

**CERAMICS FROM THE FRANKLIN GLASSWORKS:
ACQUISITION PATTERNS AND ECONOMIC STRESS**

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by
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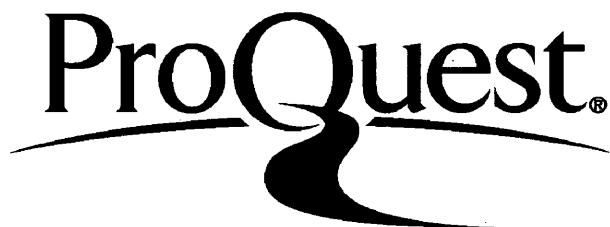
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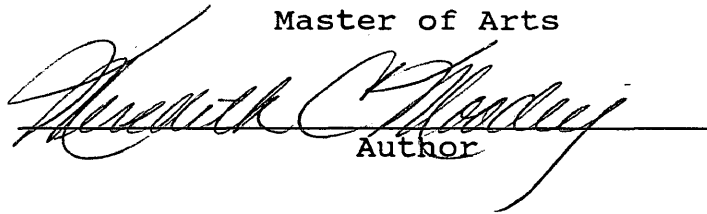
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APPROVAL SHEET

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DEDICATION

To Tucker, who has always challenged me to try the unknown, and has taught me the joy of doing things passably. You bring to my life the sense of perspective that I lack, and the sense of acceptance that I am learning.

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Finally, the completion of this thesis would not have been possible without the love and support of my parents, Jim and Penny Moodey, and siblings, Tucker and Tia. During this prolonged ordeal, they not only learned a new vocabulary, but also developed the uncanny ability to avoid "the 'T' word," in times of crisis. Their involvement in my education makes this accomplishment theirs as well as mine.

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ABSTRACT

This study examines the impact of economic stress on a group of glassworkers through changes in their ceramic expenditure patterns. The Franklin Glassworks was a short term, frontier site, occupied from 1824-1832. Documentation is sparse, but clearly reflects a business that was financially unstable almost from the outset. To examine the impact that this instability had on ceramic purchases, one must be able to observe change in the archaeological record.

The first step in a such a process is to identify and isolate temporally significant units within the site. Secondly, these units must be ordered in time to permit comparison of purchasing patterns from one phase to the next. Finally, the actual rates of expenditure were calculated.

It is common in archaeology to combine the artifacts from sites of short duration, and to treat the assemblage as if it represented a single point in time. This study attempts to demonstrate the significant loss of information that results from this practice.

**CERAMICS FROM THE FRANKLIN GLASSWORKS:
ACQUISITION PATTERNS AND ECONOMIC STRESS**

Chapter I

THEORETICAL BACKGROUND

One of the primary goals of archaeology, and in fact one of the tasks to which it is best suited, is the detection of change over time. We presume that behavior has material correlates. If, therefore, changes can be detected in the material record, we can begin to uncover the events leading to those changes. When documentary sources are available to the archaeologist, the changes that we can investigate become more complex.

The objective of this study is to examine the impact of economic stress on a group of glassworkers through changes in their ceramic acquisition patterns. The Franklin Glassworks was a small, 19th century frontier factory, excavated during the late 1960's and early 70's. Historical documentation for the site, while incomplete, is sufficient to demonstrate steadily declining economic circumstances throughout its operation.

To examine the impact of economic stress, the site must first be broken into temporally meaningful units. Once these units have been defined, the central question becomes: how can events in historical time be detected in

some patterning of the archaeological data--in this case, differences in the relative value of ceramics acquired by the company for the use of its employees.

Creating units of archaeological time that permit comparison with historical events is an area of study that is receiving increased attention by archaeologists. One of the pioneering efforts to investigate this relationship was described in James Deetz and Edwin Dethlefsen's 1966 article "Death's Head, Cherub, Urn and Willow." By comparing the motifs carved in gravemarkers around Boston, Deetz and Dethlefsen noted a gradual transition from "death's head," to a "cherub" motif, and finally an "urn and willow," between the early 18th and early 19th centuries. An examination of New England ecclesiastical history allowed them to correlate these stylistic variations with changing religious perspectives, from orthodox Puritanism, through the Great Awakening and the teaching of Jonathan Edwards, to more intellectual religions such as Unitarianism and Methodism [Deetz 1966:501-510].

Gravemarkers are ideally suited for this type of study since they bear inscribed dates of manufacture. To create temporally discrete units, Deetz and Dethlefsen needed only to group those stones carved within a ten year period. Yet this is an unusual situation for archaeologists. In most instances, a forced reliance on

datable artifacts results in chronologies that lack the precision necessary to permit comparison with historical events.

The problem of chronology has taken a central role in more recent attempts to correlate units of archaeological time with events in historical time. Albert Bartovics' doctoral dissertation entitled "The Archaeology of Daniels Village: An Experiment in Settlement Archaeology," examines local economic development in Killingly, Connecticut, focussing on one 10 acre tract known as Daniels Village. The continuous occupation of Daniels Village from the middle seventeenth century to the present, and the availability of detailed documentary records affords Bartovics the opportunity to conduct what he calls a "retrodictive experiment" in which the archaeological record is tested for its degree of coincidence with the historical record. As he states early in his study, the goal is not to supplement archaeological evidence with historical, but to examine the ways in which they can be synthesized:

"Nonarchaeological data are often combined with excavated information as analogy or direct historical projection, but normally these data comprise only supplementary evidence. However, should such data be fairly comprehensive, and directly related to the archaeological observations, a truly complementary synthesis is possible [Bartovics 1982:9]."

The analytical objective of Bartovics' investigation was to "define periods of stability and intervals of

change for the entire area of study based on information obtained from the 19 settlement locales adequately examined archaeologically, the 15 subdivisions within the village and the 4 outlying sites [Bartovics 1981:150]." To this end, he defined units of archaeological time, deriving temporal inferences from the artifact content of various deposits across the site. These inferences were based on two factors: date-bearing objects, and frequency of characteristic ceramic types.

A comparison of archaeological and historical data revealed that, in many cases, date-bearing artifacts and ceramic types did not adequately measure archaeological deposits. To further refine the chronological control therefore, Bartovics calculated probable dates of manufacture, which statistically assessed the probability that a date-bearing artifact was manufactured during a given period of historical time.

Another method employed by Bartovics to supplement the chronological potential of transfer-printed ceramics was to utilize date-bearing specimens to provide dates for matching, but undated pieces. Through this combination of chronological refinements, Bartovics was able to date not just layers and features, but also layers within features, which permitted accurate estimations of a deposit's interval of accumulation.

Stephen Mrozowski's thesis, "Archaeological Investigations in Queen Anne Square, Newport, Rhode Island: A Study in Urban Archaeology," examines the relationship between certain urban processes and the formation of archaeological sites. Central to the investigation is the comparison of documentary evidence for property-holding and transmission, with the depositional histories of three privies excavated in Queen Anne Square. Yet, as Mrozowski indicates, this objective cannot be met without " a method which permits the isolation of household assemblages on complex urban sites [Mrozowski 1981:32]."

The purpose of the documentary and archaeological comparisons is to "determine whether or not periodicity evident in the temporal distribution of ceramics contained in these deposits co-varies with occupation spans of distinct household units residing in the lots in question [Mrozowski 1981:34]." Mrozowski utilizes a combination of statistical interpretations (including frequency histograms, calculations of mean ceramic dates, and 68% and 95% confidence intervals), and non-statistical interpretations to provide evidence strengthening the correlation of household units with assemblages recovered from urban privy fills.

Finally, a thesis recently completed by Robert Hunter (1987) examines ceramic acquisition from three generations

of the Sheppard family in Henrico County, Virginia, and contrasts the information with documentary and architectural data. From surface collections and some block excavations, Hunter was able to attribute excavated vessels to the households of Mosby Sheppard (1810-1831), Mary Sheppard, his widow (1831-1845), or their son, John Sheppard (1845-1861) based on documented dates of introduction. Additional data delineating overall consumption refined the commentary on such issues as availability, social position and economic standing.

The Franklin Glassworks site differs from those presented by Bartovics, Mrozowski and Hunter in two significant respects. First, unlike the cases presented above, the Franklin operation is not well documented. No personal accounts have been recovered, and due to this scarcity of direct historical evidence much has had to be inferred from court and tax records.

More significant than the lack of documentation, however, is the fact that the Franklin Glassworks was occupied for only eight years. If the site is to be broken down into temporally meaningful units, the archaeological data must be amenable to sorting out in periods of less than eight years. While "Garbologists" such as Rathje (1977), are currently developing the analytical tools necessary for dealing with such periods

of time, the investigation of short-term sites is clearly not what archaeology does best.

The position maintained in this investigation is that ceramic acquisition patterns are adequately sensitive to reflect changing expenditure within an eight year occupation. The choice of this category of archaeological data was based on two very simple factors. First, on this site, ceramics are the only artifact class that exhibits sufficient variety to be analyzed for chronological differences.

The second factor refers back to the objective of this study which is to observe the effects of economic stress over time. This objective bears the inherent stipulation that the chosen artifact class be able to address the necessary variables of time and expenditure. Use of Miller's Ceramic Index (1980), which permits the correlation of date, decorative technique, and relative cost, fills this requirement.

This thesis is organized by chapters. The second chapter outlines the background and history of the Franklin Glassworks as well as describing the lives of its resident artisans. The contributions that these three factors made to the condition of economic stress are also discussed.

Chapter 3 describes the recovered archaeological evidence from this site. The factory itself is mentioned

briefly, and the difference between the factory and domestic areas is discussed, but the focus is on the domestic area. The six trash features are described, along with their artifactual contents.

In chapter 4, the archaeological data is analyzed, first from a spatial, then from a temporal and chronological perspective. The purpose of this chapter is to create meaningful units of time which can be ordered chronologically.

Miller's Ceramic Index is applied to the ordered assemblages in the fifth chapter, to determine whether expenditures increased, decreased, or remained constant over time. One interpretation of the visible trends is proposed. Finally, by comparing the value of the domestic assemblage as a whole, and that of individual clusters, the importance of breaking sites down on a chronological basis is demonstrated.

Chapter II

HISTORICAL BACKGROUND

To examine the impact of economic stress on the Franklin Glassworkers, the term must first be defined. A very useful and effective definition of economic stress for the purposes of historical archaeology, was presented in Joel Klein's 1973 article "Models and Hypothesis Testing in Historical Archaeology" [Klein 1973:68]. Drawing on an equilibrium model, Klein posits that cultural systems must exist in a state of equilibrium if they are to function, but that the type or nature of that equilibrium state may change in response to external factors.

A cultural system is said to be in a state of stable equilibrium when any displacement from the steady state is met with a return to that state. Conversely, in a state of unstable equilibrium a system will not recover from displacement, but will become further displaced over time.

During periods of unstable equilibrium, adjustments must be made by the community in its economic sub-system. "Economic stress" defines the state of the community as it is making these adjustments [Klein 1973:70-1].

The usefulness of an equilibrium model for historical archaeology lies in the fact that it can be easily applied to cultures with cash economies. Within such economies, the amount of money available to individuals for the purchase of goods they do not produce is a limiting factor. When a change in this variable results in the availability of less cash, the community can be said to have changed from a state of stable, to a state of unstable, equilibrium [Klein 1973:71]. Manifestation of this change may appear in the archaeological record as decreased spending for certain categories of goods, or the elimination of non-essential items.

In any given historical circumstance, a number of interrelated factors clearly contribute to the nature and the intensity of economic stress. In this chapter, three variables: setting, history, and the lifestyles of glassworkers, will be examined for their contributions to the economic stress experienced at the Franklin Glassworks.

BACKGROUND

The Franklin Glassworks is a frontier industrial site representing eight years of occupation. It was established in 1824 in Portage County of the Connecticut Western Reserve--an area known today as northern Ohio [Fig.1].

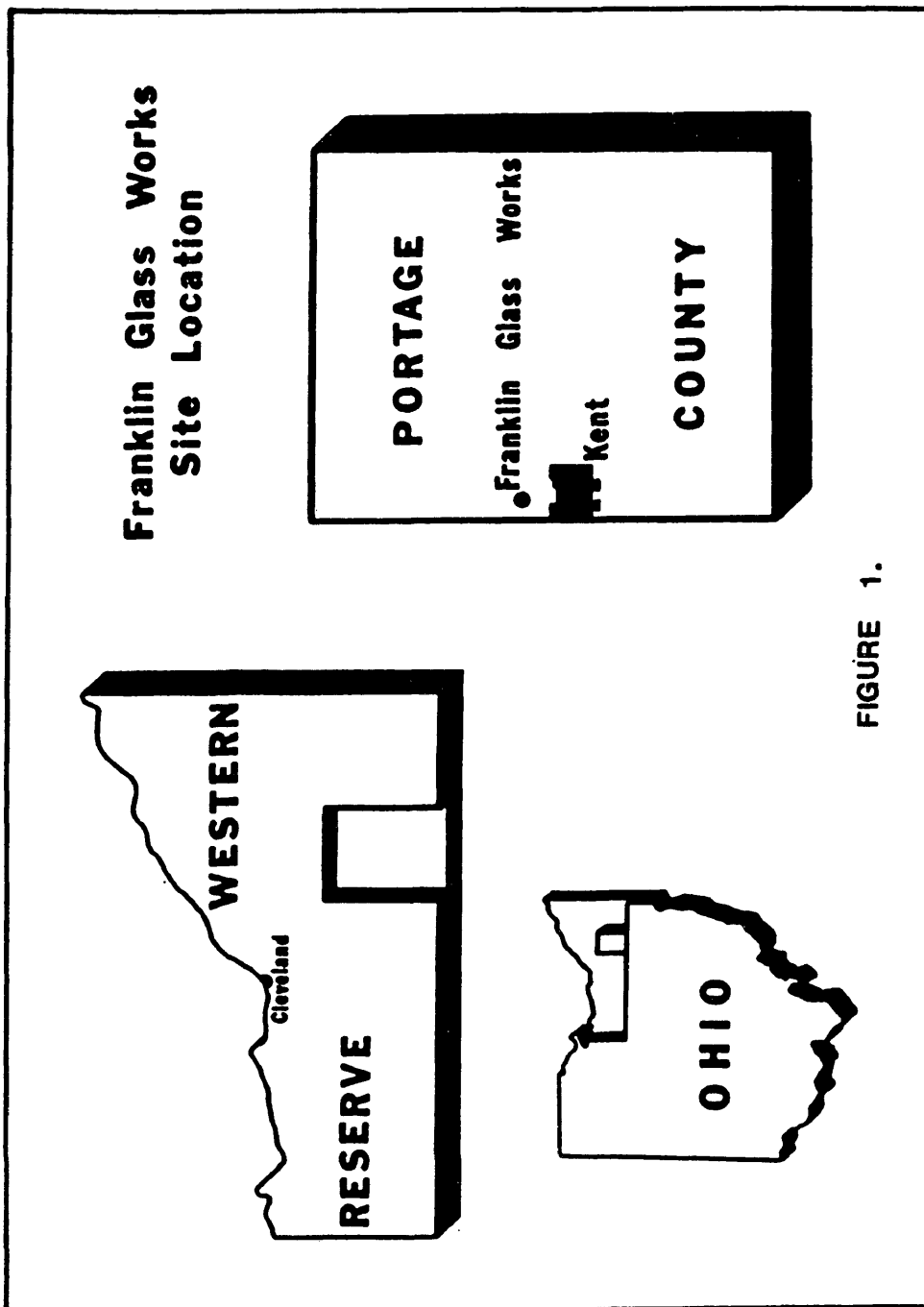


FIGURE 1.

