TABLE 2

Revised Woodland I Complexes and Diagnostic Artifacts

Clyde Farm I: stemmed points (Types B, D, E, I); stone bowls

Barker's Landing I: same as Clyde Farm I, but with extensive use of argillite and rhyolite

Clyde Farm II: stemmed points (Types D, B, E, I); broadspears; stone bowls; Marcey Creek ceramics

Barker's Landing II: same as Clyde Farm II, but with extensive use of argillite and rhyolite

Clyde Farm III: stemmed points (Types D, E, B, I); fishtail points; Marcey Creek, Ware Plain, Dames Quarter, and Seldon Island ceramics

Barker's Landing III: stemmed points (Types D, E, B, I); fishtail points; Marcey Creek and Dames Quarter ceramics; extensive use of argillite and rhyolite

Wolfe Neck: stemmed points (Types D, E, B, I); Wolfe Neck ceramics

Delmarva Adena: stemmed points (Types D, E, B, I); Accokeek, Nassawango, Coulbourn, and Wilgus ceramics; Adena mortuary artifacts (Adena bifaces, copper beads, tubular pipes, pendants)

Black Rock I and II: stemmed points (Types D, E, B, I); refined Vinette I/Wolfe Neck ceramics

Carey: stemmed points (Types E, B-small variety); Fox Creek points; Mockley ceramics

Late Carey: Fox Creek points: triangular points; Mockley ceramics

Webb: Jack's Reef points; triangular points; Hell Island ceramics; specialized mortuary objects (platform pipes, large pentagonal bifaces)

Delaware Park: Jack's Reef points; triangular points; small Type B stemmed points; Hell Island ceramics

Previous Research

The drainage area that includes the St. Jones River and its southern tributary, the Murderkill River (Figure 4), has probably been subjected to some of the most intensive archaeological study of any other portion of Delaware, except for a few northern sections of the State Route 1 Corridor. The St. Jones/Murderkill drainage is certainly the largest, well-studied archaeological region of Delaware, and there are several reasons for its careful study. In the first place, some of Delaware's most spectacular and richest archaeological sites, such as those containing Delmarva Adena and Webb complex cemeteries with large numbers of exotic grave offerings were discovered fairly early in this region (Custer 1989:72-76). The presence of Adena sites drew the attention of avocational and professional archaeologists, and they tried to discover more of these sites. Many archaeological sites were recorded by the Delaware State Historic Preservation Office as a result of this survey activity. In addition to this somewhat undirected search for significant sites, several systematic surveys with explicitly stated sampling designs

were undertaken in the St. Jones/Murderkill region including surveys with stratified random designs by Galasso (1983) and Gelburd (1988), and a systematic survey of St. Jones Neck (Delaware Bureau of Archaeology and Historic Preservation 1977).

All of the above surveys, combined with various levels of test excavations and larger scale data recovery excavations, have generated a significant data base within which to consider the present excavations at the Carey Farm and Island Farm sites. For the most part, the comparative data will be presented in the site research design, interpretations, conclusions, and discussion sections of this report. However, this section will describe past archaeological studies at the Carey Farm and Island Farm sites.

Both sites were already known at the time of the beginning of systematic recording of archaeological sites in Delaware in the early 1960s. Although the background data on the site records are not especially clear, it is likely that the sites were recorded and registered by Geigor Omwake, an energetic avocational archaeologist who provided the site records that formed the core of the current site location system for many parts of Delaware. However, it is unlikely that Omwake found the sites himself. Many members of the local Kent County Archaeological Society (KCAS) collect artifacts along the St. Jones River, and one of them probably found the site and gave the information to Omwake to record. Indeed, up to the time of the current excavations, the site was being intensively collected by Richard Gardner, a KCAS member, who generously allowed the study of his collection as part of our background research.

Gardner's collection, and the general surface collection of artifacts from the Carey Farm Site curated at the Island Field Museum include diagnostic artifacts from all of the varied prehistoric time periods of Delaware. Almost every major ceramic variety is also included although Mockley ceramics dating to ca. A.D. 100-500 (Custer 1989:173-175) are the most common. Collections from the Island Farm Site show a similar time range of site occupation, although these collections are somewhat less extensive than those from Carey Farm.

As shown in Figure 2, the Carey Farm Site was initially mapped as extending along the St. Jones River on both the north and south sides of Delaware Route 10. In 1971, personnel from the Delaware Section of Archaeology, one of the precursors to the current Delaware State Historic Preservation Office, undertook a controlled surface collection in the area of the site south of Route 10 (Figure 2). (The sources for this discussion of the results of early excavations at the Carey Farm include unpublished site notes on file at the Island Field Museum and the National Register of Historic Places Nomination Form for the site - Delaware Bureau of Archaeology and Historic Preservation 1977.) Distribution studies showed that the greatest numbers of artifacts were found within 30 meters of the bank of the St. Jones River, and limited test excavations conducted at the same time also suggested that sub-surface pit features were present.

When it became known that the owners of the southern section of the Carey Farm Site planned construction that would destroy the archaeological remains, test excavations were undertaken in 1975 and 1976. A number of prehistoric pit features were identified and excavated. The main diagnostic ceramics recovered were Mockley cord-marked and net-marked varieties. A charcoal sample from one feature returned a radiocarbon date of 200 A.D. $\pm$ 90 (I-5817), and this date matched well with other dates for Mockley ceramics in Delaware (Custer 1989:173-175) and the Middle Atlantic region

in general (Gleach 1988). A series of generalized side-notched projectile points were also recovered from features in addition to the ceramics. Especially significant finds from these test excavations were a large number of preserved floral and faunal remains.

The best faunal and floral remains, and the radiocarbon date noted above, came from a single storage/refuse feature excavated from the portion of the site located north of Route 10 in the area of the current excavations (Figure 2). Hickory nuts and some unidentified small seeds were recovered from flotation analysis. Faunal remains included bones from beaver, box turtle, deer, diamond-back turtle, dog, muskrat, shellfish, turkey, and woodchuck, and oyster shells. A cold-weather occupation was inferred from the faunal and floral remains with the most important food sources being deer and oysters. The data from these excavations were later used by Griffith (1974) in an analysis of the seasonality of settlement patterns in the Delaware Coastal Plain. Griffith's research is of special significance because it formed the core of a later, more extended work (Thomas et al. 1975) that established many of the basic models of resource utilization and settlement patterns that are used today when studying the archaeology of the Middle Atlantic Coastal Plain. Because the limited test excavations at the Carey Farm Site produced much useful data on prehistoric lifeways, and because it was anticipated that many more features were present in unexcavated areas of the site, it was nominated to and eventually listed on the National Register of Historic Places in 1977. Unfortunately, the entire section of the site south of Route 10 was destroyed by construction without further study.

Luckily, the northern section of the Carey Farm Site was preserved. However, in 1986 it became apparent that this section of the site would be adversely affected by construction of the new State Route 1 Relief Route. Specifically, a large portion of the site was to be destroyed by construction of an interchange connecting State Route 1 with Route 10. The remainder of the site was to be destroyed by excavation of a massive borrow pit that would eventually be used as a wetland replacement area after the borrow pit excavations were complete. Consequently, initial pedestrian studies of the site were begun in 1987 as part of the Phase I testing of the State Route 1 Corridor (Bachman et al. 1988). This initial testing confirmed the location of the site, and extended its limits northward from the initial boundaries determined by the earlier surveys to a small unnamed tributary of the St. Jones River (Figure 2). The same survey confirmed the mapped location of the Island Farm Site as shown in Figure 2.

Because the Carey Farm Site was already listed on the National Register of Historic Places, data recovery excavations were necessary in the face of its destruction. In order to be able to develop a data recovery plan for this massive site, preliminary test excavations consisting of shovel test pits (STPs) and 1- x 1-meter excavation units were undertaken to identify surface and plow zone artifact concentrations, search for any undisturbed landscapes that might be present beneath the bottom of the plow disturbed soils and the top of the older underlying Columbia Formation sediments, and gather data to estimate the number of pit features that might be present. A similar excavation program was also initiated at the Island Farm Site, which was also subject to destruction by borrow pit excavations, due to its proximity and similarity to the Carey Farm Site.

Test excavations at the two sites extended between 1989 and 1991 (Plate 6). At the Carey Farm Site, 452 1- x 1-meter squares were excavated at 10-meter intervals across the site along with over 100 shovel test pits. These excavations recovered thousands of artifacts and identified nearly 150 features. Figures 21 and 22 show the distribution of artifacts and Figure 23 shows the distribution of features. Many of the features were remains of semi-subterranean pit houses, and a wide variety of artifacts

PLATE 6

Phase II Excavations

indicative of an extensive habitation site were present. Diagnostic artifacts representing all periods of Delaware prehistory were also present, with Middle Woodland artifacts being most numerous. Some preliminary evidence of the existence of buried and undisturbed landscapes was present in the form of a light tan/yellow silty soils located beneath the plow zone soils and above the coarse sands of the Ice Age Columbia Formation. However, upon further examination it was seen that these soils were merely a slightly different sedimentary facies of the older Columbia Formation, and the few artifacts recovered from these soils were later intrusions into it. Similar interpretation problems had been encountered elsewhere in Delaware with these same soils (Custer, Catts, Hodny, and Leithren 1990). Based on the number and distribution of features identified in the test excavations, it was estimated that there might be as many as 2000 features within the boundaries of the Carey Farm Site.

Phase II excavations of the Island Farm Site were combined with testing of the adjacent Kimmey Site (Plates 1 and 2), a nineteenth and twentieth century farmstead site (Jamison et al. 1994). A significant finding of the background studies of the Kimmey Site was the fact that a large section of the bank of the St. Jones River in the vicinity of the Island Farm Site had been destroyed by a sand mining operation early in the twentieth century. Few prehistoric artifacts were found in test excavations east of the location of the sand mine site, with the exception of a small rectangular area of the Island Farm Site located just to the north of the small unnamed ephemeral stream that marked the northern limit of the Carey Farm Site (Figure 2, Plate 7). This section of the Island Farm Site produced numerous artifacts and intact sub-surface pit features similar to those found at the Carey Farm Site, and was the only part of that site subjected to later data recovery excavations.

