DISCUSSION AND CONCLUSIONS

The following discussion of the results of the excavations at the Carey Farm and Island Farm sites is organized by the topics listed in the research design outlined in the beginning of this report.

Paleoenvironmental Studies

The paleoenvironmental data gathered as part of the archaeological studies of the Carey Farm and Island Farm sites reinforce the existing models of environmental change in central Delaware (Kellogg and Custer 1994; Custer 1989:176-184), particularly the middle and late Holocene. The summaries of environmental data noted in Figures 7 and 8 match well with the cultural time periods defined on the basis of changes in prehistoric adaptations and lifeways, and these correlations indicate that paleoenvironmental change had important and significant effects upon prehistoric cultural adaptations.

Paleoenvironmental data can also be used on a more localized basis to investigate correlations between prehistoric settlement intensity and paleoenvironmental data. Table 109 shows the occurrence of dated house features over time at the Carey Farm and Island Farm sites for the four major time periods of their occupation. When all site areas are combined, it can be seen that 64 percent of the dated houses are associated with the Middle Woodland Period, particularly the Carey Complex. Early Woodland house features are the next most common (25%), and Late Archaic and Late Woodland house features are the least common. If the distribution of dated house features among the four periods is considered to be representative of the distribution of all features at the site among these time periods, the projections of the total number of house features per time period can be made (Table 110). If it is assumed that each of the houses represents one individual occupation of the site, then the number of occupations during each time period can be divided into the time span of the period to estimate the amount of time that elapsed between each occupation. These time spans are noted in Table 110 and range between one and 80 years.

It should be clear that the assumption that each feature indicates a separate occupation ot the site is very misleading. The recognition of the feature clusters discussed earlier shows that each feature probably does <u>not</u> represent a separate occupation. Thus, the assumption that each feature can be associated with a separate occupation of the site would grossly overestimate the number of occupations during any given time period. Nonetheless, even with the number of occupations grossly overestimated, the most frequent use of the site was only once each year during the Middle Woodland Period. And, according to this figure, there would never have been more than one occupation present during any given year! For the other time periods, the site would have been used much less frequently. During the Late Archaic, the site would only have been used only once every 80 years. The main point of this application is that even when the number of occupations is grossly overestimated, the Carey Farm and Island Farm sites were used relatively infrequently over time. However, this infrequent use over a long period of time produced a very large and impressive archaeological site. Thus, a large "village" occupation is not needed to produce a site like Carey Farm, and none was ever present at the site.

When the settlement intensity is considered in light of the environmental data in Figures 7 and 8, it is clear that the most intensive settlement of the site occurred during the wet and warm climates of the later part of the Holocene. However, the settlement is probably more closely correlated with the appearance of brackish water marshes in the site area. In this case, the appearance of brackish wetlands is probably more important than local climatic conditions. The importance of both the wetlands and

TABLE 109

Dated House Feature Occurrence Over Time

AREA	LATE ARCHAIC (3000 - 1000 B.C.)	EARLY WOODLAND (1000 B.C. - A.D. 500)	MIDDLE WOODLAND (500 - A.D. 1000)	LATE WOODLAND (1000 - A.D. 1600)
South	1 (3)	9 (25)	25 (69)	1 (3)
South Central	2 (3)	10 (13)	63 (82)	2 (3)
North Central	2 (11)	4 (22)	11 (61)	1 (5)
North	3 (7)	13 (30)	22 (51)	5 (12)
Woods	0 (0)	1 (50)	1 (50)	0 (0)
Island Farm	1 (4)	12 (55)	5 (23)	4 (18)
TOTAL	9 (4)	49 (25)	127 (64)	13 (7)

TABLE 110

House Feature Density Over Time

	LATE ARCHAIC (3000 - 1000 B.C.)	EARLY WOODLAND (1000 B.C. - A.D. 500)	MIDDLE WOODLAND (500 - A.D.1000)	LATE WOODLAND (1000 - A.D.1600)
% of Dated Houses	4	25	64	7
Time Period Duration	2000	1500	500	600
Projected Houses	25	155	396	43
Years Between Occupations	80	10	1	14

the climatic conditions are better illustrated by the species diversity data in Figure 8. These data show that the most intensive settlement occurred during the time of the most diverse environments, <u>and</u> the driest environments within the overall trend of wet environments during the later part of the Holocene. Settlement intensity declined markedly ca. A.D. 900 when species diversity dropped dramatically and local climates became more moist. Clearly, the more detailed data generated by the work of Brush (1994), especially the species diversity data, is the most useful for understanding relationships between climate and environment, and more of these types of studies should be undertaken in the future.

TABLE 111

Diagnostic Artifacts in Plow Zone Soils from Varied Site Areas

Area	Paleo-Indian/ Early Archaic	Middle Archaic	Late Archaic	Early Woodland	Middle Woodland	Late Woodland
South	0 (0)	0 (0)	1 (3)	6 (19)	19 (61)	5 (16)
South Central	0 (0)	1 (3)	1 (3)	8 (30)	16 (59)	1 (3)
North Central	1 (1)	2 (3)	3 (5)	6 (9)	26 (41)	26 (41)
North	1 (6)	0 (0)	0 (0)	0 (0)	5 (29)	11 (64)
Woods	1 (2)	1 (2)	1 (2)	21 (33)	25 (39)	15 (23)
Island Farm	2 (8)	0 (0)	3 (12)	3 (12)	13 (50)	5 (19)
TOTAL	5 (2)	4 (2)	9 (4)	44 (20)	94 (43)	63 (29)

( ) - Percent

Another related research issue within this topic is consideration of potential shifts in settlement within the Carey Farm and Island Farm sites over time. Table 109 provides data relevant to this question regarding features at the sites, and Table 111 provides similar data from the plow zone soils. Based on current models of settlement pattern shifts over time (Custer 1994a:95-98), it can be hypothesized that there should be more later occupations in the areas of the sites that are farthest upstream. This shift would have occurred because sea-level rise would have caused the highly productive saltwater/freshwater interface to move progressively upstream. As this zone moved, prehistoric groups may have moved their settlements to stay close to it (Figure 24).

When feature data are considered, there are no indications that there were any changes in settlement over time within the section of the river spanned by the sites. In fact, The northernmost, and the furthest upstream, area, the Island Farm Site, actually had more earlier occupations, rather than more later ones. On the other hand, when plow zone data are considered, the North Central and North areas show increases in numbers of Late Woodland diagnostic artifacts, and presumably occupations. However, this trend is not continued moving upstream into the Woods Area and the Island Farm Site. The feature data are more reliable than plow zone data and the trends in the plow zone data may be due to sampling errors. In sum, there are no data to support the hypothesis that prehistoric groups shifted their settlement progressively upstream over time within the bounds of the Carey Farm and Island Farm sites. These data would be consistent with the interpretation that the change in the saltwater/ freshwater interface, oligohaline zone, of a mile or less, the distance spanned by the Carey Farm and Island Farm sites, was insufficient to cause a settlement pattern change. Earlier research at the Leipsic (Custer, Riley, and Mellin 1994) and Pollack sites (Custer, Hoseth, Silber, Grettler, and Mellin 1994) had shown that no settlement movement occurred when the oligohaline moved over a distance of one-half mile over time. Therefore, the data from the Carey Farm and Island Farm site expands that range to a full mile and provides new insights on factors affecting prehistoric decisions.

The data on settlement pattern changes can also be compared to data from the Hawthorn Site (7NC-E-46) in northern New Castle County (Custer and Bachman 1983). Analysis of site distributions around Churchman's Marsh (Custer 1982), a large tidal wetland, showed that prehistoric groups moved settlements and produce new special function sites when they had to travel two miles to obtain critical resources. The combination of the Hawthorn and Carey Farm data would suggest that the critical distance that determined if a group would change its site location was less than two miles and more than one mile. Ethnographic data on the !Kung of South Africa (Yellen 1977) and Australian Aborigines (Gould 1978) show similar movement patterns. Further research may help to determine this critical distance even more precisely.

The final research issue identified within the topic of paleoenvironmental studies was a consideration of the effects of aeolian erosion. As was noted earlier in this report, it was hoped that the excavations in the Woods Area, which had never been plowed, would provide some data regarding aeolian deflation and deposition. Unfortunately, such data were not present. However, some interesting data on landscape changes were gathered. The excavations in the Woods Area yielded a very large number of artifacts, even though the number of excavation units in this area was small. The higher artifact yield of this area is almost certainly due to the fact that this area was not cultivated and, therefore, not subjected to the extensive erosion that was seen in the sections of the site that had been cultivated. However, it is also useful to note that the features in the unplowed Woods Area were no more complete than those seen in the plowed areas. Features in both areas were equally truncated. This similarity suggests that there was deflation and erosion of the landscapes around the site that was not related to cultivation. Daniels (1993) has demonstrated that aeolian erosion occurred throughout the St. Jones drainage at various times prior to European settlement, and this erosion probably deflated the features in all site areas. Then, later cultivation produced extensive erosion in plowed areas that reduced the artifact yields. Thus, the archaeological record of central Delaware has been altered by both natural and human-made activities in the past, and all of these modifications of the landscape must be considered when interpreting that archaeological record.

Chronology

The main research question noted in the research design for the topic of chronology is refinement of local sequences using sets of diagnostic artifact associations from well-defined feature contexts. Luckily, the Carey Farm and Island Farm sites provided excellent information on this topic. Plate 85 shows the varied projectile point types that are associated with Early Woodland ceramics such as Wolfe Neck, Accokeek, Nassawango, and Coulbourn varieties. Point types associated with these points include Type D stem (Plate 85A-E), Type B stem (Plate 85F-G), generalized corner-notched (Plate 85H), Hellgrammite (Plate 85I), and teardrop (Plate 85J). It is important to note that the majority of the point types are stemmed points types that are also associated with earlier and later ceramics. In this case, the Carey Farm assemblages do not allow for a refinement of the chronological sequences, but instead highlight the variability of Early Woodland assemblages and the long-term tradition of use of stemmed points.

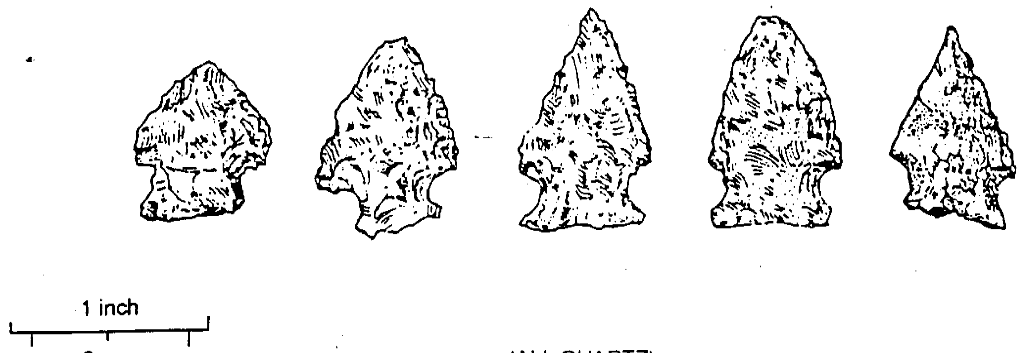
Plate 86 shows the varied projectile point types associated with Middle Mockley ceramics at the Carey Farm and Island Farm sites. Numerous point types are present including generalized side-notched (Plate 86A-H), Type B stem (Plate 86I-K), Type E stem (Plate 86L), Type D stem (Plate 86M-R), teardrop (Plate 86S), ovate (Plate 86T), Fox Creek (Plate 86U), Type I stem (Plate 86V), and

PLATE 85
Projectile Points Associated with Early Woodland Ceramics

A - Jasper Type D Stem - Feature 1676
B - Jasper Type D Stem - Feature 2035
C - Chert Type D Stem - Feature 137
D - Jasper Type D Stem - Feature I12
E - Jasper Type D Stem - Feature I12
F - Jasper Type B Stem - Feature 2035
G - Jasper Type B Stem - Feature 2002
H - Jasper Corner-Notched - Feature 2035
I - Jasper Eared-Hellgramite - Feature 2021
J - Argillite Teardrop - Feature 2039

FIGURE 111

Side-Notched Projectile Points/Knives from the Hawthorn Site



(ALL QUARTZ)