The name "Western Reserve" originates in the territory's 18th and 19th century identity as a part of Connecticut's western holdings. Between 1776 and 1786, when other states in the union ceded their western claims, Connecticut "reserved" its right to the ownership of 3 million acres bordering Lake Erie. Congress eventually complied with this demand, and the Western Reserve became, by extension, a part of New England.

Devastating disease, the lingering threat of Indian attack, and terrain described by one settler as a "howling...vast and unbroken wilderness [Cackler 1964:15]," contributed to the slow population of the Reserve. Nevertheless, one group of investors known as the Connecticut Land Company foresaw profit in the sale of land. After bargaining briefly with the state of Connecticut, they purchased the Western Reserve in 1796. In this way northern Ohio fell into the hands of land speculators--capitalists who welcomed industry as a means of luring settlers to the frontier. The glass industry was one of the first to respond.

The unlikely selection of an isolated frontier as the site for a glassworks was influenced by a number of factors. First, distance and transportation costs involved in crossing the Alleghanies provided economic protection from an influx of British imported glass following the War of 1812. Secondly, the Ohio Legislature

provided incentive through its decision in 1823 to suspend taxes on

"...all mills, all woolen and cotton manufactories, and all manufactures of iron or glass... (Chase 1832:Vol. II:1258)."

Finally, an important factor was the availability of raw materials. While glass was manufactured from a simple combination of ingredients: sand, potash, soda ash and lime, the manufacturing process requires tremendous quantities of firewood (to fuel the furnaces) and a very durable type of crucible clay. If these resources were not close at hand, importation costs greatly diminished the return on the finished product [Miller:1987].

By the early 19th century, a combination of farming and industrial activity had limited the necessary resources on the east coast, particularly timber. Glass manufacturers naturally looked to the west with its boundless supply of fuel as a place to build new factories.

The construction of four glasshouses in Portage County between 1819 and 1824 attests to the suitability of local resources to the industry. Dense forests blanketed the Reserve, much to the despair of Connecticut farmers. To make their property arable, some landholders evidently took the suggestion made by Tench Coxe in his 1814 Survey of American Industries, leasing timbered lots to industries such as potteries and glassmakers with

tremendous fuel requirements [Coxe 1814:xliv]. Not only did the factories benefit from this arrangement, but according to Miller's research, in clearing the land, its value was increased nearly 400% [Wittlesey 1842:19]. While no documentation exists detailing the arrangement between the owners of the Franklin Glassworks and the landholder of lot 80, clearing the land is likely to have been part of the agreement.

Portage County also had ample supplies of clean sand and lime deposits to offer, but by far its most valuable resource was crucible clay. Securing clay for melting pots that could withstand the 2000 degree temperatures required to melt glass was extremely difficult. Evidently this problem was not limited to the frontier, since, according to Rhea Mansfield Knittle even east coast factories were importing three-fifths of their clay from Germany as late as 1860 [Knittle 1927:19]. A toast made by factory-owner James Edmunds on the Forth of July, 1825, and recorded in the Western Courier, suggests that good quality clay may have been locally available to the potters at the Franklin Glassworks: "By Mr. Edmunds,--The Clay of the West, not inferior to any clay in the known world [Vol. 1, No. 42, p. 3, July 9, 1825]."

HISTORY

The history of the Franklin Glassworks as recorded in tax and court records, census reports and newspapers is far from complete. Following two years of excavation, George Miller spent a number of months piecing together the available documentation. This research culminated in the recent publication of the glassworks history in the Glass Club Bulletin [Miller 1987].

Briefly, it appears that the factory was established in 1824 by James Edmunds and Richard and George Parks, and that it was producing glass by 1825. Within three weeks of the factory's opening, the Parks brothers evidently abandoned the partnership, leaving Edmunds as the sole owner of a very risky and potentially expensive business.

Over the course of the next seven years, financial difficulties plagued the Franklin Glassworks. Court Records from the Portage County Court of Common Pleas chronical a series of charges brought against Edmunds, ranging from unpaid debts to the issuance of certificates of insolvency and notes of loan. While it is clear that the Franklin Glassworks was never a tremendous financial success, Edmunds evidently eluded bankruptcy on a number of occasions. One of the means by which he accomplished this feat appears to have been the incorporation of Isaac

Crank (?) or Grant, and Christian Cackler into the partnership after the loss of the Parks brothers.

The cause and date of the factory's ultimate downfall, like most of its history, passed undocumented. In 1831 the final trial involving Edmunds was settled, and by 1833, when tax assessment of manufactures resumed in Portage County, the Franklin Glassworks was not listed on lot 80. It is therefore assumed that glass production ceased sometime around 1832.

All available sources appear to link the Franklin Glassworks' demise to Edmunds' undercapitalization and eventual inability to meet financial responsibilities. A contributing factor, after 7 years of intensive manufacture, may have been the depletion of timber and other raw materials. If the production of glass was becoming less profitable, the financial distress indicated in the documents may reflect a gradual worsening of this condition.

A second, more dramatic, possibility was suggested by a large boulder of glass excavated from the factory well. Furnace collapses, such as would have produced this artifact, were not at all uncommon in the production of glass. Had this occurred at the Franklin Glassworks, it would certainly have spelled financial disaster for the already unstable company.

THE GLASSWORKERS

To date, all efforts to link worker's names to the glasshouse have been unsuccessful. The 1830 census for Portage County lists only the head of each household, and it was not until 1850 that occupational information was included in these records.

While a description of this specific operation may be lacking, the traditional nature of glassblowing and the accompanying lifestyle of its practitioners, makes it possible to draw upon a substantial body of information compiled by social historians [Wallach-Scott 1975], historians of glass production [Watkins 1930, Davis 1949, Scoville 1948], and glassmen themselves [Jarves 1968]. Spanning two centuries and three continents, these studies nevertheless provide a consistent picture of a life that was highly regimented, somewhat uncertain, socially and physically isolating, and extremely dangerous to one's health. On the other hand, this was a prestigious occupation that reaped monetary benefits for its practitioners, the respect of the artistic community, and the awe of the general public.

Tremendous skill was the identifying characteristic of glassblowers throughout the 19th century, and not surprisingly, they felt it essential that this skill be guarded and maintained. Deming Jarves, an agent at the

New England Glass Company, wrote to a friend that when the factory workers discovered that he (Jarves) had succeeded in pressing a piece of glass, they became so enraged and concerned for the safety of their trade secrets that they threatened their agent's life. It was six weeks before Jarves felt he could enter the factory, and six months before he felt it safe to walk the streets at night [Gaffield Collection, Scraps, I:95].

Most methods of protecting the secrets and skills of glassmaking were more subtle than those employed at the New England Glass Company. One of the most common was the requirement of a lengthy apprenticeship. To train a boy in the techniques of blowing glass took many years, for it was only through much experience that an apprentice developed the ability to judge the proper temperature and state of glass. Coordination and timing of the rapid, accurate motions were essential, and these too only came after years of practice. An apprentice who began his career at the age of ten as a bottle carrier could expect to be twenty-five before he was judged to have the experience to be a glass-blower [Wallach-Scott 1974:32]. Rarely were young men able to devote so much of their lives to learning a trade.

Another practice through which the level of skill was maintained was that of limited apprenticeship. Glassblowers exercised tight control over the entry into

their craft, and frequently chose their own sons as students. The knowledge and skill passed from father to son in this way is likened by Joan Wallach-Scott to the practice of wealthy men willing possessions to their children [Wallach-Scott 1974:35]. Of course it was possible to enter the trade without the benefit of a related sponsor, but apprenticeship under such circumstances was often excessively long.

The most profound effect that limited and lengthy apprenticeship had on the American glass industry was reflected in the chronic scarcity of skilled workers. Traditional secrecy mitigated against a body of knowledge from which the public could draw to establish their own factories. Techniques rarely left the family circle, and as a result, foreign workers had to be constantly introduced into the American industry as it expanded [Davis 1949:50-2].

That American investors were desperate for skilled labor is evident in the expense and risk that they undertook to acquire it. Emissaries travelled frequently to European countries to engage workers and shop foremen [Scoville 1948:31]--so frequently, in fact, that the British glass industry was forced to prohibit the emigration of glassblowers. For an American manufacturer to lure glassworkers away became a penal offense. Glassworkers too were threatened with corporal punishment

should they attempt to leave European factories, yet the practice continued [Scott 1974:47].

There is no record of how many American emissaries were punished for their unethical recruiting practices, but it is clear that they often suffered for their actions upon return to the United States. Because skilled workers were so scarce in this country, competing factories eagerly awaited the arrival of immigrant glassworkers, often enticing them with promises of higher wages and better working conditions. These the glassblowers were likely to accept, leaving the first manufacturer without labor, and short the cost of a passage to America [Scoville 1948:31].

Commensurate with the competition for skilled labor, the salaries commanded by glassblowers throughout the 19th century, were quite high. In 1831, wages for were double in America what they were in England, and 3 times greater than in Germany [Davis 1949:90]. Lura Woodside Watkins, says of the workmen in East Cambridge, Massachussets:

"...the glass blowers were the most prosperous workmen in the community. Their pay was very high, often amounting to as much as nine or ten dollars a day, which, of course, would be equal to many times that sum today [Watkins 1930:159]."

And Joan Wallach-Scott quotes a French subprefect who describes glassmen as "honest and skilled workers, accustomed to ease by their high wages [Wallach-Scott 1974:20]."

The picture presented of glassworkers to this point is one of a very comfortably settled, closely knit community, drawn together by the nature of their craft. But while glassblowing may have resulted in the formation of strong bonds within the factory, it appeared to have just the opposite effect on worker's relationships with the community. The mysterious character of their craft, the hours that they kept, and their general physical condition, created both social and physical distance between artisans and townspeople.

Foremost on the list of social barriers was the simple fact that most people were wary of glassworkers. The secrets of the glasshouse were guarded so closely that a craftsman who could create a green pitcher from a crucible of white sand was regarded with a certain amount of suspicion. Also, if, as the literature suggests, many artisans were foreign, unfamiliar languages may have been spoken inside the factory, or accents may have been particularly strong. This would only have contributed to the apparent mystery of the operation and to the craftsmen's alienation from the community.

Another contributing factor to the social rift between glassworker and townsfolk was the work schedule maintained in the factories. Inefficiency characterized many wood-burning furnaces, and consequently the process of firing the furnace could take as long as twelve hours.

To take advantage of this lengthy preparation, glassblowers typically worked twelve hour shifts during the coolest part of the day--from midnight until noon. Clearly this would have limited the circle of friends with whom they could associate.

But with or without companionship, glassworkers seem to have made the most of their free time. They were notorious for their heavy drinking, or at least for the frequency of their drunkenness, despite Lura Woodside Watkins' defense of the men at the Cambridge glass factory. According to Watkins:

"When the weekly holiday came around on Saturday most of the men went "over the bridge" for a drink of beer. This was a practice to which they had been brought up in the old country. They made a festive occasion of it, dressing in their best-- and their best meant a fifty-dollar suit and a tall beaver hat. Few of the men overindulged: hard drinking was the exception rather than the rule [Watkins 1930:160]."

Libarius on the other hand describes glassworkers as "thirsty and easily made drunk [Jarves 1968:23].," to which Jarves add that while this is their true character, it "is not general, having known several without the fault [Jarves 1968:23]." Warren Scoville, less charitably, writes: "Intemperance seems to have been an unusually common failing of employees, and sometimes the men would not show up at the factory for days [Scoville 1948:38n.]"

This, and other unsavory aspects of their character won glassworkers few friends within the community. In a

description of New Hampshire glassworkers, one history recounts that after a fire at a local factory:

"the phlegmatic fellows were lying around the old manufactory. doing nothing but to smoke their kiefekill dodeens, and the vast fuligenous cloud that hung portentously on the skirts of the mountain must have alarmed the people mightily..."

[Starbuck 1984:58].

Soon after this display, Starbuck notes that the site was abandoned, and the workers "warned out of town" by Selectmen who did not welcome these individuals as permanent residents [Starbuck 1983:47].

