

INTRODUCTION

This report presents the results of Phase III data recovery excavations at the Whitten Road site (7NC-D-100) near Bear, New Castle County, Delaware (Figure 1). Data recovery excavations focused on a historic occupation dating from the mid-eighteenth century to the mid-nineteenth century. Excavations were conducted by archaeologists from the University of Delaware Center for Archaeological Research (UDCAR) for the Delaware Department of Transportation (DelDOT) in conjunction with the replacement of the approaches and bridge over the Christina River on Whitten Road (Delaware Route 346). The fieldwork began in late June and continued through early December of 1985, in compliance with Section 106 of the National Historic Preservation Act and in consultation with the State Historic Preservation Officer and the Bureau of Archaeology and Historic Preservation (BAHP).

The Whitten Road site was discovered in December 1984, when Phase I/II controlled surface collection (Custer et al. 1985) located a concentration of historic material, principally ceramics, in a plowzone context within the project area (Figure 2, Plate 1). Limited test excavations based on the surface survey, verified the presence of in situ artifacts and features beneath the plowzone. Phase III data recovery research consisted of the excavation, description, and interpretation of these archaeological remains. One hundred forty-four features were located, mapped, and excavated during data recovery excavations and many of these proved to be architecture-related posthole/mold features (Figures 3, 4, 5). Distinct patterns of paired sets of features identified three different structures. Also found was a plank-lined well, that was tightly packed in places with discarded demolition debris, various midden deposits and apparent fence lines. All of these remains suggest a substantial occupation spanning the mid-eighteenth to the mid-nineteenth centuries. Chemical analysis of soils was employed to help discern specific activity areas on the site. Prehistoric artifacts dating to the Woodland I Period (3,000 B.C. to A.D. 1,000) were also recovered, but were determined to be within disturbed contexts.

Accompanying the various intact deposits was a large and varied artifact assemblage in the plowzone including ceramics and other evidences of domestic occupation. The greatest single concentration of plowzone artifacts was located above a set of paired postmolds thought to be related to a structure. Smaller concentrations of artifacts were found surrounding one other set of paired postmold features. Artifact concentrations adjacent to structures have been commonly related to disposal practices associated with domestic structures (South 1977). No artifact concentration was associated with the third set of paired postmolds suggesting that the related structure was a service-related building, such as a barn, shed, or stable, rather than a domestic structure. The analysis of faunal material indicates that a number of domesticates, including pig, cow, horse, and

dog, were present at the site. Smaller percentages of wild food species including deer, gray fox, wild fowl, and oyster were also present.

Archival research has indicated that the 260 acre parcel within which the site was located was settled by the 1730s and indicated that the occupation was related to a tenancy on the property that existed until the 1850s. Documentary evidence of a tenant occupation of the site was supported by the features related to the structures and the artifact assemblage suggests a tenant occupation. Diagnostic artifacts such as ceramics, pipe fragments, and coins indicate an occupation from the last quarter of the eighteenth century to the mid-nineteenth century, the time period of the tenant occupation.

ENVIRONMENTAL SETTING

The Whitten Road project area is located in the Delaware High Coastal Plain. This summary of its environmental setting is abstracted from Custer (1984:25). Located between the Fall Line and the Smyrna River, the High Coastal Plain represents the southeastern extension of the very coarse glacial deposits of the Columbia sediments. In many areas these coarse deposits resisted erosion, creating a rolling topography with up to 16 meters (50 feet) of elevation difference between the headlands bordering the larger streams and the adjacent floodplain marshes. Such a setting exists in the study area with a difference in elevation of approximately 5 meters (16 feet) between the Christina River floodplain and the bluff setting of the Whitten Road site. Such elevation differences are great enough to significantly influence seasonal differences in plant communities (Braun 1967:246-47). Water courses tend to be deeply incised and are lined by a veneer of relatively recent sediments that is thin along the upper reaches of drainages and thickens moving toward their mouths. Most streams are tidal and the saltwater/freshwater mix allows for a wide range of varied resources. Soils include a variety of well-drained and swampy settings that are distributed in a mosaic pattern across the region.

The environments of the region around the study area have changed dramatically over the past 15,000 years (Custer 1984:30-37). However, given the active nature of the adjacent Christina River and the poorly drained conditions in its floodplain, the project area would have supported a swampy deciduous floodplain forest composed of hydrophytic species for most of the past 15,000 years. A deciduous gallery forest probably covered most of the adjacent headlands over the same time period. Although the morphology of the stream channel would have changed through time, it probably always carried water and supported some kind of swampy woodland within its frequent floodplain. In sum, the environments of the project area would have been attractive for human habitation throughout the prehistoric and historic periods, with its flowing fresh water, well drained headlands, game-attractive swamp, and abundant cobble deposits for the

manufacturing of stone tools.

Modern Environment

The Whitten Road site is located in a plowed field on a bluff south of the Christiana River. Archival research indicates that much of this southernmost part of White Clay Creek Hundred has been cultivated since the early eighteenth century and until recently, the area has remained largely rural and agricultural in nature. Substantial parcels of woodland in the area survived until well into the nineteenth century although only a few such wooded areas exist today along the Christiana River. In the last five years, substantial development has taken place, and today, recent housing developments are the dominant feature of the landscape. These developments pose a significant threat to the preservation of historic and prehistoric cultural resources in the area and serve to highlight the significance of the prehistoric and historic components identified at 7NC-D-100.

REGIONAL PREHISTORY

The prehistoric archaeological record of northern New Castle County area can be divided into four blocks of time: The Paleo-Indian Period (ca. 12,000 B.C. - 6500 B.C.), The Archaic Period (6500 B.C. - 3000 B.C.), the Woodland I Period (3000 B.C. - A.D. 1000), and the Woodland II Period (A.D. 1000 - A.D. 1650). A fifth time period, the Contact period, may also be considered and includes the time period from A.D. 1650 to A.D. 1750, the approximate date of the final Indian habitation of northern Delaware in anything resembling their pre-European Contact form. Each of these periods is described below and the descriptions are summarized from Custer (1984).

Paleo-Indian Period (12,000 B.C. - 6500 B.C.)

The Paleo-Indian Period encompasses the time period of the final disappearance of Pleistocene glacial conditions from Eastern North America and the establishment of more modern Holocene environments. The distinctive feature of the Paleo-Indian Period is an adaptation to the cold, and alternately wet and dry, conditions at the end of the Pleistocene and the beginning of the Holocene. This adaptation was primarily based on hunting and gathering, with hunting providing a large portion of the diet. Hunted animals may have included now extinct megafauna and moose. A mosaic of deciduous, boreal, and grassland environments would have provided a large number of productive habitats for these game animals throughout Delaware, and watering areas would have been particularly good hunting settings.

Tool kits of the people who lived at this time were oriented toward the procurement and processing of hunted animal resources. A preference for high quality lithic materials has been noted in the stone tool kits and careful resharpening and maintenance of

tools was common. A lifestyle of movement among the game attractive environments has been hypothesized with the social organizations being based upon single and multiple family bands. Throughout the 5500 year time span of the period, the basic settlement structure remained relatively constant with some modifications being seen as Holocene environments appeared at the end of the Paleo-Indian Period.

Numerous Paleo-Indian sites are noted for northern Delaware including hunting and processing sites near Hockessin and adjacent to the Wilmington Medical Center (Custer, Catts and Bachman 1982), possible quarry sites near Iron Hill, and isolated point finds.