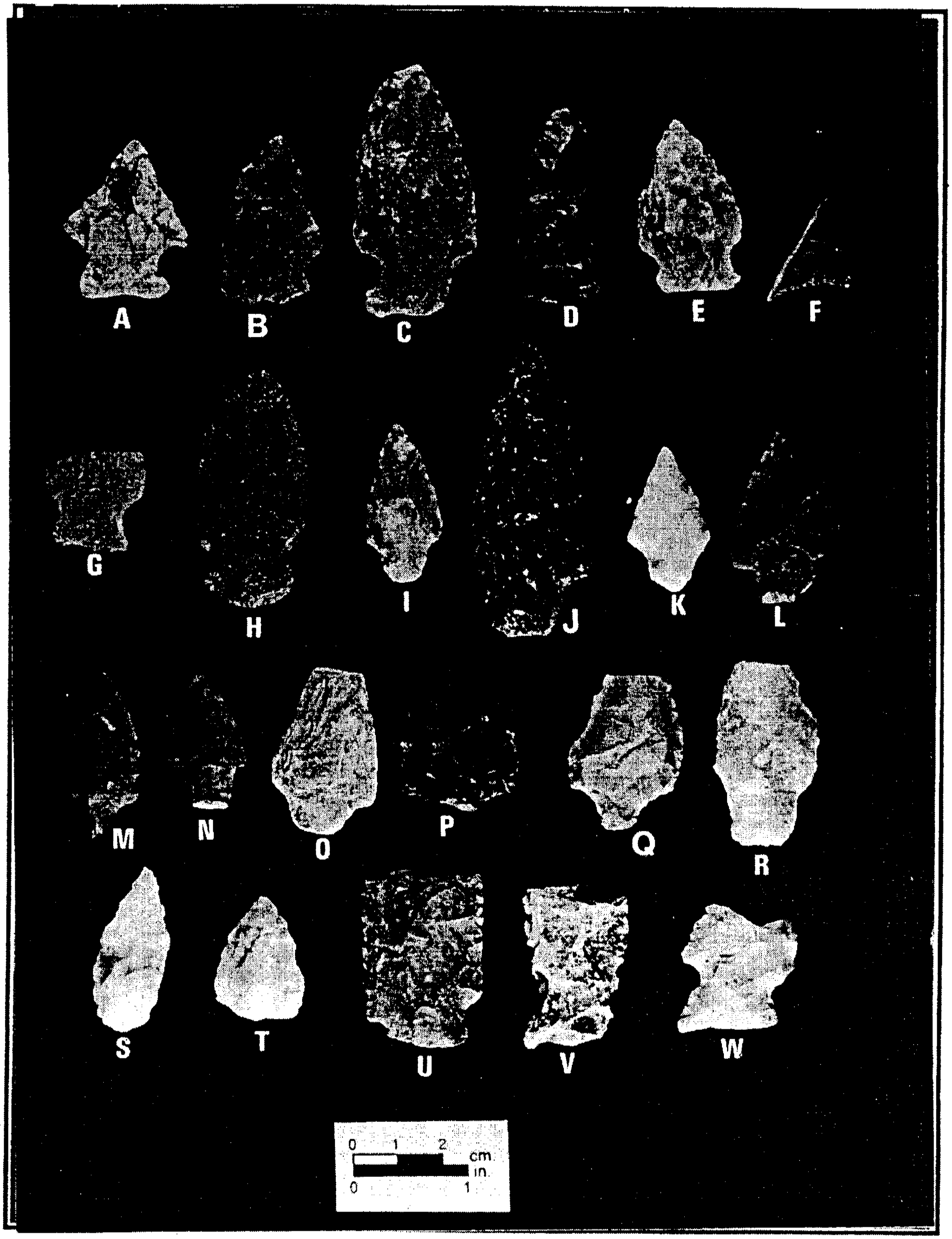
Snyder's corner-notched (Plate 86W). It is important to note that this assemblage contains only one Fox Creek point. As was noted previously, Fox Creek points are usually associated with Mockley ceramics in other parts of the Middle Atlantic region. However, it is clear from the data from Carey Farm that a variety of other points are associated with Mockley ceramics in Delaware. This regional variability in Middle Woodland assemblages had been noted previously (Thomas et al. 1974) and the variability may indicate the presence of regional interaction spheres, or territories. Further research is needed to define these territories, but it seems clear from the Carey Farm and Island Farm data that the Delaware side of the Delmarva Peninsula north of Cape Henlopen was part of one regional interaction network, and the Maryland side was part of another. It may be possible that the Delaware drainage and the Chesapeake drainage were part of different prehistoric territories. If so, the drainages were more important in defining interaction zones than the land mass of the Delmarva Peninsula.

The large number of side-notched points that are found with Mockley ceramics is somewhat unexpected even though some side-notched points are present in Middle Woodland assemblages of the Upper Delaware Valley (Custer 1995). Unfortunately, these side-notched points are not especially distinctive, as can be seen by comparing the side-notched points from the Carey Farm and Island Farm sites (Plate 87A-H) with those found at the Hawthorn Site (Figure 111), which are approximately 3000 years older. The points in the two assemblages look very much alike, and there is no basis for defining a special Middle Woodland side-notched point type at the present time.

Plate 87 shows the varied projectile point types associated with Hell Island ceramics at the Carey Farm and Island Farm sites. Types present include Type D stem (Plate 87A-F), Type E stem (Plate 87G-I), Type B stem (Plate 87J), generalized side-notched (Plate 87K), and a large elongated triangle (Plate 87L). Missing from the assemblage are Jack's Reef points, which are usually associated with Hell Island ceramics. There are fewer examples of point/ceramic associations for Hell island ceramics than there are for Mockley ceramics, and the absence of the Jack's Reef points may be due to sampling biases. Nonetheless, the assemblage shown in Plate 87 still highlights the variability of projectile point associations during Middle Woodland times. This variability must be considered when defining the diagnostic artifacts associated with the varied Woodland I culture complexes as was done

PLATE 86

Projectile Points Associated with Mockley Ceramics



Key to Plate 86

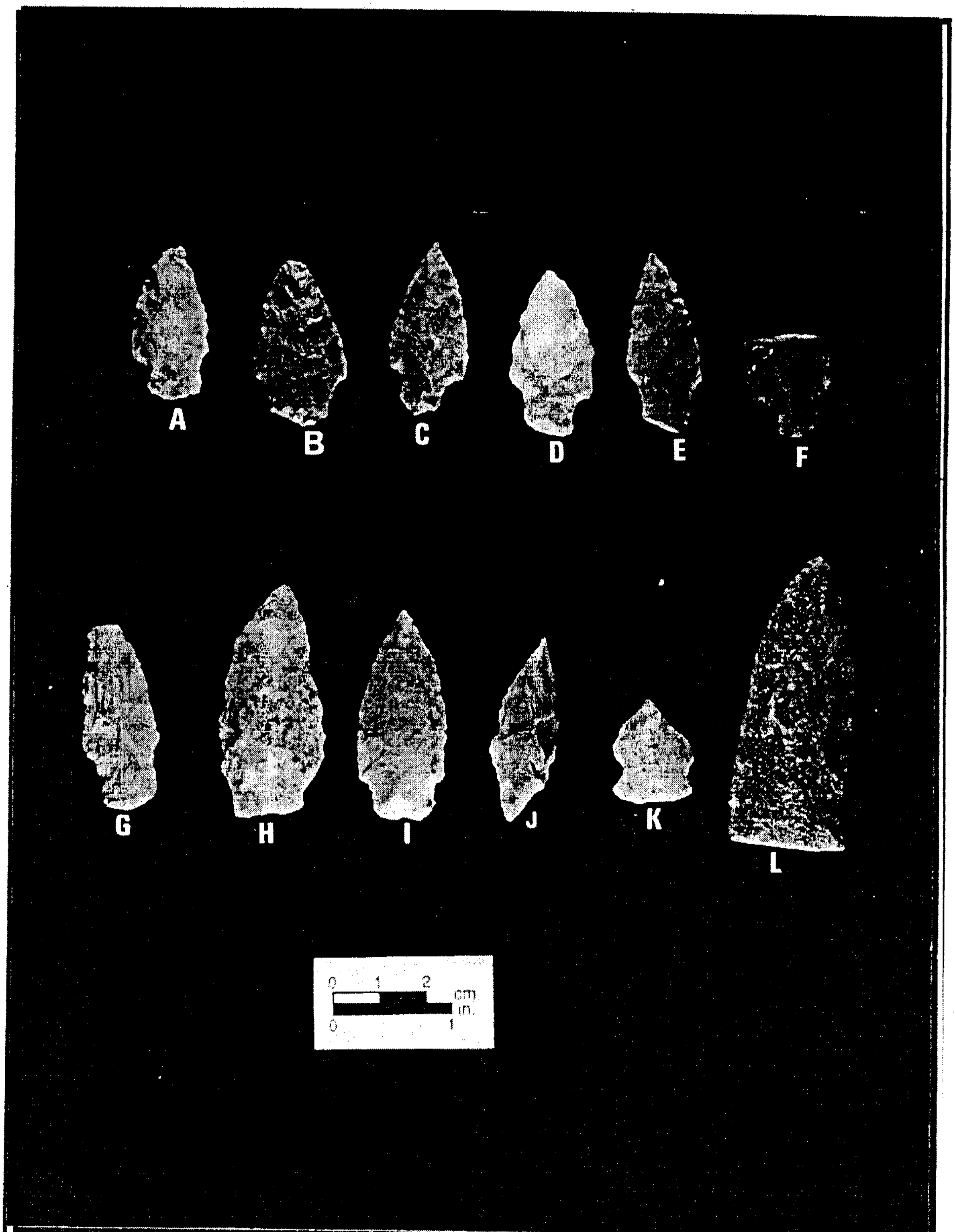
A - Jasper Side-Notched - Feature 357
B - Chert Side-Notched - Feature 440
C - Jasper Side-Notched - Feature 608
D - Jasper Side-Notched - Feature 608
E - Quartz Side-Notched - Feature 614
F - Jasper Side-Notched - Feature 604
G - Argillite Side-Notched - Feature 510
H - Ironstone Side-Notched - Feature 510
I - Jasper Type B Stem - Feature 1487
J - Chert Type B Stem - Feature 608
K - Quartz Type B Stem - Feature 509
L - Chert Type E Stem - Feature 611
M - Jasper Type D Stem - Feature 608
N - Chert Type D Stem - Feature 371
O - Argillite Type D Stem - Feature 614
P - Chert Type D Stem - Feature 607
Q - Jasper Type D Stem - Feature 509
R - Quartz Type D Stem - Feature 682
S - Quartz Teardrop - Feature 428
T - Quartz Ovate - Feature 607
U - Chert Fox Creek - Feature 427
V - Jasper Type I Stem - Feature 608
W- Flint Ridge Chalcedony Snyder's
Corner-Notched - Feature 465

in Table 2. At present, there is probably no need to change the associations listed in Table 2, but we should remember that significant variation may be present and future research may produce data that will force a revision of Table 2.

The projectile point associations depicted in Plates 85-87 are similar to some seen at the Delaware Park Site (7NC-E-41) in northern Delaware (Thomas 1981). Thomas originally rejected the validity of the Delaware Park associations because they did not match with traditional notions of Early and Middle Woodland projectile point assemblage composition. There were no stratigraphic or contextual reasons to reject the associations at Delaware Park, and the presence of similar associations at the Carey Farm and Island Farm sites indicates that the projectile point and ceramic associations at Delaware Park are probably valid representations of technological variability during Early and Middle Woodland times.

The presence of a Flint Ridge chalcedony Snyder's Corner-Notched point in association with Mockley ceramics shows a Delmarva Adena Complex presence at the site, as do the finds of clay-tempered Nassawango, Coulbourn, and Wilgus ceramics (Custer 1989:258-275). Research at the Island Field Site (Custer, Rosenberg, Mellin, and Washburn 1990) yielded data that suggested that Delmarva Adena complex traits persisted into Carey Complex times, and the data from the Carey Farm Complex support this contention.

