-physical unit in the Park. The landform consists of two adjacent swampy depressions and several related springs. Now maintained by the Park Service as an open meadow (as it may have been during prehistory) the area supports a wide variety of life forms and may have been an attractive location for seasonal hunting camps. During the survey of Big Meadows, eleven (11) sites were located and three (3) were tested.

Gaps -- Along the backbone ridge, twenty-two (22) gaps are located within the Shenandoah National Park. The gaps are areas of low elevation, relative to the axis of the ridge adjacent to it, and are noticeable from a distance as a "V"-shaped notch in the mountain profile. Because of the attribute of being easily accessible up adjacent hollows, it is assumed that the gaps were used by prehistoric populations for crossing the ridge. Because a majority of the gaps are open to the prevailing westerly winds, it is doubtful that they would have attracted long term settlement, but rather sites could be expected to be short term transient camps. In the course of the fieldwork, four (4) gap sites were located and one, at Swift Run Gap (Hoffman 1975a), was systematically tested.

Peripheral Saddles -- Located on finger ridges extending to the east and west of the main ridge, peripheral saddles are companion landforms to Gaps, i.e. they are areas of low elevation relative to the adjacent ridges and serve as a divide between two drainage basins. Because they are most often located on east-west angling ridges, the saddle itself is provided protection from harsh climatic conditions by the adjacent higher elevations. A survey of the USGS 7.5 minute quadrangles for the Park resulted in the location of a total of twenty seven (27) saddles, 14 on the east side of the divide and the remaining 13 to the west. During the survey, a total of 5 saddle sites were investigated in 4 different areas of the Park.

Peripheral saddles range in area from small steeply sloped divisions between mountains (as in two located along Rocky-top Trail) to large relatively level areas where there is considerable soil development, as at Old Rag. Saddles are potentially important areas for the location of seasonal hunting camps, possibly large base camps, and also transient camps where groups stayed while transversing from one hollow to another. Available resources would include a variety of both floral and faunal species, similar to those found in the hollows.

<u>Foothills</u> -- In several areas the Park boundaries extend beyond the range of the montane physiographic region and on both the east and the west side encompass areas of gently rolling foothills dissected by numerous small intermittent streams. Often a sufficient area of level ground is

available for occupation. The extent to which this landform is found in the Park has not been systematically quantified, though survey has revealed two sites associated with it. Large long-term base camps, from which hunting and gathering forays into the mountains could be easily accomplished, are one type of site which could be expected in these areas.

Mountain Slopes -- Comprising the largest proportion of the Shenandoah National Park, mountain slopes refer to the steep side slopes of river valleys and the mountain peaks. Due to the steepness of the slope, there is very little likelihood for a "sufficient area" of habitable ground. In fact, survey of the P ark region has revealed no sites on the slopes (other than occasional isolated finds) though the Park files contain information on three (3) sites located on mountain slopes. It should also be noted that Park Naturalist Jim Brennan (Personal Communication 1976) located a site on the western side of Loft Mountain where a level area, much like a shelf, provided the necessary plot of land. Other habitable areas which can occur on slopes are rockshelters, an example being site MD-106 outside of the Park on Old Rag mountain.

It is most likely that sites were located on adjacent landforms so that the resources of the slopes could be exploited. The predominance of Oak and Hickory (Shelton 1975:78) on these slopes would have provided nuts, while faunal species (deer, bear, turtles, snakes) are also abundant on the slopes.

In review, seven landform types have been defined in order to stratify the environment of the Blue Ridge. Landform is related to numerous other variables such as flora, fauna, geology, and hydrologic processes. The distribution by landform of known prehistoric sites is presented in Table 2.

TABLE 2 Tabulation of Known Prehistoric Sites by Landform

Landform	Surveyed	Park Records
Hollows	45	4
Ridges	4	10
Upland Basins	11	0
Gaps	4	2
Peripheral Saddles	5	1
Foothills	2	2
Mountain Slopes	0	3
Unknown	0	5
TOTAL	71	27

HYDROLOGIC ASSOCIATION

Another variable which has been used in order to stratify the environment is the association of sites with different water sources. Generally, the montane region is rich in water so that no site location would be far removed from a source of water. However, it is likely that site function may be related to the type of water source available at the site. Basically there are two sources to be dealt with -- springs and streams -- both of which are widely distributed throughout the Park.

Springs -- Much of the geologic bedrock of the Blue Ridge serve as aquifers, resulting in numerous springs which erupt in various locations. Eleven (11) of the 71 surveyed sites were located in close proximity to springs. When considering the function of sites related to springs the question of seasonality of spring flow is an important variable, possibly related to seasonality of site occupation.

Streams -- As with springs, streams of a variety of sizes are numerous within the Park boundaries. There is a correlation between streams and the landform "hollow", i.e. all hollows have streams. As expected, therefore, a majority of the sites in the sample are associated with streams (50 of the 71). However, in order to make sense of this factor streams may be further classified to determine whether some sort of cultural selection is involved.

Primary Streams -- A primary stream is defined as the major stream carrying runoff from the drainage basin. Hollows formed by these streams are generally better suited to habitation than those associated with the secondary streams and many have floodplains of alluvial soils near the lower end of the hollow.

Primary streams can be further subdivided into perennial and intermittent. It can be hypothesized that the larger, long termed sites would be associated with the more dependable water sources. In fact, 28 of the 71 surveyed sites were located along the courses of the large perennial streams, though it is noted that during the survey it was the main watercourse which usually received the most attention. Five (5) of the 71 sites were adjacent to intermittent primary streams.

Secondary Streams -- A majority of the primary streams receive runoff from associated stream valleys containing smaller, usually steeper, streams. Hollow formation is generally less developed than with primary streams so that "sufficient areas" of habitable land are less likely to occur. In some of the larger basins, however, even the secondary tributaries are large enough to have provided the necessary terraces for occupation.

As with the primary streams, secondary tributaries can be further subdivided into perennial and intermittent. Of five (5) secondary stream associated sites, one (1) was along a perennial stream and the remaining four (4) were along intermittent streams.

Confluence -- The final category for hydrologic association is the area of the confluence of two streams. In the survey these areas, particularly where a primary and a large secondary stream converge, have almost inevitably produced evidence of prehistoric occupation providing there is a "sufficient area" of habitable land. Twelve (12) sites were located in such areas.

It should be noted that hydrologic association could not be determined for ten (10) of the sites located in the survey. Located on ridges, peripheral saddles, and in gaps it is probable that other features of these areas were primary in determining these site locations.

TABLE 3 Tabulation of Surveyed Sites by Hydrologic Association

Spring	11
Perennial Primary	28
Intermittent Primary	5
Perennial Secondary	1
Intermittent Secondary	4
Confluence	12
Undetermined	10
TOTAL	71

LITHIC RESOURCES

Because the overwhelming majority of the artifacts retrieved from the Shenandoah National Park sites were stone, it is crucial to consider the relation of sites to possible sources of prehistorically usable raw material for manufacture of these objects. Holland has noted (1960: 65-74) a chronological shift in the preference for rock material in the Valley from quartzite to cryptocrystalline rock. Although this pattern was found to be the case at one Park site (AU-158), a majority of the sites demonstrated a heavy utilization of quartzite, with descending quantities of cryptocrystalline, quartz, and greenstone.

Although in Paine Run this probably is due to most sites being of Archaic date, the distribution in other areas is most likely due to geographic and cultural factors. In order to see whether site location is related to observable frequencies of materials at sites the surveyed sites were plotted with relation to locally occurring bedrock.

Although the geologic structure of the Park is complex, it is basically composed of rock from seven identifiable formations. Though each of these formations is associated with numerous types of rock (Gathright 1976), it is possible to identify a dominant element. These are in order of oldest to youngest (Gathright 1976):

Old Rag Granite - Light-gray, coarse grained, quartz-potash feldspar granite

Pedlar Formation - Greenish-gray, coarse-grained, massive to banded granodiorite

Swift Run Formation - Dark-gray to purple sericitic shale, gray to brown quartzite, and brown argillaceous pebble-conglomerate

Catoctin Formation - Dark green metamorphosed basalt with interbedded purple phyllite

Weverton Formation - Light-gray, ferrugenous, locally resistant conglomeratic quartzite with interbedded brown and green locally conglomerate shale and silvery-green sericitic shale

Hampton Formation - Brown to greenish-gray shale and siltstone with interbedded greenish-brown to black, resistant, ferruginous quartzite

Erwin-Antietam Formation - Upper member: light gray to white quartzose and arkosic sandstone with interbedded yellowish-red to white clay and sandy clay. Lower member: light-gray to white, very resistant, thick bedded quartzite with interbedded brown shale and siltstone

For our purposes, the upper levels of the geologic sequence, the Hampton and Erwin-Antietam Formations require the greatest attention. Both of these rock formations have thick beds of "high grade", very resistant quartzite. These rocks are present along the entire western escarpment of the Blue Ridge, though notably predominant in the southern section. The predominance of quartzite in the assemblages from Park sites gives an indication of the importance of these formations.

The second most dominant rock formation associated with sites is the Catoctin Formation which dominates a great deal of the Park. The product of Precambrian lava flows, this formation is comprised of thick beds of basaltic greenstones. This material though very granular, was often utilized by prehistoric populations.

As can be seen in Table 4, nearly 70% of the sites surveyed were on one of these three formations. If the Pedlar Formation were included in this consideration the percentage would jump to over 90%, leaving only seven (7) sites for the remaining geologic formations. This clustered distribution would seem to indicate that geologic association was playing a major role in site selection. This view must be revised, however, in light of the areal distribution of these formations (Gathright 1976: Plates). From this it is apparent that these four rock formations comprise the largest area of the Park and virtually all of the surveyed areas.

TABLE 4 Tabulation of Surveyed Sites by Geologic Association

Old Rag Granite	6
Pedlar Formation	15
Swift Run Formation	0
Catoctin Formation	22
Weverton Formation	1
Hampton Formation	13
Erwin-Antietam Formation	14
TOTAL	71

One fact which is known concerning difference between sites on the east and west of the Blue Ridge is differential preference for lithic materials. To the west there is the early use of quartzite which gave way to a use of cryptocrystalline materials (Holland 1960); while to the east a majority of the Piedmont site assemblages are comprised of quartz and greenstone. Such a distinction was expected to be found between sites on the western and eastern escarpments of the Blue Ridge. Of twenty-eight (28) sites which yielded large enough samples for comparison (more than 10 artifacts), twenty-three (23) were predominantly quartzite using, four (4) quartz, and one (1) cryptocrystalline. The geographic distribution of these sites shows that twelve of the quartzite using sites on the west of the ridge and the remaining eleven were on the east side. As expected, all of the quartz using sites were located to the east and the one cryptocrystalline site was on the west. This distribution indicates that quartzite, when available nearby, was a preferred material for lithic manufacture; or conceivably, that Valley populations were crossing the ridge and utilizing the eastern escarpment.

ELEVATION

In order to determine whether there was any selective pressure involved in site selection related to possible vertical zonation of resources, the distribution of the 71 sites was plotted using an interval scale of 500 feet. I is noted that there is a clustering of sites at the lower

TABLE 5 Tabulation of Surveyed Sites by Elevation

less than 1000 feet	0
1001-1500	20
1501-2000	17
2001-2500	16
2501-3000	3
3001-3500	14
3501-4000	1
over 4000 feet	0
TOTAL	71

elevations (between 1000 and 2500 feet). This is related to the predominance of hollow sites in the sample. Eleven of the fifteen sites between 3000 and 4000 feet were located at Big Meadows and reflects the importance of that unique ecological zone.

PALEOCLIMATOLOGY (Table 6)

Certainly the most problematic situation in dealing with an environmental interpretation of prehistoric settlement and subsistence systems is the fluctuation through time of climatic patterns. Carbone (1976) has done extensive research on the paleoclimatology of the Shenandoah Valley and has suggested some possible changes in the highland environment. Three of the climatic episodes identified by Carbone are of concern to the present endeavor.

The Pre-Boreal/Boreal Episodes, running from approximately 8000 to 6000 BC, are associated with the Early Archaic. In the highlands, Carbone suggests that this episode was associated with a shift from tundra-like conditions to subarctic woodlands and an establishment of Hemlock-White Pine forests along the Mountain slopes and a mixed conifer-deciduous forest in the river valleys (Carbone 1976:187). The Atlantic/Sub-Boreal Episodes are associated with the Middle to Late Archaic (ca. 6700 BC - 1000 BC). This was a period of general warming and, due to "moisture stress resulting from decreased precipitation", Carbone (1976:106) sees the development of Oak-Hickory and mesic forest conditions in the mountains as well as a return to open (meadow?) conditions in the highlands. The Sub-Atlantic episode represents a climatic shift back to cooler moist conditions and is associated with the establishment of modern forests. Temporally, this change is associated with the end of the Archaic, the transitional period, and the beginning of the Woodland cultural period (ca. 1000 BC - present).

TABLE 6

Climatic Episodes and Associated Cultural Periods

(adapted from Carbone 1976)

Climatic Episode	Characteristics	Dates	Cultural Periods
Pacific neo-Atlantic Scandic sub-Atlantic	return to cool moist conditions. Oak-Chestnut on ridges. White Oak on Valley floor. Establishment of modern forest communities	present to ca. 1000BC	Late Archaic through Woodland
sub-Boreal Atlantic	Decreased precipitation, increased temperatures. Mesic forests on floodplains, grasslands on Valley floor, Oak-Hickory in highlands	ca. 1000BC to ca. 6700BC	Middle to Late Archaic
Boreal pre-Boreal	sub-arctic woodlands in highlands, hemlock/white pine on slopes, mixed conifer/deciduous in Valley.	ca. 6700BC to ca. 8500BC	Early Archaic
Late Glacial	alpine tundra in highlands, coniferous forests on slopes, grasslands, mixed coniferous-deciduous forests on Valley floor	before ca. 8500BC	Palaeo- Indian

With the paucity of chronological data from surveyed sites in the Park and insufficient climatological research in the mountain zone, it is currently impossible to evaluate the significance of climatic variation. It is noteworthy, however, that of the 71 sites in the sample, twenty-three (23) yielded evidence of Archaic (Middle and Late) occupation and it is conceivable that this pattern reflects an increased utilization of the highland resources during the dry periods of the Atlantic/Sub-Boreal episodes. It is important to be wary of jumping to conclusions, however, particularly in light of the fact that forty-five (45) of the sites could not be dated specifically within the Archaic period.

Chapter IV

The Cultural Variables

In this chapter, three areas of cultural variability are considered: (1) assumptions about the reasons prehistoric groups utilized the Blue Ridge, (2) the classificatory system used in the analysis of the artifacts recovered from the sites, and (3) a provisional system for defining site types.

Assumptions About Prehistoric Exploitation -- In the introductory chapter, brief consideration was given to the knowledge of Eastern United States prehistory. It was noted that three rough periods are generally recognized. For the present purposes there is no need to deal with the Paleo-Indian period for no early sites have yet been located in the Park. It is the author's opinion that both the Archaic and the Woodland periods can be considered together, with certain cautions. The Archaic (and probably the Transitional) populations relied entirely upon animal and plant resources available naturally. The best information available indicates that these groups were organized as small bands (perhaps a kin unit?) which moved seasonally to areas where resources were available. Such settlement models as restricted wandering and centrally based transhumance relate to this subsistence strategy. In the Woodland period, on the other hand, populations were generally sedentary horticulturalists, spending the largest part of the year in small villages, often located on fertile river bottoms. Such a subsistence base does not rule out, by any means, a continued pattern of natural resource exploitation. In fact, there is evidence, both in the Park and in the Piedmont, that Woodland groups (of an indeterminant size and structure) may have followed a seasonal round of exploitation.

Basically, the following assumptions can be made about prehistoric exploitation of the montane region. (1) The primary goal was the pursuit of both faunal and floral resources, that is, hunting and gathering. The available resources of the mountains were (and are) numerous. Even a mere listing of potential food sources would be several pages long, though several obvious possibilities can be noted. In terms of fauna, it is possible to identify several species, some of which would have required specialized hunting techniques. Of course, the largest species were the White Tailed Deer and the Black Bear, both of which would have provided considerable meat, fat, skins, and bone. Other smaller mammals which were probably exploited were Racoon, Otter, Skunk, Fox, Woodchuck, Squirrel, Beaver, Rabbit, and various other species of rodents. The smaller animals would probably have been trapped, while the larger deer and bear would have been stalked and killed with projectiles or perhaps driven off of cliffs as may have occurred at MD-138. Aside from mammals, the mountains also have abundant reptiles and amphibians (snakes, turtles, frogs, salamanders, lizards) and the various streams would have numerous fish (brook trout and dace). The climax forests which were probably established throughout the mountains also would have supported wild turkey.

Available floral resources would have been quite abundant particularly in terms of nuts and berries. The predominant forest types in the mountains would yield acorns, chestnuts, and hickory nuts, among others as well as numerous herbs and root plants. As mentioned in Chapter II, however, the areal distribution of these resources could not be determined, so that it is impossible to determine whether significant micro-niches were being exploited.

Another variable which the groups would have had to consider is the seasonality of these resources. The nut bearing trees would have been at peak mast crop in the fall months, and the large animal species, such as deer and bear would be at maximum weight after a season of plentiful food. Such considerations hint at seasonal occupation of the montane region.

(2) A second possibility for the use of the mountains is as a route for transversing from the Valley to the Piedmont (or vice versa). The wide dispersal of artifact types (projectile points, steatite, ceramics) on both sides of the Blue Ridge is ample evidence that such transmontane movement was occurring. Again, it is impossible

to determine from available data how such transient groups were structured. Although it is probable that such movement made use of the lower elevation gaps, such as Swift Run and Thornton, virtually any of the larger hollows would have provided relatively easy access from one side of the ridge to the other.

(3) One final possibility for the use of the mountains, and one for which there is no direct evidence, would be the utilization of high elevations as promontories to note the movement of animal herds (such as bison in the later periods) or hostile neighbors in the Valley. Certainly, the vista from the higher mountains and ridges would have provided unimpeded observation for many miles.

Perhaps the most crucial variable in dealing with the survey of the Shenandoah National Park is the definition of the minimal unit of occupation. This is related to several factors including: (1) habitable area available, (2) site function, and particularly, (3) group size. During the survey it was determined that the smallest scatter of artifacts seldom was less than 5 meters in diameter. With such an area, it is probable that we are dealing with an extremely small group of 3 or 4 individuals, perhaps a nuclear family. Definition of this minimal unit is important in designing a research strategy which insures the location of even the smallest sites. As such, the use of a five meter sampling interval is currently being utilized in surveys of the Park.

ARTIFACT ANALYSIS

Because of the lack of good substantiating evidence for the activities of populations in the mountains, a means for gaining insight into questions of site function must be formulated making use of the artifacts recovered. Although both ceramics and stone tools are represented in the Park assemblages, lithics comprise more than 99 percent of this sample and have, therefore, received the greatest attention. One of the most notable aspects of the lithic assemblages is the near absence of traditionally recognized tool types, such as "scrapers" and projectile points. This situation has presented serious problems in dealing with pertinent questions of site function. By far, the majority of finds from the Park sites consist of debitage from lithic manufacture. In order to deal with this material in such a way as to emphasize potential variation within and between sites, a morphological system has been employed to classify the artifacts; that is, a system based on the technological and physical attributes of the material. (Hoffman and Cleland 1977:4). The system utilized in the analysis of Park materials is derived from that used by Hoffman and Cleland (1977) in their analysis of lithic materials from Allahdino, Pakistan. A few changes were made in order to keep the classification purely morphological and to adapt it to the peculiarities of the local assemblages. Basically the assemblages are divided among three broad categories: (1) Flakes,

(2) Cores, and (3) Bifacial Tools, each representing different stages in the production of stone tools.

Flake Categories

Cortex -- Cortex flakes are "distinguished by the presence of a portion of the original weathered surface of the parent material on their dorsal faces. The extent of cortex varies, but when relatively high suggests that the removal of the flake was intended to clean the weathered exterior from the raw material (core)." (Hoffman and Cleland 1977:9).

Generalized Secondary -- This category includes flakes which were "struck from the core subsequent to the removal of the cortex flakes." (ibid.) They do not have any cortex, and by the definition used in this classification they have a distinguishable bulb of percussion.

Blade-Like Flakes -- These flakes "differ from true blades mainly in degree. They are less symetrical; their edges are not nearly as parallel" and they generally have less than a 2:1 length to width ratio.

True Blades -- Flakes having distinctively parallel sides, at least a 2:1 length to width ratio and a triangular or prismatic cross-section.

Broken -- Flakes which do not have a distinguishable bulb of percussion or striking platform. This does not include any cortex flakes or broken secondary flakes having a bulb of percussion.

With the exception of the broken category, each of the flake classes were further subdivided into groups of "worked", "utilized", "non-worked/non-utilized", and "unknown". This operation was conducted with trepidation and the analysts were very conservative in what was considered utilized or worked. The main reason for this conservative approach was because a majority of the flakes were quartzite, a material which does not clearly show the effects of utilization. Secondly, due to inadequate optical equipment available at the Laboratory, the analysis was conducted with only hand lenses. Generally, those flakes exhibiting an edge, edges, or point which was "worn smooth" or rounded was classed as utilized. Utilization on cryptocrystalline materials was easier to identify due to small chips broken off the utilized edge. Worked flakes were somewhat easier to recognize due to small flake scars evident on the edges. The "unknown" division was reserved for particularly problematic specimens. Two recurring types were placed in this group; (1) flakes with a "broken" distal end which may have resulted from utilization <u>or</u> natural breakage, and (2) flakes which had a "notch" which, although appearing unnatural, had sharp edges rather than smooth.

All of the flakes categories (except broken) were also classed according to size. An arbitrary division of 2 cm in length was used to separate "micro" from "macro" categories. This division was implemented in order to distinguish flakes which were the product of the early stages of tool manufacture from those which were secondary and tertiary retouch flakes. Though not all of the microflakes were retouch flakes, a high frequency of these at a site was interpreted as an indication of either tool resharpening or final stage biface manufacture.

Core Categories -- The classification system provided three categories for cores: (1) Cores and core remnants, (2) Core tools, and (3) Chunks.

Cores and Core Remnants -- Grouped together as one, this category consisted of large rocks showing evidence of having had flakes struck from it in the form of "inverse" bulbs of percussion and small fragmentary remains of such cores. As such the size range of this category was wide, from large specimens of vein quartzite recovered from the Blackrock Springs Site (AU-167) to very small cryptocrystalline specimens at the Gentle Site (MD-112). Again, a high frequency of core remains at a site, particularly when in association with a high frequency of cortex flakes, would be indicative of primary lithic manufacture.

Core Tools -- This category is an end product of the production sequence. It consists of identifiable tools which were produced by trimming flakes from a core to achieve a desired shape. As such, the shapes of these objects varied greatly and several functional tool types were represented, including axes, scrapers, and chopping tools.

Chunks -- As with the broken/unidentifiable flake category, the class of "chunks" is another problematic category which refers to objects which have a "chunky" appearance which tends to exclude them from the flake categories, while at the same time having no attributes which would place them into the core remnant group. Probably, chunks are merely the accidental (and probably inevitable) result of working with poor quality lithic material. It is noted that the largest majority of chunks were of milky quartz which has numerous fracture lines in its structure making regular flaking sometimes very difficult. Functionally, all chunks were production waste.

Bifacial Tools -- This final category was reserved for artifacts which were so extensively retouched from both the dorsal and ventral faces as to make their technological origin (as a flake or as a core) indeterminable. Bifaces are distinguishable by a bi-convex cross-section and extensive secondary and tertiary retouch flake scars along its edges. Because these retouch flakes are generally small, the presence of high frequencies of micro-secondary flakes (less than 2 cm) is taken as an indication of final stage biface manufacture or resharpening.

It is usually these bifacial specimens which have received the greatest typological consideration in the literature, resulting in a plethora of type names and temporal associations for different forms. Unfortunately, as indicated in Chapter II, the frequency of bifacial tools at tested sites was low, generally in the vicinity of 2 to 3 percent of the total lithic assemblage.

Bifaces were further subdivided into whole, broken/ identifiable, and broken/unidentifiable. Park assemblages contained high frequencies of broken/unidentifiable specimens, usually biface points or mid-sections. This situation is particularly noteworthy because the low frequency of identifiable tool categories (both core tools and bifaces) from Park sites sets them apart from known prehistoric sites outside of the Park where finished tools are often found in great numbers (see Chapter VII). Unfortunately, aside from Holland's work (1960) there is no published data concerning non-Park sites which relates the ratio of bifaces to non-biface debitage; and even with Holland's work caution should be taken when considering the sampling procedures. Holland's purpose was not to relate the ratio of tools to waste, but rather he was interested in the lithic materials. As such, he sought only to obtain a representative sample of this material and tried to collect at least 100 chips (Holland 1960:66). The almost total absence of finished tools at Park sites is probably related to variation in the function of the site and to the length of each occupation.

Problems with the Lithic Analysis -- Faced with the task of analyzing over 18,000 stone artifacts in a severely limited amount of time, several "short-cuts" had to be taken to insure completion. Due to this time factor, rather than measuring and recording the metrical data for each object, the previously mentioned 2cm size division was utilized to gain control over the size of the artifacts. Although this division has proven quite useful in the interpretation, it is felt that some important size attributes were missed, one case in particular is site AU-167 where there were several very large flakes which did not show in the final quantified data.

A second problem was the lack of a functional classification of the materials. Hoffman and Cleland have demonstrated that the use of a bi-nomial -- that is, both morphological and functional -- classification can reveal different aspects of the assemblage. In part, the author assumed that variation in the frequencies of morphological lithic categories could be directly related to variation in function. This was true to a limited extent, but it was discovered that what was demonstrated was <u>not</u> function, but rather a <u>difference</u> in function. Without a consideration of the function of these tools it became impossible to specify the extent of this difference. In a later stage of the current analysis, when it was realized that very little could be said of the sites without, at the very least, a provisional functional classification, all bifacial and core tools were reanalyzed. In the following chapters referral will be made to these categories: (1) projectile points, (2) knives (or edge utilized tools with an acute working angle), (3) axes, (4) scrapers (or edge or end utilized tools with a steep working angle), (5) preforms (or incompletely worked bifacial tools), (6) drills, and (7) chopping tools.

PROVISIONAL SITE TYPOLOGY

Because of the various factors enumerated in Chapter II, the definition of a series of site types for the Park can only be provisional at this stage. Traditional divisions of sites into camp, base camp, village, lithic workshop etc. have only limited applicability to the montane environment. Because the assumption is made that use of the mountains by prehistoric populations was probably intermittent, and possibly seasonal, the categories of village and possibly base camp (as defined by Holland: personal communication) are neither expected nor found in our sample. Because these traditional settlement units are of minor importance to the present study, a new set of parameters for defining site types had to be formulated.

Four inter-site variables serve as the basic attributes for this system. These are (1) site size, that is the area of the site, either the occupational spread or the landform area; (2) artifact density, defined as the number of artifacts recovered from the equivalent of one cubic meter of soil, (3) proportional frequency of morphological categories of artifacts, and (4) site depth. (Appendix II presents a short tabular summary of these variables at Park sites.) Each of these variables is related to the intensity and duration of occupation and the hypothesized group size which used the site. In order to relate sites to probable function it is necessary to consider the differential occurrence of specific functional tool types.

Four site types have been defined: (1) Base Camp; (2) Hunting/Gatherings Stations; (3) Rockshelters; and, (4) Transient Camps.

Base Camp -- Generally, a base camp, as that term applies to Park sites, is a large site with a moderate to high density of artifacts. Site depth may vary, depending upon local pedologic processes. Because such camps would have been utilized seasonally for several weeks at a time, artifacts would be expected to represent a wide range of activities. Lithic debitage representing all stages of tool manufacture might be expected, as well as food processing artifacts. Because the length of any single occupation would have extended for a period of anywhere from several days to several months, close proximity to a reliable water source would be desirable.

<u>Temporary Hunting/Gathering Stations</u> -- Sites of small size and low artifact density have been classed as temporary hunting/gathering stations. It is most likely that such sites were related to the larger base camps from which smaller bands would forage the surrounding areas. Thus, rather than being the location of a wide range of activities, these stations were probably the loci of certain activities related to the procurement of food and other resources. The sites are numerous and widely scattered, perhaps indicating that their use was for very short periods of time. Some of these sites were apparently utilized frequently so that if more data were available it may have been possible to further subdivide this category. Generally, however, because these sites would have been occupied for only short time periods, probably no longer than one night per visit, if that long, few tools would be expected and those which were present would probably be indicative of the site's use. Majority of the known sites in the Park probably fall into this category and it is noted that many yielded no tools at all. This would indicate that such tools were taken away when the site was abandoned, or that the tools which were left behind were not preserved.

Several activities can be envisioned for these sites, including (1) ambush, or a position from which hunting was conducted; (2) butchering; (3) plant food collection; (4) lithic manufacturing, which can be seen as a form of "gathering" of available stone and working it to a "preform" stage for transport; and (5) overnight bivuac, serving as a short term habitation if the group was unable to return to the base camp before nightfall.

Rockshelters -- As a "type" of site, rockshelters are difficult to classify. The major attraction of these locations was the protection provided from the natural elements. It is probable that such sites were used as temporary camps, though the limited area provided would result in the accumulation of a high density of artifacts. Rockshelters would probably have been used for the making or revitalizing of stone tools resulting in high frequencies of debitage. Because small groups may have occupied these sites for several days evidence of food preparation could also be expected.

Transient Camps -- Suggested as a possibility for prehistoric use of the mountains, sites associated with transmontane travel would probably be difficult to isolate. In all probability, such sites would have been used for other, subsistence oriented, purposes in addition to serving as a wayside. Small, low artifact density sites would probably be expected in conjunction with a mixture of lithic materials from both the east and the west. Few, if any, functionally diagnostic artifacts would be present. It would further be expected that such sites would be located in areas within easy access to the opposite side of the ridge.

Chapter V

Intra-Site Variation

In the following analysis of intra-site variability, ten sites are considered which have yielded the most information concerning prehistoric exploitation of the Park. These ten sites represent four landform zones including six hollow sites (located in three different hollows), two upland basin sites (at Big Meadows), one gap site (Swift Run Gap), and one peripheral saddle (Old Rag area). The quality of the data from these sites varies due to the use of different sampling and recording procedures during the testing (see Chapter II).

AU-154

Location and Physical Setting -- (Figure 1) Site AU-154 is located ca. 35 meters south of Paine Run on the alluvial floodplain formed by that perennial primary stream. The site is situated just within the mouth of hollow at an elevation of 1400 feet. The Park boundary bisects the site on the northern side, thus separating the Park portion from the river. Only cursory inspection of the private land was conducted but clearly indicated that the scatter of artifacts continued, probably as far as the stream. Within the Park boundary, the site is approximately 100 meters long in an east-west direction and extends southward about 25 meters where the mountain slope rises steeply

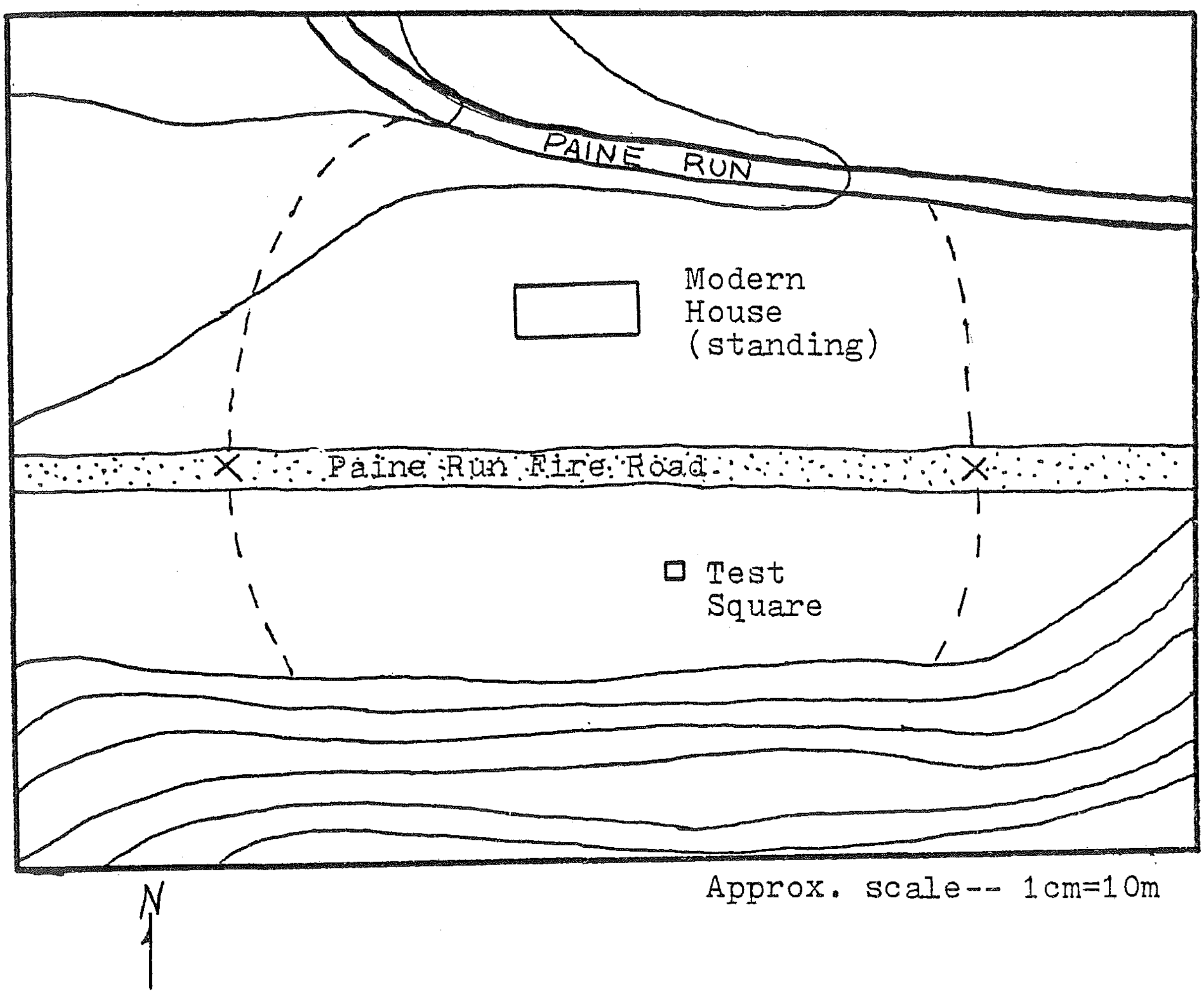


Figure 1 -- Sketch map of site AU-154. Site is situated on the Paine Run floodplain at an elevation of 1400 feet. Dashed line is conjectured as no systematic definition of the site's area was made. "X's" in road mark extent of material found in road. South side of road is the Park Boundary.

