CHAPTER VIII
CONCLUSIONS

"Life can only be understood backwards, but it must be lived forwards."
- Soren Kierkegaard

This final chapter begins with a summary overview of the site investigations, followed by a discussion of the research results organized by the major research issues used in the project research design (subsistence, settlement patterns, site formation processes, and technology). This is followed by a discussion of the Barker's Landing Complex, Custer's term for the Late Archaic culture of central Delaware. The chapter concludes with suggestions and recommendations for future archaeological work in Delaware, drawing on the knowledge gained and lessons learned from the Puncheon Run Site.

Without a doubt, the excavations at the Puncheon Run Site represent one of the largest archaeological studies undertaken in Delaware. Although the survey of the Puncheon Run Site cannot compare to some of the other, more massive undertakings, such as the Carey Farm and Pollack excavations, where hundreds of truckloads of earth were moved and thousands of features were documented, the Puncheon Run excavations stand as one of the longest sustained archaeological efforts in recent memory. DelDOT sponsored the first surveys of the Puncheon Run peninsula in 1995, followed by more intensive programs of test excavation and data recovery that extended from 1997 to 1998. The ensuing laboratory studies extended the life of the project by another two years.

The St. Jones/Murderkill River drainage system is a distinctive archaeological region with many unique sites, and the excavations at Puncheon Run provided an outstanding opportunity to investigate a broad area of the region's prehistoric landscape and to bring fresh perspectives to the study of subsistence, settlement patterns, chronology, site formation processes, and technology. Any project that stretches over so many years should provide ample opportunities for learning, and Puncheon Run is no exception. Although the Puncheon Run Site was rightly regarded as a unique opportunity for learning about Delaware's Woodland I cultures, it is also important to view the results of the Puncheon Run investigations in a broader context, with reference to the vast amount of archaeological information available from other sites in Delaware and the surrounding region.

As the Puncheon Run project approaches closure, it is appropriate to address a number of questions:

- What did we learn about the archaeology of Delaware?
- What "lessons" did we learn?
- What would we do differently, if a similar opportunity presented itself again?
- What research directions should we continue to explore?
- How can we re-think our methodological approaches for Phase II and Phase III investigations?

- In light of the new regulations (36 CFR 800) for compliance with Section 106 of the National Historic Preservation Act that became effective while the Puncheon Run project was underway (June 1999), what strategies would be effective for involvement of the public and Native American groups?

Answers can be provided to most, if not all, of these questions, and the investigators have attempted to weave their own answers to these questions into the topical discussions that follow. There are no single "correct" answers, and these are not necessarily the only questions that can and should be asked. Although we have gathered and processed a large volume of information, there is still much to learn. Perhaps the most important thing to be learned is how to ask new questions. It is expected that each reader will bring a unique point of view and draw their own conclusions.

A. Summary of Findings

Puncheon Run represents a series of camps or processing sites occupied by small groups of people between 7000 BC and AD 1500. The main occupations took place between 3000 BC and AD 1000, a period known in Delaware as the Woodland I period. Evidence of human activity was spread out across the entire Puncheon Run peninsula, an area of about 10 hectares (24 acres). The survey and testing investigations were conducted across the peninsula, providing information about the distribution of artifacts and features across the landscape. The final data recovery investigations focused on five areas of the site.

Two of the five areas were at the eastern end of the site, designated Locus 3, near the St. Jones River. The Metate block was a contiguous block of 74 1x1-meter units excavated to investigate buried archaeological deposits that proved to date to the early Woodland I or Late Archaic period, circa 2800 to 1200 BC. Finds in this area included at least three prehistoric hearths, a large metate, numerous small, contracting-stemmed projectile points, concentrations of debitage, and other artifacts. This area has been interpreted as a spring or fall fishing camp. The Feature 30 block was an excavation focused on three large features. Two of these were deep pits with volumes of about 4,000 liters; both of these pits showed signs that they had been lined with silty soil, and one may have had a shelf around the sides. These features may have been storage pits, or they may have had some ritual purpose. The third feature was a shallow pit measuring about 3x4 meters. Occupations in this area took place throughout the Woodland I period, but the main use seems to have been in the later Woodland I or Middle Woodland period, circa AD 500 to 900.

The other three areas of excavation were in the western portion of the site, designated Locus 1, along Puncheon Run, where it is a free-flowing stream. The Silo Pit area was a broad terrace that contained prehistoric pit features, but relatively little other evidence of prehistoric occupation. Removal of the plowzone from an area of roughly 40x40 meters exposed around 44 soil anomalies, 31 of which were excavated. Sixteen of these were interpreted as cultural pits, including a cluster of 11 cylindrical storage pits ("silos") radiocarbon dated to between AD 1 and 450, and at least two other similar pits dating to between 700 and 400 BC. Very few artifacts were recovered in this area; however, one isolated feature, the outline of which had been obliterated by rodent tunneling, contained more than 100 sherds of steatite-tempered pottery. Some of these sherds may have derived from just two vessels, one identified as Marcey Creek and one as Selden Island, which date

to between 1200 and 800 BC. The Cobble Bar area was a small excavation (3x3 meters) intended to sample a lithic resource procurement station along Puncheon Run. This debitage concentration, most of which extended outside the project area, derived from the manufacture of stone tools from cobbles collected in gravel beds exposed along the stream. Just west of the Cobble Bar area was the Buried Plowzone area, where historic slope wash had buried a campsite, contributing to the preservation of prehistoric pottery. In the Buried Plowzone area, 37 1x1-meter units were excavated, and more than 3,800 artifacts were recovered. The artifacts include sherds of most of the types known from central Delaware, from Marcey Creek to Townsend (AD 1000 to 1600), indicating that people camped in this area from before 800 BC to after AD 1000. South State Street, the old colonial road, runs close to the Buried Plowzone area, which may represent a Native American campsite situated near a former spring or along the trail that was the road's predecessor.

Although very little can be said about the part of the site that was set aside for preservation (in Locus 2), it is important to emphasize the importance of this element of the program. This part of the landscape contains evidence of an Archaic occupation, and, since it will remain in state ownership, it will be available for future investigations. The importance of site preservation cannot be overemphasized, as there are still many unanswered questions in Delaware archaeology.

A variety of technical analyses were performed as part of the Puncheon Run investigations, including soil flotation and study of macrobotanical remains, phytolith analysis, extraction and identification of protein residues from stone tools, soil chemistry and particle size analyses, microscopic analysis of edge wear on stone tools, and radiocarbon dating. The project also included studies of ethnohistoric sources for Native American life in the region and collections from other archaeological sites in the vicinity. The analysis has focused on questions of importance to the study of regional prehistoric, especially subsistence, settlement patterns, and the relationship between individual archaeological sites and the broader landscape.

B. SUBSISTENCE

One of the main problems with the study of prehistoric Native Americans in Delaware is a lack of information on subsistence practices. Because of the sandy, highly acidic soils, it is very unusual for plant or animal remains to survive in archaeological contexts except in very unusual conditions. Essentially all of the subsistence information available so far from the St. Jones drainage comes from a single feature at the Carey Farm Site (see Chapter II). The lack of subsistence information makes it difficult to understand the economic base of Native American societies in the region, their settlement patterns, their degree of mobility, and other important issues.

At Puncheon Run, a variety of techniques was used to obtain subsistence information. More than 200 liters of soil were processed by flotation to recover botanical specimens. Wood charcoal, which provides data on the site environment, was recovered in small amounts, but only a small number of charred seeds and nut fragments were found, and the integrity of these finds was called into question by the discovery of modern, uncharred seeds in most of the samples. The potentially important specimens identified included hickory nutshells, a few goosefoot (*Chenopodium*) seeds, and one seed from an American lotus (*Nelumbo lutea*). Phytoliths were extracted from 27 samples taken from feature and non-feature contexts around the site, and these were analyzed for information on

plant use. Only one sample, from the bottom of one of the silo pits, stood out from the site background; that sample produced a large surplus of grass phytoliths, suggesting that the pit had been lined with grass. No food species were identified.

Protein residues were extracted from a number of stone tools from the site, and these were tested for species identification using the cross-over immuno-electrophoresis technique. The species identified included American eel, gizzard shad, Atlantic croaker, striped bass, bay anchovy, and deer, and the results from Locus 3 suggest a heavy reliance on fish. However, difficulties with this method, including false positive results in the control samples, call these results into question.

One of the most interesting and unexpected findings from the protein residue studies was that two modern, replicated points, submitted as controls, returned positive results for deer protein. In searching for an explanation for this result, it was realized that these points had been made with an elk antler billet and a deer antler percussion flaker, and that these knapping tools could have left protein residues on the finished points. It is thought that prehistoric tool-makers also used antler tools. This could explain much of the deer protein that has been detected on stone tools (Jacoby 1999). There is much other evidence, in the form of ethnohistorical documents and bones from archaeological sites, that indicates that Native Americans relied heavily on deer for food; however, the Puncheon Run results raise questions about the validity of protein residue studies that emphasize deer procurement at individual sites.

