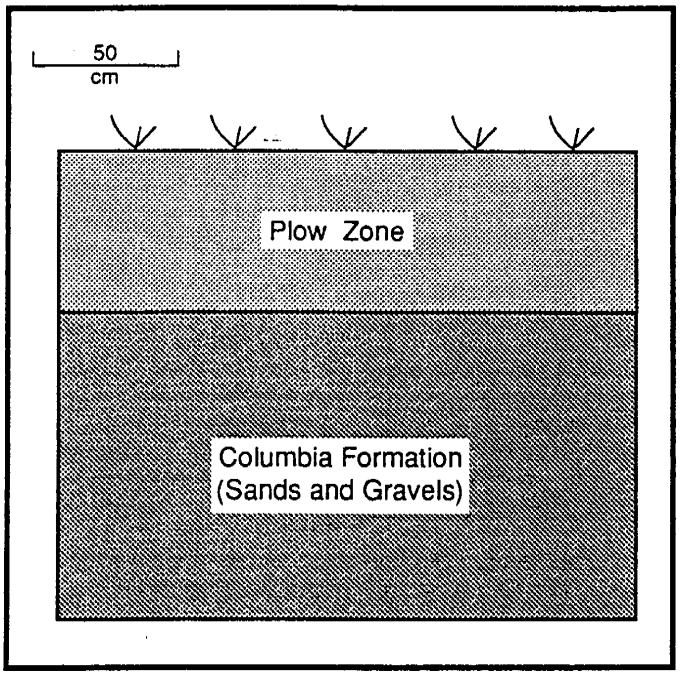
FIGURE 37

Typical Profile - Carey Farm and Island Farm Sites



the past 200 years, and the plow zone was thinnest in the most highly eroded areas. In most areas of the site the plow zone had a sandy texture, but in the eroded portions the texture of the sands was coarser, and gravels and cobbles were present as well.

The gravels and cobbles were derived from the underlying Columbia Formation (Figure 37), which was located directly beneath the plow zone in most areas of the site. The Columbia Formation is of Pleistocene age, 15,000 - two million years old, and consists of very coarse sands and gravels (Jordan 1964). There is no chance for buried artifact-bearing soils within the Columbia Formation due to its great age; therefore, in most areas of the site artifacts were confined to the plow zone, or to pit features that had been excavated into the Columbia Formation at a later time. When these pit features occurred, they were visible as stains at the plow zone/Columbia Formation interface.

Figure 38 summarizes the natural depositional and cultural processes which affected the site's stratigraphy over time. It is important to note that plowing of the site, along with subsequent erosion, truncated all of the features in the cultivated field (Figure 38 - Part III). It is very likely that some shallow features were also completely obliterated by this process.

Figure 39 shows a typical profile of the wooded area. This area showed no signs of disturbance of the profile by plowing, and the profile shown in Figure 39 probably characterized the entire site area prior to A.D. 1600. Horizon I is a shallow surface soil (A horizon), usually less than 15 centimeters thick, that had a silty texture and was dark brown in color. Horizon II is even thinner and is a light tan