Contours to show lay of the land and are not precise.

Field drawing by Douglas McLearen

from the floodplain. The site was located by the discovery of numerous quartzite flakes and some tool fragments in the roadbed which marks the boundary of the Park. Surface reconnaisance of the area was limited by a thick mat of decomposing leaves, but several clusters of chipped stones were noted, particularly at the bases of trees.

Testing Methods -- Except for a few artifacts which were retrieved from the road bed, no collections were made from the surface of this site. In order to evaluate the site a 2-meter test square was placed near one of the surface concentrations and was excavated in arbitrary 10 centimeter levels to a depth of 40 centimeters. The soils consisted of a 5-10 cm level of dark forest humus overlying a shallow deposit of light brown clay loam with heavy root disturbance. Below this root action the soil became a yellowish-brown sandy clay grading into a compact reddish to yellowish brown clayey sand. All levels were exceedingly rocky, consisting predominantly of river smoothed quartzite cobbles. Although no plow scars were noted in the subsoil, the fact that several artifacts recovered mended between levels indicated that the site was disturbed. Artifacts were concentrated in the upper 20 cm, falling off to practically none by 40 cm.

The main purpose for this testing method was to test the site's depth, which was satisfactorily accomplished. On the other hand, the method resulted in poor sampling of possible horizontal variation in the distribution of materials. It cannot be evaluated at present just how significant a bias this represents, though the material located in the road bed seems to mirror the types of artifacts excavated.

Chronology -- Chronologically diagnostic artifacts from the 2 meter test indicate that the site was being occupied during the middle to late part of the "Archaic" period, perhaps around 3000 to 1000 BC. This is based on the occurrence of two projectile point bases, one identified as Savannah River and the other as Halifax-like (Coe, 1964).

Artifact Analysis -- Because of the disturbed nature of this site and the limited nature of the areal testing, the assemblage of artifacts is dealt with as if it were a single, undifferentiated component.

Artifact and Density and Lithic Materials -- A total of 2157 stone artifacts were recovered from the two meter test, yielding an intra-site artifact density of 1348 artifacts per cubic meter. Of the assemblage, 90.4% of the artifacts were quartzite. Another 7.9% were crypto-crystalline, most notably a large quantity of reddish "jasper", which may have been available locally in the Paine Run stream bed (Boyer: Personal Communication). The remainder of the assemblage consisted of a mixture of both quartz and greenstone flakes.

Morphological Analysis -- (Appendix I, Table 1) A total of 302 cortex flakes (14.0%) and 18 cores or core remnants (0.8%) indicates that the area of the site which was tested was probably the locus of lithic manufacturing activities. Although a majority of the flakes from the site were larger than 2 cm in length (795--36.9%), a relatively high frequency of micro-flakes in the sample (563--26.1%) seems to indicate that the production of tools went from cores to finished products at the site.

A total of 146 (6.7%) of the flakes in the assemblage had been utilized. Based on a comparison with other sites in the sample, this frequency is relatively high and points to activities beyond mere lithic manufacturing.

Functional Analysis -- A total of 37 (1.7%) of the artifacts were either finished core tools or bifaces. A large portion of these tools were functionally unidentifiable (16) and the remaining 21 showed little functional specialization. Knives (7), scrapers (6) and projectile points (7) were dominant, indicating the exploitation and processing of faunal resources. Two unfinished and non-utilized bifaces are further indications of lithic manufacturing. Two chipped stone axes were also among the tools.

<u>Interpretation</u> -- The geographical location of AU-154, with its easy access to both the Shenandoah Valley and the mountains, and the large habitable area, are both

strong factors pointing to the use of this site as a long-term or seasonal base camp. This assumption is further supported by the high artifact density, and the indications for multi-functional activities on the site. The manufacture of stone tools (using the abundant quartzite cobbles on the floodplain), the processing of faunal resources, and apparent floral exploitation, all point to varied function. It is probably unlikely that the Archaic groups which used the site would have come specifically to manufacture tools, but rather the placement of the site can be seen as a means of maximizing the exploitation of several resources in both the mountain hollow, adjacent slopes and ridges, and even the Shenandoah Valley itself. It is hoped that in the future further extensive testing can be initiated at this site in order to expand the currently limited information available.

The Paine Run Rockshelter (AU-158)

Location and Physical Setting -- (Figure 2) A series of rock outcrops in the Erwin-Antietam quartzite have formed four rock overhangs at the lower end of Paine Run. AU-158 is located approximately 1/4 mile to the east of AU-154 at a point where the hollow has narrowed, due to the resistant bedrock, to a width of ca. 50 meters. Of the four shelters clustered in this vicinity, AU-158 is the largest, 9 meters wide by ca. 5 meters deep (at lower levels it probably extends back farther) by 2 meters high.

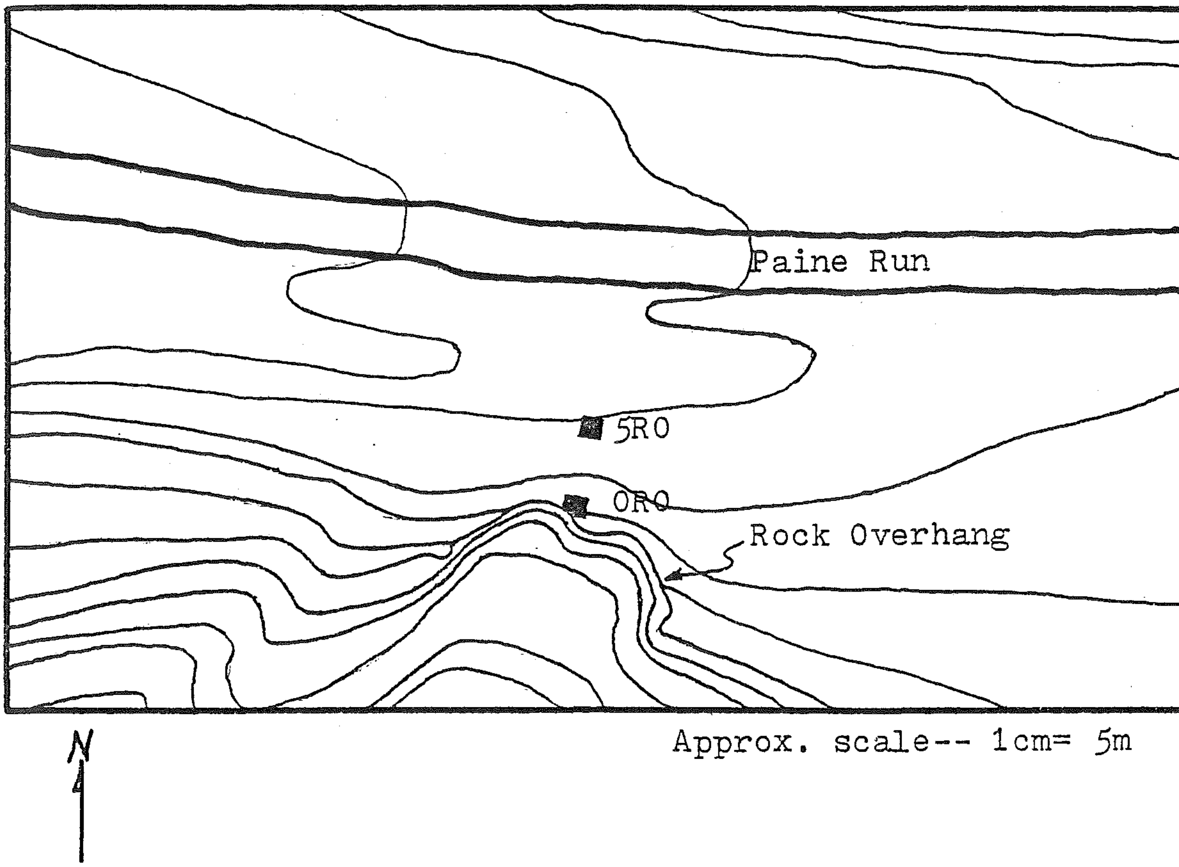


Figure 2 -- Sketch map of site AU-158, showing location of test squares with relation to rock overhang (lower center). Cultural deposits are limited to area beneath shelter.

Contours to show general lay of the land and are not precise.

Drawing by author

The shelter is situated on a narrow section of the Paine Run floodplain and is presently some 15 meters from the stream. Surface finds during the initial reconnaisance of the site included numerous cryptocrystalline flakes, prehistoric ceramics, and projectile points. Because of these finds, and the strong liklihood that the shelter had stratified fill, it was considered a site of prime importance and worthy of more intensive testing.

Testing Methods -- A datum line was established running roughly east-west (oriented to the shelter itself) along the front of the shelter falling nearly on the "drip line" evident on the ground surface. A perpendicular line was run northwards, towards the stream, from the "0" point of the grid. Two one meter test squares were placed within this grid, square 0R0 located just outside of the shelter's drip line on the mound of accumulated fill and square 5R0, five meters to the north on the bank of an old stream bed.

Considering the latter unit first, 5R0 was excavated to a depth of 40 cm and consisted of two basic soil levels: an upper level of dark brown forest humus extending to a depth of 8 cm and beneath that an undifferentiated level of brownish-yellow sandy loam intermixed with numerous river cobbles. The upper level contained a few scattered quartzite and cryptocrystalline flakes, but the lower level was culturally sterile.

Square 0R0 was excavated in arbitrary 5 cm levels to a depth of 90 cm, where roof fall and excessive amounts of fluvially deposited cobbles made further excavation in the small confines of a one meter square impossible. Four distinct soil levels were noted during the excavation. The surface material consisted of a dusty level of dark ash intermixed with modern refuse extended to a depth not in excess of 4 cm. Below the surface, a level of medium brown loam was 15 cm deep at the southern extent, but due to the downward slope of the shelter fill, was virtually non-existant at the northern side of the square (see figure 3). A thick level, some 30-35 cm in depth, underlay this brown loam, consisting of rocky yellowish-brown sandy loam. Numerous large boulders, probably fall from the roof of the shelter and from downslope movement, were encountered in this level and greatly reduced the excavation area. This was underlain by a stratum of reddish-brown sandy soil, again accompanied by numerous rocks. As with most enclosed and contained sites, numerous pockets and lenses of soil were evident throughout the test pit.

All soil from this pit was passed through a 1/4 inch mesh for the recovery of small flakes. Although the ideal depth of each level was 5 cm, it is noted that, although this unit was adhered to as best as possible, the rocky soil conditions often resulted in levels which were inadvertently too deep. This probably was not too severe a problem for interpretation as indicated in the

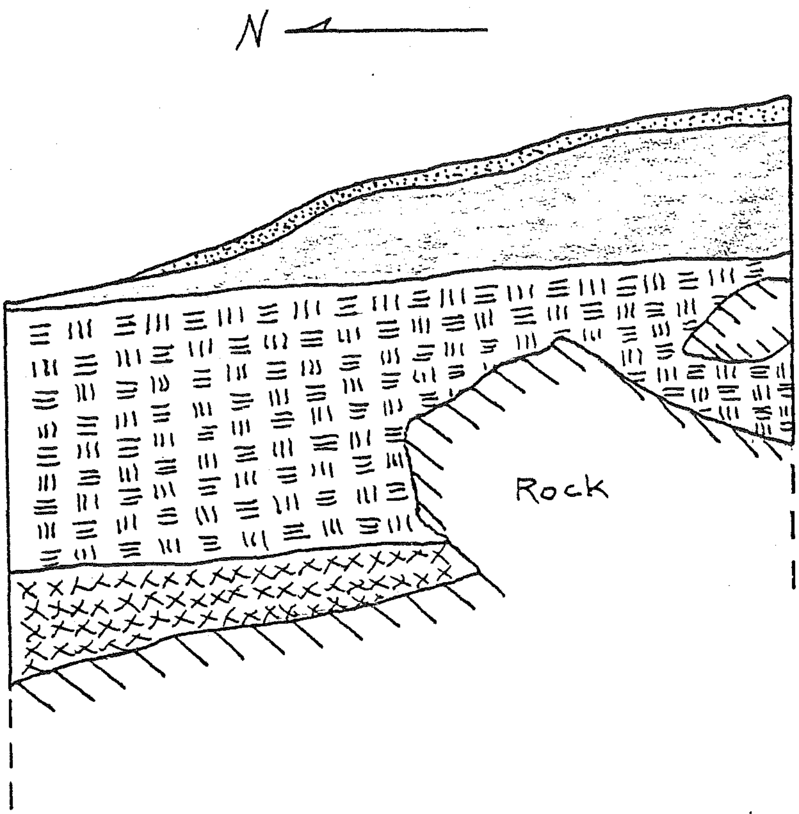
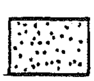
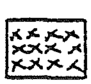


FIGURE 3 -- Profile drawing of East section of square ORO, AU-158, showing four natural soil levels.

 Surface level of ash and debris

 Medium Brown Loam

 Rocky yellowish-brown sandy loam

 Reddish-brown sandy loam

Scale -- 1cm = 10cm

section on artifact analysis.

Chronology -- Based on the data from square 0R0, AU-158 can be divided into two separate horizons. In terms of chronologically diagnostic artifact types, the upper soil stratum of brown loam contained Levanna triangular projectile points and several sherds of prehistoric ceramics. These two artifacts types when found in association place the sites usage in the period from approximately AD 1000 to ca AD 1500. In addition, small red jasper stubby barbed (Holland Type H) is similar to Ritchie's Jack's Reek Corner Notched point (1961:26-7) which is dated in New York to AD 905±250 and is associated with distinct Hopewell influences. Though diagnostic artifacts below the brown loam stratum were lacking, a single side-notched quartz projectile point (Holland Type M; 1955) was recovered from Level F (25-30cm). This form, though occurring in small quantities throughout the chronological span of Holland's analysis, is most numerous during the pre-ceramic horizon (Holland 1960: facing page 48). No ceramics were encountered in the lower horizon.

Perhaps the most notable chronological attribute is the sharp change noted in the frequency of lithic materials utilized (Figure 4). In the upper horizon, there was a predominant usage of cryptocrystalline, representing between 80 and 90 percent of the assemblage. The frequency dropped off sharply below 15 cm, being replaced

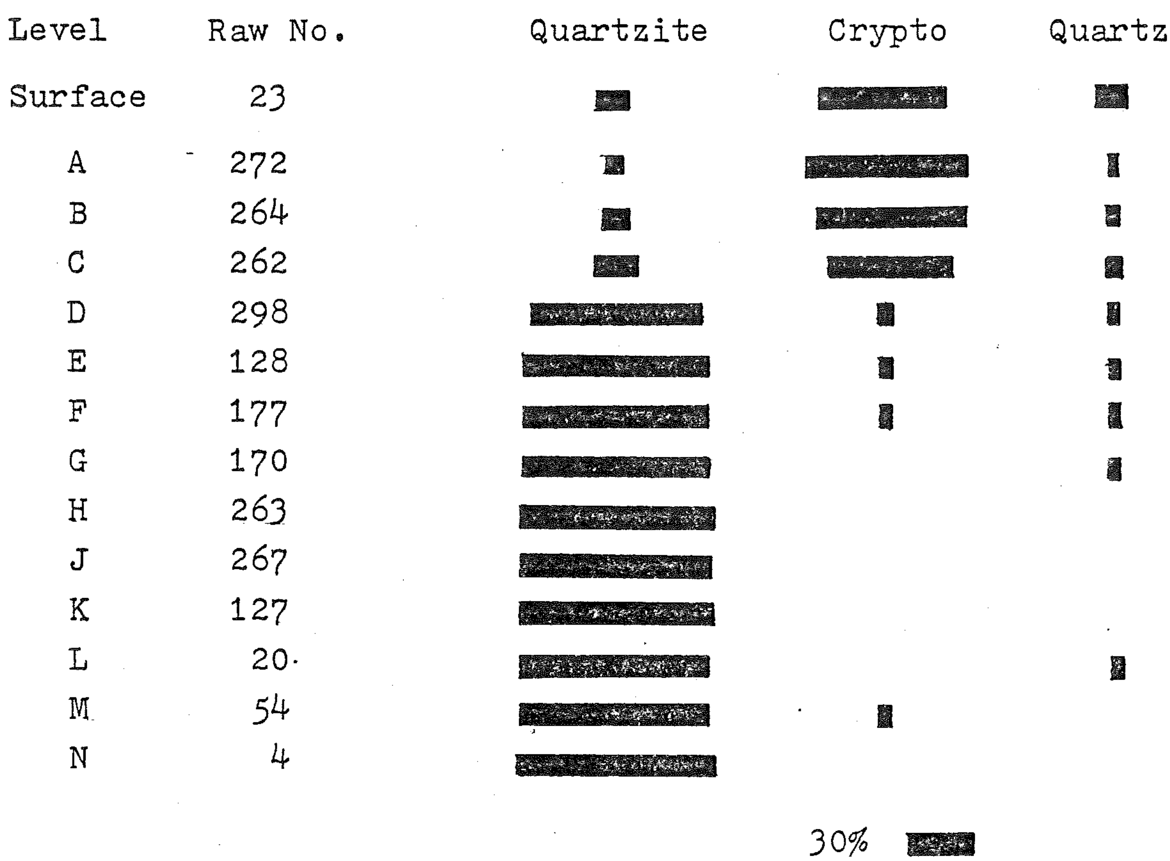


Figure 4 -- Seriation of Lithic Materials by arbitrary excavation levels (5cm) showing dramatic change from quartzite to cryptocrystalline between Levels C and D.

almost entirely by quartzite. This is particularly noteworthy in light of Holland's conclusion about differential utilization of these two materials through time (Holland 1960:64-75). What Holland noted, based upon seriation of projectile points and pottery, was a notable increase in the use of "chert" (cryptocrystalline) towards the end of the preceramic horizon. In light of his findings, the rockshelter can be considered as a site consisting of an earlier preceramic quartzite using component followed by a ceramic- "chert" using component. In addition, the results of this test lend substantiating stratified evidence to Holland's hypothesis.

Artifact Analysis -- Because of the obvious chronological separation of this site, the analysis has been split into two sections: (1) analysis of the upper component, or component I and (2) analysis of the lower unit, or component II.

Component I

Ceramics -- Twenty-two (22) fragments of ceramic vessels were recovered from the upper 15 cm of the rockshelter fill. Of these, 14 were Albemarle cord-marked, 2 Albemarle net impressed, and 2 Albemarle Plain. The remaining 5 sherds were of the crushed pottery and quartz tempered Moysonec Series. Four of these sherds mended. This latter ware has been dated to ca. 1000 BC in some

Virginia contexts (Holland: Personal Communication), though the overall association with triangular points and Albemarle pottery tend to date the component at least 2000 years later.

Lithics

Artifact Density and Lithic Materials -- Component I was represented by a lithic assemblage of 798 pieces of stone. Recovered from 15 cm of a one meter square this yields an incredibly high artifact density of 5320 per cubic meter. As noted earlier, this late component utilized primarily cryptocrystalline, a total of 654 (82.0%) of the artifacts were of this material. Such a high frequency clearly shows that lithic materials were being brought to the site, as cryptocrystalline rock is not present in the vicinity of the rockshelter.

Morphological Analysis -- (Appendix I, Table 2.) Perhaps the singlemost notable attribute of the morphological breakdown is the preponderance of micro-flakes. A total of 523 (65.5%) of the assemblage consisted of these flakes smaller than 2 cm. It is further noted that if the size division had been 2.5 cm, this frequency would have been considerably larger.

A low frequency of cortex flakes (4.4%) and cores (0.6%) and the near complete absence of macro-flakes (5.9%) combine to support the idea that little primary core reduction was occurring at the site. Rather, the high frequency of small flakes seems to be an indication that most lithic manufacturing consisted of revitalization of dulled tools or the final stage of biface manufacture.

Utilized flakes were sparse, comprising only 1.5% of the assemblage and worked flakes were not present. Such low frequencies point to little variation in the activities at the site.

Functional Analysis -- A high frequency of bifaces (25 in the sample -- 3.1%) allows fairly reliable functional analysis. Twenty-two of these bifaces were projectile points, all but two being triangular. The two non-triangular points were a quartz contracting stem and a red jasper stubby-barbed (Holland Types K and H) and may have actually been associated with the lower component (both were recovered from the C level -- 10-15 cm). The remaining bifaces were scrapers. The presence of ceramics, however, indicates that the site was also being used for food preparation purposes, perhaps related to the collection and processing of plant foods.

Component II

As may be noted on Figure 4, there are two vertically separated areas where the quantity of artifacts are high. This may be indicative of further chronological division. However, the lack of diagnostic artifacts precluded making this separation.

Artifact Density and Lithic Material -- The 75 cm depth of the lower component at AU-158 yielded 1508 stone artifacts for an artifact density of 2026 per cubic meter. It should be noted, however, that this figure is somewhat lower than the real density due to the presence of large boulders in the fill which reduced, to an undetermined extent, the volume of dirt removed in the lower levels. 1460 of the artifacts were quartzite, or for all intents, the assemblage can be said to be totally quartzite (96.8%).

Morphological Analysis -- (Appendix I, Table 3) No one morphological category stands out in this component as particularly noteworthy. It is mentioned that a relatively higher frequency of cortex flakes occurred -- 157 or 10.4% -- than in the upper level. In addition, the frequency of macro-flakes increased considerable to 38.1% of the assemblage. These two attributes are possibly related to the local availability of quartzite and the predominant usage of that material. The smaller flakes remained at a relatively high frequency (36.6%). There was also an increase in the proportion of utilized flakes though it is still markedly low -- a total of 63 or 4.2%.

Functional Analysis -- Only eight bifacial tools were present in the lower component. Five of these were too fragmentary for identification. Near the top of the deposit a small cryptocrystalline "drill" was discovered. A quartz side notched projectile point and a large bifacially worked blade, probably a knife or large projectile point complete the tool assemblage. It is possible that this latter specimen was not completed.

Interpretation -- The single most important feature of this rockshelter is its cultural stratification. The obvious chronological separation, however, is not clearly reflected in the functional interpretations of the two components. It is fairly obvious that the shelter served as a small temporary hunting/gathering station, though it is difficult to fully evaluate the lower component due to the inadequate sample of functionally identifiable tools.

The high density of material can be explained by two factors: (1) the site was probably occupied for short durations for several thousand years and (2) the activities of chipping stone in such a confined area ultimately results in the accumulation of considerable debris.

AU-158 stands out as perhaps the most important archaeological site located to date in the Shenandoah National Park, for it offers the opportunity to establish a stratified local sequence. There is great liklihood for the preservation of hearths with charcoal for dating purposes and the preservation of various organic materials reflecting the resources exploited. Study of pollen and sediment analysis could shed important light on questions of the palaeo-environment.

The Bear Trap Site (AU-166)

Location and Physical Setting -- (Figure 5) AU-166, and its companion site AU-162, are located within the confines of the hollow formed by Paine Run at an elevation of 1640 feet (AU-166) and 1600 feet (AU-162). Both sites are located at the confluence of Paine Run and a large spring fed secondary stream which descends from a steep hollow to the south. The lower site is situated on a stream terrace ca. 3 meters above the present stream level, while the upper site is located on a "shelf-like" bench some 13-15 meters above Paine Run. The location of a small dried stream bed to the west of AU-166 may account for the site's present distance from the stream.

AU-166 was discovered literally eroding from the bed of a short road leading from Paine Run Fire Road to a State Game Commission bear trap. The cutting and the subsequent use of the road by heavy vehicles have resulted in the exposure of most of the site. During surface reconnaisance numerous quartzite chips were noted and several projectile points and a few other tools were collected. The site is small, extending approximately 10 meters north-south and probably no more than 8-10 meters east-west.

Testing Methods -- It was realized that the exposed nature of this site endangered its preservation so plans were made to "salvage" the surface materials. Because of its

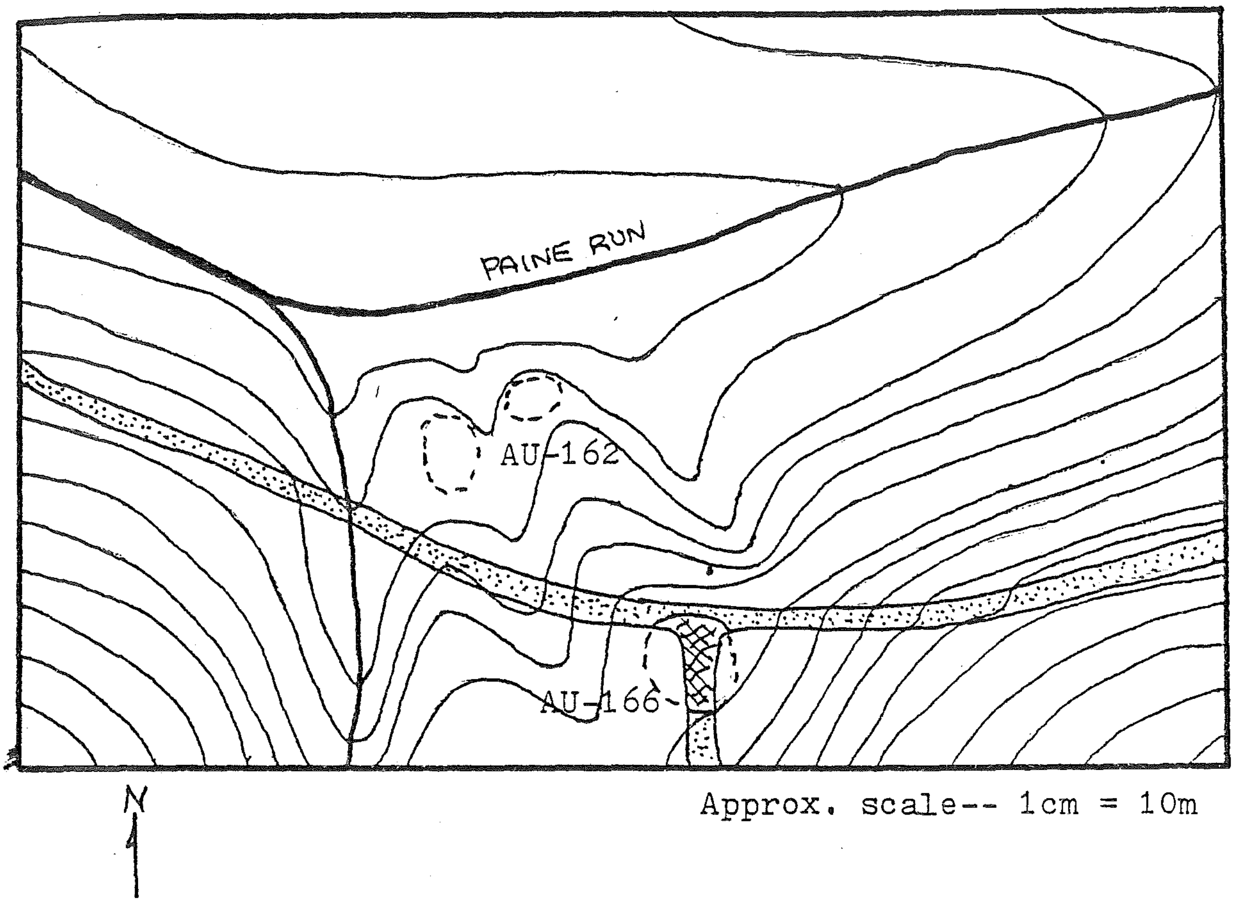


Figure 5 -- Sketch map showing relationship of sites AU-162 and AU-166. Note that AU-162 is located on low stream terrace at confluence of Paine Run and an un-named secondary stream. AU-166 (the Beartrap Site) is near back of a higher elevation terrace associated with the secondary stream. Elevation of the lower terrace is 1600 feet.

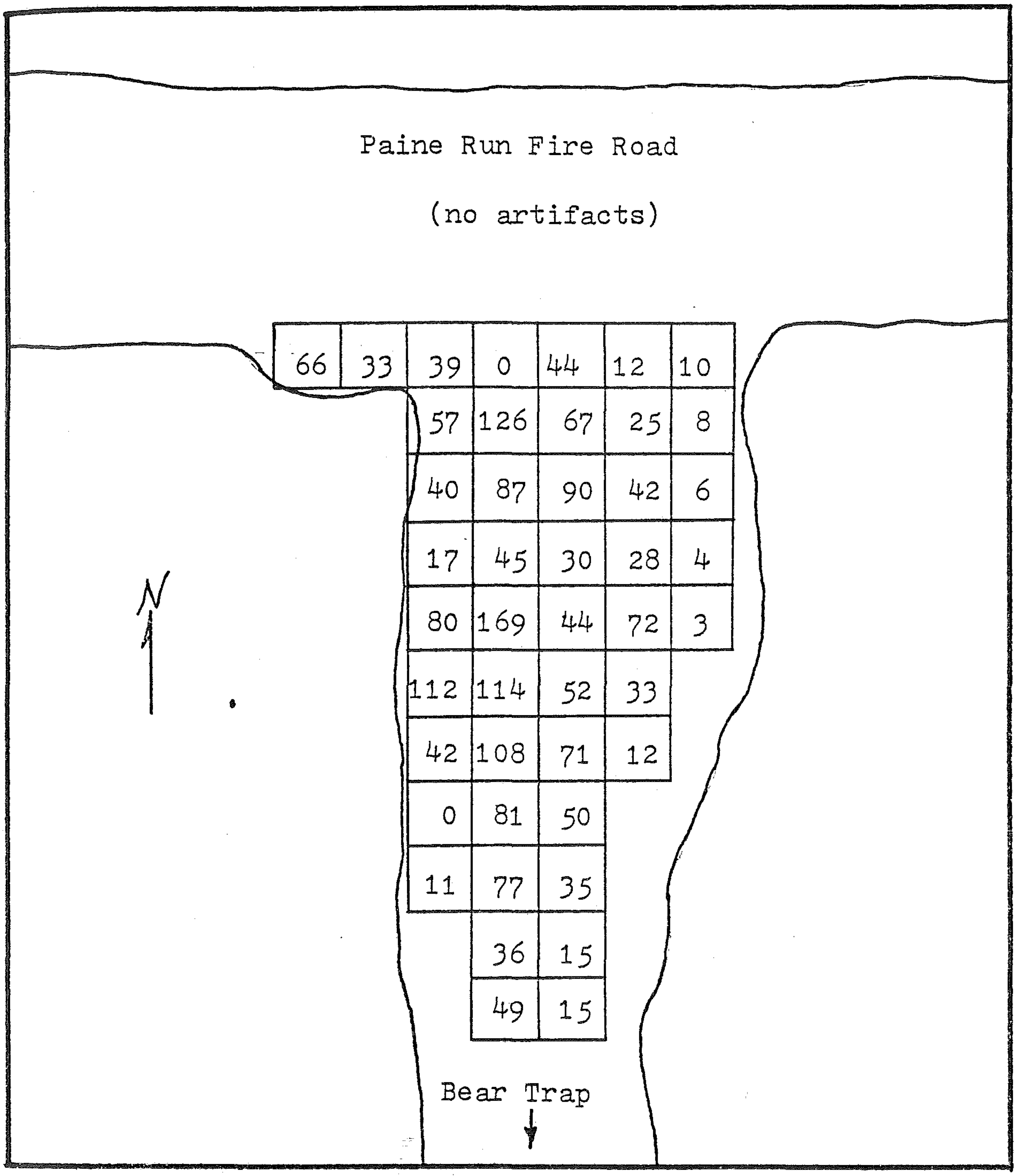
Contour interval approx. 10 feet

Field Drawing by Douglas McLearen

small size, the collection of artifacts was accomplished in one day by gridding the entire exposed section into 45 one meter squares. No subsurface testing was undertaken, so no soil descriptions are available. The method of systematic surface excavation was ideally suited to this site, allowing for detailed analysis of horizontal variability. It is pointed out, however, that AU-166 was extremely disturbed and the horizontal proveniences have been altered. Realizing this fact, no attempt was made to plot the location of individual flakes, though all tools and cryptocrystalline rock were drawn on scale drawings of the squares.

The previously mentioned companion site -- AU-162 -- was not systematically tested, though extensive surface collections were made. The importance of the relationship of these two sites is discussed below.

