II. RESEARCH PERSPECTIVE

"The modern city is the most complex artifact, in both its physical and socio-cultural aspects, that humanity has ever created" (Salwen 1978:459). The study of this "artifact" is also a very complex and difficult undertaking. There are so many different aspects of a city that can be examined, such as its economic, political, religious, and social structure. In developing a research design for an urban archaeological project, such as the Wilmington Boulevard Mitigation Program, not all aspects of urban environments are compatible with archaeological research. Variables such as a city's political and religious structure cannot be discerned through the study of the archaeological record in a predefined, restricted urban area, such as the Wilmington Boulevard project area. A study of such variables requires a systematic sample of urban space. However, there are some aspects of urban behavior that are quite suitable to a narrowly defined archaeological study, particularly when these aspects are represented in all areas of a city. Also, this spacial restriction permits an opportunity to focus attention on methods for extrapolating maximum information on an area within the larger urban environment, allowing for comparisons to other areas of the city. Such work takes on a building-block approach to understanding urban processes.

Those aspects of urban behavior that are suitable to an archaeological study have, in fact, been studied in prehistoric, old world urban centers and in modern American cities. These aspects are the spatial distribution of socio-economic group residences and land use (Willey 1974, Morris and Thompson 1974, Arnold and Ford 1980) and consumer behavior (Rathje and McCarthy 1977).

Land use refers to the type of human activity that takes place, in the case of an urban setting, within a lot, street face, block, or neighborhood. These activities may be residential, commercial, industrial, or public in nature, or a combination of these and other activities. A socio-economic group is understood, here, as an aggregate of individuals who share a common ethnic affiliation, economic status, and/or social status. Consumer behavior is more or less self-explanatory. It refers to how individuals or households purchase, use, and dispose of material goods, such as ceramic vessels, bottled products, food, and other items which may be purchased in the city or obtained in the local natural environment.

The reasons for selecting these three variables is as follows. In the literature on urban studies, these variables are typically used as material correlates of major urban processes, which have usually been subsumed into the larger construct of industrialization. Thus, study of these material correlates leads to an understanding of more abstract urban processes, such as industrialization. Secondly, these variables are readily accessible in terms of identification and measurement both in the historical and archaeological records, as will be demonstrated below. Thirdly, these aspects of urban behavior can be quantifiably compared to other urban settings in the United States.

In order to develop a statement on the historical development of Wilmington, Delaware (c.f. Delaware Department of Transportation Scope of Work,

Wilmington Boulevard-Monroe to King Street Archaeological Mitigation Program 1980), we have elected to study the spatial distribution of land use and socioeconomic groups over time (i.e. settlement patterning in archaeological parlance) and changes in urban consumer behavior. To date, no archaeological study has addressed how these aspects of urban human behavior have changed in American cities, with the exception of some very special projects in Alexandria, Virginia (Cressey et al 1982), and Tucson, Arizona (Rathje and McCarthy 1977). Study of these types of behavior have been more the research foci of urban social historians and urban geographers (Thernstrom 1964, Goheen 1970, Ward 1971, and Hershberg 1976). These disciplines have developed an impressive data and theoretical base on the identification, measurement, and explanation of changes in these variables. To study these variables in the context of Wilmington, we have taken models, propositions, and hypotheses on changes in urban settlement patterning and consumer behavior from these disciplines, and will examine them in the context of data from the project area. The Alexandria Archaeological program took a similar approach in developing their research orientation (Cressey and Stephens 1982). For example, they used a core/periphery model derived from geographers, economists, and historians to study changes in urban behavior in Alexandria (Cressey et al 1982). By using these other disciplines for a research base, the discipline of archaeology can make a unique contribution to urban studies by using material culture, a heretofore under-utilized data source, for the study of urban behavior and processes.

First, we will examine the models and hypotheses developed by social historians and urban geographers, which address changes in these variables. From this examination will develop the specific research focus to be addressed by this project, i.e. research domain. The research domain will take the three aspects of urban human behavior we have selected to study and place them in the context of an urban process that appears to have had the greatest influence on their nature. As will be shown below, this is the process of industrialization. This research domain will guide the development of specific, testable research questions on changes in the three variables. That is, using this urban process as an independent variable, how do we expect this process to affect changes in the three dependent variables of land use, socio-economic group residences, and consumer behavior? These questions will be the hypotheses tested with both archaeological and historical data from the project area.

Social historians and urban geographers have, for many years, studied the nature of urban settlement patterning. As early as the 1920s, scholars in Chicago were developing models on the nature of settlement in terms of the locations of different land use in a city (Park, Burgess, and McKenzie 1925). From these works came the concentric ring model of urban land use; and later models, such as the sectorial and nodal models of urban space. For example, Burgess posited that a city had a central business district containing financial, retailing, wholesaling, and some types of manufacturing establishments. The area around this commercial core was an area of deteriorating property, where the businessmen who owned these properties waited for the commercial core area to expand into this second area, thus increasing their profits. He saw that as the wealthy and then middle class groups left the center area, there was an influx of immigrants and lower level socio-economic groups into the deteriorating areas around the core area (Greenberg 1981a). This land

use patterning resulted in a series of concentric rings of different socio-economic groups, businesses, and industries, radiating out from the city's core.