FIGURE 38

Development of the Carey Farm and Island Farm Site Profiles

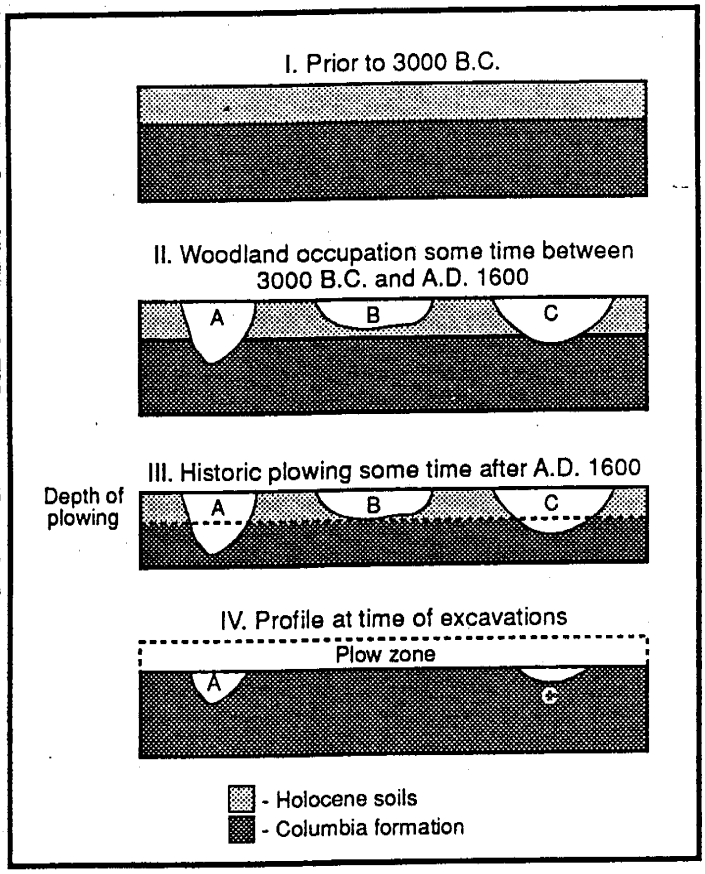
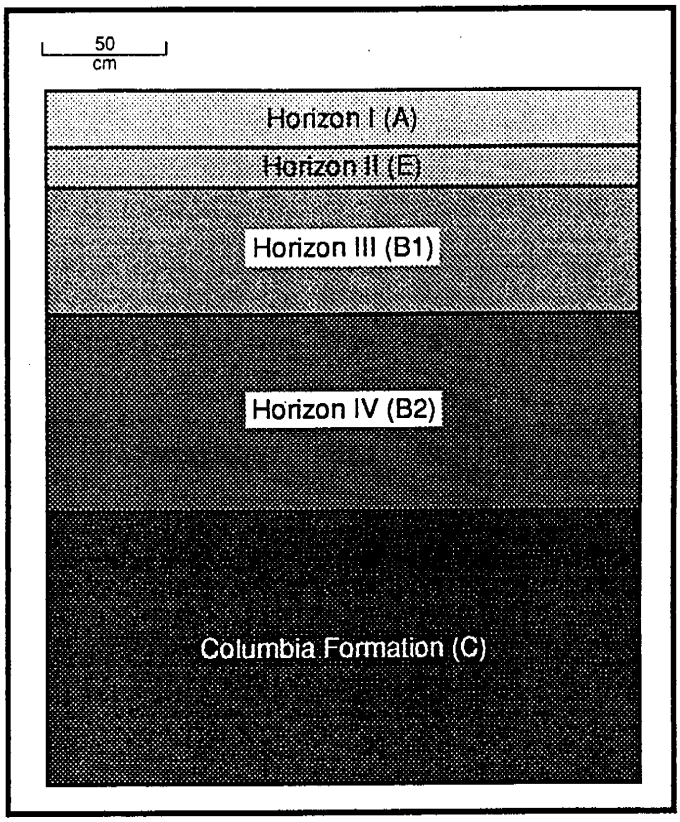


FIGURE 39

Typical Profile from Wooded Area



to gray silty sand (E horizon). Horizon III is somewhat thicker than the overlying horizons and is a weakly developed B horizon (B1) with a silty texture. It ranged in color from light brown to brownish orange. Horizon IV is a better developed B horizon (B2) that has a slightly clayey texture within the silt matrix due its more extensive development. Its color ranged from brownish orange to yellow-orange. Horizon IV was underlain by the same Columbia Formation soils that had been identified in the adjacent cultivated fields.

The degree of development of the profile shown in Figure 39 suggests that the soils were intact for at least 5000 years. Some features were encountered within the woods, but most of these originated close to the surface within Horizon III. No features originated in Horizon IV. The silty texture of the soils, their location in an area not prone to alluvial flooding, and their thickness suggest that they had an aeolian origin.

In sum, the stratigraphy of the Carey Farm and Island Farm sites has been extensively disturbed by cultivation in almost all areas. This disturbance created a situation where prehistoric artifacts were either in disturbed plow zone contexts, or within prehistoric pit features.