Chronology -- Although AU-166 could be broken into two distinct "hot spots" or heavy concentrations of materials, chronologically diagnostic artifacts were sparse. Several projectile points were collected but none were examples of tightly dated specimens. These were mainly corner notched and side notched points which are roughly correlated with the early to middle Archaic. A chipped stone "Guilford" axe can be interpreted as placing the sites use during the period ca. 4000 BC - 3000 BC. Also, a small end scraper in the assemblage may tend to support this temporal



Scale -- 1cm = 1m

Figure 6 -- Plan of site AU-166 gridded for collection and distribution of artifacts.

placement (Holland 1960:81).

Artifact Analysis -- Although it was possible to define two areas of the site which could be called "hot spots", no significant variation was noted between them. In light of the disturbed nature of the site, the lithic assemblage has been treated as a single unit.

Artifact Density and Lithic Material -- A total of 2170 artifacts were recovered from AU-166. This yields an artifact density of 2411 per cubic meter. Although this density is extremely high, factors explained below may have contributed to this large figure. 97.1% of the assemblage was quartzite.

Morphological Analysis -- (Appendix I, Table 4) The most important feature of the morphological categories at the Bear Trap Site was the overwhelmingly high frequency of broken flakes. A total of 957 (44.1%) of the artifacts fell into this category (in some squares as high as 60%). This may be due to the site's position in a road where trucks passing over the exposed material would tend to break some of the flakes. As such, the disproportional frequency of broken flakes may, in part, account for the high artifact density.

Keeping in mind the high frequency of broken flakes, the fact that 710 (32.8%) of the assemblage were macro-flakes and only 391 (18.0%) micro-flakes indicates that tool resharpening or biface manufacture was probably not a major activity. In addition, 115 cortex flakes (5.3%) indicates that the site was not used for primary core reduction. Most notable, however, is the high frequency of both worked and utilized flakes. The 29 worked flakes (1.3%) and 155 utilized flakes (7.1%) stand out as important features of the assemblage.

Functional Analysis -- The total of 43 core and bifacial tools from the site represent an assemblage of hunting related objects. Ten projectile points, 11 knives, 5 scrapers, 1 axe, 1 chopping tool, and a preform comprised the identifiable tools. In addition, there were 5 blade-like flakes which had been worked and utilized as edge tools or knives. Thirteen of the tools were either too fragmentary to identify or could not be classified.

Interpretation -- The high frequency of worked and utilized flakes, low frequency of artifacts related to primary lithic manufacturing, and a tool assemblage which seems best related to hunting activites, place this site into the category of small, temporary hunting/gathering station. The location of the site is ideal for this purpose, due to its close proximity to both the main hollow, and the adjacent secondary hollow and mountain slopes. In addition, the site is located at the confluence of two streams thus making it doubly attractive to prehistoric populations.

The relationship of AU-166 and AU-162 is important in this regard. In all possibility, both of these sites represent the locus of similar activities. It cannot be determined whether or not any chronological division exists between the sites, though their similar location and artifact assemblages point to a possibility that both areas were utilized for several millennia.

The Blackrock Springs Site (AU-167)

Location and Physical Setting -- (Figures 7 and 8) AU-167 is located along the northern side of Paine Run at an elevation of 1800 feet, on a large cobble terrace about 3 meters above the present stream bed. The site is strategically located below Blackrock Springs and Blackrock Gap (See Figure 7). Present forest cover consists of red oak, chestnut oak, with associates of scarlet oak, blackjack oak, white oak and pitch pine (McLearen 1976).

The terrace on which the site is situated measures approximately 150 meters north-south by 60 meters east-west, providing a large area for habitation. The soils are shallow and exceedingly rocky. During surface reconnaisance clusters of artifacts were noted, mainly located along the stream side edge of the terrace. Locally occurring quartzite of the Hampton Formation is present in both cobble form (in the stream bed) and in

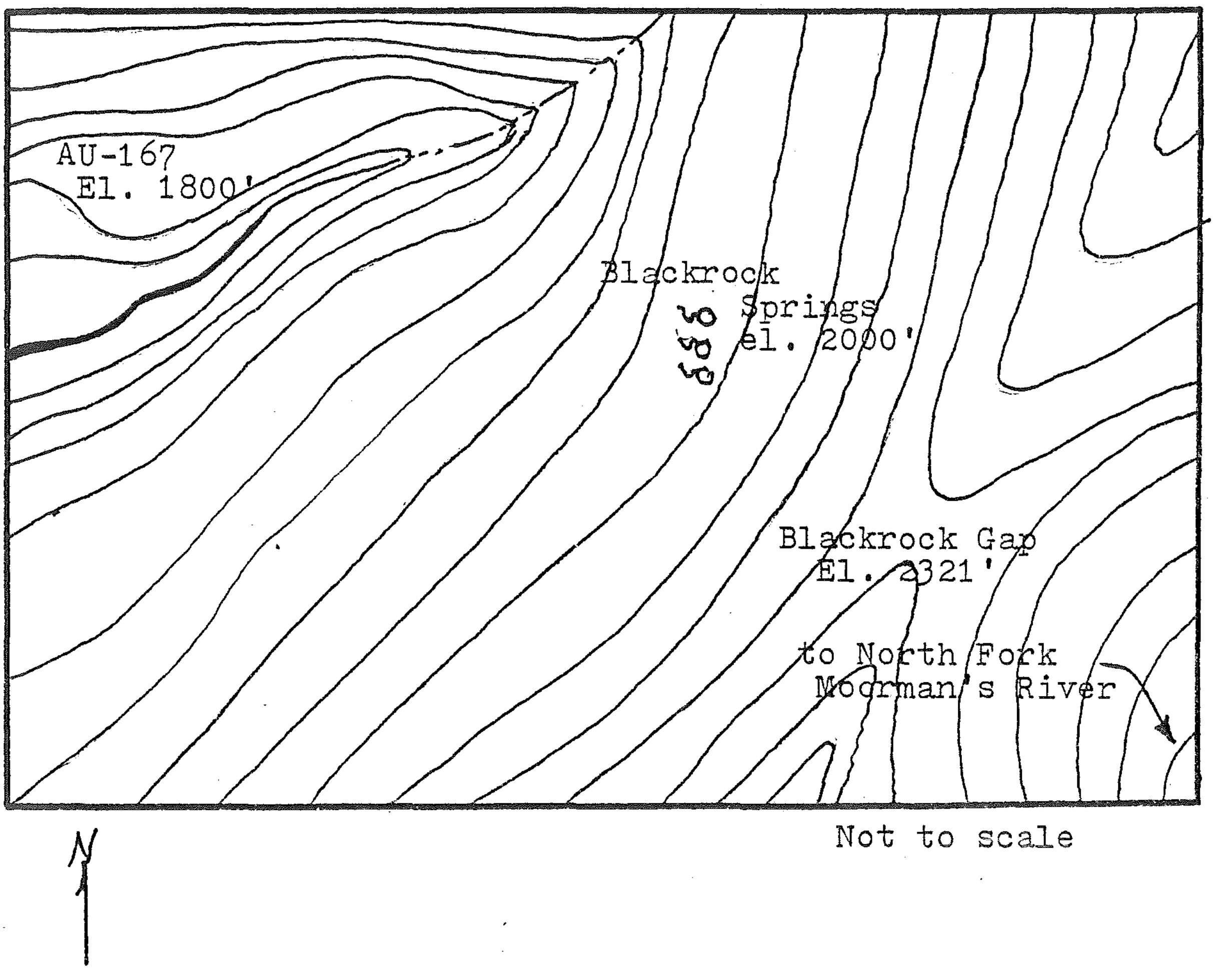


Figure 7 -- Sketch map showing relationship of AU-167 to Blackrock Springs and Blackrock Gap. Distance from site to Blackrock Gap approx. ¼ mile.

Contours to show general lay of the land, exaggerated in the vicinity of the site to show the terrace. Elevations at site, springs, and gap give vertical relationship.

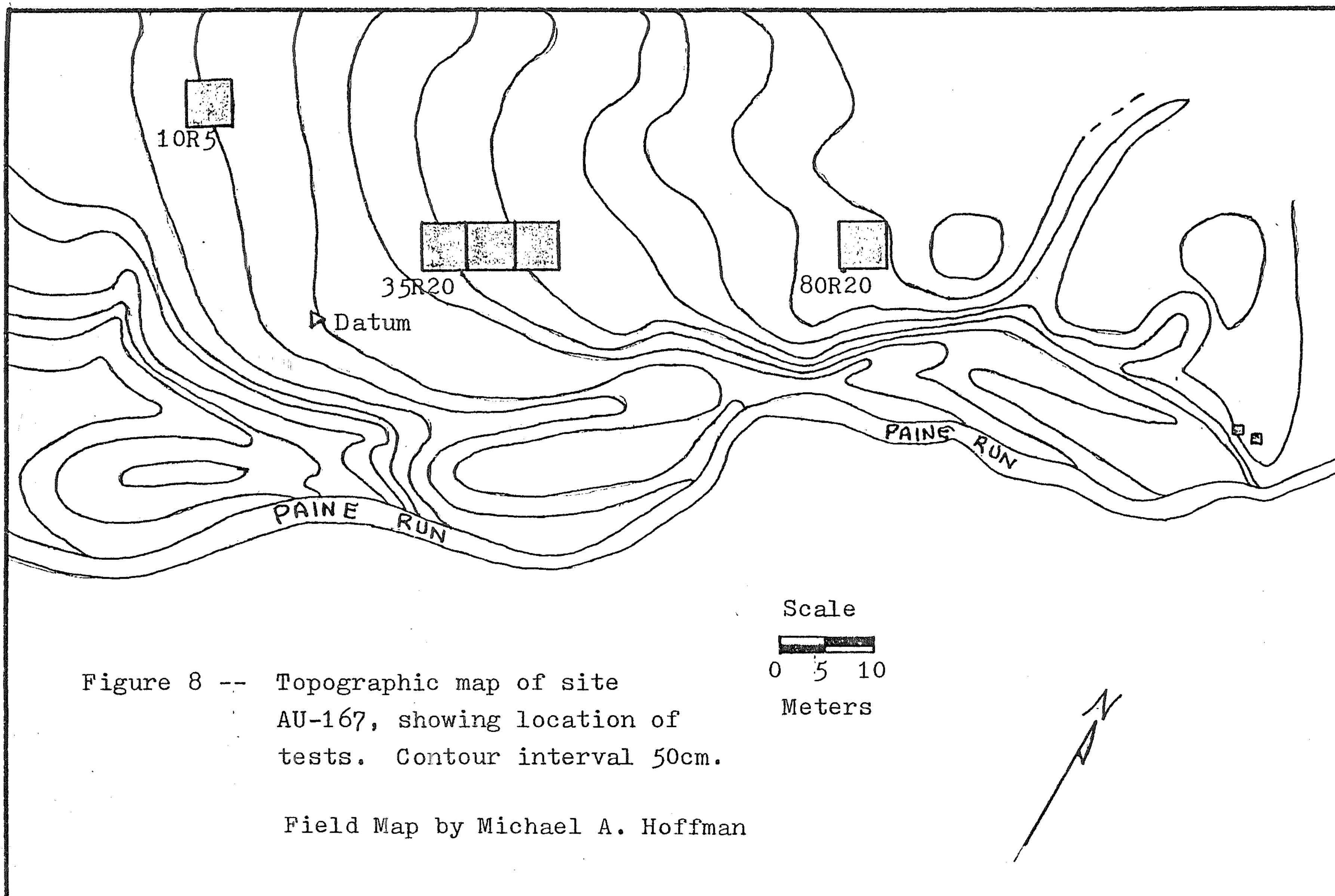


Figure 8 -- Topographic map of site AU-167, showing location of tests. Contour interval 50cm.

Field Map by Michael A. Hoffman

vein form (near the mountain slope to the west).

Testing Method -- For a detailed account of the testing procedures at this site, as well as an in-depth description of the lithic assemblage, the reader is referred to McLearen (1976). In brief, due to the apparent shallowness of artifact deposition, the method of systematic surface excavation was employed. The site was initially gridded into large five meter "sections" and 5 of these were selected for a sample. The sections were then subdivided into 25 one-meter squares for collection. The humus and decomposing forest litter were removed, revealing the artifact bearing layer of dark brown loam. It was at this point that it became obvious, due to apparent clusters, that the site was not significantly disturbed and that horizontal distribution of the artifacts was probably close to the way it had been during prehistoric times. All artifacts were, therefore, plotted on 1:10 scale drawings before being removed from their position.

Chronology -- Chronologically diagnostic artifacts recovered from AU-167 place its occupation in the middle to late Archaic. The earlier forms were a St. Albans-like quartz point, tentatively dated to ca. 6000 to 5000 BC (Broyles 1966), several Morrow Mountain specimens and a Guilford lanceolate point (Coe 1964). The later forms include Savannah River (Coe 1964) and a parallel sided stem projectile, which is also associated with the late Archaic (Holland Type L; 1955). Generally, these point types indicate an enormous chronological span for the use of the site, from as early as ca. 7500 BC to as late as ca. 1000 BC.

Artifact Analysis -- A total of 3002 artifacts were recovered from the Blackrock Springs Site yielding an overall artifact density of 469 artifacts per cubic meter. Of these, 98.1% were quartzite, which as noted above, is readily available on the rocky terrace. However, these 3002 artifacts were not randomly distributed within the site, but rather were clustered. Study of the distribution maps drawn in the field, in conjunction with an assumption that areas of high artifact density represent the loci of cultural activities, led to the definition of six identifiable clusters within the site. The clusters represent areally 28% of the site and encompass 63.1% of the total artifact assemblage. The remainder of the squares had lower densities than the clusters they surrounded, and the varying frequencies of artifacts were considered as "background noise".

Cluster I

Artifact Density and Lithic Material -- Cluster I was located in 5-meter section 10R5, near the northwest extremity of the site. It was isolated by dropping all

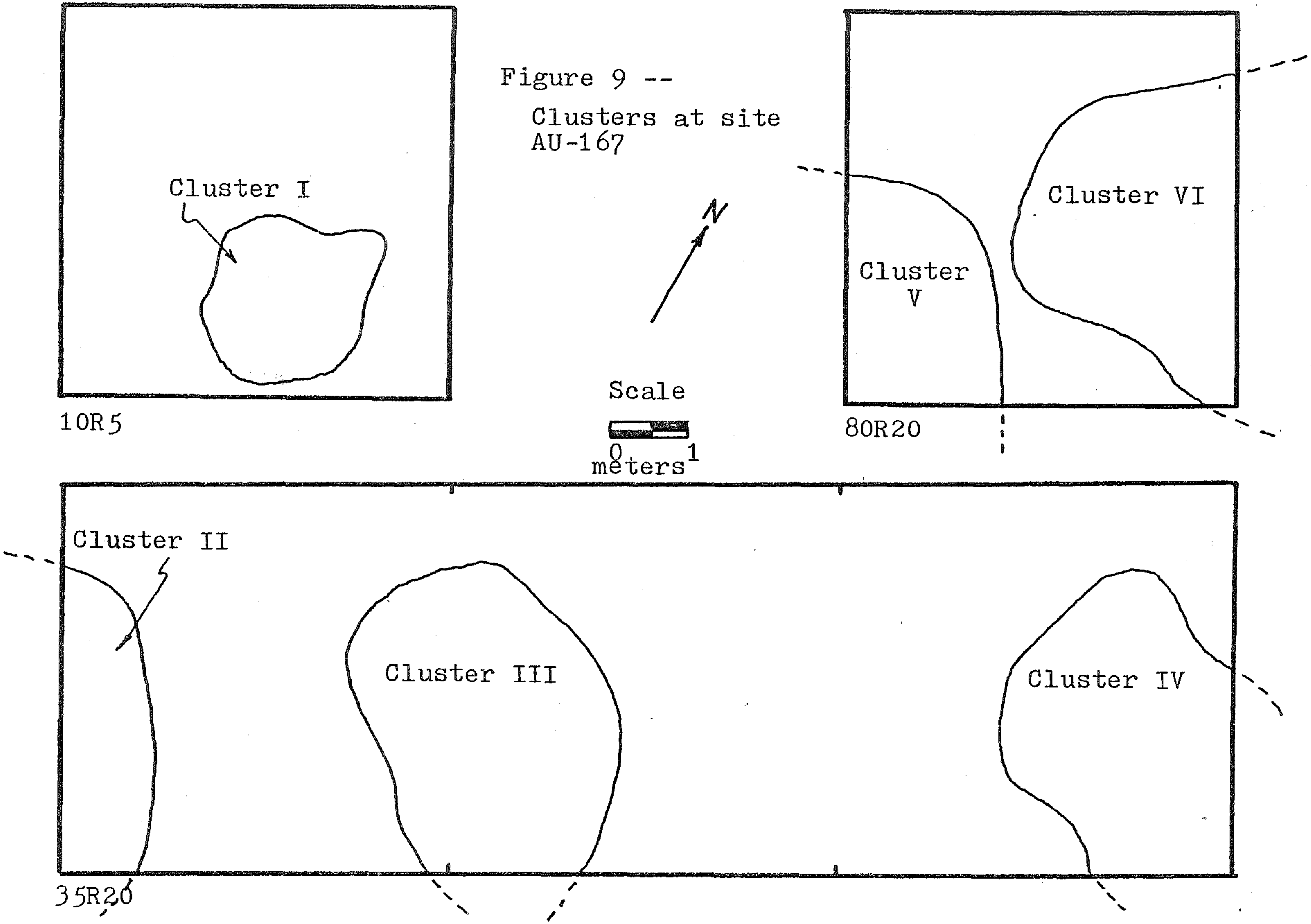


Figure 9 --
Clusters at site AU-167

squares with less than 15 artifacts and resulted in a cluster of approximately 4.5 square meters encompassing one-meter squares 12R3, 12R4, 12R5, 13R4, and 13R5. A total of 176 artifacts comprised the unit which had an artifact density of 704 per cubic meter. All of the material utilized was quartzite.

Morphological Analysis -- (Appendix I, Table 6) Three features of the morphological composition of this cluster are noteworthy. First is the high frequency of macro-flakes, 76 in the sample (43.2%). Actually, this division does not adequately express the real difference which this cluster demonstrates. Majority of the macro flakes in this cluster were considerable larger than 2 cm, though the lack of precise metrical data precludes a quantitative expression of this variance.

The second feature which is noted is a high frequency of cortex flakes, 35 in the sample (19.7%). This was far and away the highest frequency of cortex flakes at the site (though Cluster VI is also noteworthy in this regard) and represents 13% of the cortex flakes from the entire site.

Finally, 8 worked flakes (4.5%) is also a relatively high frequency for the site, and when seen in light of the 14 utilized flakes and 4 bifaces from the same area there is a possibility that varied activities, from primary lithic manufacturing to food processing were being conducted.

Functional Analysis -- Near the center of this cluster a group of bifacially worked tools were found. This consisted of three knife type blades (one possibly a Savannah River variant) and the forth, though too fragmentary for positive identification, appears to be the broken end of yet another knife.

Cluster II

Artifact Density and Lithic Materials -- Cluster II is located at the southern end of the extended sample area within 5-meter section 35R20. It was isolated by dropping squares with less than 20 artifacts, though the northern limit was somewhat arbitrary. It included squares 35R17, 35R18, 35R19, and 35R20. Due to its location, it is probable that only a small portion of this cluster was contained in the test area and it probably extended to the south. A total of 194 artifacts were recovered from these squares yielding an artifact density of 970 per cubic meter. With the exception of 1 quartz chunk, all of the finds were quartzite.

Morphological Analysis -- (Appendix I, Table 7) Though no particular feature of the morphological categories stand out, a low frequency of cortex flakes (5.2%) indicates that little primary core reduction was occurring. In this same vein, the low frequency of micro flakes (14.9%) points to little final stage biface manufacture.

Ten (10) utilized flakes (5.2%) and 4 worked flakes (2.0%) though not high frequencies do lend some evidence for food processing activities, though this interpretation is not substantiated by the functional analysis.

Functional Analysis -- Again, little can be said of the functional nature of this cluster. A large "adze" located in square 35R20 may represent woodworking activities. Other tools were functionally unidentifiable. Because of the lack of data concerning this cluster, no specific interpretation of it is possible.

Cluster III

Artifact Density and Lithic Material -- Cluster III is located within the large rectangular test area and spans from the northern side of 5 meter section 35R20 into 5-meter section 40R20. Definition of this cluster was difficult due to a generally high "background noise" level, though the cluster emerged when dropping all squares with less than 25 artifacts. The cluster is almost fully within the sampled area and has an area of about 10.5 square meters, including one-meter units 39R17, 39R18, 39R20, 40R17, 40R18, 40R19, 40R20, 41R18, 41R19, and 41R20. A total of 334 artifacts yielded a cluster density of 607 per cubic meter. Except for 4 cryptocrystalline flakes (2 utilized), 2 quartz flakes, and 1 quartz chunk, all of the artifacts were quartzite.

Morphological Analysis -- (Appendix I, Table 8) As with Cluster II, there is little to be noted in the relative frequencies of morphological categories. The presence of 2 cores, 41 cortex flakes (12.3%) and, 131 macro flakes (39.5%), may be indicative of primary core reduction. In addition, 46 utilized flakes (13.8%) seems to indicate some resource processing.

Functional Analysis -- Of 8 bifacial tools in Cluster III, 5 can be identified as knives. One appears to be the base of a projectile point though it is too fragmentary for identification. The last is a large bifacially worked cortex flake, which is probably an early stage in the manufacture of a tool and is not classified functionally.

Cluster IV

Artifact Density and Lithic Material -- Cluster IV is located at the northern end of 5-meter section 45R20 and was isolated easily due to the extremely low frequency of artifacts in the adjacent squares. The area, though extending to the northwest of the test area, has an area of 10 square meters and includes one meter squares 47R17, 47R18, 47R19, 48R17, 48R18, 48R19, 48R20, 49R17, 49R18, 49R19, and 49R20. A total of 220 artifacts yields an artifact density of 440 per cubic meter, the only cluster with a lower density than the site as a whole. With the exception of a single quartz micro-secondary flake, all of the artifacts were quartzite.

Morphological Analysis -- (Appendix I, Table 9) Although the artifact density of this cluster was very low, a significant number of the artifacts were either bifaces or core tools (4.2%). Other than a high frequency of broken flakes (39.5%), the morphological analysis says little about this cluster.

Functional Analysis -- Several functional categories were present in Cluster IV. Two core tools were identified as an adze for wood working and a chopping tool. Four knife-like blades, two "preforms" which could easily have been used as chopping tools or knives, one side-notched projectile point and one unidentified biface fragment constitute the remainder of the tools. Generally, these tools represent a rather non-specialized tool kit.

Cluster V

Artifact Density and Lithic Material -- Cluster V is situated in the southwest corner of 5-meter section 80R20 and extends out of that test area. The cluster encompasses squares 80R18, 80R19, 80R20, 81R18, 81R19, and 81R20 and has an area of about 5.5 square meters within the test area. A total of 290 artifacts in this cluster yield an artifact density of 966 per cubic meter, reflecting the generally higher density of artifacts at this portion of the site. All of the artifacts, with the exception of 1 cryptocrystalline secondary flake, a cryptocrystalline point base, and a quartz chunk, were quartzite.

Morphological Analysis -- (Appendix I, Table 10) This cluster has an extremely high frequency of broken flakes (51.7%) and a fairly high frequency of cortex flakes (8.6%) which could be indication of lithic manufacturing. In addition 9 worked flakes (3.1%) and 17 utilized flakes (5.9%) represent food processing activities. In general, however, not enough of this cluster was tested to fully evaluate it.

Functional Analysis -- Five bifacial tools in the assemblage included two projectile points, an elongated bifacial knife, an ovoid shaped "preform" or cutting/chopping tool, and one unidentified blade-like fragment.

Cluster VI

Artifact Density and Lithic Materials -- Cluster VI is also located in 5-meter section 80R20, though this is to the north and extends out of the tested area. An area of 9.5 square meters encompassing squares 82R18, 82R19, 83R17, 83R18, 83R19, 84R17, 84R18, 84R19, and 84R20 yielded 675 artifacts for an artifact density of 1499 per cubic meter. All artifacts except four quartz flakes were quartzite.

Morphological Analysis -- (Appendix I, Table 11) Several points worthy of mention are noted with respect to Cluster VI. These are: (1) a high frequency of micro flakes (26.1% of the entire site assemblage), (2) a high frequency of cortex flakes (14.9% of the total site assemblage), (3) a high frequency of broken flakes (46.4% of the cluster), and (4) a low frequency of bifaces (0.4% of cluster). It is also noted that there were several large cores present, both in the tested area and to the north. All of these factors point to the specific use of this area as a lithic manufacturing station, with the completed artifacts removed.

Functional Analysis -- No functionally identifiable tools were located in this cluster. This absence, in light of the factors noted above, indicates that the cluster was the specific location of lithic manufacturing activities. This interpretation is supported by the low frequency of worked and utilized flakes. When it is kept in mind that these chipping activities would result in large quantities of waste material, the high artifact density for this cluster also substantiates the interpretation as a lithic station.

Interpretation of AU-167

From this detailed analysis several important factors have come to light. Generally, the artifacts from the site are unspecialized, reflecting numerous possible activities and indicating that groups settled the terrace for a number of different reasons at different times. The comparison of the morphological frequencies (Figure 10) shows that there is little variation in the actual con-

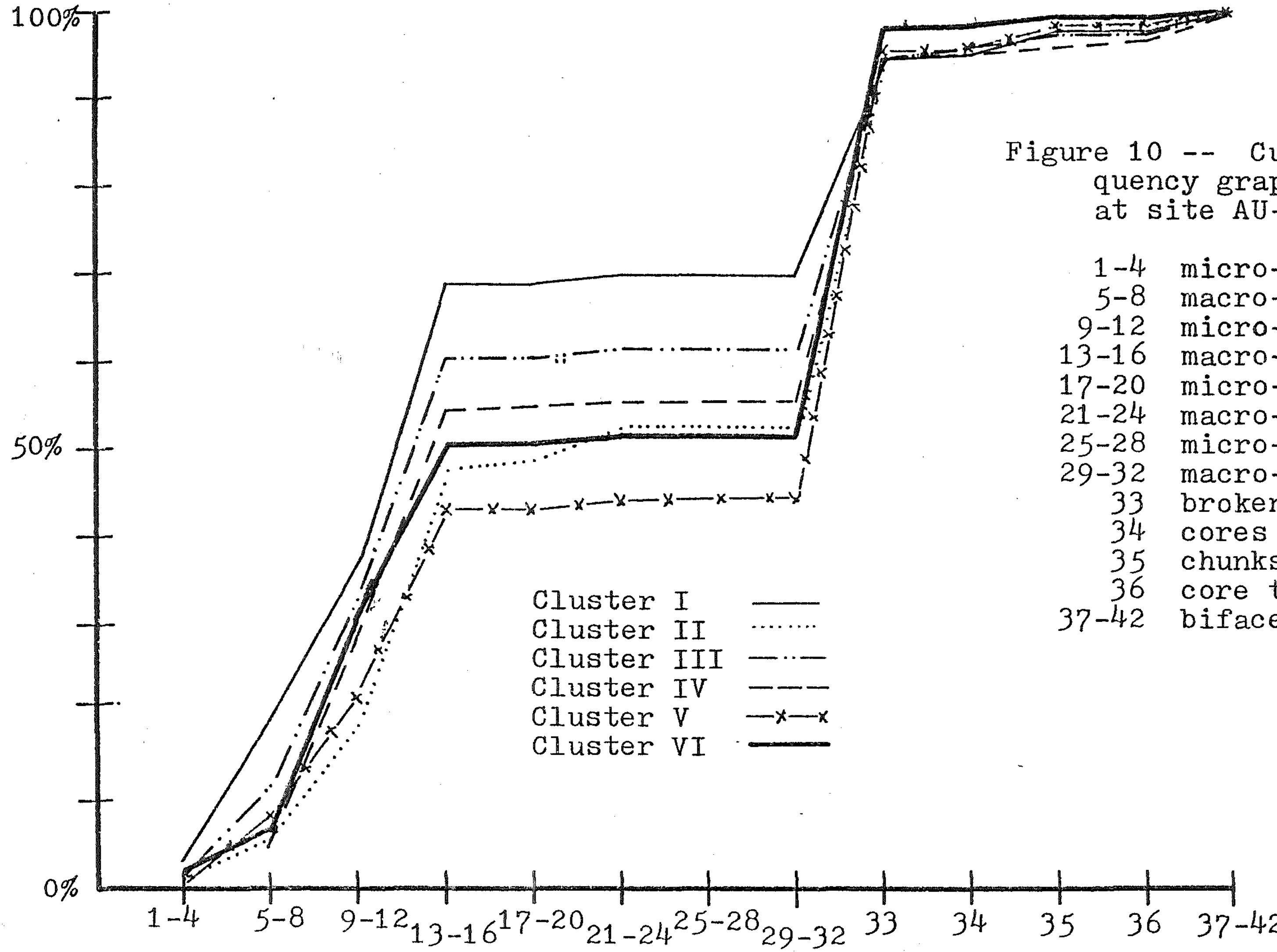


Figure 10 -- Cumulative frequency graph for clusters at site AU-167.

1-4	micro-cortex flakes
5-8	macro-cortex flakes
9-12	micro-secondary flakes
13-16	macro-secondary flakes
17-20	micro-bladelike flakes
21-24	macro-bladelike flakes
25-28	micro-true blades
29-32	macro-true blades
33	broken
34	cores and core remnants
35	chunks
36	core tools
37-42	bifaces

figuration of the cumulative graphs. The differences are much as were described in the cluster descriptions. The most significant differences are at the lower left (the area of the cortex flakes) and the upper right (the tool categories). The center section reflects the lack of blades and the vertical separation between Clusters I and V may be interpreted as representing difference in frequency of broken as opposed to whole flakes. However, when looking at individual clusters within the site some intra-site variation can be noted, although it is admittedly of a tenuous nature.

It is tempting to hypothesize that the areas of high density were used for longer periods of time than those of low density. This should be avoided, however, particularly in light of the functional analysis of Clusters IV and VI, the two most dissimilar units at the site (note the two key areas of the graph--cortex flakes and tools). In Cluster IV, the lowest density of artifacts is found, but with a greater frequency of tools relating to activities other than lithic manufacture. On the other hand, Cluster VI has the highest density of artifacts but few tools. When it is kept in mind that the reduction of a single biface results in an enormous amount of debitage the lesson should be clear. The other clusters apparently represent areas which were not as specialized as the two mentioned here.

Another aspect of this analysis is the light it sheds on possible group size. It was noted earlier that the size of a potentially habitable area would possibly be related to the group size. However, now it can be clearly seen that although AU-167 rests on a larger terrace, the actual units of occupation are not much larger than 10-15 square meters, with the smallest Cluster I, being only 4.5 square meters. The implications of this factor on possible group size is that it becomes likely that each cluster may represent a single camp site for a group of hunters and/or gatherers which probably did not number more than 5 or 6 individuals. In light of the long chronological span of intermittent site usage it is likely that there are literally hundreds of these campsites strewn across the surface of the terrace, some of the older ones which may have been kicked around and mixed by later occupations. In this respect, it is noted that none of the early projectile point types were located in any of the clusters.

The extended analysis of the site leads one to the conclusion that each of the clusters represents a single temporary hunting/gathering station. Although this seems likely, the complexity of the site, and the evidence in several of the clusters for multi-functional activities may be an indication that the site served several purposes through the millennia of its usage. In fact, it is likely that the site may have served as a "small scale" base camp. The location of the site with relation to the eastern side of the Blue Ridge, the nearby springs, and the upper portion of Paine Run make such an interpretation quite attractive.

The Gentle Site (MD-112)

Location and Physical Setting -- (Figure 11) Located on the eastern escarpment of the Blue Ridge, MD-112 is situated atop an elongated terrace (which is actually an extension of the ridge) at the confluence of the Hogcamp Branch and the Rose River. The terrace, at an elevation of 2200 feet, extends for ca. 100 meters East-West and at its widest point is ca. 50-75 meters wide. The entire area is very flat and provides a sufficient surface for extensive occupation. The site has been visited numerous times by crews from the Laboratory of Archaeology with large quantities of artifacts noted in exposed sections of ground and along several trails which cut through the site. It is noted that both the Rose River and the Hogcamp Branch are large streams typical of the eastern slopes which are steep and very rocky. Numerous waterfalls and deep pools are in the vicinity, raising the possibility of exploitation of riverine fish species (e.g. brook trout).