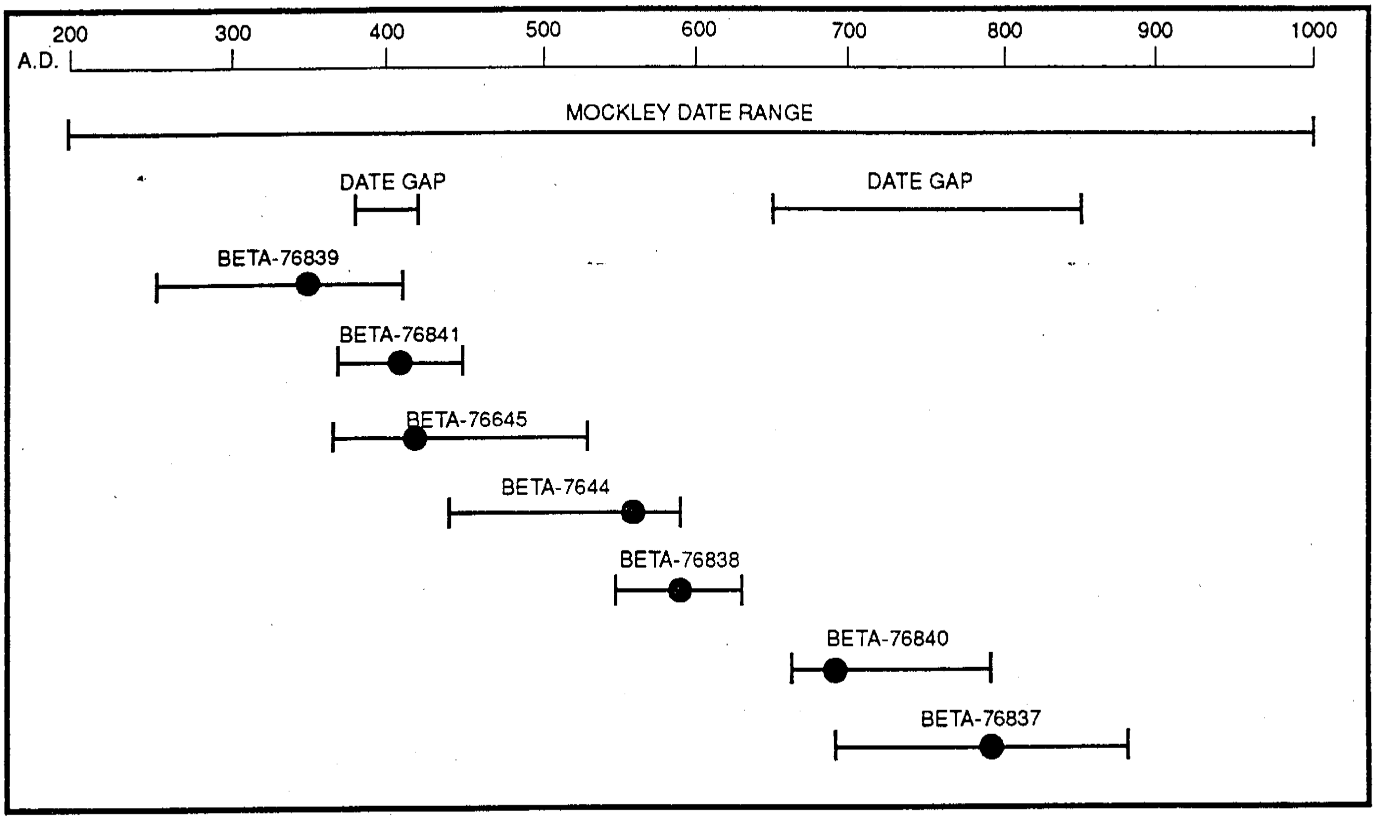
PLATE 87
Projectile Points Associated with Hell Island Ceramics



A - Chert Type D Stem - Feature 1460
B - Chert Type D Stem - Feature 2031
C - Jasper Type D Stem - Feature I5
D - Quartz Type D Stem - Feature I5
E - Chert Type D Stem - Feature I5
F - Jasper Type D Stem - Feature I5
G - Jasper Type E Stem - Feature 2037
H - Quartz Type E Stem - Feature 1998
I - Jasper Type E Stem - Feature 2031
J - Jasper Type B Stem - Feature 2031
K - Quartz Side-Notched - Feature 2031
L - Quartzite Triangle - Feature I5

FIGURE 112

Radiocarbon Date Ranges for Mockley Ceramics



A final topic to consider in archaeological chronologies deals with the radiocarbon dating of Mockley ceramics. Gleach (1988) analyzed dates for Mockley ceramics from throughout the Middle Atlantic region, and noted that the date range for Mockley ceramics spanned the period between A.D. 200 and A.D. 1000. Within this time range, Gleach noted two possible gaps in the radiocarbon dates; one between A.D. 380 and A.D. 420, and another between A.D. 650 and A.D. 850. Figure 112 shows the total date range and the two gaps in the date distributions. Also shown in Figure 112 are the ranges of the calibrated radiocarbon dates for Mockley ceramics from the South Central Area of the Carey Farm Site (Table 38). It can be seen that the Carey Farm dates fall within both date gaps, particularly the early one. Gleach's original study did not have a large data base. In fact, the seven dates from Carey Farm represent 33 percent of the sample available to Gleach. Thus, the Carey Farm radiocarbon dates suggest that the gaps noted by Gleach are probably the result of biases inherent in a small sample rather than being the result of significant cultural events.

Household Settlement Patterns

The main research question outlined in the research design for this topic was the identification of "atypical" house patterns that did not fit with the standard dwelling identified at most sites of the Woodland Period (Figures 30 and 40). No such atypical forms were found at the Carey Farm and Island

Farm sites. In fact, the regularity of the features was exceptional. The similarities in size and shapes of prehistoric Woodland Period houses throughout central Delaware suggests that the basic social unit occupying the houses, the nuclear family, remained rather constant for thousands of years.

Household settlement pattern data from the Carey Farm and Island Farm sites also suggests that the standard house pattern may have even greater antiquity than previously thought. In several instances, Early and Middle Archaic artifacts were found in Type 1 and Type 2 pit house features. Similar occurrences of early artifacts in pit houses had been seen at other sites (see discussion in Custer, Kellogg, Silber, and Varisco 1995), but they were usually considered to be the result of accidental inclusion of older artifacts in the fill of younger features, not a genuine association. We suggest here, however, that there have been enough of the "accidental" inclusions to raise the possibility that the associations have been genuine. The main reason we initially rejected the associations is that we did not believe that Early and Middle Archaic people lived in pit houses. Clearly, preconceptions about the archaeological record were limiting its interpretation. However, there are now enough data available to see beyond this preconception and consider the possibility that Middle and Early Archaic pit houses exist. Future field research should be sensitive to this possibility and seek to derive special contextual information on possible associations of Early and Middle Archaic associations in Type 1 and Type 2 features.

Community Settlement Patterns

The research design notes that this topic is one of the most significant for the Woodland I Period because it relates to the study of basic social complexity (Custer 1994a:74-83). Specifically, this research sought to determine the largest number of families that could have occupied the communities that existed at the Carey Farm and Island Farm sites. For the most part, the feature distributions at both sites seemed to indicate the occasional use of the sites by individual families, or small groups of families, over a long period of time. However, the feature clusters identified in the South (Figures 52 and 53) and South Central (Figures 71 and 73) areas could possibly qualify as multi-family community occupations. Nevertheless, the largest number of houses that could have been contemporaneously occupied was six. This number is also the maximum size of communities identified at the Snapp (Custer and Silber 1994) and Leipsic (Custer, Riley, and Mellin 1994) sites. Thus, to date, the largest communities positively identified in Delaware would have consisted of no more than six families, and the Carey Farm and Island Farm site data do not contradict this generalization. Also, communities of this size have been identified for numerous sites of different ages within the Woodland I and Woodland II periods. The common size at varied time periods suggest that there was little change in community sizes over time in prehistoric Delaware.

The varied distributions of feature types among the different site areas of the Carey Farm and Island Farm sites provide indications about the activities that took place in each area (Tables 4 and 5). In all areas except for the Island Farm Site, the overwhelming proportion of the features are Type 1 and Type 2 house features. Other storage, processing, and refuse features are present, but only in small amounts. In contrast, the Island Farm Site has many more storage, refuse, and processing features in relation to the house features. The Island Farm Site also contained a higher proportion of Early Woodland features as was noted earlier. The different feature assemblages and the somewhat different date of occupations are probably related. The higher proportion of non-house related features at the Island Farm Site could indicate that the site was used more for resource processing rather than long-term habitation during Early Woodland times.

A final topic to consider in relation to community settlement patterns is the presence of the very large feature (Feature 371) in the South Central Area of the Carey Farm Site (Plate 65). This large pit was a Type 5 feature and its function is uncertain. Its large size precludes its use as a roasting pit or processing feature, and it also did not contain any artifacts relating to such a function. Likewise, its configuration was significantly different from the house-related features and it does not seem to be part of a dwelling. The most likely function of this feature is some kind of storage feature, but its large size makes one wonder what would have been stored in it.

Similar large pits associated with Mockley or related ceramics, and interpreted as storage pits, have been found at other Middle Woodland sites in the Middle Atlantic region including the Delaware Park Site in northern Delaware (Thomas 1981), Site 18CV272 in southern Maryland (Gardner, et al. 1989), the Hampton University Site in southern Virginia (Edwards, et al. 1989), and the Abbott Farm near Trenton, New Jersey (Cross 1956). Gardner et al. (1989) and Curry and Kavanagh (1991) suggest that these larger features may have served as communal storage features that were used when Middle Woodland groups gathered together in multi-family communities. The presence of Feature 371 within one of the feature clusters in the South Central Area of the Carey Farm Site supports this contention. Stewart (1986) has also suggested that Middle Woodland groups gathered together for communal resource processing, and these large features may have played a role in these activities as well.

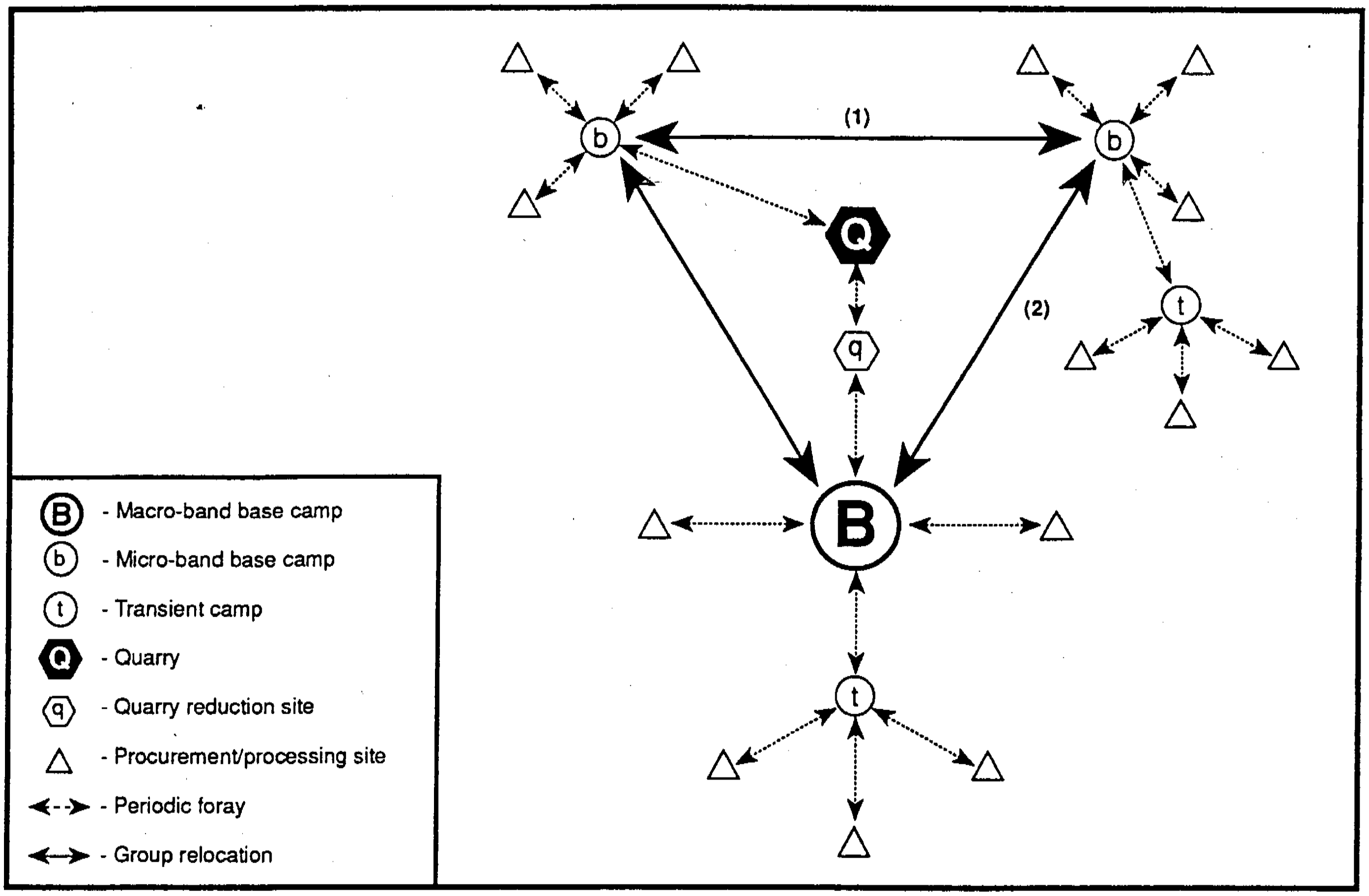
Regional Settlement Patterns

The research design noted that the regional settlement pattern topics were mainly related to the paleoenvironmental research topics, and these were already discussed. Nonetheless, there are some additional issues in regional settlement patterns that can be addressed. The first of these issues is methodological, and relates to the use of plow zone data versus excavated feature data in determining the main occupations of multi-component sites. In the consideration of potential settlement pattern shifts over time within the boundaries of the Carey Farm and Island Farm sites, it was observed that the plow zone artifact distribution data would have led one to believe that there was more intensive Late Woodland settlement in the North Central and North areas compared to the remainder of the site (Table 111). However, excavated feature data showed that both of these site areas were most intensively occupied during Middle Woodland times, as was the remainder of the site. Because the excavated feature data are certainly better indicators of the intensity of site use, these data were used in the site interpretation. Unfortunately, such excavated data are not always available, and archaeologists are forced to use surface collections and plow zone samples of artifacts to assess the chronology of site occupations. The disconformity between the plow zone and feature data sets at the Carey Farm and Island Farm sites should serve as a cautionary note for relying too heavily on surface collection and plow zone assemblages.