There are many arguments against this model of urban space. Others see that different forms of private enterprise, be they industrial or small retailers, require different types of locations in the city and result in different types of residential patterns for the groups working for and/or benefiting from these enterprises (Greenberg 1981b). Thus, if a city's different economic establishments do not require to be centralized, that is adjacent to both other commercial establishments and a work force, then the Burgess model is not applicable. It is applicable, however, in cities with centralized industries and commercial establishments. Thus, the nature of urban land use seems to be linked to the specific characteristics of a city's economic base. As this base changes, so will the land use patterning of the private enterprises and the labor forces that support these enterprises. Such a change would occur when a city changes from a mercantile economic base to an industrial one. In a mercantile city, private enterprises would be centralized, located around product import and export terminals and the financial and commercial establishments supporting this importing and exporting of goods. In an early industrial city, private enterprises would shift to a focus around power sources, such as water. This, in turn, would affect the location of support businesses and labor forces for these industries.

During the period of growing industrialization, the city's core would be changing from its pre-industrial, mercantile character. There is an increase in the commercial and industrial establishments in the center, or central business district, leading to the deterioration of the area for residential purposes. High level socio-economic groups leave the center area and move to the city's edge due to the rising land values and higher rents in the core area. As a result, retail services expand into this core area (Ward 1971, Hershberg 1976). This central business district then becomes as large in area as the original early city (Ward 1971).

In addition to studies of urban land use, there have been many works on the spatial distribution of urban socio-economic groups. These studies have often linked group residency to the nature of urban, private enterprise. For example, scholars working on the Phildelphia Social History Project have used the city as their research universe, studying its economic and demographic structure over time, especially for the latter part of the nineteenth century (Hershberg 1976). Specific studies within this project examined the socio-economic group structure of the city and how industry location, economic factors, and transportation networks have affected the spacial distribution of different groups. For example, Greenberg (1981b) found that in the nineteenth century, urban populations were distributed according to the availability of housing and jobs. She also found that ethnic groups lived around their place of work, forming an ethnic enclave within a larger working class neighborhood made up of different groups, but all still clustered around the place of work (Greenberg 1981b). Thus, the locations of industries had an important effect on the location of urban working class neighborhoods.

This type of settlement pattern seems to be linked to decisions made in the local, regional, and national economies of the late nineteenth century

(Greenberg 1981b), an economy that is clearly an industrial one. On a more direct link between the industrial process and settlement patterning, Hershberg et al (1981a) see that the industrial process alters the city's occupational and social structure. In turn, these changes in social structure reveal themselves in the spacial distribution of the city's socio-economic groups. He finds that during the end of the nineteenth century, people of similar socio-economic backgrounds, particularly the wealthy, move into new areas of the city in order to live near people like themselves. Social differentiation is now physically expressed in the city landscape (Hershberg et al 1981a).

Other social historians and urban geographers have found similar changes in other American cities. Ward (1971) found in his study of several cities, that in the pre-industrial period, the rich lived in the city's central area, for the purpose of convenience to their work, administration facilities, and financial institutions. Also, some of the wealthy did have residences near the edge of town. Residing around the rich were the artisans and tradesmen, with the poor occupying the city's edge (Ward 1971). As the city's core area became more industrial and commercial in character, the rich moved out. After the introduction of good urban transportation systems, during the height of the industrial period, the exodus from the center accelerated, and the middle level economic groups followed the rich away from the core area. The vacated residences around the commercial core were then subdivided , and the poor, especially immigrants, moved into the area (Ward 1971).

Warner (1978) also records this type of change in the distribution of socio-economic group residences in Boston. In the industrial period, the inner city is the residence of the working classes, with the middle and upper level groups on the city's edge (Warner 1978). He sees this spacial separation as being related to income level and not ethnicity (Ward 1978).

Industrialization not only involves changes in the spacial distribution of groups, but, as Hershberg points out (1976), the social structure of the city also changes. Hechter (1976) sees that a cultural division of labor (i.e. ethnic) is inherent in the modern world capitalist system, which is intensified in the period of industrialization. Certain types of industrial enterprises need to recruit labor at minimal cost, so distinctive cultural groups, i.e. blacks and immigrants, cluster in specific types of occupations and become residentially segregated (Hechter 1976).

Further, with new technological development taking place during this period, there is a widening in the cultural division of labor, which in turn leads to stratification of labor by skill (Hechter 1976). Hershberg et al (1981b) see this pattern of emerging new skills in the increase in bureaucratic and managerial positions, and these new occupations are mirrored in residential patterns. They also found that ethnicity was not a factor in residence location except for blacks (Hershberg et al 1981b).

