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Specialization: Stoneware pottery production in Northcentral Texas, 1850–1910

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SPECIALIZATION: STONEWARE POTTERY PRODUCTION
IN NORTHCENTRAL TEXAS, 1850-1910

By

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Abstract

SPECIALIZATION: STONEWARE POTTERY PRODUCTION
IN NORTHCENTRAL TEXAS, 1850-1910

By Susan Anne Lebo

Chairperson of the Supervisory Committee:

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Ceramic specialization, a key concept in both scientific and cultural evolutionary archaeology, continues to be poorly defined more than ten years after Rice published her model of ceramic specialization (Rice 1981). Rice and others continue to struggle toward an accepted definition of what specialization is and how it can be identified in the archaeological record. Two critical models underpin Rice's model of specialization: an attribute model specifying a correlation between specialization and kinds of artifact attributes, and a distribution model specifying a correlation among specialization, the distribution of production loci, and the finished products.

I evaluate Rice's model of specialization using historical and archaeological data available for nineteenth- and twentieth-century stoneware pottery-kiln sites and domestic farmstead sites in Northcentral Texas. Deed/title records, population census schedules, tax rolls, and business advertisements provide historical information on the temporal and spatial distributions of production methods, and resource, production, and domestic loci. I conduct macro- and micro-analysis of archaeological stoneware

ceramics from seven pottery kilns and five farmsteads and of clay specimens from seven clay outcrops to verify the historical information and to evaluate the ceramic attributes that Rice identifies as appropriate for examining ceramic specialization.

Although the historical and archaeological data indicate that stoneware production in Northcentral Texas was specialized, no correlation was found between Rice's attribute model and specialization, e.g., an association between paste composition and specialization. Rice's attribute model fails because specialization is not how pottery is made but rather who makes the pottery, i.e., a small number of individuals. Her attribute model specifies correlations between production types, e.g., specialized or nonspecialized, and specific attribute <u>expressions</u> rather than specific attribute <u>relations</u>.

Contrastively, Rice's distribution model is not rejected and can be strengthened by developing appropriate empirical criteria for identifying low-volume specialized production sites. Historical and archaeological data reveal that contemporaneous resource, production, and household loci are not coterminous as assumed by Rice's distribution model. Stoneware pottery production was carried out by a small number of potters, with each nonceramic-producing household acquiring stonewares from several stoneware pottery-kiln sites.

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CHAPTER 1

RESEARCH PROBLEM

Ceramic specialization is a recurrent theme in archeology and its potential to address evolutionary questions has not gone unnoticed. The concept of specialization is of central importance to both scientific evolution (Dunnell 1978, 1980; Wenke 1981) and cultural evolution (Brumfiel and Earle 1987b). The only elaborations, however, have been by cultural evolutionists. Despite this effort, cultural evolutionary models of specialization fail to explain why specialization originates, persists, or ceases. Extant models rely heavily on concepts and models from European economic histories and anthropological and ethnographical studies, resulting in the development of specialization models based primarily on behavioral correlates rather than empirical data (Jones 1991; Mason 1991; Neff 1984; Rice 1981, 1987b, 1991). These models seek to explain a progression from household production to industrial production distributed by market systems (Arnold 1975; Brumfiel and Earle 1987a, 1987b; Prentice 1983; Rice 1987b; Sanders and Price 1968). Furthermore, cultural-evolutionary models have largely been tied to specific data sets and have sought to isolate cause and effect relationships between social, political, and economic levels of organization and the appearance of specialization (Benco 1986; Brumfiel 1980; Brumfiel and Earle 1987a, 1987; Costin 1986; Lewis 1983; Mallory 1984; Tosi 1984; van der Leeuw 1977, 1981).

Traditionally, archaeologists have approached ceramic specialization as a problem of the identification of the relations among ceramic attributes, production organization, and distribution of production loci. To address these data, archaeologists have relied extensively on identifying specialized ceramics and "reconstructing" the production mode through the use of modern analogs, rather than defining empirical correlates of production methods and locations. The core of the most widely applied model of ceramic specialization--devised by Rice in 1981--is untested behavioral correlates.

Rice's model defines ceramic specialization as a mode of production carried out primarily by skilled full-time potters, who produce relatively standardized pottery using increased production efficiency methods common among industrial economies (Rice 1981, 1987b, 1991). This model, and similar models proposed by others (e.g., Benco 1986; Brumfiel and Earle 1987a, 1987b; Costin 1986), contains untested empirical criteria for identifying specialization that must be tested in order to examine specialization in both temporal and spatial dimensions. As a result, the theoretical relations among these data sets remain untested empirical criteria and leave open the primary question, "Do empirical correlates of specialization actually occur?"

Any attempt to develop an evolutionary model capable of examining specialization requires empirical evidence of production loci and the relations among archaeological ceramics and specific production sites. Rice's model, and those proposed by others based on her model, often place greater emphasize on behavioral rather than empirical correlates. Indeed, Rice (1989:110) asserts that often it is impossible to achieve this empirical data, and therefore archaeologists should focus on the "internal variability" of the ceramics and behavioral correlates, allowing inferences to be made about ceramic production and specialization. By redirecting studies of specialization to the internal variability of ceramics and inferences on ceramic production and away from the recovery of empirical production data, Rice's model is incapable of explaining specialization in the archaeological record. Further, Rice's discordant model lacks an empirical definition of <u>what specialization is</u>.

Acquiring requisite empirical data of production loci can best be accomplished through the utilization of materials characterization techniques and historical data. Materials characterization techniques allow for determining the sources of the clay and temper materials and the locations of the kiln sites involved in the production of archaeological ceramics. Historical data provide an independent method for testing the results of the archaeological model. Any data set that fails to show the assumed theoretical and empirical correlations specified in the evolutionary model is sufficient to negate the model as a whole.