Lack of concern for community ties was undoubtedly linked to the frequent migration of glassworkers. Especially in the case of frontier factories early in the 19th century, glass production chased receding forest lines, stopping only long enough to clear the land of available resources before pushing west. The physical arrangement of the factory also acted as a limiting factor, since only one team of glassmen, consisting of a glassblower and his two apprentices, could work from each furnace opening [Wallach-Scott 1974:47]. This meant that as each apprentice achieved the status of glassblower, he was forced to leave his current place of employment, and find a factory that had need of his services.

In addition to being socially excluded, glassworkers often found themselves physically removed from the surrounding town or community. Because they so rarely

stayed in one location for more than a few years, glassmen almost never appear in court records as landowners.

Rather, employers were likely to supply housing in the form of rented rooms, or dormitory-like structures on the factory grounds. The former type of lodging was more common in cities on the east coast, where factories were close to, or even incorporated into the surrounding community.

In rural areas, factory owners would have found it more advantageous to provide company housing on the factory grounds. It was essential that workers live close to the work-place since furnaces, especially those that burned wood, were very unpredictable in the amount of time they would require to melt the batch. For this reason, after the crucibles had been set, workers usually went home to sleep until they were needed. When the glass approached the proper state, it was the job of a watchman to go and wake the blowers. To have them living in a single building, close at hand, would certainly have facilitated this task.

Proximity to the factory was required for yet another reason. In addition to their drunkenness, glassworkers were notorious for their poor health. This was the result, for the most part, of exposure to molten glass, the extreme heat of which damaged their lungs and taste buds. Deming Jarves quotes Baron Von Lohen as saying:

"It must be owned those great and continual heats, which those gentlemen are exposed to from their furnaces, are prejudicial to their health; for, coming in at their mouths, it attacks their lungs and dries them up, whence most part are pale and short-lived by reason of the diseases of the heart and breast, which the fire causes [Jarves 1968:23]."

There was also the matter of the blow-pipe which, in passing from mouth to mouth, frequently spread epidemics among the workers. The combined effects of searing heat and disease shortened glassblower's lives considerably. In fact, one factory in France, studied by Joan Wallach-Scott, reported that between 1866-1875, the average life expectancy was 34, with the status of "old men" conferred upon workers who had achieved the age of 40 [Scott 1974:43]. Given their weakened physical condition, not to mention the long and late hours that they worked, glassworkers would not have benefitted from a long walk home on a winter night [Scott:1974:51].

ECONOMIC STRESS

For James Edmunds, the competition for glassworkers, and their resulting high wages would have had profound implications. Edmunds' employees were not a group of local men willing to learn the art of glassblowing. Rather, they were likely to have been foreign-born, highly skilled individuals who came to the Reserve not to claim a piece of the frontier, but for the sole purpose of practicing their craft. To employ these individuals,

Edmunds would have had to offer wages competitive with those being offered on the east coast. Further, if he was to keep those workers in his employ, he would have had to maintain those salaries, in spite of fluctuations in the factory's financial status.

In contrast to these demands, the nature of glass-blowing seemed to insure fluctuations in economic stability. Opening a factory was an extremely capital intensive undertaking, requiring a large initial output of cash to build furnaces and crucibles, to gather the necessary raw materials, and, most significantly, to hire the glassmen. Even after these arrangements were made, there were few certainties in the production of glass. A rush of cool air coming in at the furnace door frequently caused the crucibles to crack, spilling hundreds of dollars worth of molten glass. Thoughts such as these may well be what prompted the Parks brothers to abandon the Franklin partnership less than three weeks after the factory's opening.

The combined conditions of financial uncertainty, the isolated and untamed nature of the frontier, and the great demands of glassworkers formulated a situation of economic stress. Documentary evidence reveals Edmunds' financial instability throughout the eight years of factory occupation, as well as his repeated attempts to refinance. It is unlikely, under these circumstances, that Edmunds

found it possible to maintain a high standard of living for his employees.

The literature suggests that glassworkers would not have tolerated reductions in salary --competition was high and a more generous employer would not have been hard to find. But given Edmunds' additional responsibility to provide room and board for his workers, he may have found this an inconspicuous place to reduce spending. Many aspects of boarding workers can be expected to have material correlates that become part of the archaeological record. It is the position of this author that mounting economic difficulties should be reflected in the material culture of the Franklin Glassworks through decreased spending on some less important, status bearing items, particularly ceramics. In the following chapters, the framework for testing this hypothesis will be constructed.

Chapter III

ARCHAEOLOGICAL EVIDENCE

In 1928, glass-collector Harry Hall White located the Franklin Glassworks site on a knoll off of Seasons Road in Franklin Township. As his research was quite focussed, White made no attempt to systematically excavate the site, but rather, spent the next four years extracting information through extensive surface collections, random pitting and test trenching. No detailed results of this investigation have ever been published [Brose 1975:4].

Between 1932 and 1965 the Franklin Glassworks sank once again into obscurity. During the mid-1960's, however, local glass-collector Duncan Wolcott secured White's research materials, and by comparing photographs with the surrounding landscape, was able to relocate the site. Working together with James Courtney, Wolcott obtained funding through the Kettering Foundation for complete archaeological excavation of the factory. This work was begun in 1968, and continued through the summer of 1970, under a subsequent grant from Mrs. Warren Corning and James Courtney [Miller 1983:90].

THE FACTORY

Excavation of the factory area took place during the summers of 1968 and 1969 under the direction of Dr. David Brose of Case Western Reserve University. While not directly related to this study, a summary of Brose's work shows the factory to be a frame structure approximately 25'x 50', with a timber roof and packed clay floors. Seven furnace foundations were located within the structure, six of which were used in the preparation (fritting) or cooling (annealing) of vessels. The main furnace, clearly the largest, had four openings from which teams of glassblowers could work [Brose 1975:7-8].

Under the common "shop" system (with teams of four men), a furnace with four openings would suggest that the factory employed at least sixteen men, and as many as twenty, considering the number of auxiliary tasks associated with glass manufacture. This number, however, seems high for a frontier operation. It is likely that a slightly modified "shop" system, in which three, or even two men staffed each opening, was employed.

Artifactual evidence from the factory area was dominated by aqua, chartreuse, olive, citron and chestnut glass fragments. From fifteen waste dumps, 7900 fragments of a discernable form and 4800 unidentified fragments were recovered. In addition, the factory yielded over 1000 frit, and 6000 cullet samples [Brose 1975:10].

A second large artifact category from the factory was that of ceramic sherds. These fell into three categories: 1) salt glazed and glazed redware crocks, probably used for water storage, 2) a small number of white paste earthenware sherds of English manufacture, representing vessels from which workers ate and drank while at the factory, and 3) the largest category, clay crucible sherds from melting pots 3 to 5 gallons in size [Brose 1969:4].

Metal artifacts included a number of glassmaking tools, such as small triangular files used to break glass vessels from the blowpipe, pieces of the pipes themselves, and pucellas or shears. In addition, a number of cast pewter buttons, nails and hinges were recovered.

THE DOMESTIC AREA

Because there was no documentary evidence for an associated residence, factory excavations did not include testing for such a structure. Late in the summer of 1969, however, with the factory excavation nearly completed, excavators David Frayer and George Miller noticed increasing ceramic concentrations north of the factory. The association of other non-industrial artifacts with these concentrations suggested the presence of a domestic structure extending beyond the current limits of excavation.

As was previously noted, it was not uncommon for factory owners to construct a dormitory-type of structure on the grounds for the convenience and protection of their craftsmen. Based on this information, Miller and Frayer hypothesized that the Franklin Glassworks had provided such housing, and tested this by extending two perpendicular trenches, 2.5 feet wide and 25 and 50 feet long, north of the factory. These trenches failed to locate any structural evidence, but did identify an area of dense domestic refuse located approximately 50 feet from the factory's northernmost point, and continuing north for another 50 feet. Figure 2 illustrates the relationship between the factory and domestic excavation units.

Excavation of the domestic refuse area began in the summer of 1970 under the supervision of Miller and Alan Hugley. Five foot squares were opened where test trenches revealed large quantities of domestic refuse, and excavation proceeded by following artifact concentrations--a method which, in spite of its high return in feature and physical data, has greatly impeded the definition of site boundaries. That is, since no outlying areas were sampled, the potential for determining the size of the occupational area of the Franklin Glassworks is limited.

Complicating the definition of "domestic area" boundaries, was a lack of structural evidence. During the

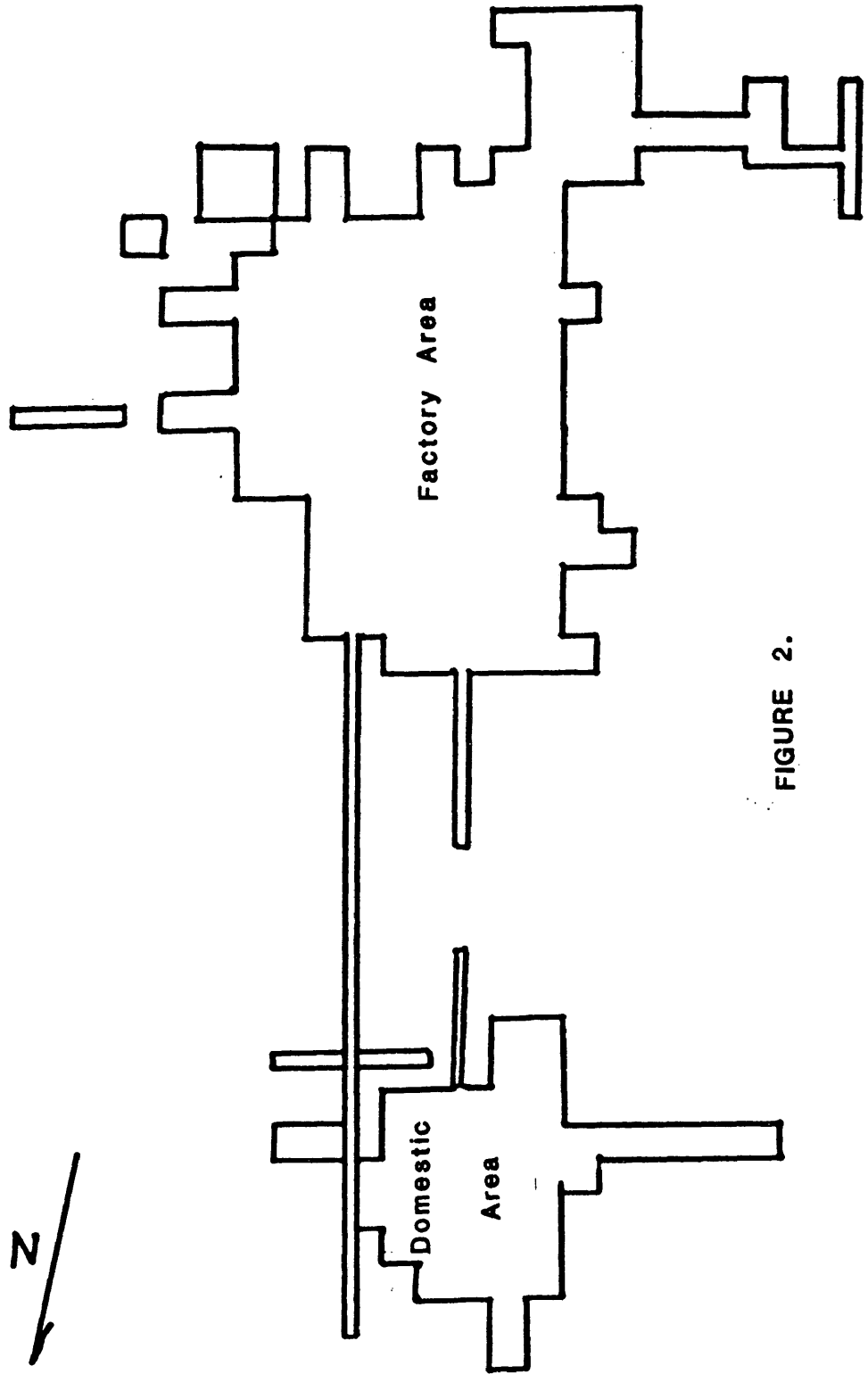


FIGURE 2.

summer of 1970, 1,330 square feet were excavated yielding only six shallow trash pits. Identification of this area as the locus for separate, domestic activities was based on clear functional differences between the northern area artifacts and those from the factory area.

Further confirmation resulted from mechanical stripping of the plowzone between the two excavation areas, which revealed a well. If there were two separate activity areas represented on lot 80, the intervening space would have been an ideal location for the water supply.

THE FEATURES

Figure 3 illustrates the positions of the six features within the domestic area. All were shallow intrusions into the glacial clay subsoil, and all showed evidence of plow disturbance. Since the plowzone was approximately 1' thick across the site, and some features extended only 6" below it, it is possible for as little as 1/3 of the original fill to remain in some pits. The problems that this poses for feature analysis will be addressed in a later chapter.