TABLE 4

Feature Count Summary

AREA	NON-CULTURAL FEATURE	CULTURAL FEATURE	TOTAL
Island Farm	118	116	234
Woods	0	4	4
Carey North	336	260	596
Carey North Central	209	131	340
Carey South Central	200	192	392
Carey South	214	132	346
TOTAL	1077	835	1912

General Feature Data

Detailed descriptions and analysis of the various features excavated at the Carey Farm and Island Farm sites will be provided later in this report in the discussions of each of the site areas. However, there are some general attributes of all of the features that can be discussed here. Table 4 shows the numbers of cultural and non-cultural features found in all areas. In all areas except the Woods, non-cultural features outnumber the cultural features. Approximately one third of the non-cultural features were fence posts and the remainder were tree features. The tree features were identified based on the presence of irregular root protrusions that extended from the base of the soil stains. In almost all cases, the presence of these irregular protrusions made it fairly easy to distinguish the cultural features from those caused by tree root complexes.

The information on the tree features is interesting to note because some archaeologists unfamiliar with the identification of non-shell cultural features in Coastal Plain soils have questioned our identification of Type 1 and 2 features as cultural features, and have suggested that they may be related to trees and tree falls. Some have commented that they just cannot believe that there could be as many as 800 cultural features at a site. In the first place, these critics have not considered the fact that the 835 features at these two sites were spread out over an area of 25 acres, yielding a cultural feature density of approximately 35 features per acre. This cultural feature density translates to one cultural feature for every 135 square meters of site area, and that feature density is much lower than densities seen at many other types of sites in the Middle Atlantic region (c.f., Custer 1994b). Some critics have also commented that they cannot believe that there were not more tree features at these sites. We believe that these critics have not looked at data like that presented in Table 4, and do not realize that more than half of the features excavated were evaluated and rejected as cultural features. And, the majority of the rejected features are tree-related.

TABLE 5

Feature Type Summary

	FEATURE TYPES						
AREA	**1**	**2**	**3**	**4**	**5**	**Other**	**TOTAL**
Island Farm	24	6	23	55	2	6	116
Woods	0	4	0	0	0	0	4
Carey North	235	4	12	6	1	2	260
Carey North Central	114	2	7	3	4	1	131
Carey South Central	127	13	27	10	9	6	192
Carey South	75	14	14	11	10	8	132
TOTAL	575	43	83	85	26	23	835

Later, in the discussion of the flotation analysis results, we will present more data from both cultural and non-cultural features to support the identification of cultural features at these sites. However, some general excavation data on this topic will be presented here. In many cases, the non-cultural origin of some features was not apparent from their plan view at the plow zone - subsoil interface. Feature attributes, such as irregular root protrusions were not apparent until the profile of the feature could be viewed. Therefore, many of the non-cultural features were partly excavated and soils from them screened. Artifacts were recovered from this screening, and they are included in the site's artifact counts, even though their context is questionable. These artifacts were <u>not</u> considered in the discussion of feature-related artifacts, however. The collection of artifacts from non-cultural features is of some interest, nonetheless, because it can be used to compare artifact frequencies between cultural and non-cultural features.

A random sample of 50 non-cultural features was chosen for analysis and the artifact frequencies for these features were calculated with adjustments made for partial feature excavation and feature size. The mean number of artifacts per non-cultural feature was three artifacts per feature with a standard deviation of one artifact. For comparison, a random sample of 50 cultural features was also analyzed in a similar manner. In order not to have a biased sample, cultural features with more than 100 artifacts in them were excluded from the sample. Thus, the sample of cultural features is providing a lower estimate of the number of artifacts per feature, than is really present. The mean number of artifacts per feature in the random sample was 14 artifacts with a standard deviation of two artifacts. These two means were then compared using a difference-of-mean test (Parsons 1974) and seen to be significantly different ($t=34.7$, $p<.001$). Therefore, the non-cultural features have significantly fewer artifacts than the cultural features, as would be expected if the cultural features are properly identified.