With this differentiation in labor by skill (Hechter 1976, Hershberg et al 1981b), there is a differential access to the economic opportunities developed by the industrial process (Hershberg and Dockhorn 1976). Hechter (1976) believes that there is an actual material gap between groups. Thus, it appears that not only are the residential locations of groups becoming more

segregated in the industrial period, but the material goods, i.e. consumer behavior, of these groups becomes more differentiated. For example, as socio-economic group affiliation increases, the consumer behavior of these groups would become more internally similar simply as a result of increased interaction. We are well aware that the differences in consumer behavior in twentieth century social groups is recognized by advertisers and businessmen (Martineau 1958). There should also be an expected differentiation of consumer behavior between groups as a result of purchasing power based on income. Changes in purchasing power probably take place with the advent of the industrial period due to the resulting changes in urban occupation structure (c.f. Hershberg 1976).

These studies have shown that the nature of urban settlement patterning, for both land use and socio-economic groups, and the nature of consumer behavior, change during the period of industrial growth, and in many cases seems to be linked to the industrial process.

This, then, is the research domain for this project. Simply stated, we will study the effects of industrialization on consumer behavior and the spacial distribution of land use activities and socio-economic group residences in Wilmington. Prior to discussing our expectations of the types of changes that should occur in these variables, we will discuss in more detail the nature of these variables and how they are to be identified with historical and archaeological data from the project area.

Industrialization

In the above discussions, we did not define the term industrialization. There is no agreement on the nature of this process (Ward 1971), since various researchers use a range of variables to identify this process. These variables include the change from human to natural power sources, such as water and steam, the point when industrial manufacturing dominates economic life (Heilbroner 1962), and the introduction of complex organization strategies for the purpose of large scale, high output production (Hershberg 1976), as in an assembly line. Each of these variables, or in combination, leads to a different historical conclusion about this critical process. We have selected to define industrialization as the increased use of water and steam power in industry and an increased industrial focus on the railroad. This is what Heilbroner (1962) refers to as the second "Industrial Revolution", in which there is a clustering of inventions focusing on railroad transportation and steel manufacturing.

When does industrialization occur in Wilmington? Mechanization of several types of industries, such as textile and flour, occurred very early in the nineteenth century in Wilmington. The railroad appears in the city by the late 1830s. Historic documents show that after the introduction of the railroad, there is a subsequent increase in many types of industrial enterprises, especially those related to railroad car and engine manufacturing. The increase in these types of mechanized industries is quite evident in the city's 1845 directories. Also, this period in American history was one of rapid industrial growth, following the panic of 1837 (Bailyn et al. 1977). Cochran sees the period between 1840 and 1850 as the time of northeastern

industrial maturity (from Bateman 1982). Further, in his review of Cochran's work, Bateman states:

> By 1840, compared against world economic standards of that day, the nation was industrialized, largely due to selfsufficient change that involved not only manufacturing but agriculture, transport, and finance. From then until the years immediately preceding the Civil War, the economy in the northeast region moved into a position of industrial maturity centered upon the manufacturing complex extending southward from New York to Wilmington . . . (Bateman 1982:179).

Based on these findings, we have designated the period of 1840/1850 as the transition of Wilmington from a pre-industrial city to an industrial one.

Land Use

As defined earlier, land use refers to the type of activity that took place within a city lot, street, block, or neighborhood. The specific types of land use that we will examine include residential, commercial, and industrial. Current historical archaeological work has demonstrated that land use, or function, can be discerned by examining the patterning of artifactual materials within a historical property. By patterning, we mean the spacial distribution of artifact classes, such as ceramics, nails, glass; and the frequency of these artifacts within an assemblage from a deposit or entire property. Identification of an industrial land use is often very straightforward, for example, due to the high frequency of waste materials, such as slag, glass, and/or coal. There is also usually evidence of mechanical items, structures with remains of heat producing facilities, and large scale, non-domestic architecture. To distinguish between small scale manufacturing, retail establishments and domestic land use is often not as easy as with industrial land use. South (1977) has shown that differences occur in the spacial distribution and frequency of artifacts from eighteenth century commercial properties and residential ones. Garrow (1982) has provided evidence that differences in artifact patterning also occur in nineteenth century properties. These pattern differences usually occur in the frequency of materials in the kitchen versus architectural artifact categories. However, the specific type of commercial land use on a given property is often not apparent, but it is usually quite evident whether a property is or is not a residential one.

The identification of land use activity is not as difficult when using historical data. There are extensive business directories in Wilmington which indicate the location of both residences and businesses in the city. There are numerous city maps for the nineteenth century, indicating the location of land uses, often with names and descriptions of the businesses. Used jointly, historical and archaeological data sources provide excellent information on the land use activities of properties in the project area.

In the study of land use, we will examine how different types of land use activities are distributed in the project area. Figure 3 indicates the various patterns of land use that can be expected.