Figures 4 - 8 illustrate the dimensions of the six house area features. The two largest, features 46 and 51, are at the greatest dimensions approximately 9' x 5', while the smallest measured approximately 5' square. No

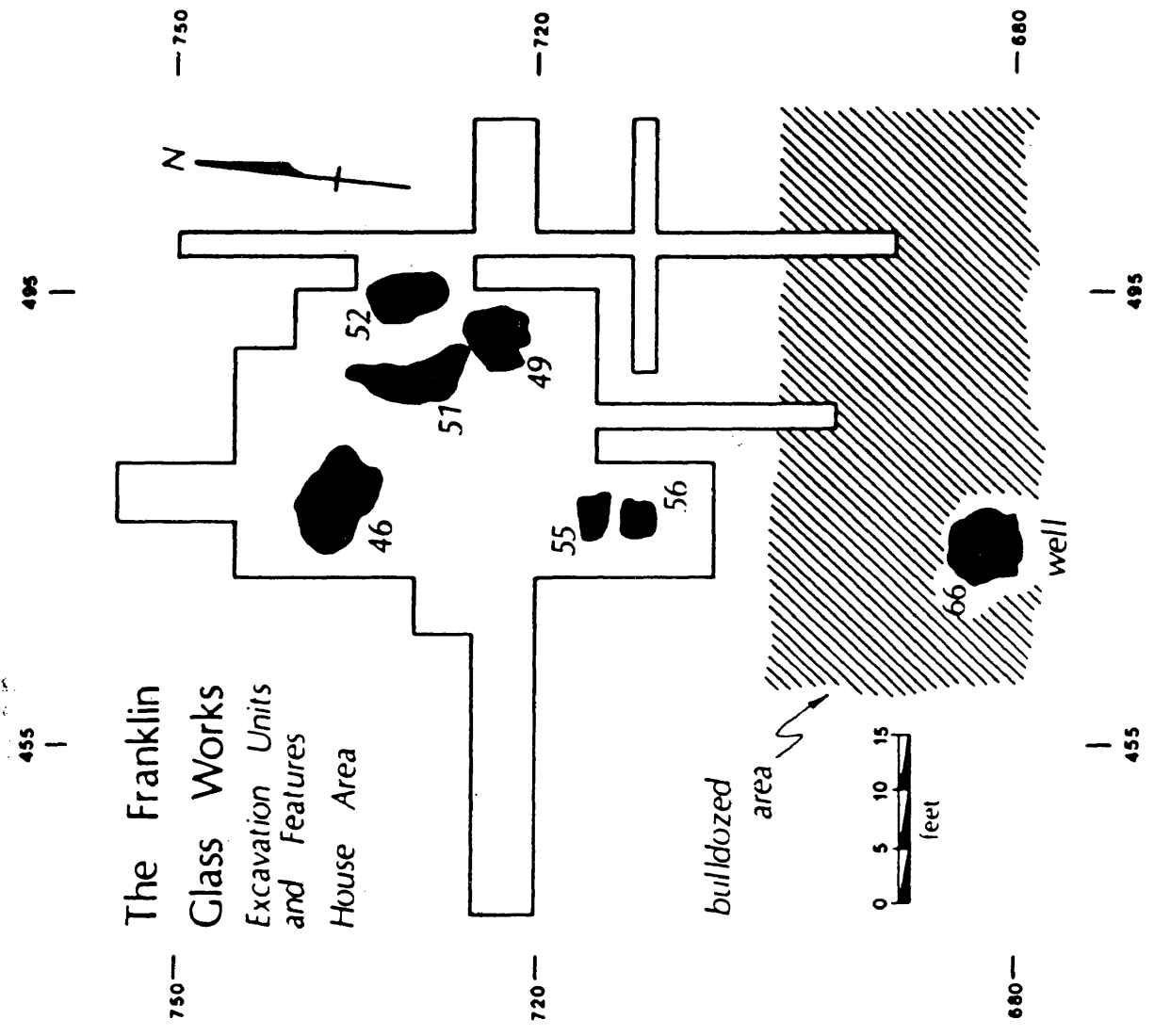


FIGURE 3.

feature extended further than 2 feet below the plowzone, or 3 feet from the surface.

FEATURE 46 [Fig. 4]

The northernmost and largest feature, 46 was filled predominantly with an ashy, dark brown loam. Isolated pockets of brick rubble and ash were contained within the fill, as well as a large rock.

Although it was the largest of the features, 46 contained an unusually high number of artifacts--more than the other five features combined. The largest artifact category was that of ceramics, with 206 sherds recovered. More than half of these were from a red ware crockery jar. The remainder were refined earthenwares.

Non-ceramic artifact categories were dominated by organic food remains, with 173 bone and bone fragments recovered. Other categories dwindled sharply. A few glass vessel sherds, window glass, nails and unidentified iron fragments comprised the balance of the assemblage.

FEATURE 49 [Fig. 5]

The smallest of the features, 49 was filled with a combination of dark brown and medium brown loam, flecked with bits of brick and charcoal. This was an exceedingly shallow feature, extending only 6" below the plowzone.

Most of the artifacts recovered from 49 were burnt animal bone. Other representative categories included ceramic, with 14 refined earthenware sherds excavated, nails, and a few window glass and glass vessel fragments.

FEATURE 51 [Fig. 6]

Another very large feature, 51 was filled primarily with light brown clay containing two large pockets, one of dark brown loam, and the other, dark brown loam mixed with charcoal and ash. At its deepest point, feature 51 extended slightly less than a foot below the plowzone.

As in feature 49, the largest artifact category in 51 was bone, although unlike the former, 51 contained no burned specimens. Also heavily represented were glass vessel sherds, and ceramic sherds. Of particular interest in this feature was a carved bone knife haft.

FEATURE 52 [Fig. 7]

Filled with a homogenous medium brown loam, feature 52 contained very few artifacts. Ceramic sherds made up half of the excavated assemblage. Twenty-one refined earthenware sherds were recovered, as well as 3 red bisque sherds. Also recovered were 13 bone fragments, one of which was burnt, and a number of glass vessel sherds.

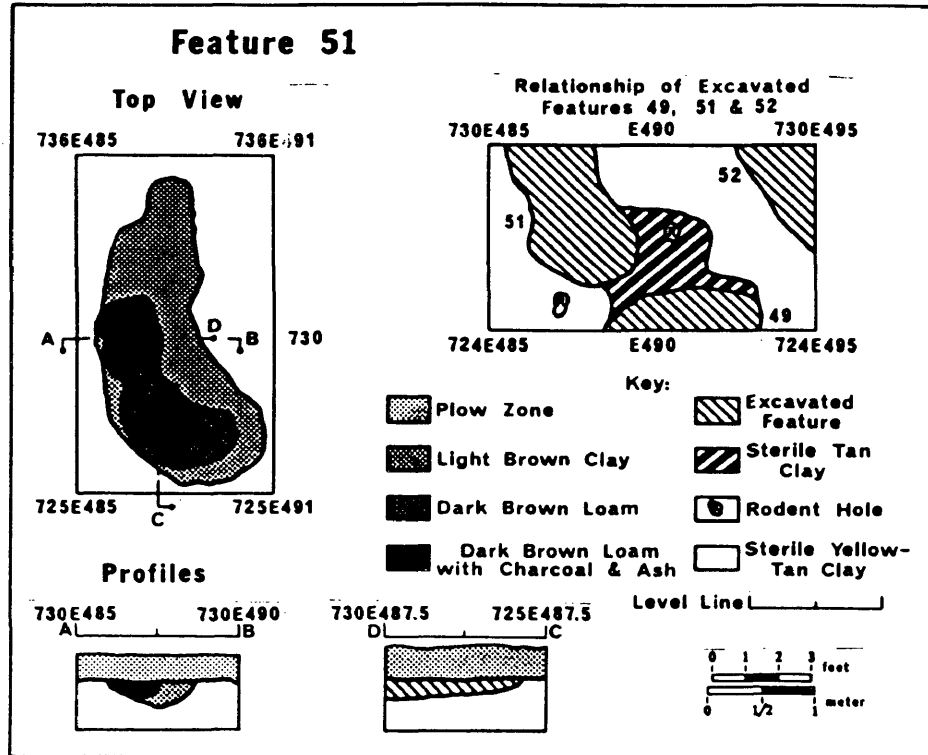


FIGURE 6.

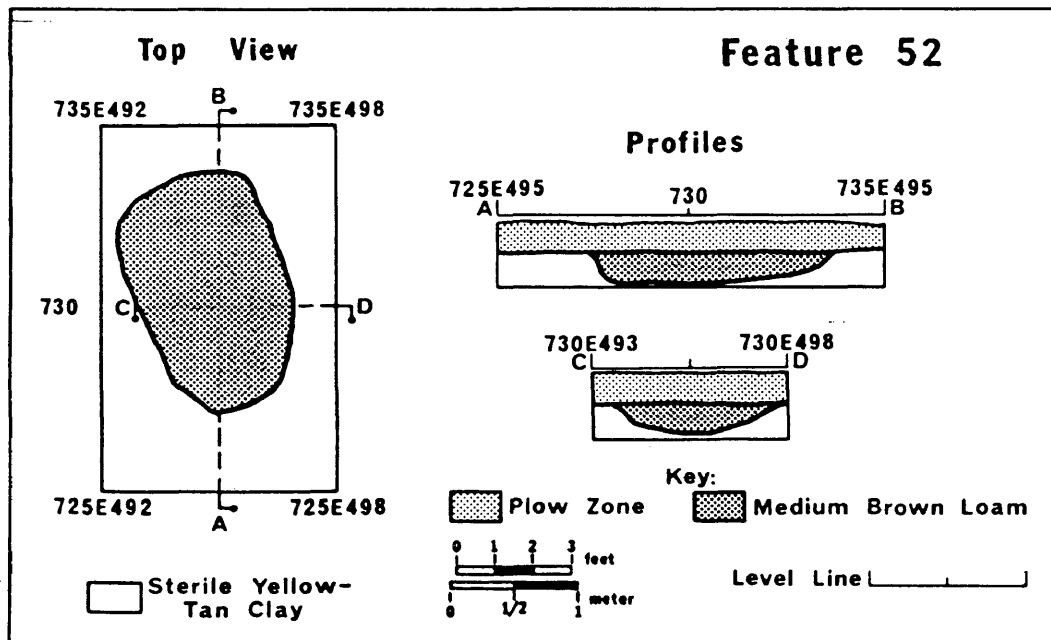


FIGURE 7.

FEATURES 55 & 56 [Fig. 8]

Features 55 and 56, very small and shallow pits, were exceptionally rich in artifacts. Both were filled with a dark brown ashy loam, and, given the presence ceramic mends between the pits, it is likely that these were two lobes of a single feature, truncated by the plowzone.

Forty-eight of the site's sixty-five window glass fragments derived from the fill of these two features. Feature 55 contained 26 of these, as compared to 22 fragments recovered from feature 56. Ceramics were most heavily represented by refined earthenwares, although these were the only two features to contain stoneware sherds. Of particular interest was an 1830 penny found in feature 56.

To this point, the six features described above have been labeled the "domestic area" with little evidence to substantiate the claim. Clearly there is a spatial separation between the two assemblages, but in order to demonstrate that the trash dump was not related to the factory, or that it was not from a later occupation, there must be proven functional differences and chronological similarities between the factory and "domestic area" assemblages.

Ceramic dates between factory and domestic refuse areas suggest simultaneous occupation, with a number of transfer-printed patterns (although no vessels) shared

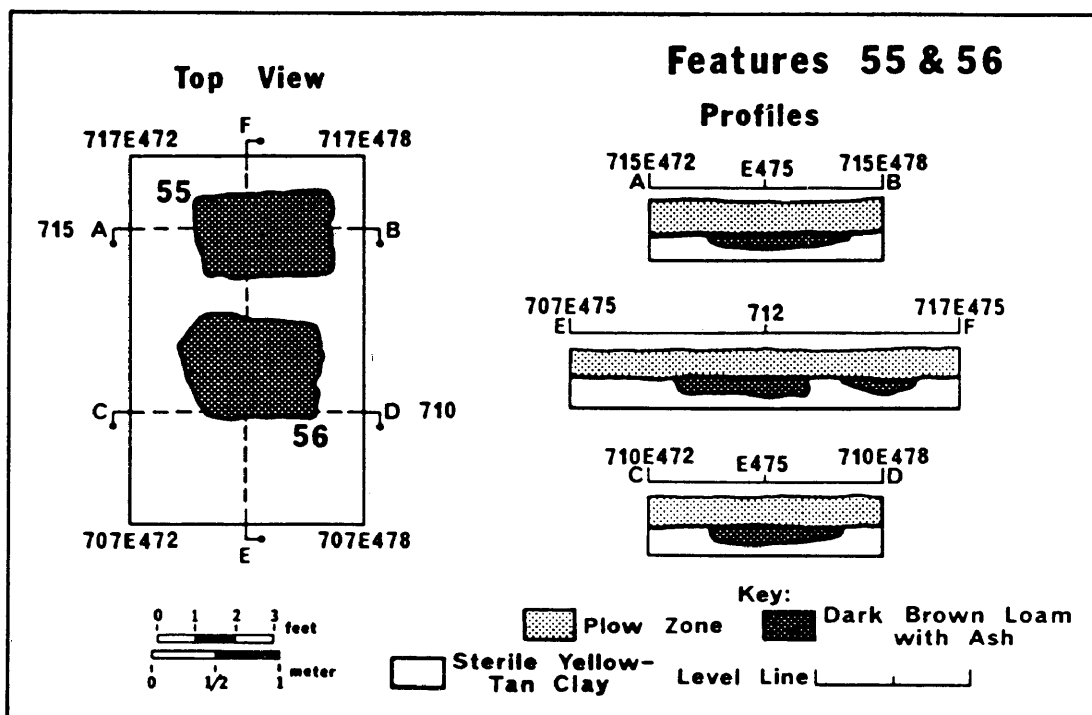


FIGURE 8.

between the two sites. Evidence for contemporaneity was strengthened by the recovery of an 1830 penny from feature 56. This date coincides with the 1824-1832 dates of factory occupation.

While there are obvious chronological similarities between the two assemblages, their contents exhibit striking differences. Factory refuse was dominated by frit, cullet and other industrial refuse, while this category accounted for less than 3% of all domestic area artifacts. On the other hand, the domestic refuse area yielded 141 refined earthenware vessels to the 102 excavated from the factory. After adjusting these figures to reflect differing site sizes, there were roughly four times more vessels discovered per excavated foot in the domestic area than in the factory area.

This demonstration of two separate occupational areas leaves one very fundamental question unanswered. If the factory included a structure used to house the glassworkers, why did testing and excavation fail to pick up structural evidence? There are at least two possible explanations. First, the house may have fallen outside of the excavated area, in which case areas of domestic debris (i.e. the trash pits) may be the only remaining evidence. Insofar as this investigation concerns the ceramic assemblage, lack of a structure is of little consequence.