Because the Carey Farm and Island Farm community settlement pattern data do not contradict the notion that there were not many large base camps in the Delaware Coastal Plain during the Woodland I Period (Custer 1994a:74-83), the basic regional settlement model used for this period is still applicable. Figure 113 shows the model and it includes both large and small base camps used on a serial seasonal basis. The current data would suggest that the smaller base camps were much more common than the larger ones; however, as was noted in a recent overview of the Woodland I Period in Delaware (Custer

FIGURE 113

Regional Settlement Model



1994a:74-83), it is still very possible that the large base camps were indeed present, and they should continue to be included in the settlement models. Future research should be sensitive to the discovery of these larger prehistoric communities.

The presence of the argillite cache in Feature 1059 allows a consideration of issues in regional settlement patterns. Lowery and Custer (1990) have observed that caches are not common on the Delmarva Peninsula until Late Archaic times. After the advent of the Late Archaic, caches are present and they continue to appear up until Late Woodland times. The conventional interpretation of this phenomenon is that prior to Late Archaic times, prehistoric groups were highly mobile and their wandering ranges and routes were not necessarily very predictable. Therefore, they were unlikely to place items in caches for later use because they might not return to that specific location to retrieve them. In contrast, Woodland I groups developed more predictable wandering ranges and more well defined territories, probably due to population pressures. Because these groups were more likely to re-use the same site, as evidenced by the multiple occupations of the Carey Farm and Island Farm sites, they placed items in caches for later use. They did not retrieve all of these caches and, therefore, they are part of the archaeological record for us to find.

We would like to suggest here that this model of cache use and group mobility may be completely wrong, and suggest an alternative interpretation. Because ethnographic studies of Arctic and Sub-Arctic groups show that almost all of these highly mobile hunting and gathering populations use some kind of caches, it is probably unlikely that Paleo-Indian - Middle Archaic groups of the Delmarva Peninsula, who were also highly mobile hunting and gathering groups in forested environments similar to those of the southern Sub-Arctic, never used caches. It may be possible that we do not find caches because Paleo-Indian - Middle Archaic seasonal movement patterns were regularized, and they very rarely failed to retrieve the tools and other artifacts that they left in the caches. In contrast, it is possible that we actually find caches post-dating the Late Archaic because these later groups had more irregular wandering ranges and often failed to retrieve their caches on a more frequent basis, thereby leaving them to become part of the archaeological record. In this interpretation we have completely turned around the earlier interpretation. Finds of caches in the archaeological record imply poorly defined territories and wandering ranges, while the absence of caches implies regular wandering between repeatedly reused locations.

Levels of mobility may also play a role in the use and loss of caches. Highly mobile groups may have needed to place more bulky items in caches due to their transportation costs, and probably relied on known cache locations to insure that they had the proper tools at the proper locations for resource processing and procurement. Less mobile groups could carry more bulky items, and did not have as great a need for cached items. Future research at sites which produce cached materials should take these alternative interpretations into account.

Lithic Technology

The research design notes a number of research questions related to lithic technologies, and some of these have been addressed in the presentation of excavation results from the individual site areas. One topic relating to all areas is the continued comparison of lithic assemblages using a series of measures applied in many other DelDOT reports. The research design also specifically notes that it is best to use lithic assemblages from well-dated contexts, rather than samples that are amalgamations of materials from varied contexts. Middle Woodland contexts are the best defined ones at the Carey and Island Farm sites, specifically those from the feature clusters. Therefore, the lithic data from the Middle Woodland clusters were used for analysis here.

The first step in the analysis was to compare the Middle Woodland assemblages with one another. There were not enough tools in any single cluster to allow meaningful analysis; however, the clusters from the South Area and the clusters from the South Central Area could be combined for analysis. Tables 112 - 114 list the lithic assemblage data for the combined Middle Woodland clusters of the South Area in the standard form used in this report. Tables 115 - 117 list the same data for the combined Middle Woodland clusters of the South Central Area. Comparison of Tables 113 and 116 shows very little difference between the two assemblages in terms of use of secondary lithic materials. The cortex percentages are very similar to one another in most cases, and the pattern of intensive use of cobbles of quartz, chert, and jasper is similar to patterns noted earlier in the report for the site area assemblages. Also, the raw material utilization patterns (Tables 114 and 117) are very similar to one another and

TABLE 112

Lithic Artifact Assemblage and Raw Materials - Combined Clusters, South Area

	RAW MATERIALS								
TOOL TYPE	Quartzite	Quartz	Chert	Jasper	Rhyolite	Argillite	Ironstone	Other	TOTAL
Flakes	82 (28)	257 (117)	224 (85)	729 (295)	7	5	0	0	1301 (525)
Utilized flakes	2 (0)	16 (9)	12 (4)	41 (16)	1	0	0	0	72 (29)
Flake tools	0	1 (1)	4 (4)	8 (4)	0	0	0	0	13 (9)
Points	0	1 (0)	0	4 (1)	0	0	0	1 (1)	6 (2)
Early stage biface rejects	1 (1)	4 (2)	2 (2)	3 (2)	0	0	0	0	10 (7)
Late stage biface rejects	0	1 (0)	0	0	0	1	0	0	2 (0)
Other bifaces and fragments	0	1 (0)	4 (1)	6 (4)	0	3	0	0	14 (5)
Miscellaneous stone tools	0	1 (1)	1 (1)	2 (2)	0	0	0	0	4 (4)
Cores	0	4 (4)	5 (4)	3 (3)	0	0	0	0	12 (11)
TOTAL	85 (29)	286 (134)	249 (101)	796 (327)	8	9	0	1 (1)	1434 (592)

( ) - Artifacts with cortex

TABLE 113

Lithic Artifact Assemblage - Cortex Percentage - Combined Clusters, South Area

	RAW MATERIALS								
TOOL TYPE	Quartzite	Quartz	Chert	Jasper	Rhyolite	Argillite	Ironstone	Other	TOTAL
Flakes	34	45	38	40	0	0	--	--	40
Utilized flakes	0	56	33	39	0	--	--	--	40
Flake tools	0	100	100	50	--	--	--	--	70
Points	--	0	--	25	--	--	--	100	33
Early stage biface rejects	100	50	100	67	--	--	--	--	70
Late stage biface rejects	--	0	--	--	--	0	--	--	0
Other bifaces and fragments	--	0	25	67	--	0	--	--	36
Miscellaneous stone tools	--	100	100	100	--	--	--	--	100
Cores	--	100	80	100	--	--	--	--	91
TOTAL	34	46	40	41	0	0	--	100	41

TABLE 114

Lithic Artifact Assemblage - Raw Material Percentage by Tool Types - Combined Clusters, South Area

	RAW MATERIALS							
TOOL TYPE	Quartzite	Quartz	Chert	Jasper	Rhyolite	Argillite	Ironstone	Other
Flakes	6	19	17	56	<1	<1	0	0
Utilized flakes	3	22	17	57	<1	0	0	0
Flake tools	0	8	31	61	0	0	0	0
Points	0	17	0	67	0	0	0	17
Early stage biface rejects	10	40	20	30	0	0	0	0
Late stage biface rejects	0	50	0	0	0	50	0	0
Other bifaces and fragments	0	7	28	43	0	21	0	0
Miscellaneous stone tools	0	25	25	50	0	0	0	0
Cores	0	33	42	25	0	0	0	0
TOTAL	6	20	17	55	<1	<1	0	<1

TABLE 115

Lithic Artifact Assemblage and Raw Materials - Combined Clusters, South Central Area

	RAW MATERIALS								
TOOL TYPE	Quartzite	Quartz	Chert	Jasper	Rhyolite	Argillite	Ironstone	Other	TOTAL
Flakes	175 (82)	732 (373)	1192 (566)	3076 (1621)	11	27	8	15 (0)	5236 (2642)
Utilized flakes	3 (2)	9 (5)	30 (14)	107 (52)	1	2	0	0	152 (73)
Flake tools	0	1 (0)	5 (1)	10 (6)	0	0	0	0	16 (7)
Points	0	10 (0)	17 (0)	32 (8)	0	6	1	0	66 (8)
Early stage biface rejects	0	6 (4)	8 (8)	8 (8)	0	0	0	0	22 (20)
Late stage biface rejects	0	0	3 (3)	9 (3)	0	0	0	0	12 (6)
Other bifaces and fragments	1 (0)	3 (0)	8 (1)	26 (5)	0	0	6	0	44 (6)
Miscellaneous stone tools	2 (2)	0	8 (8)	12 (11)	0	0	0	2 (0)	24 (21)
Cores	3 (3)	14 (12)	20 (20)	26 (26)	0	0	0	0	63 (61)
TOTAL	184 (89)	775 (394)	1291 (621)	3306 (1740)	12	35	15	17 (0)	5635 (2844)

( ) - Artifacts with cortex

TABLE 116

Lithic Artifact Assemblage - Cortex Percentage - Combined Clusters, South Central Area

	RAW MATERIALS								
TOOL TYPE	Quartzite	Quartz	Chert	Jasper	Rhyolite	Argillite	Ironstone	Other	TOTAL
Flakes	47	51	47	53	0	0	0	0	50
Utilized flakes	67	55	47	49	0	0	–	–	48
Flake tools	–	0	20	60	–	–	–	–	44
Points	–	0	0	25	–	0	0	–	12
Early stage biface rejects	–	67	100	100	–	–	–	–	91
Late stage biface rejects	–	–	100	33	–	–	–	–	50
Other bifaces and fragments	0	0	12	19	–	–	0	–	14
Miscellaneous stone tools	100	–	100	92	–	–	–	0	88
Cores	100	86	100	100	–	–	–	–	92
TOTAL	48	51	48	53	0	0	0	0	50

TABLE 117

Lithic Artifact Assemblage - Raw Material Percentage by Tool Types - Combined Clusters, South Central Area

	RAW MATERIALS							
TOOL TYPE	Quartzite	Quartz	Chert	Jasper	Rhyolite	Argillite	Ironstone	Other
Flakes	3	14	23	58	<1	<1	<1	<1
Utilized flakes	2	6	20	70	<1	1	0	0
Flake tools	0	6	31	62	0	0	0	0
Points	0	15	26	48	0	9	1	0
Early stage biface rejects	0	27	36	36	0	0	0	0
Late stage biface rejects	0	0	25	75	0	0	0	0
Other bifaces and fragments	2	7	18	59	0	0	14	0
Miscellaneous stone tools	8	0	33	50	0	0	0	8
Cores	5	22	32	41	0	0	0	0
TOTAL	3	14	23	59	<1	<1	<1	<1

TABLE 118

Lithic Artifact Assemblage and Raw Materials - All Middle Woodland Clusters Combined

TOOL TYPE	Quartzite	Quartz	Chert	Jasper	Rhyolite	Argillite	Ironstone	Other	TOTAL
	RAW MATERIALS								
Flakes	257 (110)	989 (490)	1416 (651)	3805 (1916)	18	32	8	15	6537 (3167)
Utilized flakes	5 (2)	25 (14)	42 (18)	148 (68)	2	2	0	0	224 (102)
Flake tools	0	2 (1)	9 (5)	18 (10)	0	0	0	0	29 (16)
Points	0	11 (0)	17 (0)	36 (9)	0	6	1	1 (1)	72 (10)
Early stage biface rejects	1 (1)	10 (6)	10 (10)	11 (10)	0	0	0	0	32 (27)
Late stage biface rejects	0	1 (0)	3 (3)	9 (3)	0	1	0	0	14 (6)
Other bifaces and fragments	1 (0)	4 (0)	12 (2)	32 (9)	0	3	6	0	58 (11)
Miscellaneous stone tools	2 (2)	1 (1)	9 (9)	14 (13)	0	0	0	2 (0)	28 (25)
Cores	3 (3)	18 (16)	25 (24)	29 (26)	0	0	0	0	75 (72)
TOTAL	269 (118)	1061 (528)	1540 (722)	4102 (2067)	20	44	15	18 (1)	7069 (3436)

( ) - Artifacts with cortex

TABLE 119

Lithic Artifact Assemblage - Cortex Percentage - All Middle Woodland Clusters Combined

TOOL TYPE	Quartzite	Quartz	Chert	Jasper	Rhyolite	Argillite	Ironstone	Other	TOTAL
	RAW MATERIALS								
Flakes	43	50	46	50	0	0	0	0	48
Utilized flakes	40	56	43	46	0	0	--	--	46
Flake tools	--	50	55	55	--	--	--	--	55
Points	--	0	0	25	--	0	0	100	14
Early stage biface rejects	100	60	100	91	--	--	--	--	84
Late stage biface rejects	--	0	100	33	--	0	--	--	43
Other bifaces and fragments	0	0	17	28	--	0	0	--	19
Miscellaneous stone tools	100	100	100	93	--	--	--	0	89
Cores	100	89	96	90	--	--	--	--	96
TOTAL	44	50	47	50	0	0	0	6	49

the larger area assemblages discussed earlier in this report. Consequently, the two sets of lithic data from the Middle Woodland clusters can be combined to form a single large Middle Woodland lithic assemblage data set (Tables 118 - 121). These data can then be used in the standard lithic analysis approach.