Table 5 shows the numbers of different types of features identified in each site area. House-related features (Types 1 and 2) comprise nearly three-quarters of the total feature assemblage, but the proportions of varied feature types vary somewhat among the different site areas. These differences will be discussed later in this report. Table 6 shows the feature dimensions by area. Although the measurements vary somewhat among the different site areas, they are similar and this similarity also underscores the validity of the application of the feature typology.

TABLE 6

Feature Dimensions by Area

			FEATURE TYPE				
			1	2	3	4	5
ISLAND FARM							
	Feature Count		24	6	23	55	2
	Length	Min./Max.	76/253	163/298	59/85	79/202	–
		Mean	119	204	63	130	–
		Std. Dev.	65	54	17	40	–
	Width	Min./Max.	45/206	51/219	49/80	53/162	–
		Mean	131	183	61	101	–
		Std. Dev.	54	41	9	15	–
	Depth	Min./Max.	12/92	13/85	15/50	41/104	–
		Mean	65	69	38	82	–
		Std. Dev.	9	7	5	7	–
CAREY NORTH							
	Feature Count		235	4	12	6	1
	Length	Min./Max.	80/330	–	62/80	72/144	–
		Mean	150	–	73	103	–
		Std. Dev.	60	–	10	21	–
	Width	Min./Max.	31/210	–	61/75	54/123	–
		Mean	93	–	66	93	–
		Std. Dev.	55	–	9	18	–
	Depth	Min./Max.	5/80	–	10/45	18/55	–
		Mean	53	–	23	41	–
		Std. Dev.	20	–	6	9	–
CAREY NORTH CENTRAL							
	Feature Count		114	2	7	3	4
	Length	Min./Max.	63/310	–	55/78	–	–
		Mean	272	–	61	–	–
		Std. Dev.	58	–	9	–	–
	Width	Min./Max.	59/281	–	49/79	–	–
		Mean	176	–	58	–	–
		Std. Dev.	39	–	11	–	–
	Depth	Min./Max.	8/75	–	15/61	–	–
		Mean	59	–	41	–	–
		Std. Dev.	21	–	9	–	–
CAREY SOUTH CENTRAL							
	Feature Count		127	13	27	10	9
	Length	Min./Max.	135/450	162/320	70/99	81/213	112/175
		Mean	241	238	81	140	142
		Std. Dev.	71	63	30	32	40
	Width	Min./Max.	51/230	95/210	68/95	55/180	81/161
		Mean	115	150	78	91	122
		Std. Dev.	31	18	12	19	33
	Depth	Min./Max.	35/128	63/98	15/40	25/60	52/110
		Mean	85	80	22	42	75
		Std. Dev.	22	31	8	7	9

TABLE 6 (continued)

Feature Dimensions by Area

		FEATURE TYPE				
		1	2	3	4	5
CAREY SOUTH						
Feature Count		75	14	14	11	10
Length	Min./Max.	165/280	180/343	68/97	71/174	97/154
	Mean	225	249	77	135	133
	Std. Dev.	62	73	35	31	39
Width	Min./Max.	41/140	84/213	51/98	49/193	75/150
	Mean	82	149	70	100	138
	Std. Dev.	38	41	15	22	28
Depth	Min./Max.	17/110	40/99	19/39	21/72	42/100
	Mean	62	75	25	48	69
	Std. Dev.	21	29	7	6	5

Analysis of Feature Functions

It is difficult to identify the functions of all prehistoric soil pit features. The functions of some pit features are apparent through the application of ethnographic analogies or from artifacts and ecofacts found in the pits. However, determination of the functions of other types is more problematic. This section of the report reviews the inferred functions of the varied types of pit features found at the Carey Farm and Island Farm sites.

The classification of feature types applied earlier in this report noted possible functions of the varied feature types (Figure 29). Types 1 and 2 are presumed to represent varied portions of prehistoric pit houses. This function was identified based on an especially well-preserved house feature at the Snapp Site (Custer and Silber 1994) and other pit houses found in the southern portion of the state (Artusy and Griffith 1975). Feature 153 at the Snapp Site (Custer and Silber 1994) is the most completely preserved example of a prehistoric pit house found in northern Delaware. Figure 40 and Plate 19 show hypothetical reconstructions of prehistoric pit houses based on Feature 153 and various ethnographic examples from the Middle Atlantic and Northeast (e.g., Bock 1978:113; Conkey, Boissevain, and Goddard 1978:183; Feest 1978a:274, 278; Callender 1978:649, 651; see also discussions in Callahan 1985, 1986 and Thurman 1986).