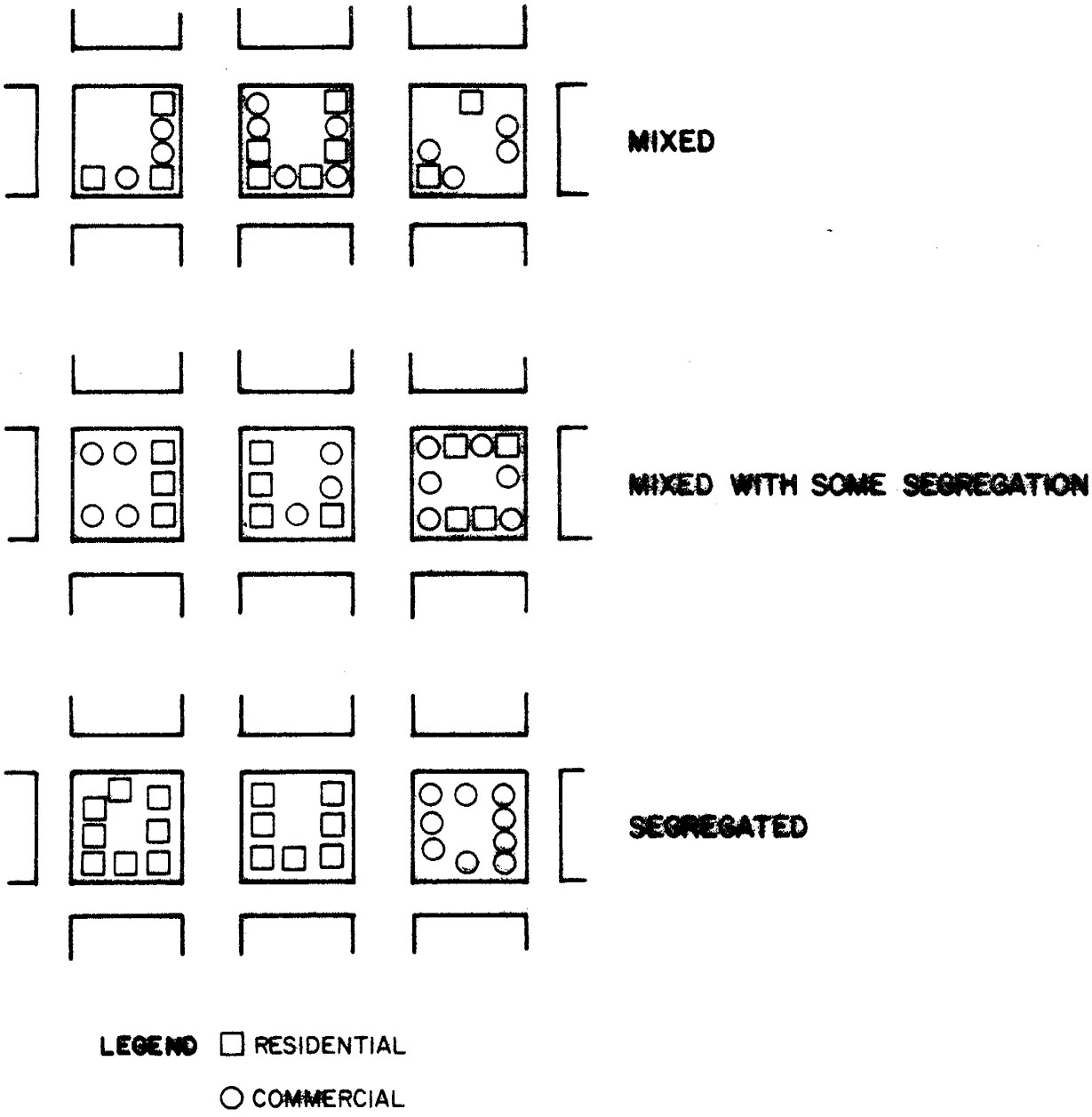

FIGURE 3
POSSIBLE PATTERNS
OF LAND USE

Socio-economic Group

Socio-economic group is understood here as an aggregate of individuals who share a common ethnic affiliation, economic status, and/or social status. For the purpose of this study, socio-economic group identification will be done independently with both historical and archaeological data. To define these groups with historical data is somewhat problematic. The factors we have selected to define these groups are somewhat simplistic. There are many other measurements that can be used to place individuals along a socio-economic continuum, such as real and personal wealth, birth, education, and others. To collect data on these variables for a mitigation program such as the Wilmington Boulevard project, would be prohibitive given time and cost constraints. However, the categories we have selected: ethnicity, economic level and social status, are definable within our project parameters, and are to some extent empirically based. Also, some social historians have demonstrated the utility of these factors in developing a social ranking (Therstrom 1964, Hershberg and Dockhorn 1976).

For this project, ethnic affiliation refers to black or white, with black individuals further divided as free or slave.

Social status is correlated here with an individual's occupation. The linkage of social status and occupation follows work by Thernstrom (1964) and Hershberg and Dockhorn (1976). Thus, different occupations indicate different social standing in urban society. The correlation of social status and occupation appears to be supported for the middle through late nineteenth century, but no work has addressed this correlation for the early part of the century. Therefore, for our purposes, we will accept the correlation between social status and occupation for the nineteenth century, with the understanding of the problems inherent in this approach for occupations in the early periods of the century.