Table 121 lists the data used in the comparative analysis and Figure 114 shows the locations of the sites used in the analyses. Tables 122 and 123 show rankings of the sites listed in Table 121 by their cortex percentages and their cryptocrystalline raw material percentages. In these tables the sites are listed in order from highest to lowest by percentage frequency. Pairwise comparisons of the percentages

TABLE 120

Lithic Artifact Assemblage - Raw Material Percentage by Tool Types - All Middle Woodland Clusters Combined

	RAW MATERIALS							
TOOL TYPE	Quartzite	Quartz	Chert	Jasper	Rhyolite	Argillite	Ironstone	Other
Flakes	4	15	22	58	<1	<1	<1	<1
Utilized flakes	2	11	19	66	<1	<1	0	0
Flake tools	0	7	31	62	0	0	0	0
Points	0	15	24	50	0	8	1	1
Early stage biface rejects	3	31	31	34	0	0	0	0
Late stage biface rejects	0	7	21	64	0	7	0	0
Other bifaces and fragments	2	6	21	55	0	5	10	0
Miscellaneous stone tools	7	4	32	50	0	0	0	7
Cores	4	24	33	39	0	0	0	0
TOTAL	4	15	22	58	<1	<1	<1	<1

TABLE 121

Comparative Lithic Resource Use Data

Site	Function (Complex)	Total Artifacts	Cortex %	Crypto-crystalline %	Quartz/ Quartzite %	Reference
Carey Farm	**Middle Woodland base camp**	**7,069**	**49**	**73**	**18**	
7NC-G-105	Micro-band base camp	2,437	5	45	21	Custer et al. (1995)
7K-C-203						
Area A	Base camp	1,163	40	85	14	Custer et al. (1994)
Area B	Base camp	3,184	36	75	24	Custer et al. (1994)
Area C	Base camp	5,452	33	69	23	Custer et al. (1994)
Woods	Base camp	1,496	26	41	57	Custer et al. (1994)
7K-C-194A	Base camp (Woodland II)	1,230	28	63	35	Custer, Riley, & Mellin (1994)
7K-C-360	Hunting/ staging	2,287	30	56	41	Riley, Watson, & Custer (1994)
7K-C-365A	Hunting/ staging	2,537	38	51	46	Riley, Watson, & Custer (1994)
7K-C-365B	Lithic reduction	8,130	4	5	94	Riley, Watson, & Custer (1994)
7S-G-123	Cobble reduction	164	54	65	23	Custer and Mellin (1991)
7K-C-204	Macro-band base camp	124	27	54	37	Riley et al. (1994)
7K-C-359	Micro-band base camp	160	26	63	33	Riley et al. (1994)
7K-C-363	Procurement	133	21	76	19	Riley et al. (1994)
7K-C-364	Staging/ processing	1,742	32	56	39	Riley et al. (1994)
7NC-D-100	Procurement	293	41	51	46	Shaffer et al. (1988)
7NC-D-3	Quarry reduction	368	0	51	38	Custer, Ward, & Watson (1986)
7NC-D-5	Quarry reduction	94	0	60	32	Custer, Ward, & Watson (1986)
7NC-E-9	Micro-band base camp	4,090	14	79	18	Custer et al. (1990)
7NC-E-46	Hunting/ staging	10,512	20	22	69	Custer and Bachman (1984)
7NC-D-54	Cobble reduction base camp	1,288	28	32	59	Custer et al. (1981)
7NC-D-55A	Cobble reduction base camp	132	45	16	69	Custer et al. (1981)
7NC-D-55B	Cobble reduction base camp	2,304	29	8	88	Custer et al. (1981)
7NC-A-17	Hunting/ staging	279	9	23	71	Custer and Hodny (1989)
7NC-A-2	Base camp	845	38	18	67	Custer and De Santis (1985)
36LE4	Lithic reduction	306	0	1	97	Custer (1992)
7NC-D-125						
Area A	Staging/ processing	10,576	1	98	2	Riley, Custer, Hoseth, & Coleman (1994)
Area B	Staging/ processing	1,931	2	92	8	Riley, Custer, Hoseth, & Coleman (1994)
Area C	Staging/ processing	1,096	13	54	45	Riley, Custer, Hoseth, & Coleman (1994)
7NC-D-129	Procurement	2,207	7	74	26	Custer et al. (1988)
7NC-D-140	Procurement	133	21	75	25	Catts, Hodny, & Custer (1989)
7NC-E-6A						
Area 2A	Macro-band base camp	5,515	9	60	34	Custer (1982)
Area 2B	Macro-band base camp	6,206	9	71	23	Custer (1982)
7NC-D-19	Quarry reduction base camp	653	0	74	26	Custer, Ward, & Watson (1986)
7NC-F-61A	Quarry reduction base camp	1,922	1	99	1	Watson and Riley (1994)
7NC-G-101	Base camp (Clyde Farm)	2,388	28	79	17	Custer and Silber (1994)
	Base camp (Webb)	153	37	73	25	Custer and Silber (1994)
	Base camp (Woodland II)	329	23	80	14	Custer and Silber (1994)

TABLE 122

Cortex Percentage Ranking

SITE	SITE TYPE (COMPLEX)	CORTEX %
7NC-D-5	Quarry Reduction Base Camp	0
7NC-D-3	Quarry Reduction Base Camp	0
36LE4	Lithic Reduction	0
7NC-D-19	Quarry Reduction Base Camp	0
7NC-F-61A	Quarry Reduction Base Camp	1
7NC-D-125A	Staging/Processing	1
7NC-D-125B	Staging/Processing	2
7NC-A-2	Base Camp	2
7K-C-365B	Lithic Reduction	4
7NC-G-105	Micro-Band Base Camp	5
7NC-D-129	Procurement	7
7NC-E-6A		
Area 2A	Base Camp	9
Area 2B	Base Camp	9
7NC-A-17	Staging/Processing	9
7NC-D-125C	Staging/Processing	13
7NC-E-9	Base Camp	14
7NC-E-46	Processing/Staging	20
7NC-D-140	Procurement	21
7K-C-363	Procurement	21
7NC-G-101	Base Camp (Woodland II)	23
7K-C-203 Woods	Base Camp	26
7K-C-359	Base Camp	26
7K-C-204	Base Camp	27
7K-C-194A	Base Camp (WoodlandII)	28
7NC-D-54	Cobble Reduction Base Camp	28
7NC-G-101	Base Camp (Clyde Farm)	28
7NC-D-55B	Cobble Reduction Base Camp	29
7K-C-360	Processing/Staging	30
7K-C-364	Processing/Staging	32
7K-C-203 Area C	Base Camp	33
7K-C-203 Area B	Base Camp	36
7NC-G-101	Base Camp (Webb)	37
7NC-A-2	Base Camp	38
7K-C-365 A	Processing/Staging	38
7K-C-203 Area A	Base Camp	40
7NC-D-100	Procurement	41
7NC-D-55A	Cobble Reduction Base Camp	45
Carey Farm	**Base Camp (Middle Woodland)**	**49**
7S-G-123	Cobble Reduction Base Camp	54

TABLE 123

Cryptocrystalline Percentage Ranking

SITE	SITE TYPE (COMPLEX)	CRYPTO - CRYSTALLINE
36LE4	Lithic Reduction	1
7K-C-365B	Lithic Reduction	5
7NC-D-55B	Cobble Reduction Base Camp	8
7NC-D-55A	Cobble Reduction Base Camp	16
7NC-A-2	Base Camp	18
7NC-E-46	Staging/Processing	22
7NC-A-17	Staging/Processing	23
7NC-D-54	Cobble Reduction Base Camp	32
7NC-G-105	Micro-Band Base Camp	45
7K-C-203 Woods	Base Camp	51
7NC-D-100	Procurement	51
7NC-D-3	Quarry Reduction	51
7K-C-365A	Staging/Processing	54
7K-C-204	Base Camp	54
7NC-D-125C	Staging/Processing	56
7K-C-364	Staging/Processing	56
7K-C-360	Staging/Processing	
7NC-E-6A		60
Area 2A	Base Camp	60
7NC-D-5	Quarry Reduction	63
7K-C-359	Base Camp	63
7K-C-194A	Base Camp (Woodland II)	65
7S-G-123	Cobble Reduction Base Camp	
7K-C-203 Area C	Base Camp	71
Carey Farm	**Base Camp (Middle Woodland)**	**73**
7NC-E-6A		•
Area 2B	Base Camp	73
7NC-G-101	Base Camp (Webb)	74
7NC-D-19	Quarry Reduction Base Camp	74
7NC-D-129	Procurement	75
7NC-D-140	Procurement	
7K-C-203 Area B	Procurement	76
7K-C-363	Base Camp	7[illegible]
7NC-E-9	Base Camp	79
7NC-G-101	Base Camp (Clyde Farm)	80
7NC-G-101	Base Camp (Woodland II)	
7K-C-203 Area A	Base Camp	92
7NC-D-125B	Staging/Processing	98
7NC-D-125A	Staging/Processing	99
7NC-F-61A	Quarry Reduction Base Camp	

using difference-of-proportion tests (Parsons 1974) were undertaken for all pairs of sites. Sites with similar percentage values are linked by brackets in these tables. It should be noted that percentages of quartz and quartzite are often used in these analyses to monitor the use of non-cryptocrystalline materials; however, they were not used in this study because they represent such a small portion of the lithic assemblage.

Table 122 shows the site rankings by cortex percentages. The Middle Woodland assemblage from the Carey Farm Site falls in the grouping of sites with the highest cortex percentages. Almost all of these sites are associated with deposits of secondary raw materials and prehistoric groups were obviously using the most easily available materials. The presence of a variety of site types in this grouping indicates that differential access to varied raw material types was more important than site functions in determining the use of primary and secondary raw materials. Table 123 shows a ranking

TABLE 124

Lithic Resource Use Classification

CRYPTOCRYSTALLINE	CORTEX: HIGH	CORTEX: LOW
HIGH	**Carey Farm** 7NC-G-101 (Webb Complex, base camp) 7NC-G-101 (Clyde Farm, base camp) 7NC-G-101 (Woodland II, base camp) 7K-C-363 (procurement) 7NC-D-140 (procurement) 7K-C-203 Area A (base camp) 7K-C-203 Area B (base camp) 7K-C-203 Area C (base camp)	7NC-E-9 (base camp) 7NC-E-6B, Area 2B (base camp) 7NC-D-129 (procurement) 7NC-D-125B (processing/staging) 7NC-D-125A (processing/staging) 7NC-F-61A (quarry reduction base camp) 7NC-D-19 (quarry reduction base camp)
MEDIUM	7S-G-123 (cobble reduction base camp) 7NC-D-100 (procurement) 7K-C-365A (processing/staging) 7K-C-364 (processing/staging) 7K-C-360 (processing/staging) 7NC-D-54 (cobble reduction base camp) 7K-C-194A (Woodland II, base camp) 7K-C-204 (base camp) 7K-C-359 (base camp) 7K-C-203 Woods (base camp)	7NC-D-125C (processing/staging) 7NC-E-6A, Area 2A (base camp) 7NC-D-3 (quarry reduction base camp) 7NC-D-5 (quarry reduction base camp) 7NC-G-105
LOW	7NC-D-55A (cobble reduction base camp) 7NC-A-2 (base camp) 7NC-D-55B (cobble reduction base camp) 7NC-E-46 (processing/staging)	7NC-A-17 (processing/staging) 7K-C-365B (lithic reduction) 7NC-A-2 (base camp) 36LE4 (lithic reduction)

of sites by cryptocrystalline raw materials. The Carey Farm Middle Woodland assemblage falls in one of the higher categories. As was the case for cortex groupings, the site groupings include a variety of site types, and this variety implies that lithic resource availability was more important than specialized site activity areas in determining the lithic resources used at a site. Table 124 shows a classification of the sites listed in Table 121 based on the cortex and cryptocrystalline percentages. The Carey Farm Site Middle Woodland assemblage is classified with the sites with high cortex and high cryptocrystalline materials. All of these sites are located near cobble resources and it is clear that prehistoric Delawareans were opportunistic and used the lithic materials that were most readily available.