Information on subsistence practices was also sought through less direct methods. Subsistence was one of the main topics pursued in the ethnohistorical research. Although data on historic Indians cannot be applied directly to their ancestors of 2,000 years earlier, information was acquired on the range of available resources in the region and some possible strategies for acquiring them. Historically, anadromous fish and deer were the most important animal foods in the region, supplemented by turtles, oysters, crabs, waterfowl, and other small animals. Important plant foods included tuckahoe—a marsh root that may have been arrow arum, golden club, pickerel weed, or wakerobin—nuts, berries, and small seeds.

Another topic investigated in the ethnohistorical literature was pit storage, and the pits from Puncheon Run were also compared to other clusters of pits that have been excavated on archaeological sites in the region. The results of these studies indicated that storage pits were not simply used for the long-term storage of staple foods at village or base camp sites. They have been found at several types of sites, including small sites with no evidence of long-term occupation, and ethnohistorical accounts indicate that they may have been used to store all manner of materials. The pits in the Silo Pit area of Puncheon Run were most likely used to store food at a processing site some distance removed from any camping area; this strategy of remote storage may have been used simply for convenience, or to conceal the stored items from enemies, greedy chiefs, or others who wanted to take it. Information from the edge-wear analysis of stone tools was also considered from the perspective of subsistence. Most important in this regard was the discovery that most of the small, contracting-stemmed points showed wear characteristic of piercing flesh, which indicates that they were used as spear points. Since very few of these points were broken in the stem area, as is characteristic of thrown projectiles, it was surmised that they were used as thrusting spears, possibly for spearing fish trapped behind a weir.

The ethnohistorical literature indicates that Native Americans did not only focus on the food resources available to them. Plants that were valuable as medicines, as dyes, and for sacred purposes were also key parts of their environment. For example, a plant known as "Holy Grass," *Hierochloe odorata*, has been found in Maryland and Delaware only on archaeological sites, and it may have been introduced into the region by Native Americans because of its religious significance (see Volume II, Appendix E).

C. SETTLEMENT PATTERNS

One of the most distinctive characteristics of the Puncheon Run Site is that the archaeological features and deposits were spread over a very broad area, more than 8 hectares (20 acres), rather than being concentrated in a smaller, compact area that would be traditionally viewed as a single archaeological site. This allowed analysis to proceed from a broader perspective, enabling the identification of discrete activity areas or loci within the landscape, and led to new insights on prehistoric settlement patterns and their relationship to the larger landscape.

One of the most ardently disputed issues in Delaware archaeology concerns housing and the definition of household occupation areas. Large numbers of semicircular or "D-shaped" pits found on sites in central Delaware have been identified as the basements of semisubterranean houses, and this identification has been used to study households and communities (Custer 1994). The status of these so-called "pit houses" is much in dispute, calling into question the statements about community size and other issues that have been based on analysis of the sites where these features are found. One of the initial goals of Berger's investigations at Puncheon Run was to locate and investigate such features, with the intent of shedding light on this issue.

At the outset of Berger's investigation of the Puncheon Run Site, it was expected that as many as 300 to 400 pit house features might be found, and the first phase of site testing was designed specifically to examine such features. The expectation of numerous pit house features was not borne out, and the research design eventually focused on other issues. During the entire program at Puncheon Run, only two possible candidates for semisubterranean houses were identified. One of these "house" features, Feature 32, was determined to be a natural disturbance; the other, Feature 37, was never conclusively identified, although it contained more than 453 artifacts. Numerous pit features were identified during the Puncheon Run excavations, and many were carefully excavated (see Volume II, Appendix K); however, none of these pit features fit the model (Custer 1994) of a semisubterranean house.

Housing was also one of the foci of the ethnohistorical literature review. In the ethnohistorical record, only one type of house construction is discussed for the whole of eastern North America: wigwams built of bent saplings and covered with bark or reed mats. No pit houses are mentioned by any of the seventeenth- or eighteenth-century writers. The only semisubterranean structures described for the region were sweat lodges, but these should be distinguished by internal hearths, which are not regular features of the semisubterranean "houses" of Delaware.

Of course, the lack of pit houses at Puncheon Run does not prove that this type of residential structure was never used at other sites in Delaware. The Woodland I manifestation at Puncheon Run

is viewed as a series of very short-term occupation areas, resource procurement and processing areas, resource caching areas, and possibly ceremonial loci. Pit houses in Delaware are considered to be associated with cold-weather (winter) occupations, and the information available from Puncheon Run points to spring, summer, and autumn occupations.

Since direct evidence of houses was lacking at Puncheon Run, examination of small-scale community patterns focused on hearth areas, following the assumption that hearth areas represented the focal areas of campsites (Plate 43), as in the "Binford model" of hunter-gatherer campsites (Binford 1983:149). At Puncheon Run, a number of hearth areas had been identified in Locus 3 during the extended Phase II work; however, that phase of work involved mechanical plowzone stripping to search for pit house features. This provided an effective means for identifying subplowzone features but with the attendant sacrifice of data from the plowzone. The final data recovery program in Locus 3 began with a search, a "fishing expedition," for an intact hearth area, which would then become the focus of a large block excavation. The fishing expedition identified a number of additional hearths, represented by clusters of fire-cracked rock, but the discovery of a large grinding stone, or metate, effectively redirected the final data recovery program in Locus 3. The metate was considered such a unique find that it was selected as the focal point of a block excavation. Ultimately, the Metate block excavation encompassed a number of hearth areas, effectively realizing the original goals for data recovery in this area of Locus 3.

The type of small-scale patterning seen in the Metate block appears representative of activities associated with resource processing and ancillary activities. Multiple lines of analysis suggested that fish processing was a key activity. The common artifact type was small, narrow-bladed, stemmed points ("pebble points"), believed to have been used for spearing fish, but a variety of other tool types were also present. A number of small hearth areas, represented by fire-cracked rock clusters, were scattered around the area, and small-scale spatial analysis showed a number of concentrations of debitage that represented lithic workshop areas, perhaps no more than single events associated with the reduction of one or more cobbles. The spatial clustering within the Metate block and nearby areas appeared as random or informally grouped "behavioral nodules" associated with small groups. There was no evidence of an organized community plan, comparable to the household clusters identified at other Woodland sites, such as Carey Farm and Snapp.

According to Custer's Woodland I settlement model (Custer 1994), interior storage pits are a feature of the typical semisubterranean pit house (Figure 72), and the discovery of small, D-shaped pits in subplowzone contexts has been put forth as evidence of pit houses. At the Puncheon Run Site, the largest cluster of storage pits was identified in Locus 1, an area of the site with very little of the material normally associated with occupation sites. The simplest (and therefore the most favored) interpretation for the concentration of storage pits in this area was that this was an "outlying" place used for caching seasonally available surplus foods, located away from the main habitation area, possibly to provide some measure of concealment of the stores. This interpretation would fit with a logistical model of collecting, wherein highly mobile hunter-gatherer groups range through various environmental zones, harvesting, processing, and caching seasonally abundant foods. Storage pits would have been established at or near the places used to harvest seasonally available resources. In this model, the presence of storage pits does not imply increasing sedentism but instead points to a scheduling strategy that allowed a time lag between harvest and consumption. Resources would