Archaic Period (6500 B.C. - 3000 B.C.)

The Archaic Period is characterized by a series of adaptations to the newly emerged full Holocene environments. These environments differed from earlier ones and were dominated by mesic forests of oak and hemlock. A reduction in open grasslands in the face of warm and wet conditions caused the extinction of many of the grazing animals hunted during Paleo-Indian times; however, browsing species such as deer flourished. Sea level rise was also associated with the beginning of the Holocene Period in northern Delaware. The major effect of the sea level rise was to raise the local water table, which helped to create a number of large swamps, such as Churchmans Marsh. Adaptations changed from the hunting focus of the Paleo-Indians to a more generalized foraging pattern in which plant food resources would have played a more important role. Large swamp settings such as Churchmans Marsh supported large base camps as indicated by the remains at the Clyde Farm site. A number of small procurement sites in favorable hunting and gathering locales are also known in northern Delaware.

Tool kits were more generalized than earlier Paleo-Indian tool kits and showed a wider array of plant processing tools such as grinding stones, mortars, and pestles. A mobile lifestyle was probably common with a wide range of resources and settings utilized on a seasonal basis. A shifting band-level organization which saw the waxing and waning of group size in relation to resource availability is evident.

Woodland I Period (3000 B.C. - A.D. 1000)

The Woodland I Period can be correlated with a dramatic change in local climates and environments that seems to have been a part of events occurring throughout the Middle Atlantic region. A pronounced warm and dry period set in and lasted from ca. 3000 B.C. to 1000 B.C. Mesic forests were replaced by xeric forests of oak and hickory, and grasslands again became common. Some interior streams dried up, but the overall effect of the environmental changes was an alteration of the environment, not a degradation. Continued sea level rise also made many areas of the Delaware River and Bay shore the sites of large brackish

water marshes which were especially high in productivity. The major changes in environment and resource distributions caused a radical shift in adaptations for prehistoric groups. Important areas for settlements included the major river floodplains and estuarine swamp/marsh areas. Large base camps with fairly large numbers of people are evident in many areas of northern New Castle County such as the Delaware Park site, the Clyde Farm site, the Crane Hook site, and the Naamans Creek Site. These sites supported many more people than previous base camp sites and may have been occupied on nearly a year-round basis. The overall tendency was toward a more sedentary lifestyle.

The overall tool kits show some minor variations as well as some major additions from previous Archaic tool kits. Plant processing tools became increasingly common and seem to indicate an intensive harvesting of wild plant foods that may have approached the efficiency of horticulture by the end of the Woodland I Period. Chipped stone tools changed little from the preceding Archaic Period; however, more broad-bladed knife-like processing tools became prevalent. Also, the presence of a number of non-local lithic raw materials indicates that trade and exchange systems with other groups were beginning to develop. The addition of stone, and then ceramic, containers is also seen. These items allowed more efficient cooking of certain types of food and may also have functioned as storage for surplus food resources. Storage pits and house features during this period are also known from the Delaware Park Site and the Clyde Farm site. Social organizations also seem to have undergone radical changes during this period. With the onset of relatively sedentary lifestyles and intensified food production, which might have produced occasional surpluses, incipient ranked societies may have begun to develop, as indicated by the presence of extensive trade and exchange and some caching of special artifact forms. By the end of the Woodland I Period a relatively sedentary lifestyle existed in northern Delaware.

Woodland II Period (A.D. 1000 - A.D. 1650)

In many areas of the Middle Atlantic, the Woodland II Period is marked by the appearance of agricultural food production systems; however, settlements of the Woodland I Period, especially the large base camps, were also occupied during the Woodland II Period and very few changes in basic lifestyles and artifact assemblages are evident. Intensive plant utilization and hunting remained the major subsistence activities up to European Contact. Similarly, no major changes are seen in social organization for the Woodland II Period of northern Delaware.

Contact Period (A.D. 1650 - A.D. 1750)

The contact period is an enigmatic period of the archaeological record of northern Delaware which began with the arrival of the first substantial numbers of Europeans in Delaware. The time period is enigmatic because few Native American archaeological sites that clearly date to this period

have yet been discovered in Delaware, although numerous Contact Period sites are evident in southeastern Pennsylvania. It seems clear that Native American groups of Delaware did not participate in much interaction with Europeans and were under the virtual domination of the Susquehannock Indians of southern Lancaster County, Pennsylvania. The Contact Period ended with the virtual extinction of Native American lifeways in the Middle Atlantic area except for a few remnant groups.

The well-drained surfaces of the uplands within the study area, coupled with the proximity to surface water would have made the study area attractive to prehistoric peoples for all of the time periods noted above. However, only smaller procurement sites, staging sites, or small base camp sites are expected for the study area due to the absence of incoming tributary streams of the Christina in the study area.

REGIONAL HISTORY

The following local historical summary is presented to provide a background on the important regional and local historical events that affected the inhabitants of northern Delaware. Descriptions of regional historical events are based on the work of Munroe (1978, 1979), Hoffecker (1974, 1977) and Scharf (1888).

The Seventeenth Century

The earliest colonial settlement in Delaware, known as Swanendael ("valley of swans"), was made at present Lewes in 1631 under the sponsorship of patroons of the Dutch West India Company for the purpose of whaling and raising grain and tobacco. This venture was privately financed, but it ended in tragedy when the all-male population was wiped out by the local Indians in a massacre in 1632. Farther north a group of Swedes in the employ of the New Sweden Company built Fort Christina in 1638 in what is now part of the present city of Wilmington establishing the first permanent European settlement in Delaware. The Swedish government supported the venture, and Fort Christina became the nucleus of a scattered settlement of Swedish and Finnish farmers known as New Sweden.

The Dutch claimed the identical land -- from the Schuylkill River south -- by right of prior discovery, and in 1651 the West India Company retaliated by building Fort Casimir at New Castle in an attempt to block Swedish efforts to control commerce in the Delaware River. The Swedes captured this fort in 1654 and renamed it Fort Trinity. Rivalry between Swedes and Dutch continued, and the Dutch recaptured Fort Trinity in 1655, and also seized Fort Christina. As a result, New Sweden ceased to exist as a political entity due to lack of support from the homeland. Nonetheless, Swedish families continued to observe their own customs and religion.

In 1657, as a result of peaceful negotiations, the City of Amsterdam acquired Fort Casimir from the West India Company, and founded a town in the environs of the fort called New Amstel. This was a unique situation in American colonial history -- a European city became responsible for the governance of an American colony. A small fort was also erected at Lewes in 1659 for the purpose of blocking English intrusion, and a few settlers built homes there including 41 Dutch Mennonites who established a semi-socialistic community in July of 1663. They, too, were under the supervision of local officials appointed by the burgomasters of Amsterdam.

English hegemony of the region began in 1664 when Sir Robert Carr attacked the Dutch settlement at New Amstel on behalf of James Stuart, Duke of York, brother to Charles II. This was an important move on England's part to secure her economic position in the New World. New Amstel, renamed New Castle, was besieged and sacked by English soldiers and sailors resulting in the deaths of three Dutch soldiers and the wounding of ten others. English troops plundered the town, and English officers confiscated property, livestock, and supplies belonging to the City of Amsterdam, as well as the personal property and real estate owned by the local Dutch officials. The homes of the Mennonites and other settlers at Lewes were also pillaged.

