2. RESEARCH ORIENTATION AND THE STATE PLAN

PREVIOUS ARCHÆOLOGICAL RESEARCH in the region has provided valuable insights into the locations of human activities through time. In some cases, as in the project area, settlement models are so well developed that sites can be predicted with uncanny accuracy, but there is yet much to be learned about human utilization of this part of Kent County.

THEORETICAL ORIENTATION

The research for this project reflects a cultural materialist theoretical orientation. Cultural materialism refers to the study of the effects of technology and environment on human behavior. Culture is viewed as a form of adaptation to both the natural environment and the social environment that results from the interaction of human individuals and groups (Custer 1986:2; cf. Harris 1968:240-41; Harris 1979).

This theoretical approach is explicitly incorporated into the Delaware management plan for prehistoric archæological resources (Custer 1986:2). A complementary management plan, which deals with historic archæological resources, follows similar lines (DeCunzo and Catts 1990). The cultural materialist approach is implicit in the development of models which use features of the natural environment (such as soil types or topography) or elements of the cultural environment (such as roads, landings, or farmsteads) to predict the locations of a variety of property types, including prehistoric settlements, cemeteries, and industrial sites.

Using this theoretical position, we developed a research strategy which is designed for the efficient identification of both prehistoric and historic sites. The research strategy consists of the identification and application of models that predict the locations of the major historic property types which can be expected within the project area. These property types include both prehistoric settlements and historic tofts and are of particular concern because they can provide information on a wider range of research questions than other properties considered in this study. Such an approach can be considered an empirical test of the positive statements of the models. It should be kept in mind, however, that the present exercise does not constitute a formal test of any model.

The dominant property type in the project area is the agricultural field, or *croft*. Because the extent of arable land has not changed, predictive models are not required to identify present or former agricultural fields. However, explicit statements about the relationship between agricultural practices and soil characteristics will be developed. Field observations will be used to determine whether these relationships are visible in the archæological record. This information can then be used in future studies to develop models which relate the use of particular agricultural practices to other social and environmental factors.

Drainage ditches in the project area are a well-documented property type. For the most part, their remains, consisting of both the ditch itself and the associated spoil pile, remain highly visible elements of the landscape. Furthermore, the purpose of these features is quite clear. They were created to drain wet areas so that they could be cultivated. We have, therefore, not attempted to define a model for ditch location. The research presented here, should, however, provide background information which can be used to develop models which relate the presence of ditches to other cultural phenomena.

The social impact of ditching, and its role in upward mobility of marginal farmers, is evident at two different locations, on opposite ends of the project area.

In historical archaeology, cultural materialism is also applied to the study of social and economic differences. Much of the historical archaeological research of the last two decades has been directed toward identifying the material parameters of social, economic, and ethnic groups. Although this

economic, and ethnic groups. Although this is not the primary focus of the study presented here, both toft location and agricultural practices are influenced by the social and economic status of the farmer, and will be considered in a separate discussion.

PLANNING CONSIDERATIONS

The Delaware prehistoric cultural resources management plan identifies the Dover area as a region with "high/medium significant site potential with development pressure" that deserves special attention (Custer 1986:206). The project area itself is located along the eastern edge of the Mid-Peninsular Drainage Divide Management Unit (Custer 1986:178).

The study of sites in this zone which are likely to have been occupied during the Archaic Period has been identified as a priority research topic (Custer 1986:174). The study of Woodland I and Woodland II procurement and micro-band base camp sites is also important (Custer 1986:174-6).

The Delaware Comprehensive Historic Preservation Plan (Ames et al. 1989:33) places the project area in the Upper Peninsula geographic zone. European settlement had taken place within the project area by the middle of the 18th century, so that all but the earliest of the time periods established by the comprehensive plan are likely to be represented (Ames et al. 1989:37).

Two historic themes defined by this study, Agriculture and Settlement Patterns and Demographic Change, are represented by historic properties within the project area. Agriculture has been identified as the highest priority historic context for the Upper Peninsula zone for the periods 1770 to 1830 and 1830 to 1880 (Ames et al. 1989:83-4).

Settlement Patterns and Demographic Change are defined as the second highest priority historic context for this zone during the same periods of time. In view of the perceived importance of agriculture, the subject was afforded a separate discussion in the first report of this project (Heite and Blume 1992: 80-97).

EXPECTED PROPERTY TYPES

The number of property types which can be expected in the project area is quite limited. For the prehistoric period, procurement sites are the most likely property type in all time periods (Custer and Galasso 1983:10). These sites can be identified by their small size and the limited range of tool types. A limited number of micro-band base camps may also be found in the project vicinity. These sites are larger than procurement sites and a wider range of tool types is present.

For the historic period, three property types can be expected. The first of these is the toft, defined as "a homestead; the site of a house and its outbuildings" in the *Oxford English Dictionary*. In the catalogue of historic property types provided as Appendix C in the Delaware Comprehensive Historic Preservation Plan, the less precise term "plantation and rural farm sites" appears superficially to be roughly equivalent to the toft. However, most archæologically-oriented researchers prefer the term "toft" because it commonly is construed to refer to all the land, buildings and artifacts related to the homestead, not merely to the random collection of buildings that might happen to survive above ground at the time of a cultural resource survey (Ames et al. 1989:146).