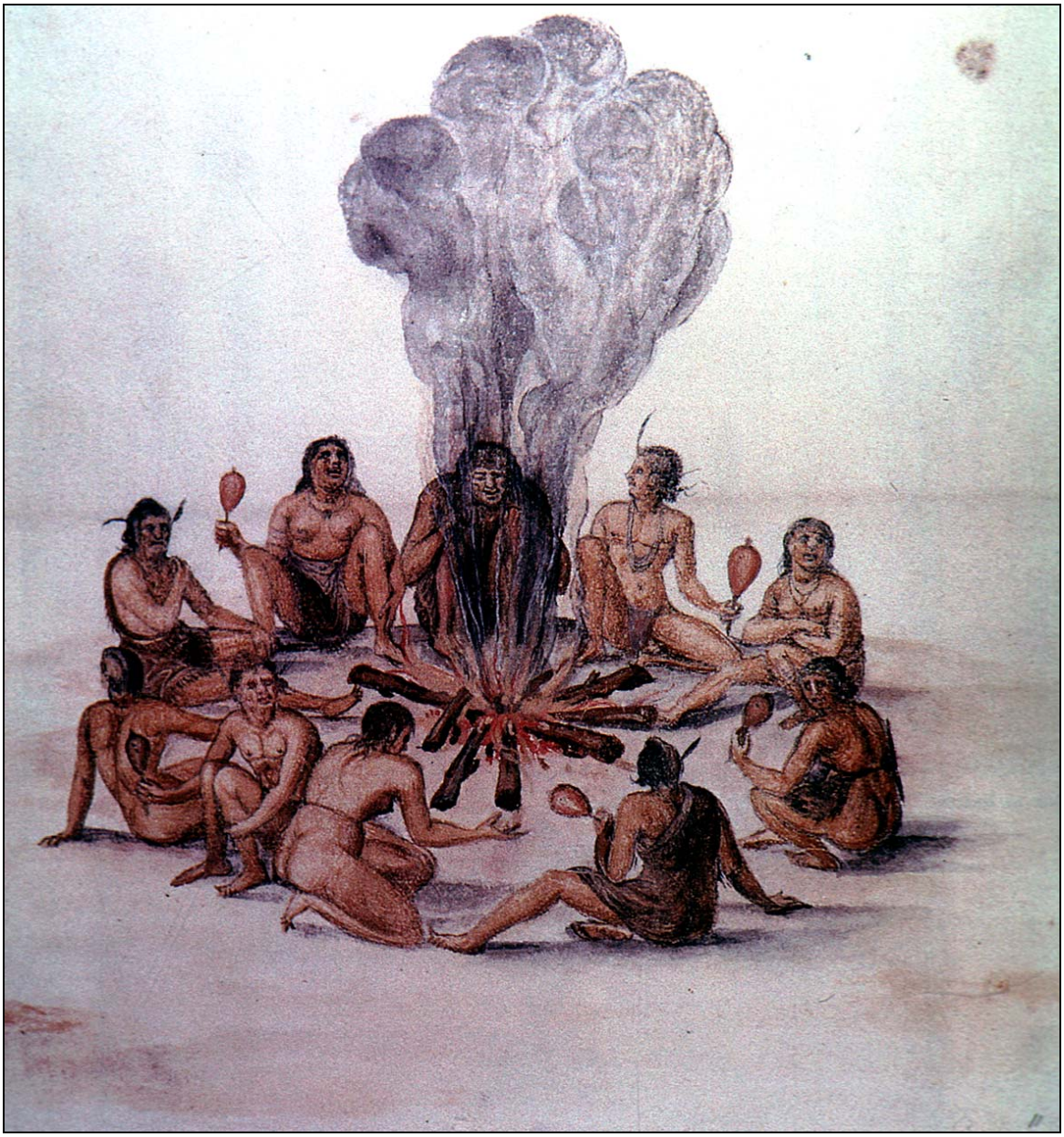

PLATE 43: *Indians Round a Fire* *SOURCE: Painting by John White, circa 1585*

have been cached in locations where they were safe from animals and human enemies and available for consumption during lean times. Without conclusively addressing the issue of house pits, the Puncheon Run Site investigations indicate that storage pits are not necessarily a feature of residential sites. Woodland period hunter-gatherer groups may have used storage pits that were broadly distributed across the landscape, in locations that were deliberately isolated from their main habitation areas, to conceal their surplus foods from plundering animals, enemies, or emerging elite classes who demanded tribute.

Settlement pattern studies must address the question of community composition, which is still one of the most elusive questions regarding the prehistory of Delaware. What was the size and composition of the Woodland I groups who ranged within the St. Jones River drainage? Despite the great interest in "breathing life into the artifacts," the Puncheon Run Site investigations have made admittedly little headway in this regard, at least with regard to direct information. The current model, espoused in Delaware and surrounding Middle Atlantic states, features microband and macroband base camps, which would have been occupied by groups organized at a band level of social organization. The communities associated with microband and macroband camps would have been composed of extended family households; the total group size would have fluctuated between microband and macroband, but the groups would have had an essentially similar social composition.

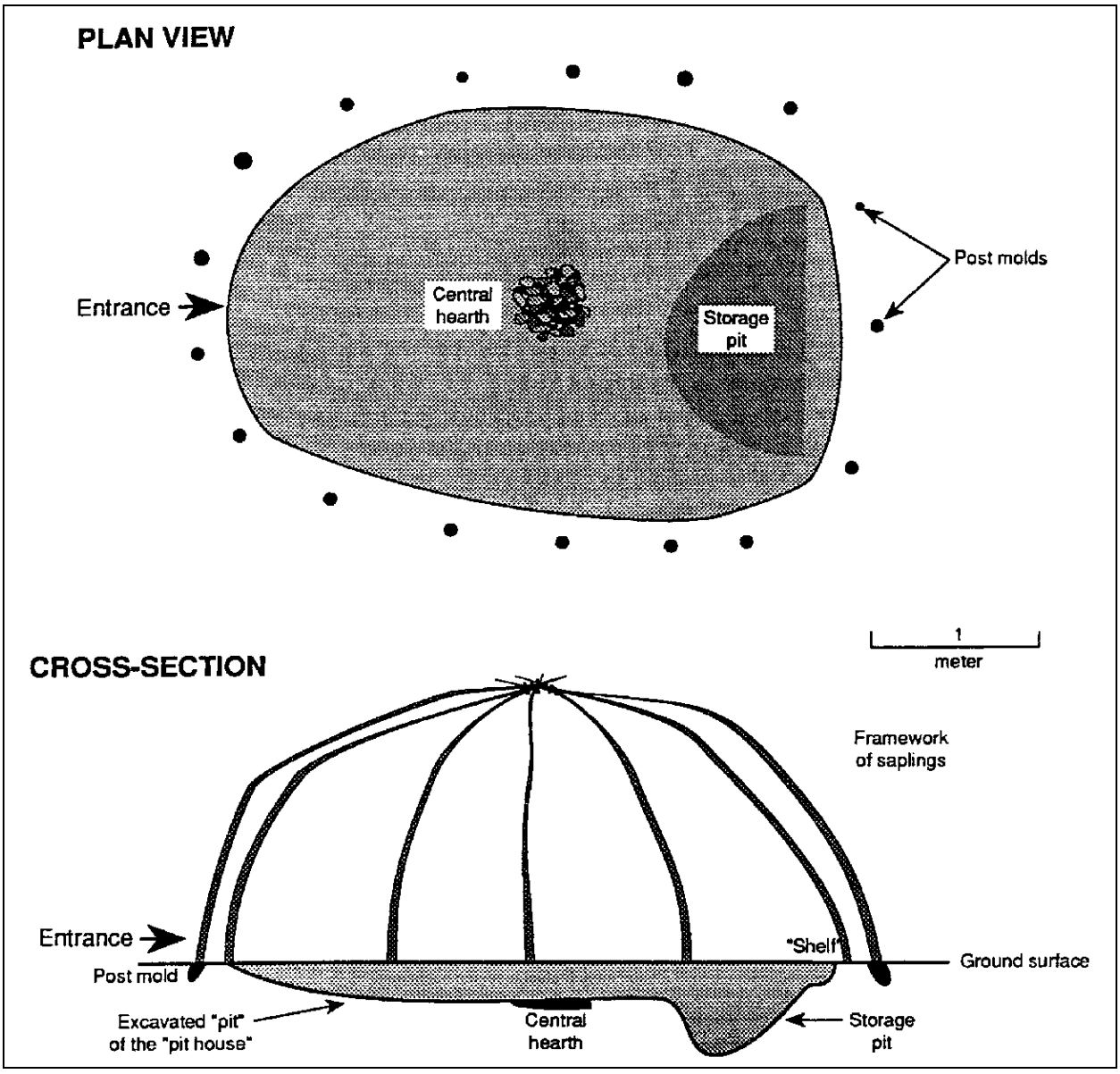

FIGURE 72: Pit House Architecture *SOURCE: Custer 1994*

However, the perspective afforded by this study, with activity areas distributed across the landscape, provides an opportunity to view this issue differently. The wide separation of activity areas in discrete loci conjures up images of small task groups, perhaps formed on the basis of age or gender —for example, groups of women engaged in one set of activities, or men engaged in another.

Of course, we have no real basis to assume that the social fabric of Delaware's Woodland I Native American groups was organized by strictly defined gender roles. While archaeologists have often relied upon stereotypical views—men hunt and fish; women gather and process plant food—and almost unfailingly interpreted activity areas (except for mortuary sites) in purely economic terms, one is challenged to think more creatively when asked to view the world from the point of view of children or the elderly. Portions of the landscape take on a broader meaning when questions such as the following are asked: What happened in the "empty spaces" between work areas, resource processing stations, lithic tool manufacturing areas, and the like? Where did children run and play? What forms of recreation did the community engage in? Surely the landscape was crisscrossed with a network of trails and paths and dotted with special places that we can only imagine.

The settlement pattern models commonly put forth for the Woodland I period often feature seasonal movement of hunter-gatherer groups through a fairly well-defined sequence of base camps and resource procurement areas. Seasonality is a key feature of these models, and the typical view is that major subsistence resources are the key determinants for seasonal movements of hunter-gatherers. Such simplistic models need to be reformulated, particularly for the Woodland period, when storage technologies allowed for accumulation of surplus and a lag or seasonal shift between the season of harvest and the season of consumption. Statements of seasonality are based on speculation as to the resources being extracted (anadromous fish, wetland tubers, etc.), but there is little direct evidence of the use of specific, seasonally available resources. The few fragments of charred hickory nutshell, found at almost every archaeological site, are typically put forth as evidence of an autumn occupation. Archaeologists will continue to wrestle with these questions of seasonality in Delaware, and the Puncheon Run Site illustrates the lack of direct subsistence data as clearly as any other site. Dietary bone from archaeological contexts was virtually nonexistent, and upwards of 35 cubic meters of feature fill were excavated without the recovery of a significant dietary faunal or floral assemblage. Can we realistically continue to pursue questions of subsistence and seasonality with our current techniques?