A transfer of political authority from Dutch to English then followed, and the Dutch settlers who swore allegiance to the English were allowed to retain their lands and personal properties with all the rights of Englishmen. Former Dutch magistrates continued in office under English authority, and Swedes, Finns, and Dutch alike peacefully accepted the rule of the Duke of York through his appointed governors. In 1682, the granting of proprietary rights to William Penn and his representatives by the Duke of York essentially gave economic and political control of the Delaware region to Philadelphia, the new seat of government (Munroe 1978).

The settlement pattern for this early period was one of dispersed farmsteads located along the Delaware and its tributaries, such as the Christina, Appoquinimink, Brandywine, White Clay and Red Clay, where the land possessed good agricultural qualities (Hoffecker 1977). The Swedish and Dutch settlers had also pushed their settlement far up the valley of the Christina toward the Elk River. The town of Christiana Bridge, so named because it was the crossing place of that river, was established by about 1660 at the head of navigation of the Christina.

With the arrival of Penn in the 1680's, an individualistic system of land settlement including the granting by the proprietors of tracts or parcels of land to settlers, was pursued. Penn usually granted land to families, the standard size tract being about 500 acres (Myers 1912:263). A study of the land warrants granted in New Castle County between 1679 and 1700 indicates that about 80% of the grants issued were for

properties of 300 acres or less, and only 13% of the warrants were for properties 500 acres or larger (Eastburn 1891). These larger grants usually went to land speculation companies, such as the London Company, who by 1687 possessed a tract of over 1300 acres north of White Clay Creek. The price of land was inexpensive; in the province of Pennsylvania land sold for 5 to 15 pounds for 100 acres, or about one to three shillings per acre. Unlike colonies to the south, the quality and cheapness of the land discouraged the establishment of large estates and land tenancy (Bidwell and Falconer 1941).

By 1683 the cultivated areas of the region consisted of the three lower counties, New Castle, Kent, and Sussex, and three Pennsylvania counties, Philadelphia, Buckingham (Bucks), and Chester. The total population of all six of these counties in 1683 has been estimated to have been about four thousand people (Myers 1912:239). In New Castle County, five tax districts, called Hundreds, had already been established by 1687. With the growth of the population, four more hundreds were created in 1710.

With the exception of the port towns of Philadelphia and New Castle, there were no other major commercial or social centers in the area. The small hamlets that were established were almost always situated on a navigable river or stream, the major transportation routes of the period. Few were located inland, for the road network was almost nonexistent. An exception to this was "Ogle's Town", which was located along the road to the Elk River as early as 1679. The villages of Christiana Bridge and Cantwell's Bridge were the only hamlets of any size in the area and both were located on major rivers and roads; Christiana was located on the road from New Castle to Upland, and Cantwell's Bridge was on the Bohemia Manor cart road to the Chesapeake. The village of Christinahamm, at the mouth of the Christina was slowly being eclipsed by the rise of New Castle, and as early as 1690 was a village of only minor importance (Klein and Garrow 1984).

In the New Castle County region, water transportation was the major mode of travel and commerce in the late seventeenth century. Most of the farmstead tracts and land grants had frontage on a stream or water course to ensure that communication and moving of produce to local markets could be accomplished (Hoffecker 1977). In a country that was heavily wooded with a mixture of oaks, walnut, hickory, chestnut, and maple, water travel was the easiest, safest, and most effective means of transport. Overland travel was extremely difficult, because the roads were few and very poor. Even the road from New Castle to Christiana Bridge, probably the area's major overland transportation route, was in horrible condition. Generally, the roads in the area were simply intra-regional connectors to the coastal towns.

Swedish settlers to the region grew rye and barley on their farms, but these grains were quickly replaced by wheat when it

was found that wheat could be grown more easily. More importantly, it was realized that it was a marketable commodity, and the farmers and settlers in the area soon shifted from a subsistence-oriented to market-oriented agriculture. Wheat, and to a lesser extent corn, were grown and then shipped by water to local milling sites. The transportation of grains to milling sites supported an extensive coastwide trade employing shallops or other similar boats. These milling sites were among the earliest manufacturing complexes in the region. There was a mill in New Castle by 1658, and one on Red Clay Creek by 1679 (Pursell 1958). Villages such as Christiana Bridge, Newport, and Appoquinimink grew larger because of this shipping trade, and became market places for the surrounding country. The amount of this flour that was exported in the seventeenth century is not known, but it is expected that much was consumed locally. By the start of the eighteenth century, regional specialization was discernible with northern Delaware beginning to be recognized as a wheat and grain producing region (Hanna 1917; Loehr 1952; Pursell 1958; Hoffecker 1977).

Another seventeenth century export from the region was lumber. The English settlers faced with rapidly diminishing timber resources in England were the primary exploiters of the forests. A sawmill was located on Bread and Cheese Island in New Castle County by 1679. However, lumber was a more important export from Sussex County, and the lumber from mills in New Castle County was probably used for building materials by the steadily growing urban population. In order to lessen a chronic shortage of building materials and the necessity of importation from abroad, brickyards were another seventeenth century industry. The first commercial brickyard in Delaware was established as early as 1657 by the Dutch at New Amstel (Heite 1976).

Unsuccessful attempts at the mining and smelting of iron ore were tried in the Delaware region during the seventeenth century. In Delaware, the Iron Hill area in west Pencader Hundred was an area known to contain iron deposits by 1673, the date of publication of Augustine Hermann's map which labels the spot "Yron Hill". However, no information is available on these early mining activities. If the assumption of seventeenth century mining is correct, Delaware would rank as one of the earliest iron producers in the Middle Atlantic. It is evident that there was sufficient trust and interest in the deposits to draw a group of Welsh miner/settlers to the area early in the eighteenth century. From this event was established a long-time ironmaking and forging tradition in northern New Castle County, specifically in the Iron Hill area.

Northern New Castle County was part of a broader regional economy that was centered in Philadelphia, which in the last quarter of the seventeenth century, quickly began to dominate the economic scene in the lower Delaware Valley. New Castle County was a part of Philadelphia's agricultural and commercial hinterland, along with western New Jersey, northeast Maryland,

southeastern and northeastern Pennsylvania, and Kent and Sussex counties in Delaware (Lindstrom 1978; Walzer 1972). Farmers in the region sent their grains to the local milling centers, where the wheat flour and bread were then shipped to Philadelphia for export to the West Indies, other North American colonies, and southern European countries. The farmers in New Castle County quickly adapted to this market system of agriculture. It is estimated that over one-half of the farmsteads in the area were situated within eight miles (or a half-day's journey) of a mill or shipping wharf (Walzer 1972:163).

The Eighteenth Century

Settlement in New Castle County continued much as it had in the previous century. In the Philadelphia region, there was a large influx of immigrants between 1725 and 1755, particularly Scotch-Irish, most of whom were indentured servants (Munroe 1978:160). As the transportation network improved, colonists began to move inland away from the navigable rivers and streams. Good, productive land was settled first, but as the population began to grow, marginal property was also occupied. Land was still inexpensive, in 1795 selling for 3 to 4 pounds per acre near Christiana Bridge, or about \$300 an acre (Strickland 1801:19; La Rouchefoucault 1800). A study of the land warrants granted by the Penn government in New Castle County between 1701 and 1725 shows that 85% of the farm properties granted to settlers in the area were of 300 acres or less in size, a percentage similar to that in the seventeenth century. Significantly, farms of 100 acres or less increased from only 10% of the total between 1679 and 1700 to 27% by the first quarter of the eighteenth century (Eastburn 1891). This was due to a tendency for the large grants and tracts to be divided and subdivided by sale and inheritance (Munroe 1954:19). If Chester County, Pennsylvania, can be used as a comparison, farm sizes dropped from about 500 acres in 1693 to less than 130 acres by 1791 (Ball and Walton 1976:105). By 1750 it appears that the density of rural settlement in southeast Pennsylvania and New Castle County was approximately five households per square mile (Ball 1976:628; Lemon 1972). At the close of the century, Delaware ranked third in population density behind Rhode Island and Connecticut (Seybert 1818).