FIGURE 21

Artifact Distribution from Phase II Testing at the Carey Farm Site

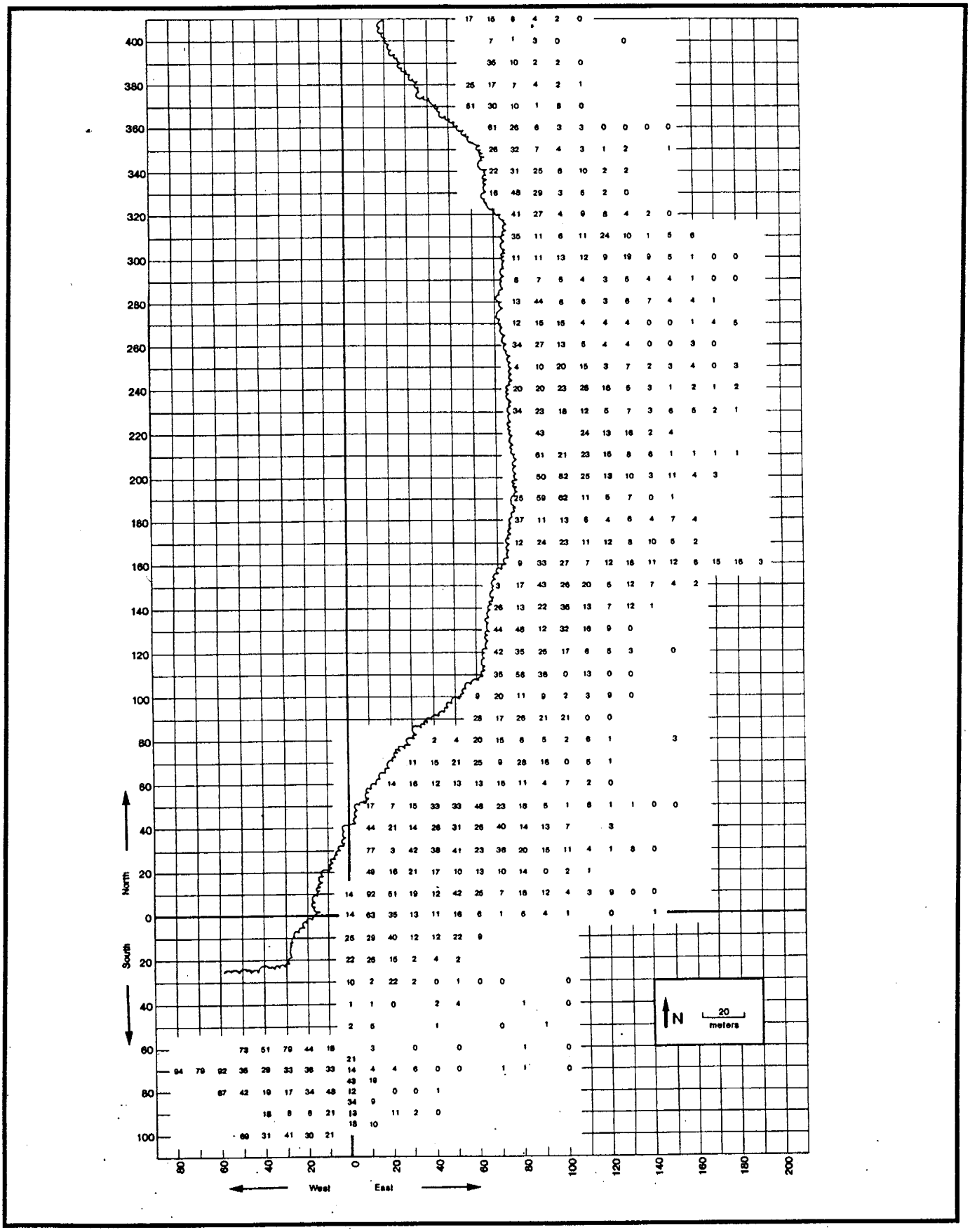


FIGURE 22

Artifact Distribution from Phase II Testing at the Carey Farm Site

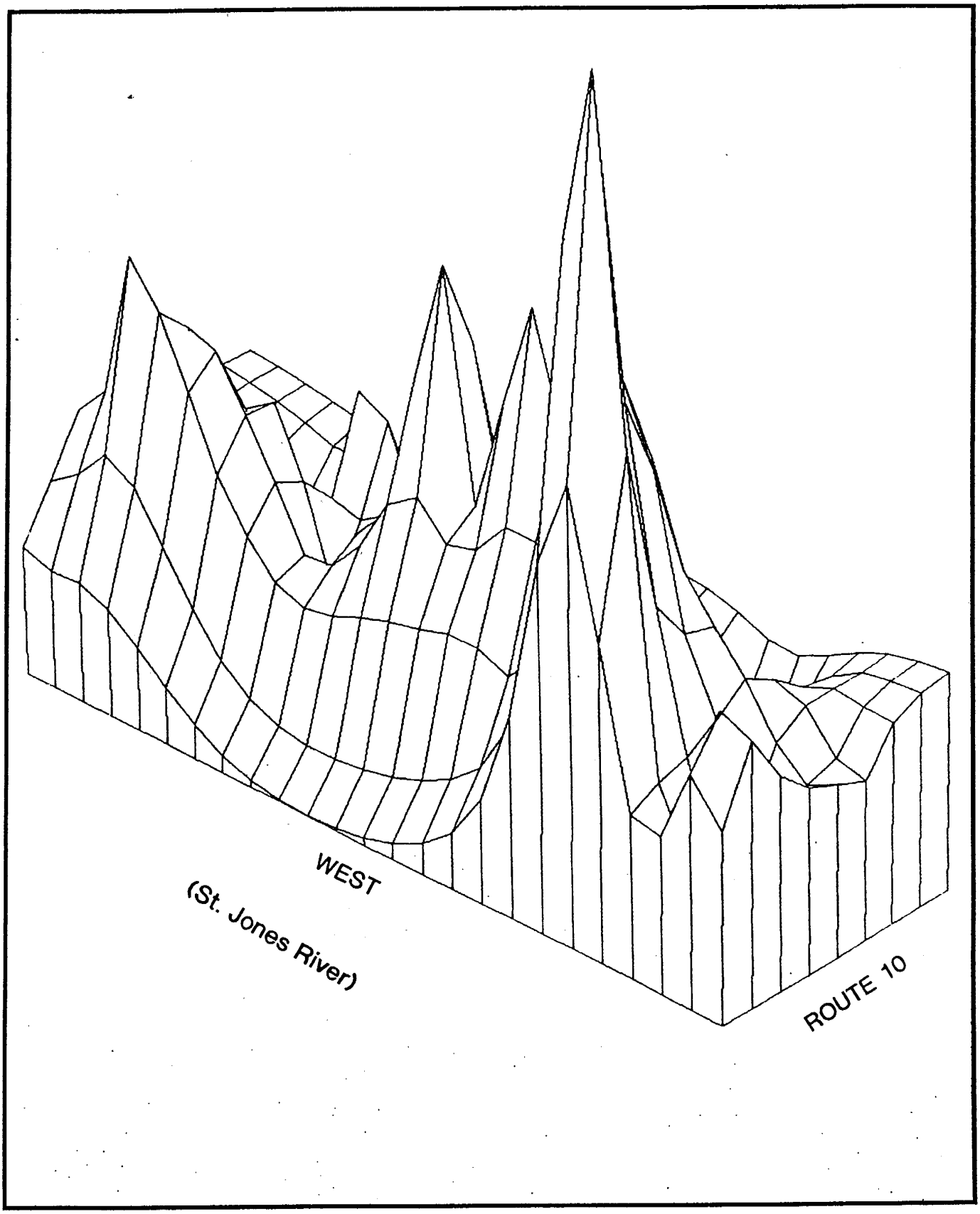
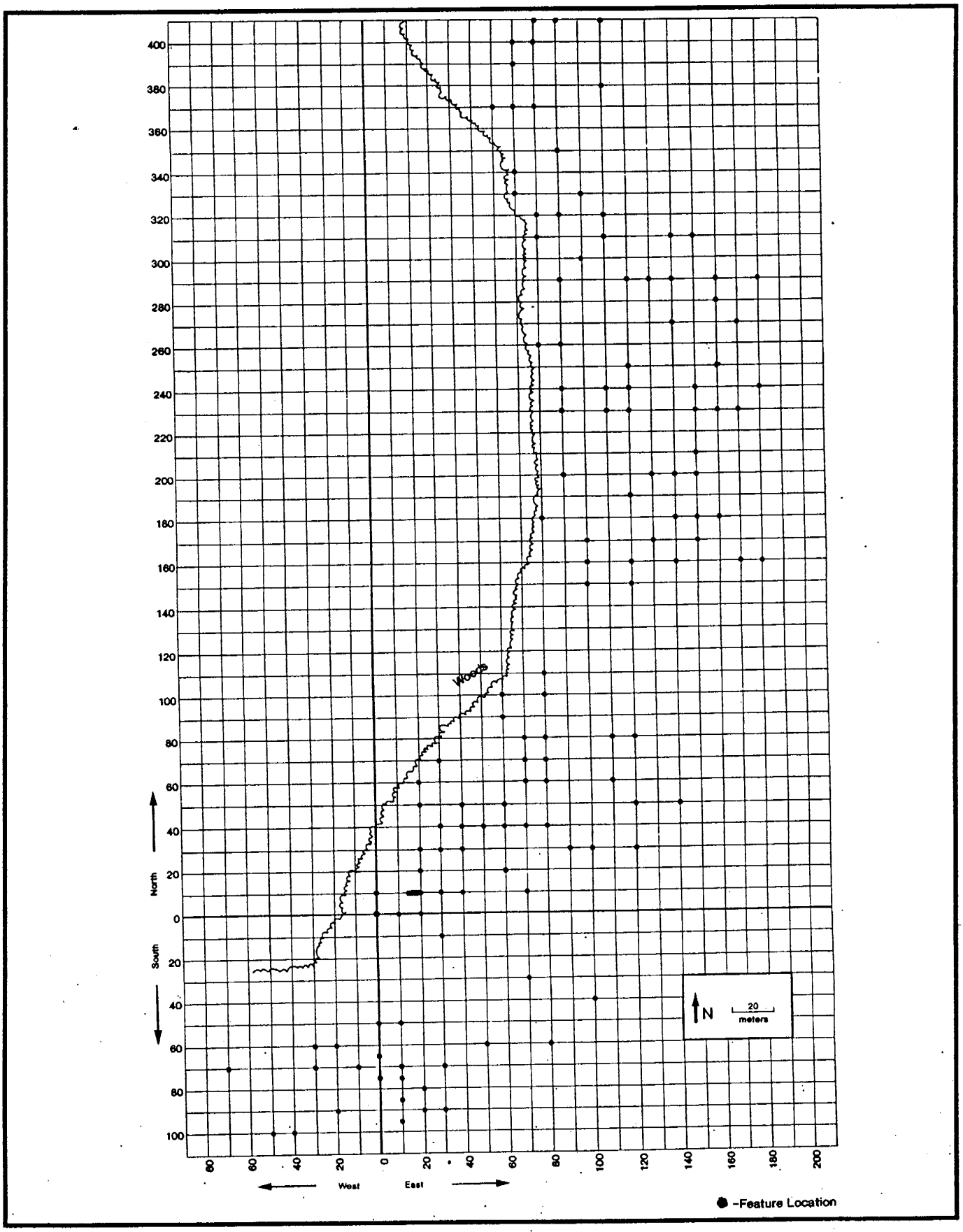


FIGURE 23

Feature Distribution from Phase II Testing at the Carey Farm Site



In sum, previous archaeological studies of the Carey Farm and Island Farm sites revealed that both sites contained extensive archaeological remains including pit houses, storage features, and refuse features. Many of these features contained diagnostic artifacts, or organic materials that could be used for radiocarbon dating, so that their ages could be ascertained. Furthermore, preserved food remains were present so that ancient diets could be studied and analyzed. Finally, the site areas that would be destroyed were very large (Carey Farm - approximately 20 acres; Island Farm - approximately five acres), and excavation of these large areas provided a unique opportunity to investigate the nature of the prehistoric communities of the sites' ancient inhabitants. The following section of this report describes the research methods used in the data recovery excavations. It should also be noted together all data from all excavations at both sites have been gathered for presentation in this single report.

Research Design and Research Methods

Research Design. The Carey Farm and Island Farm sites were the last of a series of large base camp sites excavated by the University of Delaware Center for Archaeological Research (UDCAR) as part of the archaeological studies associated with the Early Action Segment of the State Route 1 Corridor (Figure 1). The other large prehistoric base camp sites included the Leipsic Site (Custer, Riley, and Mellin 1994), Snapp Site (Custer and Silber 1994), and the Pollack Site (Custer, Hoseth, Silber, Grettler, and Mellin 1994), and the data gathered from these sites raised a number of research issues and questions that were used in developing the research design for the Carey Farm and Island Farm sites. Research overviews for sites within the State Route 1 Corridor (Custer and Bachman 1986, 1987; Custer, Bachman and Grettler 1986, 1987) were also consulted for the preparation of this research design. Finally, while the lab research and analysis were being completed, a review of available Woodland I data from Delaware was completed (Custer 1994a). This review synthesized all of the research designs noted above and specifically identified eight research problems (Custer 1994a:171-177) that could be addressed at sites like the Carey Farm and Island Farm sites. These eight research problem themes comprise the current research design, and each research question is discussed below.

1. Paleoenvironmental Studies. Research at the Pollack and Leipsic sites included a paleoenvironmental component like the one already described for the Carey Farm and Island Farm sites and this research showed a close link between site location changes and changes in riverine environmental zones caused by sea-level rise. Specifically, research at the Leipsic and Pollack sites showed that individual site settlement intensity peaked at the times of maximum riverine environmental productivity. One research goal of excavations at the Carey Farm and Island Farm sites was to see if a similar pattern was present at these two sites. Study of this research question required the exposure and excavation of a large number of features, which hopefully would include numerous pit house features. Artifacts from the features were carefully examined for diagnostic projectile points and ceramics, and radiocarbon samples were taken to allow the dating of the features. It was hoped that a large enough number of features could be dated to allow the charting of settlement intensity over time. This settlement intensity could then be compared to the data on changes in riverine productivity and regional paleoenvironments within the St. Jones drainage noted previously. Also, changing settlement intensity in project area can be compared to the rather unique environmental diversity data noted in Figure 8. In general, it is expected that settlement intensity will be proportional to environmental productivity and species diversity.