Although is it generally accepted that the Mid-Drainage Zone of the St. Jones River provided an abundance of resources associated with the riparian and adjacent wetland habitats, one should not assume that these were the only resources in the Woodland I subsistence regime. The ethnohistorical literature search (see Volume II, Appendix E) demonstrated that a very broad range of upland resources was used by Native American groups, not only for subsistence but also for medicinal, recreational, and spiritual purposes.

One should not be tempted to envision entire communities moving, in straight-line fashion, from one food source to another. Surely, individuals and small groups ranged widely across the landscape to obtain resources that were endemic to very specific locales. Native American groups would have understood the unique qualities of certain lithic materials, such as rhyolite and argillite, which had to be obtained from sources outside of the Delaware Coastal Plain. Certain medicines or potions

would have required specific bark, moss, or roots that were not distributed widely within the natural landscape. Animals, which often embodied protective spirits, also favored specific habitats which would not coincide with the environments that provided daily foodstuffs. A more complete picture of settlement patterns should account for these complexities within the cultural and natural landscape. As in the modern culture of North America, the Native American landscape was much more than a series of eating places and work areas; many places were imbued with spiritual, ceremonial, or social significance.

Among the site types that appear in settlement pattern models for the Woodland I period, the Puncheon Run Site is most readily identifiable as a series of procurement stations and processing loci, spread across a large landscape. One of the more interesting insights is that the spatial separation of these loci enables them to be viewed as distinct areas, not necessarily used by the same group. This observation calls into question the very notion of a base camp, that is, a compact habitation area where a group would have remained for a duration of weeks or months and where a wide variety of tasks related to resource processing, storage, and consumption would have been carried out. The complexes of remains that have been interpreted as such base camps could just as well have been created by separate groups visiting the same spots over the millennia, each with a very different purpose.

Another find with implications for the study of settlement patterns is the large objects that might be referred to as "site furniture." The primary examples from Puncheon Run were the large metate in the Metate block and a large anvil stone found in Phase II Block 5 nearby. These heavy objects were probably not moved often, but the difficulty of placing them on the site in the first place suggests that they were intended for repeated use. Therefore, their presence on a site may indicate that people returned regularly to that spot. However, neither the metate nor the anvil shows particularly heavy wear. If the same people returned to Puncheon Run every year at the same seasons to do the same things, much heavier wear should have been evident. Perhaps the notion that prehistoric Native Americans would not carry a heavy stone up onto the site for a single use is mistaken, or perhaps the people who brought the heavy stones onto the site intended to come back but never managed to return.

D. Site Formation Processes

Archaeological interpretation of cultural behavior must rest on a sound understanding of the processes that shaped the archaeological record, generally referred to as site formation processes (Schiffer 1983, 1987). A number of studies were undertaken that provided specific information on site formation processes at the Puncheon Run Site:

- geomorphological investigations;
- soil chemistry analysis;
- artifact distribution studies, including refitting of fire-cracked rock; and
- excavation of a groundhog den.

The biomantle concept has been particularly useful for the study of site formation processes at Puncheon Run. As described by Johnson (1993), the biomantle consists of the upper layer of the

soil, which is constantly being churned by insects, burrowing mammals, plant roots, tree throws, and other biological agents. These processes cause artifacts left on the surface to move downward through the soil profile, burying them without any deposition of soil on the site. Particularly in Locus 3, it was necessary to account for the burial of artifacts and features, which could have been attributed to burial by the introduction of new soil by wind or water or to some process by which artifacts move downward through the soil. In this case, the geomorphological investigations, which included soil particle size analysis (see Volume II, Appendix A), determined that artifact burial could not be attributed to the introduction of new soil (by aeolian deposition, for example), so the biomantle model was adopted as the best model to account for the burial of artifacts.

The geomorphological investigations were initiated early in the program to examine a broad range of phenomena, ranging from the genesis of regional landforms to the interpretation of individual features. One of the most useful methodologies in this regard was the detailed examination of individual soil profiles, as manifested in cultural strata, features, and control columns. Field observations and interpretations were checked against laboratory analysis of soil particle size distributions, which permitted a more confident interpretation of soil genesis. Soil chemistry tests were undertaken primarily to assist in feature interpretation.

During the initial testing, a program of soil micromorphology analysis was undertaken in an attempt to understand the character of soils within and at the boundaries of suspected cultural features. The samples were analyzed by a method that relies on microscopic examination of an intact soil column. Using this method, small fragments of B- and C-horizon soil may be identified, and this can help to determine the origin of certain types of features. It was specifically expected that this technique would provide the means to identify the floors of pit houses. The soil micromorphology study identified a variety of disturbances in the feature fills, especially in the upper levels, that were visible at the microscopic scale; these processes, such as worm and insect activity, could account for the movement of smaller artifacts and seeds through the soil profile (Goldberg and Arpin 1998). As the ensuing field investigations did not identify any good examples of pit house features, soil micromorphology was not pursued further. The soil micromorphology results did confirm the presence of an active biomantle at the site.

Actualistic data on another aspect of the biomantle, animal burrowing, was obtained by the controlled excavation of a woodchuck den. A literature search, focusing on sources available through the Internet, turned up much information on the general behavior of woodchucks, including studies that measured the rates of soil translocation attributable to woodchuck burrowing (see Volume II, Appendix L). Excavation provided basic information on the size and configuration of a woodchuck den at Puncheon Run, with burrowing reaching a maximum depth of 1.5 meters below ground surface. This has important implications for artifact translocation, as well as soil chemistry analysis. Chemical test results showed that contexts associated with woodchuck dens had very high levels of phosphorus, potassium, and manganese, as well somewhat elevated levels of organic matter. In light of these results, the idea that certain chemical signatures might be useful to distinguish cultural versus natural features no longer seems so viable.

Artifact distribution studies are often undertaken to identify activity areas, but they can also elucidate postdepositional processes. These analyses were undertaken in the Metate block, which

provided the most comprehensive excavation data from the entire site. Analysis of distribution of lithic debitage, controlling for size categories, led to at least two important findings. First, the presence of well-defined clusters of debitage, interpreted as lithic workshop areas, often confined to a single 1x1-meter excavation unit, indicated that the site had retained a high degree of "horizontal stratigraphy," which would support fine-grained analyses of intrasite spatial patterning. The second important finding was related to vertical distribution of debitage; controlling for raw materials associated with specific cultural components, the vertical distributions indicated a weak, but nonetheless identifiable, vertical cultural stratigraphy. Even though the archaeological deposits were confined to loose, easily worked sandy soils, bioturbation processes had not obliterated patterning in the data related to cultural phenomena.

Refitting, or cross-mending, of fire-cracked rock fragments from the Metate block also suggested that there had been relatively little postdepositional disturbance to the archaeological deposits in Locus 3 (see Volume II, Appendix N). Most refits were within defined features, and horizontal refits (those within the same excavation level) far outnumbered vertical refits (those involving different excavation levels). Vertical displacement of relatively heavy elements is thought to be caused primarily by floral and faunal agency (bioturbation). The low frequency of vertical refits, therefore, suggests that the degree of postdepositional disturbance was low. Interestingly, when vertical displacement was present, the upper specimen was much more likely to be the smaller mass. This finding suggests that not all vertical artifact migration is oriented downward, as suggested by the debitage size sorting. Rather, it appears that within a certain size threshold, artifacts may be more likely to move upward, most likely propelled by freeze/thaw cycles.

Refitting is an analytical technique that has been used by many researchers to examine archaeological site formation processes. Despite the widespread use of this technique, the results of cross-mend analyses have been frequently misinterpreted. The most common error is to assume that conjoinable fragments of an object establish contemporaneity between archaeological contexts. For example, many investigators assume conjoinable artifacts excavated from different levels or strata demonstrate that these contexts represent a single depositional event, ignoring scenarios that would involve selective reuse or redeposition of fragments of the same object. Schiffer has pointed out that different classes of artifacts vary significantly in their ability to reflect formation processes through refitting analysis. For example, flakes from a lithic core are subject to a variety of activities associated with manufacture, use, and discard, so that they are not particularly useful for identification of activity areas or depositional units (Schiffer 1987:285-287).

Evidence of the soil mixing envisaged in the biomantle model is provided by the flotation of soil samples taken at Puncheon Run. Uncharred, modern seeds were found in almost all of the samples, including those taken from apparently intact prehistoric features. Samples taken from Stratum B, Level 3 in the Metate block, between 10 and 20 centimeters below the bottom of the plowzone, contained as many as 136 modern seeds. Samples from Level 4 contained many fewer seeds, no more than eight, but all of the samples investigated contained at least one modern seed. The presence of these seeds, along with the absence of any evidence for soil deposition in this part of the site, supports the argument that the artifacts were buried by a mixing of the soil by biological agents. Further evidence for the biomantle hypothesis is provided by an analysis of the vertical distribution of flakes in the Metate block. The average flake size decreases uniformly with depth regardless of

raw material (see Chapter IV). It is hard to imagine any cultural or depositional mechanism that would explain this trend, but it is just what one would expect if the artifacts were in fact being buried by soil mixing.