Lemon (1967) has divided the eighteenth century in the Philadelphia region into three periods of growth. The first period, from 1700 to 1729, was one of urban stagnancy after the initial rapid growth of the seventeenth century. However, hamlets - unplanned towns that sprang up at crossroads and around taverns, ferries and mills - did begin to appear at this time. Ogletown is a fine example of the eighteenth century hamlet in New Castle County. It certainly did not deserve the appellation of town "...There being but one Brickhouse & a Few Wooden ones all the property of Thomas Ogle, no tavern in the place..." (Paltsits 1935:7). But Ogletown was, like Red Lion, Middletown, and Aiken's Tavern, located at a crossroads on a major overland transportation route (Coleman et al. 1987).

The second period of urbanization that Lemon recognizes, 1730 to 1765, saw a renewal of town growth based on internal trade. In the Pennsylvania region, Lancaster, York, Carlisle, Reading, and Wilmington were examples of this period of urban growth. On a more local scale, towns such as Newport, Cuckoldstown (modern Stanton), and Newark were chartered and prospered during this period. Christiana Bridge, which had stagnated since the 1680's saw growth and prosperity as a major grain transshipment port for produce coming from the upper Chesapeake Bay area. Having only about ten houses in 1737, Christiana blossomed under the trading and shipping industries into a burgeoning town with several large mills, between fifty and sixty houses, and several taverns by the end of the century (Acomb 1958:124; Padelford 1939:11; Conrad 1908, vol. 2:495).

Christiana Bridge, located at the head of sloop navigation on the Christina River, had stagnated since the 1680's, but saw growth and prosperity as a major grain transshipment port for produce coming from the upper Chesapeake Bay area. Over the next half-century, but particularly after the American Revolution, Christiana blossomed under the trading and shipping industries into a burgeoning town. By the end of the century, the town could boast a population of 289 inhabitants, ranking fourth in New Castle County in size behind Wilmington, New Castle and Newport. Located there were several large mills, between thirty and fifty houses, several taverns, and a Presbyterian Church (Rogers and Easter 1960; Acomb 1958:124; Padelford 1939:11; Conrad 1908 2:495).

Newport, established about 1735, rivaled Wilmington and Christiana Bridge as a grain-shipping and flour-milling center during the eighteenth century. Because it was cheaper to ship flour by water to Philadelphia from Newport than to transport the grain overland directly from Lancaster to Philadelphia, grain was transported to Newport overland from the Lancaster and York areas of Pennsylvania. Contemporary travel maps of Newport show it to have been laid out in a regular town plan, consisting of parallel streets extending from the Christina River, and intersected by others at right angles (Colles 1961:170; Moore and Jones 1804:170; Scott 1807:180). It was described by travelers as being the size of New Castle, with about forty well-built houses, three or four stores and as many taverns (Padelford 1939:11, Scudder 1877:264; Penn 1879:295).

The crossroads town of Newark, chartered in 1758, represented a shift from a water-oriented shipping town to an inland market town. It was located on the two major overland transportation routes, the road from Dover to southeast Pennsylvania and the road from Christiana to Nottingham. Eighteenth century maps show it to have been at the center of no fewer than six roads (Cooch 1946). Newark was established as a market town that supplied the local population with commodities brought from Philadelphia and the surrounding region. While not quite as large as Newport, it was "...the most considerable collection of houses... since Lancaster" (Penn 1879:295).

Several mills for local produce were found along White Clay Creek in the town's vicinity, and the Newark Academy was established in the town by the early 1760's.

The town of Stanton, known as Cuckoldstown as early as 1746, became an important milling and grain center in the late eighteenth century. A grist mill was known to be in the vicinity of Stanton as early as 1679, and by 1800 Cuckoldstown rivaled Newport as a local grain processing center. Ships of moderate draft were able to navigate up Red Clay Creek and take on local as well as southeastern Pennsylvania farm produce. Located at the confluence of Red Clay Creek with White Clay Creek, Stanton was never a large town. A map of the New Castle County region, drawn in 1777, did not even include the location of Stanton (Cooch 1946), and a traveller's guide, published in 1789 (Colles 1961:170) shows only a mill and ten dwellings in the vicinity of the town. It was described at the end of the eighteenth century as a "...place of little note...in its vicinity were some good flour mills" (Moore and Jones 1804:6).

Wilmington was by far the largest urban center in New Castle County that developed in this period. Chartered in 1739, the city's location was considered by one visitor to be "one of the pleasantest and most favorable on the whole continent" (Acomb 1958:123). Wilmington soon became a port of entry and a post town, and was an important link in the Philadelphia trading network. Of special significance to the city's location was its proximity to the Brandywine mills. Located one-half mile north of Wilmington, Brandywine Village was a small town "...chiefly consisting in mills and taverns, eight or ten being within 100 yards of each other" (Chilton 1931:288). Wilmington thus was a receiving center for local and regional farm produce, brought by water from Christiana, Stanton, and Newport, and shipped up the Delaware to Philadelphia (Lindstrom 1978; Walzer 1972).

Lemon's third period of urban development, 1766-1800, was marked by less noticeable town growth which paralleled a more erratic economic pattern. Little growth in the towns of New Castle County took place during this period. However, an increase in population and land tenancy was noted (Lemon 1972:216).

The condition of roads in New Castle County improved considerably over the course of the eighteenth century, but in some locations they were unsatisfactory even by contemporary standards (Munroe 1954:137; Gray 1961:309). In 1755 the road from Middletown to 'Christeen' was considered good, but from Christiana north "the roads are, in many places, extremely bad and the appearance of the country the same" (Padelford 1939:12). The road from Christiana to Philadelphia, by way of Newport, Wilmington, and Chester, was the post road, but it was described as a "hilly and rocky road; a better and more pleasant is by New Castle" (Schoepf 1911:376).

The road network in north-central New Castle County also improved due to both population growth and interregional trade. A road known as the "New Munster Road" passed through Newark on its way to Lancaster and was laid out in 1765. The "Limekiln Road" (present-day Limestone Road) was evidently established as early as 1726, and extended from the rich grain producing country of southeastern Pennsylvania to the mills in the vicinity of Stanton. A road from Ogletown to the Elk River was resurveyed in 1774 (Conrad 1908:490). From Wilmington, a nexus of roads radiated west, south, and north, connecting the Delaware River with the head of the Chesapeake Bay (Head of Elk), Kent and Sussex counties, and southeastern Pennsylvania. Christiana was a major crossroads town on the road to Head of Elk, and also on the route from Red Lion to New Castle. Newport was the terminus of the Lancaster Road, and a route from Newport westward to Newark was laid out in 1750. By mid-century, the roadbeds of many of the area's present-day state roads (Route 4, 7, and 273; portions of Pennsylvania's Route 896), were already established.