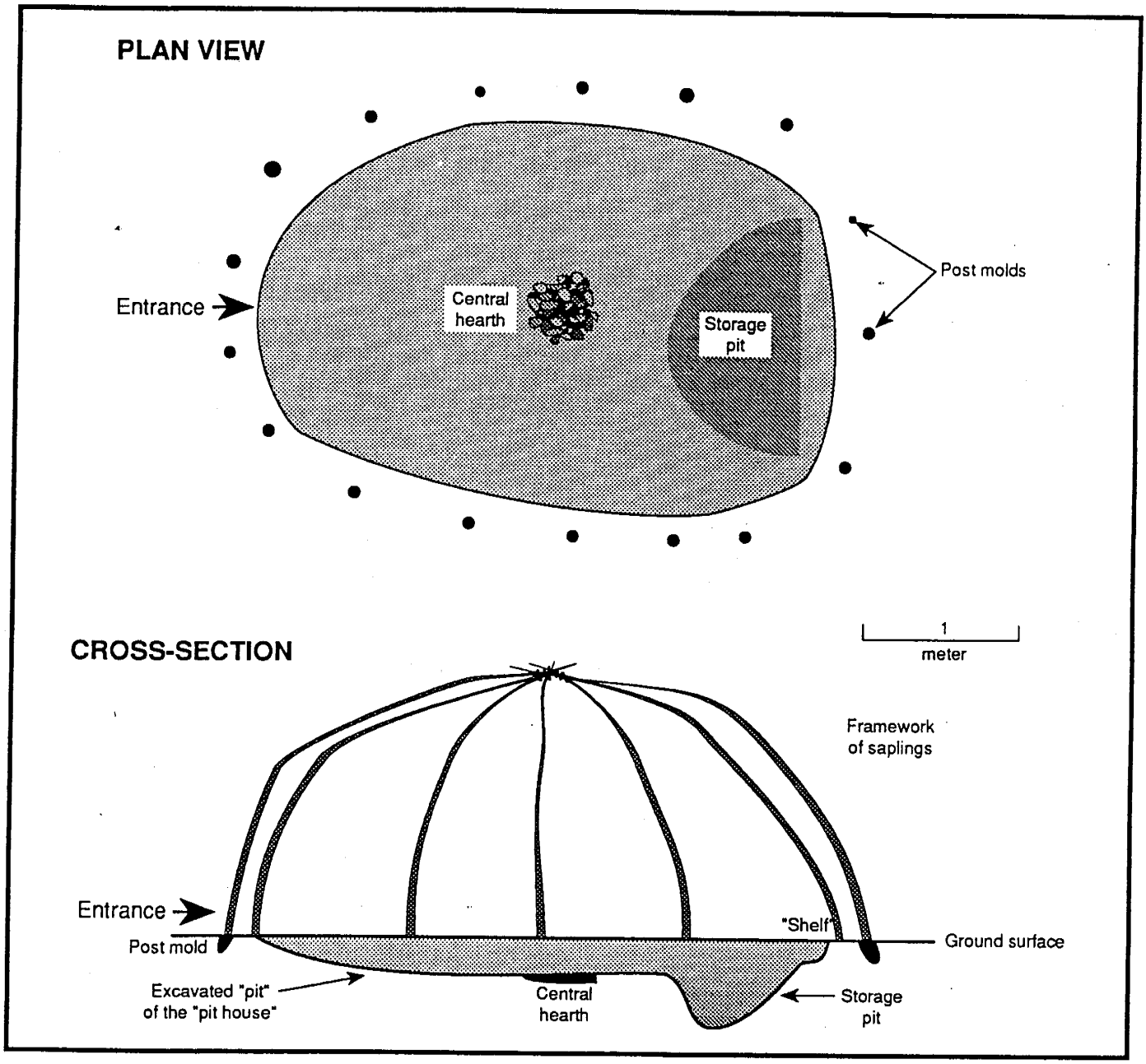
The typical house is centered upon an excavated pit "basement" up to 3.0 meters long and 2.5 meters wide. The depth of the pit "basement" when identified archaeologically, varies between 0.25 meters and 0.5 meters. However, it is important to note that these features cannot be identified at archaeological sites until after the overlying plow zone soils are removed and these plow zone soils can be between 0.3 meters and 0.5 meters deep. Therefore, these pit "basements" were deeper and larger in plan view (at the time of prehistoric construction) than we now see them.