Economic status is also difficult to identify. Occupation has often been correlated with wealth, and thus economic status, but this correlation is problematic (c.f. Hershberg and Dockhorn 1976). For example, Jones (1980) has found that level of wealth does not directly correlate with type of occupation in the late colonial period. Since individual wealth data were not collected on this project, we will not use occupation as a correlate to economic level, given the many problems of such an approach. Instead, we will use archaeological data. This approach will be discussed below. Also, we have selected nature of land tenure, i.e. owner or renter, as an indicator of wealth on a gross scale. We assume that a wealthy individual will live on a property he owns, while an individual of lesser wealth probably would not.

Table 2 demonstrates how individuals, based on historical evidence, will be categorized using the above scheme. Individuals will be placed in either a high, middle, or low socio-economic level.

Even though there have been several studies on the nature of artifactual assemblages associated with different socio-economic groups (Otto 1977; Rathje and McCarthy 1977; and Schuyler 1980), none of these studies have determined how to identify, archaeologically, the type of socio-economic group that occupied a site or property. Miller (1980), however, has devised a method

Table 2. Criteria for Socio-economic Group Level Identification

Occupational Category	Socio-economic Level
1. Upper level non-manual workers	High
2. Lower level non-manual workers	Middle
3. Skilled manual workers	Middle
4. Semi-skilled manual workers	Low
5. Lower level manual workers	Low
Ethnic Affiliation	
1. White	High to Low
2. Black Free	Low
3. Black Slave	Low
Tenancy	
1. Owner/occupant	High to Middle
2. Renter/occupant	Low

whereby the economic position of an individual or household can be inferred. He has developed a mechanism for measuring the relative cost of a ceramic assemblage, producing an economic scaling. Using the results of the Miller analysis, we can infer the economic position of a household by equating the cost of a given assemblage to wealth and, in turn, economic level. That is, presumably the higher the cost index of the ceramic materials, the higher the economic level of the individual or household that used these materials. The results of the Miller analysis can then be compared to the socio-economic level of a resident based on historical research, to see if they concur. This strategy provides both independent measures of socio-economic level and additional evidence of the validity of Miller's method as an archaeological measure of the economic level of an individual or household. Some recent works have already produced supportive data for the use of the Miller method as an archaeological measure of economic position (Garrow 1982, Shephard personal communication).

Consumer Behavior

Consumer behavior refers to how individuals and households purchase, use, and dispose of material goods. To conduct a study of consumer behavior, we have assumed that the quality of material goods recovered from the archaeological record resulted from the type of consumer actions that an individual or household had selected to follow. This assumption will, of course, be modified if a given deposit of artifactual materials has clearly been deposited or altered by either natural or cultural transformation processes (c.f. Schiffer 1972). Specifically, we will be examining similarities and differences in the quality of material assemblages (c.f. Shephard 1980) that can be associated with socio-economic groups. The linkage of a given artifact assemblage to a specific socio-economic group will be accomplished by (a)

identifying the type of group that occupied a property, following the historic, not archaeological, methods described in the previous section; (b) determine the time range of the group's occupation of the property; (c) identify any artifactual assemblages from the property that date from this period of occupation; and (d) assume an association between the socio-economic group and the given assemblages.

The types of artifactual materials that will be examined in this study will include all materials recovered from datable deposits, and deposits that are from primary and secondary refuse contexts (Schiffer 1972) within a lot. If deposits are not from these contexts, then they cannot be easily related to the occupant(s) of the property from which they were recovered, and therefore, cannot be associated with a specific socio-economic group. The importance of these refuse contexts will be discussed further in the Field Investigation Chapter.

The procedure for identifying the quality of a given artifact assemblage is as follows. Whenever possible, a Miller analysis will be done on an assemblage to identify the economic scaling of the ceramic materials. In this manner, the quality, i.e. cost, of materials is obtained. Next, the resulting Miller economic indices will be compared to those from different assemblages of both similar and different socio-economic groups of the same time period, and then compared to the assemblages of similar and different groups from different periods. Also, assemblages of the various socio-economic groups will be compared using additional analytical techniques to identify quality, such as an analysis of ceramic vessel sets (c.f. Garrow 1982). These other types of analyses will be discussed in the Artifact Analysis Chapter.

In addition to these methods, there will also be an analysis of floral and faunal materials to measure the similarities and differences in the food products consumed by socio-economic groups. Specifically, these types of materials will be examined to determine the type and relative cost of food items used by these groups. One method of determining cost is to study how food is processed. For example, it has been hypothesized that there are cost differences in the processing of meat by sawing as opposed to hacking. Also, Henry Miller (1979) and Otto (1977) have found that different cuts of meat are consumed by different social groups, living in rural settings. This might also occur in an urban setting. The faunal analysis proposed here will be an opportunity to test this proposition.

To reiterate, the research domain of this project is to study the effects of industrialization on consumer behavior, and the spacial distribution of land use activities and socio-economic group residences. In the preceding section, we discussed how these variables of urban behavior will be identified and measured. In the following sections, we will examine how these variables are expected to change as a result of industrialization. As discussed earlier, these expectations form the project hypotheses to be tested.