A second possibility is that, like many houses on the frontier, this was a log structure, the evidence for which was quickly plowed away. While damage done by agricultural equipment is visible in the truncated features, reference to historical documents and oral histories details its duration and extent.

According to an 1850 Portage County Plat Book, the earliest land record for the area, the land was owned by Christian Cackler, once a partner in the Franklin Glassworks operation. The evaluation of Cackler's property lists 35 acres of plow land, 98 acres of meadow, 15.8 acres of woods and unarable land.

While this assessment cannot be used to prove that the factory and domestic areas were not under cultivation in 1850, the extent of meadow lands would suggest that they were not. With 98 acres available for cultivation, the brick-filled factory ruins would be an unlikely spot to select for plowing [Miller 1974:10].

Interviews conducted by George Miller with local farmers provided details for much of the 20th century. Mengas Anderson recalled plowing lot 80 with horse-drawn plows, and having to drive the team back and forth over the factory to break up the "brick walls" (probably the furnaces). Elmer Gimberling, another local resident, indicated that horse-drawn plows had been used as late as the 1930's. Evidently mechanical plowing, the deepest and

most destructive type, was not introduced on lot 80 until after World War II [Miller 1974:9-10].

Summary and Conclusions

The Franklin Glassworks site includes two components: the factory and the domestic areas. The former is characterized by a hard-packed clay floor, 7 furnace footings and 15 waste dumps containing industrial debris. Evidence for the latter is much more subtle. Excavation of the domestic area revealed six shallow trash pits exhibiting clear signs of plow disturbance. There was no structural evidence.

The assertion made in this chapter is that the trash features contain refuse generated by the workers in a non-factory related context. Frit and cullet, two glassmaking ingredients highly represented in the factory area, were present in insignificant quantities on the domestic site. On the other hand, the domestic area yielded nearly four times the ceramic sherds recovered from the factory. Finally, the spatial arrangement of the site, with a well and privy located between the two areas, also seemed to suggest separate but contemporary usage.

In Chapter 4, these pits will be arranged chronologically to permit observation of changing spending patterns. As this chapter indicates, however, the

destruction caused by agricultural activity and insubstantial size of the features present obstacles to the analysis of feature fill. The severity of these obstacles will be considered in a later discussion.

Chapter IV
ARTIFACT ANALYSIS

The ability to establish a chronology, or the order in which a series of events occurred, is central to the discovery of change over time. Since the objective of this investigation is to observe the spending patterns of glassworkers during a period of financial decline, discrete units of depositional activity must first be identified. Once these have been isolated, they may be ordered chronologically. Finally, the spending patterns reflected in each temporally significant unit must be calculated for comparison with the other units. This chapter addresses the first and second of these tasks: the identification and chronological ordering of units.

From an archaeological standpoint, the filling of each of the six domestic area features represents a discrete depositional activity. Although this is not necessarily true on sites of longer duration, or within features exhibiting obvious layers, those excavated north of the Franklin Glassworks were probably filled within a short period of time.

Theoretically, then, the domestic area provides six temporally meaningful units that might be arranged

chronologically. Archaeology, however, is unsuited to detecting six periods in an eight year occupation, and to attempt such a breakdown would probably result in more speculation than chronological distinction. Given the short occupation of the site, the proximity of features to one another and the general lack of depth among features, the goal of this investigation is, therefore, to define "feature clusters," or groups of features that are temporally related, rather than to order all six.

Reduced to its most basic elements, archaeology can be described as a study of the interrelationships between space, form and time [Spaulding 1960:439]. Based on these criteria, the analysis of the domestic area features will encompass three phases. Phase I will examine the position of features in space in an effort to determine which are most closely related in that dimension. In Phase II, the artifactual content from each pit will be compared. Drawing on functional similarities and differences, the trash pits will be grouped according to the types of activities they represent. These groups will then be compared to those derived from Phase I observations, and based on these spatial and formal dimensions, features will be grouped into clusters which define discrete periods of depositional activity.

I. Spatial Analysis

Of the three phases of this investigation, spatial analysis is certainly the most straightforward, involving only the observation and classification of the features on the basis of their positions in space. Clearly the assertion that physical proximity implies chronological or even functional similarity is not a strong argument. The spatially related groups or "clusters" identified in this way are, however, intended only to strengthen or point out discrepancies in the groupings achieved through functional analysis in the next section.

Figure 9 illustrates the positions of features 46, 49, 51, 52, 55 and 56. Because this is a small site, all features are reasonably close together. However, in examining the locations of these pits, the site appears to be divided into northern, eastern and southern components, with feature 46 in the north, 49, 51 and 52 in the east, and 55 and 56 in the south. The three "clusters" may then be defined as follows:

<u>I</u>	<u>II</u>	<u>III</u>
46	49, 51, 52	55, 56

These tentative groupings will be checked against those based on functional similarity in the next section.

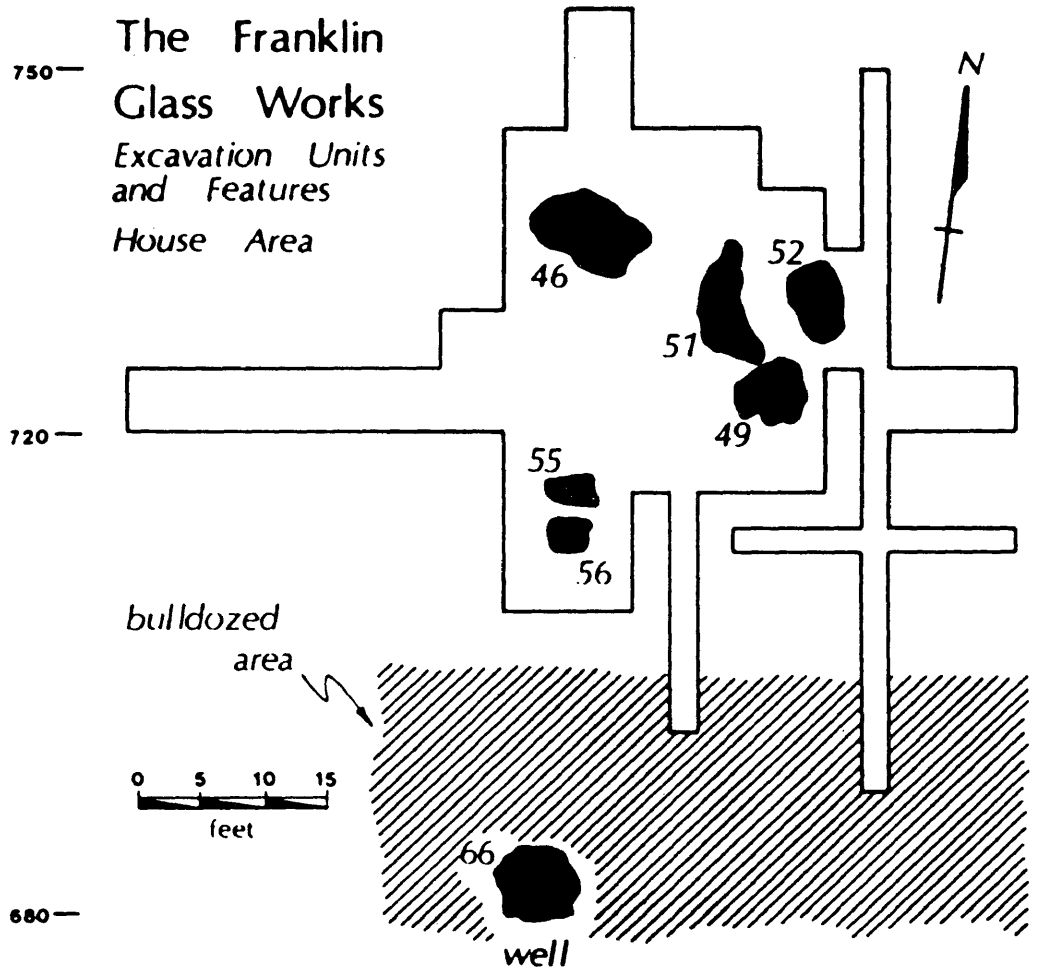


FIGURE 9.

II. Functional Analysis

To base chronological relationships between features on similarities in their artifact assemblages assumes a specific relationship between time and depositional type. That variability in artifact frequencies may have chronological significance has been suggested by Rubertone in her study of urban land use patterns [Rubertone 1982].

Archaeological analysis of depositional patterns commonly draws a direct correlation between specific artifact frequencies and the behavior that produced this pattern. The recovery of large numbers of nails and window glass fragments for example, is interpreted as evidence for intensified, or near-by construction activity.

Rubertone, however, finds a clear relationship between artifact frequency, spatial context and activity to be problematic in that it dismisses factors that affect the rate of deposition (such as use-life and span of manufacture), and depositional context (such as artifact size, condition and material). By observing differential occurrence of artifact classes among depositional types, she found patterns conforming closely to documented historical events, and to observed architectural changes, yet these did not necessarily reflect the activities performed in that area. As Rubertone concludes, "the

archaeologist's search for artifactual residues of certain types of activities in given temporal periods may result in frustration [Rubertone 1982:140]."

For the purposes of this investigation, the assemblage from each domestic area feature was divided into functional categories based on those developed by Stanley South. The quantity of each artifact type and was recorded, and added within artifact classes. Percentages were then calculated to demonstrate the contribution made by each class to the entire assemblage. As in South, faunal bones have been excluded from the analysis, since they are not the same type of by-product of human behavior represented by the other groupings. They have, however, been included in the chart for the reader's consideration.

The results of the functional groupings are reported in Table 1. To summarize, all features are characterized by high kitchen values which, in all features but 55 and 56, dominate the assemblage. Features 55 and 56 exhibit slightly higher values for architectural refuse. "Clothing" and "personal" artifact categories are poorly represented in all features, with their combined contribution never exceeding 2.5% of the assemblage. Finally, the "activities" group, which on this site contains only glass manufacturing debris, comprises between 2% and 10% of the recovered artifacts from each feature.

	#	46 %	#	49 %	#	51 %	#	52 %	#	55 %	#	56 %	TOTALS
KITCHEN:		86.26%		55.56%		60.34%		91.43%		45.33%		40.73%	
Refined Earthenware	83	31.68%	14	38.89%	10	17.24%	21	60.00%	19	25.33%	18	22.22%	165
Stoneware	-	-	-	-	-	-	-	-	10	13.33%	7	8.64%	17
Red Bisque	123	46.95%	-	-	5	8.62%	3	8.57%	-	-	1	1.23%	132
Glassware	20	7.63%	6	16.67%	20	34.48%	8	22.86%	5	6.67%	7	8.64%	66
ARCHITECTURE:		11.06%		38.89%		27.59%		2.86%		54.67%		54.32%	
Window Glass	6	2.29%	3	8.33%	7	12.07%	1	2.86%	26	34.67%	22	27.16%	65
Nails	7	2.67%	11	30.56%	9	15.52%	-	-	11	14.67%	20	24.69%	58
Construction Hardware	16	6.10%	-	-	-	-	-	-	4	5.33%	2	2.47%	22
CLOTHING:		.38%		-		-		-		-		1.23%	
Buttons	1	.38%	-	-	-	-	-	-	-	-	1	1.23%	2
ACTIVITIES: (Glassmaking obj.)		2.30%		5.55%		10.34%		5.71%		-		2.46%	
Slag	3	1.15%	-	-	1	1.72%	-	-	-	-	-	-	4
Cullet	3	1.15%	2	5.55%	5	8.62%	2	5.71%	-	-	1	1.23%	13
Crucible sherds	-	-	-	-	-	-	-	-	-	-	1	1.23%	1
PERSONAL:		-		-		1.72%		-		-		1.23%	
Coin	-	-	-	-	-	-	-	-	-	-	1	1.23%	1
Jackknife	-	-	-	-	1	1.72%	-	-	-	-	-	-	1
TOTALS	262	100%	36	100%	58	99.99%	35	100%	75	100%	81	99.97%	547
BONE	173		37		26		13		17		7		

TABLE 1.

Based on Rubertone's investigation, features exhibiting similar percentages for specific artifact classes should bear a chronological relationship. Referring to the chart then, features 55 and 56 are the most nearly similar, exhibiting less than a 5% difference in all artifact categories. Features 49 and 51 also show great similarity, with "Kitchen" artifacts comprising slightly more than half of the assemblage, and architectural materials ranging from 27% to 38% of the total.

The northernmost feature, 46, clearly stands apart from the other 5 based on functional analysis. This trash deposit was characterized by very high "kitchen" values, and correspondingly low values for architectural artifacts.

Only feature 52 deviates from the groupings proposed on the basis of spatial position. The extremely high values for kitchen artifacts (91%) suggest a similarity to the feature 46 assemblage, however, architecture and activities categories do not support this relationship.

One explanation for the non-conformity of feature 52 may be the scarcity of artifactual evidence. A sample size of 35 (after the removal of faunal bone), makes it very difficult to discern differences between assemblages. While the use of ratios lessens the effects of varying sample sizes, 91% of 35 artifacts is not as significant a

statistic as 86% of 262 artifacts. It is felt then, that due to the small sample size of 52, and in light of its physical proximity to 49 and 51, this feature should be grouped with 49 and 51 for later analysis.

Summary and Conclusions

As demonstrated by Rubertone (1982), two or more features exhibiting similar proportions of functionally related materials are likely to be related in time. Based on the similarities in their fills, the six domestic area features were grouped into the following three clusters:

<u>I</u>	<u>II</u>	<u>III</u>
46	49, 51, 52	55, 56

A comparison between this order and that derived through spatial observations shows them to be in general agreement. Through spatial and functional analysis, evidence has been presented that suggests the presence of temporally significant units. If features within these clusters were filled at roughly the same time, then those groupings must have a discernable order. The discovery of that order is the goal of the chronological analysis.