This dissertation has two major objectives: to evaluate and test Rice's model and to document development of Euroamerican ceramic production in Northcentral Texas between 1850 and 1910. Toward this end, Rice's model is evaluated in terms of two "expectations" of specialization that she uses to interpret the archaeological record: (1) a correlation between ceramic attributes and specialization, and (2) a correlation between the distribution of production loci and specialization. Two independent tests of her model are achieved using historical data and materials-characterization data.

Several factors make this Historic Period data set ideal for examining ceramic specialization. Primary among these factors is that Northcentral Texas stoneware ceramic production loci and raw material sources can be assessed independently of ceramic attributes and behavioral correlates through the utilization of historical data. Extensive population census (Appendix A), deed (Appendix B), tax roll (Appendix C), manufacturing census, and advertising records are available, and each contains considerable evidence documenting specialized ceramic production. These records can be used to demonstrate the relations among production mode, production loci, and ceramic attributes not possible for prehistoric ceramic data sets. Further, population census (Appendix D), deed (Appendix E), and tax roll (Appendix F) information is available for nonproduction households and can be used to examine the distribution of specialized ceramics across households.

Equally important, specialized Northcentral Texas stoneware production occurred before, and therefore was not influenced by, the peculiarities of the recent explosion of transportation and industrialization changes. Early production occurred primarily in rural environments, whereas later production concentrated in urban settings. This change in production loci requires explanation and can be demonstrated using a historic data set. Historical data can replace reliance on analogic argument. Assumptions about who was involved in production, their skill level, how much time was devoted to this activity, and production mode, among others, can be tested.

The problem of specialization and testing Rice's model are approached in the following manner: Chapter two provides a detailed evaluation of specialization models developed by Rice and others with primary emphasis on the two major elements--attributes and distribution--of these models.

Chapter three presents a detailed description of the historical data available for addressing specialization in Northcentral Texas during the period under discussion, the relevance of these data to the region's archaeology, and the suitability of using Northcentral Texas stonewares to address questions of specializations.

Chapter four looks at the question of what information is needed regarding Northcentral Texas stoneware history vis-a-vis Rice's model of specialization in the context of the attributes of the artifacts and their production characteristics. This discussion includes background information on project setting and development of the region's stoneware production. It concludes with a brief summary of the empirical data available to address specialization as presented in Rice's model.

Chapters five and six describe the sampling, classification, and analyses of Northcentral Texas stonewares with respect to Rice's model. In Chapter five, two types of analyses are conducted to test the possible association between ceramic attributes and production loci. The first analysis--acquired through the use of a scanning-electron microscope in combination with an electron dispersive x-ray analyzer--is used to examine the relevance of elemental paste composition to production loci. These elemental data are analyzed using a multivariate clustering technique. A second analysis--also using the scanning electron microscope--combines elemental paste composition data with specific macroscopic attributes--to test for possible associations among paste, functional, technological, and stylistic variation. These variations may provide clues to temporal and/or potter-specific changes.

In Chapter six, historical data and archaeological macroanalysis of vessel forms, vessel sizes, and decorative techniques are examined to determine the validity of Rice's contention that low ceramic attribute diversity is reflective of specialized production.

The final chapter summarizes the problems inherent in Rice's model and the findings of this study with respect to the nature of Northcentral Texas stonewares and their relevance to Rice's theory of specialization. The results of this study reveal that Rice's model of ceramic attribute variation cannot to be directly associated with production specialization; attribute variation within and among specialized pottery kiln sites is not accountable by synchronous or diachronic changes in production methods. Rice's discordant model focuses on <u>how</u> ceramics were made rather than the relations among who was involved in production, where production occurred, and the distribution of the finished ceramics. Her asserted relations between ceramic variation and specialization are not supported. The significance and implications of this study for specialization and stoneware research are discussed. Future directions for additional specialization and stoneware studies are suggested.

CHAPTER 2

RICE'S MODEL OF SPECIALIZED CERAMIC PRODUCTION

While a number of anthropologists (e.g., Arnold 1975; Balfet 1965; Brumfiel 1980; Earle 1981; Feinman 1980; Fry 1980; Johnson 1973; Sahlins 1972; Sahlins and Service 1960; Steward 1955; Wenke 1981; Wright and Johnson 1975) have been concerned with the question of the relevance of ceramic specialization to the development of complex societies, Prudence Rice's model, first articulated in an article in Current Anthropology (1981) and subsequently revised (1987b, 1991), is considered by most to be the definitive study on this issue. Indeed, with the publication of her model, Rice intensified archaeological interest in specialization studies and continued the debate on how to identify specialization in the archaeological record (e.g., Beaudry 1984; Brumfiel and Earle 1987a; Costin 1986; Feinman 1985; Middleton and Freestone 1991; Stark 1985).

A number of specialization studies conducted during the past ten years (e.g., Costin 1986; Brumfiel and Earle 1987; De Atley and Melson 1981; Feinman 1985; Feinman, Kowalewski, and Blanton 1984; London 1991; Sinopoli 1988) have utilized concepts explicitly defined in Rice's model (e.g., standardization and diversity) to determine whether or not a particular assemblage is indicative of specialized production. It should be noted that while Rice did not develop these concepts (among the authors she cites are Clarke 1968; Fried 1967; Kohler 1978; Pielou 1974; Rathje 1975), she provides explicit definition of the relations among these concepts (Rice 1981).

Some of the specialization studies conducted in the past ten years have criticized specific aspects of Rice's model (e.g., Benco 1986; Costin 1986, 1991; Neff 1984), which have undergone modification as she has sought to clarify concepts and incorporate ongoing research results. Less attention, both by Rice and others, however, has been directed toward testing the model's theoretical assumptions, specifically the relevance of ceramic attributes and distributions in determining specialization.

Background

Two approaches have generally been used to identify specialization in the archaeological record: (1) identification of production locations outside the household, and (2) characterization studies of ceramic assemblages. Toll (1985:234) notes that many criteria for identifying specialized production locations "apply only to Old World technologies in pre-Columbian times." Unfortunately, few sites have been found in pre-Columbian America with empirical evidence of specialized production, limiting the explanatory value of many specialization studies (Jones 1991; Toll 1985).