Based on the studies in urban history and geography discussed above, we expect the following changes to occur in these three types of behavior in Wilmington. In Wilmington's industrial period, the distribution of land use activities and socio-economic group residences will be more spacially

distinct, forming distinctive neighborhoods and clusters of land use activities of the same type, than found in the city's pre-industrial period. In addition, the city core area, in the pre-industrial period, will be characterized by high socio-economic level group residences mixed with commercial properties. Areas surrounding this high economic level residence and commercial area will contain middle level socio-economic group residences and then lower level group residences. In the industrial period, the core area will become more and more commercial in nature, with a decrease in all types of residences.

In terms of consumer behavior, in the pre-industrial period, there will be differences in the material assemblages of different socio-economic groups, but these differences will become more evident in the industrial period, and will show a more measurable separation between these groups.

It should be mentioned here that Shephard (1980) is presently studying the nature of consumer behavior for nineteenth century middle class groups. He hypothesizes that in the pre-industrial period, the material assemblages of low and middle socio-economic level groups are similar, but very different from those groups in the upper socio-economic scale (Shephard 1980). In contrast, during the industrial period, material assemblages of high level socio-economic groups are characterized by a greater quantity and quality as compared to the middle level groups. In addition, both middle and upper level groups have more similar consumable goods compared to lower level socio-economic groups (Shephard 1980), which means that the middle level groups are moving towards greater identity with upper level groups.

It was initially assumed that the Wilmington Boulevard project area would represent a cross-section of the entire city, thus the results of the historical and archaeological investigation of the project area could be extrapolated to the rest of the city for addressing the research domain, and more specifically, for examining changes in the types of urban behavior we have selected to study. Historical research on the project area has shown that in the eighteenth and early nineteenth centuries, the project area is an excellent reflection of what is happening in the city as a whole (see History Chapter). However, by 1845, the demographic structure of the city had changed somewhat, and the project area became part of a growing central business district, but still contained some residential characteristics. This lack of a perfect congruency between the project area and the city as a whole will be taken into account in addressing the project research domain and in the formulation and testing of the hypotheses below. For the post 1845 period, we will indicate that we are measuring the three behavioral variables in the context of a developing central business district.

When conducting the first stage of research design development, we also expected that the project area would contain materials from the earliest period of Wilmington's history (the Frontier period). If such material did occur, then it would have been possible to study another period of Wilmington's growth, in addition to its pre-industrial and industrial periods. Our data retrieval program has shown that artifactual materials from this period do not exist in the project area in any undisturbed context. Also, subsequent historical research has shown that this period of development only lasted for a few years, with the town quickly becoming a mercantile

center for the region. For these reasons, no hypotheses addressing this period will be presented below.

Hypotheses

Table 3 summarizes the hypotheses to be tested. The hypotheses addressing settlement behavior will be addressed first, followed by two hypotheses on consumer behavior.

TABLE 3. PROJECT HYPOTHESES

	PRE-INDUSTRIAL PERIOD	INDUSTRIAL PERIOD
Settlement Patterning	1. Mixed land use	Higher segregation of land use
	2. Fairly mixed distribution of socio-economic group residences	Higher segregation of socio-economic group residences
Consumer Behavior	3. Measurable differences in quality of material assemblages associated with different socio-economic groups	A more measurable difference in quality of material assemblages associated with different socio-economic groups
	4. Measurable differences of quality of food types used by different socio-economic groups	A more measurable difference of quality of food types used by different socio-economic groups

Hypothesis #1

In the pre-industrial period, prior to the 1840s and 1850s, there is a mixed land use pattern in the project area. This mixed pattern will have commercial and residential properties adjacent to each other, and in some cases, within the same lot. During the industrial period, there is a tendency for land use types to separate out in the city landscape, and by the height of the industrial period, after the Civil War, this land use separation becomes more pronounced than in earlier periods. Also, in the industrial period, the project area becomes more characterized as a central business district.

Archaeological Test Implications:

1. Lot artifact assemblages dating from the pre-industrial period will either (a) contain materials from domestic activities (i.e. high kitchen group frequencies and high personal group frequencies) and will be adjacent to lots containing a preponderance of commercial related artifacts (i.e. high architecture and activity group frequencies) or (b) contain both domestic and commercial related materials.

2. Lot artifact assemblages dating from the industrial period will contain a low frequency of artifacts related to domestic activities, or the frequency of lots containing domestic materials in the overall project area will be lower than those containing commercial materials.

3. Lots with materials dating from the industrial period will contain either commercial or domestic related materials, but those lots with commercial materials will cluster and abut other lots with commercial materials. The same pattern will occur with lots containing domestic materials.

Archaeological Data Requirements:

1. Datable archaeological materials from pre-industrial and industrial periods.

2. Primary and secondary refuse deposits from lots which were either residential, commercial, or both residential and commercial.

3. Artifactual material from abutting lots and from lots on each block in the project area.

Historical Test Implications:

1. There will be an increase in single use properties over time, especially in the industrial period.

2. There will be an increase in non-owner occupied properties over time.

3. There will be an increase in strictly commercial properties over time with the greatest increase after the 1840s and 1850s.

4. There will be a continuing decrease in residential owner occupancy over time.

5. In the pre-industrial period, commercial and residential properties will abut each other and/or be located within the same lots.