Farming in the eighteenth century in New Castle County continued to be a system of mixed husbandry, combining the cultivation of grains with the raising of livestock (Bidwell and Falconer 1941:84). Farming was the most important occupation for between 80 and 90 percent of the area's population (Egnal 1975:201). Wheat remained as the primary grain produced, followed by rye, corn, barley, oats, and garden vegetables. In many areas, generations of repeated tillage had begun to exhaust the soil, and in general, even judged by contemporary standards, "...the business of the inland farmers at the end of the eighteenth century was ineffectively and even carelessly managed. Only in a few particulars had any noticeable improvements been made over the primitive methods employed by the earliest settlers" (Bidwell and Falconer 1941:84). A French traveler in Delaware at the end of the eighteenth century, reflecting European views of American agriculture, wrote "the farms are in general small and ill-cultivated; they receive little or no manure and are in every respect badly managed. Some English farmers have recently settled in this neighborhood ... they will doubtless make considerable improvements in agriculture" (La Rouchefoucault 1800:511).

Agricultural practices in New Castle County followed an extensive, rather than an intensive, use of the land (Lemon 1967, 1972:169). Not until the 1750's did three-field or four-field rotational patterns of planting, and only occasionally six-field rotation, become prevalent and widespread. Contemporaries reported that, through the use of these rotational patterns, a yield ranging between six and twenty bushels of wheat per acre could be harvested (Tilton 1946; Strickland 1801). The extensive use of the land was based on this wheat production, the most valuable and important trading commodity that the region could export. It has been suggested that this pattern of land use was the result of a lack of adequate labor supply, the availability of inexpensive land, household consumption, the market, and the attitudes of the people of the region (Lemon 1972:179).

Research in southeast Pennsylvania for this time period indicates that on an average farm of 125 acres, twenty-six acres would be in grain; thirteen in meadow for hay; twenty for pasture; eight of nine in flax or hemp, roots, other vegetables, fruits, and tobacco; three for the farmstead; and the remaining sixty acres would be fallow and woodland (Lemon 1972:167; Ball 1976:628).

Studies of the economic development of the region through the eighteenth century (Sachs 1953; Lemon and Nash 1968; Egnal 1975; Ball 1976; Ball and Walton 1976) have found the period to be one of modest changes in agricultural productivity. These changes, based on population growth and the rise in per capita income, can be seen in two distinct periods; 1720 to 1745, and 1745 to 1760. Minor fluctuations throughout the century were caused by King George's War, the French and Indian War, and the non-importation agreements of 1766 and 1769-1770. In addition, colonists were affected by alternating periods of prosperity and depression. Philadelphia continued to be the major urban center in the region, and from about 1750 until the end of the century was the dominant commercial and social center of the eastern seaboard, with a population that was second only to London.

Main (1973) categorizes the New Castle County area as a commercial farm community, or a community that sold a high proportion of its agricultural produce. For this type of community to exist, good farmland and accessibility to markets were necessary. Main's research found that these communities were characterized by high percentages of wealth, rich men, artisans, professionals and merchants, and a high proportion of large vs. small farmers.

Delaware's manufacturing capacity in this century began to be realized. During the eighteenth century the iron industry, lumber products, and grain milling enterprises continued to grow and prosper. New industries were started that engaged in the preparation of snuff from tobacco, the production of salt from brines in lower Delaware, and the rudiments of the textile industry. By the end of the century Delaware was one of the leading manufacturing states and Wilmington was one of America's leading industrial cities. It is evident from research that much of the century was characterized by the stagnated growth of industry due to the effects of first English trade policies, then the Revolutionary War, and finally by the economic uncertainties that followed the War. However, "Locally from 1790 to 1810, commerce prospered as it never had nor would again" (Welsh 1956). This period of increased growth corresponds with the implementation of more sophisticated record-keeping by the Federal Government and thus, much more substantial research is possible.

A report on the industries of the City of Wilmington in 1791 noted the presence of 12 flour mills, 6 saw mills, 1 paper mill, 1 slitting mill, 1 barley mill, and 1 snuff mill. A turn of the century observer commented: "No less than 265,000 barrels of

flour, 300,000 barrels of wheat, 170,000 bushels of Indian corn, besides barley, oats, flaxseed, paper, slit iron, snuff, salted provisions and etc. are annually sent from the waters of the Delaware state; of which the Christiana is by far the most productive and probably many times as much so as any other creek or river of like magnitude in the union" (Hancock 1947). Another observer in 1799 recorded the presence of additional mills devoted to the manufacture of linseed oil, a calico printing house, a manufactory of silk bolting-cloth, a hat-making factory, and numerous ship building facilities.

Manufactories that processed iron products also developed. The construction of a forge by Samuel James within the Welsh Tract in 1723 was the earliest successful forge in the Middle Atlantic. In Maryland, the Principio Furnace Company, which was to become the largest iron producing company in the Middle Atlantic, did not begin production until 1734 (Whitely 1887). In Virginia a successful iron works was not established until 1724 (Swank 1884). While Colonel Lewis Morris had operated a bog ore mine at Shrewsburg in New Jersey as early as 1676, it was not until the second decade of the eighteenth century that a truly commercial works was established (Bining 1938). Many of these eighteenth century ironworks were organized into a sort of plantation system with a main ironmaster's house overlooking the forge areas, workshops, storehouses, and worker's housing. While this system was present in Pennsylvania and New Jersey throughout the eighteenth century, little is known about the Delaware system. Two of the early ironworks in Delaware, one established by William Keith in 1722 near Cooch's Bridge, and a rolling mill set up by Alan Wood on Red Clay Creek both seem to have been organized under the plantation system. The ethnic ties of the Iron Hill Welsh miners seem to have allowed for a less strict plan of settlement. Outside of the immediate area of the blast furnace and forge, the ironworks in all situations encouraged blacksmiths and other artificers to settle in the immediate region. The bar iron produced by the forges was used by these persons to make tools, implements, and ironware of different sorts. In a largely agricultural area such as New Castle County there was a close connection between ironmaking and agriculture during the eighteenth and part of the nineteenth centuries. The combination of a readily available raw product and a constant market for their products created the need for a large population of blacksmiths and machinists. Thus, northern New Castle County was in the forefront of economic development during the first three quarters of the eighteenth century.

The Nineteenth and Twentieth Centuries

In the northern Delaware area, the mid-nineteenth century was marked by rapid industrial and urban growth. Population expansion was accompanied by a noticeable decline in the number of people engaged in agriculture. The rapid growth of the population during the early decades of the century forced many new farmers in the Middle Atlantic area to clear and farm lands of poor or marginal quality. Many of these farmers were hard-pressed to

turn a profit from their farmsteads, and there was an outmigration of a large portion of the population during the 1820's and 1830's to better lands to the west, particularly in the Ohio River Valley. It has been noted by one author that between 1810 and 1820 the population of Delaware remained stationary and only increased after 1840 (Hancock 1947:374). The loss of jobs related to agriculture was partly offset by the development of new sources of income and employment, particularly in urban and industrial contexts (Taylor 1964a:441; Lindstrom 1979:300). Thus, much of the surplus population that had in previous centuries been farm laborers, tenants, or unemployed, moved into urban and industrial centers where jobs were more plentiful. These trends occurred over the first half of the nineteenth century, and by 1860 were well established.