In an agricultural holding, the toft is distinguished from the croft, a term which refers to the fields, meadows, woodlots, and other parts of the holding not in immediate use by the homestead. Kenneth Lewis, who used the toft as the sampling unit in his study of the frontier town of Camden, South Carolina, provides a detailed but concise discussion of the nature of both urban and rural tofts (1977:175):

> The term *toft* is used here to refer to the immediate site of a dwelling or other principal structure and its outbuildings. It is both a spatial and functional unit in that it designates the area within which occur those activities that lie closest to and are most intimately concerned with the functions of the principal structure. As such, the toft is not confined to a specific size or form and may vary considerably according to the nature of the structure with which it is

associated. In an urban settlement a toft might comprise an entire holding; however, in a rural settlement where holdings would include agricultural fields, the toft includes only that part of the holding in which activities immediately associated with the household are carried out.

Within the project area, only rural residential tofts are likely to be encountered. Predictive models based on documentary research will be used to identify the number of tofts likely to be found within the project area as well as the likely locations of these tofts (see Heite 1985).

The second historic period property type is the agricultural field, one element of the croft and the locus of a particular variety of human activity. In the catalogue of property types for the Agriculture historic context (Ames et al. 1989:141), fields are seen as exemplifying the products of agriculture, specifically fruits and vegetables and textiles.

Such a definition ignores the field as a workplace, or as the product of a farmer's labor. The field, including its chemical content, plow scars, and borders, is a property type that can speak volumes about the people who have tilled it (Heite and Blume 1992:80-97). In this study, agricultural fields are seen as providing evidence of agricultural practices, particularly reclamation methods and the use of soil additives.

Because little has been written about the agricultural field as an historic property type, in this study, we will concentrate on identifying observable traces of agricultural practices that might be archæologically interpreted by future investigators. These evidences include planting holes and plow scars, artifact distributions, chemical traces of fertilizers, and physical traces of soil improvers such as marl and calcined shell.

The third property type for historic agricultural period resources which is likely to be found in the project area is the ditch. Ditches have been used throughout the historic period to drain wet areas in order to make them arable. Tax ditch companies were particularly active during the period 1830 - 1880. Many ditches have been re-dug periodically over the last 100 to 150 years, but others have not.

The only expected industrial property type in the project area is the country sawmill, commonly powered by a farm tractor. Such mills allowed farmers to market the timber that grew on their wetlands, and to provide lumber for their own purposes.

EVALUATION CRITERIA

It will be necessary to evaluate certain sites in terms of possible eligibility for listing on the National Register of Historic Places.

Evaluation of National Register eligibility involves three elements: integrity, extent or boundaries, and context, which for archæological sites is normally expressed as criterion D: properties that have yielded, or may be expected to yield information. The amount of information needed for reaching these conclusions may vary with conditions.

In a group of planning documents for the Route 13 Relief Route corridor studies, Custer and his associates have developed a framework for evaluating both prehistoric and historic sites (Custer, Jehle, Klatka, and Eveleigh 1984:113-129; Custer and Bachman 1986:192-194; Custer, Bachman, and Grettler 1986:178-180). Prehistoric sites can be ranked as follows, in descending order of significance:

1. All unplowed sites, regardless of period of occupation or site type, are of high potential significance.

2. Late Paleo-Indian and Archaic sites which have been plowed, but which are otherwise undisturbed, are of high potential significance.

3. Plowed base camps of all time periods are considered potentially highly significant.

4. Plowed sites which are not procurement sites and are associated with bay/basin features are potentially of medium significance.

5. Plowed, disturbed, and eroded sites of all types are potentially of low significance.

6. Plowed procurement sites are also potentially of low significance.

See Figure 5, page 24, for this list in flowchart format and page 95 for interpretation.

After these planning studies were completed, additional testing within the Relief Route corridor (Custer and Watson 1987; Ward and Bachman 1987) indicated the presence of buried components in a large number of sites, particularly those which had never been plowed. Such sites are capable of providing significant information for the study of prehistory because of the temporal separation provided by site burial. Thus, in this study, both plowed and unplowed prehistoric sites which include buried components will be evaluated as highly significant. The flowchart in figure 5, page 24, illustrates these ranks in graphic form.

Criteria for evaluating historic period sites developed in previous planning studies apply primarily to toft sites. The characteristics of significant sites are summarized as follows (derived from Custer and Bachman 1986:194):

1. Sites containing well preserved remains are highly significant.

2. Sites which display a range of well-defined activity areas are highly significant.

3. Sites which contain dense deposits of cultural material are highly significant.

4. Sites in which temporally distinct occupation loci can be identified, either as part of a long term occupation of the site or as a single short term occupation, are highly significant.

Because these criteria were defined for application to toft sites, they are not readily applicable to other rural historic property types defined for the project area, such as fields and industrial sites. In view of these lacunæ in the state plan documents, chapter 3 of this report addresses the subject of evaluating industrial sites.