Within the pit "basement" was a deeper D-shaped storage pit that can be envisioned as a "sub-basement." Charred plant remains are often found in these pits along with flintknapping debris. These artifacts and ecofacts would indicate that the "sub-basement" functioned first as a storage pit and later as a refuse disposal pit. Little stratification is evident in the fill of these pits indicating that they were used, and then filled with refuse, over a rather short period of time. The very fact that these features show signs of use as both storage and refuse disposal facilities implies a short-term use of the structure.

One gets the impression that food resources were stored in the "sub-basement" in the late summer and fall when most local plant food resources are most readily available (see Thomas et al. 1975 for a review of the seasonal variability of food productivity in prehistoric Delaware environments). These resources were then

FIGURE 40

Pit House Architecture



consumed by the house's inhabitants during times of low natural environmental productivity, probably the cold-weather months (Thomas et al. 1975). The use of the pits as refuse disposal facilities strongly implies that the house's inhabitants did not plan to reuse them for food storage. Consequently, the house and associated pit features were probably abandoned prior to the need for a new storage facility during the following winter. In this scenario, the pit houses would represent cold-weather dwellings occupied for a single year.

In some cases, interior hearths are present within the houses (Plates 23 and 24). The presence of interior hearths is often seen as a sign of cold-weather occupations (Cordell 1984) and adds further support to the contention that these houses were cold-weather dwellings. However, not all houses have interior hearths, even though they do have interior storage pit features. The houses without interior hearths may not have been inhabited during cold-weather months, but the presence of the storage pits implies otherwise. It is also possible that the personal preferences of the houses' inhabitants determined whether or not hearths were placed inside the houses.

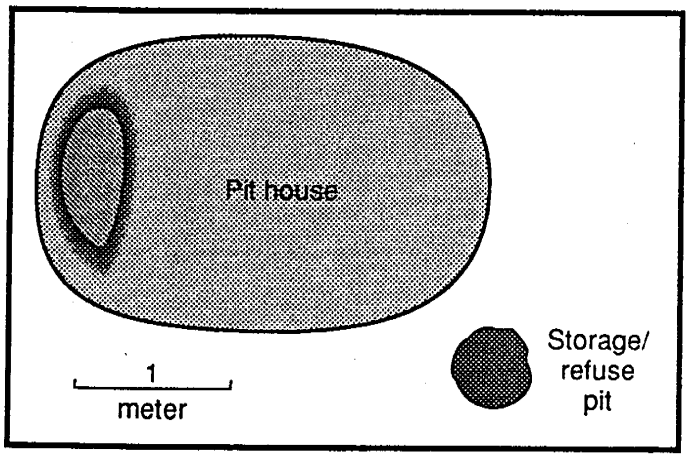
The framework superstructure of the house cannot be determined directly from the archaeological evidence except for post mold stains located around the "basement" pit feature (Figure 40). No prehistoric post molds were found at the Carey Farm and Island Farm sites, but at the Snapp Site the posts are set outside the "basement" creating a small shelf around the perimeter of the interior of the house. The post mold stains are angled and indicate that the posts leaned toward the middle of the structure. Almost certainly, the roofs of the houses with interior hearths had holes in them to allow smoke to escape Ethnohistoric data (see review in Callahan 1985) indicate that structures were covered with either thatch, woven mats, or bark. These materials were used both individually and in combinations. The presence of large pieces of bark in a feature at the Leipsic Site (Custer, Riley, and Mellin 1994), dating to ca. A.D. 778 - A.D. 1114, indicates that the houses would have been covered with bark. It is also possible that these bark sheets were part of a covering of the storage/refuse pit.