Urbanization in New Castle County during the first quarter of the century was closely tied to transportation routes and agricultural and industrial production. However, most of the towns of importance in the eighteenth century - Christiana Bridge, Newport, Stanton, Cantwell's Bridge, and Newark - originally settled because of their location on major transportation arteries, remained major marketing, milling and shipping centers for only a brief period into the nineteenth century. As early as 1808, it was reported that Christiana Bridge "was formerly the greatest of all the waters across the peninsula," and that its decline was caused by the numerous mills on the Elk River and its tributaries, the rise of Baltimore and the inexpensive cost of shipping produce to that city, and the development of other water and overland transportation routes more convenient than the one through the town (American State Papers 1808, Misc. 1:758). In a more favorable review in 1815, however, it was recorded that Christiana Bridge "is an important place as a depot for goods transporting east or south, as it offers the shortest land carriage between the bays" (Niles' Weekly Register IV, 6:93). Clearly, Christiana remained a major crossroads town, but by the late 1820's was no longer the commercial center it had been in the eighteenth century (Cooch 1976).

The fate of Newport in the early nineteenth century was similar to Christiana's. Transportation costs from southeast Pennsylvania to Philadelphia and even Baltimore (by way of the Susquehanna River), became less expensive, reducing the amount of traffic through the town. By 1809 the village was described as "a small village falling into decay. It once contained five taverns and seven stores, which are now reduced to two of each kind" (Scudder 1877:265).

By mid century, spurred first by the construction of the Chesapeake and Delaware Canal, and then by railroad construction, several of the local towns were experiencing a rebirth as transportation and manufacturing centers. Newport retained some of its importance as a transshipment and milling center because of the construction of the Philadelphia, Wilmington, and Baltimore Railroad, which was completed in 1837 (Strickland

1835:225-234; Dare 1856:80). By the end of the century, Newport was a "thriving village of 750 inhabitants ... now as prosperous and progressive as ever" and was fast becoming industrialized as a textile milling center (Delaware State and Peninsula Directory [DSPD] 1898:169). Stanton, like Newport, was saved from total decline by the railroad, and by 1900 was also a manufacturing center of woolen mills, flour mills, and fertilizer works. Its population at this time was 279 people (DSPD 1898:198). By 1898, "Ogletown" was a tiny village of only eighty inhabitants, and was strictly an agricultural town. Railroads, canals, and turnpikes had passed it by, and Ogletown did not even possess a bank (DSPD 1898:174). Newark was fortunate to be the home of Delaware State College, later the University of Delaware, and to have two railroads constructed nearby. The town was a manufacturing center like Newport and Stanton, and was located on major transportation routes.

In the first half of the nineteenth century, methods and routes of transportation underwent substantial changes in New Castle County, as first turnpikes, then canals, and finally railroads were introduced. Throughout the century, improved transportation was the key to urban, agricultural, and industrial development. The first successful turnpike in Delaware was the Newport and Gap turnpike, which was begun in 1808. It was noted in 1809 that the economic situation of Newport was failing and that "the inhabitants hope something from a turnpike road now progressing" (Scudder 1877:264). The Newport and Gap turnpike did slow this process of decay, but it could not halt it.

By 1815, eight more turnpikes, all with roads in New Castle County, had been chartered: the Wilmington Turnpike Company, incorporated 1808; the New Castle and Frenchtown Turnpike Company, 1809; the New Castle Turnpike Company, 1811; the Kennet Turnpike Company, 1811; the Wilmington and Great Valley Turnpike Company, 1813; the Wilmington and Philadelphia Turnpike Company, 1813; the Elk and Christiana Turnpike Company, 1813; and the Wilmington and Christiana Turnpike Company, 1815. It should be noted that economic decline like that suffered by Christiana was often an impetus for the construction of a turnpike. For example, the two turnpikes that were built through Christiana in 1813 and 1815 were attempts to get Christiana 'back on the map', and to provide a viable Baltimore-Philadelphia overland connection. Despite the improved transportation routes listed above, it was found that water travel was still the cheapest, fastest, safest, and most dependable means of transport available (Gray 1961:311).

The most significant canal built in Delaware was the Chesapeake and Delaware Canal, completed in 1829. Originally planned to connect the Elk and Christina Rivers, it was later constructed across the Delmarva Peninsula below New Castle, just north of Reedy Island. The canal was expected to bring wealth and prosperity to the communities of northern Delaware, and in fact, two new towns were constructed, Delaware City and Chesapeake City, at the termini of the Canal. Instead of

widespread prosperity, however, the canal contributed to the economic decline of Christiana, Newport, Stanton, and New Castle, as goods previously shipped overland across the peninsula could now be sent more cheaply by water. Even Chesapeake City and Delaware City were disappointed in their expected economic boom, and growth in these towns was slow. Only Wilmington, fast becoming an important regional industrial town, benefited from the Canal. Although not an original purpose of its construction, the Canal also came to serve as a border between two distinct socio-cultural sections of Delaware: the industrial/commercial area of northern New Castle County, and the agrarian communities of southern New Castle, Kent, and Sussex counties. The Canal would continue to serve in this borderline function throughout the remainder of the century, and does so today.

Railroads came to New Castle County in the 1830's. The first line, the New Castle and Frenchtown Railroad, was constructed in 1832 as a direct result of the opening of the Chesapeake and Delaware Canal, and was an effort to compete with that transportation route (Hoffecker 1977:43). In 1838, the Philadelphia, Wilmington, and Baltimore Railroad was completed, and quickly became the major transportation route across the Delmarva Peninsula (Dare 1856). Throughout the remainder of the century, rail lines continued to be built in northern New Castle County, such as the Baltimore and Ohio, the Wilmington and New Castle, and the Wilmington and Western railroads. As noted previously, the towns of Newark, Stanton, and Newport benefited from their proximity to these railroads, staving off the economic stagnation and decline that were experienced by Christiana, Oglethorpe, and Glasgow.

New Castle County continued to be predominantly agricultural throughout much of the nineteenth century. In 1815 it was reported that "the greater part of the inhabitants of this state are devoted to agricultural pursuits, and they have rendered it very productive. The principal produce is wheat, rye, indian corn, barley, oats, and flax. Grasses are abundant, and thrive very luxuriantly, furnishing food for many cattle - and every sort of vegetable ... thrives well here. The staple produce is wheat, of which a great quantity of flour is made for export" (Melish 1815:181). At the start of the nineteenth century, however, agriculture in New Castle County was in a dismal situation. Farming practices continued as much they had during the previous century with the use of the four field system of cropping. Wheat was still the dominant crop, the use of fertilizers was infrequent, and a large number of tenant farmers worked the land. Production was, on the whole, quite low during the first quarter of the century. It was estimated that the average return of crops for all of Delaware was five bushels of wheat per acre, ten of corn, and fifteen of oats, despite the knowledge that the use of fertilizers could increase crop yields to forty bushels of wheat per acre and eighty of corn (Allmond 1958:57).

Demand for American agricultural products was high until about 1815. The outmigration of the population that took place at this time can be seen in the tax assessment data for the nineteenth century for White Clay Creek Hundred (Coleman et al. 1984). A steady rise in the number of taxables was observed from 1800 to 1818, with a sudden drop in 1819. The assessments also list many of the taxables as no longer being in the Hundred, and often there is a notation of "gone to Ohio" or "Moved to Indiana". Contributing to these difficulties were the problems presented by the Hessian Fly and Black stem-rust, both of which did severe damage to wheat crops. However, it has been suggested that indirectly the Hessian Fly was helpful to wheat cultivation, because it caused increased attention to be given to fertilization and crop tillage, which increased agricultural productivity (Bidwell and Falconer 1941:96).