Testing Methods -- As mentioned, this site was visited several times by crews from the Laboratory with different collection techniques used each time. The first visit, very early in the project, consisted of surface collection

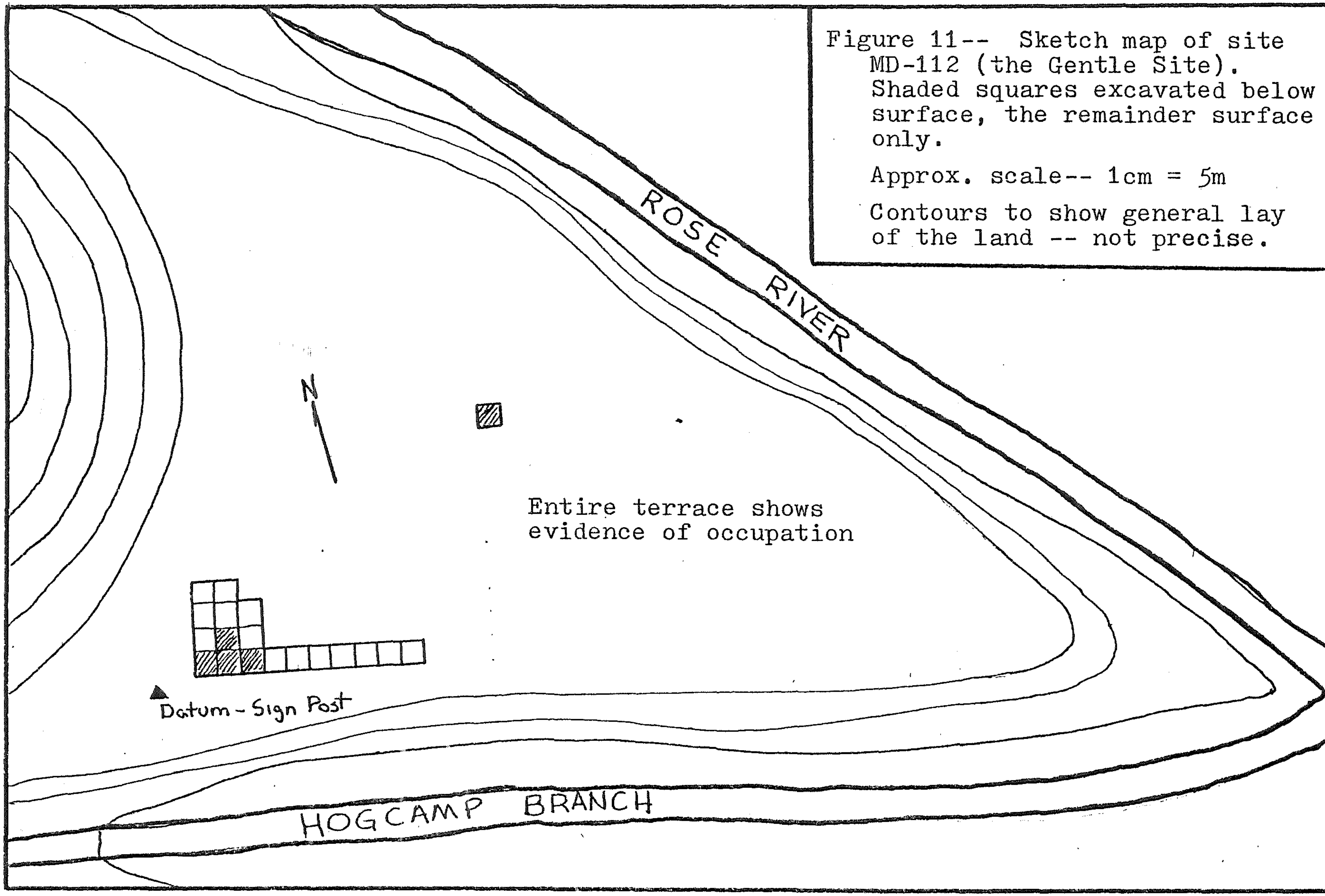


Figure 11-- Sketch map of site MD-112 (the Gentle Site). Shaded squares excavated below surface, the remainder surface only.

Approx. scale-- 1cm = 5m

Contours to show general lay of the land -- not precise.

with no localized provenience for the artifacts recovered. During a later visit, no material was collected from the main portion of the site, rather, materials were retrieved from the eroding bank on the Hogcamp Branch side of the site. Because of the tremendous potential of the site, when sampling techniques had been more clearly refined, a crew was sent to the site to obtain a systematically collected sample of the material (Miller 1976).

Although it was originally planned to scatter test pits across the entire surface of the terrace, this goal was not reached. Rather, a series of two-meter squares were laid in along Dark Hollow Trail just as it enters the terrace down the Hogcamp Branch. One other two-meter test was situated in the center of the terrace. Systematic surface excavation was utilized to collect artifacts exposed in the trails and 5 of the test pits were excavated below the surface. Due to extremely limited time available at the site, the depths of these pits were shallow, with only one extending below 10cm. The soil profile consisted of a thin level of forest humus, varying in thickness from 2 cm to 10 cm (depending upon the location of the square -- those in the trail were shallow) overlying a thicker stratum of yellowish-brown clayey loam intermixed with a high percentage of gravel. A small test pit excavated to a depth of 34 cm indicated that this soil level was extensive and may be the subsoil for the terrace. Artifacts were predominantly concentrated on the surface and in the shallow humic horizon, falling off sharply in the thick subsoil level.

It is most unfortunate that the original plan for testing this site was not accomplished. Although a great deal of useful information was recovered, it is extremely biased due to the concentration of squares in one small area of the site. Pertinent questions of horizontal variation were not answered by the procedures utilized. It is hoped that in the future more extensive testing can be undertaken at this important site, utilizing widely scattered test squares within the already established grid.

Chronology -- MD-112 yielded a total of 37 identifiable projectile points or point fragments. Of these, eighteen were Levanna triangular, with another seven crude triangular (Holland Type D). The presence of these forms, in addition to sherds of Albemarle Series pottery indicates a Woodland date for the occupation possibly in the period of AD 1300 - 1600. One small quartz triangular point (Clarksville Small) indicates that the use of this site may have extended into the proto-historic period. The possibility of an earlier occupation of the site is hinted at by the occurrence of a Stanly-Morrow Mountain transition type projectile point of the Early Archaic ca. 5500 - 4500 BC (Miller 1976:192). However, the statistical dominance of the later forms clearly points to more intense utilization of the site in the later time frame.

Artifact Analysis -- Due to the nature of the tested sample of this site, inadequate data were recovered for segregation of the site into smaller components. Unfortunately, therefore, the analysis of the artifacts must assume uniformity. This assumption may not be terribly unwarranted as a qualitative evaluation of the surface materials does not lead to a definition of areas of notably higher (or lower) artifact density.

Ceramic Analysis -- A total of 25 sherds of prehistoric pottery were found at MD-112. A majority of the sample (23) were Albemarle Series. Though 14 of these sherds were too fragmentary to identify surface treatment, 5 were fabric impressed, 2 net impressed, 1 cordmarked, and 1 plain. In addition, Radford Series, limestone tempered pottery was represented by two sherds which mended.

Lithics

Artifact Density and Lithic Material -- A total of 5444 stone artifacts were recovered from the site. This results in an artifact density of 2388 per cubic meter. Of the assemblage, 74.4% was quartzite, with both quartz and cryptocrystalline each contributing slightly more than 12% of the material.

Morphological Analysis -- (Appendix I, Table 12) The single most important attribute of the assemblage's morphological distribution was the overwhelmingly high percentage of micro-flakes which numbered 4521 or 83.0% of the total. Again, this figure does not reflect the true situation which is that probably as many as 98% of the flakes were less than 2.5 cm, and a great majority of these were extremely small chips, many less than 1 cm. Such a preponderance of these small flakes is indicative of two related factors: (1) that resharpening of dulled bifacial tools was a major activity at the site as many of these tiny chips could be functionally classified as "edge resharpening" flakes, and (2) that the artifacts being produced were generally small in size. The low frequency of cortex flakes (7.4%) can be interpreted as meaning that objects were brought to the site either completed or as "preforms". The remnants of 38 cores in the sample, all very small, indicated that some limited core reduction was occurring at the site.

Functional Analysis -- The presence of ceramics at the site may be interpreted as representing activities related to the gathering of wild plant foods which were stored and transported from the mountains in these containers. The lithic assemblage, with its low frequency of worked and utilized flakes (5.7%), is difficult to functionally classify. Nearly 80% of the tools recovered from the site were projectile points or point fragments. In addition to these, there were two small scrapers, two scraper/knife combination tools, one drill, and a large greenstone chopping tool. This latter specimen is also noteworthy because one face showed possible evidence of utilization as a grinding stone, perhaps from the preparation of meal from nuts.

Interpretation -- The large area and strategic location with respect to various areas makes MD-112 a very attractive location. By travelling up the Hogcamp Branch easy access is reached to Big Meadows and up the Rose River to Fisher's Gap and on to the western slopes. The high frequency of both quartzite and cryptocrystalline at this site is particularly noteworthy in light of the noted predominance of quartz and greenstone in most prehistoric assemblages to the east of the Blue Ridge. This factor would indicate one of two occurrences: (1) the groups utilizing MD-112 came from villages located in the Valley where the cryptocrystalline was located and utilized quartzite found during the crossing of the western slopes, or (2) that groups at MD-112 made trips to the western areas and obtained lithic materials which were better suited to their needs.

The high density of materials, which is apparently fairly uniform within the site, the unique location of the site, and the high percentage of projectile points indicate that the site was probably a high elevation base camp from which hunting and gathering activities were conducted. This interpretation, though highly probable, should only be seen as tentative in light of the inadequate sampling to date. The site's late chronological association with village oriented horticultural societies raises some questions of the possibility of more permanent occupation of the area. This, however, has not been demonstrated in the types of artifacts located.

MD-138

Location and Physical Setting -- (Figure 12) MD-138 is situated at the base of a sheer 10 meter high greenstone cliff along the eastern edge of Big Meadows. The marshy headwaters of the Hogcamp Branch provide the eastern boundary for the site, the steep cliff the western, and a ridge of large boulders the northern. An area of ca. 30 by 35 meters is encompassed by these features, and is topographically a flat, rocky terrain. The stream, at this point in its development, has not yet established a channelway and numerous springs erupt along the eastern edge of the site.

Testing Method -- After defining the extent of surface materials, five one-meter test squares were randomly placed within the confines of the site. These squares were excavated to a depth of 15 cm and revealed the stratigraphic nature of the terrace. Beneath a thin surface of forest litter, a stratum of dark brown forest loam

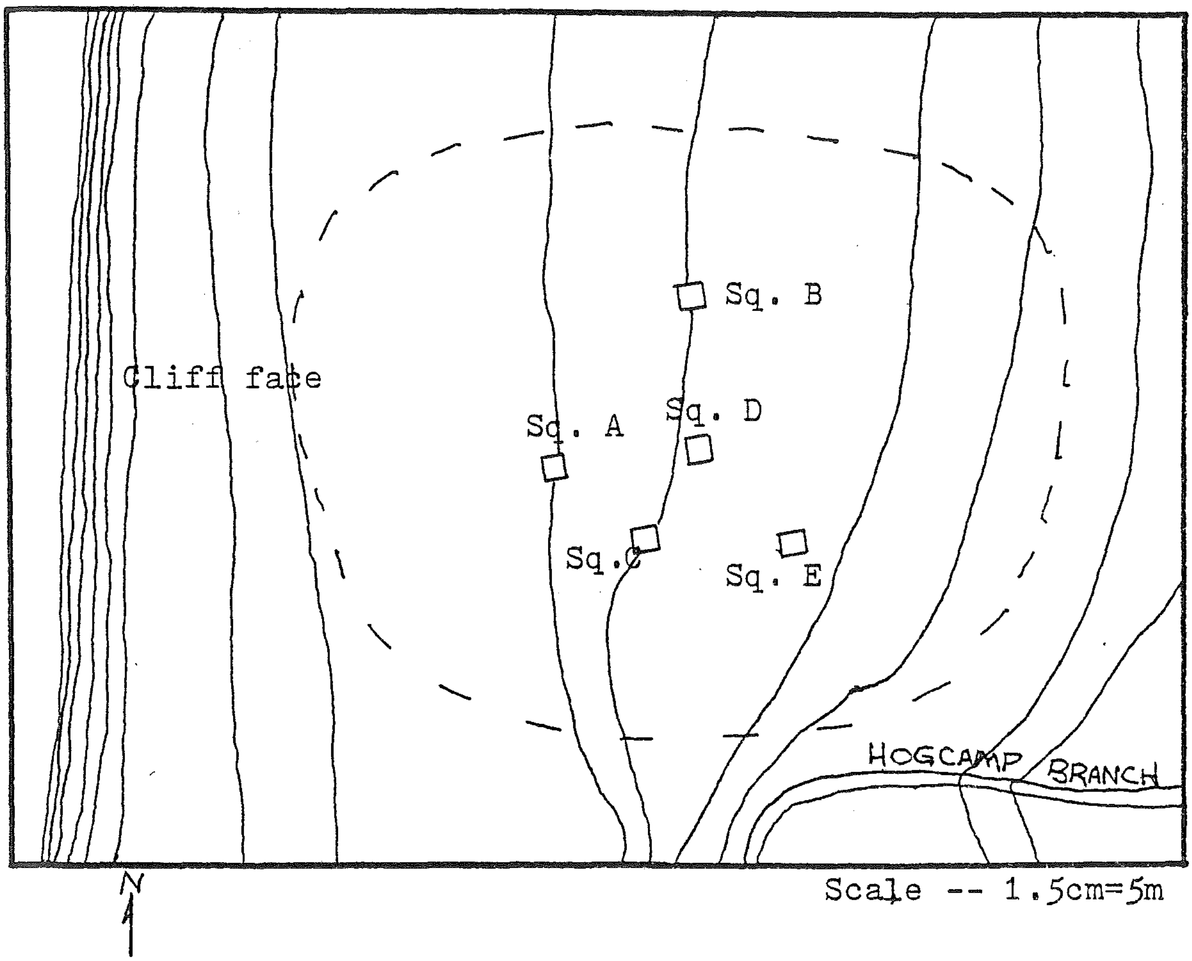


Figure 12 -- Topographic map of site MD-138.

Contour Interval -- 1 meter

Field Map by James Miller

extended to a depth of 5-8 cm. This overlaid a lighter brown clay loam which was from 5 to 10 cm thick. Artifacts were limited to the upper level of forest humus, with only a few located in the upper portions of the lower stratum.

Chronology -- MD-138 yielded several diagnostic artifacts, including a Guilford lanceolate and a Morrow Mountain projectile points indicating occupation during the Middle Archaic (ca. 4000-3000 BC, Coe 1964). Later forms included a notched stem projectile point (Holland Type I) of the Middle to Late Archaic and a surface find Levanna triangular point, assigned to the Woodland period.

Artifact Analysis -- Due to the relatively undifferentiated nature of the lithic assemblage the site is treated as a single unit.

Artifact Density and Lithic Materials -- Only 71 artifacts were recovered from MD-138 yielding an artifact density of 142 per cubic meter. Quartzite comprised 78% of the sample with quartz and cryptocrystalline each contributing approximately 10%. This breakdown is interesting in light of the similar frequencies from the Gentle site, though the chronological ambiguities make a direct comparison infeasible.

Morphological Analysis -- (Appendix I, Table 13) The complete absence of cortex flakes and core remnants and the high frequency of bifaces (11.3%) and worked and utilized flakes (18.3%) are strong indications that MD-138 was a specialized site.

Functional Analysis -- All of the bifacial tools from MD-138 were projectile points or point fragments. In addition to these the edge utilized flakes were probably used as cutting or scraping tools.

Interpretation -- If we assume, for the sake of argument, that during the Archaic period (specifically ca. 4000 to 3000 BC) that Big Meadows was in fact an open, grassy meadow it is likely that the area would have been attractive to numerous large, browsing animal species, such as deer and possibly bison in the later periods. As such, it would be conceivable that prehistoric hunters would have utilized the steep greenstone cliff to their advantage by driving large numbers of animals, perhaps by burning off the meadow, over the cliff and then butchering them at the base of the cliff. Although such an interpretation is quite attractive, there is really insufficient evidence to substantiate it.

In general though, it would be safe to interpret the site as a highly specialized temporary hunting camp. This is supported by the wide range of projectiles which indicate usage by several different groups through long periods of time; the extremely low density of artifacts pointing to the probability that little stone chipping was done there; and the wide, non-clustered deposition of materials.

MD-143

Location and Physical Setting -- (Figure 13) Site MD-143 is located adjacent to a line of scrub locust trees along the northeastern margin of Big Meadows. The area is on a gently sloping, grassy knoll which overlooks the swampy headwaters of the Hogcamp Branch, which flows to the south of the site. The area is presently covered with a thick meadow mat, making definition of the site's perimeter difficult (Miller 1976). An area of approximately 10 by 15 meters was defined as the apparent extent of artifactual material. The eastern edge, however, was never clearly delineated and may continue for some distance into the thick thorn bush covered forest adjacent to the site.

Testing Method -- As with MD-138, a series of 5 one-meter test pits were randomly distributed within the site, with a sixth located just to the northwest of the artifact concentration. The pits were excavated in arbitrary 10 cm levels, the deepest to a depth of 50 cm. Four distinct soil horizons were noted: an upper level of grass and roots (meadow mat), an 8 cm thick stratum of brownish humic soil, a 20 cm thick stratum of reddish-brown clayey soil, and the lowest level of very pale brown clay with gravel sized pieces of shale, greenstone, and epidote.

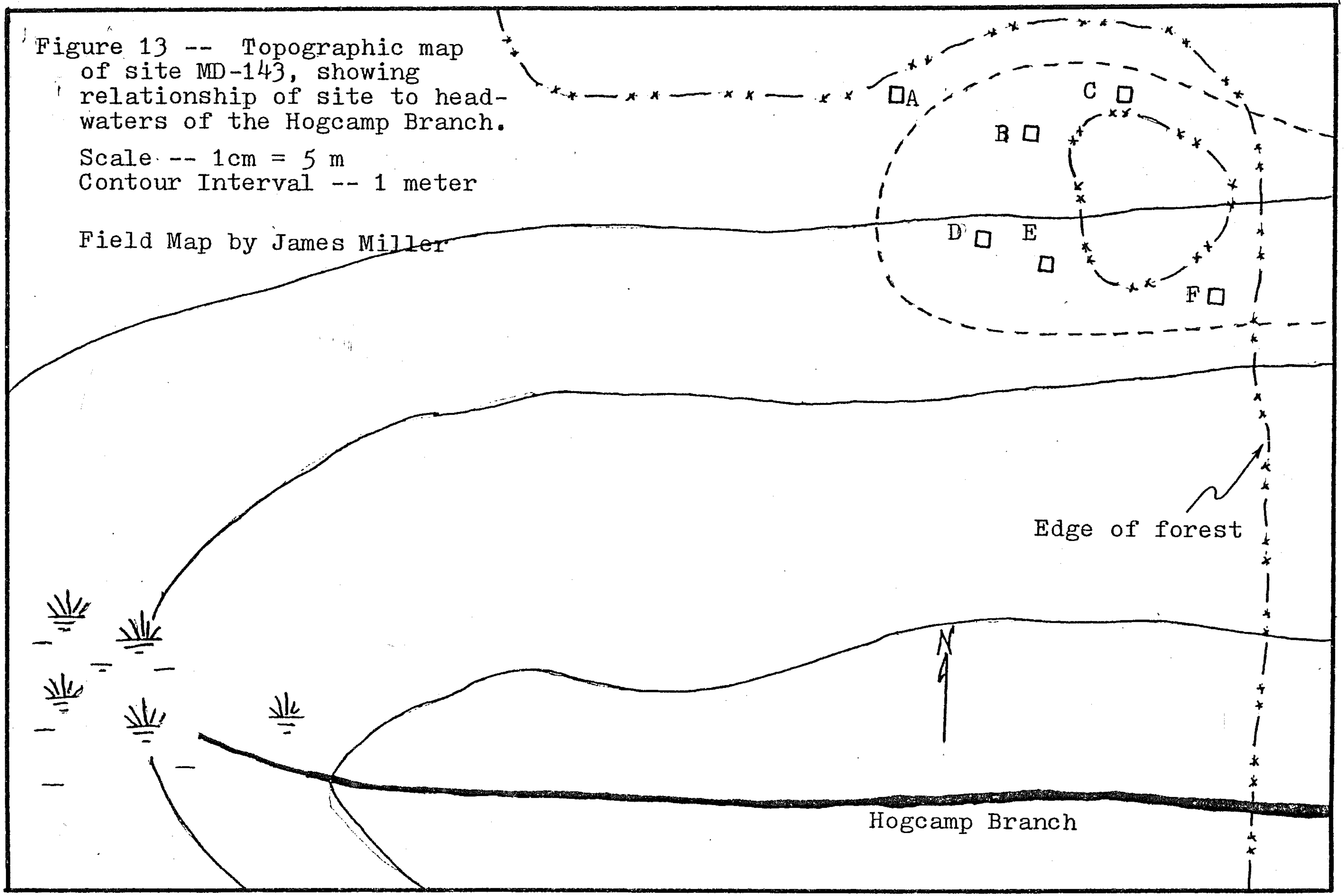


Figure 13 -- Topographic map of site MD-143, showing relationship of site to headwaters of the Hogcamp Branch.

Scale -- 1cm = 5 m
Contour Interval -- 1 meter

Field Map by James Miller

Cultural material was distributed throughout these soil levels with no noticeable chronological separation, although frequencies dropped off somewhat with increasing depth.

Chronology -- Although the great depth of the site suggests a long usage by prehistoric groups, the assemblage did not yield any diagnostic indicators for such a long span. Rather, a single chronologically useful projectile point, a Halifax type, tentatively dates the occupation to the late Archaic (Coe 1964). A C-14 date from the nearby Elvin Graves rockshelter was 1500 $\pm$ 120 for a feature associated with Halifax points (Holland: Personal Communication).

Artifact Analysis

Artifact Density and Lithic Materials -- Although this site had considerable depth, it was impossible to isolate vertically separate components. It is noted that artifact density was highest in the upper 20 cm (ca. 260 per cubic meter) and dropped off considerably below. A total of 426 artifacts were recovered from the test squares yielding an overall artifact density of 197 per cubic meter. Slightly over 90% of the assemblage was quartzite, with quartz and cryptocrystalline each contributing about 4.5%.

Morphological Analysis -- (Appendix I, Table 14) A very low frequency of cortex flakes (0.7%) indicates that little primary core reduction was occurring. It is noted, however, that 257 (60.3%) of the assemblage were secondary flakes, with more than half of them being micro. This indicates perhaps the fashioning and shaping of preforms brought to the site, and/or the resharpening of dulled tools. There was also a low frequency of bifacial tools and worked and utilized flakes.

Functional Analysis -- One projectile point and two possible drill type bifaces represent the only functionally identifiable tools recovered.

Interpretation -- The low density of artifacts and the low frequency of functionally identifiable tools combine with the ideal site location, to classify MD-143 as a temporary hunting/gathering station. It is conceivable that groups used this site to observe the movement of animals on the meadow or as they approached the small pool of water at the source of the Hogcamp Branch.

MD-146

Location and Physical Setting -- (Figure 14) MD-146 is one of five sites in the sample which was located in a peripheral saddle. The location of this landform is between Old Rag Mountain and Robertson Mountain, at the intersection of Old Rag, Weakley Hollow, and Berry Hollow Fire

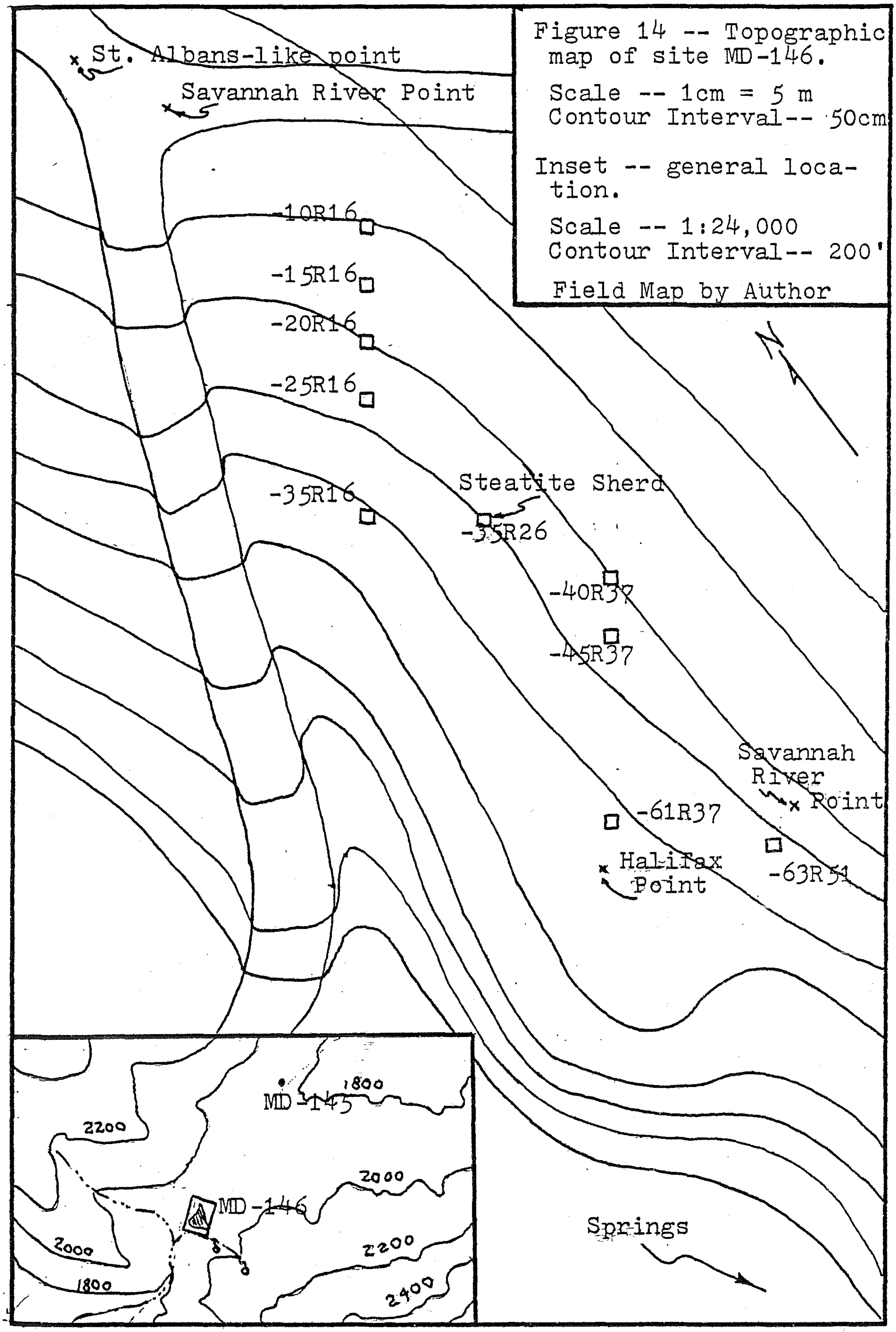


Figure 14 -- Topographic map of site MD-146.
Scale -- 1cm = 5 m
Contour Interval-- 50cm

Inset -- general location.
Scale -- 1:24,000
Contour Interval-- 200'

Field Map by Author

roads. The saddle formed here is very large (over 100 acres but not precisely determined) and flat. MD-146 is situated at the southern end of the saddle at a point where it drops into Berry Hollow. Two nearby intermittent springs feed a small secondary stream which trickles below the site and eventually winds its way into the Robinson River.

During the early twentieth century a small farming village, Old Rag, was located at this intersection and had a population of 233 in 1932 (Sizer 1932). The evidence of this small community is virtually lost in the dense successional growth now covering the area, though scattered recent artifacts bear witness of the previous activities. More important for the present concerns, however, are the piles of "field stone" which represent the accumulation of rocks which impeded plowing. One of these piles is located near the center of a concentration of surface lithic artifacts. In addition to the disturbance due to plowing, there is a gentle slope crossing the site and exposures of bare ground attest to the detrimental effects of erosion, as artifacts are clearly being washed downhill.

The perimeter of the site was never clearly defined though it seems to run roughly from the road to Old Rag shelter south to the drop off into Berry Hollow, a distance of approximately 100 meters. The width is also bounded by the Berry Hollow Fire Road; and, although the eastern extent was not determined, it extends at least 70 meters from the road and probably as far as the springs.

Testing Methods -- The original purpose envisioned for the testing at this site was to determine the location of the Brown House, reputed to be the earliest historic structure in the Park, perhaps as early as AD 1750 (Foss 1976:400-2). The opportunity to accomplish two purposes with the same effort led to a decision to conduct extensive testing within the area of the intersection of the two roads. Towards that end, a grid was imposed on the site, with the initial plan to excavate a one-meter square every five meters. Ten squares were opened before funding for the project was terminated.

The squares were excavated in arbitrary 20 cm levels to a depth of 40 cm. As expected, however, the area had been extensively cultivated, resulting in a mixing of modern and prehistoric material. Because it was noted that cultural material was primarily confined to the upper 20 cm and in order to save time, a number of squares were only dug to 30 cm. All soil was screened for small artifacts.

A one meter control pit (-35R26) was excavated to a depth of 50 cm to test the soil profile. It was found that the upper 20 cm consisted of brown clay loam, identified as plow zone. Below this was a yellow sandy clay with decomposing bedrock, probably the subsoil.

Chronology -- A majority of the chronologically diagnostic artifacts were recovered from the surface. Two Savannah

River, one Halifax, and a parallel sided stem projectile points place the occupation of the site in the late Archaic. Other point forms substantiate an Archaic period of occupation, and a St. Albans-like point, recovered from the road bed, hints at possible Early Archaic utilization.

Artifact Analysis

Lithics

Steatite Bowl Fragment -- A single fragment of a steatite bowl was recovered from square -35R26. This find was particularly useful in light of recent developments in the use of neutron activation to pinpoint the quarry source of the specimens. This fragment was analyzed by Dr. Ralph Allen of the Chemistry Department at the University of Virginia and was compared to known quarry sites by Dr. C. G. Holland. It was determined that the Old Rag specimen probably had been quarried from the Baron Quarry in Chester County Pennsylvania (Holland: Personal Communication).

Artifact Density and Lithic Materials -- It was decided that due to the insufficiency of the tests and the disturbed nature of the site that it would be best to treat all of the proveniences as a single unit. A total of 1159 artifacts retrieved yielding an artifact density of 438 per cubic meter. Lithic materials utilized were mixed though quartz was dominant with 50.8%, and quartzite second most common with 38.6%. The remainder consisted of small percentages of cryptocrystalline (5.0%) and greenstone (3.1%). This distribution was much as expected for sites related to eastern populations.

Morphological Analysis -- (Appendix I, Table 15) A low frequency of cortex flakes and cores indicate little primary core reduction. An exception to this is a high number (23) of quartz cores and core remnants. In light of the total absence of quartz cortex flakes, this situation is most problematic but perhaps can be understood by the nature of the quartz which has a difficult to recognize cortex and is also found in vein form so that if it was being quarried it would not be expected to have a cortical exterior. Of the secondary flakes, most were small micro-flakes perhaps indicating retouch or sharpening of tools.

Functional Analysis -- Most of the identifiable tools in the assemblage were projectile points. There were also 6 scraping tools, 4 knife-like blades, and a greenstone axe. Several functionally identified artifacts were noted in the field, but not collected, including two hammerstones, several scrapers, and a few projectile points.

Interpretation -- The location of this site with relation to the springs suggests seasonal occupation. When seen in light of the relatively low artifact density and functional analysis, it seems that the site could be classed as a temporary hunting/gathering station. The wide range of point types recovered further substantiates this probability as they indicate use of the area by different peoples intermittently for several millennia. It is emphasized, however, that inadequate sampling biases this interpretation because the denser areas of the site were not tested. The possibility that the site was a multifunctional base camp cannot be overlooked.

The presence of the Pennsylvania steatite raises questions about how it came to be deposited at MD-146. Two possibilities could explain this. First, it could have found its way to Virginia via trade routes. This possibility seems rather unlikely, especially when it is realized that Virginia itself was a major center of quarrying activities. A second possibility, though not based upon solid evidence, is that the vessel belonged to a nomadic band of Archaic hunters who wound their way southward and into the Blue Ridge. To substantiate either of these possibilities, however, would require broad regional synthesis beyond the scope of this presentation. In any future work, however, the importance of this southward transmission of material culture should be explored in greater depth.

RM-117

Location and Physical Setting -- (Figure 15) Site RM-117 was located during a reconnaisance survey in conjunction with planned development of a tract of land to the south of U.S. highway 33, where it transverses the Blue Ridge at Swift Run Gap. The site lies in a shallow saddle which is drained by a small secondary stream. It is ideally located with respect to prevailing winds, as it is protected on the west by a ridge (Figure 17). The area is gently sloping and towards the upper part of the saddle levels considerably. The extent of successional vegetation around the area attests to its recent usage, and further complicated a complete evaluation of the site. As such, no definite site perimeter was established, though an area 45 by 30 meters accounted for 80% of the artifacts recovered.