The analysis of the lithic assemblages from the Carey Farm and Island Farm sites revealed little variation among the site area assemblages. All of these assemblages were quite large, and in fact are larger than most of the assemblages used in the above comparative analyses (Table 121). In fact, when Tables 121 and 124 are compared, it can be seen that the greatest variability occurs among the smaller assemblages. These observations raise the possibility that the variability measured and categorized in Table 124 may be due entirely to sample size, even though the difference-of-proportion test takes

TABLE 125
Flake Attribute Data

	FEATURES AND FEATURE CLUSTERS					
	SOUTH		SOUTH CENTRAL			
ATTRIBUTES	Cluster I	Cluster II	Cluster I	Cluster II	Cluster III	Feature 841
Flake Type						
Complete	23	46	39	13	21	26
Proximal	25	13	20	27	25	19
Medial	30	11	16	25	13	30
Distal	22	30	15	35	41	25
Flake Size						
Small	61	42	66	55	65	54
Medium	38	53	31	44	35	43
Large	1	5	3	1	0	3
Platform Shape						
Triangular	60	31	16	20	73	25
Flat	23	40	34	46	8	38
Round	17	29	50	34	19	37
Remnant Biface Edge						
Present	5	3	6	4	3	9
Absent	95	97	94	96	97	91
Platform Preparation						
Present	32	45	33	28	44	41
Absent	68	55	67	72	56	59
Scar Count						
Mean	2	1	1	2	1	1
Standard Deviation	1	1	1	1	1	1
Scar Direction						
Mean	1	1	2	1	2	1
Standard Deviation	1	1	1	1	1	1

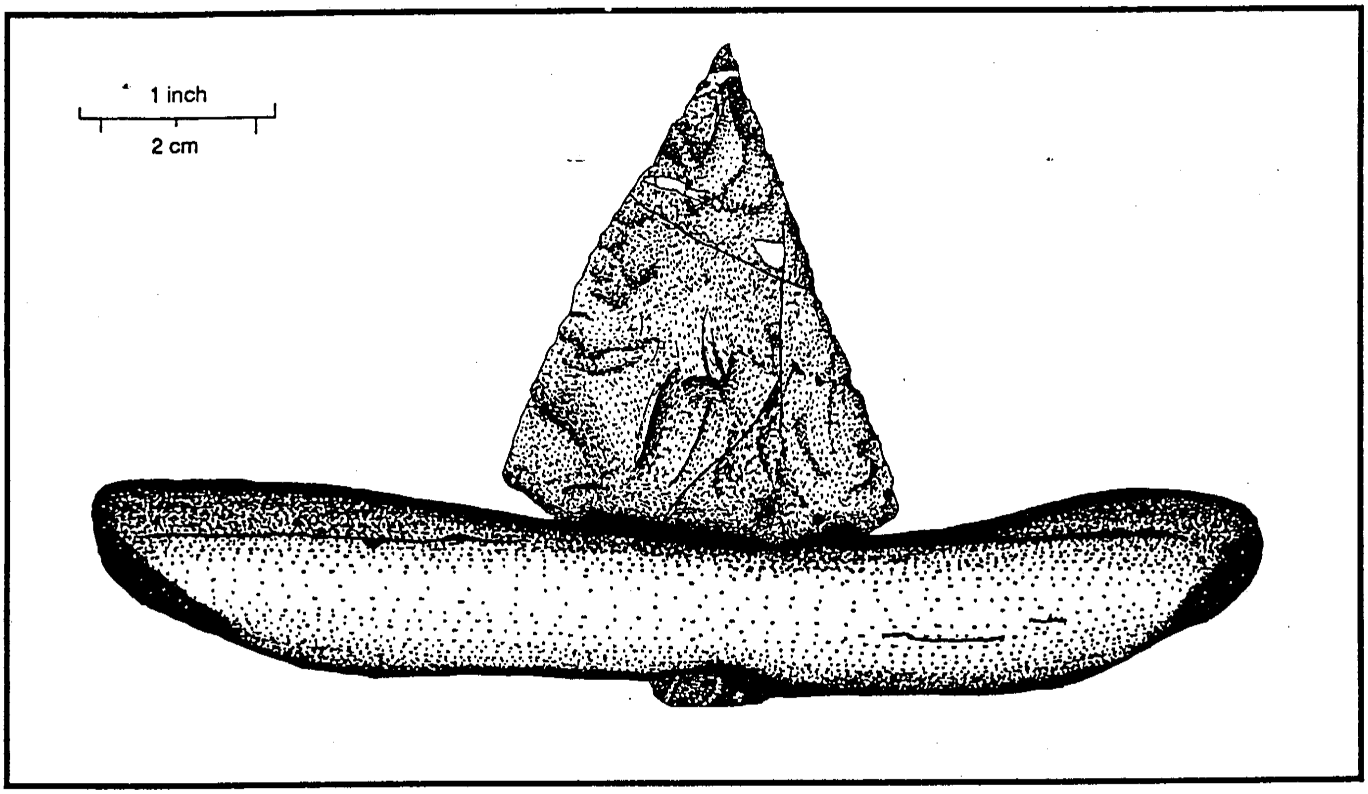
Note: Except for scar count and scar direction, all values are percentages.

sample size into account when noting similarities and differences. Future studies should take sample size into account, and it may be useful to apply some of the techniques used in meta-analysis (Hunter, Schmidt, and Jackson 1982) when analyzing lithic data from numerous sites. Such applications, however, are beyond the scope of this report.

Flake attribute analyses using methods described in Riley, Custer, Hoseth, and Coleman (1994) were applied to samples of flakes from each of the individual Middle Woodland features clusters and Feature 841, which had an unusually large lithic assemblage, in order to see if the debitage resulted from biface reduction or unifacial flake production. Ironstone flakes were not included in the analysis because recent research (Custer, Kellogg, Silber and Varisco 1995) has shown that ironstone debitage assemblages have their own special sets of attributes. Table 125 shows the flake attribute data for six samples of debitage. When the values in Table 125 are compared to control values for biface and flake reduction reported by Riley, Custer, Hoseth, and Coleman (1994) it can be seen that they fall between the flake and biface values. These findings indicate that both flake and biface reduction were taking place, as was indicated by the analysis of the overall tool assemblages.

FIGURE 115

Hafted Biface Reconstruction No. 1



The argillite cache in Feature 1059 (Figures 76-78; Plates 58, 59, and 68) and the assorted bifaces found in other features (Plates 42 and 69) show that some argillite was being used during Middle Woodland times in central Delaware, even though argillite use is generally more common earlier in the Woodland I Period. The argillite bifaces' shape and configuration suggest that they were being used as hafted knives, and Figures 115 and 116 show possible configurations of hafted bifaces based on reconstructions prepared by Jack Cresson.

Ceramic Technology

The large number of ceramic sherds and the several complete, or nearly complete, ceramic vessels found at the Carey Farm and Island Farm sites allow for the study of numerous topics in ceramic technology. In this analysis, vessel counts are used rather than sherd counts because numerous studies (see Rice 1987) have shown that vessel counts are more useful and representative of the true variation in ceramic attribute distributions. Vessels were identified on the basis of context, mending of individual sets of sherds, and distinctive surface treatments. A total of 293 individual vessels were identified and Table 126 lists the numbers of identified vessels by type along with some attributes of their surface treatments. It should be noted that the totals for the distributions of varied attributes do not always match among the varied data sets and tables discussed below because not all attributes could be recorded for every vessel due to their varied preservation.