Research at other large sites in central Delaware also showed that the location of settlement within large sites focused on areas close to the saltwater/freshwater interface, the oligohaline zone. As the location of this zone moved upstream on the drainages, so did the locations of the largest base camps. This kind of regional settlement pattern shift has been hypothesized for the St. Jones and Murderkill drainages as a whole (Figure 24) with earlier Delmarva Adena sites, such as the St. Jones Adena Site (7K-D-1) located less than one mile downriver from the project area, and still earlier Late Archaic sites, such as the Barker's Landing Site (7K-D-13) located even further downstream. Because the Carey Farm and Island Farm sites stretch along the St. Jones River for nearly a mile, they provide an opportunity to study potential shifts in settlement with regard to the oligohaline zone on a more localized level. Research at the Leipsic and Pollack sites, which spanned a somewhat smaller distance along the Leipsic River, showed that there was no evidence of settlement pattern movements within a

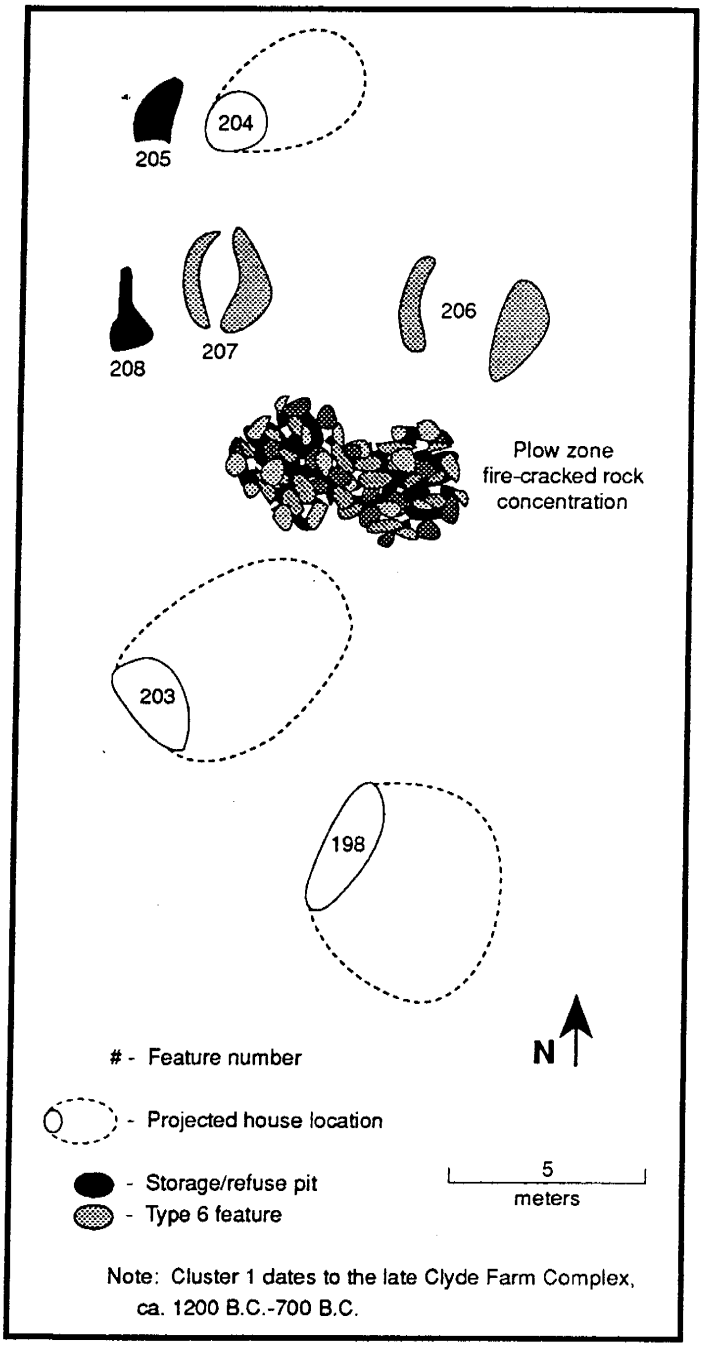
distance of a 1/2 mile. In order to see if similar patterns of movement were present at the Carey Farm and Island Farm sites, the distribution of diagnostic artifacts in plow zone and feature contexts, and radiocarbon dates from feature contexts along the course of the river will be analyzed.

An additional research issue within the category of paleoenvironmental studies is the study of aeolian deposits at the Carey Farm and Island Farm sites. It has already been noted that there was no evidence of post-Pleistocene aeolian deposits within the cultivated field areas of the sites. However, a wooded area separated the two sites and flanked a small ephemeral stream (Figure 2, Plates 1, 2, and 7). Archaeological testing was undertaken within this wooded area to see if any archaeological deposits existed in undisturbed and unplowed contexts, and to see if there was any evidence of aeolian soil deposits.

2. Chronology. The discovery of diagnostic projectile points and ceramics, and radiocarbon dates in good stratigraphic contexts has allowed the refinement of Woodland I chronologies, as was noted in an earlier section of this report. Search for further data to refine Woodland Period chronologies was recommended (Custer 1994a:172), and the current research specifically sought to use the depositional contexts of the excavated pit features to define artifact associations that could be used in local and regional chronological studies (see Evans and Custer 1990).

FIGURE 25

Snapp Site Feature Cluster (Clyde Farm II Complex)



3. Household Settlement Patterns. Current household settlement pattern data show a low degree of variability in Woodland I house forms and sizes. Custer (1994a:172-173) suggests that an important research issue is to see if additional variability in house forms is present. This research issue was addressed by taking care to recognize house-related features at the Carey Farm and Island Farm sites, especially the eroded house pits. We also specifically sought to identify "non-typical" house forms such as those seen at the Snapp Site (Custer and Silber 1994) and Hockessin Valley Site (Custer and Hodny 1989).

4. Community Settlement Patterns. This research topic is one of the most significant for the Woodland I Period because it is directly related to the study of the basic social complexity of Woodland I groups (Custer 1994b). To date, there are no clear cut examples of "macro-band base camps" that were homes for more than five or six families. Most models of Woodland I social complexity (Custer 1989:296-297) suggest that such larger social groupings were present, but no unequivocal examples have yet been excavated. It is expected that larger social groupings will be reflected in clusters of houses such as the one seen at the Snapp Site (Figure 25), except with more houses. In order to see if larger clusters of houses existed at the Carey Farm and Island Farm sites, large areas of the sites were exposed and large numbers of features were excavated. Special attention was given to the identification of diagnostic artifacts and radiocarbon dates from these features to identify those that may have been used contemporaneously. The spatial arrangement and orientation of features was also considered.

5. Regional Settlement Patterns. The regional settlement pattern research questions noted by Custer (1994a:173-174), as they pertain to individual sites rather than regional surveys, are mainly related to the paleoenvironmental research issues discussed earlier in this research design.

FIGURE 26

Lithic Tool Types

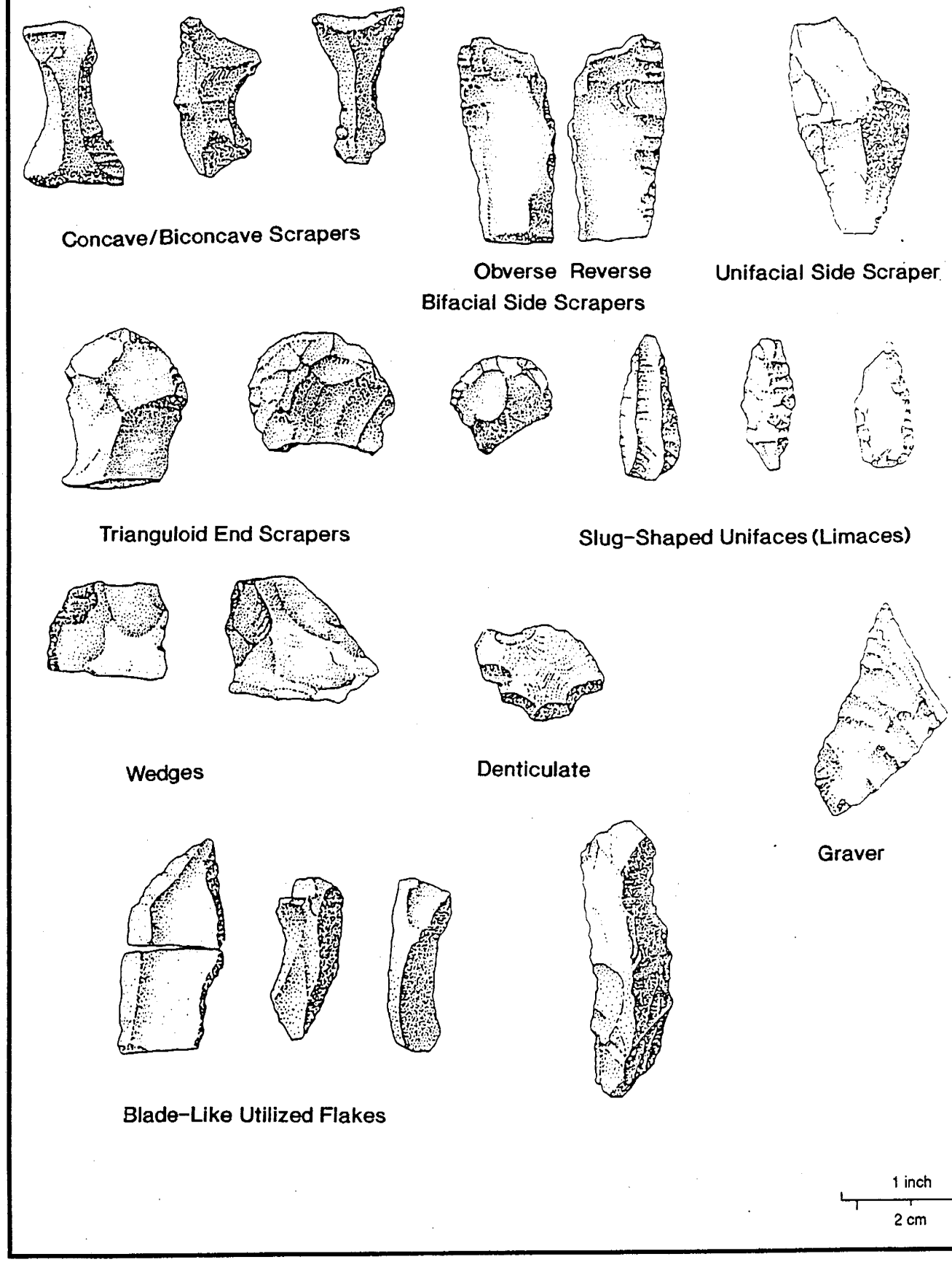


TABLE 3
Sample Summary Tool Catalog - Snapp Site

	TOTAL ASSEMBLAGE	CLYDE FARM
Points/Knives	78	16 (0)
Late Stage Bifaces	12	7 (1)
Early Stage Bifaces	22 (16)	6 (4)
Drills	1 (0)	0
Concave/Biconcave Scraper	10 (7)	0
Bifacial Side Scraper	13 (8)	5 (2)
Unifacial Side Scraper	35 (22)	17 (12)
Trianguloid End Scraper	12 (7)	3 (1)
Slug-shaped Unifaces	4 (4)	3 (3)
Wedges	7 (7)	2 (2)
Primary Cores	15	4
Secondary Cores	29	4
Denticulates	0	0
Gravers	0	0
Regular Utilized Flakes	157 (119)	24 (15)
Blade-like Utilized Flakes	22 (10)	4 (2)

Value in ( ) is number of tools with cobble cortex

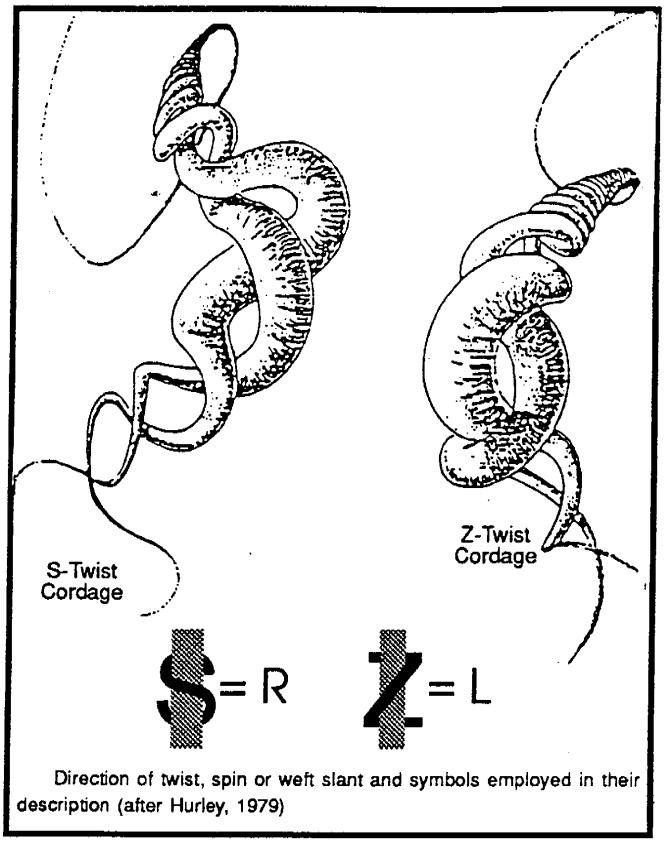
6. Lithic Technology. Past reports prepared by UDCAR for this series have generated a data base of lithic resource utilization data that allows the consideration of a number of research questions regarding lithic resource use, particularly the variable use of secondary and primary raw materials. This data base also includes information on the use of non-local lithic raw materials, such as argillite, rhyolite, and ironstone, that provide information for the consideration of the research questions associated with prehistoric trade and exchange, which will be discussed later. In order to provide data relative to these research issues, the lithic artifacts from the Carey Farm and Island Farm sites were processed and cataloged using methods that have been applied in other UDCAR studies in this series. Specifically presence and absence of cortex and non-local materials were noted and recorded.