Further, because of a long-standing interest in examining specialized production in an urban context, little work has been concerned with developing appropriate criteria for looking at early, nonurban production locations (Jones 1991; Rice 1981; Stark 1985; Toll 1985). Also, few studies have focused on specialized ceramic production in historic America (e.g., Faulkner 1982; Smith and Rogers 1979; Turnbaugh 1985).

The apparent absence of unequivocal evidence of production locations had led archaeologists to focus their attention instead on identifying artifact attributes that can be used to "infer" specialization. In so doing, archaeologists assume that by examining the products of ceramic production it is possible to "reconstruct" the production process. This assumption has not been demonstrated.

These reconstructions are derived from correlations of modern ethnographic observations of production behavior with attributes of archaeological ceramics (see Benco 1986; Brumfiel 1980; Brumfiel and Earle 1987a; Feinman 1980, 1985; Jones 1991). A series of causal models of specialization were developed in this manner. These models define causal relationships for explaining the emergence of specialization and state-level politics (e.g., Benco 1986; Brumfiel 1980; Dow 1985; Feinman 1980, 1985; Johnson 1973; Rice 1977, 1981; Wright and Johnson 1975). Among the causal relationships used to explain the emergence of specialization are environmental diversity (Arnold 1985), agricultural marginality (Arnold 1975, 1985; Dow 1985; Neff 1984), kin-based economic control (Rice 1977), sociopolitical centralization, tribute systems, and restricted access to resources (D'Altroy and Bishop 1990; Knapp 1990; Rice 1977, 1981), and exchange or marketing systems (Brumfiel 1980; Earle 1981; Spence 1981).

These models view change as an inevitable result of other sociopolitical-functional changes. Critics of these models (e.g., Neff 1984) argue convincingly that such models cannot account for why specialization occurs, are particularistic, lack predictive value, view change as transformational, and minimize the significance of observable variation, thereby eliminating the possibility of explaining specialization (see Adams 1981; Davis 1981; Dunnell 1980; Hodder 1981; Neff 1984; Wenke 1981).

What Is Specialization?

In a culture-reconstruction framework, the concept of specialization has two conflicting roles; both are often interwoven, forming a circular interpretation. First, specialization is evoked to explain observable variation in the archaeological record resulting from effects of the natural and cultural environment. Included in this variation are changes in the aesthetic quality of the products, often reflecting changes in production methods or technology, and changes in the frequency distributions of specific artifact classes, such as "elite wares" and production loci (e.g., Becker 1973). Second, in the developmental history of a particular region or culture, specialization is a subject to be explained, and cause-and-effect relationships are sought to account for the appearance and nature of specialization. These explanations are largely based on economic models concerned with the systemic relations of production and the economic, social, and political needs and organizations that exist to obtain the requisite raw materials, carry out production, and distribute products within a particular region or population (Brumfiel 1980; Brumfiel and Earle 1987a).

Rice (1981) defines specialization as an adaptive process involving the dynamic relations between a society and its environment, which evolves in tandem with sociocultural complexity. According to Rice, behavioral and material production become regulated and routinized. This situation occurs when access to certain kinds of resources becomes restricted to a particular social segment of the population. In this context, it is assumed that a correlation exists between social complexity and specialization, and that specialization can be identified by measuring changes in the relative variability evident in the finished ceramics (Rice 1981:219-220).

For Rice, this change from nonspecialized production involves a decrease in the number of potters and the range of resources utilized, an increase in skill of the potters, and a standardization or simplification of the production methods (mass production, molds, and routinization). The most important change is assumed to be a reduction in the range of resources utilized. This resource reduction occurs as access to resources begins to be controlled by a small segment of the population as an "elite" segment arises (Rice 1981, 1989).

Rice's Model

While Rice's model has undergone a number of revisions and/or modifications over the last decade, the inference of specialization from changes in artifact attributes and/or production loci remains the mainstay of her model. Basically, Rice states that ceramic assemblages that can be described as exhibiting highly standardized attributes or low-attribute variability are the products of specialized production carried out by a small number of individuals working outside the household. This putative correlation is further asserted for assemblages characterized by low richness and low evenness diversity-index values and is used to infer specialized production loci (Rice 1981, 1987a, 1987b, 1989).

Artifact Attributes

Although the association is undemonstrated, the study of artifact attribute variability is identified by Rice as <u>the most important</u> method of determining specialization in the archaeological record. This method assumed importance in specialization studies by Rice and others because of the paucity of archaeological evidence of production sites and insufficient ethnographic data on definitions and characterization of specialization production (Rice 1989). The role of this method in specialization studies is defined as "an indirect pathway toward determining production locations and strategies" (Rice 1989:110). The fact remains that no theoretical justification for this method is provided. That ceramic attribute variability is universally and directly correlated with specialization remains an assumption.

In discussing artifact attributes, Rice uses three concepts--standardization, variability, and diversity--to provide empirical correlates for her behavioral assumptions of ceramic specialization. Rice sees standardization as a reduction in behavioral and material artifact variability. Thus for Rice, standardization has implications for all aspects of ceramic production. These implications include resource selection, processing, forming, finishing, firing, and production organization (Rice 1987b, 1989).

Rice defines standardization as the "relative homogeneity" of attributes within each pottery type. She asserts that as production becomes increasingly specialized, standardization increases and becomes evident in the attributes of the ceramics produced. Furthermore, standardization is assumed to be absent in nonspecialized production, and the rate at which standardization occurs remains unknown, although variable rates may occur among attributes (Rice 1981, 1987b).

According to Rice, standardization will first be evident in the paste composition of elite wares because of increasing restrictions in resource access. Artifact standardization will vary between elite and utilitarian ceramics as a result of differences in production modes and loci, vessel functions, and distribution methods and demands (Rice 1991).