Testing Methods -- Because the survey conducted in this area was aimed at the evaluation of potentially endangered sites, the method employed was to scatter one-meter test squares across the entire tract of land in question. To this end, twenty-five squares were investigated. They were excavated in 20 cm arbitrary levels, either to 20 or 40 cm, depending upon the productiveness of the test. Soil was trowel and shovel sorted for artifacts. It is noted, however, that not all of these squares were associated with RM-117. Rather, the survey delineated an east-

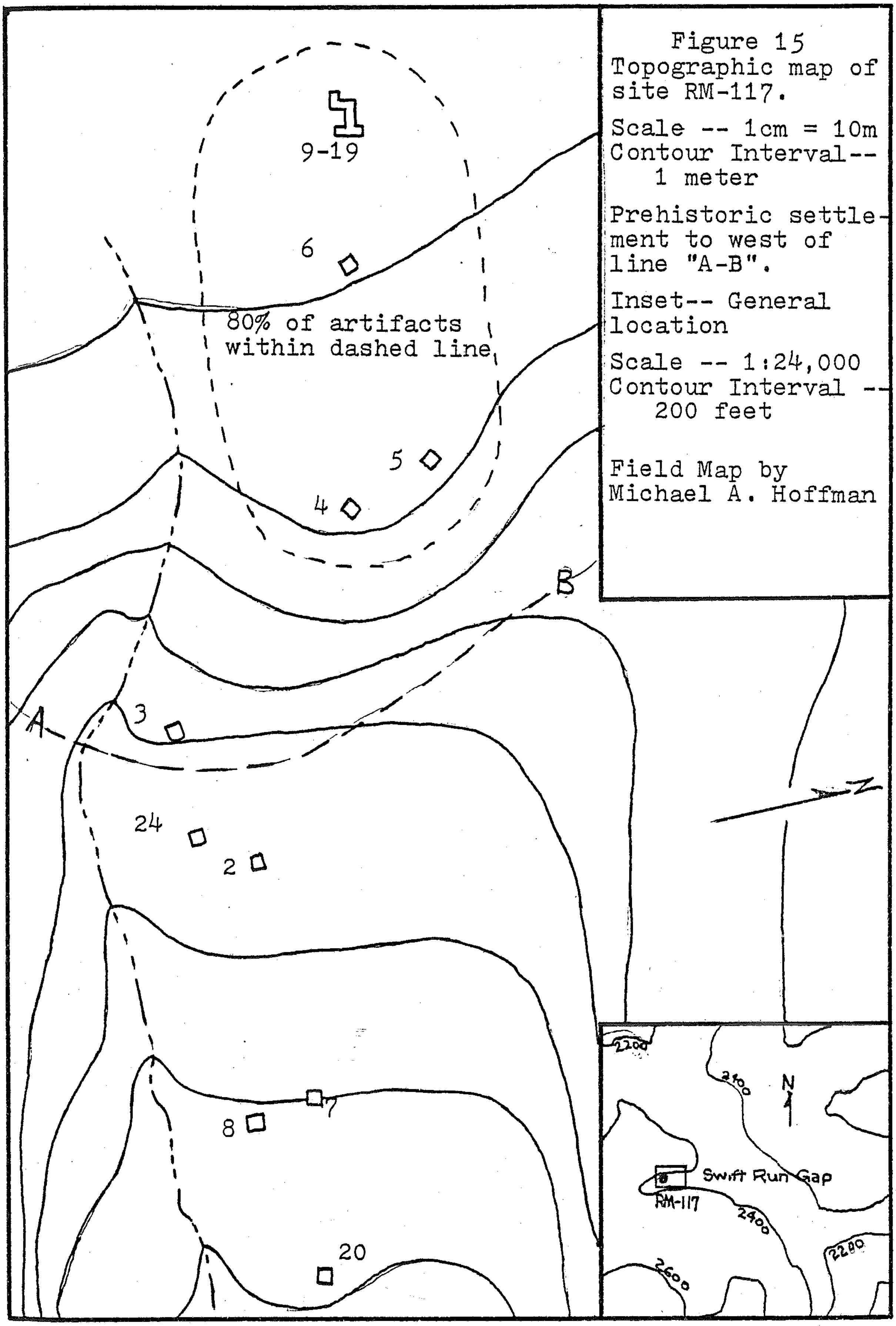


Figure 15
Topographic map of site RM-117.

Scale -- 1cm = 10m
Contour Interval--
1 meter

Prehistoric settlement to west of line "A-B".

Inset-- General location

Scale -- 1:24,000
Contour Interval --
200 feet

Field Map by
Michael A. Hoffman

west line through the saddle which divided the prehistoric site from the more recent historic materials found to the North (Hoffman 1975:6).

In addition to the squares which were excavated, Squares 10 through 19 were surface collected in an area that yielded large amounts of prehistoric material and which was interpreted at the time (Hoffman 1975a:4) as an undisturbed campsite which was eroding from the humic zone.

The soil profile of the area disclosed a 20 cm plow zone of dark gray humus and roots underlaid by 10 cm of brown sandy clay loam. The subsoil of mottled yellow sandy clay extended to at least 50 cm below the surface.

Chronology -- Several diagnostic artifacts were recovered during the test at RM-117. A quartz Halifax-like and a cryptocrystalline Lamoka-like projectile points, and a greenstone Guilford axe, tentatively date that site to the middle Archaic, or about 2000-3000 BC. In addition, a sherd of Albemarle series pottery indicated that the site was also utilized during later periods.

Artifact Analysis

Artifact Density and Lithic Materials -- Only the squares to the south of line A-B (figure 17) are included in the analysis. A total of 420 artifacts were recovered from this area with an artifact density of 300 per cubic meter.

Quartzite made up 61.4% of the total, cryptocrystalline 15.5%, quartz 14.0%, and greenstone 8.8%.

Morphological Analysis -- (Appendix I, Table 16) Low frequencies of cortex flakes (3.1%) and cores (only 1 in the sample) indicate that little primary lithic reduction was occurring at the site. In addition, a relatively high frequency of micro-flakes (35.9%) may imply the sharpening of tools or late stage biface manufacture. Finished tools were also infrequent (2.1%) though well within the range of other sites in the P ark.

Functional Analysis -- Functionally identifiable tools from RM-117 consisted of 2 projectile points and a chipped greenstone axe.

Interpretation -- It was hypothesized earlier in this paper that sites located in gaps would possibly have been temporary transient camps representing the movement of groups across the mountains. The fact that the morphological analysis indicates that little lithic manufacturing was being done and the low artifact density tend to support the idea that occupation was for short periods of time. The intermixture of lithic materials seems a fair indication of transmontane movement, especially since the geologic association of the site would not have provided any locally available materials. The functional analysis, though based upon an extremely small sample, makes it impossible to distinguish RM-117 as either a transient camp or a hunting/gathering station. Of course, it is inherently likely that the site may have served both purposes.

RM-122

Location and Physical Setting -- (Figure 16) Situated in the hollow formed by West Swift Run, RM-122 was located on a narrow terrace bordering the southern side of the stream (Figure 16, inset) just within the Park boundary. The terrace, which sits about 2 meters above the level of the watercourse and to the north of a steep mountain slope, provides a potentially habitable surface of ca. 3000 square meters. The site is at an elevation of 1400 feet and lies only a short distance into the mountain zone, just to the east of the broad bottomland expanse of Swift Run.

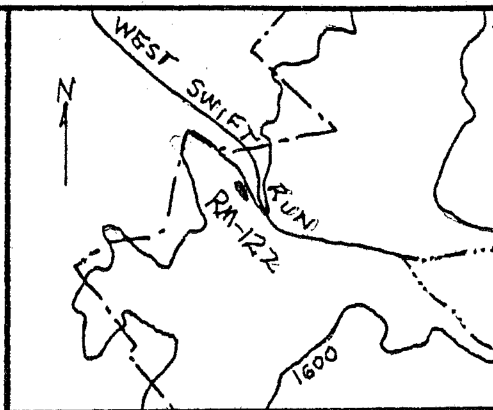
Artifacts eroding from the river bank led to the testing of the site. Surface reconnaisance delineated the apparent extent of the site as ca. 55 by 20 meters along the axis of the terrace.

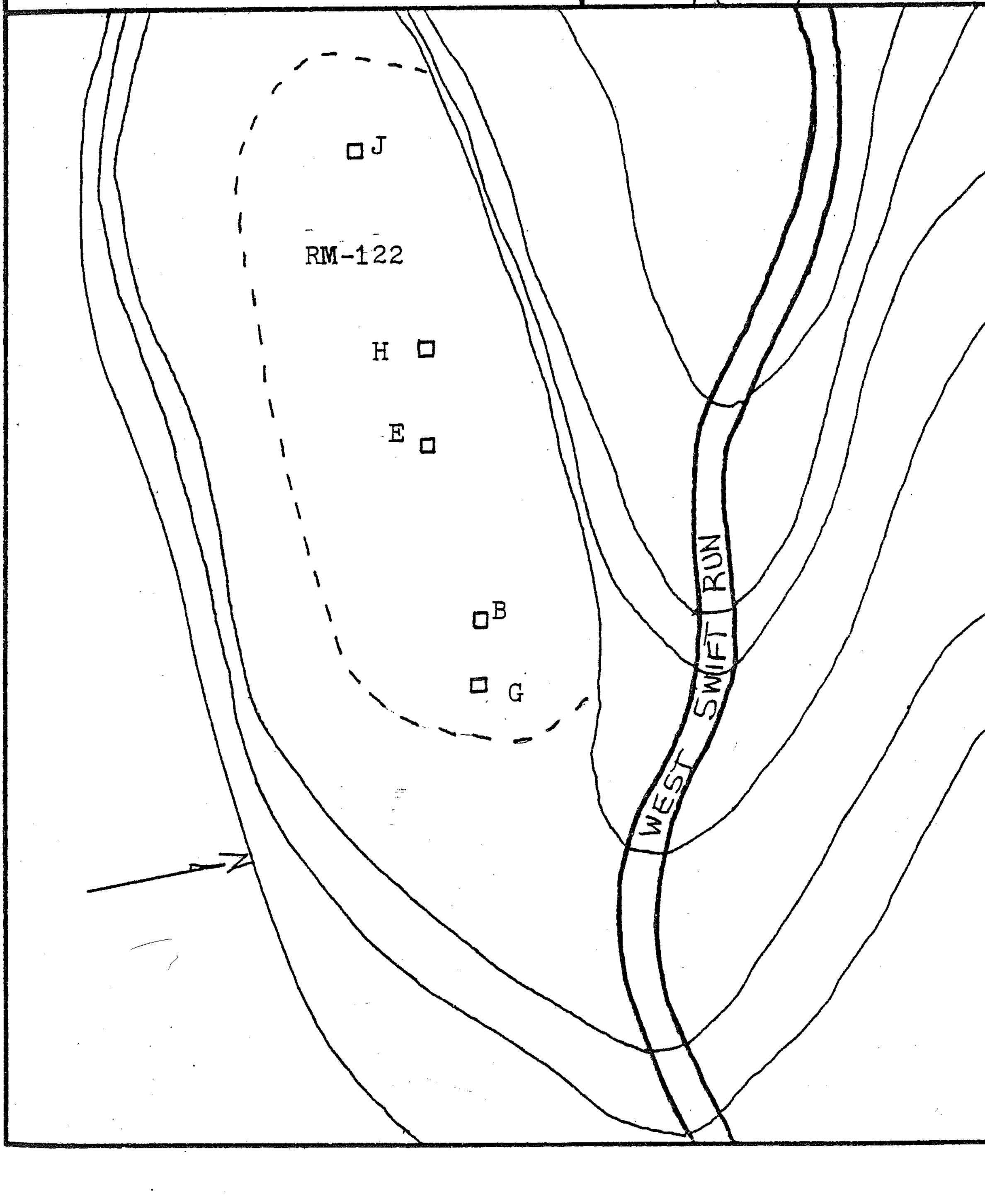
Testing Methods -- A series of one-meter squares were excavated in the area, with five located within the area delineated as the main portion of the site. Arbitrary levels of 20 cm were utilized. Soil was trowel and shovel sorted for artifacts. The soil profile consisted of up to 20 cm of brown clay loam, possibly a plowzone, overlying a thick subsoil of light brown loam. Artifacts were

Figure 16 -- Sketch map of site RM-122 showing relation of terrace to West Swift Run and slope to south.

Approx. scale -- 1cm = 5m
Contours not precise

Inset -- General location
Scale -- 1:24,000
Contour Interval -- 200'





predominantly confined to the upper soil level, and concentrated near the center of the defined site area.

Chronology -- Only one chronologically diagnostic artifact was recovered from the site. This was a crude triangular projectile point (Holland Type D). In addition, a base fragment from another biface may have come from a broken Savannah River point, though it was too fragmentary to be certain of this identification. The presence of these forms may indicate that this site was utilized during the "transition" period, however, without better examples such a placement is only tentative.

Artifact Analysis

Artifact Density and Lithic Material -- A total of 213 chipped stone artifacts were recovered during testing at RM-122. This figure results in an extremely low artifact density of 128 per cubic meter. Although quartzite was dominant (77.5%), several other materials were also present, including 7.5% quartz, 8.0% greenstone, and 2.8% cryptocrystalline.

Morphological Analysis -- (Appendix I, Table 17) A very low frequency of cortex flakes (0.9%) represents the lack of significant core reduction at RM-122. In addition, a high frequency of micro-flakes (45.1%) seems a good indication that the chipping that was done was more secondary trimming and final biface production. Although a number of the bifaces at the site were well chipped greenstone knives, it is noted that only 11 greenstone macro-flakes were recovered indicating that many of the tools were brought to the site already completed.

There were also relatively high frequencies of worked and utilized flakes (15.5%) and bifacial tools (6.1%).

Functional Analysis -- Aside from the one crude triangular projectile point, and 3 bifacial greenstone knives, no other functionally identifiable tools were represented, though several biface fragments were possibly either scrapers or projectile points.

Interpretation -- The very low density of artifacts of this site, in addition to the high frequency of worked and utilized flakes, strongly suggests the function for the site was as a temporary hunting/gathering station. Occupation was probably limited to short stays though the location and size of the area would seem to have been more attractive to longer term habitation. The lack of evidence for more intensive use of the site may be explained if further survey of the lower portions of Swift Run were to be conducted. In specific, it is noted that the hollow widens onto broad floodplains less than one half mile to the west of RM-122 and it is likely that a large base camp may have been located there.

Chapter VI

Inter-Site Variation

Because data from a majority of the sites is not sufficiently detailed for an in-depth analysis, the brief consideration here is of a very general nature. Specific treatment is given to (1) locational patterns as determined by survey, (2) lithic materials utilized and its relationship to site location, (3) morphological variation as revealed in cumulative graphs of morphological categories, and (4) functional variation as it can best be determined from the limited data available.

Because only two specific landforms have been intensively surveyed, primary consideration is given to Paine Run and Big Meadows. In addition, a brief mention is made of the locational pattern of sites in Nicholson Hollow.

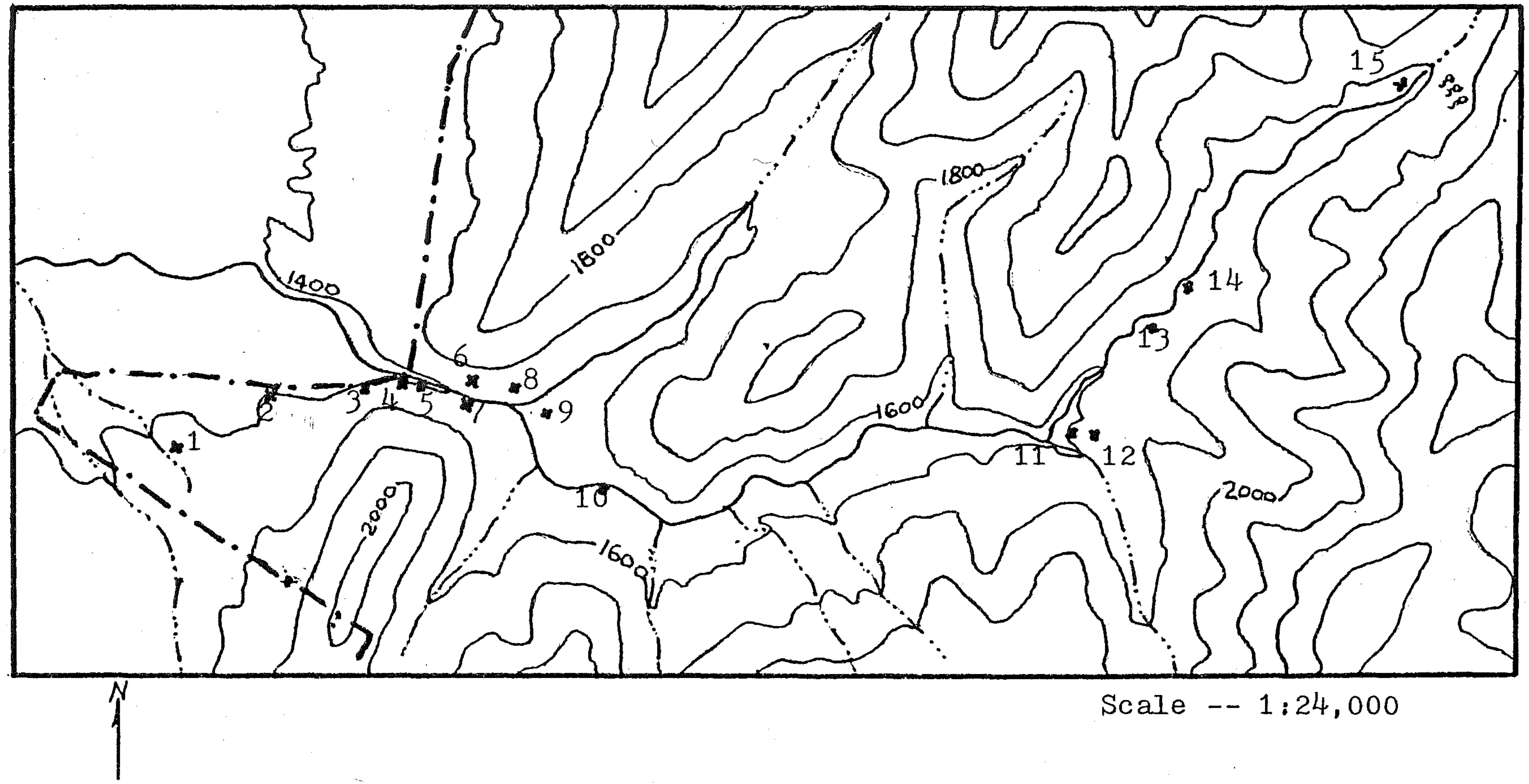
<u>Paine Run</u> (Figure 17)

Located on the western slopes of the Blue Ridge, Paine Run has cut a wide swath into the Blue Ridge massif which extends from the Valley floor some 3 miles to the foot of Black Rock. The hollow varies in width along its course, spreading out near the intersection of adjacent secondary streams and constricting in areas of highly resistant bedrock. The lower end of the hollow lies at an elevation of slightly less than 1400 feet and extends upward to Blackrock Springs at an elevation of 1800 feet. Above the springs, it becomes a small intermittent stream.

Locational Patterns -- During the survey of Paine Run a total of 15 prehistoric sites were located (Figure 17). With the single exception of AU-166, the sites are all consistently located close to the stream along the natural terraces or narrow floodplains which border the stream. Survey of relatively flat ridges flanking the stream valley revealed no indications of prehistoric activities. Stream braiding (with the resulting lack of developed terraces) in the central section of the hollow has either obliterated prehistoric sites, or discouraged settlement throughout prehistory. At the present, it is not possible to test either hypothesis in lieu of major excavations.

Extensive outcrops of Erwin-Antietam Quartzite near the mouth of the hollow have formed a series of rock overhangs providing 4 small to medium sized rockshelters (including AU-158) which demonstrated evidence of habitation.

Upstream from the confluence of Paine Run and Left Hand Hollow (a secondary stream valley which has not been surveyed) the stream is flanked occasionally by small, but flat, terraces which were often the location of small hunting/gathering stations. Below this intersection the stream has developed a narrow strip of alluvial floodplain which continues to widen out into the Valley. This section



Scale -- 1:24,000

Figure 17 -- Topographic map of Paine Run showing distribution of sites. Note the gap between sites 10 and 11 which is an area of stream braiding.

Contour Interval -- 200 feet

1.	AU-152	4.	AU-156	7.	AU-155	10.	AU-161	13.	AU-163
2.	AU-153	5.	AU-158	8.	AU-159	11.	AU-162	14.	AU-164
3.	AU-154	6.	AU-157	9.	AU-160	12.	AU-166	15.	AU-167

provides a habitation area for several large sites, including AU-154 which was interpreted as a base camp.

In terms of elevation, there seems to be slight variance in site types. In the lower elevations there are five relatively large sites which may have served as base camps. All of the sites at the higher elevations appear to be small hunting/gathering stations, although it was noted that AU-167 may have served as a high elevation base camp at some point in the past.

Lithic Materials -- With the notable exception of Component I, AU-158, all of the sites in Paine Run demonstrated a preference for quartzite. In light of Holland's hypothesis concerning the shift from quartzite to cryptocrystalline rock the high frequencies of quartzite are indicative of exploitation by pre-ceramic quartzite using populations. This is easily understood in light of the geologic association of the hollow which is based entirely on either the Hampton or Erwin-Antietam Formation in which high quality quartzite is readily available. The importance of cultural factors is demonstrated however in Component I, AU-158 where, even with the quartzite locally abundant, the population chose to bring the higher quality cryptocrystalline materials from the Shenandoah Valley to the site. The fact that no other "chert" using components were located in Paine Run raises several interesting questions about exploitation of the montane region in the later period.

Morphological Variation -- Figure 20 presents the superimposed cumulative frequency graphs for the morphological categories of stone artifacts from 4 Paine Run sites. Because inadequate samples were recovered from most of the 15 sites, this graph presents only the results for those sites discussed in Chapter V. It is immediately noted that all of the graphs have a similar configuration. This is because at all sites the relative intra-site frequencies were fairly similar. That is, at all sites there were high frequencies of generalized secondary flakes, virtually no blade-like flakes or blades (the horizontal section), high frequencies of broken flakes, and low frequencies of tools. Notable variation occurs between site AU-154 and sites AU-166 and Component II AU-158 with respect to frequency of cortex flakes; between Component I AU-158 and all other sites with respect to micro-secondary flakes and bifacial tools.

Functional Variation -- Based upon site size, artifact density, and a consideration of functional tool types, it seems that the Paine Run sites demonstrate considerable variation, variation which is not readily apparent in the morphological analysis. Both of the larger tested sites (AU-154 and AU-167) yielded a wide range of evidence for activities such as hunting, butchering, lithic manufacture, and woodworking. On the other hand, the two smaller sites (AU-158 and AU-166) had assemblages which

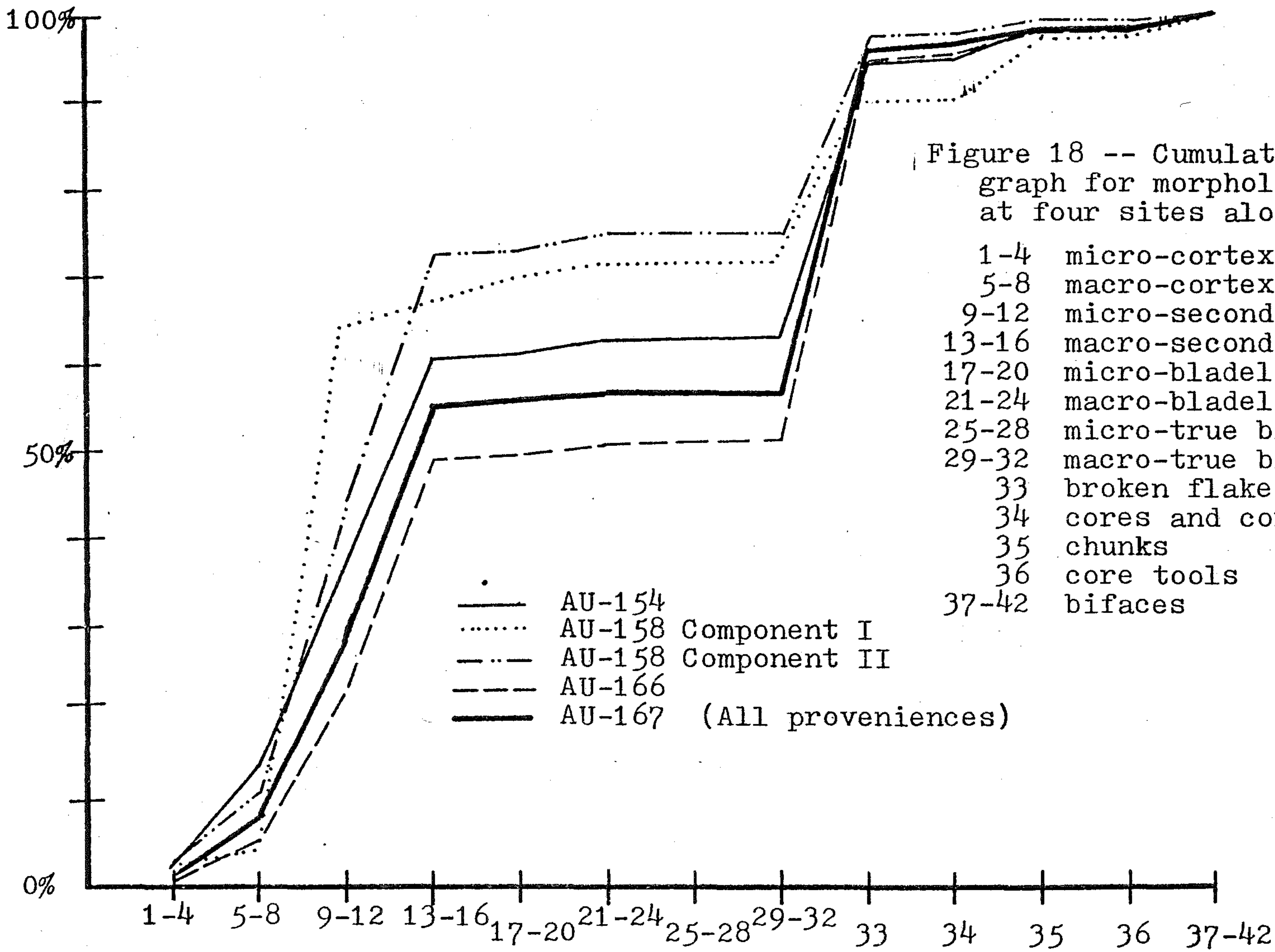


Figure 18 -- Cumulative Frequency graph for morphological categories at four sites along Paine Run.

1-4	micro-cortex flakes
5-8	macro-cortex flakes
9-12	micro-secondary flakes
13-16	macro-secondary flakes
17-20	micro-bladelike flakes
21-24	macro-bladelike flakes
25-28	micro-true blades
29-32	macro-true blades
33	broken flakes
34	cores and core remnants
35	chunks
36	core tools
37-42	bifaces

seemed to be more specialized. At both of these latter sites, there was only minimal evidence for lithic manufacture, while the tools generally indicated hunting activities. It is noted that no evidence was found at any Paine Run sites for plant food processing. This absence can possibly be explained if the plant foods were collected and removed to another location for processing. Also, as noted earlier, the small size of the sample at AU-154 may have missed areas which were used for the processing of these foods.

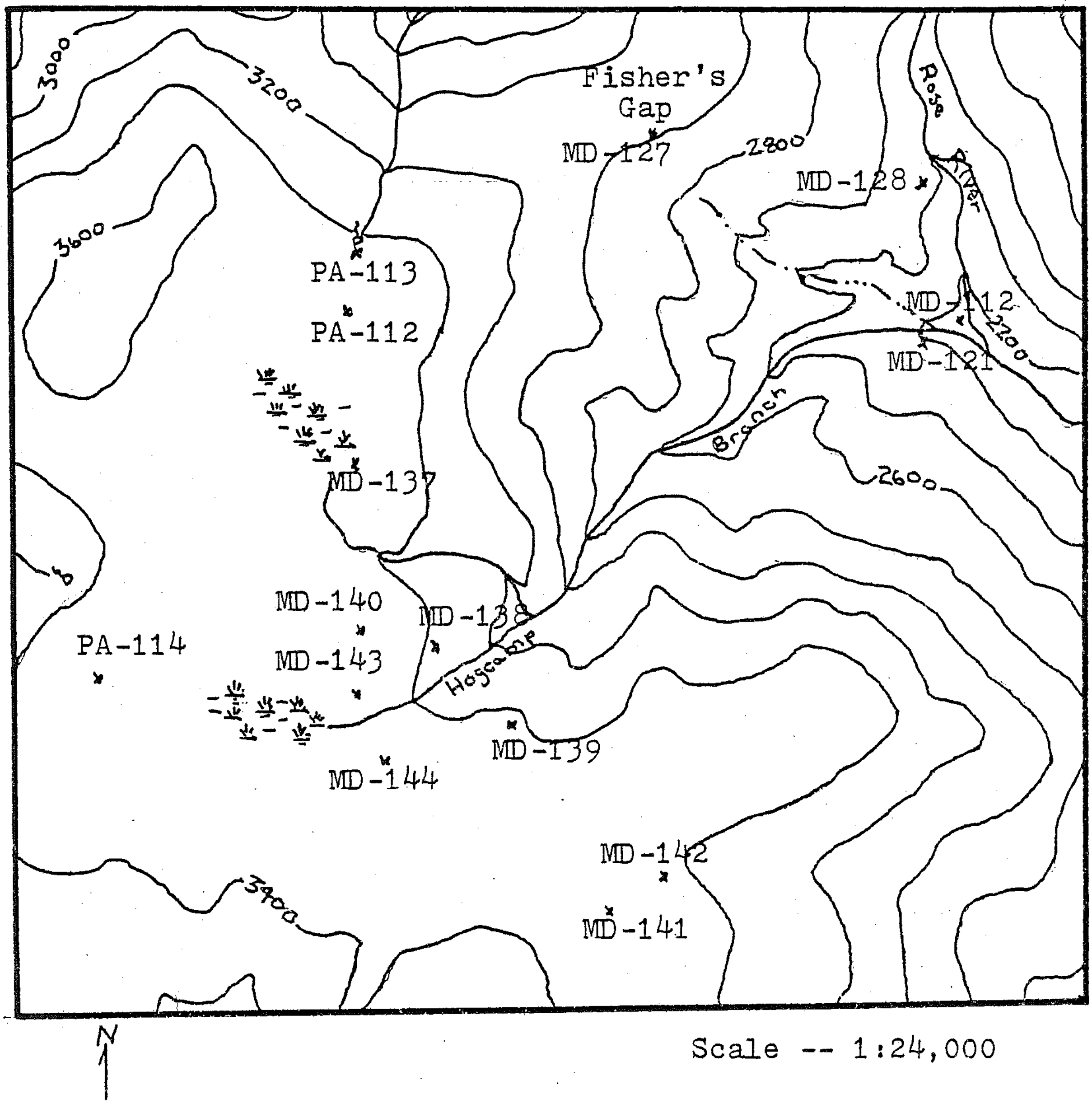
Perhaps the most interesting aspect of the analysis of Paine Run is the potential to define a series of related sites. If, as suggested, AU-154 and possibly AU-167 were seasonally occupied base camps, then it is probable that the small sites which are found along the course of the stream were probably special activity locations. The fact that both AU-158 and AU-166 had high artifact densities does not undermine this interpretation. As mentioned earlier, both of these sites had attributes which made them particularly attractive to prehistoric populations -- shelter at AU-158 and access to a large secondary stream hollow at AU-166. Further intensive survey of the adjacent stream hollows, ridges, and peripheral saddles could shed more light on this enticing possibility.

<u>Big Meadows</u> (Figure 19)

Located in the central section of the Park at an elevation of 3400 feet, Big Meadows is a unique upland basin. The area consists of two bowl-like depressions, each with a marshy spring from which the Hogcamp Branch finds its source. Surrounding these depressions are low elongated ridges overlooking the springs. To the north, the Hogcamp Branch drops swiftly through a series of waterfalls into Dark Hollow, to the east the "meadow" continues toward Stony Mountain, to the west is a precipitous drop to the Shenandoah Valley, and to the south the topography drops gently towards Milam's Gap.

Although there continues to be debate concerning the prehistoric flora of the area, the uniqueness of the landform itself (regardless of the cover) would have made it attractive to various animal species and, therefore, also to hunting groups. If it were, in fact, a grassy meadow this drawing power would have been multiplied as the different ecological situation would have increased the area's carrying capacity.

Locational Pattern -- An intensive survey of Big Meadows resulted in the location of eleven prehistoric sites, shown in Figure 19. Although no definite "pattern" is discernible, it can be noted that the larger sites are clustered near the marshy areas, springs, or streams (specifically, note the locations of PA-112, PA-113, MD-137,



Scale -- 1:24,000

Figure 19 -- Topographic map of Big Meadows showing distribution of sites. Map includes portion of Rose River hollow including sites MD-112, MD-121, MD-127, and MD-128.

Contour Interval -- 200 feet

MD-138, MD-143, and MD-144). The remainder of the sites were positioned around the peripery of the basin and consisted mainly of scattered flakes.

Lithic Materials -- The sites at Big Meadows consisted of mixtures of lithic materials. At both MD-138 and MD-143, as well as other sites only cursorily surveyed, quartzite was dominant, but both quartz and cryptocrystalline were present in small quantities. At PA-113 (see Appendix I, Table 18 for morphological breakdown), however, quartz comprised the largest percentage (47.8%). This mixture of materials denotes probably exploitation of the area by prehistoric groups from both the east and west sides of the mountains.

Morphological Variation -- Figure 20 presents the cumulative frequency graphs plotted for 3 Big Meadows sites. It is clearly evident that their graphs are virtually similar indicating little morphological variation. All have low frequencies of cortex flakes, and though MD-143 is an exception, the other two had relatively high frequencies of bifacial tools.