VALUE OF PREDICTIVE MODELS

Because they are imposed artificially by researchers, survey strategies, by definition, will skew results. Today's site surveyors attempt to minimize subjective errors by using predictive models, random samples, and fixed interval tests. None of these strategies, however, can conclusively demonstrate the absence of sites; nor can they guarantee identification of all sites that exist in a given study area.

Short of 100% excavation, any strategy is nothing but an educated guess, tempered by statistics. However, experience over the past 20 years has shown that the use of an informed strategy is the most effective way to maximize site identification, that is to say, to identify the largest number of sites with the least amount of effort.

The oldest strategy is the predictive model, used intuitively for decades and most recently codified and quantified on the basis of non-exclusive random surveys. Predictive models attempt to identify and quantify factors that help determine site locations, based upon data derived from surveys.

Too often, however, underlying surveys have been either subjective or less than exhaustive, causing models to be skewed. A good predictive model, to be accepted as more or less reliable, must be based entirely upon data that was not generated in a subjective manner.

Such a model exists for the St. Jones drainage (Custer and Galasso 1983) and has been incorporated into the state management plan for prehistoric resources (Custer 1986).

At the same time, regional surveys in Kent and New Castle counties have made it possible to quantify some of the relationships between site location and ecological factors (Custer, Bachman, and Grettler 1986; Custer and Bachman 1986).

Since historically most major sites have been identified by means other than random or non-exclusive surveys, it is difficult to justify using models based upon the whole corpus of survey data in many localities. This difficulty should not exist in the study area.

Because much of the project area has been cultivated for two centuries, the historic survey was expected to produce rich results.

Predictive models (Custer and Galasso 1983; Custer and Eveleigh 1983; Custer, Bachman, and Grettler 1986; Custer and Bachman 1986; Gelburd 1988) were used to identify potential prehistoric site

locations. Similar models were used to identify possible sites for historic period cemeteries (Heite and Blume 1992:33-37). Documentary research provided evidence for predicting the locations of other historic period sites.

Instead of mechanically testing with small shovel or auger holes at many fixed intervals along the centerline, the authors chose to test at locations where historical research or settlement models predicted sites might be found.

This decision was based upon the extremely wide variety of environments within the project area, which included bay/basin features, known house sites, woodlots that have never been cultivated, two points of confluence of major and minor streams, bluffs, and knolls. With such a wealth of promising environments, it was virtually certain from the outset that sites existed; the problem was to locate them and determine their nature, which could better be done by sampling a larger area at each potential site location. The excavation register (abbreviated ER) includes both 3' by 3' test pits and areas where cultivated fields were walked, as well as some interval shovel test pits and mechanically stripped areas.

The DelTech campus included large areas of fallow fields, where weeds had supplanted cultivated ground. It was therefore necessary to rely more upon test digging in these areas.

INTERVAL TESTING AS A STRATEGY

Interval testing, favored by many, requires the archæologist to exert massive effort in places where both models and intuition indicate that sites are unlikely to exist.

Moreover, rigid interval testing changes radically the definition of a "site" for management purposes. Traditionally, a site has been defined as a place where artifacts are found and its limits are defined by identifying nearby places where artifacts are not found in tests sunk at fixed intervals.

Interval testing methods define a site as a place where artifacts are found in density sufficient to appear in mechanically-prescribed samples.

Interval or grid testing is a valid and useful method for defining limits of known sites, or mapping activity areas within sites, but the authors concluded that it should not be used to find sites, without serious consideration of other approaches.

WHAT IS A SITE?

Identification of sites with artifacts, or with certain numbers of artifacts in a given test sample size, forces elimination from consideration of the sites where artifacts are not found, or sites where the setting is itself the artifact, or sites where artifacts may be sparse or intangible.

It is more correct to define a site as a place containing evidence of human activity (Deetz 1967: 11). The subject of the archæologist's attention can therefore be identified as the study of human effect on his environment, or the environment's effect on humanity. Any evidence of human agency therefore becomes an artifact within a site, which is more properly defined as any place where people left evidence from which we can draw conclusions.

For purposes of the present study, this shift in definition becomes useful, because some of the evidences of human agency are atmospheric, environmental, or even intangible. Soil chemistry, pollution, reflectivity of the ground surface, or the water table elevation, are all clearly artifact categories that cannot be recovered, boxed, and numbered with India ink. They are nonetheless artifacts in the sense that they are evidence resulting from human agency.

PREHISTORIC SETTLEMENT MODELS

Professional and avocational archæologists in Delaware have long used an intuitive predictive model for prehistoric site location. This rather simplistic model stated that prehistoric sites were most likely to be found on high, well-drained areas near fresh water with readily available sources of food (Lewis 1970:2). With the advent of more

sophisticated technologies, such as LANDSAT imagery and computer aided statistical analysis, it has been possible to refine and quantify this model. The St. Jones watershed has been particularly well-studied.

A series of studies in the St. Jones and Murderkill drainages resulted in the identification of a set of probability zones that indicated whether a given area was highly likely or moderately likely to have been occupied during prehistoric times (Custer and Galasso 1983; Eveleigh, Custer, and Klemas 1983). These probability zones were derived from a logistical regression analysis of LANDSAT data.