The biomantle concept is also relevant for interpreting pit features. Even the most apparently intact pit features contained modern materials. One 2-liter sample from Level 3 of Feature 51, 20 to 30 centimeters below the bottom of the plowzone, yielded 21 carpetweed seeds, four wood sorrel seeds, two spurge seeds, and one chickweed seed, all uncharred. Charcoal from this same level returned a radiocarbon date of 2,440±50 BP. Feature 51 was a storage pit, without visible rodent tunnels or other obvious disturbances. Some of the other features in Locus 1 had been so disturbed by groundhog tunneling that their original outlines could not be discerned during excavation.

The upper edges of many features at the interface of the plowzone and subsoil had been blurred by bioturbation processes. Features 30 and 38 were both effectively invisible at the bottom of the plowzone, as was Feature 14, a large anomaly in the Buried Plowzone area. The top levels of these features had blended so completely with the surviving E-horizons in these areas that they were indistinguishable. Only beneath the E-horizon could clear edges for these features be discerned. Most of the features in the Silo Pit area were visible at the base of the plowzone, but this area had seen much greater erosion in recent times, and no E-horizon was present. Even in this area, the boundaries of some features were misread at the plowzone interface, and their true outlines did not become apparent until excavation proceeded more deeply into the subsoil. The evidence from soil flotation shows that much more mixing has taken place in the upper levels of the features. For example, whereas a sample from Level 2 of Feature 50 contained 34 modern seeds, a sample from Level 5 contained only three. The nine samples taken from Levels 1 through 3 in the features of the Silo Pit area yielded an average of 13 seeds, whereas the 13 samples from deeper levels yielded an average of one uncharred seed. This demonstrates the importance of obtaining soil samples from deep contexts, as they are less likely to contain a modern seed assemblage.

Feature fills generally exhibited more biological activity than the adjacent subsoil contexts. The features of the Silo Pit area all had crisp edges at depths (20 to 30 centimeters below the plowzone interface) where they were still heavily contaminated with modern seeds. One explanation for this is that the feature soils, which were looser and richer in organic remains than the surrounding subsoil, drew animals and plant roots into them. A feature, then, especially one in which organic wastes have been deposited, is an attractive microenvironment for burrowing insects and animals, as well as tree roots, which penetrate more deeply into feature fills than into undisturbed subsoils.

E. TECHNOLOGY

Lessons learned with regard to Native American technology were derived primarily from lithics analyses, including an edge-wear analysis of selected tools, experimental replication of narrow-bladed, stemmed points ("pebble points"), analysis of production strategies (specifically, core reduction modes), and the examination of general assemblage characteristics as viewed in the proportions of curated versus expedient tools. Other information regarding technology was gained through the analysis of features, especially storage pits. Subsistence technology was also approached indirectly, through protein residue studies; the important fish species native to the region

range from the massive sturgeon to the small bay anchovy, and these would require different technologies to harvest: nets for bay anchovies, for example, and spears and gaffs for sturgeon. An effort was made to place the Puncheon Run Site into a broad regional perspective, and this involved examination of museum collections and review of excavation reports for other sites. Although the review of excavated collections and site reports highlighted the unique character of the Puncheon Run Site as well as other sites along the St. Jones River, the comparative effort was perhaps not as successful as was hoped, primarily because of the lack of comparable data, especially for formal tool types.

Edge-wear analysis, using microscopic identification of wear patterns, provides a much more direct indication of tool function than the study of their shapes. For the Puncheon Run Site, interpretation of wear patterns on archaeological specimens was supported by experimental creation of use-wear patterns, as well as a large body of published literature. The major lessons learned from the edge-wear analysis were as follows:

- the formal characteristics of tools are not particularly good indicators of tool use or function; and
- many expedient tools, particularly utilized flakes, are probably unrecognized during an analysis that relies on macroscopic identification of formal characteristics.

The use patterns of two of the most important formal tool types in the Puncheon Run Site assemblage were confirmed by this method: the small, contracting stemmed points generally showed wear consistent with spear points, while the wear patterns on the edges of endscrapers were consistent with use for scraping. However, the edge-wear study also showed that tool shape and function cannot be equated in a simple way. Some of the projectile points, especially some of those with broken tips, had been reused as scrapers. Edge-wear analysis of informal tools, such as cores and utilized flakes, showed that these tools had been used for cutting and scraping a variety of different materials, information that was not at all apparent from their forms. The range of uses associated with utilized flakes includes generalized cutting, scraping of soft materials, cutting of medium/hard material, cutting grass, wood shaving, scraping or carving wood, and butchering flesh. These tool functions are not at all apparent from a macroscopic examination.

Although edge-wear analysis should play a greater role in future investigations, some limitations must be noted. First, it requires sophisticated equipment that is typically available only at a few universities and research laboratories; this type of analysis cannot be done on a kitchen table. Wear patterns are most clearly recognized on high-quality lithic material, such as chert and jasper. Quartz and quartzite, which form a major portion of the archaeological assemblages in the Delaware Coastal Plain, are not well suited for the identification of edge-wear patterns. Soft, easily eroded materials such as argillite and siltsone, which are also found at Delaware archaeological assemblages, are entirely unsuitable for edge-wear studies.

These insights into tool function also have important implications for settlement pattern studies. First, they provide specific information regarding the range of activities carried out at each site,

which, along with features and other classes of archaeological remains, forms the basis for classifying sites into types such as procurement stations or base camps.

The identification of wear patterns on expedient tools such as utilized flakes also contributes to the more general identification of *expedient* versus *curated* technologies as described by Parry and Kelly (1987). In this classification, a curated technology is characterized by emphasis on the use of bifacial tools produced in a standardized way from flakes or blades struck off prepared cores. In an expedient technology, most tools are unmodified flakes struck off unprepared cores, and there are few bifaces or other formal tools; expedient flakes are struck off cores in an almost random way, with little distinction between tools and waste, as virtually all of the resulting flakes are potential tools. Parry and Kelly argue that curated technologies are generally associated with highly mobile populations, and expedient technologies are associated with more sedentary groups. The existing model of Delaware's Woodland I period emphasizes an increasingly sedentary settlement pattern, as manifested by larger base camps and storage pits. The Puncheon Run investigations do not support the model of increasing sedentism during this period, but this question might be pursued in the future by greater attention to lithic technologies. Such an approach to understanding settlement systems must rely on a much more rigorous level of lithic analysis than is commonly practiced, at least in the Middle Atlantic region, and would place greater emphasis on edge-wear studies.

Lithic technology studies in the Middle Atlantic region, particularly in the Coastal Plain, emphasize the importance of cobble reduction technologies, including bipolar reduction. These technologies are well documented in numerous excavation reports, including this one. However, it is time for the level of interpretation to rise beyond the technological processes of tool production. More sophisticated questions must be framed, which in turn call for new analytical approaches. Analysis of the Puncheon Run Site assemblage deviated from the more standard, trait-based approach, instead emphasizing the characteristics of whole assemblages (mass analysis) rather than individual pieces of debitage. Perhaps more importantly, experimental replication studies were undertaken using locally available lithic material, from which stone tools and their associated debitage assemblages were made. The debitage assemblages generated by the experimental tool replication served as baseline or control assemblages for comparison and interpretation of the actual archaeological assemblages from the site. The use of experimentally based assemblages as controls provided a measure of validity to the archaeological interpretations than would have been possible with purely theoretical models. It is believed that this analytical approach, including the mass analysis approach to assemblage analysis, will be useful in future studies.

One example of how this approach might be applied in future studies is directly related to the question of curated versus expedient technologies. Experimental tool replication provided a series of assemblages which represents the production of finished tools characteristic of a curated technology. Presumably, an expedient technology would produce a distinct debitage assemblage, specifically one characterized by relatively little debitage associated with the final shaping of late-stage bifaces into finished tools. At Puncheon Run, the average debitage size in the archaeological collections was larger than in the experimental collections resulting from the manufacture of points, suggesting that the manufacture of expedient tools or rough bifaces was indeed one of the major activities at the site; however, further analysis, including experiments on the manufacture of the full range of tool types, would be necessary to confirm this.

One technology that is particularly well represented at Puncheon Run, and at many other sites along the St. Jones River, is the use of storage pits. Excavations at Puncheon Run documented at least 16 pits with silo or deep basin shapes on the site, all apparently dug by humans. The earliest such pit with a secure date was Feature 69, which contained Marcey Creek and Selden Island sherds, dating it to before 800 BC. Because the outline of this feature had been obscured by rodent tunneling, its original form cannot be determined in detail. The earliest pit with a clear silo shape was Feature 41, radiocarbon dated to 785 to 400 BC; this feature measured 90 centimeters deep, had steeply sloping sides and a flat bottom 105 centimeters in diameter, and had a volume of approximately 960 liters. Feature 51, of similar date, was a deep basin much smaller than the other pits on the site, with a volume of only 209 liters. The largest group of features was the Main Pit Cluster in the Silo Pit area, which contained 11 features dating to between AD 1 and 450. These features all had steep sides and nearly flat bottoms, and they ranged in volume from 572 to 2,563 liters. Very few artifacts were found around these features, and the only indication of their contents was a surplus of grass phytoliths in the bottom of Feature 98, perhaps indicating that it had been lined with grass. Such linings are well attested in the ethnohistorical record on pit features, as is burial of food stored in baskets. Another detail that emerged from the ethnohistorical study is that when baskets of food were stored in pits, the pits were filled in and the food was buried; when the baskets were removed, the pit was probably not dug out again entirely, and much dirt probably slumped into the bottom of the pit. Therefore, these pits were not entirely empty or open when they were abandoned.