III. Chronological Analysis

Introduction:

The objective of this section is to build a chronological framework for the feature clusters, based on ceramic assemblages. Two points need to be addressed before this objective can be accomplished. First, the ceramic assemblage must be identified and characterized, and secondly, the assemblage must be adapted for use in the cluster framework.

The ceramic assemblage under investigation here is that classified in the functional analysis as "refined earthenwares." Red bisque and stoneware categories have been excluded for the simple reason that they provide comparatively little chronological information. Referring back to Table 1, in which functional categories are outlined, one of the great limitations of this site should be obvious. The small size and lack of depth among features result in sherd counts that, with one exception, do not exceed 21. Feature 46, the largest feature, contained 83 refined earthenware sherds. Since this study proposes to analyze ceramics at the vessel, rather than the sherd level, the number is further reduced. Clearly a combined vessel count of 34 is insufficient to make any positive chronological statements.

One means by which to supplement the assemblage is to include in the analysis those sherds recovered from the plowzone. While inclusion of the plowzone sample raises the sherd count from 165 to 3277, and the vessel count from 34 to 141, it also raises some legitimate concern over the integrity of the resulting assemblage. The ability to attribute vessels to specific site locations (clusters) is central to this investigation, and the displacement of sherds, especially on a horizontal plane, is therefore problematic.

The degree of confidence that can be placed in the integrity of a plowzone sample should depend, to some extent, on the length and intensity of agricultural activity. The effects and extent of plowing on lot 80 were briefly discussed in chapter three. To reiterate the significant points, plowing appears to have been continuous on this lot at least since the beginning of the 20th century, although mechanical plowing was probably not a factor until the close of World War II. Regardless of duration, the effects of plowing were clear in the depth of the plowzone, and its richness from an artifactual standpoint.

One recent investigation by Julie King and Henry Miller on the van Sweringen site in St. Mary's City concluded that while plowing results in the inevitable mixing and blurring of artifacts, there is actually

minimal horizontal movement. Further, this study strongly suggested that the activities responsible for specific deposits are distinctive enough to reveal patterns in spite of mixing [King and Miller: 1987]. More relevant to this site, in a 1986 article "Of Fish and Sherds: a Model for Estimating Vessel Populations From Minimal Vessel Counts," George Miller attempted to calculate the degree of horizontal movement of sherds from the domestic area of the Franklin Glassworks. Investigation of the cross-mends revealed that almost 38% of the mends were between sherds found less than 5 feet apart, and that 80% of all mends were less than 15 feet apart. Complete results of this study are presented in Table 2.

TABLE 2

DISTANCES BETWEEN CROSSMENDS FOR THE HOUSE AREA
OF THE FRANKLIN GLASSWORKS

	<u>No.</u>	<u>% of mends</u>	<u>Cum.</u>
Mends less than 5'	60	37.97	-
Between 5' and 10'	27	17.09	55.06
Between 10' and 15'	40	25.32	80.38
Between 15' and 20'	17	10.76	91.14
Between 20' and 25'	5	3.16	94.30
Between 25' and 30'	8	5.06	99.36
Between 30' and 35'	1	.63	100.00

[Miller 1986:62].

These statistics seem to indicate that plowing, despite its intensity, had minimal impact on the horizontal distribution of artifacts on this site.

Further, it appears that archaeological precedent not only permits but approves the consideration of plowzone samples with those sherds recovered from the features. For the purposes of creating a ceramic chronology, then, plowzone and feature samples have been combined.

Earlier phases of this investigation, including spatial and formal analysis, resulted in the identification of "feature clusters" which were determined to have temporal significance. For chronological data, based on the ceramic assemblage, to be applied to these "clusters," the 141 vessels also had to be attributed to specific clusters.

When sherds from a vessel were recovered from a feature, vessel attribution was straightforward--the vessel was simply assigned to that feature's cluster. But the incorporation of plowzone sherds required some method of attributing vessels with no feature association. It is assumed here that most vessels were originally deposited in trash features.

To this end, a map of excavation units was superimposed on a map delineating feature locations. All units overlying any portion of the three identified feature clusters were sectioned off and attributed to that cluster. The cluster units are depicted in Figure 10.

With cluster units identified, the 141 domestic area vessels were individually plotted on this map. When sherd

concentrations suggested that a vessel fell within a specific cluster unit, that vessel was catalogued as part of the cluster's "assemblage." Using this procedure, 117 of the 141 domestic area vessels could be assigned to one of the three feature clusters. The appendix identifies the vessels from each cluster.

Chronology

Through spatial and functional analysis, the trash features from the domestic area have been grouped into 3 temporally meaningful clusters. The purpose of chronological analysis is to create an order for those clusters based on ceramic assemblages.

Archaeological chronologies may be constructed in one of two ways. Absolute chronologies are based on known dates of occupation, and derive their information from historical sources. On the Franklin Glassworks site, for example, the absolute chronology includes an opening date of 1824, court cases suggesting financial distress in 1827, 1829 and 1831, and a closing date of 1832.

Relative chronologies, on the other hand, create an order among events that occurred during that occupation, but do not place the resulting sequence in time. They are based on datable artifacts found in archaeological contexts, and are created by comparing assemblages between

features, site areas, or other units of archaeological investigation. The chronological analysis undertaken in this section draws upon both types of information to better understand the effects of financial decline.

How an assemblage is analyzed determines, to a great extent, whether the resulting chronology is absolute or relative. There are two ways to analyze archaeological data, the first being quantitative, and the second, qualitative. Quantitative analysis, typified by the work of Stanley South (1977), is based on the number of artifacts of a specific, datable type recovered from a particular context. Chronological information is obtained by comparing that number between contexts. Because the quantitative method is based only on comparison, it can yield, by definition, only relative chronologies.

The qualitative method, typified by the work of Ivor Noel Hume (1982), is based on the presence or absence of an artifact (or artifact trait) with a documented date of introduction. While qualitatively derived dates are not "absolute" in the strictest sense (that is, they do not historically document the deposition of the assemblage) they do provide a solid date in the form of a terminus post quem.

The choice of ceramics as the basis for chronological comparison was discussed in the first chapter. Briefly restated, ceramics are the single artifact class from the

domestic area assemblage that exhibit sufficient variety to be analyzed for chronological differences. Also, through use of Miller's ceramic index, this artifact class can address both variables under investigation here: time and expenditure. Some intrinsic properties of ceramics have made them the focus of many chronological investigations. First, their widespread availability and frequent use almost assures their presence in any domestic context. Secondly, ceramics exhibit wide stylistic variations. Rapidly changing taste and technology resulted in the frequent replacement of broken vessels with patterns and styles reflecting the latest fashion. With the aid of manufacturer's records and importers invoices, these changes can be dated with a fair degree of accuracy.

Quantitative Analysis

Perhaps the simplest method of creating a chronology for the domestic area assemblage is to divide the vessels on the basis of ware type--that is, into assemblages of pearlware and whiteware. This very crude distinction is a reflection of technological changes instated by the Staffordshire potters.

Chronologies for 17th and 18th century ceramics, such as those formulated by Ivor Noel Hume (1969) or

Stanley South (1977), are grounded in the frequent introduction of ware types. The enormous variety of ceramic wares available during that period resulted in assemblages with major recognizable differences in paste and glaze. Through an examination and seriation of these differences, very accurate, detailed chronologies have been delineated. The most frequently cited ceramic chronology is that outlined by Ivor Noel Hume in his Guide to Artifacts of Colonial America (1969).

By the end of the 18th century the overwhelming success of the English earthenware manufacturers drastically reduced the number of wares available. As light-bodied earthenwares gained sudden, almost rampant popularity, the use of salt-glazed stoneware, delftware, slipware and other tablewares declined sharply. Consequently, 19th century ceramic assemblages, when compared with those from a century before, appear to lack the variety necessary for tight dating based solely on ware type.

Some archaeologists responded to this situation by shifting the focus of ceramic studies away from chronology and toward such issues as economics. Others continued to look at chronology, but concentrated on minor distinctions in earthenwares indicative of technological change throughout the late 18th and early 19th centuries.

English white earthenware was manufactures in three forms: creamware, pearlware, and whiteware, among which there are some very crude temporal distinctions. Creamware, the earliest of the three, was perfected no later than 1762 by Josiah Wedgwood. It had a thin, hard-firing pale yellow body, and a clear glaze with a yellow, or sometimes greenish, cast. Throughout the years of its manufacture, creamware was gradually refined to a lighter color so that by 1785, according to Noel Hume, the difference between early and late creamware was quite pronounced [Noel Hume 1969:126].

When the market grew tired of creamware, by the late 1770's, Wedgwood replaced it with pearlware. Beginning with a standard creamware paste, he added a small quantity of cobalt to the glaze. The bluish cast that resulted from this process offset any yellow color from the body. One of the best means of distinguishing pearlware vessels is to examine the footrings, handles or other crevices where puddling intensifies the blue cast of the glaze [Noel-Hume 1969:129-30].

By 1820, through further refinements, pearlware was being transformed into a very white-bodied, colorless glazed earthenware. A combination of whiteware and pearlware make up the vast majority of 19th century ceramic assemblages.

Because occupation of the Franklin Glassworks site began in 1824, after the introduction of whiteware, all three ware types were expected in the cluster assemblages. Quantitative analysis, therefore, involves calculating the percentage or ratio of each type to the others. Based on the information presented above, a logical prediction might be that, over time, the amount of pearlware in each feature should decrease, while the percentage of whiteware increases.

Creamware, which with 6 vessels constituted only 3% of the entire vessel population, was not considered an important element in the chronological investigation. Since it had been replaced by pearlware and whiteware before 1820, the presence of creamware on this site probably serves as an economic statement rather than a temporal one: The 4 bowls recovered may have been part of a kitchen ware set used only where display was not an issue. This would explain why the factory assemblage contained a greater number of creamware vessels, despite a vessel count that was roughly 40% smaller than the house sample.

The percentages of creamware, pearlware and whiteware were calculated separately for each cluster, with the following results:

TABLE 3
WARE-TYPES WITHIN FEATURE CLUSTERS

	I (46)	II (49, 51, 52)	III (55, 56)
Number of vessels	37	37	43
Percentage Whiteware (number)	54.05% (20)	37.8% (14)	69.8% (30)
Percentage Pearlware (number)	37.8% (14)	54.05% (20)	30.23% (13)
Percentage Creamware (number)	8.1% (3)	8.1% (3)	- (0)

Based on the percentages of whiteware and pearlware in each cluster, I through III were ordered chronologically. Cluster II, containing the highest percentage of pearlware and the lowest of whiteware, was determined to be the earliest of the feature clusters. The most recent appears to be III, with 69.8% whiteware and only 30.23% pearlware, while cluster I fell clearly in between.

To summarize the data then, the relative chronological order of the domestic area clusters, based on quantitative analysis, appears to be:

Earliest: Cluster II (features 49, 51, 52)
Middle: Cluster I (feature 46)
Latest: Cluster III (features 55, 56)

In the next section, qualitative data are compared with these results both for confirmation, and for more concrete dates that may anchor these clusters in time.

Qualitative Analysis

Changes in ceramic technology were few during the 19th century, and are certainly of little use in dating an 8 year occupation. But while ware types remained relatively unchanged throughout the 19th century, decorative techniques changed rapidly. This was especially visible among transfer-printed vessels, which constitute a large proportion of the domestic area assemblage.

Temporal Changes: Decorative Technique

Transfer-printing was a long-lived and very popular means of decorating ceramics that was introduced in 1753. Its advantages over hand-painting were clear in that it permitted very detailed decoration, and could be used repeatedly to create identical sets of tea and tableware at small expense.

The value of transfer-printing for chronological purposes has close ties to the development of white earthenwares. Prior to the introduction of creamware, the types of wares suitable for printing were extremely

limited. Some delft tiles were transfer-printed, as were English porcelains, but the more common light-bodied ware, salt-glazed stoneware, had too granular a surface for good quality decoration [Hughes n.d.:56].

The newly introduced creamware provided an excellent surface for printing. With a light body and smooth surface, creamware could be printed over the glaze, and was successfully produced and marketed with black printed decoration. While blue printing was, in fact, more popular, creamware proved too yellow to be printed in this color.

It was not until the advent of pearlware that underglaze blue transfer-printing gained popularity. Pearlware, with its white body and slightly blue glaze proved a complimentary background for the heavy blue Chinese style patterns that dominate late 18th century transfer-printed wares [Hughes n.d.:126].

From the 1790's until about 1810, improvements on transfer-printing ran towards creating more delicate patterns. The thick lines and linear shading characterizing early examples were gradually replaced by sharper images and the use of stippling as a shading technique. Of the blue transfer-printed wares recovered from the domestic area, most are of a negative pattern. This is a technique whereby the background is sketched in various shades of blue while the actual pattern is

rendered in white. It required a greater control over the cobalt (to prevent it from flowing) than was exhibited in positive image printing, and was popular from about 1822 until 1830 [Miller: personal communication]. The fact that these dates span almost the entire occupation of the glassworks explains the clear predominance of dark blue, negative printed patterns on the site.

As with many popular styles, dark blue transfer printing became common during the early 19th century. Demand slackened, and by September 1830, one of the Boston Earthenware dealers began reducing the price of dark blue printed wares [Records of the Association of Earthenware Dealers of Boston, 1817-1835]. Evidently dark blue was considered out of style by at least that date, and probably a few years before.

Between 1820 and 1830, the colors in which printed wares were available expanded considerably. Merchant's account books and correspondence between manufacturers and importers are just two of the sources that provide dates of introduction for each of these colors.