Similar methods were applied to the 40 mile long, 7 mile wide Rt. 13 Relief Route corridor study (Custer, Jehle, Klatka, and Eveleigh 1984). For areas of the corridor immediately adjacent to our project area, high probability zones were found along the major tributaries of the St. Jones, such as Fork Branch and in association with bay/basin features (Custer, Jehle, Klatka, and Eveleigh 1984: Attachment V). Field tests of the probability zones developed for the corridor study indicated an extraordinarily high degree of accuracy.

Custer, Bachman, and Grettler (1986:172-8) then examined the frequency of site occurrence with respect to specific environmental variables. The results of this analysis can be summarized as follows:

1. The number of sites found in a given probability zone closely corresponded with the expected number of sites.

2. Seventy-five percent of the sites were found within 100 meters of water.

3. Thirty-eight percent of the sites were associated with stream confluences.

4. Stream terrace settings were favored as site locations over other geomorphological settings.

5. Well-drained soils, particularly Sassafras soils, were overwhelmingly favored over less well-drained soil types.

6. The aspect of a landform is of little significance.

These summary statements were developed for the Low Coastal Plain physiographic province and can be applied directly to the project area to identify probable site locations.

Information from the High Coastal Plain portion of the Rt. 13 Relief Corridor study can also be used, with some caution, to identify other possible site locations (Custer and Bachman 1986). In particular, this study identifies headlands and bay/basin features as the most frequent geomorphological settings for sites.

Using these statements about site location, we can identify specific areas of the project area which are most likely to have been settled during prehistoric times. These are the areas which were singled out for testing. They are identified by stippling on the sketch map, figure 2, on page 4.

The project crosses St. Jones River just below the confluence of its major tributaries, Fork Branch and Maidstone Branch. Such confluences are considered to possess a high likelihood of containing archæological sites. One previously identified site, 7K-C-107, Blueberry Hill, is located on a headland overlooking the confluence of Fork Branch with Maidstone Branch.

Bay/basin features, the landlocked watery depressions that dot central Kent County, were heavily utilized during prehistory. As many as 90% of such features have associated archæological remains, mostly from the Woodland I period, but including every period except the Paleo-Indian (Custer and Cunningham 1986:18; Custer, Bachman, and Grettler 1987:33). Testing of one such feature in New Castle County indicated that the archæological material was concentrated on a sandy knoll in the center of a cluster of bay/basins. Such locations exist west of Fork Branch.

In the southern New Castle County part of the Route 13 corridor, nearly all the Woodland II sites were found in the fringe of forest land around the edges of plowed fields along bluffs adjacent to major drainages. Sites of this period were found to be small and tightly organized against the edge of the

bluff, which may explain why they were consistently missed during surface surveys of the adjacent agricultural fields (Custer and Cunningham 1986:25). Such locations exist in the project area on the both banks of Fork Branch.

At the nearby Mudstone Branch site, Louise Heite (1984) discovered a small, isolated, Woodland deposit on a knoll near a swamp along the creek, where the model predicted a seasonal procurement site could be expected.

Elevation was evidently a serious concern among prehistoric people when they were choosing sites. Even the very slightest existing difference in elevation can have a dramatic effect on the artifact content of the ground, as was demonstrated nearby in a 1985 project (Heite and Heite 1985). Similar vertical changes in artifact content were to be noted at Simon's Savannah (Heite and Blume 1992:42).

Micro-topography, recording contour intervals in the range of 10 centimeters or one inch, might profitably be employed to interpret such sites.

HISTORIC SETTLEMENT MODELS

Environmental factors and transportation considerations have been paramount influences on the location of historic-period toft sites in rural Delaware. Assuming that a settler had a choice of building at any place on his land, he followed certain rules of preference, some of which have been inferred archæologically (Custer and Bachman 1986).

The earliest settlers chose water-oriented sites, within a convenient distance from navigable waterways (Smolek, Pogue and Clark 1984) at low elevations. Although water transportation was a significant component of the tidewater culture, it was never a major consideration for the inland settlers along freshwater streams.

Settlers who opened the back country, beyond tidewater, depended upon road transportation for local travel. As more inland settlers came to depend exclusively upon roads, emphasis shifted to inland routes for circulation of goods, information, and services.

Road-oriented towns developed during the eighteenth century at places convenient to both landings and roads. Commerce moved inland from the old landings to new sites on the ridges, where roads to the interior crossed the King's road from Philadelphia to Lewes.

By the middle of the eighteenth century, new house sites were not oriented toward river transportation. Houses built after this time generally face roads, even though the farm might also have access to a landing.

This shift did not herald the end of waterborne commerce, however. Waterborne transport continued to link the Delaware hinterland with Philadelphia, but the internal distribution system within each locality was land-based, dependent upon feeder roads running generally east and west along the ridges between streams. Denney's Road was such an artery. In fact, it can be shown that the heyday of steamboat transportation in Delaware occurred after the railroads arrived. Only the relatively recent advent of hard-surface north-south highways finally extinguished river commerce in much of lower Delaware.

A general movement from water orientation to road orientation of farm tofts may be observed to take place gradually during two centuries. Beginning in the eighteenth century, new and stylish houses for property owners were built to face the roads, while older water-oriented properties eventually fell to disuse. A convenient site, near the middle of the holding, close to a source of potable water, continued to be the main criterion for toft placement. Later, when the railroads came, there was a short period when farmers built their houses to face the new transportation system.