The revival of the New Castle County Agricultural Society, one of the first such organizations in the nation, in 1818, encouraged farmers in the use of improved drainage techniques, fertilizers, and machinery. New Castle County was on its way to becoming one of the finest agricultural counties in the United States by 1860. Indeed, between 1830 and 1860, when judged by contemporary agriculturalists, the county was considered to be "far superior to other sections of the state" (Hancock 1947:375), and one newspaper observed that "it will satisfactorily compare, in every respect, with the crack counties in the large neighboring states" (Delaware State Journal, June 12, 1846). Fertilization, farm machinery, and improved drainage were helpful in the agricultural success, but the county's rich natural resources, its fine transportation network, and the proximity of cities, were advantages with which other areas, particularly Kent and Sussex counties, found difficult to compete. A traveler through the region summed this up well when he wrote "the northern portion of this little state is generally a fine tract of country, being highly and skillfully cultivated, and well adapted to the growth of wheat and other grains of superior quality. In a word, this portion of the state presents all that is delightful in agriculture" (Myers 1849:39).

Average farm size remained much as it had been during the eighteenth century, about 200 acres. However, farms of 300 to 400 acres were not uncommon (Bausman 1933:64). Prior to 1900, real estate values for agricultural property ranged from \$50 to \$125 an acre in the Christiana-Ogletown-Stanton area (DSPD 1898). The system of farming employed in northern Delaware was similar to that used in neighboring Chester County, and was either a cropping system, a mixed system, or a grazing system (Bidwell and Falconer 1941:261). Documentary evidence of the W. M. Hawthorn farmstead (Coleman et al. 1984) indicates that the mixed system of farming was used by the occupants of the farm. In this method, a well-watered portion of the farm was kept as permanent pasture and was frequently manured, with the remainder of the farm cropped in a rotation of corn, oats, barley, wheat, and clover. The Chester County system of farming was widely held in high esteem, and a typical farm, following this pattern, probably

was clean and well arranged, with well-built fences dividing the farmstead into seven to twelve enclosures, and with neatly-constructed farm buildings located near a spring (Bidwell and Falconer 1941:262).

Livestock production in New Castle County continued to be a major farm occupation in the first half of the nineteenth century (Bidwell and Falconer 1941:394). Prior to 1850, the area of eastern Pennsylvania, New Jersey, and northern Delaware had been known for its cattle-feeding industry. However, it was dairy-farming that began to predominate in New Castle County, particularly because of the need for fresh butter and milk in the urban centers of Philadelphia and Wilmington. By 1847, dairies ranging from 15 to 100 cows were common in northern New Castle County (Bidwell and Falconer 1941:427).

Between approximately 1840 and 1860, southern New Castle County and Kent and Sussex Counties were large producers of peaches, which were shipped by rail and water to Philadelphia, Wilmington, and Baltimore. This "peach boom" was short-lived, however, when a disease called "the Yellows" devastated the orchards. Some northern New Castle County farmers did grow peaches, but the area did not base its agricultural production on this fruit. Thus, farmers in this area were less affected by the peach blight than areas further south. Other fruits, particularly apples, were grown for profit in the northern New Castle County area (U.S. Agricultural Censuses, 1850-1880; Myers 1849:39; Hoffecker 1977).

From 1860 until the end of the century, truck or market gardening and the orchard industry began to predominate in much of Delaware. This trend saw its largest percentage increase in the state between 1889 and 1899, with an increase of 457.2% (Shannon 1945:260). Northern New Castle County did join this agricultural trend, but still grew a large amount of cereal crops. These grains were no longer for export or widespread consumption, but were for local use in the urban centers, and for cattle-feeding.

Tenant farming, which had been quite common in the eighteenth century, became even more prevalent during the nineteenth century. Large land owners, having acquired much of their holdings during the hard times of the 1820's leased their lands to tenants. One author likened the farm situation in Delaware in the second half of the nineteenth century to that of the ante-bellum southern aristocracy: "there developed a class of farm owners who not only did little labor themselves, but required that the hired labor render personal services...They lived on their farms and personally directed their farm businesses. Some of them owned additional farms which they either 'carried on' or rented to tenants" (Bausman 1933:165). By 1900 over 50% of all the farmers in Delaware were tenants or share croppers. Over the period between 1880 and 1900 this figure represents almost an 8% increase in farm tenancy (Shannon 1945:418). Tenancy remained a dominant farming practice into the

twentieth century.

The growth of non-agricultural businesses coincided with the decline in agricultural pursuits, which was caused by population expansion and outmigration, poor agricultural production in the early years of the nineteenth century, and urban and industrial expansion (Taylor 1964a; Lindstrom 1978, 1979). Lindstrom (1978: 123) found that in 1820 over 76% of the population in the Philadelphia hinterland were farmers by occupation, and by 1840 this number had declined to about 70%. In addition, the income per agricultural worker fell well below that of the non-agricultural worker. At the same time the income of farmers in the region who were able to remain productive was higher when compared with other areas of the nation. Thus, while many farmers were forced to migrate west or into the cities, or become tenants, many farmers who were successful enjoyed a substantial income and prosperity.

In New Castle County, these changes had brought an end to export crop production, and a real specialization began to occur. New Castle County became an area that specialized in the production of corn, dairy products, fruits and vegetables, and lumber, while producing much less wheat and livestock (Lindstrom 1978:125). By the middle of the century, the county produced goods that were desired by the nearby urban communities supplying perishables such as milk, butter, fruits, and vegetables. This shift from cereal farming to market gardening would continue into the next century.

Regional development during the nineteenth century was much more complex than in the previous decades, primarily due to the great strides in industrialization, urbanization, and transportation that were caused by the Industrial Revolution (Taylor 1964b; Walzer 1972; Lindstrom 1978, 1979). The first half of the century witnessed a noticeable decline in Philadelphia's economic influence over the region, caused by Baltimore's rise, the competition for markets between the two cities, and a drop in the consumption by foreign markets of Philadelphia's agricultural produce. The area responded by diversifying its agricultural production, but primarily it devoted increasingly more of its resources to manufacturing (Lindstrom 1978:122).

While milling continued to be an important occupation in New Castle County, manufacturing of all sorts became common as the century wore on. The variety of manufacturing and milling establishments in northern New Castle County was astounding. In 1815, Niles Weekly Register observed that the White Clay Creek, Red Clay Creek, and Christiana River drainages within Delaware were the power sources for forty-six different mills or manufactories: twenty-four grist mills, ten saw mills, five cotton mills, two woolen manufactories, one paper mill, one slitting mill, one snuff mill, one glazing mill, and one oil and saw mill. Less than thirty-five years later, the number of woolen and cotton manufactories had doubled to fourteen, all steam or

water powered, and it was recorded that "the manufactures of Delaware are more extensive than its commerce" (Myers 1849:40). Although Beers' Atlas of the State of Delaware shows only a slight increase since 1815 in the total number of mills and factories in the hundreds of White Clay Creek, Mill Creek, Christiana, and Pencader, the diversification of mill types in 1868 reveals a shift in the number of agriculturally-oriented establishments and a rise in the number of manufactories based on an industrially-oriented economy. As noted above, in 1815 there were twenty-four grist mills and, excluding saw mills, only half as many mills of other types. By 1868, there were nineteen grist mills and, again excluding saw mills, fifteen mills of all other types - iron, cotton, woolen, paper, snuff, spice, bark, and phosphate.