Variability is defined by Rice as the converse of standardization, i.e., the "relative heterogeneity" of ceramic types. According to Rice, variability and standardization occur on a spectrum ranging from relatively heterogeneous to relatively homogeneous. The term "relative" here is used to indicate that no absolute scale exists to identify variability versus standardization. Rice defines variability in two ways. First, it is a variation of noise within artifact types, where types are defined as "ideal types" determined by modal distributions. Deviation from these "ideal types" is noise and reflects the skill of the potters. Second, variation is defined as sample diversity that reflects changes in production methods (e.g., resource selection and mass production) (Rice 1981).

Rice further asserts that changes in artifact variability can be ascribed to specific factors. In her model, technological and functional artifact variability are assumed to be the result of economic production considerations, such as cost effectiveness, quality control, and mass production. The individual potter's skill is also a factor. Paste composition exhibits the first evidence of a reduction in variability as production becomes specialized. In contrast, stylistic attributes will exhibit variability fluctuations as they respond to the social, ideological, and aesthetic concerns of the producers and consumers (Rice 1987b:203).

Diversity as a concept has been borrowed from population ecology. Rice, however, uses it as "a statistical measure akin to 'variance'--i.e., the kind and account of variation around a mean." In this context, Rice summarizes ceramic assemblage variability as a single statistical value (Rice 1981, 1987b, 1989).

Although diversity may be derived by various methods, it is generally assumed to have two important components: richness and evenness (Leonard and Jones 1989). As used by Rice, richness is the number of classes (number of species), while evenness is the distribution of phenomena (individuals) among these classes. Application of such a diversity index is predicated on the assumption that variation changes as a result of specialization, and that this change is predictable and measurable. Within this context, Rice (1981:222) states that

> high richness and high evenness in technological, decorative, and formal data would tend to suggest use of a variety of resources and/or the existence of numerous producers; low richness and low evenness would suggest restricted access to resources, a small number of producers, and/or mass production.

By examining changes in the relative richness and evenness of a ceramic assemblage over time, Rice asserts that production changes can be identified. A decrease in evenness involves a narrowness of the "ideal type," increasing skill in achieving this type, and a reduction in the number of producers--i.e., specialized production (Rice 1981:222). In this context, Rice assumes that evenness is more directly correlated with identifying specialization.

Rice's assertions about the relations between ceramic attributes and specialization are presented in Table 2.1 (from Rice 1981:Table 1). Paste composition is assumed to be highly variable in nonspecialized ceramic production and highly standardized in specialized production. Different rates of paste composition change are asserted for utilitarian and elite ceramics, with the first evidence of competitive variation followed by standardization occurring in elite ceramic classes. Decorative attributes are assumed also to change from variable to highly standardized for utilitarian ceramics. In contrast, Rice asserts that elite ceramics become increasingly elaborate with specialization.

Production Loci

The identification of production loci--the places where pottery is manufactured--is a second avenue that Rice sees for examining specialization. Rice recognizes three methods for identifying production loci (Rice 1981, 1987b). The first method involves locating concentrations of material remains associated with the manufacturing process--i.e., tools, molds, kilns, raw materials, and waster sherds. The second

Table 2.1 Relationships among paste composition and decoration variables with ceramic production (from Rice 1981: Table 1).

	Paste Composition		Decoration	
Culture Complexity Continuum	Utilitarian Ceramics	Elite Ceramics	Utilitarian Ceramics	Elite Ceramics
Simple Society - No Specialization	Variable	---	Variable	---
Simple Society - Low Level or Incipient Specialization	Less Variable	Variable	Standardized Methods and Attributes	Standardized Methods and Attributes
Ranked Society - Competitive Production	Competitive Variation	Standardized	Competitive Variation	Competitive Variation
Stratified Society - Specialization	Standardized	Standardized	Standardized	Elaborated (increase in numbers and/or kinds)

method involves identifying regions of ceramic production based on broad spatial patterns of similar stylistic and/or technological ceramic attributes. Specialization is inferred for assemblages containing a large number of well-executed vessels of similar size, shape, and production skill. The third method involves using compositional data to identify the geological provenance or source of raw materials used in ceramic production.

The first method has not been particularly successful in nonurban settings where Rice's model is most often applied. Few archaeologists have recorded archaeological evidence of ceramic production sites in nonurban settings in prehistoric Mesoamerica or elsewhere (Beaudry 1984; Fry 1980; Jones 1991; Rice 1981, 1989; Stark 1985). Several factors account for this apparent lack of archaeological evidence of ceramic production loci. First, many archaeologists in Mesoamerica continue to rely on ethnographic studies of specialization rather than recovering archaeological evidence. Second, few studies have been undertaken to locate and excavate production loci (see Jones 1991). Instead, archaeologists continue to emphasize sites characterized by monumental architecture. Little archaeological research is directed toward identifying and excavating habitation sites in rural or early "urban" settings.

The second and third methods are widely applied in Mesoamerica and elsewhere (ceramic examples: see Beaudry 1984; Bennett et al. 1989; Buko 1984; Cruxent and Vaz 1978; Ferring and Perttula 1987; Fry 1980; Middleton and Freestone 1991; Neff 1984; Neff et al. 1988; Nelson 1985; Rands and Bishop 1980; Rice and Saffer 1982; Stark 1985; Wilson 1978). Both methods are used by Rice and are useful for examining whether or not particular ceramic types may have been locally produced. They are not, however, sufficient for identifying production loci. The failure of these methods is the lack of an integrated theoretical framework for correlating these variables with production loci (Lebo 1992).

In her 1981 model, Rice asserts that identifying production loci is an important criterion for examining specialization. In this context, specialization is defined as a change in the distribution of production loci, with production no longer being carried out at the household level. In simple egalitarian societies, production is assumed to be conducted at the household level with members of each family producing ceramics for their own use in or near the dwelling. In contrast, in complex societies with social stratification, production is carried out by a small subset of the population in occupation barrios or workshops. These workshops first appear in urban settings and are associated with the production of ceramics for elite individuals (Rice 1981).