Functional Variation -- Perhaps the most notable feature of the Big Meadows sites is their consistency with respect to artifact density and site size. All are small sites (considering the amount of habitable land) and have extremely low densities. Both of these factors are

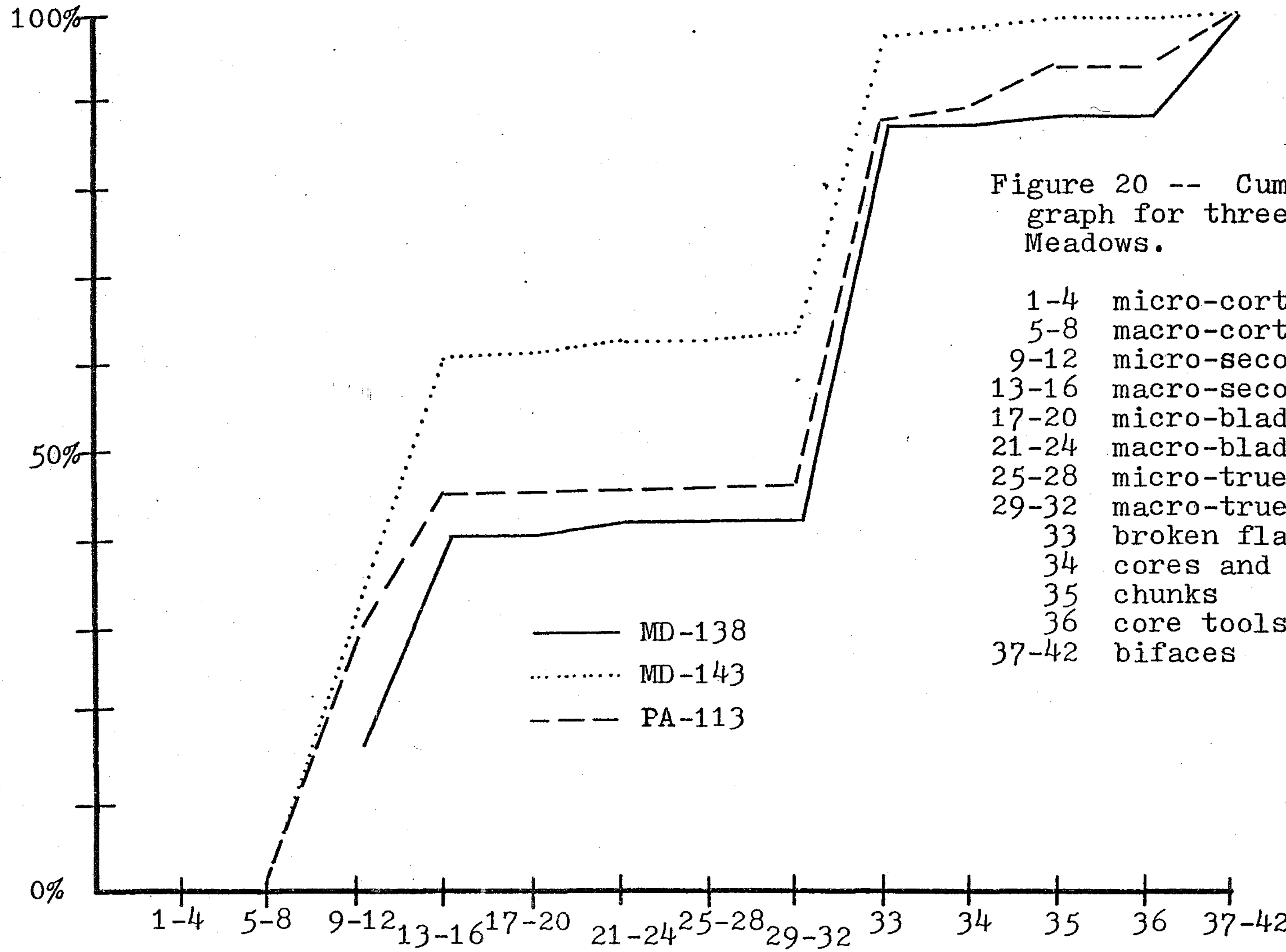


Figure 20 -- Cumulative frequency graph for three sites at Big Meadows.

1-4	micro-cortex flakes
5-8	macro-cortex flakes
9-12	micro-secondary flakes
13-16	macro-secondary flakes
17-20	micro-bladelike flakes
21-24	macro-bladelike flakes
25-28	micro-true blades
29-32	macro-true blades
33	broken flakes
34	cores and core remnants
35	chunks
36	core tools
37-42	bifaces

directly related to site function. Apparently all Big Meadows sites can be classed as temporary hunting/gathering stations. It is in this context that the use of the word "station" rather than "camp" has significant meaning. It is possible that many of these sites were not habitation sites at all, but rather merely a locus of some specific activities which culminated in the deposition of small amounts of materials. Probably none of the three tested sites were this ephemeral, but such sites as PA-114 or MD-140 seem less likely to have been settled for long. These small sites could have been used to butcher kills, lie in wait for animals to approach the springs, or for the collection of floral resources.

Nicholson Hollow (Figure 21)

Located on the eastern slope of the Blue Ridge, Nicholson Hollow is a steep. boulder strewn stream valley drained by the Hughes River. The configuration of the hollow is fan-shaped with several large perennial secondary streams entering the main river along its course through the mountains. Because only locational survey was undertaken here, no consideration can be given to questions of lithic materials, morphological variation, or functional variation. However, it is possible to note a pattern in geographical distribution of sites.

Locational Patterns -- Although only the upper section of

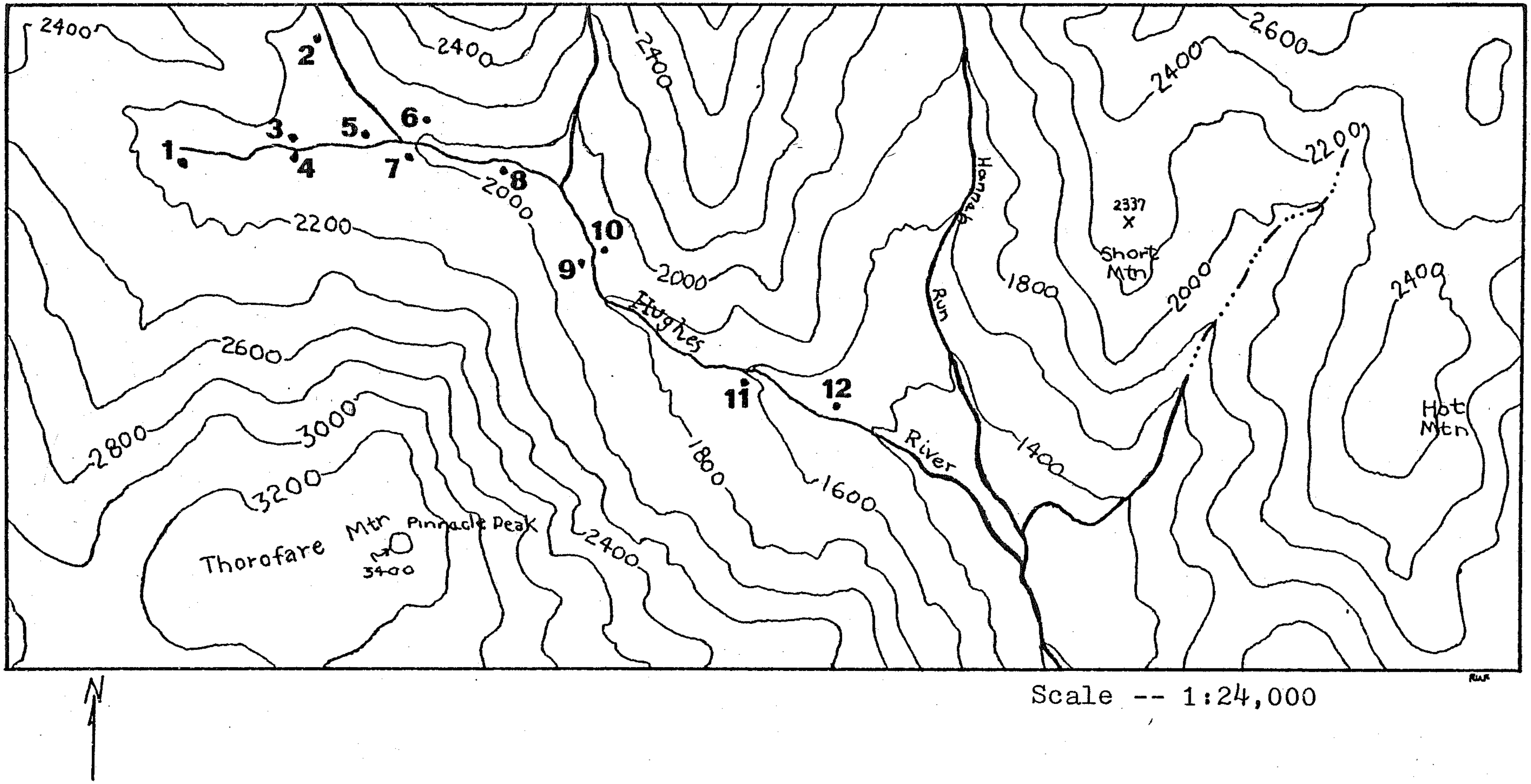


Figure 21 -- Topographic map of Nicholson Hollow showing distribution of sites.

Contour Interval -- 200 feet

1.	MD-122	4.	MD-126	7.	MD-130	10.	MD-133
2.	MD-124	5.	MD-123	8.	MD-131	11.	MD-134
3.	MD-125	6.	MD-129	9.	MD-132	12.	MD-135

Nicholson Hollow was surveyed, a total of twelve sites were discovered flanking the river. The linear distribution of sites is similar to that found in Paine Run, though at the upper reaches, where the hollow "fans" out, the linear pattern breaks down and sites follow the various secondary streams. Generally, two sub-categories of landform provide habitable areas for settlement. Along the length of the stream there are terraces, which vary in size and provide the location for eight of the sites. Generally, the terraces sit a considerable distance above the stream and are often strategically located with respect to small waterfalls and deep pools. In the upper portion of the hollow the land formation is different. There appears to be deposition of material from surrounding highlands. Sites 1 through 4 on Figure 21 are situated on this alluvial fill.

Another feature of the Nicholson Hollow sites is the apparent complementarity of location for several of them. Note that sites 3 and 4, 6 and 7 and 9 and 10 each form pairs of sites on opposite sides of the stream. This situation is certainly suggestive of selective factors possibly related to those areas suitability for settlement or perhaps ecological factors unique to these locations.

Although the sizes and artifact densities were not determined, two of the sites stand out as being very large and having apparently high densities. MD-123 which is located at the confluence of the Hughes River and an unnamed secondary stream has an area in excess of 100 by

100 meters with virtually all surface clearances revealing evidence of prehistoric activities. Lower down the hollow, near the confluence of the Hughes River and Hannah Run, the hollow again widens and may have accumulated alluvial fill. On the broad flat area, adjacent to the Hughes River, MD-135 was located. No measurements were made of the extent of the chipping debris, though it is widely scattered and several clusters were noted. The remainder of the sites were either small (contained by small terraces) or only small areas of concentration were noted.

Chapter VII

Regional Variation

In the following chapter consideration is given to variation between sites throughout the Shenandoah National Park as a region. Moving beyond the bounds of the montane environment, brief consideration is also given to variation between the mountain sites and known sites adjacent to the Park in both the Shenandoah Valley and the Piedmont. This variance is related to possible differential distribution of resources.

The Shenandoah National Park as a Region

As the foregoing chapters have shown, there is noticeable variation in the physical environment of the mountain physiographic zone. Survey of the Park has concentrated primarily on the stream valleys and upland basins.

Hollows -- The distribution of sites in the various stream valleys indicates that there was considerable variation in the types of sites exploiting these areas. Site sizes and artifact densities within the landforms varied, as did the distribution of functionally identifiable artifacts. The location of both large "base" camps and small hunting/gathering stations suggests that the exploitation of the hollows was extensive and further, that the hollows were the primary location for most intensive prehistoric settlement. This situation is easily understood in light of the various attributes of the hollows. These are: (1) there is considerably greater area available in the hollows for settlement; (2) there is a fairly constant supply of water in the streams; (3) the hollows provide easy access to other areas of the mountains; and (4) there was a great variety of potential resources in the moist hollows and adjacent mountain slopes.

Ridges -- Because very few ridge sites are represented in the sample, it is presently impossible to fully evaluate them. It is noted that those ridge sites which are known are all small, probably hunting/gathering stations or transient camps. This also stands to reason due to the unreliability of intermittent springs or the total absence of nearby sources of water.

Upland Basins -- Big Meadows (the only known example of this landform in the Park) was covered in some detail in the preceding chapter. Little variation was noted between sites within the landform and it was concluded that all of the sites there could be classed as small hunting/gathering stations. It seems clear that exploitation of this particular ecological niche continued for several millennia but it was never very intensively inhabited. In order to fully understand this area, it must be considered in relation to associated hollows, gaps, and ridges. For instance, there are interesting possibilities in the relationship between Big Meadows and the Gentle Site. It is likely that Big Meadows was exploited from base camps located in these stream valleys.

Gaps -- Because only one gap site was intensively surveyed (RM-117) it is difficult to fully evaluate their importance in the prehistory of the Blue Ridge. Certainly, their low elevation with relation to adjacent ridges and ease of access up the stream valleys make them ideal for crossing the ridge. All 4 of the gap sites in the sample were small and had low artifact densities indicating that occupation was probably for short periods of time. It is possible that well used foot trails may have crossed the mountains through many of these gaps so that the same sites would have been used by different groups intermittently for several millennia. The chronological data for RM-117 attests to such a long span, while the mixture of lithic materials suggests that groups from both the Piedmont and the Valley settled there.

Peripheral Saddles -- There is notable variation between these landforms, some being large expanses (such as the one at Old Rag) and others being merely a narrow strip of gently sloping land. Because the only intensive survey was at Old Rag it cannot be determined whether there was variation in the sites located in these areas. Although the site at Old Rag (MD-146) was classified as a hunting/ gathering station, the insufficiency of the testing there leaves this interpretation as conjectural. The fact that the limited information from other saddle sites seems to support that interpretation may be seen as partial confirmation. Considerably more research is needed on these areas.

The Shenandoah National Park as a Whole

The point has finally been reached where it is necessary to bring all of these artificially separated areas back together and construct an overall regional picture of the mountain zone, which can be compared to the adjacent regions. Taking a broad overview of the site distribution, it is evident that prehistoric populations may have preferred the moist hollows. It is cautioned, however, that because the survey was oriented towards these landforms there may be an unwarranted bias involved. When it is kept in mind, however, that the hollows were the location of several different types of sites, including base camps, the above interpretation becomes more likely. In addition, the exploitative strategies included resources available throughout the mountains resulting in a scattering of small hunting/gathering stations in all landform categories. Because all other areas of the Park are most easily reached via the stream valleys, it seems evident, based upon the location of the larger base camps in the hollows, that exploitation of ridges, upland basins, and mountain slopes was centrally based from sites adjacent to a reliable water source.

In terms of artifacts, the analysis of the morphological frequencies revealed a generally similar pattern at all of the sites, though significant variation is noted between sites with respect to the categories of cortex flakes, micro-flakes, worked and utilized flakes, and to a much lesser extent, bifacial tools. There is also distributional variation in the types of lithic materials utilized though a general preponderance of the usage of quartzite is noted. This variation was to a certain extent related to the geologic association of the sites (with the site based on quartzite being almost totally quartzite using), though even in areas where other materials may have been more readily available, there was still a high frequency of quartzite.

Finally, a common attribute of all of the Park sites is a very low frequency of finished tools. This factor has led to serious problems with specific functional interpretation of the sites. It is also noted that this feature places all of the sites into an overall class of temporary, perhaps seasonal, camps where activities were varied, but the tools used were either not preserved or carried from the sites. It is assumed that if the site were occupied for longer periods of time that considerably more debris would have accumulated and many more tools found.

The Relationship of Mountain Sites to Adjacent Areas

When shifting the scope of this analysis from the mountain physiographic region to a consideration of the interrelationship of sites in the area which can be called "North Central Virginia", several problems are encountered. In the first place is the previously mentioned paucity of information on sites in these areas. In the Valley, this situation is partially resolved by Holland's work (1960) and Gardner's excavations and research (1974). In the Piedmont, however, there is little published data available. Secondly, the data which are available have not been quantified for easy comparison to Park sites. Third, as with the Park, there is little, if any, reliable data on the environment of the Valley or Piedmont. Carbone's paleo-environmental analysis of the Shenandoah Valley (1976) has certainly contributed an interesting model of environmental variation which is referred to later. Virtually no information is available on the paleo-environment of the Piedmont. Because of these problems the following analysis is necessarily conjectural and general.

Having come to the realization that prehistoric settlement of the Park was probably not long term, i.e. there was no "mountain culture", it is necessary to relate the sites in the mountains to those outside.

In the Shenandoah Valley, Holland (1960) has reported a total of 16 sites bordering the South River and the South Fork of the Shenandoah River. Because these sites are situated close to several areas of the Park which have been surveyed they serve as a useful comparitive sample. Of these 16 sites, 13 were assigned to the "preceramic quartzite using component" with quartzite comprising from 53% (RM-4A) to 85% (RM-8). What is of particular importance is the high frequency of projectile points and blades. Eight of the 13 preceramic quartzite stations had over 30 specimens, and several had much higher quantities. The extremely high frequency of finished tools at these sites can be seen as a major distinction between mountain and valley sites. This is not to say that sites similar to those in the mountains were not found, in fact there are a few sites which, from Holland's descriptions, would seem to fit the definition of temporary hunting/gathering stations. The predominance of the larger, tool bearing sites, however, is interpreted as indicating that most of the preceramic activities were centrally based at large "villages" or base camps.

Holland's sample included only 3 ceramic sites. Because these sites were only surface collected, none could be easily defined as agricultural villages, but rather seem to be later manifestations of the same sort of base camps or hunting/gathering stations typical of the preceramic sites. It is probable that Holland's survey missed the villages which have been reported farther north in the Valley (e.g. The Keyser Form Site in Page County, Virginia) and there is little reason to assume that they were not also located to the south.

For the Piedmont area to the east of the Blue Ridge, the University of Virginia's statewide survey files contain information on 34 sites in the nearby vicinity of the Shenandoah National Park. Of these, 28 are identified as "Archaic" camps and consisted primarily of thin scatters of quartz and greenstone artifacts. Detailed information on the artifacts from a majority of these sites was not readily available (most collections are presently held by the Smithsonian Institute). Two of the sites were classified as Archaic "villages" or base camps, and both are noteworthy for their close proximity to the mountain zone. AB-137, located in Sugar Hollow along the Moorman's River, and MD-150, along the banks of the Rapidan River just outside the present Park boundary, are both large sites yielding large quantities of projectile points and blades. The predominant lithic material at these two sites was quartz, though smaller percentages of quartzite and cryptocrystalline rock (neither available to the east of the Blue Ridge) indicate transmontane movement or trade. The location of these two large sites is very interesting, particularly in light of the small size of other Archaic sites in the Piedmont. In fact, the sites are strategically situated so that centrally based hunting and gathering activities could easily exploit both mountain and piedmont resources.

Only 4 of the sites in the sample were associated with the later ceramic, or Woodland, period. All of these were small camps, though MD-107 (Henshaw Rockshelter: Holland and Graves 1951) yielded 164 points and blades. The small number and size of these Woodland sites could be an indication of considerably less utilization of the Piedmont. This seems rather unlikely however, and the lack of the later village sites is probably merely a fluke of the sample available. In particular, it is noted that Jefferson's mound excavations were conducted along the Rivanna River, not far from the Blue Ridge, and it is probable that a village was associated with this site.

The Environmental Perspective (Refer to Table 6)

The paucity of data on the environment for the Shenandoah Valley, the Blue Ridge, and the Piedmont make interpretation more conjectural than based in fact. Carbone's research in the Valley (1976) posits several environmental changes which are of particular note. Specifically, when dealing with the "Archaic" period, Carbone has presented a reconstruction of the Valley environment in relation to the uplands (pp. 190 and 191). During the Atlantic/Sub-Boreal Transition, which roughly corresponds to the Middle to Late Archaic (ca. 6500 - 1000 BC), the ecological situation is of some importance. According to these findings, the period saw a general increase in temperature and a decrease in precipitation (1976:106). Associated with this, Carbone hypothesizes a valley environment of mesic forests in the floodplains of the Shenandoah River, with open grassland on the terraces, while in the mountains Oak-Hickory forests are thought to have flourished. Such an environmental situation could have great impact on the explanation of the distribution of Middle and Late Archaic sites. In fact, it is most conceivable that a pattern of centrally based transhumance was associated with this ecological situation. If in fact, the valley and the mountains did have such drastically different environments, then the exploitation of the montane resources is easily understood. In fact, it is not difficult to picture the pattern of settlement. Particularly during the late summer and fall months, the mountains would have been particularly attractive as both the acorns and hickory nuts would be ripe and faunal species, such as white-tailed deer and bear would be at maximum weight after a season of plentiful food. It is also possible that these animals would have been more abundant in the mountains where food (nuts, berries, bark) would have been most plentiful.

The distribution of sites by elevation may also be evidence for this situation. If as Carbone hypothesizes, this drier period was associated with open grassland on the fringes of the valley and perhaps at the higher elevations (meadow conditions at Big Meadows?) then the lower elevations in the mountains would have been fringe areas which would probably have supported a wider range of resources. In fact, the deer and other smaller animal species (e.g. rabbit) prefer these fringe zones, and many predatory species are also located in such areas.

Environmental data for the later period is even less precise, though increased precipitation and decreased temperatures <u>may</u> have increased forest conditions in the valley and thus lessened (but not eliminated) the importance of the mountains.

Unfortunately, no data on the paleo-environment of the Piedmont is available. It is probable, however, that a similar situation may have obtained. The generally dissected, hilly piedmont would probably have been more of a mosaic pattern than in the valley with grassland on the river terraces and forest on the slopes. If such a pattern was extant in the Piedmont, it may explain the wide dispersal of Archaic "camps" throughout the area, and perhaps help to explain the apparent lack of sites in the mountains which showed evidence of utilization by Piedmont populations. It is noted, however, that the sites dealt with in this report may not be representative of the exploitation of the eastern side of the Blue Ridge.

It becomes evident from this analysis that there is greater explanatory value in taking a broad regional viewpoint than in trying to interpret the findings from the mountain sites in their own rights. In fact, it is virtually impossible to fully comprehend the cultural-ecological motivations of the prehistoric groups solely on the basis of data from either of these areas without consideration of the total settlement and subsistence patterns of the prehistoric populations.

Chapter VIII

Conclusions

Two and a half years ago, when systematic archaeological research of the Shenandoah National Park began, the discovery of a small scatter of flaking debris was met with great enthusiasm and interest. As the work continued, however, it became evident that prehistoric exploitation of the montane region was extensive and that the research design had to be based upon the formulation of an explanatory and predictive model of prehistoric settlement. In these concluding pages there are three basic aims: (1) to present a capsule summary of the research to date by starting with the fundamental facts which are available and providing an interpretation of them, (2) to briefly review the chronological placement for Park sites, and (3) to state succinctly the nature of the settlement model which is suggested by these data and to suggest methods for testing its validity.

Summary

(1) There were prehistoric people in the mountains. This fact has been well established by the discovery of the material remains of their activities. Starting from this very basic premise, the purpose of continued research is to establish when, where, and why they were there.

(2) These people chipped stone tools and left the debris behind. It is the activity of chipping stone which

has resulted in the material evidence for prehistoric utilization of the mountains. In order to analyze this debitage a system of classification based upon the physical attributes of the objects was set up. It was assumed that different activities would have resulted in the deposition of debris which had different characteristics which could be quantitatively expressed. This assumption proved to be only partially valid since morphological frequencies for Park sites were all roughly similar, though certain characteristics did demonstrate enough difference to warrant functional segregation. It has become clear that extensive functional comparison should be pursued in the future.

(3) The type of stone chipped varied. Basically, four types of stone were utilized, quartzite, quartz, cryptocrystalline, and greenstone. The difference in geographical distribution of sources of these materials and their differing utilization by prehistoric man suggests an interaction in the mountains of peoples from the east and west sides of the Blue Ridge.

(4) The location of stone chipping activities varied. It was determined that the loci of chipping activities were not randomly distributed within the mountain zone. Rather, the debris is found clustered in areas designated "sites". These sites were located only in areas which were defined as "potentially habitable". The mountain region was divided into 7 categories of potentially habitable landforms, and it was discovered that sites were most often

associated with hollows and perennial streams, though not exclusively.

(5) <u>The size of sites varied</u>. Site size, often a function of the area of the potentially habitable landform, is considered a dependent variable. Several factors contribute to difference in site size: (1) the size of the group occupying the area; (2) the activities conducted at the site; (3) the length of time spend at the site; and (4) the frequency of occupations, i.e. the number of times the site was utilized.

(6) <u>The density of chipping debris varied</u>. Density was defined as the number of artifacts occurring in the equivalent of one cubic meter of soil. Densities at Park sites varied from 128 (RM-122) to 5320 (AU-158, Component I). As with site size, artifact density was treated as a variable dependent upon several factors including (1) the activities performed at the site; (2) the length of a single occupation; (3) the number of times which a site was occupied, (4) population size, and (5) level of sociocultural complexity.

When taken together with variation in site size, sites with high artifact density and large size were interpreted as the locus of numerous activities by large groups of people and were defined as "base camps". On the other hand, small sites with low density were interpreted as hunting/gathering stations, probably occupied for short periods of time by small groups.

(7) The depth of chipping debris varied. It was discovered that there was variance in the depth of the sites. Though most were restricted to the upper 20 cm, several were shallower and others significantly deeper. The depth of a site was related to (1) the span of time during which a site was utilized and (2) the pedologic processes at the site. Given a suitable combination of these factors, chronologically distinct occupations at a site may be separated vertically. Only one site in the sample (AU-158) demonstrated notable stratification, though another (MD-143) had a depth suggesting a long period of use.

(8) Stone tools were manufactured. The end product of chipping activities was the production of stone implements. There is evidence that several of the sites were used for the manufacture of stone tools; whereas, others yielded evidence that the tools were brought to the site either finished or nearly finished and ready for use.

(9) The shapes of these stone tools varied. The noted differences in stone tool morphology is related to two factors: (1) chronological variation, i.e. tool forms varied through time; and (2) functional variation, i.e. different shaped tools were often utilized for different purposes. In addition, varying frequencies of the flake assemblages had been utilized without modification and others had been slightly retouched so as to create a working edge.

Determination of the specific function of these tools was difficult (or impossible in some cases), though traditional tool categories were encountered, such as knives, scrapers, axes, and projectile points.

(10) Not all sites had tools. A high percentage of the surveyed sites did not yield any completed tools. This was interpreted as meaning that the tools which were used or made at the site were removed when the occupation ended or that the tools were of materials which were not preserved, such as bone or wood.

It was further noted that the frequency of tools and their interpreted functions varied from site to site. When correlated with the attributes of geographic location, site size, artifact density, and proportional frequency of morphological categories, the frequency of identifiable tools aided in clarifying questions of site function and site type.

(11) The frequencies of tools at all Park sites was low in relation to known sites outside of the mountains. The significant difference between Park sites and Valley or Piedmont sites was interpreted as evidence for central based transhumance, with late Summer and Fall exploitation of mountain resources. Because the actual data used to make this interpretation are very tenuous, considerably more research is needed to validate it.

<u>Site Chronology</u> -- When the conjectural temporal span for prehistoric sites in the Park are plotted (Figure 22) it is seen that eight of the sites fall into the period from ca. 5000BC to ca. 1000BC. This is then followed by an apparent gap in the record, and four sites can be placed in the period from ca. AD 500 to AD 1600. It was suggested in the section on Regional Analysis (Chapter VII) that this temporal distribution may be related to climatic factors, with the Archaic Park sites associated with the warm, dry period of the Atlantic and Sub-Boreal climatic episodes. The later site, however, cannot be explained with such a line of reasoning. Evidence from late period Woodland sites to the east of the Blue Ridge, for instance the Henshaw and Elvin Graves Rockshelters, clearly demonstrate that populations from the west were crossing the mountains. Holland has interpreted these sites as associated with an elaborate "seasonal round" and classes the small sites to the east as temporary, seasonally occupied camps (Holland 1967). Such a model corresponds nicely with the evidence for the middle and late Archaic, and in this respect sheds interesting light on the Gentle Site, which could easily be seen as a late Summer and Fall base camp, possibly associated with the horticultural villages to the west. From this location, groups would be able to exploit both mountain and Piedmont resources. Once again, further survey of the areas in question (Fisher's gap, Rose River,

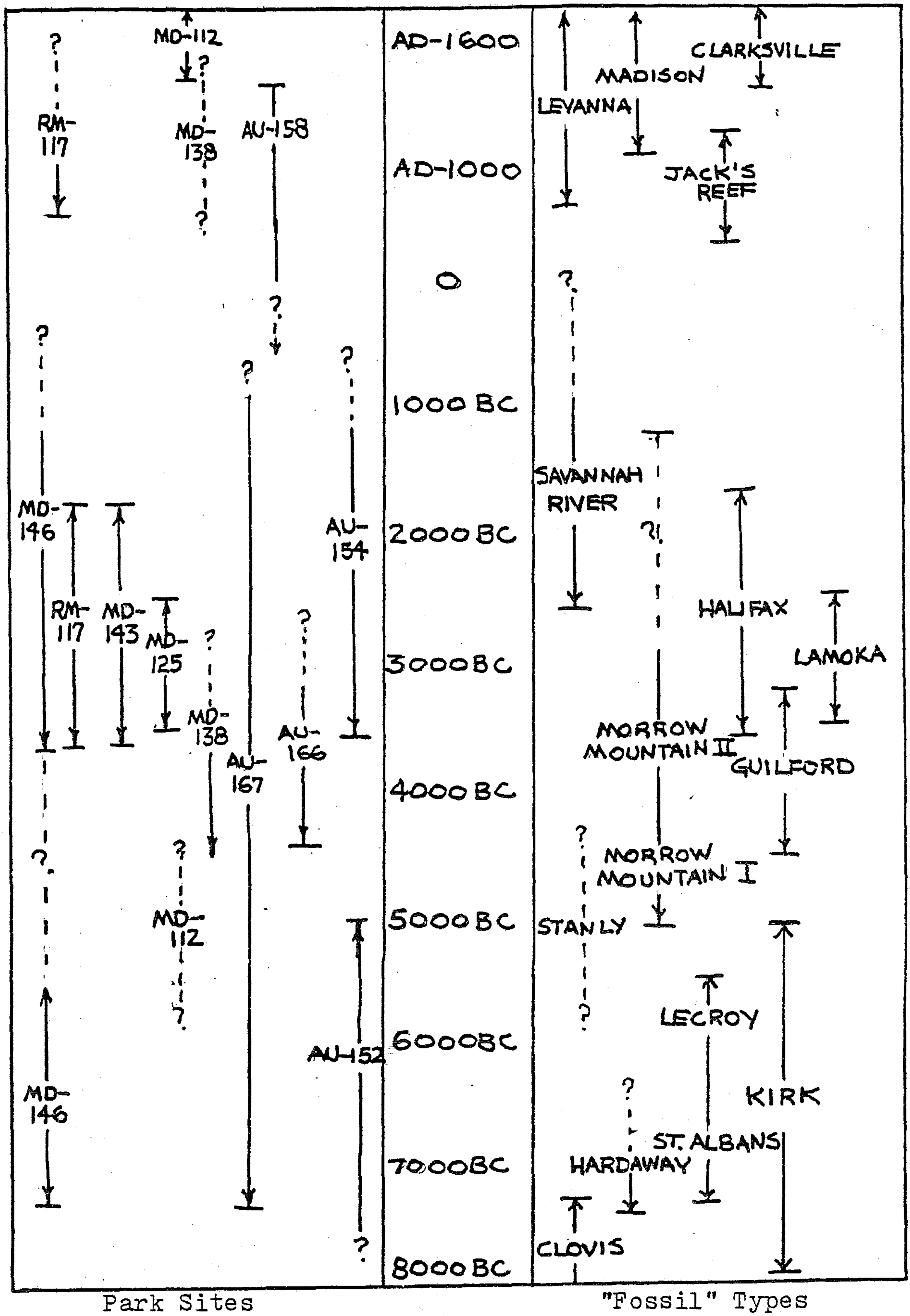


Fig. 22--Summary of Park Site Chronology

and the floodplains of the Robinson River) could aid in clarifying this possibility.

The problem with the chronological view presented, however, is the gap between the Late Archaic and the Woodland periods. It seems most likely that the mountains were being exploited during this period, so the question becomes one of the accuracy of the temporal placements. As noted in the Introduction, the Transitional Period is the least understood segment of Virginia prehistory. It is obvious then that there is a need to amass further data, through extensive site excavation, in order to fill in this gap in the picture.

Settlement System -- The overall low density of material and low frequency of finished tools from the Park sites argues for a careful evaluation of the settlement system. Based upon a rough comparison of Park sites with known sites adjacent to the Blue Ridge, the hypothesis was made that the mountain sites are best interpreted as intermittently occupied late summer and Fall camps. It seems likely that the large, relatively high density sites (such as AU-154 and MD-112, and perhaps AU-167 and MD-146) may have served as base camps from which groups from surrounding Valley or Piedmont settlements based hunting and gathering activities. In this model of settlement, therefore, a broad regional survey would have as a major aim the location and delineation of associated "special activity" camps, specifically hunting/gathering stations. Such sites were most likely used only intermittently by small bands and would not be expected to yield large quantities of artifactual material. Because of this minimal impact on the environment, the remains of such sites are extremely fragile and subject to serious disturbance, through both natural processes (mainly erosion) and non-systematic collection of "arrowheads" by Park visitors. The removal of a single projectile point from some of these small sites <u>may</u> remove the <u>only</u> diagnostic evidence available. It is therefore suggested that the preservation of all sites, from the tiny campsite to the large base camps, become an integral part of the Park's interpretation programs.

The results of this analysis indicate that the most useful means for explaining site locations is to take a broad regional outlook, encompassing both the mountains and their surrounding physiographic regions. This overview is critical because the populations utilizing the montane zone were dependent upon the resource potential of both regions. The exploitation of the montane areas was temporary and probably seasonal. The choice of sites was limited by the rugged topography of the mountains to areas bordering streams in hollows, level ridge tops, broad upland basins, gaps, peripheral saddles, and foothills. It is further hypothesized, based upon survey data, that the most intensive occupation occurred in the stream valleys where there were abundant resources, plentiful water supplies, and large areas of habitable land.