The first official report on the state of manufacturing in the United States was compiled by Tench Coxe for the Year 1810 (Coxe 1814). The report not only provides the first statewide census for manufacturers, but also a breakdown by county for this data. New Castle County was dominant in most aspects of manufacturing and of the twenty-seven categories of manufacturers, sixteen were unique to New Castle County. Manufacturers present statewide included woolen and flaxen goods made at home, fulling mills and looms, tanneries, and distilleries. At this time grist mills produced the greatest value of goods with iron manufacturers second in rank.

The War of 1812 and the Embargo Acts that preceded it proved a great stimulus to manufacturing in Delaware, especially in textiles (Munroe 1978). Much of the reemergence and success of both industry and agriculture in Delaware can be attributed to improved transportation facilities beginning in the 1830's. The linking of Wilmington by railroad with Baltimore and Philadelphia in 1837 provided not only Wilmington, but also its hinterland, with excellent markets both for the purchase of raw materials and the sale of finished products. Contained within this hinterland was also a sizable population of skilled mechanics and machinists who were able to perform the skilled technologies. This combination of good transportation, a large labor pool, and a ready supply of raw materials allowed industry in northern New Castle County to grow and diversify very rapidly. It has been pointed out that, "a notable aspect of the industrial pattern in Wilmington was the interrelationship among the local industries" (Hoffecker 1974:27). This pattern benefited greatly not only manufacturers in Wilmington, but also the small businesses that were established surrounding the city. With good railroad facilities, requested goods could be delivered within the same day, even from Philadelphia. The carriage manufacturing business represents the process well with leather tanners, foundries, and wheel shops providing the necessary parts that then only needed assembly. Subsequent sale was usually via railroad to Southern markets or to the government during the Civil War when lucrative contracts for wagons and gun carriages were received (Hoffecker 1974). Other successful businesses also followed this pattern of the shipping of their products for out of state sale. Favorable

conditions allowed Wilmington to become a leading manufacturer of transportation related equipment such as carriages, railroad cars, and iron ships. In 1853 the majority of workers in Wilmington were employed in cotton manufacturing, iron-casting, wheel making, railroad-car manufacture, shipbuilding, carriage making, leather tanning, and coopery.

At the turn of the twentieth century. America's industrial economy had become truly national in scope; however Delaware was falling behind the rest of the nation (Hoffecker 1977). Many of the successful firms in Wilmington were bought by large, national companies and the others went bankrupt due to competition from the Midwest. Nonetheless, in 1907, Wilmington stood seventh in manufacturing in the United States according to population, and had a greater diversity of industries than any other city in the United States. In sum, the historical record of the study area shows a developing commercial agriculture and increasing urbanism. This increasing urbanism had accelerated in recent years and is ultimately the cause of the historic archaeological research described here.

PREVIOUS CULTURAL RESOURCES INVESTIGATIONS

The Whitten Road Site was discovered by archaeologists from the University of Delaware Center for Archaeological Research in December, 1984, during a field reconnaissance survey (Custer et al. 1985) of the proposed right-of-way for the replacement of the approaches and bridge over the Christina River on Whitten Road (Delaware Route 346, Figure 2, Plate 1). The site was located on a bluff above the river on a finger-shaped agricultural field between two large borrow pits associated with commercial sand and gravel mining operations.

The pedestrian survey conducted during the Phase I investigation located surface concentrations of mid-eighteenth and early to mid-nineteenth century artifacts. Later test excavations uncovered in situ archaeological deposits below the plowzone (Custer et al. 1985) (Figure 2). Two round postmold-like features were observed as were several larger oblong features, all consisting of a dark brown silty soil. Sherds of temporally diagnostic "scratch blue" white salt-glazed stoneware, various redwares, and fragments of burned bone, brick, and daub were recovered from the surface of one of the larger features. A very limited testing and augering program defined the extent of what seemed to be the main feature area (17' X 25'). The site was subsequently determined eligible for listing on the National Register of Historic Places and Appendix I provides the determination of eligibility form. Appendix II contains the Cultural Resource Survey Archaeological Site Form. A data recovery plan (Appendix III) was then developed to mitigate the adverse effects of the highway construction upon the site.

FIELD METHODS

In order to adequately address the question of spatial utilization, a 8,325 square-foot area (333 5'X 5' squares) was excavated during data recovery excavations. All soil was screened through 1/4" mesh. A contiguous area of 5,525 square feet (224 5'X 5' test units) was excavated in the core area of the site which contained the known feature area identified during the Phase I and II survey. Additional features, some of which were related to structures, were also uncovered in this area (Figure 6).

A major element of the data recovery research design noted in Appendix III was concerned with the spatial utilization of the site through time. On plow-disturbed sites such as the Whitten Road site, such studies require the excavation of large areas of plowzone because only through the excavation of large, contiguous areas can patterns of features be discerned and interpreted. Controlled excavation of the plowzone, as opposed to mechanical stripping, was used to discern the relationship between artifact distributions and intact sub-plowzone features. In addition, concentrations of plowzone artifacts were used to define specific activity areas on the site. The presence or absence of specific classes of artifacts thought to represent domestic debris, such as ceramics, glass, and faunal remains, was used to determine the functions of structures located on the site. Furthermore, the Phase I and II survey had revealed that the main feature area was fairly shallow and it was therefore likely that the majority of artifacts were to be found in the plow-disturbed portions of the site. Indeed, when the plowzone artifact sample and that recovered from undisturbed archaeological deposits were finally analyzed and compared, approximately 85% of the artifact assemblage was found within the plowzone.

The research design also included an aligned, stratified random sample of the plowzone in all directions around the core area of the site (Figure 7). The sampling scheme for the plowzone called for 10' squares to be laid out around the known feature area. One randomly-selected 5' X 5' unit was excavated within each 10' square. Also, beyond the area of secondary sampling, randomly chosen 2' X 2' squares were to be excavated. One thousand nine hundred and fifty square feet of plowzone (78 5' X 5' squares) were excavated during this procedure. The Phase I and II controlled surface collection had indicated a discrete concentration of plowzone material in one area of the site (Figure 8) and the random sample of the plowzone corroborated this finding. The distribution of plowzone artifacts from the Phase III excavations provides a graphic depiction of the site limits (Figure 9) and corresponds to the distributions based on the Phase I and II study.

Secondary sampling also located posthole/mold features related to structures up to 40' from the previously known main feature area. A well was also located 60' from the main feature

area. In order to determine the patterning of posthole features in reconstructing the dimensions of these structures, intensive excavation was undertaken and much of the area of earlier secondary sampling was incorporated into the core area, as was an area of high plowzone artifact density (Figure 6). Because secondary sampling provided an adequate sample of the distribution of plowzone artifacts and effectively defined the limits of the site, the excavation of arbitrarily selected 2' X 2' test units outside the area of secondary sampling was not undertaken. Finally, following the random sampling of the plowzone, the excavation of the core area of the site, and the excavation of all features, mechanical equipment was used to strip the plowzone from those areas of known low artifact densities, and some additional features were located (Figure 6).