Because of the continuing failure to recover archaeological evidence of production loci, Rice (1989) asserts that artifact attributes should be studied as a means of indirectly identifying production loci and that alternative approaches must be pursued to understand the nature of production arrangements. To this end, Rice (1987b, 1991) increasingly emphasizes the potential of ethnographic models of production arrangements (see Brumfiel and Earle 1987; Costin 1986; Peacock 1981, 1982; van der Leeuw 1977, 1984) to reconstruct production loci.

Rice further asserts that changes in production loci can be ascribed to specific factors. In her model, increasingly, some households cannot or choose not to make ceramics, and households located closer to raw material sources or more skilled as potters begin to make pottery for use by other households. Pottery making may become associated with a lineage with territorial or heritable rights to raw material resources (Rice 1981). As production becomes increasingly the prerogative of a small group of kin-related potters and as social differentiation increases, competition will occur among potters to produce ceramics for the growing elite class. This competition will be evident as a reduction in ceramic paste variability. Paste composition will become more standardized reflecting a reduction in potters' access to raw materials. As the access to raw materials becomes increasingly more restricted, ceramic production will no longer be possible at the household level. Instead, production will be carried out by a small segment of the population to meet the needs of both the urban and rural populace and elite and non-elite individuals (Rice 1981).

Social differentiation is identified as the causal mechanism for the change from household production to production by a limited number of potters. This differentiation is asserted to affect both the access to raw material sources and the demand for completed wares. This aspect of Rice's model has met with criticism (see Adams 1981; Neff 1984) and is less visible in her more recent publications (Rice 1987b, 1989, 1991).

Three of Rice's assertions about the relations between production loci and specialization are illustrated in Table 2.2 (Rice 1981). Stripped of causal explanations of production changes and generalizations about what specialized ceramics <u>might</u> look like, these three dimensions provide an elegant model for identifying specialization.

Table 2.2 Relationships among production loci, the distribution of finished ceramics, resource access, and specialization.

Production Location	Product Distribution/Acquisition	Resource Access
Within each Household	Within households where production occurred	Unrestricted
Outside each Household	Across households not involved in production	Restricted

Production Classes:

Class 1: Within household/within household/unrestricted

Class 2: Within household/within household/restricted

Class 3: Within household/across household/unrestricted

Class 4: Within household/across household/restricted

Class 5: Outside household/within household/unrestricted

Class 6: Outside household/within household/restricted

Class 7: Outside household/across household/unrestricted

Class 8: Outside household/across household/restricted

Within this framework, Rice focuses only on Class 8--i.e., production not at the household level, with the access to raw materials restricted to a small number of individuals who produce ceramics that are acquired by nonproducing households. Even though Rice discusses the importance of these three dimensions, her model masks considerable empirical variability of specialization in the archaeological record. For example, while resource access _may_ have been restricted in some regions by environmental and/or cultural factors, specialization may occur in areas where access to raw material sources was not restricted. Rice's model does not include Class 7--production carried out by a small number of individuals outside the household with unrestricted access to resources and the distribution of ceramics across households not involved in production--as specialization.

Summary

Rice's assertions about the relations among ceramic attributes and production loci and specialization can be summarized in two hypotheses, one about attributes and one about production loci. Rice assumes, first, that ceramic attribute variability can be expressed adequately as a diversity index and this variability changes in a predictable manner as production changes from nonspecialized to specialized. Second, the types and distribution of production loci change in a predictable manner. Nonspecialized production occurs at the household level, while specialization is conducted by a small subset of the population in specialized work areas--i.e., occupational barrios or workshops.

H_1 (Ceramic Attributes):

If ceramic production is specialized, then:

(a) paste composition will be standardized,
(b) decoration of utilitarian ceramics will be standardized,
(c) decoration of elite ceramics will be variable and elaborated, and
(d) attribute diversity will be defined by low richness and low evenness or high standardization.

H_2 (Production Loci):

If ceramic production is specialized, then:

(a) production loci will be concentrated, with production occurring in a limited number of locations and the products being distributed across households.

If the conditions for both hypotheses are not met, then ceramic production was not specialized.

The two critical aspects of Rice's model are tested as part of this study. To accomplish this, the following data are identified and analyzed:

- paste composition,
- decorative attributes,
- distribution of production loci, and
- distribution of finished ceramics.

Composition of ceramic paste of sherds from the production loci and household assemblages is identified using two methods. First, macroscopic examination of the paste is accomplished using a binocular microscope. Second, the elemental composition of the paste is determined using a scanning-electron microscope (SEM) connected to an x-ray analyzer.

Decorative attributes are analyzed using traditional analysis of the interior and exterior surface treatments. Two types of surface treatments occur in the Northcentral Texas area--glazes/slips and applied motifs; both are examined.

Distribution of production loci is analyzed using two approaches. First, historical data are examined to identify the locations of historical pottery kiln sites. These locations are then correlated with the archaeological record. Second, elemental analysis is used to compare ceramic sherds from these production loci with clay samples from extant clay outcrops and sherds from household assemblages. These data allow the relationship between clay outcrops, kilns, and households to be demonstrated.

In addition to positing relations about ceramic attributes and production loci as a means for explaining specialization, Rice makes a number of other assumptions that are not relevant to an understanding of specialization. Therefore, these assumptions are not addressed in any detail in this dissertation. Many of these concepts have been borrowed and/or integrated with models proposed by other archaeologists (e.g., Balfet 1965; Clarke 1968; Fried 1967; Johnson 1975; Otto 1975; Sahlins 1982; Sahlins and Service 1968; van der Leeuw 1977, 1984). Although Rice does not test, nor is she able to test, these assumptions using her data (see Rice 1981, 1989), several assumptions can be tested using historical data, and are therefore briefly mentioned here.