SOILS AND TOFT SITING

Recent work in Virginia (Lukezik 1990) demonstrates that soil types were the principal factor in Colonial toft siting. Because farming success depends on soil characteristics, the plan of the farm may be

expected to reflect the farmer's perception of his soils.

One rule of toft placement was an unspoken prohibition against building in the middle of a good field, which was observed in the project area until the middle of the nineteenth century (FIGURE 3, PAGE 8).

This pattern was observed in the nearby Fork Branch area study, where houses were built on the edges of well-drained and fertile Sassafras soils (Heite and Heite 1985:25), but seldom, if ever, in the middle of a good agricultural field. Sassafras soil was too valuable to waste. Thrifty farmers built their houses on the edges of the best ground, which also frequently were the sites of natural springs for household water.

When mechanical pumps became available during the nineteenth century, toft siting was released from dependence upon naturally-occurring water sources. Strictures against building in the centers of well-drained fields began to relax.The movement of new toft sitings away from available surface water has been documented by Custer and Bachman (1986:168). This shift had occurred elsewhere before; during the eighteenth century, when the British upper classes were freed from dependence upon natural water sources, they began to build houses on more imposing sites, to which they could pump their water (Trevelyan 1942: 403).

While today's soil scientists grade soils in terms of suitability for cropland, woodland, and other uses, eighteenth-century settlers valued only the land that could be used for agriculture. Dutch settlers had placed a high value on meadowlands and drainable marshlands; the first English in Kent County were interested only in arable cropland, known today as Class I soils.

Some proprietary land warrants for inland tracts describe poorly-drained upland property as waste, suitable only for timber. Timber suitability, in the modern soil survey, is applied to land that colonists did not cultivate. Old surveys in the project area, which often show the cultivation patterns, indicate that only the well-drained and relatively level Sassafras soils were cultivated.

Sassafras soil also was attractive for town sites, because it is well-drained and occurs on ridges between drainages (Heite and Heite 1986). Virtually every eighteenth-century Kent County town was built on Sassafras soil. Builders and developers have extended this preference to modern suburban subdivision, which in Eastern Kent County is almost exactly congruent with the Sassafras soils.

During the nineteenth century, new farmsteads were most frequently established along roads, as fewer farmers depended primarily upon water transport.

IDEOLOGY AND TOFT SITING

Another reason for the shift to building houses in the centers of fields may have been ideological.

Nineteenth-century "mansion" houses — homes of landowners — tended to be built on physically imposing knolls or rises, looking down on the roads. New tenant tofts were established close to the roadways, frequently on soils that were not considered the best agricultural ground, but which today are considered suitable for woodlands. It is possible to interpret this class difference in site location as a symptom of romantic or neo-feudal concepts or of social stratification. It certainly can be shown that the popular literature of the middle nineteenth century is full of pictures and articles indicating that an exemplary farm is elegantly situated, with the owner's wealth displayed to the road for all to see.

An array of picturesque tenant houses along the road would not only provide housing for farm laborers, but would advertise the extent of the master's livery.

Locational factors relating to rural tofts have been explored in southern New Castle County by Custer and Bachman (1986:152-192) in a study that considered distance from resources, soil types, and water sources.

The Delaware Rail Road in 1856 brought significant changes in the landscape. Because the railroad followed a straight line dictated by larger engineering considerations,

railside development was dictated by factors other than soil types for the first time in history. Railside towns were built on poorly drained soils; properties were split by the right-of-way, and new industrial land uses were introduced.

The economic and political influence of the railroad was significant to Delaware history. Few institutions have wielded as much power as the railroad company, and few innovations have brought so much prosperity. The iron horse opened western Delaware farms to urban markets and generally stimulated the agriculture of its service area. Land values along the railroad increased, and it briefly became fashionable to build great houses facing the tracks.

Land and Other Measures of Wealth

Many of the original grantee families treated their extensive holdings as long-term investments, selling off pieces as the need arose, and swapping farms to create broad manorial holdings. Eighteenth-century Dover merchants, such as John Housman, Thomas Parke, and Nicholas Loockerman, became lords of vast acreages.

Much of the granted land would remain undeveloped or under-developed, sometimes for generations, because its function [in the eyes of its owners] was financial and not agricultural.

The merchant class converted land into ready money through a device called the "loan office," which held mortgages and issued commercial paper backed by the mortgages. Such land banking schemes, forerunners of the modern Fanny Mae instruments, were used in several colonies to overcome the lack of specie (hard money) as a circulating medium in an economy where most wealth was represented by land or by credit in distant European markets.

Merchants in London, Bristol, and other "home" cities were bankers to the American landowners and small merchants. They supplied European goods and sold American products on European markets. The Atlantic basin was a single market controlled by Dutch and English merchant houses, who decided what material goods would reach America, at what price, and through which ports. Through this sophisticated network, Dutch and English traders would sell Icelandic woollens to Indians in America, and Delaware wheat to the Caribbean sugar planters, exchanging very little specie in the process.