Light blue transfer-printing appears to have been one of the Staffordshire potters' earliest attempts to hold the interest of consumers. Nancy Dickenson, a Research Fellow at Colonial Williamsburg, has spent the last two years extracting information from the letters of Staffordshire potters Ralph and James Clews to their

importer in New York. In a letter dated 22 May, 1829,

Clews writes:

"Our friend Greenfield writes us that light patterns with pale Blue are now wanted--we are pleased to have this, and in a short time. a/c we send you out the various Patterns, amongst the rest some of this description. will you be so good as to show them to the Dealers and write us without loss of time how they are approved..."

The response to the Clews light blue line was apparently favorable, for less than 3 months later, on 14 August 1829, Clews writes his importer:

"...we have now got to work fairly with our light blue ware in every thing and shall now very shortly complete every order in our Books "...as we sent out"...a specimen of our New Patterns, shapes etc. etc. we trust the Dealers will approve of them and that you will be able to send us some good and esteemed orders so that we may be spared the unpleasantness of again discharging our hands which is not only attended with considerable expense but much inconvenience"...Should the Dealers see anything new from any quarter by sending us specimens and will give as (us?) a fair price we will make it for them--cost what it will..."

While these excerpts from the Clews correspondence would seem to suggest an 1829 starting date for light blue printed ware, it is also clear that the Clews brothers were not responsible for its introduction. The first sentence of the May letter implies that light blue transfer-printing had been introduced by at least one other potter and that Ralph and James were simply trying to compete.

A limited survey of invoices reveals that as early as 1824, importers were describing their printed wares as "dark blue," indicating that another shade must have been available. Whether that shade was a brighter cobalt blue or light blue is uncertain, however, on May 19th 1826, the account books of Philadelphia merchant George Coates record the sale of "2 sets of handled Irish teas, pale blue print [Coates Accounts Books]." Evidently light blue printed wares were available by 1826. The fact that in that year Coates stocked light blue only in teaware, the vessel form through which status was most often conveyed, suggests however, that it was quite new.

Shortly after the introduction of light blue, the Clews correspondence begins to make reference to an assortment of "fancy colors." Though not named specifically, the assortment probably consisted of the brown, red and green printed wares that appeared in large quantities beginning in 1829. Of these colors, only one brown printed vessel was recovered from the domestic area.

As mentioned earlier, printed wares from the domestic area were dominated by dark blue negative patterns. There appears, however, to be one set of light blue transfer-printed tableware (represented by 5 vessels), and at least one brown printed vessel. Since light blue was available after 1826, it can be assumed that any cluster containing

light blue sherds must have been deposited after that date.

Unfortunately, the presence of light blue printed wares proved of little benefit to the chronological ordering of feature clusters, since all clusters contained one or more vessels from the set in question. To remove all ambiguity, features were assessed separately, as well as in clusters, and, in fact, all features contained vessels of this variety. Thus, while no order was discerned through an analysis of changing decorative techniques, the domestic area clusters were shown to be deposited after 1826 rather than 1824 as was originally believed.

Temporal Changes: Style

A second advantage to examining transfer-printed wares for chronological information lies in the recognizability of specific patterns. Painted wares, because they were hand decorated, exhibited a great deal of variation, even within the same set. Lack of consistency may have been partly responsible for the fact that painted patterns were rarely named.

Through the process of transfer-printing, sets could be produced that were entirely identical. Further, the significant increase in detail permitted by the printing process led to a tremendous variety of patterns that were

distinguished by specific pattern names. Knowing the name of a particular pattern frequently enables one to identify its date of manufacture through references in ledgers, invoices and other correspondence.

The size of the domestic area sherds and the fact that the average vessel is only 1/32 extant, reduces the chance of discovering recognizable patterns on this site. Of the patterns recovered from the Franklin Glassworks domestic area, only one could be identified by name.

"Tuscan Rose," represented by a single brown-printed whiteware plate, was manufactured and marketed by Ralph and James Clews beginning in 1829. A letter from the manufacturers dated April 15th lists among the "Sundries forwarded to Messrs Ogden Ferguson & Co. "for approval, 1 light-blue printed Tuscan Rose plate." If the "Tuscan Rose" pattern were introduced early in 1829, given the time necessary to accrue and fill orders from North America, it is unlikely that the pattern reached the Western Reserve before the fall of that year. The presence of "Tuscan Rose," then, provides a clear terminus post quem date of 1829.

The scarcity of "Tuscan Rose" on the domestic area site has been discussed. The fact that there was only one vessel in evidence probably speaks to the late introduction of this pattern. That is, if it were

introduced late in the factory's history, fewer vessels would have been broken.

Summary

The purpose of this chapter was to define a chronological order for the filling of the 6 domestic area trash features. Ultimately, this order was to be used to analyze relative ceramic expenditure over time.

The artifacts from the Franklin Glassworks domestic area were analyzed from the standpoint of space, form and time. As the site was occupied for only 8 years, isolating 6 temporally meaningful units seemed unlikely. Spatial and formal analyses were therefore directed toward creating three "feature clusters" from the 6 domestic area trash features. Based on proximity in space, and similarities in fill composition, feature 46 was identified as Cluster I, features 49, 51, and 52 as Cluster II, and features 55 and 56 as Cluster III.

With three temporally related "feature clusters" identified, the goal of chronological analysis was to order them in time. To this end, the ceramic assemblage of each cluster was examined from quantitative and qualitative perspectives in order to ascertain relative and absolute chronological order. Quantitative analysis, based on relative percentages of pearlware and whiteware,

suggested that Cluster II (49, 51 and 52) was the oldest, Cluster III (55 and 56) the most recent, and Cluster I (46) fell in between.

Qualitative analysis, based on the presence or absence of certain datable artifacts, confirmed the order established through relative dating, and contributed at least two firm chronological dates. The results of this analysis are most easily understood when presented graphically. Figure 11 provides this information.

As can be seen, all clusters show clear evidence of being filled after 1826. Cluster I, containing a vessel of the "Tuscan Rose" pattern, must have been filled after 1829, the date of introduction for that pattern. Cluster III, which contained the highest percentage of whiteware, could not be confirmed as the most recent feature through ceramic chronology alone. The presence of an 1830 penny, however, supported its position based on relative chronologies. Finally, Cluster II also lacked ceramics capable of providing absolute dates. The presence of high proportions of pearlware, however, with corresponding low values for whiteware, appear to confirm this as the earliest grouping.

Within a period of 8 years, chronological differences cannot be expected to stand out. In this chapter, that fact is all too obvious. What should also be quite clear, however, is that the possibility for breaking a site such

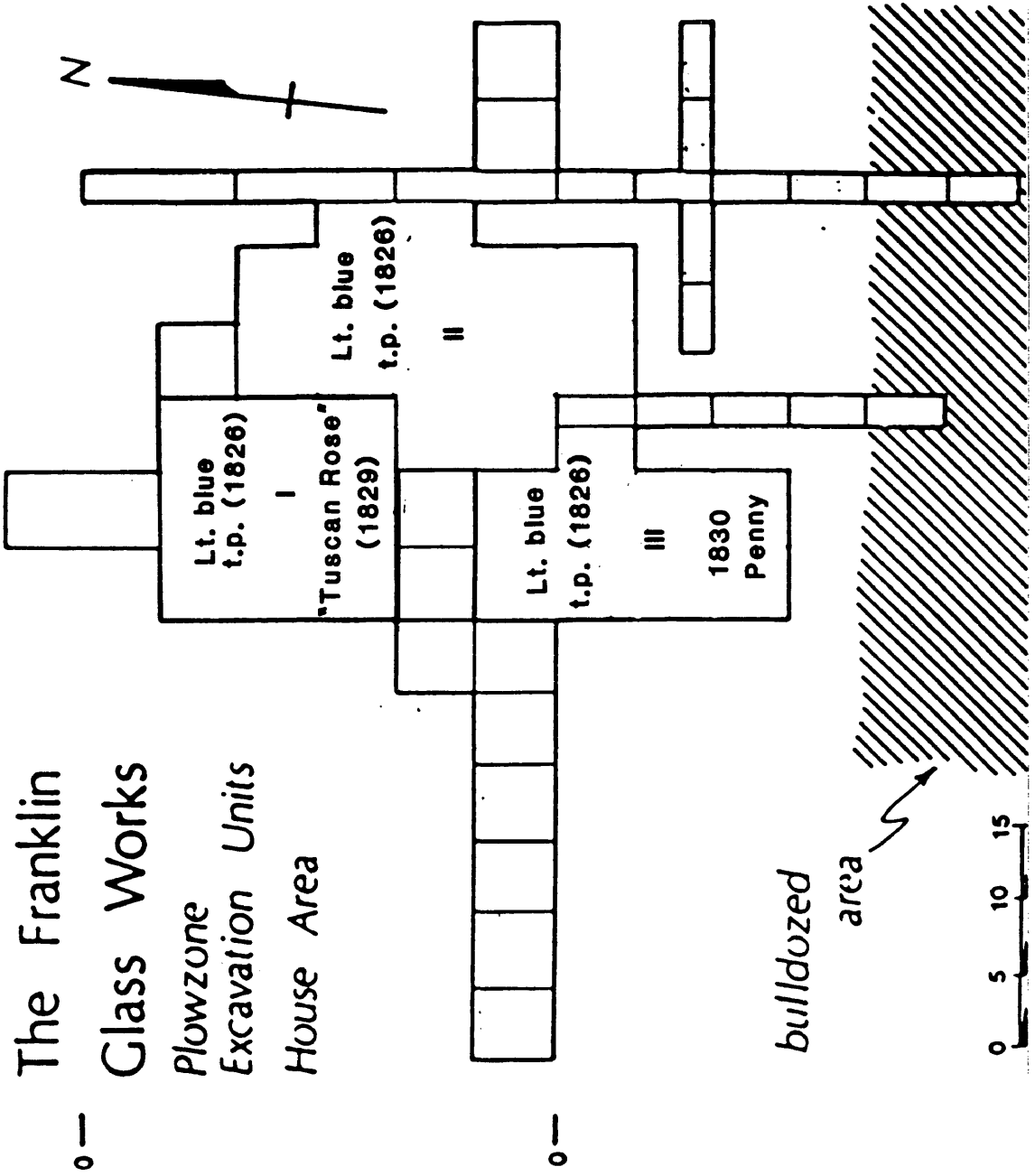


FIGURE 11.

as the Franklin Glassworks into smaller chronological units does exist, and cannot be overlooked if the search for change is to be realized.

Chapter V

CERAMIC EXPENDITURE

The previous chapter succeeded in producing a chronology among three, temporally related feature clusters isolated within the domestic area. Based on quantitative and qualitative analysis, Cluster II (features 49, 51 and 52) was identified as the earliest, Cluster III (features 55 and 56) was the most recent, and Cluster I (feature 46) fell in between. In this chapter, the average value of each feature cluster will be calculated to determine whether spending increased, decreased or remained constant as the effects of economic stress intensified. Finally, an explanation will be offered for the pattern that emerges.

Economic Scaling of Ceramics

While ceramics are frequently used to date sites, or in this case, portions of sites, to reduce their informative potential to chronology is extremely limiting. One effort toward expanding the application of ceramics to archaeological questions was the development of a set of index values for ceramics by George Miller.

In his 1980 publication, "Classification and Economic Scaling of 19th Century Ceramics," Miller argued for a more effective classification of 19th century wares based on decoration rather than ware type. In addition, he demonstrated a clear relationship between decorative technique and cost.

Miller outlined four "levels" at which refined earthenware could be purchased. The first, and least costly was undecorated creamware vessels. Slightly more expensive were those wares requiring minimal or unskilled decoration, such as edged, sponge decorated, mocha or banded wares. Hand painted vessels fell into the third category, while the most expensive vessels were those that were transfer-printed. Miller's article went on to define the cost of plates, cups and bowls in terms of the cost of undecorated creamware. These index values can be used to calculate the average cost of plates, cups and bowls from archaeological assemblages [Miller 1980].

The 1824 ceramic index values were applied to each of the three feature clusters in an effort to detect changes in ceramic consumption patterns of the Franklin Glassworkers. Within each feature cluster, separate values were calculated for teaware, tableware and bowls to maintain control over separate vessel forms. Tables 5.1 through 5.3 detail the scaling of each cluster, while

Table 6-4 compares the average values, chronologically, among the three units.

TABLE 4
INDEX VALUES FOR CLUSTER I

Form	Dec.	1824 Index val.		Number Recovered	Product
Cups	Painted	1.44	x	5	= 7.20
	Printed	3.00	x	4	= 12.00
		Average value		= 2.13	
Plates	Edged	1.29	x	8	= 10.32
	Printed	3.21	x	4	= 12.84
Muffins	Printed	2.50	x	1	= 2.50
		Average value		= 1.97	
Bowls	CC	1.00	x	2	= 2.00
		Average value		= 1.00	

TABLE 5
INDEX VALUES FOR CLUSTER II

Form	Dec.	1824 Index val.		Number Recovered	Product
Cups	Painted	1.44	x	3	= 4.32
	Printed	3.00	x	4	= 12.00
		Average value		= 2.33	
Plates	Edged	1.29	x	10	= 12.90
	Printed	3.21	x	4	= 12.84
Muffins	Painted	1.67	x	1	= 1.67
	Edged	1.33	x	2	= 2.66
	Printed	2.50	x	2	= 5.00
	Average value		= 1.84		
Bowls	CC	1.00	x	2	= 2.00
		Average value		= 1.00	

TABLE 6
INDEX VALUES FOR CLUSTER III

Form	Dec.	1824 Index val.		Number Recovered	Product
Cups	Painted	1.44	x	8	= 11.52
	Printed	3.00	x	4	= 12.00
		Average value		= 1.96	
Plates	Edged	1.29	x	6	= 7.74
	Printed	3.21	x	3	= 9.63
Muffins	Edged	1.33	x	1	= 1.33
	Printed	2.50	x	1	= 2.50
		Average value		= 1.92	
Bowls	Dipped	1.20	x	4	= 4.80
	Painted	1.67	x	2	= 3.34
	Printed	2.50	x	2	= 5.00
		Average value		= 1.64	

TABLE 7

COMPARATIVE INDEX VALUES
FOR FEATURE CLUSTERS

	II	I	III
Teaware	2.33	2.13	1.96
Tableware	1.84	1.97	1.92
Bowls	1.00	1.00	1.64

The comparative results for feature clusters II, I and III appear to reflect no overall increase or decline in ceramic expenditure. Rather, three separate trends emerge: the average value for teaware declined steadily, tableware rose, then dropped slightly, while bowls remained steady at first, then rose sharply.