Research questions related to lithic tool kit composition and lithic reduction strategies are also noted in the Woodland I overview (Custer 1994a:175). The stone tool assemblages from various contexts at the Carey farm and Island Farm sites were cataloged using a specific set of lithic tool types (Figure 26, Table 3) adapted by Lowery and Custer from the work of Bordes (1968). Use of this standardized typological system assured the gathering of comparable data for use in studies investigating similarities and differences in assemblages from more than one site. Flake attribute analysis was also applied as suggested by Custer (1994a:175) to understand lithic reduction activities.

It should also be noted that a special attempt was made to gather lithic resource use, tool kit composition, and flake attribute data from limited sets of artifacts from well-dated contexts at the Carey Farm and Island Farm sites. In some past studies (e.g., Custer and Silber 1994) such contexts were not well defined and it was necessary to lump together artifacts from varied contexts. It will be seen that the Carey Farm Site, in particular, has a number of interesting dated contexts with associated lithic artifact assemblages, and these individual assemblages were used as primary sources of lithic artifact data.

FIGURE 27

Varieties of Cordage Twists



Direction of twist, spin or weft slant and symbols employed in their description (after Hurley, 1979)

7. Ceramic Technology. Basic description of ceramic assemblages is an important research goal noted by Custer (1994a:175), and basic description will be emphasized in this report. However, some other research issues also emerged during the study of ceramics from other Delaware sites and these local research issues relate to larger regional issues in prehistoric ceramic research (Custer 1987). For example, research at the Pollack Site (Custer, Hoseth, Silber, Grettler, and Mellin 1994) noted that cord-marked ceramics seemed to be more common at sites in northern and central Delaware as opposed to a significant proportion of net-marked ceramics at sites in the southern parts of the state, particularly the Atlantic Coast Zone. These differences in textile impressions may be related to availability of nets, and, consequently, differential fishing and fowling technologies. The Carey Farm and Island Farm sites are in a position to provide interesting data pertinent to this question because they are located in between the other sites studied. Therefore, cordage impressions on ceramics from these sites were carefully studied and the varied textiles recorded.

Another issue in ceramic research related to cordage impressions on clay vessels is consideration of some of the cordage technologies (Hurley 1979). Some researchers (Johnson and Speedy 1992; Peterson and Hamilton 1984) have suggested that the direction of cordage twist (Figure 27) has cultural significance in that certain groups only spun and twisted their cordage materials in one direction. Research by Adovasio (1983) has shown that there are some potential implications for prehistoric ethnic group identification using cordage twist attributes in the Great basin. However, to date, similar studies in the Middle Atlantic (e.g., Johnson and Speedy 1992) have not produced convincing results because they have not usually considered the archaeological and cultural contexts of the specimens analyzed. These studies are also weakened by the fact that they use individual sherd counts rather than vessel counts. In the studies of cordage impressions on ceramics from the Carey Farm and Island Farm sites, vessel-based data will be used where possible and the cultural context, in terms of household and household cluster provenience and the type of cordage analyzed (simple cords versus nets, were considered. Data on vessel function and size were also recorded where possible to generate further data on the cultural context of the ceramic assemblage.

8. Subsistence Systems. Custer (1994a:175) notes that the main research issue that needs to be addressed within the study of Woodland I subsistence systems is the contextual validity of the seed assemblages collected through flotation analysis. Flotation analysis of seeds from other sites has collected small numbers of seeds that show that a wide range of wild plants were used by the Woodland I inhabitants of Delaware (Figure 28). However, the numbers of seeds recovered from sites in central

FIGURE 28

Plant Use Data for Woodland I Sites

	Pollack (1)	Lelpsic (2)	7NC-G-101 (3)	7K-D-21 (4)	7K-D-3 (5)	7NC-E-41 (6)	7NC-E-46 (7)	7S-K-21 (8)	7S-D-9 (9)	7S-G-79 (10)
Copperleaf	X	X	X							
Hickory		X	X	X	X	X	X	X	X	X
Butternut		X	X	X				X	X	
Acorn	X	X				X		X		
Chenopodium	X	X	X			X	X	X		
Amaranth	X	X				X	X	X		
Carpetweed						X				
Clammyweed	X					X				
Chickweed						X				
Mustard						X				
Flax						X				
Sedge	X					X				
Spurge	X		X			X				
Mint						X				
Skullcap						X				
Sage						X				
Thyme						X				
Bean						X				
Hog Nut						X				
Bayberry	X		X			X				
Pokeweed	X					X				
Smartweed	X		X			X				
Raspberry	X	X	X			X				
Wild Grape		X				X				
Walnut						X				X
Corn										X
Hackberry	X						X			
Thimbleberry	X		X							
Ragweed			X							
Dogwood		X								
Greenbriers	X	X								
Sheep Sorrel		X								
Solomon's Seal	X	X								
Tulip Tree	X	X								

Citations and Notes

(1) Custer et al. 1994
Dates to Archaic, Woodland I, and Woodland II periods

(2) Custer, Riley, and Mellin 1994.
Dates to Woodland I and Woodland II periods.

(3) Custer and Silber 1994
Dates to Woodland I and Woodland II periods.

(4) Thomas, et al. 1975.
Dates to Carey Complex (A.D. 600).

(5) Griffith 1974. Dates to Carey Complex (A.D. 0-60).

(6) Thomas 1981. Variety of Woodland I and Woodland II Components.

(7) Custer and Bachman 1983.
Clyde Farm Complex ca. 2200 B.C.

(8) Custer, Stiner, and Watson 1983. Delmarva Adena and Carey Complex Occupations (ca. 500 B.C. - A.D. 600).

(9) Custer and Mellin 1987.
Carey Complex Occupation (A.D. 0-600).

(10) Doms, Custer, Davis, and Trivelli 1985. Woodland II - Slaughter Creek Complex Occupation (ca. A.D. 1000-1500).

Note: Only the major plants from the Pollack Site are listed.

and northern Delaware are low, and there is some question as to whether theses small samples of seeds truly represent the refuse from prehistoric plant foods. This question is further complicated by the findings of detailed analysis of seed remains from the Leipsic Site (Custer, Riley, and Mellin 1994).

Seed research at the Leipsic Site began by considering the fact that large numbers of uncharred seeds are always found in the flotation samples from pit features. In contrast, the number of charred seeds is rather small. The standard interpretation of the differential numbers of charred and uncharred seeds is that the charred seeds are the true remains from prehistoric plant food meals. In contrast, it is assumed that because they are so small, the uncharred remains could have been introduced into the features by natural processes in either the distant or recent past. The Leipsic Site samples of both charred and uncharred remains were analyzed. Out of a total of 7597 seeds, only 136 were charred. Therefore, using the reasoning noted above, only two percent of the seeds recovered have the possibility of being prehistoric food remains. Among the uncharred seed remains, more than 80 percent were from European species. This finding reinforces the assumption that the uncharred seeds are indeed of no value in trying to assess prehistoric diets. However, 57 percent of the charred seeds were also from European species. This finding suggests that the charred seeds are also of questionable interpretive value, and calls into question some of the basic assumptions of paleoethnobotanical analysis.

In light of the findings noted above, both cultural and non-cultural features from the Carey Farm and Island Farm sites were subjected to flotation analysis and a sample of both charred and uncharred seeds were identified. A comparison of the contents of cultural and non-cultural features was then undertaken and the results are presented later in this report. Soil samples from all cultural features were taken and processed; however, approximately 40 percent of the processed samples were set aside for archive storage so that they can be analyzed in the future when some of the questions about their contents' provenience are resolved. In the remainder of the samples, charred seeds were identified and any small artifacts cataloged.

9. Trade and Exchange. The study of non-local lithic raw material distributions provides the basic data needed to consider research questions related to this topic (Custer 1994a:176). The discussions of lithic artifact research designs noted above describe the kinds of methods used in this project to produce useful data pertinent to these questions.

10. Mortuary Ceremonialism. Only one human burial was found at the Carey Farm Site and this small sample makes it impossible to address this research issue. However, the proximity of the Carey Farm and Island Farm sites to mortuary sites such as the St. Jones Adena Site (Figure 24), does create a situation where any data generated that is contemporaneous with the mortuary sites adds to an understanding of the broader lifeways of the mortuary sites' users.

11. Prehistoric Migrations. The study of prehistoric migrations in Delaware is still in its infancy and it is difficult to note specific research goals (Custer 1994a:151-153, 176-177). However, the bulk of the prehistoric occupation of the Island Farm and Carey Farm sites dates to the time period of the inferred migration, and any data description will add to the consideration of the cultural context of potential prehistoric population movements.

12. Trends in Socio-Cultural Evolution. No specific research issues are noted with respect to this topic (Custer 1994a:177). However, it can be noted that the research questions related to community-level settlement patterns are important to the study of the socio-cultural evolution in Delaware because it is critical to know the maximum size of the communities upon which the forces of this evolution operated.

Field Research Methods. In order to gather data relevant to the research questions noted above, it was necessary to excavate large contiguous areas of the Carey Farm and Island Farm sites. Phase II excavations had shown that there were numerous artifacts within the plow zone soils (Figures 21 and 22) in varying concentrations across the site. Sub-surface features were also distributed in most areas of the sites (Figure 23), even in areas where there were only a few artifacts in the plow zone soils. The proposed excavations of the gravel pit and the interchange construction would destroy all of both sites, except for the wooded area that marked the boundary between the two sites (Plates 1, 2, and 7). Therefore, the major goal of the Phase III excavations was to expose prehistoric features over the entire area of both sites and then excavate the exposed features.

Phase II testing had involved the excavation of 452 1- x 1-meter test units at the Carey Farm Site (Plate 8) and 60 similar units at the Island Farm Site. These excavation units represented a one percent sample of the sites' plow zone soils. At the Island Farm Site, there were some areas that had

PLATE 9

Counting Artifacts from Plow Zone Excavations

higher concentrations of artifacts in the plow zone soils and an additional 100 units were excavated in that area to gather a larger sample of artifacts from the plow zone. For similar reasons, an additional 401 units were excavated at the Carey Farm Site. The additional test units were randomly placed on the 10-meter grid lines and thereby supplemented the existing systematic aligned sample generated by the initial testing. The final total of 853 units at the Carey Farm Site represents a two percent sample and the final total of 160 units at the Island Farm Site represents a 2.5 percent sample. All soils from plow zone excavation units were screened through 1/4-inch mesh (Plate 9).

It should be noted that during the course of the Phase II testing it became clear that many of the features had been truncated by erosion and plowing, and similar truncation had been observed at the Leipsic, Pollack, and Snapp sites. In order to better understand the truncated features, limited test excavations were undertaken in the unplowed wooded area that separated the two sites (Plates 1, 2, 7, and 10) in hope of finding intact cultural features that may shed light on the truncated features. This testing also served to identify the cultural resources that will be preserved in this area. The results of the woodlot excavations will be presented in this report along with the results of the excavations in the cultivated fields.

PLATE 10
Excavations in Carey Farm Woods

After the plow zone sample excavations had been completed, the remaining plow zone soils were mechanically removed to expose the cultural features (Plate 11). A Caterpillar #225 treaded backhoe excavator fitted with a 72-inch toothless grading bucket and a standard ten-wheel dump truck were used (Plate 12). Field crew using flat shovels followed the excavator's progress and a smooth clear surface of reddish-yellow subsoil was exposed. Prehistoric pit features were identified as dark moist stains that appeared on the subsoil surface. At some archaeological sites in the Middle Atlantic region, prehistoric pit features are visible due to the inclusion of dark organic soils in the feature matrix. However, at the Carey Farm and Island Farm sites, and at most sites in the Delaware Coastal Plain, organic soils are not usually present. Instead, features are defined because their excavation in prehistoric times interrupted the natural development of soil profiles thereby causing a discoloration of varied hues in the soils.