First, a relationship exists between the amount of time devoted to ceramic production and specialization. In this context, specialized ceramic production is assumed to be carried out by potters producing on a full-time or nearly full-time basis (Rice 1981:219, 222-3). Second, because of a relationship between social differentiation and specialization, the first evidence of ceramic specialization will be in the production of elite ceramics, and only later, utilitarian ceramics (Rice 1981:223, 227). Third, because elite members of the population will be concentrated in nonrural areas, the first evidence of specialized production areas will be in nonrural areas. Each of these assumptions can be tested using the Northcentral Texas stonewares data set.

These relationships are tested using the historical data available on:

- the primary and secondary occupations of potters,
- production and distribution of elite and utilitarian ceramics, and
- distribution of rural and nonrural production loci.

CHAPTER 3

TEXAS: A CASE STUDY

A wealth of historical and archaeological data indicates that stoneware production was an important economic activity in Northcentral Texas during the last half of the nineteenth century, making this area an excellent setting for testing the assumptions on which application of Rice's model of ceramic specialization is based. Of particular importance are the historical data available on each stoneware pottery and potter in population census (Appendix A), deed/title (Appendix B), tax roll (Appendix C), manufacturing census, and business advertisement records. Equally valuable are population census, deed/title (Appendix D), and tax roll (Appendix E) data for families at occupation sites within the study area. These historical records can be effectively integrated with the archaeological remains of stoneware clay pits, kiln sites, and sherd assemblages from kiln sites and occupation sites.

Available Historical Data

Population Census

With the exception of 1890, detailed population census records for Northcentral Texas are available in 10-year intervals for the period 1850 to 1920 (Appendix A). These records are organized by county and are subdivided into voting precincts. Within each precinct, personal data are provided for all inhabitants. These personal data include the name, sex, age, occupation, and birthplace of each occupant by dwelling and family. The value of real estate and personal assets is given for all heads of households.

Deed Records

Deed records, documenting the acquisition and conveyance history of the land holdings and clay outcrops associated with stoneware kiln sites, are available for all occupation sites and each of the potteries operating in this region (see Appendix B and Appendix D). These records indicate pottery and clay pit locations, acreage, land value, buyer and seller, date of sale, and, less often, building improvements. Some deed records were lost when the Denton County Courthouse burned in 1876. Other deeds were refiled during the 1870 to 1900 period when families brought old deeds to the courthouse to be re-recorded.

Tax Rolls

Tax rolls compiled for each tax year beginning in 1850 and continuing to 1910 contain pertinent data on each taxpayer, including the locations, acreage, and value of each taxpayer's landholdings; the number and value of heads of horses/mules, cattle, sheep, and hogs; and the number of wagons. The total taxable assets are then given for each taxpayer. While the number of livestock and wagons may not at first appear archaeologically relevant, these data are important in examining behavioral correlates about supplemental occupations for landholding and non-landholding potters and pottery laborers (Appendix C). Tax roll data for each of the occupation sites are reported in Appendix E.

Manufacturing Census

Manufacturing census data are incomplete for Northcentral Texas, but available records do provide some information about the regional economy. Small, rural potteries are underrepresented in these census records, as the lists include only stoneware potteries with an annual product over $500. For example, only two potteries are listed in the 1850 manufacturing census, although at least five stoneware potteries were operating in the state by that time (Malone, Greer, and Simons 1979), and only six are listed in the 1860 manufacturing census even though at least 11 potteries were operating according to Branda (1976). Despite these limitations, the manufacturing census data available for Northcentral Texas during the nineteenth century is useful for constructing a general overview of regional economic development and the development of the stoneware industry.

Business Advertisements

Business advertisements, some dating as far back as the 1860s, appeared in local newspapers in Northcentral Texas during the nineteenth century. Largely limited to potteries that either produced large volumes of stonewares or were located in urban settings where greater marketing competition existed, these advertisements provide valuable data on pottery owners and the types of stonewares produced and, in some instances, the monetary value of the pottery produced in this region.

Relevance of Historical Data to Archaeology

Historical data are invaluable for locating, verifying, and supplementing archaeological data. Their absence has caused many archaeologists to rely on such inappropriate methods as ethnographic analogy or "bridging arguments" to interpret the archaeological record. Historical data are especially useful for testing the behavioral correlates of Rice's model, which relies heavily on the above-mentioned methods.

For stoneware studies, historical data can provide information on the types, age, and distribution of clay outcrops, pottery kiln sites, and occupation sites on a regional scale. Historical records available for Northcentral Texas can be correlated with archaeological data from these sites.

In this study, the population census records were consulted first, because they provided the most complete record of potters' and pottery laborers' names. The deed records were then examined to recover specific data on clay outcrops and pottery kiln sites associated with each potter or pottery laborer who had been identified in the censuses. The tax records were used to verify and supplement the land data recovered from the deed records by providing information on additional lands owned by potters but not directly associated with specific kiln sites. Advertisement records revealed data on several potteries not reported elsewhere.

An examination of population censuses and deed records proved the most valuable. Population censuses were used to identify all potters and pottery laborers who worked in Northcentral Texas between 1850 and 1920. Where possible, these data were correlated with the deed records and served as the basis for archaeological reconnaissance to identify the locations and spatial associations of the clay outcrops and pottery kiln sites owned by individual potters. These data were further used to determine when each pottery kiln operated, a history of pottery owners for each pottery, and the relative selling price of the pottery when it changed ownership.

Unfortunately, this method could not be used to identify all potteries. Family-operated potteries especially were often underrepresented in the historical record. Some potteries were operated by one or two potters for only a few years, and thus could fall between census years. Others that were rural and produced a relatively small number of vessels compared to the larger potteries in commercial centers also frequently failed to be included in deed or population census records. Furthermore, because some rural potters and laborers produced stonewares only seasonally, they were listed in the census rolls as "farmer" or "laborer" rather than "potter." This illustrates the difficulties in using terms like "specialized production" in a behavioral sense even in the historic and/or ethnographic realm.