While figures alone suggest no clear patterns, a graphic representation of the cluster values reveal something quite different. Figure 12 illustrates changes both in index values and in ratios of one vessel form to another. In reading this chart, the length of each horizontal line represents a vessel form's contribution to the cluster (with each cluster counting 100%), while position on a vertical plane signifies index value.

Two visible trends emerge from this graph. First, there is a steady decline in teaware values and corresponding increase in the index value for bowls. Plates, represented in the middle, have a fairly consistent value, with one small increase followed by a slight decline. Looking at the graph as a whole, average values range 1.33 index points in the earliest cluster (II), but only .32 points in the latest (III).

This phenomenon may be interpreted in several ways. One explanation is grounded in the fact that different vessel forms appear to have served different social

functions, and were purchased in a manner that reflected this.

Teawares have been identified as sensitive indicators of ceramic expenditures due to the fact that they were most commonly purchased in sets rather than individually [Miller 1980:12, Spencer-Wood & Heberling 1987:79]. Based on this information, the decline in teaware expenditure may reflect, as predicted, curtailed spending in response to economic hardship.

Tableware was less subject to fashion change, and the availability of standard, long-lasting types such as shell edged and willow probably accounts for the relative stability of this vessel form. Further, it was possible to buy plates as individual vessels.

It appears that at the Franklin Glassworks, following the purchase of a set of printed plates, subsequent acquisitions were of unmatched vessels. The increased index value for the middle cluster may reflect the purchase of the printed set during a period of optimism. If previous and later purchases were individual plates, the value could be expected to fluctuate only slightly.

The sharp increase in expenditure for bowls may be attributed to factors of availability. Clusters II and I, chronologically the first and second clusters, contain only undecorated creamware, while the last cluster contains an assortment of decorated bowls. A single set,

or small number of unmatched creamware bowls may have been purchased for use early in the site's history. If enough creamware bowls were broken to require a second purchase around 1830, as the clusters seem to indicate, undecorated creamware would not have been as readily available as it had been during the early stages of the factory's occupation. It would seem logical for the factory owners to respond by purchasing unmatched bowls, since these would certainly be cheaper than the purchase of a set. Because undecorated creamware vessels represent the least expensive index category, the purchase of any other decorative type would be reflected as an increase in ceramic expenditure.

The second trend emerging from Figure 12 is a gradual balancing of the ratios of plates, cups and bowls within each cluster. The Cluster II assemblage, identified as the earliest, is heavily dominated by plates at 66%, followed by cups at 26%, and bowls at 8%. The latest assemblage, Cluster III, contains 40% cups, 34% plates and 26% bowls.

The high proportion of plates reflected early in the occupation may represent plates that were brought into the household by migrating glassworkers. While glassmen were reputed to have carried little with them, a single plate would seem to be a necessity. If this wide assortment of vessels was added to tea and tablewares purchased by the

2.4

2.3

2.2

2.1

2.0

1.9

1.8

1.7

1.6

1.5

1.4

1.3

1.2

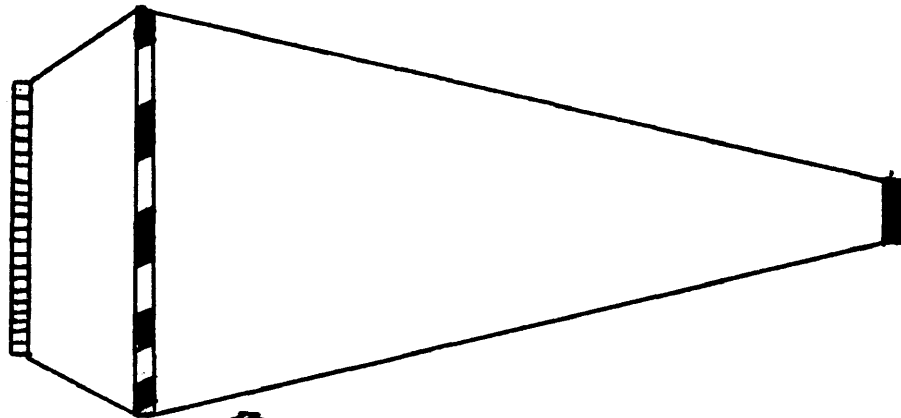
1.1

1.0

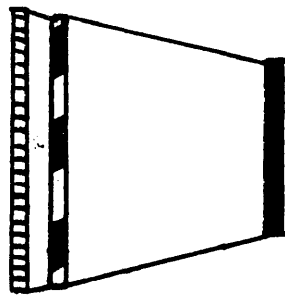
Index Value



CLUSTER II







CLUSTER I



CLUSTER III

FIGURE 12.

KEY

-  -cups
-  -plates
-  -bowls
-  10%

factory owners, the assemblage would have been quite large. Whether it can be assumed that plates were brought in with more frequency than bowls or cups remains a question.

Cups and bowls, as indicated in Figure 12, reverse the trend exhibited by plates. As tableware decreases, the proportions of bowls and cups increase dramatically. There appears to be no clear explanation for this relationship. One possibility is that purchases made early in the factory's existence were aimed at acquiring large quantities of tea and tablewares, not at outfitting a particular number of workers. As the financial situation tightened, an effort may have been made to reduce such expenditures by providing one of each vessel form to each individual. This obviously would have resulted in a leveling of the ratios of cups, plates and bowls.

A more plausible explanation, given the configuration of Figure 12 is that Clusters II and I represent normal breakage patterns, while Cluster III illustrates a clean up effort at the abandonment of the house. Since glassmen migrated frequently and could usually depend on factory owners for room and board, they would have had little use for the remaining ceramic vessels.

CONCLUSION

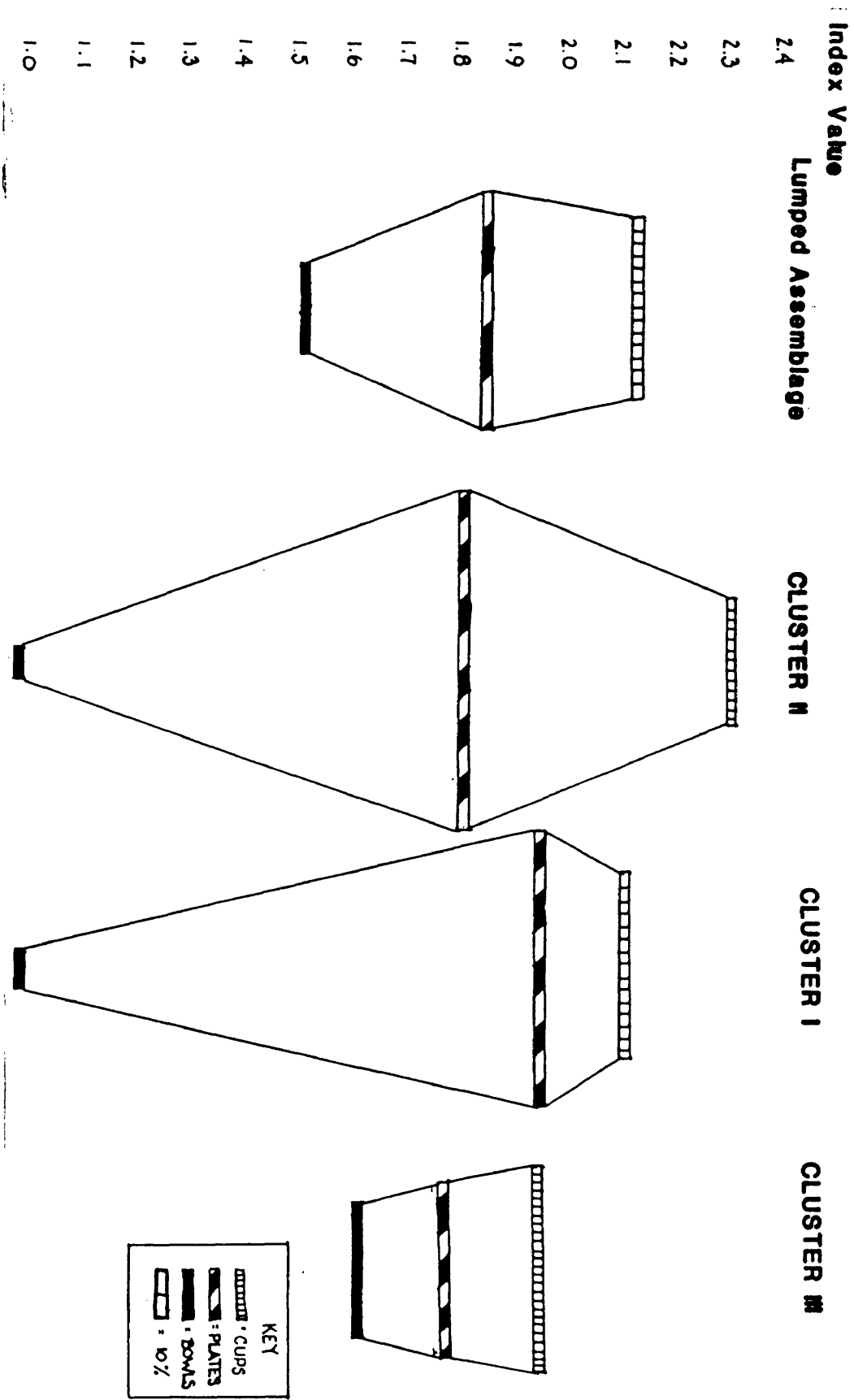
As Tables 4 - 7 and Figure 13 illustrate, efforts to detect change in ceramic expenditure over time have met with some degree of success. Teawares demonstrate a steady decline, while plates fluctuate and bowls increase in cost.

While changes are reflected, interpretation of those changes has proven highly speculative due to the nature of the site and its brief occupation. The research conducted by Suzanne Spencer-Wood, establishes expectations for the purchasing patterns linked to teaware. That is, teaware has been shown to be more sensitive than other vessel forms to changes in social status. The teaware assemblages recovered from the Franklin Glassworks closely conform to this model by demonstrating declining expenditure in response to economic stress.

Plates exhibit a different purchasing pattern than teawares, being commonly purchased as individual vessels. This fact, in combination with basic standard types results in less variation in assemblages. Given these limitations, little attention has been focussed on them in archaeological interpretations.

An explanation of the patterns exhibited by the assemblages of bowls is complicated by factors of

FIGURE 13.



availability. The replacement of plain creamware bowls by more expensive types, forced an increase in expenditure for this vessel form.

In assessing the analytical tools, the reduction of margins of expenditure for teaware, tableware and bowls over time highlights the variety of ways in which any trend (in this case, declining expenditure) may be expressed. Changing ratios of vessel forms, on the other hand, is a phenomenon that will require new questions and further investigation before it can be meaningful.

Is it, then, possible or useful to break down the Franklin Glassworks site? Figure 13 demonstrates the significant loss of information that results when whole classes of artifacts--in this instance, ceramics--are lumped together. The first figure, representing the entire ceramic assemblage lumped, enables the investigator to comment on how much money was spent on ceramics, and the differences in expenditure between vessel forms. Without a second site to use as a reference point, however, the informative potential is limited.

Definition of three chronological units, on the other hand, provides that necessary point of reference and reveals the site's occupation as a dynamic process. Rather than indicating that the average index value for plates on the Franklin Glassworks domestic site is 1.91, for example, a sequence of sub-assemblages enables one to

identify a brief optimistic period following the initial purchase, and the rapid fading of this optimism.

It is common in archaeology, particularly when addressing sites of short duration, to combine artifacts for the purpose of establishing general dates of occupation, or average expenditure for certain artifact classes. The statistics that result from such investigations, however, are only averages, and fail to acknowledge the dynamic ongoing processes that contribute to a site's formation. Insofar as archaeology is uniquely suited to the observation of such changes, it is crucial that they not be lost between the field and laboratory.

APPENDIX

VESSEL NUMBERS FROM FEATURE CLUSTERS

I	II	III
165h	168bf	009ip
342cz	170h	170d
362df	342dp	321p*
364do	362cu	342eb
364eo	369y	343y
366g	389c	377bz
366L	389es	377cf
369L	390ag	384n
375o	399a	392fa
375p	402d	421d
380an	402f	429ev
380L	402i	434fw
381a	404de	444em
382ez	404df	446bi*
394fj	416cm	446cp
404da	416dp	450gy
416cz	416dt	455hk
418an	418bs	455hs
427fu	420b	455hx
440ft	420c	455it
447en	421a	458ic
455iL	421r	458ii
458ij	422a	458it
461du	461dv	462bi
464bg	467aq	462bv
464co	467bn	462bw
467ck	467by	462bx
-----	467ce	462by
427fd	-----	462ce
364eq	179ak	462ch
366a	339L	463fx
369w	389L	465cb
369x	402h	465co
375g	413b	466db
375h	422d	466dc
394hd	425gq	469gs
396ga	458hk	469gw
398ex	464cd	-----
		177ab
		389h
		455im
		462bk
		463fb
		465bz
		466cz
		466dd

Note:

Numbers following the dashed line represent vessels re-covered from within features. Vessels followed by an (*) are redware vessels.

(CONTINUED)

NOTE: For a complete description of each vessel listed above, consult Miller, George L., "Of Fish and Sherds: A Model for Estimating Vessel Populations from Minimal Vessel Counts" Historical Archaeology 20 (2): pp. 74-85.

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