Soil stains were outlined with a trowel, sequentially numbered, photographed, drawn in plan view, and covered with tightly stretched black polyethylene film to prevent exposure to the adverse effects of sunlight, oxygen, and evaporation (Plate 10). The black polyethylene cut into pieces about three times the size of the feature held down with spikes became laminated to the subsoil after the first rainfall. At a later date, when the black polyethylene was peeled off to expose features for hand excavation, the surface was moist, fresh, and largely free of bacteria. Short of applying herbicides, the application of black polyethylene sheets was a resounding success.

PLATE 12
Backhoe Excavations

All of the soils from each of the features was dry-screened through 1/4-inch mesh (Plates 13 and 14). Features were excavated in halves along their long axis so that profiles could be recorded. If interesting artifacts were encountered, they were mapped in situ (Plate 15). Standard column soil samples for flotation were taken and processed as noted above.

Finally, it should be noted that the Carey Farm Site was so large that it had to be divided into four smaller sub-areas for ease of data analysis and presentation. Plate 16 and Attachment I show the location of the four sub-areas. The South Area runs from S100 to S20, the South Central Area runs from S20 to N130, the North Central Area runs from N120 to N270, and the North Area runs from N270 to the woods at the northern border of the site. The woods area and the Island Farm Site were also treated as similar site areas, and these six areas are used to organize data presentation and interpretation in the remainder of this report.

Laboratory Research and Analysis Methods. All artifacts were washed and marked in accordance with the procedures developed by the Delaware State Historic Preservation Office. Lithic artifacts were cataloged by raw material and functional types. Tools, samples of debitage, and soil samples were processed for potential blood and bone collagen residues following protocols developed by UDCAR (Custer, Ilgenfritz, and Doms 1988). Edge-wear analyses using high- and low-power magnification were attempted to help clarify activities undertaken at the site. To better understand stone tool manufacturing, bifaces were sorted following Callahan's (1979) categories of biface reduction. The presence or absence of cortex on lithic artifacts was noted in order to study use of cobbles for tool manufacturing.

Ceramics (Plate 17) were cataloged by the major cultural types noted for Delaware (Custer 1989). To analyze form variability of ceramics, identifications of surface treatments and tempering components were noted. Latex molds of cordage impressions were created where possible to study textile industries. Remending of ceramic sherds was conducted where possible to better determine dimensions of the original vessels. Selected soil samples were floated through water driven tanks to recover artifacts and ecofacts smaller than 1/4 inch in size. Artifacts from these samples were cataloged in similar manners to the artifacts mentioned above. All seeds were identified using low- and high-power magnification. All charred seeds were also recorded. All faunal remains were identified. Carbon from field and floated soil samples was weighed and selected for radio carbon dating. Plotted distributions of selected artifacts and ecofacts from the assemblage were generated to better assess varied occupations of the site.

PLATE 14

Excavating a Feature

PLATE 15

Excavating a Biface Cache in Feature 1059A

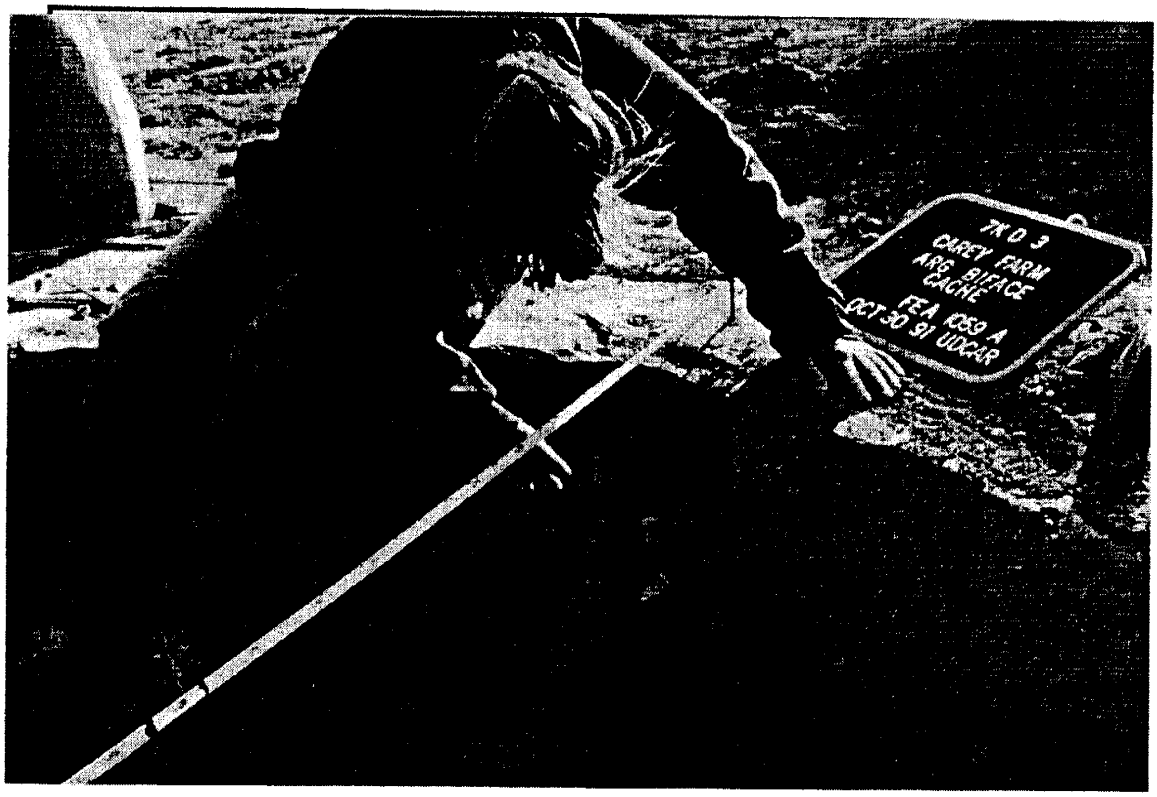


PLATE 17

Feature Typology. The final topic to be discussed is the typological system used to analyze the prehistoric archaeological pit features. Earlier excavations at the Snapp, Leipsic, and Pollack sites had shown that a limited number of pit feature shapes had been encountered at archaeological sites on the Delmarva Peninsula. Figure 29 shows the varied feature types recognized at the Carey Farm and Island Farm sites and each of these feature types is described below. A complete discussion of the feature types and their functions can be found in Custer and Silber (1994:41-52).

In general, feature Types 1, 2, and 2A are the remains of prehistoric pit houses (Custer and Silber 1994:41-52). Figure 30 shows a typical pit house feature which consists of an excavated "basement" and "sub-basement" storage pit. At the Snapp Site, sets of post molds surrounded the pits, and the posts that once sat in these holes would have constituted a wooden framework (Plate 18) which was covered with bark or hides (Plate 19). Feature Types 2 and 2A are the remains of houses where erosion and cultivation have destroyed the post molds, but where the "basement" and "sub-basement" are still intact (Figure 30). Plate 20 shows an especially good example of a Type 2A feature from the Leipsic Site where the "basement" and "sub-basement" are still intact. When erosion and ground disturbance from cultivation are especially severe, only the "sub-basement" is preserved, and a Type 1 feature results (Figure 30).