The storage pits are almost always located so that their long axis is perpendicular to the long axis of the "basement." Because it would be somewhat inconvenient to enter the structure over the storage pit, even if it had a covering, and because food storage is rarely displayed in the front of houses (see discussion in Hart 1993:95-96), the entrances to the houses were probably located on the short end of the oval structures opposite the storage pits. A similar arrangement of entrances and storage facilities is noted for late prehistoric Monogahela (Hart 1993) and Shenks Ferry (Custer, Hoseth, Cheshaek, Guttman, and Iplenski 1993) houses.

The house structures illustrated in Figure 40 and Plate 19 are idealized versions of prehistoric houses recognized in archaeological excavations. The preservation of Feature 153 at the Snapp Site is not commonly encountered in the archaeological record and provides a guide to interpreting other less well preserved house features. For example, feature Types 2 and 2a are presumed to be portions of the "basement" pits of houses. The post molds accompanying these "basements" are no longer present and were destroyed by erosion or leaching of the organic material that gives them their distinctive darker color. It should be noted that the preservation of the post molds in Feature 153 at the Snapp Site is quite rare in the sandy soils of Delaware. Feature Type 1 is presumed to be the remnant stain of the "sub-basement" and is identified as such based on its distinctive "D" shape.

FIGURE 41

Household Cluster



Feature Types 3, 4, and 5 are identified as pits that were first used as either processing or storage pits outside of houses. Some of these pit features have charcoal and fire-cracked rock associated with them (Plate 28) and may have functioned as earth ovens. Earth ovens were used to roast foods by burying heated rocks along with the foods to be cooked. Combined with the pit house features, these features comprise a "household cluster," as defined by Flannery and Winter (1976) to consist of a house, usually with an interior storage pit, and associated external pits that served as storage or processing facilities (Figure 41).

TABLE 7

Summary Catalog of All Artifacts

ARTIFACT TYPE	PLOW ZONE AND SURFACE		FEATURES		TOTAL	
Flakes	23,868	(9991)	18,860	(7680)	42,728	(17,671)
Utilized flakes	1148	(581)	625	(319)	1773	(900)
Flake tools	234	(145)	125	(98)	359	(243)
Projectile points	163	(3)	139	(27)	302	(30)
Early stage biface rejects	125	(78)	133	(53)	258	(131)
Late stage biface rejects	41	(12)	20	(5)	61	(17)
Biface fragments	237	(39)	124	(19)	361	(58)
Miscellaneous stone tools	121	(86)	60	(48)	181	(134)
Cores	215	(183)	164	(136)	379	(319)
Ground stone tools	1		7		8	
Hammerstones	20		20		40	
Ceramic sherds	1141		4188		5329	
Fire-cracked rock count	3043		3743		6786	
Fire-cracked rock weight (g)	102,101		194,602		296,703	
Total Artifact Count *	30,357		28,208		58,565	

* Does not include fire-cracked rock weight
( ) Artifacts with cortex present

Artifacts

Table 7 shows a summary catalog of all artifacts recovered from 1/4-inch screening of excavation unit and feature soils at the Carey Farm and Island Farm sites. Individual catalogs for each site area are presented later in this report.

Blood Residue Analysis

A total of 727 blood residue tests were undertaken on artifacts from the Carey Farm and Island Farm sites. Only three positive reactions occurred, and these were so slight that they were questionable. The negative results do not indicate that blood was never present on the stone tools from the sites. Rather, the negative results indicate that no blood is now present on the tools.

SOUTH AREA EXCAVATION RESULTS

This section of the report describes the specific results of excavations in the South Area of the Carey Farm Site (Figure 36, Attachment I). Table 8 shows the summary catalog of artifacts from this area. A total of 132 features were excavated in this area including 75 Type 1 features, 14 Type 2 features, 14 Type 3 features, 11 Type 4 features, 10 Type 5 features, and eight features that did not fit within any specific categories. An access road divides this area into two sections, east and west, and Figures 42 and 43 show a map of the features from the South Area. Interpretation of these data are presented in the following pages.