Tracts in Kent County were heavily mortgaged during the third decade of the eighteenth century, when the Delaware loan office was most active. A London merchant held the mortgage on the present DelTech campus during the period when it was being used to back commercial paper, before it became the Stout family farm.

The alignment crosses land that was a tenant farm owned by absentee landlords for two centuries, until 1888 when the first resident owner bought it. Such widespread absentee ownership would have a depressing effect on Kent County during the early years of the twentieth century.

Tenancy can be expressed in the archæological record several ways. The most obvious expression, which has been explored by several authors, is an examination of the tenant toft (Grettler, Bachman, Custer and Jamison 1991). But the soil itself might reveal differences in status of the cultivator. While one might intuitively assume that an owner-farmer will treat his soil more carefully than a tenant, this assumption is not necessarily proven.

Soil improvement may, instead, be a measure of education and contact with the larger intellectual community, which can be lumped under the rubric of gentrification.

Evidences of Gentrification

Those colonial Americans who prospered were the ones most closely associated with the larger trading network. Prosperity, and enjoyment of the most stylish European goods, dropped markedly as one moved away from American points of contact with the European trading sphere. Rebecca Yamin (1989) has demonstrated that stylish European goods became progressively more scarce on store shelves with increased distance from port cities.

Differences in style and price of material culture items may therefore be interpreted as measures of cultural and economic distance from the points of trading contact with Europe. It was entirely possible for a person with roots on the frontier to be land-rich and even wealthy, but culturally cut off from the stylish mainstream culture in the larger Atlantic basin.

In Delaware, some eighteenth-century mercantile sites have been studied and analysed in terms of availability of goods. Others are currently being studied. Stores will be able to tell us what was available for sale locally to the everyday individuals, but are not a clear indicator of the material culture available to wealthier individuals who were connected to upper-class urban society and routinely bypassed the local merchant establishments.

Well-off and well-connected individuals should have been willing and able to buy high-style material culture artifacts, or to order them directly from Europe. Some Kent County families maintained close communication with centers of style. Among them were the Loockermans, the Ridgeleys, the Dickinsons, and the Chews, who sought marriage alliances in cities, sent their sons away for schooling, and participated in the larger high culture. Sons of these families almost always were described in legal documents as "merchant" or "gentlemen" as soon as they established households, regardless of their personal financial accomplishments.

Other families of considerable wealth were headed by people sometimes identified as "gentleman" in legal papers, but did not enjoy cultural intercourse with centers of high material and non-material culture. Heads of such families ordinarily began as "yeoman" farmers and became "gentleman" at a later age, after having attained relative wealth and leisure by their own exertions.

Archæology may be able to distinguish between the hereditary gentry of culture as opposed to the rising gentry defined only by wealth and acquired status, and may be able to define the passage of a family from new wealth into hereditary gentility.

Tea ceremonialism, for example, leaves a distinct mark on the archæological record, and is often construed as a proxy measure for gentrification. There should be other indicators of this phenomenon that will be exemplified in the ground.

George Miller (1980) has attempted to assign an *economic* scale to preferences in ceramics during the nineteenth century, but non-economic social scales and tangible measures of gentility remain elusive.

In Mother England, the path to landed gentry status had led through mercantile towns, where ready money could be earned and converted into land, on which a new gentleman could establish himself and his posterity. In America, land was cheap, but ready money was dear; acquisition of great estates was not nearly as important or as difficult as was a connection to cultivated urban society. Status went hand-in-hand with access to the material and non-material culture and money economy of the towns.

Archæological markers for high cultural refinement, as distinguished from mere wealth and status, deserve consideration in a project area where several different social classes and modes of tenure are represented.

Stylish households probably will exhibit fast turnover of the best quality ceramics, always at or near the cutting edge of style. The earliest forms of each type will appear on stylish sites, but degenerate later forms should not be expected. On the other hand, people who depended upon the hinterlands trade network might be expected to use later, less refined versions of stylish ceramic wares, and to hold onto a style for much longer. Thus the term "Queensware" could remain in commerce a century after the original Queen's pattern was introduced and discarded by polite society.

During the last decade of the nineteenth century, Sears, Roebuck and Company recognized this division between city and country access to stylish goods, and became the world's largest retail organization by offering city goods to rural markets where

money was available, but stylish goods had never before penetrated.

Thus the true cultural impact of transport and communication improvements may be measured archæologically through the stylishness of goods and the turnover rate of new fashions found in the countryside.

DECLINE IN STATUS AND UNDER CLASSES

The inverse of gentrification has been documented among landowners near the project area (Heite and Heite 1985). A yeoman family of substantial means and skills, but of mixed racial heritage, declined to poverty during three generations, with a change in race perception and concurrent decline in status.

It was not possible during the former project to archæologically explore the changed status of these downwardly-mobile individuals, but the phenomenon was clearly identified in the documentary research as a subject for future investigation.

In the project area were some people identified as poor tenants or farm laborers during the early nineteenth century. One, identified before 1840 as a free Negro, had urecorded but recognized tangible rights in part of the project area; the location of his house site is well documented.

ARCHÆOLOGY OF AGRICULTURE

When a farmer changes the soil, his fields become artifacts in the sense that they are evidence of the farmer's effect on his surroundings.