FIGURE 116

Hafted Biface Reconstruction No. 2

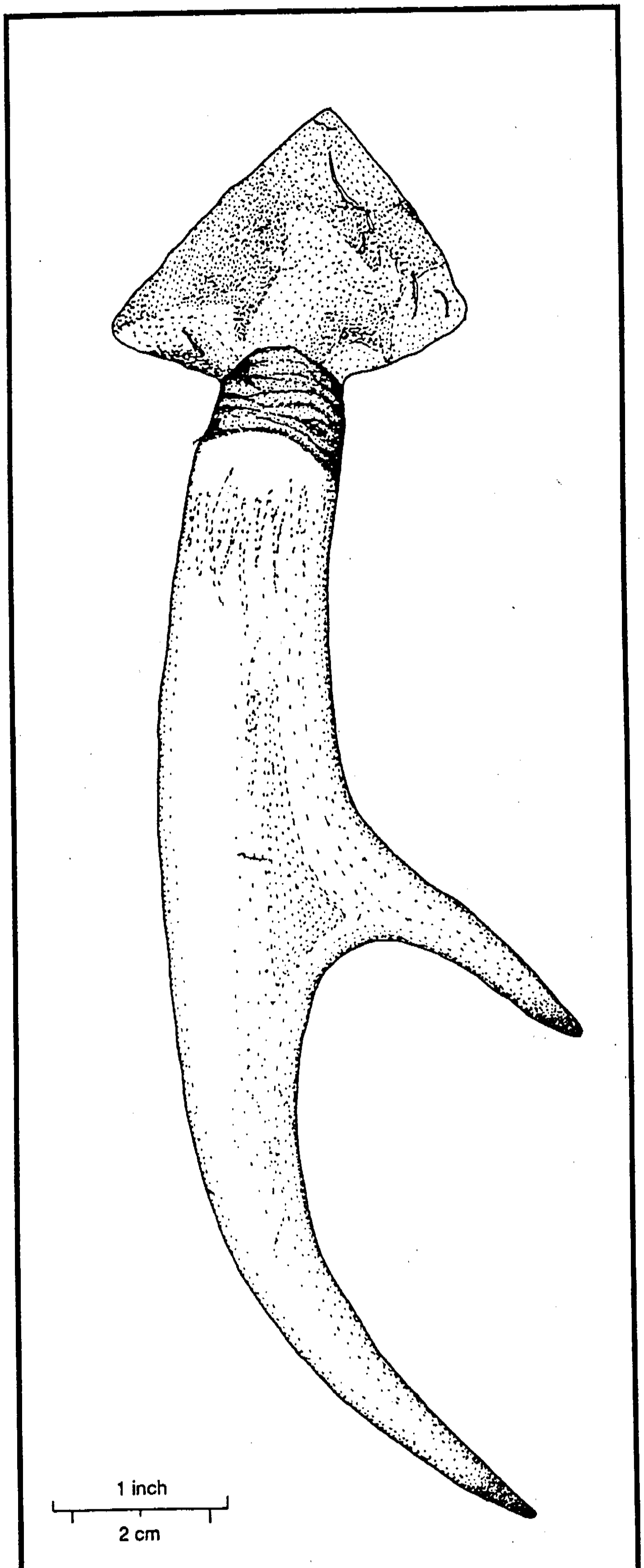


TABLE 126

Ceramic Vessel Data

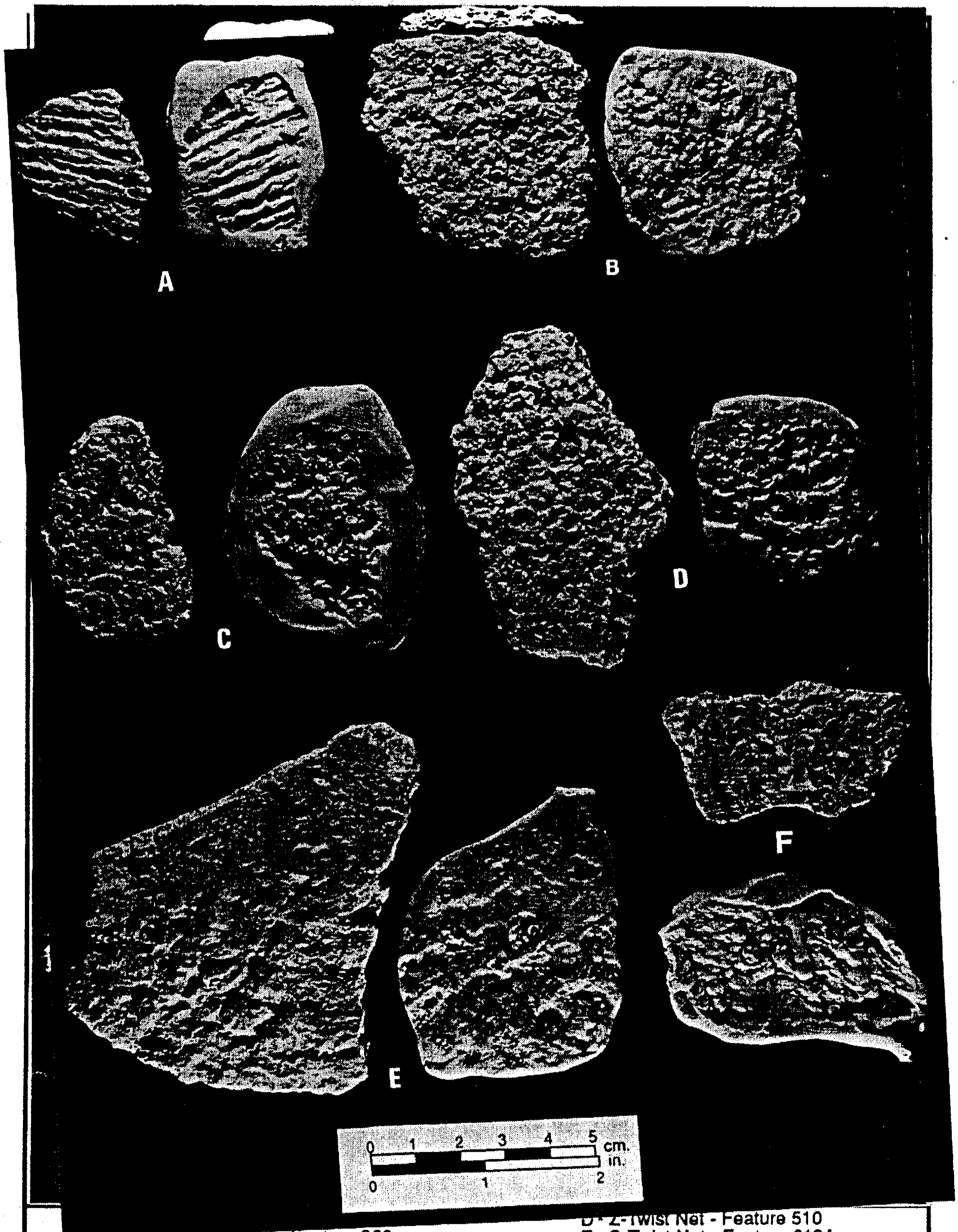
		Surface Treatment		Cordage Twist			
Type	Number	Cord	Net	Cord-S	Cord-Z	Net-S	Net-Z
Wolfe Neck	38	34	4	25	3	1	2
Accokeek	4	4	0	2	0	0	0
Nassawango	6	5	1	3	0	0	1
Coulbourn	20	14	6	7	4	1	3
Wilgus	1	1	0	0	0	0	0
Mockley	168	145	23	86	9	6	12
Hell Island	40	36	3	7	10	1	2
Townsend	11	11	0	1	2	0	0
Killens	4	4	0	0	0	0	0
Minguannan	1	1	0	0	0	0	0
TOTAL	293	255	37	131	28	9	20

Table 126 shows that Mockley ceramics were the most common ceramic type in the vessel assemblage. In fact, Mockley vessels account for 57 percent of the identifiable vessels. Hell island ceramics were the next most common ware and account for 14 percent of the vessel assemblage. Middle Woodland vessels as a group account for 71 percent of the assemblage; therefore, most of the analysis and data description presented below pertain to Middle Woodland ceramics, except where other types are specifically noted.

In many cases, rim sections of vessels were preserved (Plates 17 and 67), and vessel rim diameters could be estimated. In the case of the reconstructed Mockley vessel from Feature 372, the vessel size could be measured directly. This particular vessel had a rim diameter of 91 centimeter and a vessel height of 76 centimeters. Using various vessel capacity estimation techniques (see discussion in Rice 1987 and Custer, Watson, and Bailey 1993) the mean estimate of the vessel's volume is 48.43 liters (10.66 gallons). This estimate matches well with the actual measured volume of the vessel which was 47 liters (10.44 gallons). Vessel rim diameters could be measured for 20 different vessels, and the mean vessel diameter for this sample was 71.12 centimeters (28 inches) with a standard deviation of 10.16 centimeters (4.0 inches). The mean estimated vessel capacity is 25.25 liters (5.55 gallons) with a standard deviation of 5.81 liters (1.29 gallons). Compared to other reconstructed ceramic vessels known from Delaware (Custer 1989:71, 170, 172, 174) these vessels are rather large and have volume capacities beyond that usually associated with cooking vessels for individual nuclear families (see discussion in Custer, Watson, and Bailey 1993).

All ceramics, including the reconstructed vessels were analyzed for surface alterations that had been caused by the vessels' use. The methods described by Hally (1983) and Skibo (1992) were applied. The most important surface alteration attribute was the presence of sooting, which is associated with the placement of the vessel over an open fire, as would be done for cooking. Sooting was present on less than 25 percent of the ceramic assemblage suggesting that most of the vessels were not necessarily used for cooking. The large size of the vessels, the low incidence of sooting, and the fact that many of

PLATE 88
Cordage Twist Impressions



B - Z-Twist Cord - Feature 369
C- S-Twist Net - Feature 1
D - Z-Twist Net - Feature 510
E - S-Twist Net - Feature 613A
F - S-Twist Cord - Feature 613A

the vessels were found in storage features suggests that the most important function of a large portion of the vessel assemblage was storage, not cooking. This interpretation is further supported by the fact that the large reconstructed vessel from Feature 372 (Plate 67) has drill repair holes in its base. These holes would have made the vessel unsuitable for use as a container of liquids, or for cooking. The high incidence of vessels related to storage at the Carey Farm and Island Farm sites also supports Gardner's (1975) suggestion that the need for non-textile storage containers was an important factor in the development of pottery technology in the Middle Atlantic region.

Analysis of ceramics from the Carey Farm and Island Farm sites also involved the study of vessel surface impressions and indirect sources of data on textile technologies (Hurley 1979). Previous studies (see discussion in Custer 1994a:122-123) had noted that vessels with net-marked surfaces were more common in southern parts of Delaware than in northern areas. This difference was attributed to the fact that nets might not have been present in northern Delaware because different fishing technologies were used in northern and southern areas. The Carey Farm and Island Farm sites are located in the middle of the state, and it was expected that their ceramic assemblage would show more net-marked ceramics than other sites investigated within the State Route 1 Corridor. Indeed, there were no net-marked ceramics identified at the Pollack and Leipsic sites on the Leipsic River further north in Kent County (Custer 1994a:122). Table 126 shows that there are 37 vessels with net-marked surfaces at the Carey Farm and Island Farm sites, and these represent 13 percent of the vessel assemblage. Obviously, more nets were present at the Carey Farm and Island Farm sites compared to sites located further to the north. These nets may have been used for fishing or fowling, and the variable distribution of these textile technologies may indicate that slightly different resource procurement techniques were in use in northern and southern Delaware during Woodland I times. And, the transition in technologies may have occurred somewhere between the Leipsic and the St. Jones drainages. Further research at sites with ceramics should seek to gather additional data on this topic at the vessel level of analysis.

TABLE 127
Vessel Associations and Cordage Twist Direction

Feature Number	Vessel Count	Ceramic Type and Surface Treatment	Cordage Twist
1845	1	Nassawango Net-Marked	Z-Twist
	1	Mockley Net-Marked	Z-Twist
1714	1	Coulbourn Net-Marked	Z-Twist
	1	Accokeek Smoothed	
1615	1	Coulbourn Cord-Marked	Z-Twist
	1	Mockley Cord-Marked	S-Twist
2002	1	Accokeek Smoothed	
	1	Coulbourn Net-Marked	S-Twist
2033	1	Mockley Cord-Marked	Z-Twist
	1	Hell Island Cord-Marked	Z-Twist
358	1	Coulbourn Cord-Marked	S-Twist
	1	Mockley Net-Marked	S-Twist
	1	Mockley Net-Marked	Z-Twist
440	3	Mockley Cord-Marked	S-Twist
427	1	Mockley Net-Marked	Z-Twist
	1	Coulbourn Cord-Marked	S-Twist
509	1	Mockley Cord-Marked	S-Twist
	1	Mockley Net-Marked	Z-Twist
1	2	Mockley Net-Marked	S-Twist
783	1	Mockley Net-Marked	Z-Twist
	1	Coulbourn Net-Marked	Z-Twist
510	1	Mockley Net-Marked	Z-Twist
	1	Mockley Cord-Marked	S-Twist
613	1	Mockley Cord-Marked	S-Twist
	1	Mockley Net-Marked	Z-Twist
531	1	Mockley Cord-Marked	S-Twist
	1	Coulbourn Cord-Marked	S-Twist

Surface impressions on ceramics were also used to study cordage twist directions (Plate 88, Figure 27). As noted in the research design, vessel-based data are preferred, and the cultural context of the samples were considered. Table 126 includes the cordage twist data. In most cases, except for the few noted below, only one vessel was recovered from any given feature. Therefore, because most of the features were house features, the vessel data in Table 126 represents household variation in cordage twists. Table 127 lists the features that contained more than one ceramic vessel and also lists the ceramic type and the cordage twist. Out of 14 features with multiple vessels, there were six cases where different cordage

TABLE 128
Cross-Tabulation of Surface Treatment and Cordage Twist Direction

FEATURES WITH VESSELS WITH VARIED CORDAGE TWIST DIRECTIONS

		TWIST	
		S	Z
Surface Treatment	Cord	6	1
	Net	1	5

ALL CERAMIC VESSELS

		TWIST	
		S	Z
Surface Treatment	Cord	131	28
	Net	9	20

TABLE 129
Delaware Cordage Twist Data

CERAMIC TYPE	TWIST DIRECTION	
	S	Z
Dames Quarter	1	0
Wolfe Neck	28	5
Accokeek	2	0
Nassawango	4	0
Coulbourn	8	7
Mockley	93	22
Hell Island	12	13
Townsend	3	2
Killens	7	8
Minguannan	2	9

twists were present in a single household. These data would indicate that in 42 percent of the samples, different types of cordage twists were being used in individual households. Such household variation in cordage twist direction would seem to imply that cordage twist direction is not a good indicator of ethnic group affiliation in this region.

Consideration of the vessels from the features where the vessels showed different cordage twists reveals a pattern that is important to mention. Table 128 shows a cross-tabulation of cordage twist direction and surface treatment for the vessels that were found in features along with other vessels that had different cordage twists. There are not enough data to apply a statistical test, but it seems clear that S-twists are associated with plain cordage and Z-twists are associated with nets. When the same cross-tabulation is generated for all ceramic vessels from the sites (Table 128), there are enough data for a statistical test of the association. The chi-square test statistic for the total assemblage cross-tabulation is 31.37 with one degree of freedom and applying Yate's correction factor for continuity (Parsons 1974). The probability value of the chi-square statistic is <.005 indicating a strong association of cordage twist direction and textile type. Some authors (Peterson and Hamilton 1984) have suggested this kind of variation may be gender-based, with men making nets and women making other cordage. Whatever the case, it should be clear that the context of the cordage twist data is important, and facile comparison of sherd counts from surface collections and plow zone assemblages are not likely to provide useful data for the identification of different ethnic groups in the Middle Atlantic region.

Given the limitations of the cordage twist data noted above, the data in Table 126 were added to the accumulating data base on vessel-based counts of cordage twist directions throughout Delaware (Table 129). Table 130 shows the cordage twist data compiled by time period and an interesting trend is apparent. Z-twists are not common during the Early and Middle Woodland time periods, but are predominant during Late Woodland times. When the Middle Woodland Period ceramic types are tabulated individually (Table 130), it is clear that the shift from S-twists to Z-twists occurred at the same time as the transition from Mockley to Hell Island ceramics (ca. 500 - A.D. 700). In spite of the

TABLE 130

Cordage Twist Percentage by Time Period

	CORDAGE TWIST COUNT		CORDAGE TWIST DIRECTION	
	S	Z	S	Z
Early Woodland	43	12	78	22
Middle Woodland	105	35	75	25
Late Woodland	12	19	39	61
Mockley	93	22	81	19
Hell Island	12	13	48	52

TABLE 131

Summary Catalog of Flotation from All Site Areas

	AREAS					
	South	South Central	North Central	North	Woods	Island Farm
Number of Samples	51	90	62	127	2	50
Charred Seeds	68	105	55	83	0	57
Flakes	290	307	317	504	68	92
Ceramics	35	117	92	56	19	120
Nut Fragments	0	0	0	0	0	0

context issues raised previously, this shift is thought-provoking. However, the data base on vessel-based cordage twists is still small and the patterning may be an artifact of sample size. Nevertheless the data are intriguing enough that continued collection of vessel-based data on cordage twists is recommended.