FIGURE 29

Feature Type Plan Views and Profiles

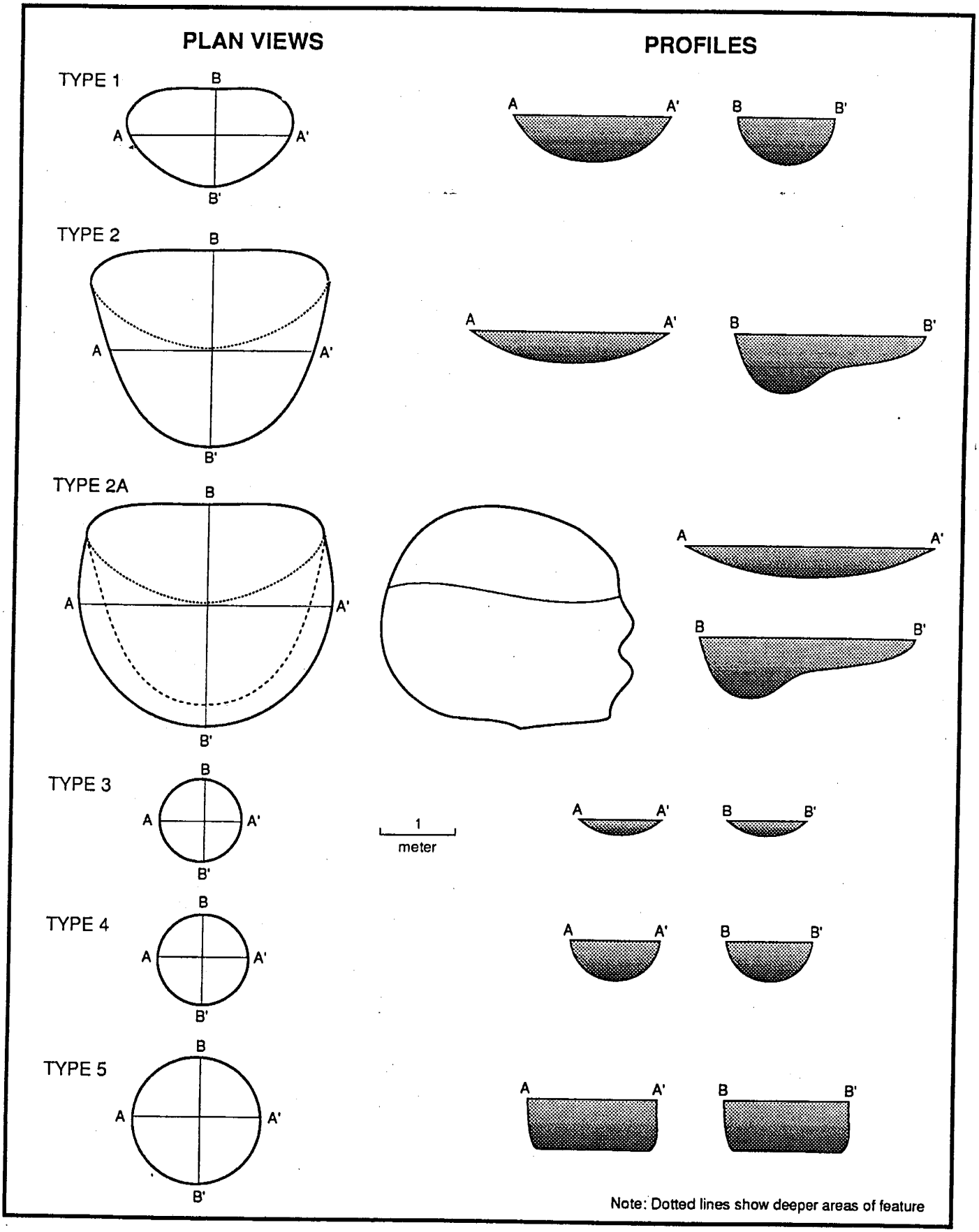


FIGURE 30

Taphonomy of Pit House Features

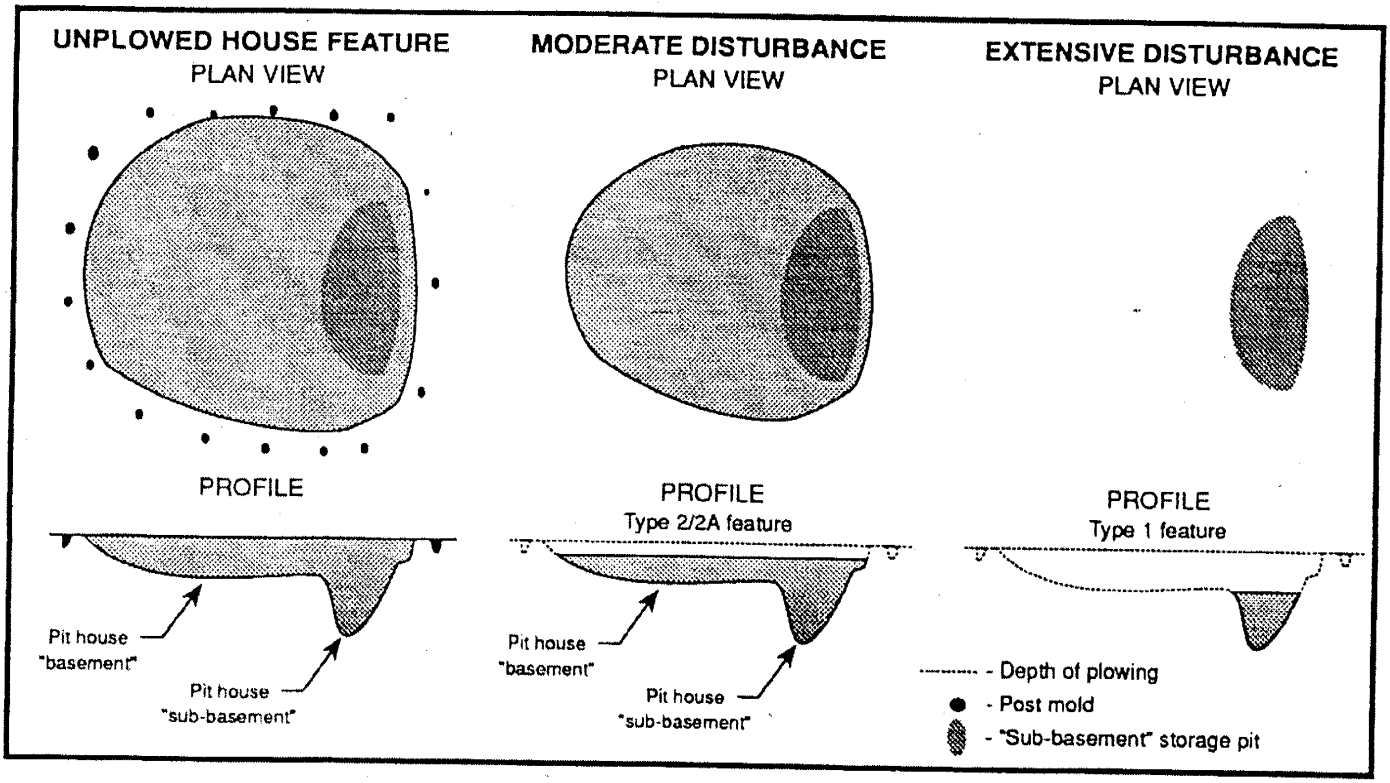


PLATE 20

Type 2A House Feature from the Leipsic Site

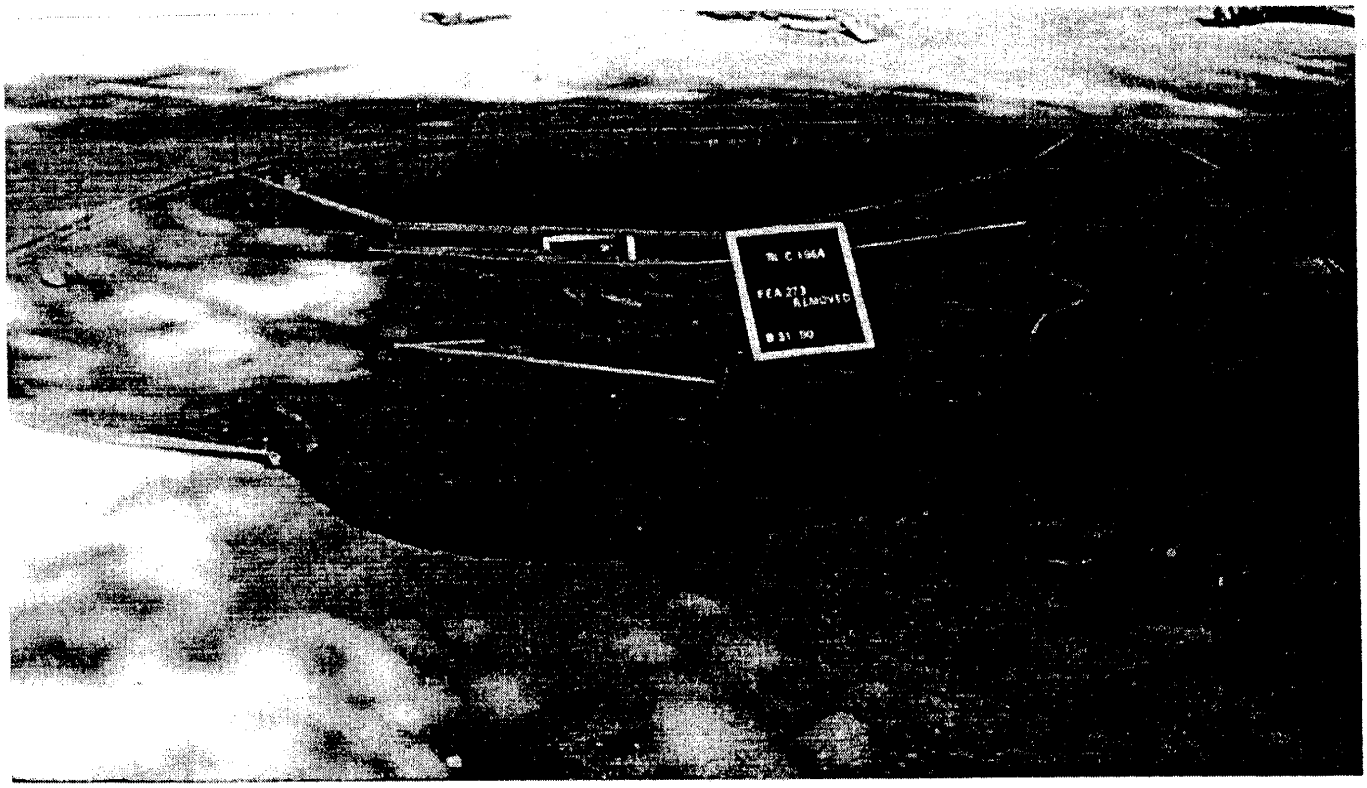
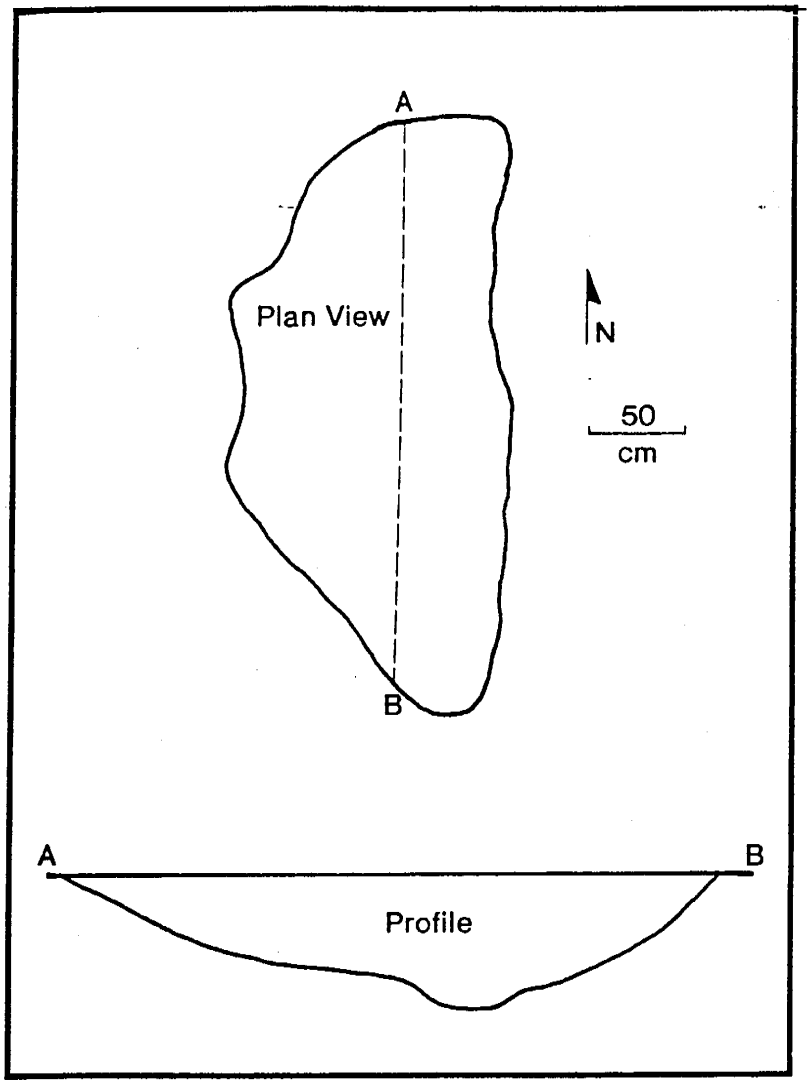


FIGURE 31

Plan View and Profile of Feature 1995, Carey Farm Site (Type 1)



Feature Type 1 is the most common feature type found at sites in Delaware. Figure 31 and Plates 21 - 24 show the plan views and profiles of typical Type 1 features from the Island Farm and Carey Farm sites. The surface area of these features usually ranges in size from one square meter to nine square meters, and the average depth is approximately one meter. This feature type typically appears as a kidney-shaped soil stain generally twice as long as wide and slightly asymmetrical along its long axis in plan view. The cross-section profile along the long axis of Type 1 features is symmetrical and is characterized by gently sloping sides. The short axis profile is less symmetrical and is characterized by steeper sides which join off center to form a rounded bottom. Type 1 features appear to have lost a significant amount of their original volume, perhaps as much as 30 to 50 percent, due to soil deflation. Type 1 features are found within Type 2 or 2A house features, generally along their back walls (Figure 30). Since the remains of the cellar holes observed in Type 1, 2, and 2A features have a long axis and a short axis, the compass orientation of the dwellings may be hypothesized. Some Type 1 features contain concentrations that may be the remains of hearth features within the houses (Plates 23 and 24).

PLATE 21

Opening Plan View of Feature 76,
Island Farm Site (Type 1)

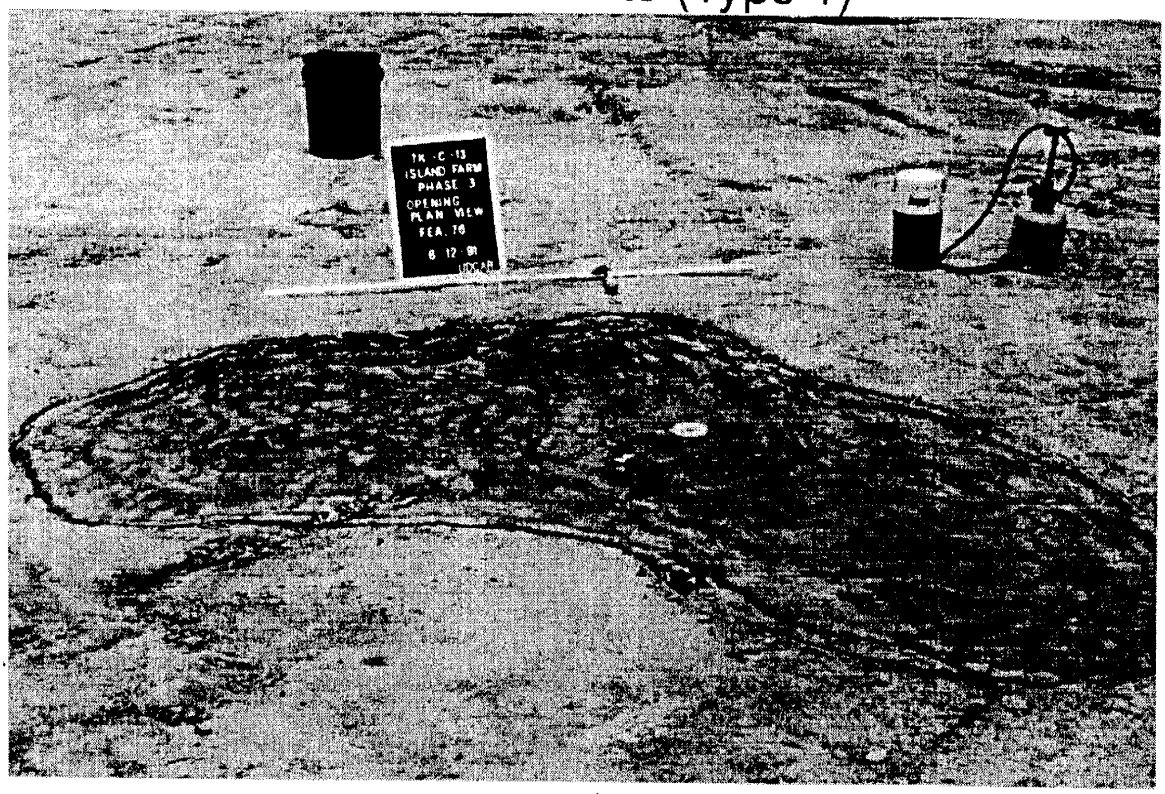


PLATE 22

Excavated Plan View of Feature 76,
Island Farm Site (Type 1)

PLATE 23

Excavated Plan View of Feature 143, Carey Farm Site
(Type 1 with Fire-Cracked Rock)