Two pits quite different from those in the Silo Pit area were dug in Locus 3. Feature 30 was a large, oval basin 165 centimeters deep, with a volume of 3,900 liters. Feature 38, which slightly intersected with Feature 30, was 135 centimeters deep but somewhat wider than Feature 30, with a volume of 4,400 liters. Feature 38 was radiocarbon dated to AD 615 to 895. Both of these features had been dug down into loose sand, and there was evidence that both had been lined with more fine-grained soil from close to the surface. Feature 30 appeared to have shelves of this redeposited soil along two sides. These more complex features may have been storage pits, or they may have had some other purpose, such as for the *chiacosan* ritual.

A very important statement about Native American technology concerns the great importance of materials that have not survived for archaeological recovery. Ethnohistorical literature shows that the Indians of the seventeenth century relied very heavily on tools made of bone, hide, wood, feathers, reeds, and grass, and artifacts made of these materials have been recovered from sites with much more favorable preservation conditions. Arrows were tipped with turkey claws, knives were made from reeds or beaver teeth, and nuts were broken in wooden mortars. The excavations in the Silo Pit area at Puncheon Run demonstrated the results of this in archaeological terms: a site with hardly any surviving artifacts. The common archaeological practice of focusing excavations on those parts of a site with the highest artifact densities may therefore miss important activity areas, and site interpretations that are based solely on lithic and ceramic evidence may be grossly distorted.

F. CHRONOLOGY

In discussing the contribution of a site to chronology, we mean not so much the establishment of a chronology for the site itself as the discovery or refinement of chronological markers that can be applied to other sites. Almost 40 radiocarbon dates were obtained from Puncheon Run Site contexts;

some of these were associated with diagnostic artifacts, and some mark site formation events, such as feature filling.

The most conspicuous diagnostic artifacts at Puncheon Run were the small, narrow-bladed, stemmed points known colloquially as "pebble points." Custer states that these points could date to any period from 4000 BC to AD 500 (Custer, Watson, and Silber 1996). At Puncheon Run, the largest concentration of these points was found in the Metate block, were they were associated with several dates spanning 2800 to 1200 BC. These dates formed two clusters: an earlier set at around 2500 cal BC, and a later set at about 1500 cal BC. Another specimen was recovered from the base of Feature 33, a small pit in Locus 3 that yielded a radiocarbon age of 2,480±40 radiocarbon years before present (rcbp) (Beta-136091), or 785 to 410 BC. This point may have been fortuitously included in the feature fill; dates of ca. 4500 rcbp (3500 to 3000 cal BC) from Feature 30 seem more appropriate for this type. Most of the pebble points from the Puncheon Run Site came from the northeastern part of Locus 3, near the Metate block and Feature 33, and there are indications that most of the occupation in this area dates to the same 3000 to 500 BC time frame. The evidence from Puncheon Run does not rule out the use of these points in other periods, but it certainly confirms that they were common in the 3000 to 500 BC period. Some characteristics of the Puncheon pebble points, particularly the retention of basal cortex and the general narrow-bladed, stemmed form, are strikingly similar to Lamoka points, which are dated to about 3500 to 3000 cal BC in central New York.

The ceramic assemblage from Puncheon Run was small, and much of what was found came from the mixed strata of the Buried Plowzone area. One important discovery was made in Feature 69 in the Silo Pit area. This pit yielded more than 100 steatite-tempered sherds, some classified as Marcey Creek and some as Selden Island. Each group of sherds appears to represent a single vessel. The presence of two vessels of these two different wares in this single, isolated feature, the only one of this date in the vicinity, indicates that both were in use at the same time. The co-occurrence of these two vessels in Feature 69 raises the issue of the relationship between Marcey Creek and Selden Island ceramics. Both types are tempered with steatite, but their vessel shapes and surface treatment are different. Marcey Creek vessels generally have a flat base and smoothed surfaces and are produced by modeling. In contrast, Selden Island vessels have a conical base and cordmarked exterior surfaces and are generally produced by coiling. Few reliable radiocarbon dates have been associated with either Marcey Creek or Selden Island ceramics. No stratigraphic separation of these wares was noted by the excavators of the type sites on the Potomac (Slattery [1946] on Selden Island, and Manson [1948] at Marcey Creek). At Clyde Farm, both Selden Island and Dames Quarter sherds (the latter differing only in temper—hornblende and gneiss instead of steatite—from Marcey Creek ware) were associated with a date of 2955±90 rcbp (UGa-5376) (Custer 1989:358). Flat-bottomed and conoidal forms were also found together in a single Early Woodland component at the Williamson site in New Jersey, dated to 1000 to 825 cal BC (Hummer 1991). Although it has often been assumed that Selden Island ceramics developed from Marcey Creek ceramics—the latter, for their part, imitative of the form of earlier carved steatite vessels—if this stylistic evolution occurred, it must have been very rapid. Opportunities to clarify the relationship between these two wares should be pursued in the future. It is curious that none of the projectile point types normally associated with these experimental ceramics (e.g., Orient Fishtail, small Savannah River, Hellgrammite side-notched) have been recognized in the Puncheon Run assemblage.

Important chronological ambiguities surround the grit- and clay-tempered wares of the 700 BC to AD 600 period in Delaware, and discoveries at Puncheon Run shed some light on this matter. The Wolfe Neck variety, which is characteristically tempered with large chunks of crushed quartz, has traditionally been dated to 700 to 400 BC (Custer 1989). A gap in the series of grit-tempered wares then followed, until the introduction of Hell Island wares around AD 600. At Puncheon Run, sherds resembling the classic Wolfe Neck type were found, along with sherds of a similar type (Ware Group VIb) that was somewhat thinner and more refined (see Volume II, Appendix H). Both varieties were found in the Buried Plowzone area and the Feature 30 block. The Feature 30 block may have been used in several different periods, but projectile point and radiocarbon evidence suggest that the main occupation was between AD 400 and 900. The thinner grit-tempered sherds, at least, may also date to this period, suggesting that the tradition of making grit-tempered pottery was maintained across the gap between the older dates for Wolfe Neck wares and the introduction of Hell Island wares. This conclusion is supported by a single sherd of this ware found in Feature 66 of the Silo Pit area, which was radiocarbon dated to cal AD 225 to 415; although one sherd could easily have been incorporated into the feature after being left by earlier visitors, the Main Pit Cluster represents an activity area dating to the AD 1 to 450 period, so it is most likely that the sherd is associated with this occupation. Previous dates for pottery tempered with clay or crushed sherds, known as Coulbourn ware, range from 400 to 100 BC; however, results from Puncheon Run, along with new radiocarbon dates from Hickory Bluff (Robertson et al. 2000), suggest that these wares remained in use for a longer period. A Coulbourn sherd was found in Feature 50 in the Main Pit Cluster of the Silo Pit area, which was radiocarbon dated to AD 225 to 440.

G. The Late Archaic on the St. Jones and the Barker's Landing Complex

Custer (1989) has defined the culture of the St. Jones and Murderkill river drainages between 3000 and 700 BC as the Barker's Landing Complex (see Chapter II). The Barker's Landing Complex is similar in most respects to the Clyde Farm Complex of northern and southern Delaware, but it is distinguished by a heavy reliance on imported stone, especially argillite from the vicinity of Trenton, New Jersey. Although argillite artifacts, especially projectile points, are found on archaeological sites across the Delmarva Peninsula, they usually only make up around 5 to 15 percent of the bifaces in the assemblage. The amount of argillite debitage is even less, suggesting that argillite tools were made near the source and carried down the peninsula in finished or nearly finished form. However, at the Barker's Landing Site, argillite made up 80 percent of all the stone artifacts, including a majority of the debitage. Another 12 percent of the artifacts were made of rhyolite, which had to be imported from even farther away, in the Pennsylvania mountains. At the Coverdale Farm Site on the Murderkill River, 40 percent of the stone artifacts were argillite, and 16 percent were rhyolite. In addition, at least two caches of crude argillite bifaces have been found in the region, one at the Kiunk Ditch Site and one at the Carey Farm Site. The heavy use of argillite at these central Delaware sites and the presence of the biface caches suggests that cargoes of argillite bifaces were brought directly to the area, probably on canoes. The bifaces were cached until needed, and then made into tools.

Custer's work, which has included analysis of all the surface collections kept at the Delaware State Museum, shows that argillite use was undoubtedly particularly heavy in the St. Jones and Murderkill river drainages (Custer 1984c). Since many of the argillite points are broadspears or expanding-

stemmed types, much of that use undoubtedly took place during Late Archaic times. However, there are important problems with Custer's description of the Barker's Landing Complex. One problem concerns the data on which Custer based his formulation, which came almost entirely from surface collections. The danger of making associations between artifacts based on surface assemblages has long been recognized. Coe, in explaining the importance of the stratified sites he reported in his groundbreaking monograph (1964:8), noted that he had once tried to produce a list of stone artifacts associated with Badin pottery that "managed to show about everything else," including artifacts from the Dalton, Stanly, and Guilford levels of stratified sites.