Subsistence Systems

The main topic for discussion with regard to subsistence systems is consideration of plant food remains obtained from flotation analysis and general excavations. The research design for this report noted that there are serious questions about the validity of the data obtained from flotation analysis, particularly due to the fact that charred seeds from European species were found in many of the features. The presence of these seeds does not question the prehistoric origin of the features. But it does raise the strong possibility that even charred seed assemblages, which are usually assumed to be especially good indicators of prehistoric plant use (e.g., Hastorf and Popper 1988), may have been contaminated. The chances of contamination of the samples is even greater when the samples are small. Table 131 provides a summary catalog of all flotation remains from all site areas and the artifact and ecofact assemblages are very small. In fact, the overall density of seeds per sample is only one seed per sample. Obviously, seed remains are not well preserved at the Carey Farm and Island Farm sites. Nor are nut shells, for none at all were preserved in samples examined. Cultural artifacts occurred at a rate of five artifacts per sample.

TABLE 132

Seeds in Flotation Samples by Site Area

	AREAS					
Charred Seeds	South	South Central	North Central	North	Woods	Island Farm
Lamb's Quarter	35	52	10	7	–	5
Noseburn	1	–	–	–	–	1
Copperleaf *	11	3	15	7	–	20
Solomon's Seal	–	–	1	1	–	–
Chokeberry	1	–	–	1	–	–
Spurge *	–	2	1	1	–	1
Winterberry	–	1	–	1	–	–
Evening Primrose	–	1	–	–	–	–
Bristlegrass *	–	1	1	–	–	–
Buffalo Berry	–	1	–	1	–	–
Tulip Tree	–	2	–	–	–	–
Dove Weed	–	1	–	–	–	1
Scleria	–	–	–	1	–	–
Sassafras	1	2	–	–	–	–
Raspberry	–	3	1	1	–	–
Smartweed	–	1	–	–	–	1
Knotweed	1	–	–	–	–	–
Timothy	–	–	–	1	–	–
Bedstraw	–	–	1	1	–	–
Pokeberry	1	–	–	–	–	–
Bayberry	–	1	1	–	–	–
Sage *	–	2	1	–	–	–
Pigweed	–	31	22	60	–	28

* European varieties

Table 132 lists the varied seed types in the flotation samples, and it can be seen that European varieties are present among the charred seeds. The presence of these charred seeds raises the possibility of contamination of the samples by post-depositional disturbances and makes the assemblage difficult to interpret. Nonetheless, Table 133 lists the seeds' uses and Table 134 provides a comparison of the distribution of some of the more common seed types among Delaware sites. The assemblage from the Carey Farm and Island Farm sites is very similar in types and composition to those from the Pollack and Leipsic sites. However, given the problems of contamination, it is difficult to understand the meaning of these similarities.

TABLE 133

Varieties of Seeds and Uses

COMMON NAME	GENUS/SPECIES	USES	REFERENCES
Lamb's-quarters	*Chenopodium album*	food	Medsger (1939:245), Tantaquidgeon (1972:128-129), Hall (1976:74)
Noseburn	*Tragia urens*	unknown	-
Copperleaf*	*Acalypha sp.*	unknown	-
Purslane*	*Portulaca oleracea*	food, medicinal	Medsger (1939:144), Niethammer (1974:121), Hall (1976:80), Erichsen-Brown (1979:417-419)
Solomon's Seal	*Polygonatum commutatum*	food, medicinal	Medsger (1939:162-163)
St. John's Wort	*Hypericum sp.*	food, medicinal	Ebeling (1986:247), Erichsen-Brown (1979:382)
Chokeberry	*Pyrus sp.*	medicinal	Ebeling (1986:63, 501)
Acorn	*Quercus prinus*	food	Ebeling (1986:210-219)
Spurge*	*Euphorbia sp.*	medicinal	Ebeling (1986:63)
Dogwood	*Cornus florida*	medicinal	Tantaquidgeon (1972:31, 116)
Winterberry	*Ilax verticillata*	dye, beverage	Erichsen-Brown (1979:191)
Possoin Haw	*Crataegus sp.*	food	Hall (1976:100)
Evening Primrose	*Oenothera biennis*	food	Hall (1976:248), Petersen (1977:66)
Bristlegrass*	*Setaria sp.*	unknown	Martin (1987:26)
Collomia	*Collomia grandiflora*	unknown	-
Buffalo Berry	*Shepherdia rotundifolia*	food, medicinal	Ebeling (1986:474, 517)
Self Heal	*Prunella vulgaris*	medicinal	Tantaquidgeon (1972:130)
Tulip Tree	*Liriodendron tulipfeca*	medicinal	Erichsen-Brown (1979:106-108)
Dove Weed	*Croton texensis*	insecticide	Ebeling (1986:105)
Scleria	*Scleria triglomerata*	unknown	-
Pigweed	*Amaranth retroflexus*	food, medicinal, other	Medsger (1939:245), Tantaquidgeon (1972:70-74), Niethammer (1974:118-119), Petersen (1977:154), Martin (1987:48-49)
Sedge	*Carex sp.*	food, building materials	Ebeling (1986:306)
Peppervine	*Ampelopsis arborea*	unknown	-
Sassafrass	*Sassafras sp.*	food, medicinal	Erichsen-Brown (1979:103-106)
Raspberry	*Rubus occidentalis*	food, medicinal	Tantaquidgeon (1972:120), Erichsen-Brown (1979:471)
Smartweed	*Polygonatum lepathifolium*	food, medicinal	Erichsen-Brown (1979:214-220), Kindscher (1987:248)
Vetch	*Vicia americana*	food, tying materials	Heitzer and Elsasser (1980:252)
Knotweed	*Polygonatum aviculare*	food, fish poison	Munson (1984:467)
Greenbriar	*Smilax sp.*	food	Hall (1976:52)
Sage*	*Salvia lyrata*	unknown	-
Nightshade	*Solanum sp.*	food	Ebeling (1986:704)
Clammyweed	-	unknown	-
Widgeongrass	*Ruppia maritima*	unknown	-
Oak	*Quercus sp.*	unknown	see Acorn
Timothy	*Phleum pratense*	see Acorn	-
Bedstraw	*Galium asprellum*	medicinal	Erichsen-Brown (1979:338)
Scurf Pea	-	unknown	-
Grey Feather	-	unknown	-
Goosegrass	*Galium aparine*	food, medicinal	Erichsen-Brown (1979:337-338
Wild Bean	*Phaseolus meticalfi*	food, medicinal	Ebeling (1986:483)
Pokeweed/berry	*Phytolacca americana*	dye, food	Medsger (1939:143), Hall (1976:79)
Bayberry	*Myrica pennsylvanica*	medicinal, food, dye	Erichsen-Brown (1979:193)

* European varieties

TABLE 134

Comparative Seed Data

	Carey Farm & Island Farm	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	X							
Hickory	X		X	X	X	X	X	X	X	X	X
Butternut	X		X	X	X				X	X	
Acorn	X	X	X				X		X		
Chenopodium	X	X	X	X			X	X	X		
Amaranth	X	X	X				X	X	X		
Carpetweed							X				
Clammyweed		X					X				
Chickweed							X				
Mustard							X				
Flax							X				
Sedge		X					X				
Spurge	X	X		X			X				
Mint							X				
Skullcap	X						X				
Sage	X						X				
Thyme							X				
Bean							X				
Hog Nut							X				
Bayberry	X	X		X			X				
Pokeweed	X	X					X				
Smartweed	X	X		X			X				
Raspberry	X	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	X								
Tulip Tree	X	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.

TABLE 135
Raw Material Types Among Debitage from Flotation

AREA	QUARTZ	CHERT	JASPER	TOTAL
South	33	62	195	290
South Central	1	90	216	307
North Central	4	63	250	317
North	40	81	383	504
Woods	7	7	54	68
Island Farm	11	21	60	92

TABLE 136
Nut Data

Nuts	South	South Central	North Central	North	Woods	Island Farm	TOTAL
Hickory Only	14	34	15	29	2	15	109
Butternut Only	0	3	0	6	0	3	12
Acorn Only	0	1	0	1	0	0	2
Hickory and Butternut	3	6	4	3	0	0	16
Hickory and Acorn	3	0	0	1	0	0	4
Butternut and Acorn	2	5	0	2	0	0	9
Hickory, Butternut, and Acorn	2	12	4	1	0	2	21
Hickory Present	22	52	23	34	2	17	150
Butternut Present	7	26	8	12	0	5	58
Acorn Present	7	18	4	5	0	2	36

Table 135 lists the raw material types among the debitage recovered from the flotation samples, and the distributions are similar to those seen for the lithic assemblages collected through regular screening techniques. The similarities of the two assemblages underscore the cultural origins of the debitage in the flotation samples. Artifact densities from the features, which averaged five artifacts per sample, were also compared to artifact densities from non-cultural features. A sample of 50 flotation samples from non-cultural features, primarily tree falls, were analyzed, and the mean number of artifacts per non-cultural feature was less than one artifact per feature, as was the number of charred seeds. The low numbers of artifacts in the non-cultural features reinforces the notion that the cultural features are indeed the product of prehistoric human activity at the Carey Farm and Island Farm sites.

In order to try to gain better information on prehistoric plant food use, the samples of charred materials that were taken for possible radiocarbon dating were carefully examined to see if any nut hulls were present. Luckily, many of these samples were present and curated even though they were too small for use in actual dating. Abundant nut hulls were present in the samples and the data from this analysis are presented in Table 136. Hickory, butternut, and acorn remains were all present. In some cases, the varied nut types occurred individually, and in other cases they occurred together in various combinations. Hickory is clearly the most commonly used nut, followed by butternut and acorn. The data in Table 136 also show that if butternut and acorn were present, hickory usually was also present. Butternut and acorn rarely occurred alone. All of these nuts are available in the fall and would have been present in the gallery forests lining the St. Jones River (Ebeling 1986). The nuts' meats could have been eaten, or rendered for their oils. The charred nature of the nut hulls suggests that they may have been used as fuel, or at least discarded in and around hearths.

It is useful to consider the fact that abundant nut remains were found in the radiocarbon samples, but were not present in the general flotation samples. In general, there were few organic materials in the radiocarbon samples suggesting that the overall preservation of organic materials at the sites was poor. On the other hand, radiocarbon samples that are noticed and collected by field excavators are rather special. They represent large accumulations of charred wood within the feature fill and are usually few and far between at Delaware sites. In fact, out of nearly 1000 cultural features at the Carey Farm and Island Farm sites, only 173 produced any kind of charcoal sample, and all but approximately 20 of these were too small to submit for radiocarbon dating. Context problems further reduced this number to the dates discussed in this report. The important point to consider is that some special preservation conditions produced the charcoal samples in a few instances, and these samples yielded large floral remains that could be analyzed. Future field excavations should be careful to recognize these special situations, and be sure to gather the charcoal samples, no matter how small they are. They may be too small to date, but they may also be the only useful paleoethnnobotanical remains present at the site.

Trade and Exchange

There are no data especially relevant to the research issues discussed for trade and exchange in the research design except to observe that the Carey Farm and Island Farm data show that non-local materials such as argillite were present in the Middle Woodland Carey Complex assemblages, but they do not seem to be very important components of the tool kits. Certainly, the Middle Woodland inhabitants of central Delaware are not participating in the rhyolite exchange networks seen in the Chesapeake region. Future research should seek to further document regional variation in trade and exchange networks.

Prehistoric Migrations

Except for the questionable cordage twist data, which shows changes at the time of putative prehistoric migrations in Delaware (Custer 1994a:151), the data from these sites are not relevant to this research issue.

Trends in Socio-Cultural Evolution

The community settlement pattern data from the Carey Farm and Island Farm sites reinforce the idea that large communities were not especially common during Woodland I times in central Delaware. As summarized by Custer (1994a:153) most models of increasing socio-cultural complexity in Woodland I times rely upon increased local population densities as causal mechanisms. The settlement data from the sites reported here, and others, show that these population densities probably were not as great as originally thought. Future research should seek to develop new data and new models of socio-cultural change that do not rely on population growth models.

In conclusion, excavations at the Carey Farm and Island Farm sites gathered important data on a wide variety of research questions and have enhanced our knowledge of the Woodland I Period, in particular, and Delaware prehistory, in general.