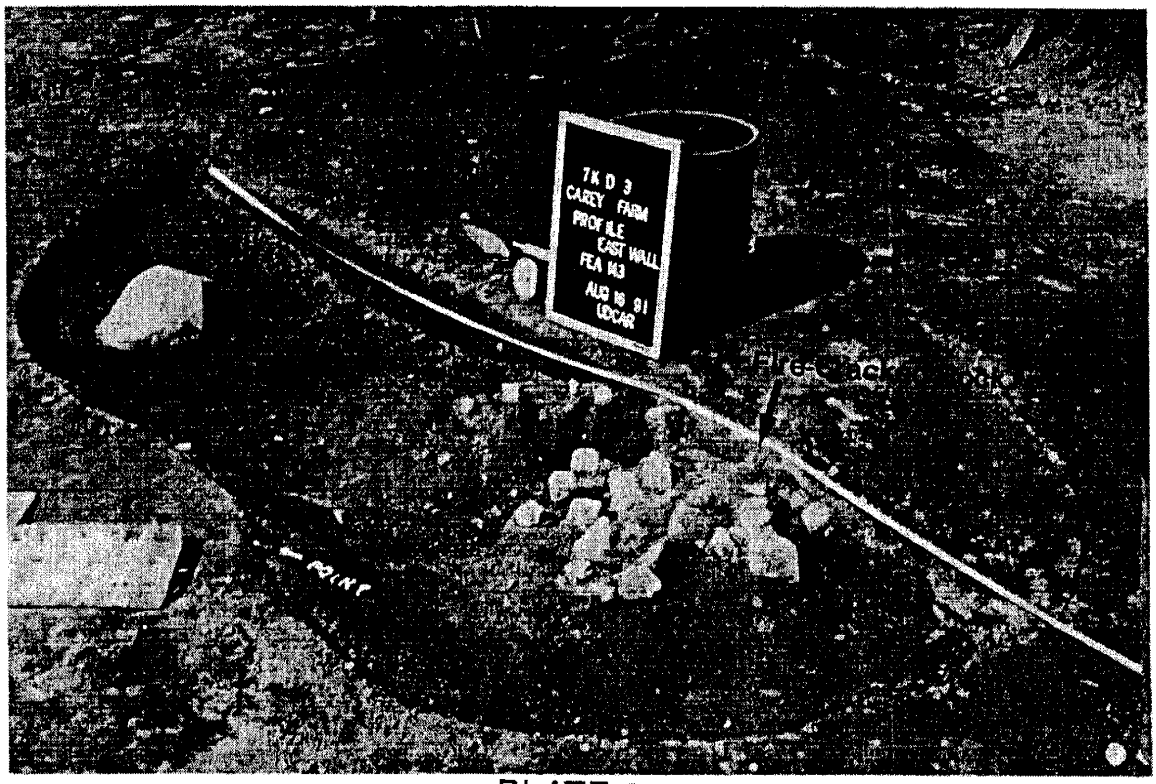


PLATE 24

Excavated Plan View of Feature 440, Carey Farm Site
(Type 1 with Interior Hearth)

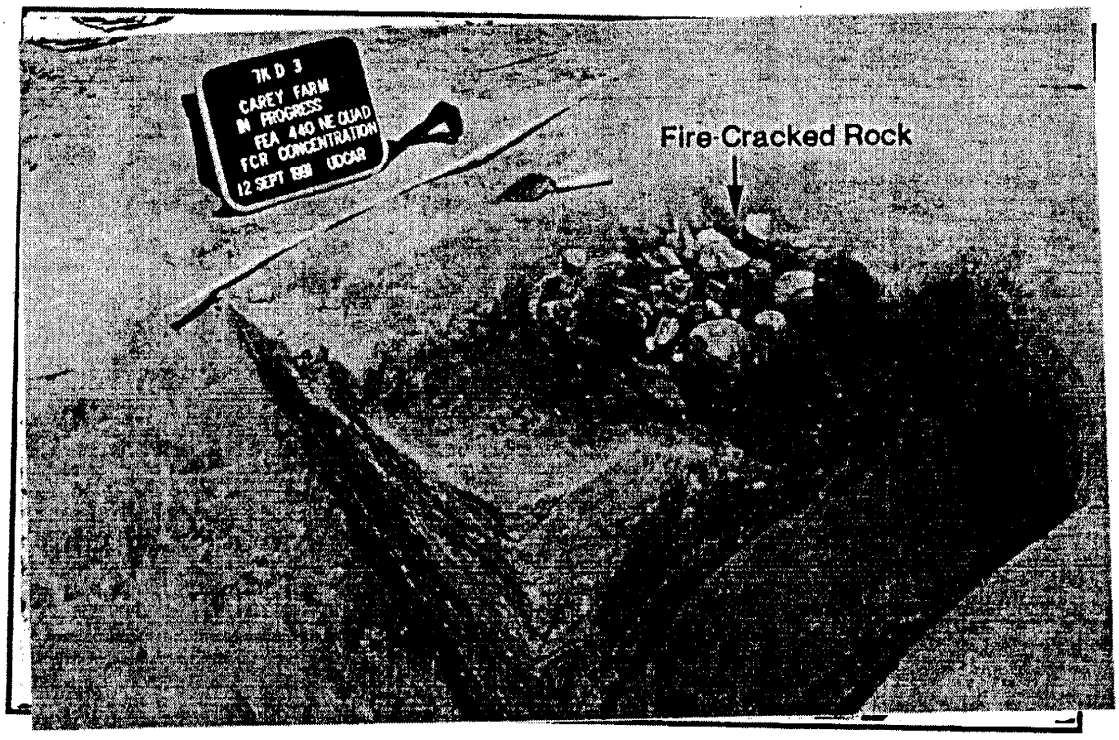
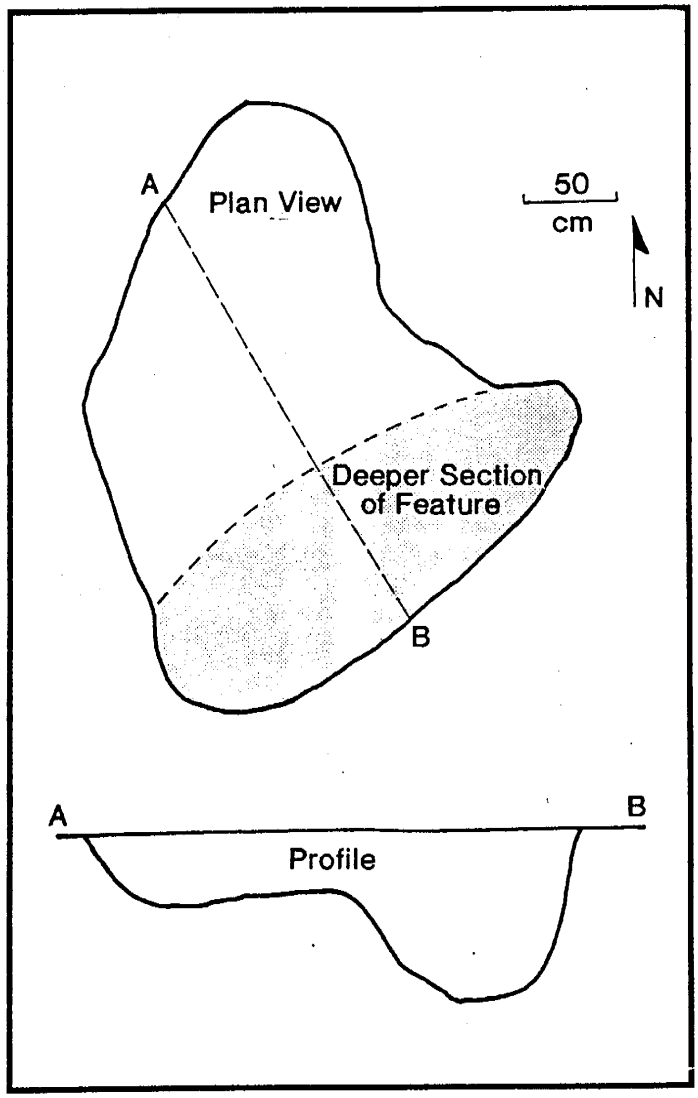


FIGURE 32

Plan View and Profile of Feature 2017, Carey Farm Site (Type 2)



Type 2 features are not as common as Type 1 features. Figure 32 and Plates 25 and 26 show typical Type 2 features in plan view and profile. In general, these features appear triangular in plan view with surface areas ranging in size from two square meters to 16 square meters. Type 2 depressions have gently sloping walls and the floors slope downward to join an internal cellar hole (Type 1 pit feature) at one end of the Type 2 feature area. The average depth of Type 2 features is approximately one meter. Type 2A features are similar to Type 2 features, appear roughly circular in shape, and have a shallow profile with gently sloping walls that grade into Type 2 and Type 1 features.

PLATE 25

Opening Plan View of Feature 623, Carey Farm Site (Type 2)

PLATE 26

Profile View of Feature 623, Carey Farm Site (Type 2)

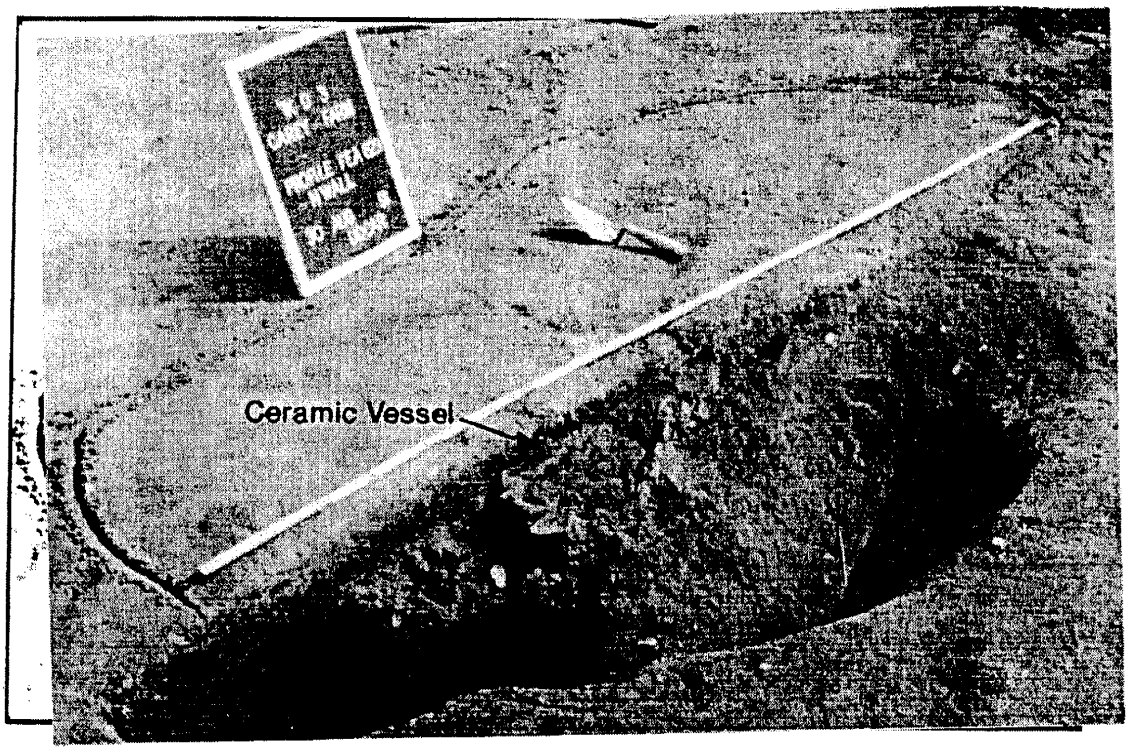
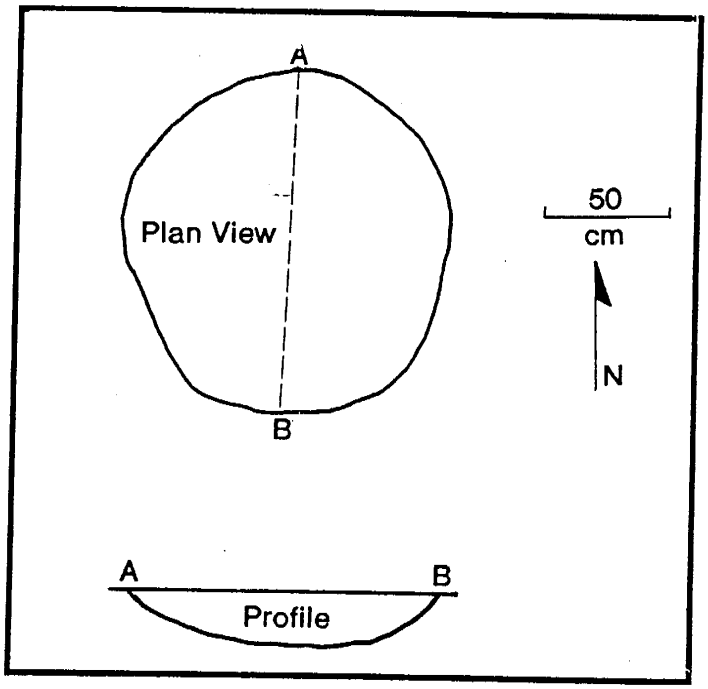


FIGURE 33

Plan View and Profile of Feature 1981, Carey Farm Site (Type 3)



Feature Type 3 is generally characterized as a shallow saucer-shaped pit feature that is relatively symmetrical in cross section. Figure 33 and Plates 27 and 28 show the plan view and profile of typical Type 3 features. The average surface area of these features is 1.0-1.5 square meters, and the average depth is 20-40 centimeters. These features probably served as storage or refuse areas, and some contain substantial accumulations of fire-cracked rock (Plate 28)

In general, Type 4 features are characterized as bowl-shaped pit features that are similar to Type 3 features, only deeper. The average surface area of Type 4 features is 1.5 square meters and the average depth is 50 centimeters. The greater depth of Type 4 features may indicate that they are a unique type and served a unique function or they may simply be a less deflated version of the Type 3 pit feature. Both Type 3 and Type 4 pit features usually contain relatively few artifacts. Figure 34 and Plate 29 show a typical plan view and profile of a Type 4 feature from the Carey Farm Site.