The diagnostic argillite points found on central Delaware sites cannot be used to date the nondiagnostic artifacts that happen to be found with them. For example, Custer believes that the economic foundation of the Barker's Landing culture was intensive use of plant foods, but there is no strong evidence to indicate that the many grinding stones found at the Coverdale Farm Site actually date to Barker's Landing times. The artifacts from the Coverdale Farm Site also include Hopewellian corner-notched points of Flint Ridge chalcedony and Mockley ceramics and Fox Creek points typical of the Carey Complex, all indicating occupation in the Middle Woodland period. Many of the grinding stones could also date to this later period. Moreover, the nondiagnostic argillite bifaces found on these central Delaware sites do not all have to date to one period; bifaces identical to some of those found at Coverdale Farm are shown in the photographs taken by Ford (1970) of artifacts from the Sandy Point Adena Site in Maryland.

Some of the largest excavated Woodland I sites along the St. Jones River would be difficult to fit into the description of the Barker's Landing Complex given by Custer. The Carey Farm and Hickory Bluff sites both had very substantial components associated with Marcey Creek ceramics, which were made between 1200 and 800 BC, but neither site yielded an excess of argillite artifacts. Argillite made up only 7 percent of the projectile points found at Carey Farm and about 10 percent of those at Hickory Bluff. Points found in features with Marcey Creek ceramics at Carey Farm were mostly made of cobble chert and jasper; the percentage of argillite was essentially the same in these features as in those containing Mockley and Hell Island ceramics. One cache of crude argillite bifaces was found in a pit at Carey Farm (Figure 73), but this feature was part of a pit cluster that dated to Middle Woodland times.

The Early Woodland deposits at Carey Farm and Hickory Bluff were all mixed to some extent, so the most intact deposit yet excavated from the period of the Barker's Landing Complex is the Metate block at Puncheon Run. In this deposit, securely dated to between 2800 and 1200 BC, almost all of the stone artifacts were of local chert, jasper, and quartz; argillite and rhyolite were almost entirely confined to the upper layers, dating to Middle and Late Woodland times. The Metate block has been interpreted here as a series of small fishing camps rather than a base camp, possibly quite different in function from the Barker's Landing and Coverdale Farm sites. However, the Metate block clearly shows that some Late Archaic groups along the St. Jones relied on local pebbles for material to make stone tools, at least some of the time. Since at least three separate occupations spanning several centuries are represented in the block (based on the radiocarbon dates from the hearths), it is unlikely that reliance on such stone was a rarity during this period. Thus far in the archaeology of the St. Jones, it seems that the better dated a deposit of the Barker's Landing period, the smaller the percentage of imported stone in the collection. On the Puncheon Run Site as a

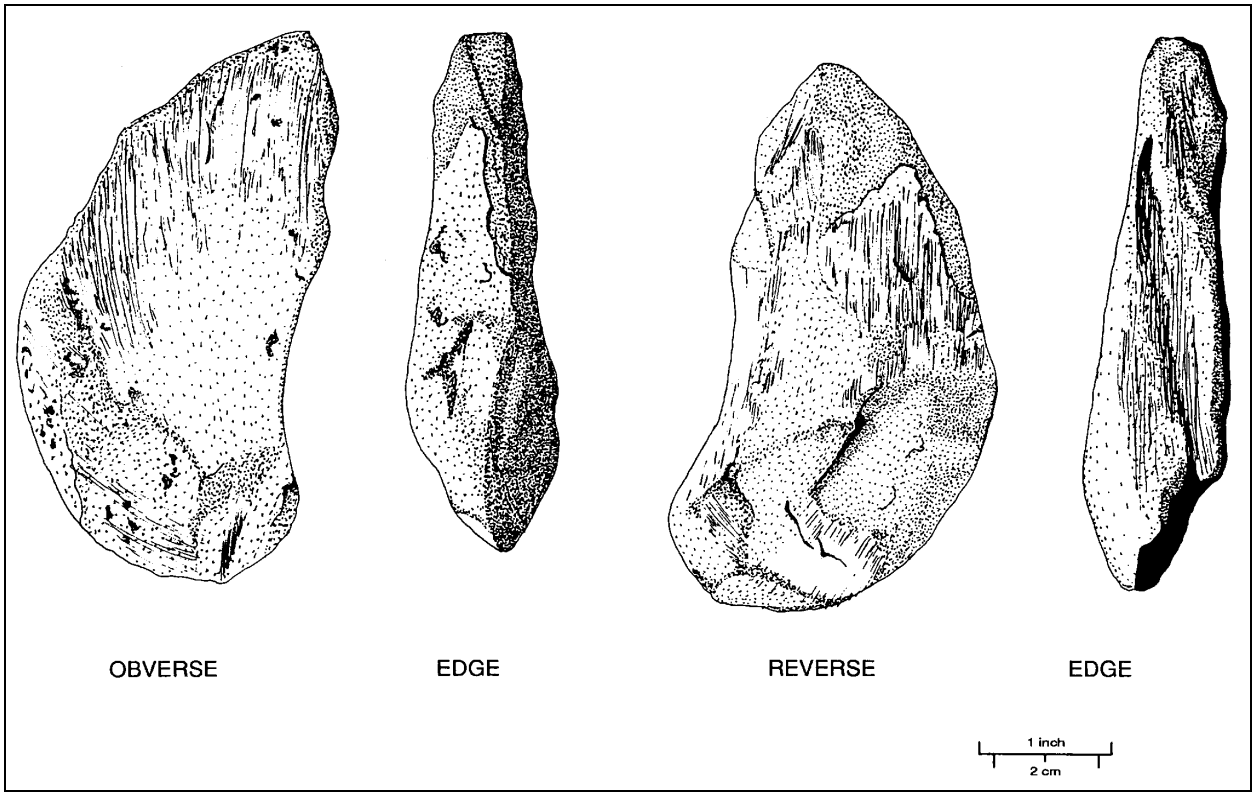

FIGURE 73: Argillite Biface from Feature 1059, Carey Farm Site

SOURCE: Custer, Watson, and Silber 1996

whole, the reliance on imported stone during Barker's Landing times was less than it was during Webb Complex (Middle Woodland) times.

It should be emphasized that the Late Archaic radiocarbon dates from Puncheon Run are concentrated in three clusters. The period from 3700 to 3400 rcbp represents a hiatus in this sequence, and therefore it is no surprise that the Susquehanna Broadspears typical of that period are absent from the lithic assemblage. This is the Woodland I type most often made of rhyolite or argillite. One could infer, following Custer's logic, that this absence implies a functional distinction between Puncheon Run and other roughly contemporaneous sites. Or, one could follow Dent's (1995) argument (see p. 61) that broadspears and narrow stemmed points were produced by distinct, coeval, competitive societies.

Following Custer's approach, the difference between these sites may represent differences in site functions. Argillite may have been associated with certain tasks, certain seasons of the year, or certain ritual acts. Edge-wear analysis of the small, stemmed points at Puncheon Run showed that most of them were used as projectile points, quite possibly to spear fish; perhaps argillite points were simply not considered appropriate for this task and were instead used as knives or in some other way. Argillite is too soft for edge-wear analysis to reveal much about how tools made of this material were used, but other techniques could be applied. Perhaps detailed mapping of the distribution of argillite within the St. Jones and Murderkill river drainages would show that it was

concentrated in certain microenvironments. Even the information currently available suggests that argillite is concentrated in the lower reaches of these rivers. On the St. Jones River, argillite seems to be most common below Carey Farm, especially along the stretch from the St. Jones Adena Site to Barker's Landing, and on the Murderkill River argillite was much more common at Coverdale Farm than at the Holleger Site, which is in a similar situation as Coverdale Farm about a kilometer upstream.

Alternative explanations for the peculiar distributions of these lithic materials in the Barker's Landing Complex may entail social or even ideological factors. Argillite entering the region was clearly brought to certain central points, such as Barker's Landing and Coverdale Farm, and distributed outward from them. It may be that the distribution was controlled by certain groups who kept all or most of this material for themselves, and that the occupants of Carey Farm, Hickory Bluff, and Puncheon Run were outside this charmed circle. This monopolizing group could have been a tribe or clan, or it could have been a developing political elite. Control of surplus wealth, and imported luxury goods in particular, has been a common way for elites to develop their power around the world. For example, Polynesian rulers maintained elaborately constructed store houses where they kept their wealth, using it to entice people into their service; as one nineteenth-century Hawaiian informant explained, the store houses

> were like the baskets that were used to entrap hinalea fish. The hinalea thought there was something good within the basket, and he hung around the outside of it. In the same way the people thought there were good things in the store houses, and they kept their eyes on the king [Sahlins 1963:296].

If the importation of argillite to the St. Jones was associated with the rise to power of early chiefs or "big men," or of aristocratic councils, then the uneven distribution of this resource may have political implications. The sites with and without large amounts of argillite may therefore represent those who did and did not fall under the power of rising elites in the region (or of domineering intruders from the Broadspear-makers' homeland in the Carolinas).