Prospects and Recommendations

Two and a half years of detailed research into the cultural resources of the Shenandoah National Park have culminated in the preparation of the present report. The "conclusions", although supported by the available data, need to be tested through a continuation of the field research. Several problems with the currently available data need to be overcome, and it is the opinion of this author and others at the Laboratory of Archaeology, that we are now able to cope with these shortcomings, both in terms of methods, analysis, and interpretation. The three major problems to be dealt with are: (1) an inadequate local chronology, (2) an inadequate sampling of the environmental strata, and (3) problems with conducting field survey due to factors of preservation, vegetation, and topography. Each of these problem areas must be dealt with in any future work. In the remainder of the paper, suggestions are made for conducting this work. It is envisioned that the recommended field work could be accomplished in 8 to 12 months with analysis of material and report preparation taking another 6 to 8 months.

Phase I -- Excavations at Paine Run Rockshelter (AU-158)

In order to establish a local chronological sequence, the excavation of AU-158 stands out as the best side for obtaining absolute dates. The limited area provided by the shelter and the demonstrated cultural stratification have already adequately pointed out the shelter's potential in this regard. The proposed work would consist of partial excavation of the fill beneath the rock overhang. The first stage of this project would entail stabilization of the rock overhang, for reasons of safety during the excavation. In addition, because the shelter is easily accessible to potential pot-hunters, a security fence will have to be constructed around the site. Throughout the excavation, the area will have to be closely guarded to protect it from wanton destruction.

After these initial problem areas have been taken care of, a detailed topographic map of the site will be made using contour intervals of 10 cm beneath the rock overhang and 25 cm in the surrounding areas. The one meter test square, 0R0, will be re-excavated and the soil profiles examined by a qualified pedologist. A "floating grid" -- that is, a grid system suspended from the roof of the shelter -- will be used so that excavation can be in large blocks rather than as individual one-meter square. The one-meter units would, however, remain as basic horizontal control units, with all artifacts recorded by square and level. All artifacts would be plotted on scale maps in the field, given field catalog numbers, and bagged separately for transport to the lab. In addition, soil samples from each level of each one-meter unit would be taken for both sediment analysis and flotation for charcoal, bone, seeds, pollen, and miniscule stone chips. Vertical control would be established through the use of 5 cm arbitrary levels measured from an established datum. In addition, obvious natural stratigraphy (particularly where there are features) would be followed where available, to avoid the mixing of components caused by the use of arbitrary levels. All excavation information will be recorded in minute detail so that as much information as possible will be available for analysis.

There are three major potentials for the rockshelter excavation. (1) There is a high probability that features, such as hearths and storage pits, will be encountered. The recovery of charcoal, bone, and other organic matter could be dated by Carbon-14 methods, and when these dates are associated with projectile point and other tools could be used to establish a local chronological sequence which could be applied, specifically, to Paine Run sites, but also, by extrapolation, to other areas of the Park. (2) There is a possibility that due to the protection afforded by the shelter and the accumulation of fill, that organic material may have been preserved. The preservation of bone, seeds, and nuts would aid in determing the resource targets of the populations and, perhaps, yield information on the seasons in which the shelter was occupied. Under exceptionally ideal conditions other aspects of material culture may also have been preserved, such as bone and wood tools, basketry, fabrics, and leather.

(3) Analysis of the soil in the shelter could be used to reconstruct the recent geologic history of the area. Correlation of this information with Carbon-14 dates, cultural deposits, and pollen analysis would provide a useful framework for reconstructing man-land relationships through time.

Phase II -- Regional Survey

Data recovered from the Park sites to date indicate that there is variation between sites which may be related to geographic location, hydrologic associations, geologic association, and elevation. In order to fill in the gaps in the present data, there is a need to expand the current information through a program of continued areal survey. Two alternatives are considered.

Alternative I -- In reviewing maps of the Park, it was noticed that a 5-mile wide transect would encompass a number of environmental strata. Thus, for this program, it is suggested that a series of three five-mile wide transects be superimposed across the Blue Ridge. Originally, it was thought that this could be done by imposing transects the entire length of the Park and then randomly selecting three for testing. It was then realized that such a random method would not be suitable, particularly in light of the politically defined boundaries of the Park.

Specifically, the transects chosen are in areas where the Park encompasses a major portion of at least one drainage system.

One five-mile transect was selected from the Northern, Southern, and Central sections of the Park, in order to provide adequate geographic sampling. The method proposed would be to begin with a detailed analysis of maps, aerial photographs, geology, landforms, streams, springs, and known archaeological sites. From this information, the environmental strata would be delineated and quantified. Field survey would be undertaken by sampling of these strata. The field methods proposed for the survey would be to place a test pit every 5 meters (the minimal unit of occupation) along transect lines in areas deemed to be "potentially habitable", all other areas would be surveyed by clearances of ground cover at regular intervals. A test pit would consist of five-shovels full of soil passed through a 1/4 inch mesh. Each transect line would be plotted on both the USGS topographic maps (7.5 Minute Series) and on scale drawings made in the field. Artifacts recovered from these test pits would be plotted on these drawings so that the site scatters would be properly recorded. In order to obtain comparable artifact samples, the use of one-meter test squares is suggested. These squares may vary in depth but should be <u>at least</u> 40 cm deep. The actual number and placement of these tests would be determined on a site by site basis, keeping in mind the need to test the range of variation. Accurately sketched maps of the area related to some permanent natural feature would also be made.

The major advantage of such a method is that it provides natural units for study. Each drainage system would be dealt with as a unit so that locational patterns of site distribution could be determined. It is conceivable that such a survey technique would result in the location of all types of sites and through a detailed analysis reveal the overall settlement pattern.

In the Southern section a five mile transect running from Brown's Gap north the Pinefield Gap would include the whole of Big Run, most of Ivy Creek, 7 minor secondary streams not associated with Big Run or Ivy Creek, 3 gaps, 5 ridges, 10 peripheral saddles, and a large area of foothills at the lower end of Big Run, only 1 1/4 miles from its confluence with the South Fork of the Shenandoah River. Geologically, the transect encompasses large areas of both Erwin-Antietam and Hampton Formations and Cactoctin greenstones.

In the Central Section an area between Betty's Rock and The Pinnacle Overlook was chosen. Although the western escarpment is very steep and the 5 hollows are truncated by the Park boundary, to the east the transect includes the entire Hughes River drainage area and a large portion of White Oak Canyon. In addition, there are 5 peripheral saddles (Old Rag included--see MD-146), 2 gaps, and 4 large ridges. The entire transect is based on the Pedlar Formation, Old Rag Granite, or Catoctin greenstones, with a thin band of the Swift Run Formation along the crest of the Blue Ridge.

A transect from Beahm's Gap north the Hogback Overlook was chosen in the Northern section. This area includes several major drainages: East Fork, Dry Run, and Jeremy's Run on the west and the North Fork of the Thornton River, Piney River, and Keyser Run on the east. In addition, there are 5 ridges, 2 gaps, and 7 peripheral saddles. Though a majority of the area is on the Catoctin Formation, the transect includes both Hampton, Erwin-Antietam, and Weverton Formations on the western side and the Pedlar Formation to the east.

Alternative II -- It is probably clear that the major disadvantage of the above proposal is the magnitude of the plan. It would be unreasonable to assume that such a project could be done fully within only 6 to 8 months of field work. Because time also means money, this second alternative is offered. Actual field methods would be the same as covered in Alternative I but the areas surveyed would be more limited. Basically, this alternative entails the expansion of the present surveys by completion of field investigation of Paine Run, Big Meadows, Nicholson Hollow, and Old Rag.

Completion would encompass the intensive survey of all areas within the drainage basins including ridges, saddles, gaps, slopes, and foothills, as well as the already surveyed areas. It may have been noticed that Alternative I by-passed Big Meadows which has been determined to be extremely important. By this proposal, the complete survey of Big Meadows, including adjacent areas of the Hogcamp Branch, Rose River, Mill Prong, Hawksbill Creek, Tanner's Ridge, Milam's Gap, and Fisher's Gap would be accomplished.

The major advantage of this method is in terms of time and cost. The areas involved are considerably smaller than Alternative I and, perhaps most important, they are areas already familiar to Laboratory of Archaeology personnel. The major disadvantage is in terms of the adequacy of the sample. Alternative I provides for survey of virtually all possible environmental strata (with the important exception of Big Meadows) and would yield data which could be used to reliably predict the locations of sites in the remainder of the Park, and to make population estimates. Alternative II answers these same questions but to a much more limited extent as it would be hampered by a geographical bias to the Southern and Central sections and, particularly in the Big Meadows area, by the truncation of the lower ends of the hollows.

Whichever alternative is chosen (or even some combination of the two) the results would be of major importance to the understanding of man-land relations during prehistoric times. Whereas two and a half years ago the Blue Ridge was seen as an area of only marginal concern in the prehistory of Virginia, it now emerges as an integral component of an elaborate subsistence system. Study of, and hopefully understanding of, this system is the main goal of the research. The work reported in the foregoing paper has laid the basic foundation for our understanding and has shown the way for future research.

APPENDIX I

Frequency Distribution Tables for Selected Sites

LABORATORY OF ARCHAEOLOGY
UNIVERSITY OF VIRGINIA DEPARTMENT OF ANTHROPOLOGY

PROJECT- SHENANDOAH NATIONAL PARK

TABLE 1

FREQUENCY DISTRIBUTION FOR ALL PROVENIENCES- AU154

	PRIM-CORT MICRO				PRIM-CORT MACRO				GEN-SECND MICRO				GEN-SECND MACRO				BLADE-LIKE MICRO			
	WKD	UTL	NON	UNK	WKD	UTL	NON	UNK	WKD	UTL	NON	UNK	WKD	UTL	NON	UNK	WKD	UTL	NON	UNK
QRTZT	1	5	33	2	4	30	187	21	0	21	382	21	3	59	372	48	0	0	5	0
QRTZ	0	0	0	0	1	0	1	0	0	0	7	1	0	0	2	0	0	0	0	0
CRYPTO	0	1	9	0	0	1	0	0	1	10	56	2	1	7	12	0	0	2	0	0
GRNSTN	0	0	3	0	0	0	3	0	0	0	0	0	0	0	2	2	0	0	0	0
OTHER	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
TOTAL	1	6	45	2	5	31	191	21	1	31	445	24	4	66	388	50	0	2	5	Q

	BLADE-LIKE MACRO				TRUE BLADE MICRO				TRUE BLADE MACRO								BIFACIAL TOOLS					
	WKD	UTL	NON	UNK	WKD	UTL	NON	UNK	WKD	UTL	NON	UNK	BROK UNID	CORE	CHNK	CORE TOOL	WHL	BRK IDT	FRG	PNT	MID	BSE
QRTZT	0	9	25	3	0	0	0	0	0	0	0	0	641	14	30	3	5	6	10	3	1	5
QRTZ	0	0	0	0	0	0	0	0	0	0	0	0	5	0	8	0	1	0	1	0	0	0
CRYPTO	0	0	2	0	0	0	1	0	0	1	0	0	27	4	32	0	0	0	0	2	0	0
GRNSTN	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
OTHER	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
TOTAL	0	9	27	3	0	0	1	0	0	1	0	0	673	18	70	3	6	6	11	5	1	5

	TOTALS	PERCENT	PERCENT RANGE
QRTZT	1949	90.357	89.379- 92.336
QRTZ	27	1.252	.709- 10.000
CRYPTO	171	7.928	0.000- 9.001
GRNSTN	10	.464	0.000- .540
OTHER	0	0.000	0.000- 0.000
TOTAL	2157	100.000	

PRIM-CORT=PRIMARY-CORTEX
GEN-SECND=GENERAL-SECONDARY
BROK UNID=BROKEN-UNIDENTIFIED
FRG=FRAGMENT
WKD=WORKED
UTL=UTILIZED
NON=NONWORKED/NONUTILIZED
UNK=UNKNOWN
CHNK=CHUNK
WHL=WHOLE
BRK IDT=BROKEN-IDENTIFIED
PNT=POINT
MID=MIDSECTION
BSE=BASE

LABORATORY OF ARCHAEOLOGY
UNIVERSITY OF VIRGINIA DEPARTMENT OF ANTHROPOLOGY

PROJECT- SHENANDOAH NATIONAL PARK

TABLE 2

FREQUENCY DISTRIBUTION FOR ALL PROVENIENCES- COM I

	PRIM-CORT MICRO				PRIM-CORT MACRO				GEN-SECND MICRO				GEN-SECND MACRO				BLADE-LIKE MICRO			
	WKD	UTL	NON	UNK	WKD	UTL	NON	UNK	WKD	UTL	NON	UNK	WKD	UTL	NON	UNK	WKD	UTL	NON	UNK
QRTZT	0	0	0	1	0	1	4	0	0	1	53	1	0	3	15	0	0	1	2	0
QRTZ	0	0	0	0	0	0	0	0	0	0	17	0	0	0	0	0	0	0	1	0
CRYPTO	0	0	20	0	0	0	9	0	0	5	399	1	0	0	5	0	0	0	19	0
GRNSTN	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
OTHER	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
TOTAL	0	0	20	1	0	1	13	0	0	6	469	2	0	3	20	0	0	1	22	0

	BLADE-LIKE MACRO				TRUE BLADE MICRO				TRUE BLADE MACRO								BIFACIAL TOOLS					
	WKD	UTL	NON	UNK	WKD	UTL	NON	UNK	WKD	UTL	NON	UNK	BROK UNID	CORE	CHNK	CORE TOOL	WHL	BRK IDT	FRG	PNT	MID	BSE
QRTZT	0	0	2	0	0	0	0	0	0	0	0	0	34	1	2	0	0	1	1	2	0	0
QRTZ	0	0	0	0	0	1	0	0	0	0	0	0	7	0	6	0	1	0	0	1	0	0
CRYPTO	0	0	8	0	0	0	1	0	0	0	0	0	108	3	44	0	0	1	6	4	2	4
GRNSTN	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
OTHER	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
TOTAL	0	0	10	0	0	1	1	0	0	0	0	0	149	4	52	0	1	2	7	7	2	4

	TOTALS	PERCENT	PERCENT RANGE
QRTZT	125	15.664	10.662- 20.992
QRTZ	34	4.261	.735- 8.779
CRYPTO	639	80.075	70.229- 88.603
GRNSTN	0	0.000	0.000- 0.000
OTHER	0	0.000	0.000- 0.000
TOTAL	798	100.000	

PRIM-CORT=PRIMARY-CORTEX
GEN-SECND=GENERAL-SECONDARY
BROK UNID=BROKEN-UNIDENTIFIED
FRG=FRAGMENT
WKD=WORKED
UTL=UTILIZED
NON=NONWORKED/NONUTILIZED
UNK=UNKNOWN
CHNK=CHUNK
WHL=WHOLE
BRK IDT=BROKEN-IDENTIFIED
PNT=POINT
MID=MIDSECTION
BSE=BASE

PROJECT- SHENANDOAH NATIONAL PARK

TABLE 3

FREQUENCY DISTRIBUTION FOR ALL PROVENIENCES- COM II

	PRIM-CORT MICRO				PRIM-CORT MACRO				GEN-SECND MICRO				GEN-SECND MACRO				BLADE-LIKE MICRO			
	WKD	UTL	NON	UNK	WKD	UTL	NON	UNK	WKD	UTL	NON	UNK	WKD	UTL	NON	UNK	WKD	UTL	NON	UNK
QRTZT	0	0	38	1	1	10	100	6	0	13	459	6	1	33	367	24	0	0	8	0
QRTZ	0	0	0	0	0	0	0	0	0	0	6	0	0	0	2	0	0	0	0	0
CRYPTO	0	0	1	0	0	0	0	0	0	2	18	0	0	0	0	0	0	0	0	0
GRNSTN	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
OTHER	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
TOTAL	0	0	39	1	1	10	100	6	0	15	483	6	1	33	369	24	0	0	8	0

	BLADE-LIKE MACRO				TRUE BLADE MICRO				TRUE BLADE MACRO								BIFACIAL TOOLS					
	WKD	UTL	NON	UNK	WKD	UTL	NON	UNK	WKD	UTL	NON	UNK	BROK UNID	CORE	CHNK	CORE TOOL	WHL	BRK IDT	FRG	PNT	MID	BSE
QRTZT	0	5	22	1	0	0	0	0	0	0	2	0	331	2	25	0	0	0	1	3	0	1
QRTZ	0	0	3	0	0	0	0	0	0	0	0	0	5	0	0	0	0	1	0	0	0	0
CRYPTO	0	0	0	0	0	0	0	0	0	0	0	0	2	1	4	0	1	0	1	1	0	0
GRNSTN	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
OTHER	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
TOTAL	0	5	25	1	0	0	0	0	0	0	2	0	338	3	29	0	1	1	2	4	0	1

	TOTALS	PERCENT	PERCENT RANGE
QRTZT	1460	96.817	90.268-100.000
QRTZ	17	1.127	0.000- 5.000
CRYPTO	31	2.056	0.000- 6.376
GRNSTN	0	0.000	0.000- 0.000
OTHER	0	0.000	0.000- 0.000
TOTAL	1508	100.000	

PRIM-CORT=PRIMARY-CORTEX
WKD=WORKED
CHNK=CHUNK
PNT=POINT
GEN-SECND=GENERAL-SECONDARY
UTL=UTILIZED
WHL=WHOLE
MID=MIDSECTION
BROK UNID=BROKEN-UNIDENTIFIED
NON=NONWORKED/NONUTILIZED
BRK IDT=BROKEN-IDENTIFIED
BSE=BASE
FRG=FRAGMENT
UNK=UNKNOWN

PROJECT- SHENANDOAH NATIONAL PARK

TABLE 4

FREQUENCY DISTRIBUTION FOR ALL PROVENIENCES- AU166

	PRIM-CORT MICRO				PRIM-CORT MACRO				GEN-SECND MICRO				GEN-SECND MACRO				BLADE-LIKE MICRO			
	WKD	UTL	NON	UNK	WKD	UTL	NON	UNK	WKD	UTL	NON	UNK	WKD	UTL	NON	UNK	WKD	UTL	NON	UNK
QRTZT	0	0	7	2	7	23	65	10	0	21	296	34	16	102	382	62	0	0	3	0
QRTZ	0	0	0	0	0	0	1	0	0	2	11	2	0	1	4	1	0	0	0	0
CRYPTO	0	0	0	0	0	0	0	0	0	1	10	1	1	0	1	0	0	0	0	0
GRNSTN	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
OTHER	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
TOTAL	0	0	7	2	7	23	66	10	0	24	317	37	17	103	387	63	0	0	3	0

	BLADE-LIKE MACRO				TRUE BLADE MICRO				TRUE BLADE MACRO								BIFACIAL TOOLS					
	WKD	UTL	NON	UNK	WKD	UTL	NON	UNK	WKD	UTL	NON	UNK	BROK UNID	CORE	CHNK	CORE TOOL	WHL	BRK IDT	FRG	PNT	MID	BSE
QRTZT	5	5	11	1	0	0	0	1	0	1	0	10	942	18	44	6	3	4	12	10	4	1
QRTZ	0	0	0	0	0	0	0	0	0	0	0	0	9	0	2	0	0	1	1	0	0	1
CRYPTO	0	0	1	0	0	0	0	0	0	0	0	0	5	0	5	0	0	0	0	0	0	0
GRNSTN	0	0	0	0	0	0	0	0	0	0	0	0	1	0	0	0	0	0	0	0	0	0
OTHER	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
TOTAL	5	5	12	1	0	0	0	1	0	1	0	10	957	18	51	6	3	5	13	10	4	2

	TOTALS	PERCENT	PERCENT RANGE
QRTZT	2108	97.143	69.231-100.000
QRTZ	36	1.659	0.000- 7.692
CRYPTO	25	1.152	0.000- 23.077
GRNSTN	1	.046	0.000- 2.381
OTHER	0	0.000	0.000- 0.000
TOTAL	2170	100.000	

PRIM-CORT=PRIMARY-CORTEX
GEN-SECND=GENERAL-SECONDARY
BROK UNID=BROKEN-UNIDENTIFIED
FRG=FRAGMENT
WKD=WORKED
UTL=UTILIZED
NON=NONWORKED/NONUTILIZED
UNK=UNKNOWN
CHNK=CHUNK
WHL=WHOLE
BRK IDT=BROKEN-IDENTIFIED
PNT=POINT
MID=MIDSECTION
BSE=BASE

PROJECT- SHENANDOAH NATIONAL PARK

TABLE 5

FREQUENCY DISTRIBUTION FOR ALL PROVENIENCES- AU167

	PRIM-CORT MICRO				PRIM-CORT MACRO				GEN-SECND MICRO				GEN-SECND MACRO				BLADE-LIKE MICRO			
	WKD	UTL	NON	UNK	WKD	UTL	NON	UNK	WKD	UTL	NON	UNK	WKD	UTL	NON	UNK	WKD	UTL	NON	UNK
QRTZT	1	4	29	3	19	60	138	14	0	31	526	19	22	143	556	64	7	1	3	0
QRTZ	0	0	0	0	0	0	0	0	0	0	9	0	0	0	3	0	0	0	0	0
CRYPTO	0	0	0	0	0	0	1	0	0	2	4	1	0	7	4	0	0	0	0	0
GRNSTN	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
OTHER	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
TOTAL	1	4	29	3	19	60	139	14	0	33	539	20	22	150	563	64	7	1	3	0

	BLADE-LIKE MACRO				TRUE BLADE MICRO				TRUE BLADE MACRO								BIFACIAL TOOLS					
	WKD	UTL	NON	UNK	WKD	UTL	NON	UNK	WKD	UTL	NON	UNK	BROK UNID	CORE	CHNK	CORE TOOL	WHL	BRK IDT	FRG	PNT	MID	BSE
QRTZT	1	6	23	2	0	0	0	0	0	0	0	0	1158	26	36	5	16	7	3	10	6	6
QRTZ	0	0	0	0	0	0	0	0	0	0	0	0	2	0	4	0	0	0	0	0	0	1
CRYPTO	0	1	0	0	0	0	0	0	0	0	0	0	11	1	2	0	0	1	0	1	0	1
GRNSTN	0	0	0	0	0	0	0	0	0	0	0	0	1	0	0	0	0	0	0	0	0	0
OTHER	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
TOTAL	1	7	23	2	0	0	0	0	0	0	0	0	1172	27	42	5	16	8	3	11	6	8

	TOTALS	PERCENT	PERCENT RANGE
QRTZT	2945	98.101	0.000-100.000
QRTZ	19	.633	0.000- 12.500
CRYPTO	37	1.233	0.000-100.000
GRNSTN	1	.033	0.000- .840
OTHER	0	0.000	0.000- 0.000
TOTAL	3002	100.000	

PRIM-CORT=PRIMARY-CORTEX　WKD=WORKED　CHNK=CHUNK　PNT=POINT

GEN-SECND=GENERAL-SECONDARY　UTL=UTILIZED　WHL=WHOLE　MID=MIDSECTION

BROK UNID=BROKEN-UNIDENTIFIED　NON=NONWORKED/NONUTILIZED　BRK IDT=BROKEN-IDENTIFIED　BSE=BASE

FRG=FRAGMENT　UNK=UNKNOWN

PROJECT- SHENANDOAH NATIONAL PARK

TABLE 6

FREQUENCY DISTRIBUTION FOR ALL PROVENIENCES- CLS I

	PRIM-CORT MICRO				PRIM-CORT MACRO				GEN-SECND MICRO				GEN-SECND MACRO				BLADE-LIKE MICRO			
	WKD	UTL	NON	UNK	WKD	UTL	NON	UNK	WKD	UTL	NON	UNK	WKD	UTL	NON	UNK	WKD	UTL	NON	UNK
QRTZT	0	0	5	1	6	5	18	0	0	1	28	1	2	8	43	3	0	0	0	0
QRTZ	0	0	0	0	0	0	0	0	0	0	1	0	0	0	0	0	0	0	0	0
CRYPTO	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
GRNSTN	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
OTHER	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
TOTAL	0	0	5	1	6	5	18	0	0	1	29	1	2	8	43	3	0	0	0	0

	BLADE-LIKE MACRO				TRUE BLADE MICRO				TRUE BLADE MACRO				BIFACIAL TOOLS									
	WKD	UTL	NON	UNK	WKD	UTL	NON	UNK	WKD	UTL	NON	UNK	BROK UNID	CORE	CHNK	CORE TOOL	WHL	BRK IDT	FRG	PNT	MID	BSE
QRTZT	0	0	1	0	0	0	0	0	0	0	0	0	43	1	5	0	2	1	0	0	0	1
QRTZ	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
CRYPTO	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
GRNSTN	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
OTHER	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
TOTAL	0	0	1	0	0	0	0	0	0	0	0	0	43	1	5	0	2	1	0	0	0	1

	TOTALS	PERCENT	PERCENT RANGE
QRTZT	175	99.432	92.308-100.000
QRTZ	1	.568	0.000- 7.692
CRYPTO	0	0.000	0.000- 0.000
GRNSTN	0	0.000	0.000- 0.000
OTHER	0	0.000	0.000- 0.000
TOTAL	176	100.000	

PRIM-CORT=PRIMARY-CORTEX
WKD=WORKED
CHNK=CHUNK
PNT=POINT
GEN-SECND=GENERAL-SECONDARY
UTL=UTILIZED
WHL=WHOLE
MID=MIDSECTION
BROK UNID=BROKEN-UNIDENTIFIED
NON=NONWORKED/NONUTILIZED
BRK IDT=BROKEN-IDENTIFIED
BSE=BASE
FRG=FRAGMENT
UNK=UNKNOWN

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PROJECT- SHENANDOAH NATIONAL PARK

TABLE 7

FREQUENCY DISTRIBUTION FOR ALL PROVENIENCES- CLS II

	PRIM-CORT MICRO				PRIM-CORT MACRO				GEN-SECND MICRO				GEN-SECND MACRO				BLADE-LIKE MICRO			
	WKD	UTL	NON	UNK	WKD	UTL	NON	UNK	WKD	UTL	NON	UNK	WKD	UTL	NON	UNK	WKD	UTL	NON	UNK
QRTZT	0	0	1	0	0	3	6	0	0	1	25	0	4	5	43	1	0	1	1	0
QRTZ	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
CRYPTO	0	0	0	0	0	0	0	0	0	0	0	0	0	0	3	0	0	0	0	0
GRNSTN	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
OTHER	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
TOTAL	0	0	1	0	0	3	6	0	0	1	25	0	4	5	46	1	0	1	1	0

	BLADE-LIKE MACRO				TRUE BLADE MICRO				TRUE BLADE MACRO								BIFACIAL TOOLS					
	WKD	UTL	NON	UNK	WKD	UTL	NON	UNK	WKD	UTL	NON	UNK	BROK UNID	CORE	CHNK	CORE TOOL	WHL	BRK IDT	FRG	PNT	MID	BSE
QRTZT	0	1	6	1	0	0	0	0	0	0	0	0	80	2	4	1	0	0	1	1	0	0
QRTZ	0	0	0	0	0	0	0	0	0	0	0	0	0	0	1	0	0	0	0	0	0	0
CRYPTO	0	0	0	0	0	0	0	0	0	0	0	0	2	0	0	0	0	0	0	0	0	0
GRNSTN	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
OTHER	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
TOTAL	0	1	6	1	0	0	0	0	0	0	0	0	82	2	5	1	0	0	1	1	0	0

	TOTALS	PERCENT	PERCENT RANGE
QRTZT	188	96.907	90.909-100.000
QRTZ	1	.515	0.000- 2.041
CRYPTO	5	2.577	0.000- 9.091
GRNSTN	0	0.000	0.000- 0.000
OTHER	0	0.000	0.000- 0.000
TOTAL	194	100.000	

PRIM-CORT=PRIMARY-CORTEX
GEN-SECND=GENERAL-SECONDARY
BROK UNID=BROKEN-UNIDENTIFIED
FRG=FRAGMENT
WKD=WORKED
UTL=UTILIZED
NON=NONWORKED/NONUTILIZED
UNK=UNKNOWN
CHNK=CHUNK
WHL=WHOLE
BRK IDT=BROKEN-IDENTIFIED
PNT=POINT
MID=MIDSECTION
BSE=BASE

TABLE 8

PROJECT- SHENANDOAH NATIONAL PARK

FREQUENCY DISTRIBUTION FOR ALL PROVENIENCES- CLS III

	PRIM-CORT MICRO				PRIM-CORT MACRO				GEN-SECND MICRO				GEN-SECND MACRO				BLADE-LIKE MICRO			
	WKD	UTL	NON	UNK	WKD	UTL	NON	UNK	WKD	UTL	NON	UNK	WKD	UTL	NON	UNK	WKD	UTL	NON	UNK
QRTZT	0	0	3	1	1	18	15	3	0	2	64	2	2	25	52	10	0	0	0	0
QRTZ	0	0	0	0	0	0	0	0	0	0	1	0	0	0	1	0	0	0	0	0
CRYPTO	0	0	0	0	0	0	0	0	0	0	1	0	0	2	0	0	0	0	0	0
GRNSTN	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
OTHER	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
TOTAL	0	0	3	1	1	18	15	3	0	2	66	2	2	27	53	10	0	0	0	0

	BLADE-LIKE MACRO				TRUE BLADE MICRO				TRUE BLADE MACRO								BIFACIAL TOOLS					
	WKD	UTL	NON	UNK	WKD	UTL	NON	UNK	WKD	UTL	NON	UNK	BROK UNID	CORE	CHNK	CORE TOOL	WHL	BRK IDT	FRG	PNT	MID	BSE
QRTZT	0	1	2	0	0	0	0	0	0	0	0	0	108	5	4	0	2	1	1	3	0	1
QRTZ	0	0	0	0	0	0	0	0	0	0	0	0	1	0	1	0	0	0	0	0	0	0
CRYPTO	0	0	0	0	0	0	0	0	0	0	0	0	1	0	0	0	0	0	0	0	0	0
GRNSTN	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
OTHER	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
TOTAL	0	1	2	0	0	0	0	0	0	0	0	0	110	5	5	0	2	1	1	3	0	1

	TOTALS	PERCENT	PERCENT RANGE
QRTZT	326	97.605	92.857-100.000
QRTZ	4	1.198	0.000- 4.167
CRYPTO	4	1.198	0.000- 6.667
GRNSTN	0	0.000	0.000- 0.000
OTHER	0	0.000	0.000- 0.000
TOTAL	334	100.000	

PRIM-CORT=PRIMARY-CORTEX
WKD=WORKED
CHNK=CHUNK
PNT=POINT

GEN-SECND=GENERAL-SECONDARY
UTL=UTILIZED
WHL=WHOLE
MID=MIDSECTION

BROK UNID=BROKEN-UNIDENTIFIED
NON=NONWORKED/NONUTILIZED
BRK IDT=BROKEN-IDENTIFIED
BSE=BASE

FRG=FRAGMENT
UNK=UNKNOWN

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PROJECT- SHENANDOAH NATIONAL PARK

TABLE 9

FREQUENCY DISTRIBUTION FOR ALL PROVENIENCES- CLS IV

	PRIM-CORT MICRO				PRIM-CORT MACRO				GEN-SECND MICRO				GEN-SECND MACRO				BLADE-LIKE MICRO			
	WKD	UTL	NON	UNK	WKD	UTL	NON	UNK	WKD	UTL	NON	UNK	WKD	UTL	NON	UNK	WKD	UTL	NON	UNK
QRTZT	0	0	0	0	0	1	9	0	0	0	49	0	0	6	50	2	0	0	1	0
QRTZ	0	0	0	0	0	0	0	0	0	0	3	0	0	0	0	0	0	0	0	0
CRYPTO	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
GRNSTN	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
OTHER	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
TOTAL	0	0	0	0	0	1	9	0	0	0	52	0	0	6	50	2	0	0	1	0

	BLADE-LIKE MACRO				TRUE BLADE MICRO				TRUE BLADE MACRO								BIFACIAL TOOLS					
	WKD	UTL	NON	UNK	WKD	UTL	NON	UNK	WKD	UTL	NON	UNK	BROK UNID	CORE	CHNK	CORE TOOL	WHL	BRK IDT	FRG	PNT	MID	BSE
QRTZT	0	0	1	0	0	0	0	0	0	0	0	0	87	0	2	2	2	0	0	3	1	1
QRTZ	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
CRYPTO	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
GRNSTN	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
OTHER	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
TOTAL	0	0	1	0	0	0	0	0	0	0	0	0	87	0	2	2	2	0	0	3	1	1

	TOTALS	PERCENT	PERCENT RANGE
QRTZT	217	98.636	90.909-100.000
QRTZ	3	1.364	0.000- 9.091
CRYPTO	0	0.000	0.000- 0.000
GRNSTN	0	0.000	0.000- 0.000
OTHER	0	0.000	0.000- 0.000
TOTAL	220	100.000	

PRIM-CORT=PRIMARY-CORTEX
GEN-SECND=GENERAL-SECONDARY
BROK UNID=BROKEN-UNIDENTIFIED
FRG=FRAGMENT
WKD=WORKED
UTL=UTILIZED
NON=NONWORKED/NONUTILIZED
UNK=UNKNOWN
CHNK=CHUNK
WHL=WHOLE
BRK IDT=BROKEN-IDENTIFIED
PNT=POINT
MID=MIDSECTION
BSE=BASE