Type 5 features, like Type 3 and 4, are circular in plan view. The average surface area of Type 5 features is 1.5 square meters. Type 5 features differ from Type 3 and 4, however, in profile. On average, Type 5 features are deeper and have straight walls that are nearly perpendicular to a flat pit floor. The average depth of Type 5 features is 70 centimeters. These features probably functioned as storage or refuse pits, and the plan view and profile of typical examples from the Carey Farm Site are shown in Figure 35 and Plate 30.

PLATE 27

Excavated Plan View of Feature 480, Carey Farm Site (Type 3)

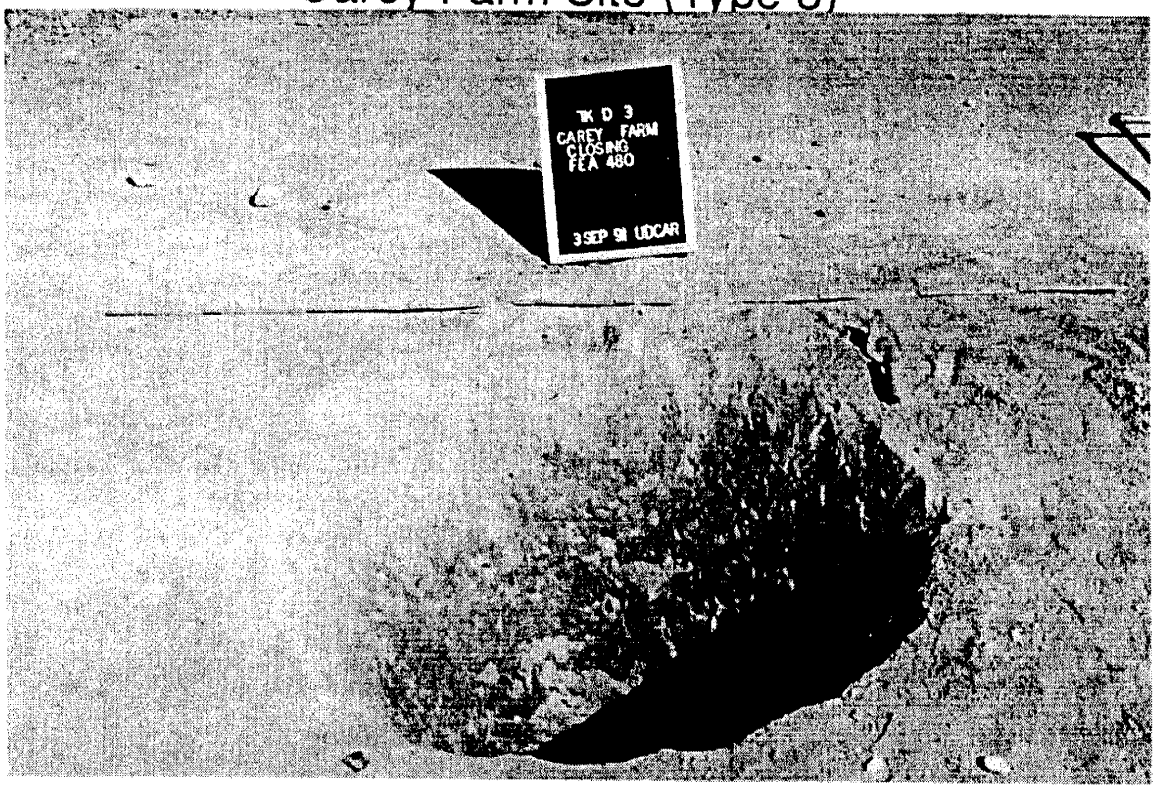


PLATE 28

Excavated Plan View of Feature 2026, Carey Farm Site (Type 3 with Fire-Cracked Rock)

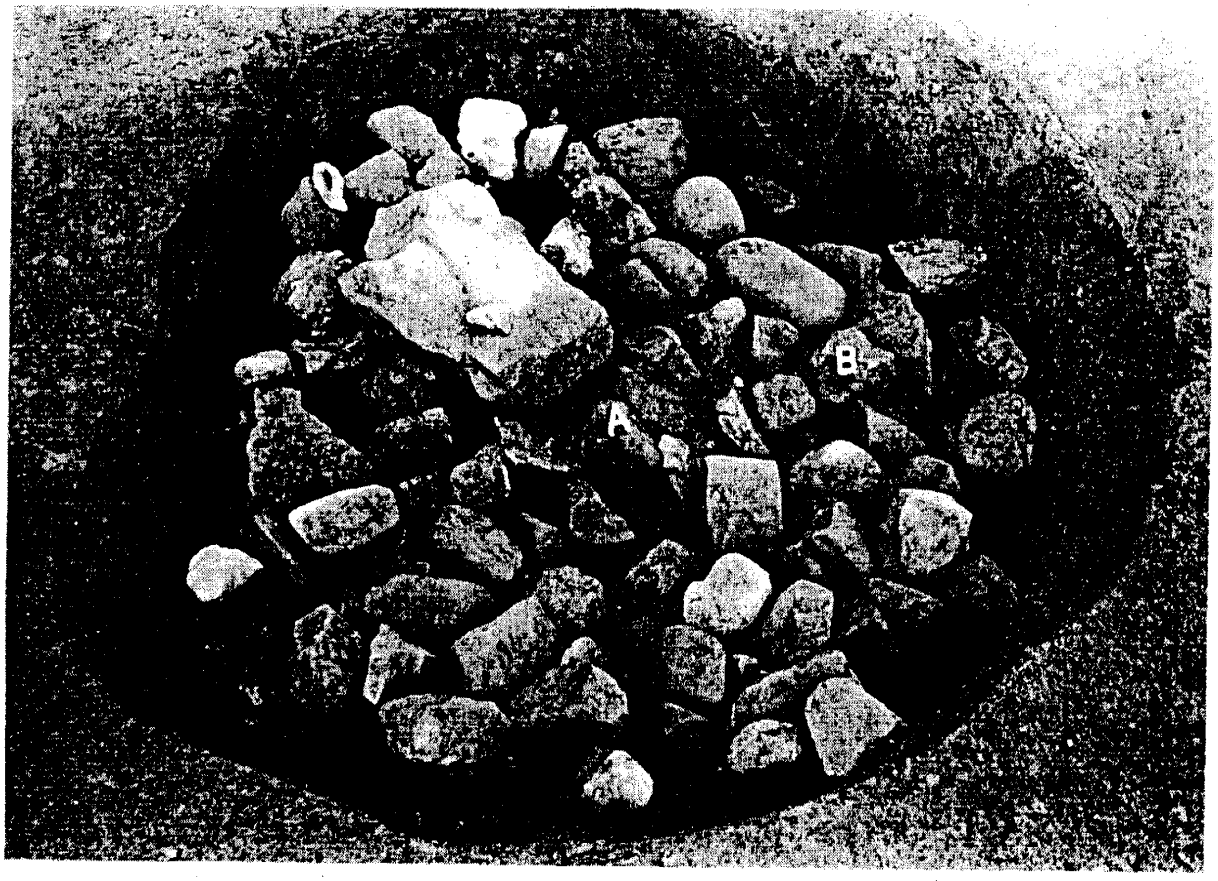


FIGURE 34

Plan View and Profile of Feature 1980, Carey Farm Site (Type 4)

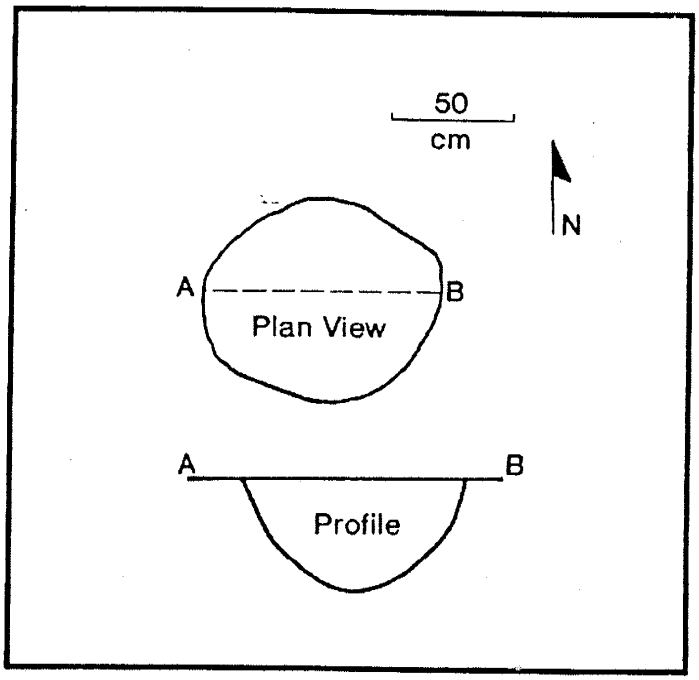


PLATE 29

Profile View of Feature 609, Carey Farm Site (Type 4)

FIGURE 35

Plan View and Profile of Feature 346, Carey Farm Site (Type 5)

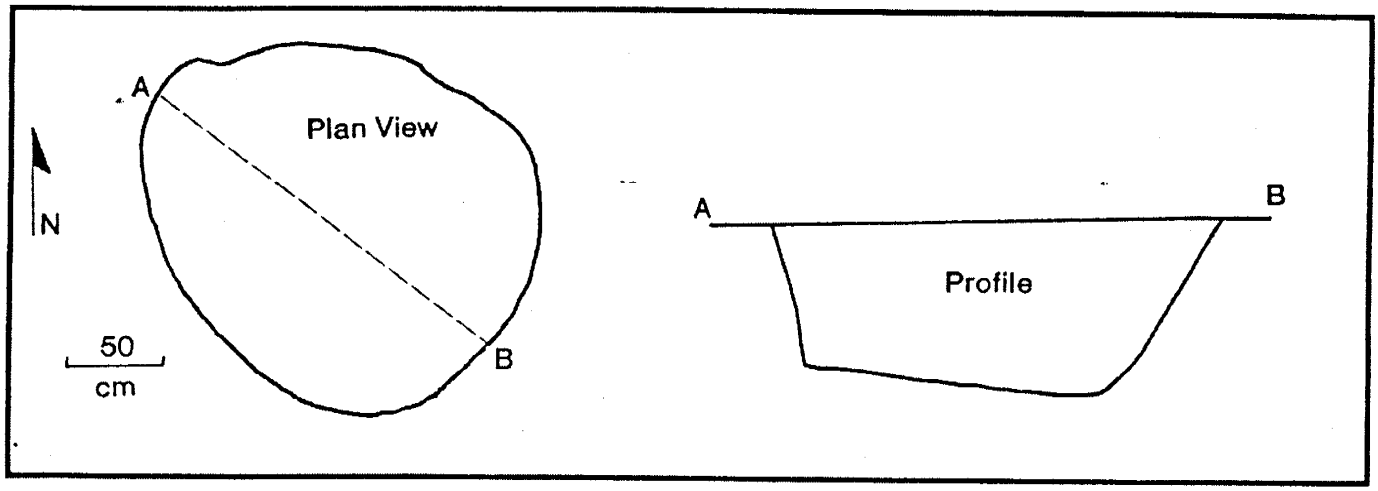


PLATE 30

Excavated Plan View of Feature 346, Carey Farm Site (Type 5)