The striking visual difference between the artifact collection from the average Delmarva site, dominated by orange jaspers, white quartz, and black cherts, and the nearly uniform gray collection from Barker's Landing reminds us of the importance of color symbolism (Pietak 1999) in Native American beliefs and raises the possibility that argillite was preferred because of its suitability for certain ritual tasks. In this most speculative model, the centers of argillite distribution, such as Coverdale Farm and Barker's Landing, would be ceremonial centers where imported stone was made into points, blessed, and possibly used in rituals; the points blessed in this way may have been considered particularly appropriate for certain tasks, so that they were not then evenly distributed through the surrounding areas.

H. FUTURE DIRECTIONS

A vast amount of data on the prehistory of central Delaware has now been assembled from both survey and excavations, particularly through work associated with the State Route 1 project over the past 15 years. The outlines of the cultural sequence have been established, the main artifact types

have been identified, and enough work has been completed regarding the difficult topics of political structures, ceremonial systems, and population movements to at least outline the main questions in these areas. Further progress requires information that will not be forthcoming from sites with poor organic preservation, features of uncertain origin, and mixed artifact assemblages like those found in plowzone collections. However, if collections from such sites would be of use, they could be examined at the Delaware State Museum, which holds dozens that have never been thoroughly analyzed. In addition, the large collections from the five professionally excavated and reported sites in the region (Carey Farm, Island Farm, Blueberry Hill, Hickory Bluff, and Puncheon Run) have not been exhausted, and much interesting work could still be conducted using this material. Sites with well-dated components or good organic preservation are needed to significantly increase our understanding of Delaware's past, and such sites appear to be rather unusual in the region. The excavation of another site like Island Farm, Leipsic, or Pollack might add very little to our knowledge of Delaware's prehistory.

Important questions about subsistence still loom large, but it seems that quite special sites will be needed to answer them. Of the nearly 2,000 features excavated at the Carey Farm and Island Farm sites, only one produced valuable floral and faunal remains; this fact clearly illustrates the great difficulty of extracting subsistence information from prehistoric sites in Delaware. Recovery of subsistence information was one of the primary goals for the Puncheon Run Site investigations, even though it was quite apparent at the conclusion of the Phase II investigations that the site had yet to produce an unambiguous floral or faunal assemblage. Dogged pursuit of subsistence information led to the application of new techniques, such as the analysis of protein residues and phytoliths, but these techniques have yet to provide wholly satisfactory results. Given the generally poor organic preservation at sites in the Delaware Coastal Plain, new information on Native American subsistence will have to depend on the development of new techniques.

Protein residue studies using the cross-over immuno-electrophoresis technique have tentatively identified fish species that were harvested at Puncheon Run, and this method could be applied on a larger scale. However, because of lingering questions about the results of this type of study, protein residue studies will not, for some time at least, be as convincing as the recovery of actual bones, and the search for sites with preserved faunal remains must continue. Clearly, more work needs to be done with residue studies to address basic questions regarding contamination and the survival times for protein residues. It is equally important to develop antisera that are more representative of the broad suite of animal resources—such as terrestrial mammals, birds, and amphibians—that would have been available to Native American groups in Delaware.

Phytolith analysis suggested environmental differences between different parts of the site, but it is uncertain whether this is related to modern environmental conditions or the prehistoric cultural landscape. Much work remains to assemble type collections for phytoliths in eastern North America and to relate different phytolith assemblages to different kinds of human activity. In the short term, however, phytolith studies seem unlikely to contribute substantially to our understanding of plant use in Delaware during the Woodland period, and the flotation recovery of charred plant remains is still crucial. Phytoliths and pollen provide quite distinct types of information on past environments, and there is a general lack of understanding within the archaeological community as to exactly how phytolith analysis can inform us about prehistoric landscapes. Charred plant remains

would also greatly help in understanding the seasonal patterns of the region's inhabitants. Without information about the season in which sites were occupied, it is difficult to get beyond the vaguest formulations of settlement patterns and, in particular, to approach the issue of increasing sedentism, one of the most important themes in the study of the Woodland period.

Because of its history of spectacular mortuary cults and other manifestations of cultural complexity, central Delaware remains a fascinating laboratory for the study of political and ideological change. However, not every site can provide information relevant to these questions. To answer the questions about the Barker's Landing Complex raised in this document, discrete, well-dated assemblages will be required; mixed deposits cannot provide convincing answers to questions about variations in the use of argillite over time and between different kinds of sites. The same is true for other difficult questions, such as the economic and political background to the Delmarva Adena phenomenon and the timing and nature of possible migrations to the region.

For all these reasons, size is probably the least important criterion for choosing sites to excavate in the future. The University of Delaware has excavated numerous sites in the state, some very large, but none get more attention in Jay Custer's published work than one of the smallest sites, the Hawthorne Site. This campsite in northern Delaware appears again and again in Custer's work because it was a single-component occupation, with almost all the artifacts deposited by a single cultural group within a period of no more than a couple of hundred years.

It is expected that storage pits will remain one of most intriguing issues in the archaeology of Delaware's Woodland I period, but it is perhaps time for a reorientation in how these features are approached. Although the debate concerning pit houses is unresolved, there is little doubt that storage pits were a common feature of the Woodland I cultural landscape. The Puncheon Run investigations have challenged the notion that storage pits are found exclusively within base camps, and it may be expected that these features can be found widely throughout the landscape, in many diverse microenvironmental settings. Now that thousands of pit features have been excavated in Delaware, it is time to question the expectation that a site which contains pit features is automatically important enough to merit archaeological excavation or preservation. In this regard, one would hope to see a greater use of site preservation as a mitigation strategy, in part because it is clear that current archaeological technology is unable to answer some of the same basic questions that are being asked again and again.

The storage pits found at Woodland sites in Delaware are intriguing for what they might say about the development of stratified societies, the concealment of surplus food, or the scheduling of movements through specific resource zones. However, the excavations at Puncheon Run and other sites have clearly established that the pit fills contain very little information (recoverable by current archaeological techniques) pertaining to the actual goods that were stored in the pits. Many excavators have speculated that some pits may not have been used for storage at all, and that instead they could have been used to trap small animals, particularly frogs. Although the Puncheon Run Site contained a relatively modest number of pit features, there was a considerable variety in their form, suggesting that pits may have been used for a wide variety of purposes.

The protocols established for pit excavation at Puncheon Run, where pits were excavated in section to expose a view of the pit fill *and* the adjacent subsoil, differ from the protocol used on many other sites, where the pit fill was excavated and the surrounding soil was left intact. Although the latter approach makes for an impressive photograph, particularly when a field of hundreds of excavated pits is shot from an overhead vantage, one has to question the "accuracy" of this type of excavation. At Puncheon Run, one of the most important lessons learned was that even the most experienced field excavators can have great difficulty in distinguishing pit fills from undisturbed subsoil, without the benefit of seeing the two contexts in profile side by side.

The excavation of the Silo Pit area at Puncheon Run, where pit features were accidentally discovered in an area with very few artifacts, led us toward a broad investigation of the prehistoric landscape. Artifact-rich "sites," the traditional focus of archaeology, are only one component of that landscape. The study of how people distributed their activities throughout their surroundings is one of the areas in which new techniques and approaches are most needed. Some of the approaches taken at Puncheon Run show promise. The distribution of Phase II testing blocks in areas of high, medium, and low artifact density resulted in the discovery of the Silo Pit area and helped to show how the entire peninsula was used by Native Americans. Analysis of the geological and biological landscapes provided interesting data. The regional perspective, which has long been one of archaeology's most useful tools, also proved important, pointing out possible connections between parts of Puncheon Run and the nearby Hickory Bluff and Carey Farm sites, as well as the striking difference between the materials from these sites and those found at Barker's Landing and Coverdale Farm. After all, the people who lived on these sites may have considered all of central Delaware their home, not just the places where they spent most of their nights, and to understand those people we must consider more of their worlds than just their camps and quarries.

Finally, it is important to ask how archaeologists can encourage broader participation of public and Native American perspectives into their work. Our endeavors will be enriched by the multiple views of those who approach the subject matter, not for reasons to do with profession and career, but purely from their personal interest in our American heritage. The past does not belong just to professionals, and working on a site is one of the best ways to learn about archaeology. At Puncheon Run we had great success hosting groups of middle-school students on the site, a practice that DelDOT has long promoted. We also provided opportunities for adults to participate in the fieldwork, both on a regular basis during the week and on two special Saturday dig days. One of the most interesting opportunities for interaction was provided by the presence on the site of several members of the Nanticoke Indian Association. The Nanticokes also worked on the site, learning about modern archaeological techniques while they shared their knowledge of their own traditions. A broader audience was reached through press coverage in newspapers and on local television. To inform visitors to the site about its progress, a kiosk was set up with informational posters, and a brochure was prepared. Since the conclusion of the project, the results have been presented to the general public through several talks given during Delaware Archaeology Month, and to professionals through a session at the Middle Atlantic Archaeological Conference and other conferences. Talks have also been given in schools and at school career fairs. It is through these and other efforts that the Puncheon Run project acquires its meaning, not as a dusty report and a shelf of boxed artifacts, but as an ongoing, open-ended effort by the people of the twenty-first century to understand their past and each other.