6. In the industrial period, commercial and residential properties will rarely abut each other, nor will they be located within the same lots.

Historical Data Requirements:

1. The occupants of the properties in the project area over time.

2. The land use activities of the project area lots over time.

Hypothesis #2

There was a greater physical distance between socio-economic group residences in the industrial period than in the pre-industrial period.

Archaeological Test Implications:

1. Materials indicative of different economic group levels dating from the pre-industrial period will be equally or almost equally distributed throughout the project area.

2. Materials dating from the industrial period will indicate the presence of only one or two types of economic group levels in the project area, with low level economic groups predominating.

Archaeological Data Requirements:

1. Artifactual materials from both the pre-industrial and industrial period.

2. Materials from lots within different blocks and from lots which abut other lots.

3. Ceramic assemblages that can be used to measure economic scaling of lot assemblages.

Historical Test Implications:

1. In the pre-industrial period, there will be a heterogeneous population of different socio-economic groups occupying the project area.

2. By the 1840s and 1850s, there will be an increasing spacial separation of individuals of different socio-economic groups in the project area, whereby, street faces and abutting lots will be occupied by individuals of the same socio-economic group.

3. There will be a decrease in the number of socio-economic groups living in the project area, with only one or two types residing in the area during the industrial period.

Historical Data Requirements:

1. The occupations of individuals living in the project area over time.

2. The ethnic affiliation of the occupants of the project area over time.

3. The location of owner occupied and renter occupied properties in the project area over time.

The two hypotheses addressing changes in consumer behavior predict an ever-increasing distinction between the artifact assemblages associated with different socio-economic groups.

Hypothesis #3

In the pre-industrial period, individuals or households of a high socio-economic level will use materials that are higher in quality (cost), than those used by middle and lower level groups. A similar distinction will exist between middle and low level groups, but to a lesser degree. However, by the industrial period, these material distinctions between all groups will become more evident, with the middle level groups using materials more like the upper level groups than the lower level groups.

Archaeological Test Implications:

1. There will be differences in the cost of ceramic assemblages, dating from the pre-industrial period, used by different socio-economic groups. The cost of ceramics used by high level groups will be higher than other groups, and costs of ceramics used by middle level groups will be higher than that for lower level groups.

2. Ceramic assemblages from the industrial period will show a greater cost difference between socio-economic groups than observed for groups in the pre-industrial period.

Archaeological Data Requirements:

1. Artifactual materials, especially ceramic assemblages, from both the pre-industrial and industrial periods.

2. Ceramic assemblages that can be used to measure economic scaling of lot assemblages.

3. Artifacts, and especially ceramic assemblages from deposits associated with different socio-economic level individuals or households.

The second hypothesis dealing with consumer behavior, states that a similar trend occurs in food items as that expected for non-food items.

Hypothesis #4

In the pre-industrial period, high level socio-economic groups will purchase more costly food items than other social groups. This pattern of food cost difference will become more pronounced in the industrial period, with greater distinctions occurring between all socio-economic groups, but with the middle level groups becoming more similar to high level groups than low level groups.

Archaeological Test Implications:

1. The cuts and types of processing of meats from deposits associated with high level socio-economic groups will be of a more costly nature than those from middle and lower level groups, in the pre-industrial period.

2. In deposits from the industrial period, cuts and processing of meats will

indicate costs differences between all socio-economic groups, and these cost differences will be greater than those observed in the earlier period.

Archaeological Data Requirements:

1. Faunal materials from deposits dating from the pre-industrial and industrial periods.

2. Faunal materials from deposits associated with different socio-economic households and individuals.

Historical Data Requirements:

1. Cost differences on cuts of meats and types of meat processing.

These are the specific hypotheses used to guide the research phase of the Wilmington Boulevard project. Not only did these hypotheses guide research, they also gave direction to the historical, archaeological, and analytical investigations of the project. The strategies for these aspects of the project are presented below.

Historical Investigations

The historical research for this project was designed to supplement and support the archaeological research and to provide an independent test of the research hypotheses. This research also addressed the question of whether the project area is representative of the city as a whole. Data from this aspect of the study defines to what extent the results of the above hypothesis testing is specific to the project area, or to what extent these can be used in describing changes in these study variables for the entire city.

In general, three levels of historical research were conducted. At the most basic level, the historian prepared a background history of the city based on available secondary sources. This background history focused on general patterns of physical and economic development as they relate to the research design. City government records were also reviewed to obtain information on general conditions within the study area and on the introduction of public services, such as sewage and water, which could significantly affect the nature of the archaeological record.

Detailed block histories were prepared for each block within the project area, tracing changes in property boundaries and values, and identifying the use, occupancy, and ownership of each property through time. These detailed histories will provide independent data regarding the functions of the properties, and the socio-economic level of the people occupying the properties.

Finally, patterns of land use, occupancy, and land sale and transfer were explored for the project area and the city as a whole. Because of the vast quantity of data available at this scale, appropriate documents were sampled at ten year intervals for the city-wide study. The patterns derived for each block were compared to the overall city pattern to determine the block's

placement within the historic structure of the city. This facilitates the answering of such questions as "are the materials from these blocks associated with a true cross-section of social groups and land uses in Wilmington, or are they associated with only a portion of Wilmington's historic spectrum?".