If the archæologist finds a plough, it is readily identifiable as a tool of farming, from which evidences of farming practice, manufacturing techniques, and distribution networks are readily inferred.

By the same standards, a sample of soil can illuminate the farmer's craft in ways that are just as tangible and revealing as the iron tools that are so readily catalogued by traditional archæological means. Soil contains chemicals, bits of limestone, shells, ashes, manure, compost, and of course, the occasional lost piece of equipment.

These bits, individually insignificant, constitute aggregate artifactual evidence not readily addressed by traditional artifact cataloguing schemes. The total of introduced materials, together with the properties of the soil, such as tilth and drainage, combine to measure the farmer's success in creating the topsoil that in turn supported his crops.

Although agriculture receives a nod in the state plan for historic preservation, the technology of the farmer's craft has not been addressed by the plan as a context for attention in cultural resource management. At minimum, agricultural fields and other "vacant" or "open" spaces should be evaluated according to the criteria applied to other historical archæological sites.

As these features are reported more fully, it may become possible to evaluate the significance of agricultural fields as a property type.

Since most cultural resource management projects involve agricultural ground, there is a perceived need and opportunity to create frameworks for studying man's effect on this important environment.

AGRICULTURAL CHANGE

Scientific agriculture, as it is practiced today, was unknown during the first years of settlement. Only after large areas had been rendered infertile did American farmers begin to address the problems of conservation and fertilization.

The first documentation for improvement of farming practices in the project area comes from an Orphans Court document dated 1796, in which the commissioners directed that the crops on Susannah Loockerman's land be rotated. Since the commissioners felt constrained to mention the subject, one may assume that the Loockerman tenants had not been rotating their crops. During the generations that followed, educated landowners conducted experiments and read the many agricultural treatises and journals that were published. Evidence for such practices, recovered archæologically, may help define the educational level and ambition of the farmer, as well as the quality of his land tenure.

Scientific farmers introduced the concept of fertilization, which received a

boost in Delaware when a marl deposit was found during the digging of the C&D Canal. Manure, shell lime, and other products were added to the soil during the early years of the nineteenth century, and by the time of the Civil War, the peninsula was dotted with fertilizer companies. Sources of nitrogen, including guano, fish, dried blood and horseshoe crabs, were spread across the landscape in attempts to recover lost fertility.

Calcined oyster shells, bits of marl, and household artifacts contained in manure may be readily recovered and quantified even during Phase I surveys.

Brick flecks in the field could indicate that fireplace ashes were used, since unlined chimneys commonly spall from the inside, creating a durable component in the ash that was included in manure.

Delaware soil productivity reached a nadir in the 1830s, when it was estimated that Delaware's farmland was within five years of total abandonment. Instead of collapse, the region rebounded during the next few years, thanks to aggressive young scientific farmers (Passmore 1978).

One tangible result of the scientific agriculture movement was Kent County's system of tax ditch companies, cooperative efforts to reduce groundwater levels and reclaim land. By 1976, there were 44 ditch companies operating in Kent County. The project area includes the mouth of White Marsh Ditch, a hand-dug ditch that apparently has not been improved during the twentieth century.

Early scientific farming practices can be seen in the soil in the form of ditches, drain tiles, calcined oyster shells, and tiny dispersed bits of brick and domestic debris that would have been included with manure.

The principal landowners in the project area, the DuHamel and Denney families were active in county and state agricultural societies during the middle years of the nineteenth century (Scharf 1888:437). Their land should be expected therefore to reflect some of the trends in scientific agriculture.

Figure 4

Sample of the Excavation Register

derived from the original survey data

Excavation Register Number	*Site Name, CRS Number and Site Number*	*Description of the unit and soil type symbol*	*List of Artifacts Recovered*
56	Athletic Field K 6453 7K-C-388	Machine-cut east-west test trench across the athletic field north of the basketball courts, 155 feet from the beginning stake to the end at the zero point on ER 57. A paved walkway separates ER 56 from ER 57 SaA	No artifacts
63	Beiser Site 7K - C -391 K-6485	Level 1 (plowzone, 0 to 20 cm below surface) of unit located southeast of centerline stake #8 + 50, on east slope of ridge.	1 jasper flake, <2 cm 1 clear glass fragment
63a	Beiser Site 7K - C -391 K-6485	Level 2 (20 to 40 cm below surface) of unit located southeast of centerline stake #8 + 50, on east slope of ridge. Bottom of level corresponds to top of C horizon.	No artifacts