The major assets of each potter and pottery laborer, including the locations and acreage of all landholdings, were determined primarily through the use of tax rolls.

This information proved particularly valuable for verifying personal assets and secondary occupations and for reconstructing deed transactions that were lost when the Denton County Courthouse burned in 1876.

Advertisement records, though incomplete, provided information not available from other sources; several potteries owned by entrepreneurs, rather than potters, were located in this manner. Correlation of the advertisement records with deeds for pottery entrepreneurs then allowed for previously unknown kiln sites to be located in the archaeological record.

Important information on site size and age, the number and duration of occupations, and family history was obtained from population census, deed (Appendix D), and tax roll (Appendix E) records for the occupation sites included in this study. The deed records provided an ownership history for each occupation site. Population censuses were used to obtain information on the families that resided at each occupation site, including when they immigrated to this region, family composition, evidence of boarders or hired laborers, and the occupations of household members. Records indicate that sometimes several families resided in a single household. Data on all property owned by the family, the acreage and value of this land, as well as the types of animals they raised were obtained from the tax rolls.

Suitability of Stonewares for Addressing Specialization

Stonewares are well suited for archaeological examination of specialization. Their ubiquitous nature at many historic sites, their preservation qualities, and their relatively complex additive rather than subtractive construction make stonewares an excellent data set for studying change. The continued production of stonewares provides excellent opportunities for ethnographic study. Their value for defining temporal and spatial relationships is well documented, and the applicability of materials characterization methods for identifying raw material sources and production areas has been demonstrated for historic ceramics around the world (e.g., Blakely 1989; Blakely and Bennett 1989; Cruxent and Vaz 1978; Faulkner 1982; Greer 1981; Hammell 1980; Lebo 1987a, 1988; Malone, Greer, and Simons 1979; Middleton and Freestone 1991; Sweezy 1984; and Turnbaugh 1985).

Several critical factors make Northcentral Texas stonewares an ideal set for examining Rice's model of ceramic specialization:

- o Extensive historical data exists, that can be used to identify the locations of all or most clay outcrops used by stoneware potters, the pottery kiln sites that operated in the region, and the spatial and temporal association of these sites with communities and occupation sites. These historical data can be used to determine if all clay outcrops and pottery kiln sites have been archaeologically located and may provide information about sites that have been mostly destroyed.

- o Few historically documented pottery kiln sites in Northcentral Texas have been completely destroyed, and sherd samples have been recovered from most sites. Kiln remains and extensive sherd assemblages occur at many pottery kiln sites, enabling detailed examination of intra-site production changes.

- o Clay outcrops utilized in stoneware production in Northcentral Texas are for the most part preserved, with some being used today to produce commercial bricks and tiles.

- o The preliminary historic data indicate a production system that spans at least part of the transition from nonspecialized to specialized production uncomplicated by modern transportation/marketing systems.

- o Stoneware technology in this region is not a product of earlier indigenous ceramic traditions. This technology was brought by immigrant potters in the 1850s, providing a clearly defined starting date of when stoneware specialization began in the area.

The suitability of Northcentral Texas stonewares is further enhanced by the opportunity to examine stoneware development from small, rural, isolated production to its growth as a commercial industry after the arrival of railroads in the 1870s. This change makes it possible to test the validity of Rice's model in two radically different environments.

CHAPTER 4

NORTHCENTRAL TEXAS STONEWARE HISTORY: AN 1850-1910 OVERVIEW

Introduction

Specialization, according to Rice, can be stipulated whenever the paste composition and decorative attributes of a ceramic assemblage exhibit low variability. Rice asserts this correlation for ceramic assemblages recovered from nonproduction sites, but a similar correlation can be assumed for ceramic assemblages from production sites as well, if a universal relationship exists between these attributes and ceramic specialization. Up to now, Rice's model has not been tested at production sites. Such a test, however, should produce the strongest evidence for evaluating Rice's assumptions regarding specialization, since empirical production data can be recovered rather than inferred. Juxtaposing data obtained from production sites against data obtained from nonproduction sites will then allow us to determine if Rice's variable relationships are appropriate for identifying specialization at nonproduction sites.

Nine utilitarian stoneware pottery production sites and fourteen extant clay outcrops have been identified in Denton County using historical and archaeological data. Overlapping production dates for these sites enables us to document ceramic production for a continuous period from 1854 until 1920. Similarly important quantitative attribute data are available for nonproduction farmstead sites in the county, of which five have been selected for inclusion in this study.

The production methods and clay outcrops utilized at the production sites will be examined in this and the following two chapters to determine their relationship with specific ceramic attributes. These data are also compared with the five nonproduction sites to determine if the relationships identified for the production sites are applicable to nonproduction loci.

Previous Studies

Production Sites

Much of the historical and archeological evidence we have for nineteenth- and early twentieth-century Texas and Denton County pottery comes from a seminal study begun in the early 1970s by Georgeanna Greer and James Malone. Malone, an archaeologist, was at that time with the Texas Historical Commission. Greer was a ceramicist who spent much of the past thirty years researching and collecting artifacts and historical data relevant to stoneware pottery kiln sites throughout the United States. The survey undertaken by Malone and Greer in Texas was to eventually uncover some 43 pottery kiln sites, including 5 in Denton County, by the time the survey ended in 1973. Greer had since published a book on American stonewares (Greer 1981) in which she referred to Texas potteries and, until her death in February, 1992, was working on a book exclusively on Texas stonewares. Two other studies, one conducted by Sandra Myers in 1969 at the Cranston-Donaldson Pottery (Myers 1970, 1981) and a second one by Susan Lebo in the 1980s at the Roark-

Griffith Pottery (Lebo, Green, and Crass 1988), have yielded much valuable archaeological and historical information regarding these two Denton County sites.