Archaeological Investigations

Documentary research was to be conducted at the same time as fieldwork, because of the time constraints imposed by the construction schedule. Properties were, therefore, chosen for excavation before detailed information was available on their land use, ethnic, and social characteristics. Stratification of properties by these three variables was, therefore, not possible. It was decided that, minimally, one property on each block be intensively studied in order to provide coverage over the entire project area. Within each block, properties which had been occupied early in the development of the city were given priority. Most of the sites in the city attributable to such occupations have already been destroyed, thus requiring this excavation priority. A priority was also given to occupations believed to have been associated with lower socio-economic level groups (based on already available documentation). These considerations did not bias the sample as much as might be expected. Because of changes in property use through time, more than one land use and socio-economic category was often represented on any given property. Of course, the only clearly identified Afro-American occupation in the project area was included among the properties to be intensively studied.

In order to ensure the efficient recovery of data appropriate to the research design, decisions had to be made on where to concentrate excavation activities within lots. In order to recover materials reflective of land use activities and socio-economic group characteristics of particular properties, attention had been concentrated on rear yard areas. South's (1977:47) studies of refuse disposal patterns indicate that, at least in Anglo-American sites, rear yard areas are major zones of refuse disposal. Previous excavations in Wilmington at the Dingee Houses (Wise 1974) supported South's observations.

The 1979 location/identification study (Thomas, Regensburg, and Basilik 1980) provided little information about the presence or nature of horizontal deposits in the project area, although the identification of pavements in two areas implied the possibility of sealed occupation levels. In addition, the results of the MAAR excavations showed that damage to foundations below the existing ground level was, in many cases, minimal. This suggested that disturbance could be expected to have affected only the uppermost level or levels. It was assumed that areas where structures had been located would be too disturbed to yield the kind of archaeological remains which were required for the research objectives, or would require too much time to excavate in relation to the amount of information recovered.

Zones where yard areas were likely to be intact were identified primarily on the basis of the nineteenth and twentieth century property atlases and on the 1976 property acquisition maps prepared by the Delaware Department of Transportation. A preliminary determination of the function of each property

was made on the basis of the 1814 and 1845 Wilmington City Directories, and from the property maps.

Artifactual Investigations

In order to test the research hypotheses, it was necessary to examine the artifactual material recovered from the project area in terms of temporal, functional and socio-economic characteristics. The first step in the analysis was to use various dating techniques to place deposits and features in their appropriate temporal position. For deposits containing eighteenth and early nineteenth century materials, South's mean ceramic dating method (1977) was used. For middle to late nineteenth century materials, dates developed by Garrow (1982) were employed, along with dates obtained from ceramic and glass marks.

The next stage of analysis was to identify artifact patterns within each excavated deposit. Pattern identification followed the methods presented by South (1977) and refined by Garrow (1982). These patterns provide an organizational tool to describe the artifact assemblages within each deposit. Also, this pattern identification permits testing hypotheses addressing land use changes. The frequency of artifacts by group (e.g. ceramics, window glass, toys, etc.) and categories within groups (food serving, food preparation) (c.f. Beidleman 1980) were compared among the deposits to identify if these frequencies cluster by land use type.

Once all artifact assemblages within deposits are organized by these patterns, the assemblages best suited for further analysis and, thus, hypothesis testing, were selected. Selection was based on the types and size of artifact groups within each datable deposit and the overall size of the assemblage associated with a deposit. Additional analyses focused on measuring the economic level (i.e. status) reflected within each major deposit. This was necessary in order to test the consumption behavior hypothesis and the hypotheses addressing socio-economic residential patterning.

Identification and measurement of social levels was conducted using Miller's economic scaling of nineteenth century ceramics (1980) and Wise's comparison of ceramic ware and functional groups (1976) for the eighteenth century. The Wise analysis can be conducted using sherd counts, though Miller's requires assemblages which are amenable to minimum vessel counts.

There are also other sets of analyses which were conducted in order to adequately and correctly interpret the results of the analyses just discussed. These sets of analyses enable the archaeologist to understand the nature of the deposits and artifact assemblages under investigation and answer the following questions. Is the deposit under investigation from a single household, or multiple households? What deposits and artifacts within deposits can be combined to form assemblages which approach a systematic context, rather than a purely archaeological one (Schiffer 1972)? Is the size of the assemblage adequate for any additional analyses beyond the pattern level? The types of analyses that can answer these questions, include, for example, analyses of cross-mends, nature of ceramics sets, and minimum vessel counts. (c.f. Garrow 1982).

Each of these analytical techniques, which will be more fully discussed and refined in the Artifact Analysis chapter, permit the testing of portions of the research hypotheses. As a result, data was generated to address the project's research domain: the effects of industrialization on consumer behavior, and the spacial distribution of land use activities and socio-economic group residences in Wilmington, Delaware. And as a complementary contribution, these analyses aid in refining the analytical tools which historical archaeologists now use to define land use and socio-economic status through the study of material culture.