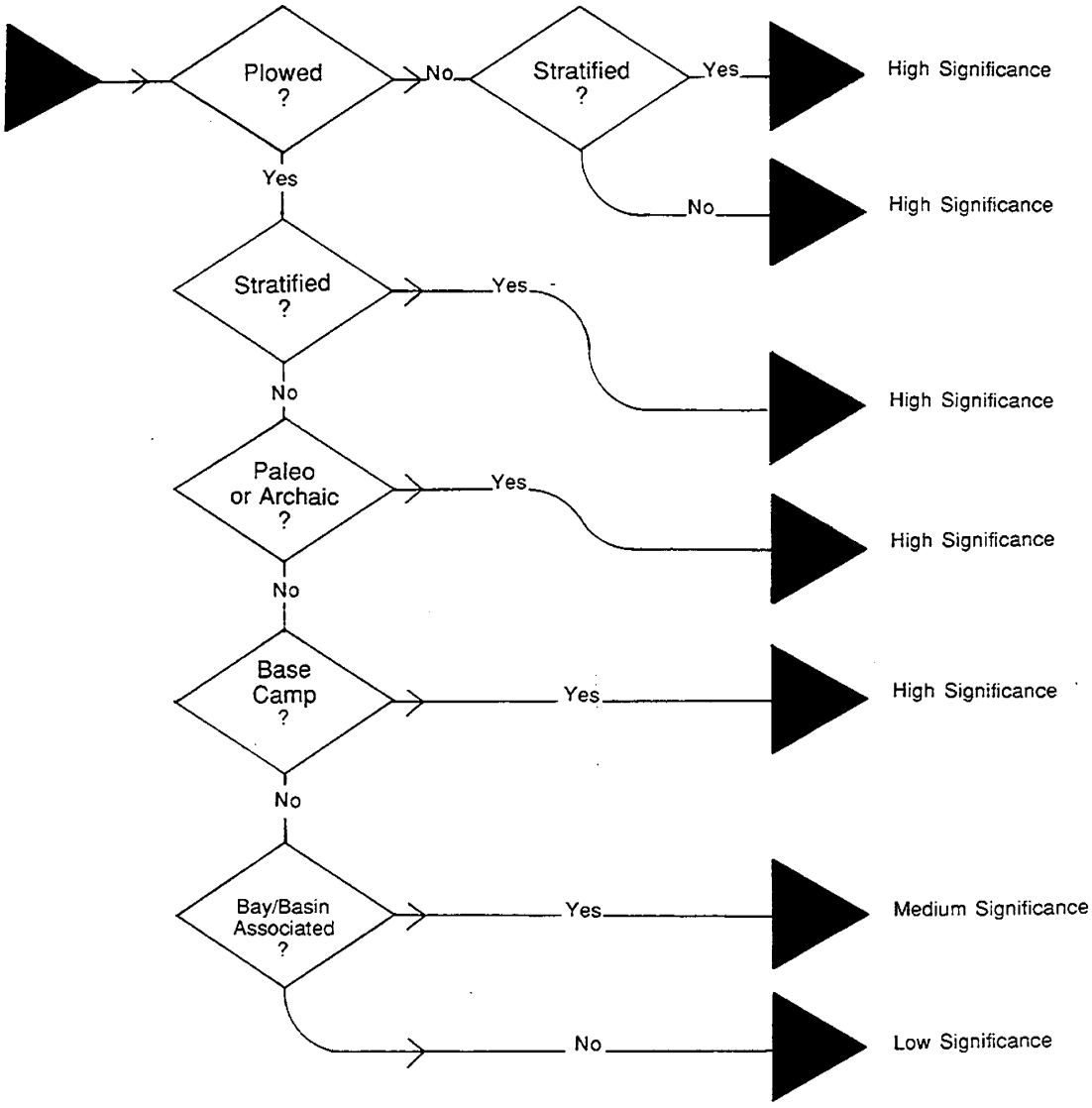

Figure 5
Flowchart Ranking Delaware Archæological Priorities

This flowchart illustrates the ranking of archæological significance of prehistoric sites, as evaluated in the state management plan, discussed on page 14
Sources: Custer and Bachman 1986; Custer, Jehle, Klatka and Eveleigh 1984; Custer, Bachman, and Grettler 1986

APPROACH AND METHODS

Survey consisted of intensive primary documentary research followed by field reconnaissance, culminating in field testing. Primary documentary research begins with a detailed chain of title compiled from official records. Other official records, including highway construction data, are consulted to determine what forces have shaped the local geography.

To these official records are added oral history interviews of local residents and research into secondary writings about the

local landowners. Map information for downstate rural sites is sketchy at best; the 1868 Beers *Atlas* stands almost alone among general sources, but there are many surveys on the public record to give locations of improvements.

Details of the methods employed for searching Delaware primary historical sources are explained in an article by one of the authors (Heite 1984).

Collections were catalogued according to the Excavation Register (ER) system, in which each unit bears a whole number and each layer is lettered (Noël Hume 1969:89). A "unit," for purposes of the excavation register, may be a square or a surface collection, or any other group of artifacts with a definable provenience. These excavation register numbers, with a prefix (90.23.) assigned by the Curator of Archæology, become the Island Field accession number, allowing direct reference to artifacts from the site without reference to any intermediate catalogue. Samples of register entries from the original survey are illustrated in Figure 4, page 23.

Laboratory treatment of artifacts was limited to cleaning and numbering, since there were no fragile, waterlogged, or otherwise special-care artifacts. Therefore, the services of a conservator were not anticipated. All artifacts were marked and bagged according to Delaware curatorial standards and turned over, with field records, to Island Field Museum.

Analytical procedures included examination of soil chemistry and soil profiles. Soil chemicals were used to interpret past agricultural activities as well as domestic activities. Soil profiles were interpreted in a prehistoric locus to reconstruct paleoenvironmental data.