PROJECT- SHENANDOAH NATIONAL PARK

TABLE 10

FREQUENCY DISTRIBUTION FOR ALL PROVENIENCES- CLS V

	PRIM-CORT MICRO				PRIM-CORT MACRO				GEN-SECND MICRO				GEN-SECND MACRO				BLADE-LIKE MICRO			
	WKD	UTL	NON	UNK	WKD	UTL	NON	UNK	WKD	UTL	NON	UNK	WKD	UTL	NON	UNK	WKD	UTL	NON	UNK
QRTZT	0	0	2	0	7	1	15	0	0	14	26	1	2	2	50	5	0	0	0	0
QRTZ	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
CRYPTO	0	0	0	0	0	0	0	0	0	0	0	0	0	0	1	0	0	0	0	0
GRNSTN	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
OTHER	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
TOTAL	0	0	2	0	7	1	15	0	0	14	26	1	2	2	51	5	0	0	0	0

	BLADE-LIKE MACRO				TRUE BLADE MICRO				TRUE BLADE MACRO				BIFACIAL TOOLS									
	WKD	UTL	NON	UNK	WKD	UTL	NON	UNK	WKD	UTL	NON	UNK	BROK UNID	CORE	CHNK	CORE TOOL	WHL	BRK IDT	FRG	PNT	MID	BSE
QRTZT	0	0	2	0	0	0	0	0	0	0	0	0	150	0	6	0	2	1	0	1	0	0
QRTZ	0	0	0	0	0	0	0	0	0	0	0	0	0	0	1	0	0	0	0	0	0	0
CRYPTO	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	1
GRNSTN	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
OTHER	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
TOTAL	0	0	2	0	0	0	0	0	0	0	0	0	150	0	7	0	2	1	0	1	0	1

	TOTALS	PERCENT	PERCENT RANGE
QRTZT	287	98.966	97.727-100.000
QRTZ	1	.345	0.000- 2.273
CRYPTO	2	.690	0.000- 1.695
GRNSTN	0	0.000	0.000- 0.000
OTHER	0	0.000	0.000- 0.000
TOTAL	290	100.000	

PRIM-CORT=PRIMARY-CORTEX WKD=WORKED CHNK=CHUNK PNT=POINT

GEN-SECND=GENERAL-SECONDARY UTL=UTILIZED WHL=WHOLE MID=MIDSECTION

BROK UNID=BROKEN-UNIDENTIFIED NON=NONWORKED/NONUTILIZED BRK IDT=BROKEN-IDENTIFIED BSE=BASE

FRG=FRAGMENT UNK=UNKNOWN

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PROJECT- SHENANDOAH NATIONAL PARK

TABLE 11

FREQUENCY DISTRIBUTION FOR ALL PROVENIENCES- CLS VI

	PRIM-CORT MICRO				PRIM-CORT MACRO				GEN-SECND MICRO				GEN-SECND MACRO				BLADE-LIKE MICRO			
	WKD	UTL	NON	UNK	WKD	UTL	NON	UNK	WKD	UTL	NON	UNK	WKD	UTL	NON	UNK	WKD	UTL	NON	UNK
QRTZT	0	3	9	0	0	5	22	4	0	0	158	2	1	14	108	11	0	0	1	0
QRTZ	0	0	0	0	0	0	0	0	0	0	3	0	0	0	1	0	0	0	0	0
CRYPTO	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
GRNSTN	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
OTHER	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
TOTAL	0	3	9	0	0	5	22	4	0	0	161	2	1	14	109	11	0	0	1	0

	BLADE-LIKE MACRO				TRUE BLADE MICRO				TRUE BLADE MACRO								BIFACIAL TOOLS					
	WKD	UTL	NON	UNK	WKD	UTL	NON	UNK	WKD	UTL	NON	UNK	BROK UNID	CORE	CHNK	CORE TOOL	WHL	BRK IDT	FRG	PNT	MID	BSE
QRTZT	0	0	5	0	0	0	0	0	0	0	0	0	315	3	6	0	0	0	0	0	2	1
QRTZ	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
CRYPTO	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
GRNSTN	0	0	0	0	0	0	0	0	0	0	0	0	1	0	0	0	0	0	0	0	0	0
OTHER	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
TOTAL	0	0	5	0	0	0	0	0	0	0	0	0	316	3	6	0	0	0	0	0	2	1

	TOTALS	PERCENT	PERCENT RANGE
QRTZT	670	99.259	97.917-100.000
QRTZ	4	.593	0.000- 2.083
CRYPTO	0	0.000	0.000- 0.000
GRNSTN	1	.148	0.000- .840
OTHER	0	0.000	0.000- 0.000
TOTAL	675	100.000	

PRIM-CORT=PRIMARY-CORTEX
GEN-SECND=GENERAL-SECONDARY
BROK UNID=BROKEN-UNIDENTIFIED
FRG=FRAGMENT
WKD=WORKED
UTL=UTILIZED
NON=NONWORKED/NONUTILIZED
UNK=UNKNOWN
CHNK=CHUNK
WHL=WHOLE
BRK IDT=BROKEN-IDENTIFIED
PNT=POINT
MID=MIDSECTION
BSE=BASE

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PROJECT- SHENANDOAH NATIONAL PARK

TABLE 12

FREQUENCY DISTRIBUTION FOR ALL PROVENIENCES- MD112

	PRIM-CORT MICRO				PRIM-CORT MACRO				GEN-SECND MICRO				GEN-SECND MACRO				BLADE-LIKE MICRO			
	WKD	UTL	NON	UNK	WKD	UTL	NON	UNK	WKD	UTL	NON	UNK	WKD	UTL	NON	UNK	WKD	UTL	NON	UNK
QRTZT	0	12	279	0	6	13	54	0	2	71	2999	43	1	32	209	13	0	3	27	3
QRTZ	0	1	11	0	0	0	2	1	2	21	469	8	0	6	10	1	0	0	0	1
CRYPTO	0	1	16	0	0	0	2	1	0	83	384	45	0	12	4	1	0	3	3	1
GRNSTN	0	0	0	0	0	1	1	0	0	2	23	1	0	4	3	4	0	0	0	0
OTHER	0	0	0	0	0	0	0	0	0	0	1	0	0	1	0	0	0	0	0	0
TOTAL	0	14	306	0	6	14	59	2	4	177	3876	97	1	55	226	19	0	6	30	5

	BLADE-LIKE MACRO				TRUE BLADE MICRO				TRUE BLADE MACRO								BIFACIAL TOOLS					
	WKD	UTL	NON	UNK	WKD	UTL	NON	UNK	WKD	UTL	NON	UNK	BROK UNID	CORE	CHNK	CORE TOOL	WHL	BRK IDT	FRG	PNT	MID	BSE
QRTZT	0	7	17	1	0	0	3	0	0	0	0	0	158	19	12	1	10	12	6	29	5	2
QRTZ	0	0	1	0	0	0	0	0	0	0	0	0	44	13	67	0	3	4	1	0	0	0
CRYPTO	0	2	1	0	0	1	1	1	0	0	0	0	52	6	38	1	4	1	7	12	0	4
GRNSTN	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	1	0	0	0	0	0
OTHER	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
TOTAL	0	9	19	1	0	1	4	1	0	0	0	0	254	38	117	2	18	17	14	41	5	6

	TOTALS	PERCENT	PERCENT RANGE
QRTZT	4049	74.375	66.272- 91.667
QRTZ	666	12.234	0.000- 22.222
CRYPTO	687	12.619	2.439- 23.810
GRNSTN	40	.735	0.000- 4.545
OTHER	2	.037	0.000- .844
TOTAL	5444	100.000	

PRIM-CORT=PRIMARY-CORTEX
GEN-SECND=GENERAL-SECONDARY
BROK UNID=BROKEN-UNIDENTIFIED
FRG=FRAGMENT
WKD=WORKED
UTL=UTILIZED
NON=NONWORKED/NONUTILIZED
UNK=UNKNOWN
CHNK=CHUNK
WHL=WHOLE
BRK IDT=BROKEN-IDENTIFIED
PNT=POINT
MID=MIDSECTION
BSE=BASE

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PROJECT- SHENANDOAH NATIONAL PARK

TABLE 13

FREQUENCY DISTRIBUTION FOR ALL PROVENIENCES- MD138

	PRIM-CORT MICRO				PRIM-CORT MACRO				GEN-SECND MICRO				GEN-SECND MACRO				BLADE-LIKE MICRO			
	WKD	UTL	NON	UNK	WKD	UTL	NON	UNK	WKD	UTL	NON	UNK	WKD	UTL	NON	UNK	WKD	UTL	NON	UNK
QRTZT	0	0	0	0	0	0	0	0	1	1	4	1	1	8	5	1	0	0	0	0
QRTZ	0	0	0	0	0	0	0	0	0	0	0	1	1	0	0	1	0	0	0	0
CRYPTO	0	0	0	0	0	0	0	0	0	0	3	0	0	0	0	0	0	0	0	0
GRNSTN	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
OTHER	0	0	0	0	0	0	0	0	0	0	1	0	0	0	0	0	0	0	0	0
TOTAL	0	0	0	0	0	0	0	0	1	1	8	2	2	8	5	2	0	0	0	0

	BLADE-LIKE MACRO				TRUE BLADE MICRO				TRUE BLADE MACRO								BIFACIAL TOOLS					
	WKD	UTL	NON	UNK	WKD	UTL	NON	UNK	WKD	UTL	NON	UNK	BROK UNID	CORE	CHNK	CORE TOOL	WHL	BRK IDT	FRG	PNT	MID	BSE
QRTZT	0	1	0	0	0	0	0	0	0	0	0	0	26	0	0	0	2	1	1	1	1	1
QRTZ	0	0	0	0	0	0	0	0	0	0	0	0	2	0	1	0	1	0	0	0	0	0
CRYPTO	0	0	0	0	0	0	0	0	0	0	0	0	4	0	0	0	0	0	0	0	0	0
GRNSTN	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
OTHER	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
TOTAL	0	1	0	0	0	0	0	0	0	0	0	0	32	0	1	0	3	1	1	1	1	1

	TOTALS	PERCENT	PERCENT RANGE
QRTZT	56	78.873	28.571-100.000
QRTZ	7	9.859	0.000- 57.143
CRYPTO	7	9.859	0.000- 25.000
GRNSTN	0	0.000	0.000- 0.000
OTHER	1	1.408	0.000- 3.125
TOTAL	71	100.000	

PRIM-CORT=PRIMARY-CORTEX
GEN-SECND=GENERAL-SECONDARY
BROK UNID=BROKEN-UNIDENTIFIED
FRG=FRAGMENT
WKD=WORKED
UTL=UTILIZED
NON=NONWORKED/NONUTILIZED
UNK=UNKNOWN
CHNK=CHUNK
WHL=WHOLE
BRK IDT=BROKEN-IDENTIFIED
PNT=POINT
MID=MIDSECTION
BSE=BASE

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PROJECT- SHENANDOAH NATIONAL PARK

TABLE 14

FREQUENCY DISTRIBUTION FOR ALL PROVENIENCES- MD143

	PRIM-CORT MICRO				PRIM-CORT MACRO				GEN-SECND MICRO				GEN-SECND MACRO				BLADE-LIKE MICRO			
	WKD	UTL	NON	UNK	WKD	UTL	NON	UNK	WKD	UTL	NON	UNK	WKD	UTL	NON	UNK	WKD	UTL	NON	UNK
QRTZT	0	0	0	0	0	1	2	0	0	4	116	0	1	11	92	6	0	0	2	0
QRTZ	0	0	0	0	0	0	0	0	0	0	9	0	1	1	3	0	0	0	0	0
CRYPTO	0	0	0	0	0	0	0	0	0	1	7	0	0	0	2	0	0	0	0	0
GRNSTN	0	0	0	0	0	0	0	0	0	0	0	0	0	0	3	0	0	0	0	0
OTHER	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
TOTAL	0	0	0	0	0	1	2	0	0	5	132	0	2	12	100	6	0	0	2	0

	BLADE-LIKE MACRO				TRUE BLADE MICRO				TRUE BLADE MACRO								BIFACIAL TOOLS					
	WKD	UTL	NON	UNK	WKD	UTL	NON	UNK	WKD	UTL	NON	UNK	BROK UNID	CORE	CHNK	CORE TOOL	WHL	BRK IDT	FRG	PNT	MID	BSE
QRTZT	0	2	4	0	0	0	0	0	0	0	1	0	141	0	1	0	0	0	0	0	0	0
QRTZ	0	0	0	0	0	0	0	0	0	0	0	0	1	2	2	0	1	0	0	0	0	0
CRYPTO	0	0	0	0	0	0	0	0	0	0	0	0	4	1	2	0	0	1	0	1	0	0
GRNSTN	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
OTHER	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
TOTAL	0	2	4	0	0	0	0	0	0	0	1	0	146	3	5	0	1	1	0	1	0	0

	TOTALS	PERCENT	PERCENT RANGE
QRTZT	384	90.141	33.333-100.000
QRTZ	20	4.695	0.000- 66.667
CRYPTO	19	4.460	0.000- 50.000
GRNSTN	3	.704	0.000- 3.077
OTHER	0	0.000	0.000- 0.000
TOTAL	426	100.000	

PRIM-CORT=PRIMARY-CORTEX
GEN-SECND=GENERAL-SECONDARY
BROK UNID=BROKEN-UNIDENTIFIED
FRG=FRAGMENT
WKD=WORKED
UTL=UTILIZED
NON=NONWORKED/NONUTILIZED
UNK=UNKNOWN
CHNK=CHUNK
WHL=WHOLE
BRK IDT=BROKEN-IDENTIFIED
PNT=POINT
MID=MIDSECTION
BSE=BASE

PROJECT- SHENANDOAH NATIONAL PARK

TABLE 15

FREQUENCY DISTRIBUTION FOR ALL PROVENIENCES- MD146

	PRIM-CORT MICRO				PRIM-CORT MACRO				GEN-SECND MICRO				GEN-SECND MACRO				BLADE-LIKE MICRO			
	WKD	UTL	NON	UNK	WKD	UTL	NON	UNK	WKD	UTL	NON	UNK	WKD	UTL	NON	UNK	WKD	UTL	NON	UNK
QRTZT	0	0	3	0	0	0	4	1	0	10	147	8	1	17	84	10	0	1	0	1
QRTZ	0	0	0	0	0	0	0	0	4	7	203	2	3	7	57	1	0	0	2	0
CRYPTO	0	0	2	0	0	1	1	0	1	5	14	0	0	6	4	0	0	0	0	0
GRNSTN	0	0	0	0	0	1	2	0	0	0	5	0	0	1	16	2	0	0	0	0
OTHER	0	0	0	0	0	0	2	0	0	0	1	0	0	0	5	1	0	0	0	0
TOTAL	0	0	5	0	0	2	9	1	5	22	370	10	4	31	166	14	0	1	2	1

	BLADE-LIKE MACRO				TRUE BLADE MICRO				TRUE BLADE MACRO								BIFACIAL TOOLS					
	WKD	UTL	NON	UNK	WKD	UTL	NON	UNK	WKD	UTL	NON	UNK	BROK UNID	CORE	CHNK	CORE TOOL	WHL	BRK IDT	FRG	PNT	MID	BSE
QRTZT	0	1	3	1	0	0	0	0	0	0	0	0	137	1	12	0	0	0	2	3	0	0
QRTZ	0	1	4	0	0	0	0	0	0	0	0	0	137	23	130	1	3	0	0	2	0	2
CRYPTO	0	0	0	0	0	0	0	0	0	0	0	0	19	2	1	0	0	0	0	0	1	1
GRNSTN	0	0	0	0	0	0	0	0	0	0	0	0	3	1	0	1	3	0	0	1	0	0
OTHER	0	0	0	0	0	0	0	0	0	0	0	0	14	0	4	0	0	1	1	0	0	0
TOTAL	0	2	7	1	0	0	0	0	0	0	0	0	310	27	147	2	6	1	3	6	1	3

	TOTALS	PERCENT	PERCENT RANGE
QRTZT	447	38.568	7.143- 75.000
QRTZ	589	50.820	7.143- 88.889
CRYPTO	58	5.004	0.000- 20.000
GRNSTN	36	3.106	0.000- 11.111
OTHER	29	2.502	0.000- 78.571
TOTAL	1159	100.000	

PRIM-CORT=PRIMARY-CORTEX
GEN-SECND=GENERAL-SECONDARY
BROK UNID=BROKEN-UNIDENTIFIED
FRG=FRAGMENT
WKD=WORKED
UTL=UTILIZED
NON=NONWORKED/NONUTILIZED
UNK=UNKNOWN
CHNK=CHUNK
WHL=WHOLE
BRK IDT=BROKEN-IDENTIFIED
PNT=POINT
MID=MIDSECTION
BSE=BASE

PROJECT- SHENANDOAH NATIONAL PARK

TABLE 16

FREQUENCY DISTRIBUTION FOR ALL PROVENIENCES- RM-117

	PRIM-CORT MICRO				PRIM-CORT MACRO				GEN-SECND MICRO				GEN-SECND MACRO				BLADE-LIKE MICRO			
	WKD	UTL	NON	UNK	WKD	UTL	NON	UNK	WKD	UTL	NON	UNK	WKD	UTL	NON	UNK	WKD	UTL	NON	UNK
QRTZT	0	0	0	0	0	0	6	1	0	1	73	1	1	6	49	8	0	0	6	0
QRTZ	0	0	0	0	0	0	2	0	0	0	15	0	0	1	6	2	0	0	0	0
CRYPTO	0	0	0	0	0	0	0	0	0	3	38	1	0	0	5	0	0	0	1	0
GRNSTN	0	0	0	0	0	1	2	1	0	0	9	0	0	2	11	0	0	0	0	0
OTHER	0	0	0	0	0	0	0	0	0	0	0	0	0	0	1	0	0	0	0	0
TOTAL	0	0	0	0	0	1	10	2	0	4	135	2	1	9	72	10	0	0	7	0

	BLADE-LIKE MACRO				TRUE BLADE MICRO				TRUE BLADE MACRO								BIFACIAL TOOLS					
	WKD	UTL	NON	UNK	WKD	UTL	NON	UNK	WKD	UTL	NON	UNK	BROK UNID	CORE	CHNK	CORE TOOL	WHL	BRK IDT	FRG	PNT	MID	BSE
QRTZT	2	2	3	1	0	0	0	0	0	1	0	0	88	1	5	0	1	1	1	0	0	0
QRTZ	0	1	0	0	0	0	0	0	0	0	0	0	13	2	14	1	0	1	1	0	0	0
CRYPTO	0	0	0	1	0	0	0	0	0	1	0	0	11	0	1	0	0	0	0	2	0	1
GRNSTN	0	0	1	0	0	0	0	0	0	0	0	0	7	0	0	2	0	0	0	0	0	1
OTHER	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
TOTAL	2	3	4	2	0	0	0	0	0	2	0	0	119	3	20	3	1	2	2	2	0	2

	TOTALS	PERCENT	PERCENT RANGE
QRTZT	258	61.429	0.000-100.000
QRTZ	59	14.048	0.000- 66.667
CRYPTO	65	15.476	0.000-100.000
GRNSTN	37	8.810	0.000- 20.000
OTHER	1	.238	0.000- .885
TOTAL	420	100.000	

PRIM-CORT=PRIMARY-CORTEX — WKD=WORKED — CHNK=CHUNK — PNT=POINT

GEN-SECND=GENERAL-SECONDARY — UTL=UTILIZED — WHL=WHOLE — MID=MIDSECTION

BROK UNID=BROKEN-UNIDENTIFIED — NON=NONWORKED/NONUTILIZED — BRK IDT=BROKEN-IDENTIFIED — BSE=BASE

FRG=FRAGMENT — UNK=UNKNOWN

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PROJECT- SHENANDOAH NATIONAL PARK

TABLE 17

FREQUENCY DISTRIBUTION FOR ALL PROVENIENCES- RM122

	PRIM-CORT MICRO				PRIM-CORT MACRO				GEN-SECND MICRO				GEN-SECND MACRO				BLADE-LIKE MICRO			
	WKD	UTL	NON	UNK	WKD	UTL	NON	UNK	WKD	UTL	NON	UNK	WKD	UTL	NON	UNK	WKD	UTL	NON	UNK
QRTZT	0	0	1	0	0	0	1	0	0	1	73	3	4	14	40	1	0	0	1	0
QRTZ	0	0	0	0	0	0	0	0	0	2	6	0	0	1	0	0	0	0	0	0
CRYPTO	0	0	0	0	0	0	0	0	0	3	0	0	0	1	0	0	0	0	0	0
GRNSTN	0	0	0	0	0	0	0	0	0	0	1	1	0	0	2	7	0	0	0	0
OTHER	0	0	0	0	0	0	0	0	0	1	0	2	1	1	0	4	0	0	0	0
TOTAL	0	0	1	0	0	0	1	0	0	7	80	6	5	17	42	12	0	0	1	0

	BLADE-LIKE MACRO				TRUE BLADE MICRO				TRUE BLADE MACRO								BIFACIAL TOOLS					
	WKD	UTL	NON	UNK	WKD	UTL	NON	UNK	WKD	UTL	NON	UNK	BROK UNID	CORE	CHNK	CORE TOOL	WHL	BRK IDT	FRG	PNT	MID	BSE
QRTZT	1	1	1	0	0	0	0	0	0	0	0	0	15	1	1	0	1	0	1	2	1	1
QRTZ	0	0	0	0	0	0	0	0	0	0	0	0	0	4	1	0	0	0	0	1	1	0
CRYPTO	0	0	0	0	0	0	1	0	0	0	0	0	0	0	0	0	0	0	0	0	1	0
GRNSTN	0	1	0	1	0	0	0	0	0	0	0	0	0	0	0	0	1	0	0	1	1	1
OTHER	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
TOTAL	1	2	1	1	0	0	1	0	0	0	0	0	15	5	2	0	2	0	1	4	4	2

	TOTALS	PERCENT	PERCENT RANGE
QRTZT	165	77.465	50.000-100.000
QRTZ	16	7.512	0.000- 33.333
CRYPTO	6	2.817	0.000- 6.250
GRNSTN	17	7.981	0.000- 16.667
OTHER	9	4.225	0.000- 50.000
TOTAL	213	100.000	

PRIM-CORT=PRIMARY-CORTEX
GEN-SECND=GENERAL-SECONDARY
BROK UNID=BROKEN-UNIDENTIFIED
FRG=FRAGMENT
WKD=WORKED
UTL=UTILIZED
NON=NONWORKED/NONUTILIZED
UNK=UNKNOWN
CHNK=CHUNK
WHL=WHOLE
BRK IDT=BROKEN-IDENTIFIED
PNT=POINT
MID=MIDSECTION
BSE=BASE

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PROJECT- SHENANDOAH NATIONAL PARK

TABLE 18

FREQUENCY DISTRIBUTION FOR ALL PROVENIENCES- PA113

	PRIM-CORT MICRO				PRIM-CORT MACRO				GEN-SECND MICRO				GEN-SECND MACRO				BLADE-LIKE MICRO			
	WKD	UTL	NON	UNK	WKD	UTL	NON	UNK	WKD	UTL	NON	UNK	WKD	UTL	NON	UNK	WKD	UTL	NON	UNK
QRTZT	0	0	0	0	0	0	0	0	1	2	3	0	1	5	1	0	0	0	0	0
QRTZ	0	0	0	0	0	0	0	0	0	1	7	2	0	1	0	1	0	0	0	0
CRYPTO	0	0	1	0	0	0	0	0	0	0	0	1	0	1	0	0	0	0	0	0
GRNSTN	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
OTHER	0	0	0	0	0	0	0	0	0	0	2	0	0	0	1	0	0	0	0	0
TOTAL	0	0	1	0	0	0	0	0	1	3	12	3	1	7	2	1	0	0	0	0

	BLADE-LIKE MACRO				TRUE BLADE MICRO				TRUE BLADE MACRO								BIFACIAL TOOLS					
	WKD	UTL	NON	UNK	WKD	UTL	NON	UNK	WKD	UTL	NON	UNK	BROK UNID	CORE	CHNK	CORE TOOL	WHL	BRK IDT	FRG	PNT	MID	BSE
QRTZT	0	0	0	0	0	0	0	0	0	0	0	0	10	0	0	0	0	1	0	1	1	0
QRTZ	0	0	0	0	0	0	0	0	0	0	0	0	16	0	3	0	0	0	0	1	0	0
CRYPTO	0	0	0	0	0	0	0	0	0	0	0	0	1	1	0	0	0	0	0	0	0	0
GRNSTN	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
OTHER	0	0	0	0	0	0	0	0	0	0	0	0	1	0	0	0	0	0	0	0	0	0
TOTAL	0	0	0	0	0	0	0	0	0	0	0	0	28	1	3	0	0	1	0	2	1	0

	TOTALS	PERCENT	PERCENT RANGE
QRTZT	26	38.806	0.000- 75.862
QRTZ	32	47.761	10.345-100.000
CRYPTO	5	7.463	0.000- 14.286
GRNSTN	0	0.000	0.000- 0.000
OTHER	4	5.970	0.000- 15.000
TOTAL	67	100.000	

PRIM-CORT=PRIMARY-CORTEX
GEN-SECND=GENERAL-SECONDARY
BROK UNID=BROKEN-UNIDENTIFIED
FRG=FRAGMENT

WKD=WORKED
UTL=UTILIZED
NON=NONWORKED/NONUTILIZED
UNK=UNKNOWN

CHNK=CHUNK
WHL=WHOLE
BRK IDT=BROKEN-IDENTIFIED

PNT=POINT
MID=MIDSECTION
BSE=BASE

APPENDIX II

	# Artifacts	Artifacts Density (per m^3)	Site Size m^2	Site Depth
AU-154	2157	1348	5000	25cm
AU-158 Upper Component	798	5320	45^2	15cm
AU-158 Component II	1508	2026	45^{2+}	75cm
AU-166	2170	2411	$100m^2$	Surface (?)
AU-167 Whole Site	3002	469	$9000m^2$	5cm
Cluster I	176	704	$4.5m^2$	
Cluster II	194	970	$4.0m^{2+}$	
Cluster III	334	607	$10.5m^{2+}$	
Cluster IV	220	440	$10m^{2+}$	
Cluster V	290	966	$5.5m^2$	
Cluster VI	681	1513	$9.5m^2$	
MD-112	5440	2388	$6000m^2$	10cm
MD-138	71	142	625^2	5-10cm
MD-143	426	197	150^2	40cm
MD-146	1159	438	$7000m^2$	20cm
RM-117	420	300	$1450m^2$	30cm
RM-122	213	128	$1100m^2$	20cm

APPENDIX III

SITE	# ART.	Cortex #	Cortex %	Micro #	Micro %	Macro #	Macro %	Wkd. #	Wkd. %	Utl. #	Utl. %	Cores #	Cores %	Core Tools #	Core Tools %	Bifaces #	Bifaces %	Broken #	Broken %
AU-154	2157	302	14.0	563	26.1	795	36.9	11	0.5	146	6.7	18	0.8	3	0.1	34	1.6	673	31.2
AU-158																			
I	798	35	4.3	521	65.3	47	5.9	0	0.0	11	1.4	4	0.5	0	0.0	25	3.1	149	18.7
II	1508	157	10.4	551	36.5	575	38.1	2	0.1	63	4.2	3	0.2	0	0.0	9	0.6	338	22.4
AU-167	3002	269	9.0	640	21.3	1064	35.4	50	1.7	255	8.5	27	1.9	5	0.2	52	1.7	1172	39.0
I	176	35	19.9	32	18.2	76	43.2	8	4.5	14	8.0	1	0.6	0	0.0	4	2.3	43	24.4
II	194	10	5.2	29	14.9	73	37.6	4	2.0	10	5.2	2	1.0	1	0.5	2	1.0	82	42.2
III	334	41	12.3	74	22.2	132	39.5	2	0.6	46	13.8	2	0.6	0	0.0	8	2.4	110	32.9
IV	220	10	4.5	53	24.1	69	31.4	0	0.0	7	3.2	0	0.0	2	0.9	7	3.2	87	39.5
V	290	25	8.6	43	14.8	85	29.3	9	3.1	17	5.9	0	0.0	0	0.0	5	1.7	150	51.7
VI	681	40	5.9	171	25.1	176	25.8	1	0.1	22	3.2	3	0.4	0	0.0	3	0.4	316	46.4
AU-166	2170	115	5.3	391	18.0	710	32.8	29	1.3	155	7.1	18	0.8	6	0.3	37	1.7	957	44.1
MD-112	5444	401	7.4	4521	83.0	411	7.5	11	0.2	276	5.1	38	0.7	2	IN	101	1.8	254	4.7
MD-138	71	0	0.0	12	16.9	18	25.4	3	4.2	10	14.1	0	0.0	0	0.0	8	11.3	32	45.1
MD-143	426	3	0.7	139	32.6	129	30.3	2	0.4	20	4.7	3	0.7	0	0.0	3	0.7	146	34.3
MD-146	1129	17	1.5	416	36.8	237	21.0	9	0.8	58	5.1	27	2.4	2	0.2	20	1.8	310	27.5
RM-117	420	13	3.1	148	35.2	118	28.1	3	0.7	19	4.5	3	0.7	3	0.7	9	2.1	119	28.3
RM-122	213	2	0.9	96	45.0	82	38.5	6	2.8	26	12.2	5	2.3	0	0.0	13	6.1	15	7.0

APPENDIX IV

SITE #	LANDFORM	HYDROLOGIC ASSOCIATION	ELEVATION	GEOLOGIC ASSOCIATION
GR-126	Gap	Spring	2400	Weverton
GR-134	Hollow	Int. Sec.	2300	Catoctin
RM-117	Gap	Undet.	2400	Pedlar
RM-122	Hollow	Per. Pri.	1400	Catoctin
RM-125	Peripheral Saddle	Undet.	1300	Hampton
AB-154	Ridge	Spring	2800	Catoctin
AU-152	Foothills	Int. Sec.	1400	Erwin
AU-153	Foothills	Per. Pri.	1400	Erwin
AU-154	Hollow	Per. Pri.	1400	Erwin
AU-155	Hollow (RS)	Per. Pri.	1440	Erwin
AU-156	Hollow (RS)	Per. Pri.	1440	Erwin
AU-157	Hollow (RS)	Per. Pri.	1440	Erwin
AU-158	Hollow (RS)	Per. Pri.	1440	Erwin
AU-159	Hollow	Confluence	1440	Hampton
AU-160	Hollow	Confluence	1450	Hampton
AU-161	Hollow	Per. Pri.	1480	Hampton
AU-162	Hollow	Confluence	1600	Hampton
AU-163	Hollow	Per. Pri.	1640	Hampton
AU-164	Hollow	Per. Pri.	1680	Hampton
AU-166	Hollow	Confluence	1640	Hampton
AU-167	Hollow	Per. Pri.	1800	Hampton
AU-169	Hollow	Per. Pri.	1520	Erwin
AU-170	Hollow	Per. Pri.	1520	Erwin
AU-171	Hollow	Confluence	1640	Erwin
AU-172	Hollow	Per. Pri.	1680	Erwin
AU-176	Per. Saddle	Undet.	2480	Hampton
AU-12	Hollow	Confluence	1700	Hampton
AB-155	Hollow	Confluence	1480	Catoctin
AB-158	Gap	Undet.	2200	Hampton
AB-164	Hollow	Confluence	1480	Catoctin
RM-3	Hollow (RS)	Int. Pri.	1350	Erwin

RM-124	Hollow	Confluence	1180	Hampton
RM-127	Hollow	Int. Pri.	1400	Erwin
RM-128	Hollow	Int. Pri.	1380	Erwin
RK-102	Hollow	Per. Pri.	2280	Pedlar
RK-103	Hollow	Int. Pri.	1240	Pedlar
PA-101	Ridge	Undet.	2700	Catoctin
PA-102	Ridge	Spring	3400	Pedlar
PA-103	Hollow	Per. Pri.	1480	Pedlar
PA-104	Ridge	Undet.	3360	Catoctin
PA-112	Upland Basin	Spring	3520	Catoctin
PA-113	Upland Basin	Spring	3400	Catoctin
PA-114	Upland Basin	Undet.	3480	Catoctin
MD-112	Hollow	Confluence	2200	Pedlar/Cat.
MD-121	Hollow	Confluence	2200	Pedlar
MD-122	Hollow	Per. Pri.	2160	P edlar
MD-123	Hollow	Confluence	2040	Pedlar
MD-124	Hollow	Int. Sec.	2320	Pedlar
MD-125	Hollow	Per. Pri.	2280	Pedlar
MD-126	Hollow	Per. Pri.	2280	P edlar
MD-127	Gap	Undet.	3060	Catoctin
MD-128	Hollow	Per. Pri.	2400	Catoctin
MD-129	Hollow	Per. Pri.	2020	Pedlar
MD-130	Hollow	Per. Pri.	2000	Pedlar
MD-131	Hollow	Per. Pri.	1950	Pedlar
MD-132	Hollow	Per. Pri.	1880	Old Rag. Gr.
MD-133	Hollow	Per. Pri.	1880	Old Rag. Gr.
MD-134	Hollow	Per. Pri.	1600	Old Rag. Gr.
MD-135	Hollow	Per. Pri.	1540	Old Rag. Gr.
MD-137	Upland Basin	Spring	3480	Catoctin
MD-138	Upland Basin	Per. Sec.	3400	Catoctin
MD-139	Upland Basin	Spring	3400	Catoctin
MD-140	Upland Basin	Spring	3460	Catoctin
MD-141	Upland Basin	Undet.	3480	Catoctin
MD-142	Upland Basin	Undet.	3440	Catoctin
MD-143	Upland Basin	Spring	3440	Catoctin

MD-144	Upland Basin	Spring	3460	Catoctin
MD-145	Per. Saddle	Spring	1840	Old Rag. Gr.
MD-146	Per. Saddle	Spring	1850	Old Rag. Gr.
MD-151	Hollow	Int. Sec.	3240	Catoctin
PA-100	Per. Saddle	Undet.	2600	Catoctin

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