Studies I conducted for this dissertation have also recovered historical data for four additional potteries and preliminary archaeological data for two of these, the Daugherty and the T. J. Donaldson(?) potteries.

Nonproduction Sites

Up until the 1970s, archaeological investigations of nonproduction sites in Denton County had been largely limited to an examination of the region's prehistoric domestic sites, while very little attention was given to the historic period. This changed in 1972 when the U.S. Army Corps of Engineers began extensive investigations of the cultural resources at Ray Roberts and Lewisville lakes prior to planned constructions or changes in regional reservoirs (Figure 4.1). Ray Roberts Lake (formerly called Aubrey Lake) is located in northeastern Denton, southeastern Cooke, and southwestern Grayson counties. Investigations in the more than 45,000-acre project area between 1972 and 1991 resulted in the recording of 296 historic sites and/or components. Of these, 71 received test excavations and 12 received intensive excavation. (Detailed descriptions of the research at Ray Roberts Lake can be found in Bousman and Verrett 1972; Ferring 1986; Ferring and Yates 1992; Lebo 1991a; Skinner et al. 1982a, 1982b; Skinner and Baird 1985).

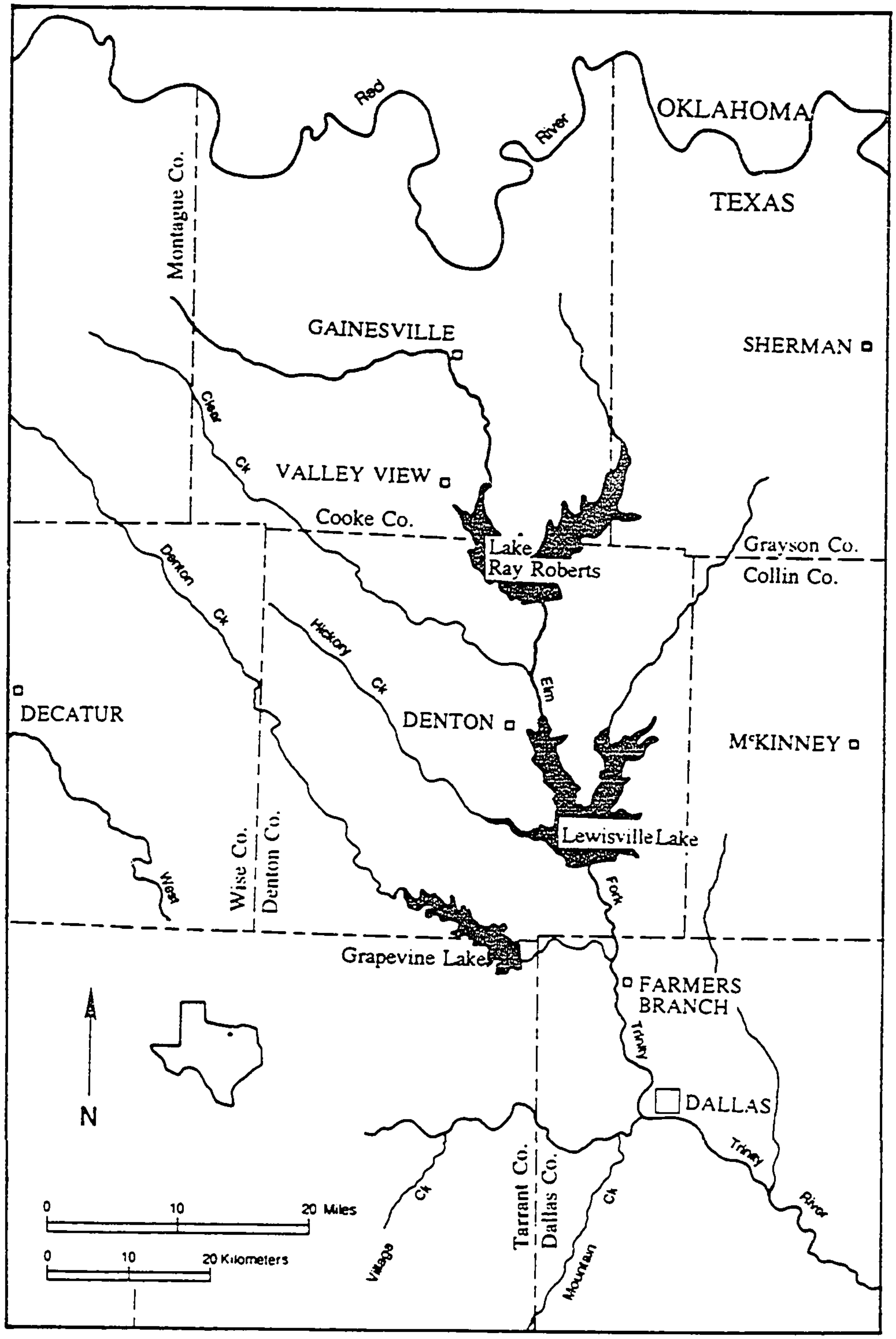


Figure 4.1 Location of the Lake Ray Roberts and Lewisville Lake project areas.

Unlike the Ray Roberts Project, the Corps undertook only peripheral studies of Lewisville Lake, since previous dams built in the first half of the century had already caused extensive flooding of the regional archaeological sites. The first investigations around the lake, which is located in southeastern Denton County and which was originally called Lake Dallas and later Garza-Little Elm, were carried out in 1972 and resulted in the identification of 13 historic components, including three stoneware pottery kiln sites (Cranston-Donaldson, Roark-Griffith, and A. H. Serren) (Nunley 1973). Two additional archaeological projects, also funded by the Corps between 1985 and 1988 resulted in the documentation of 94 historic components, testing of 16 historic farmsteads, and intensive excavation of three farmsteads (Brown and Lebo 1991b; Cliff and Moir 1985; Lebo 1990, 1991; Lebo and Brown 1990).

Clay Studies

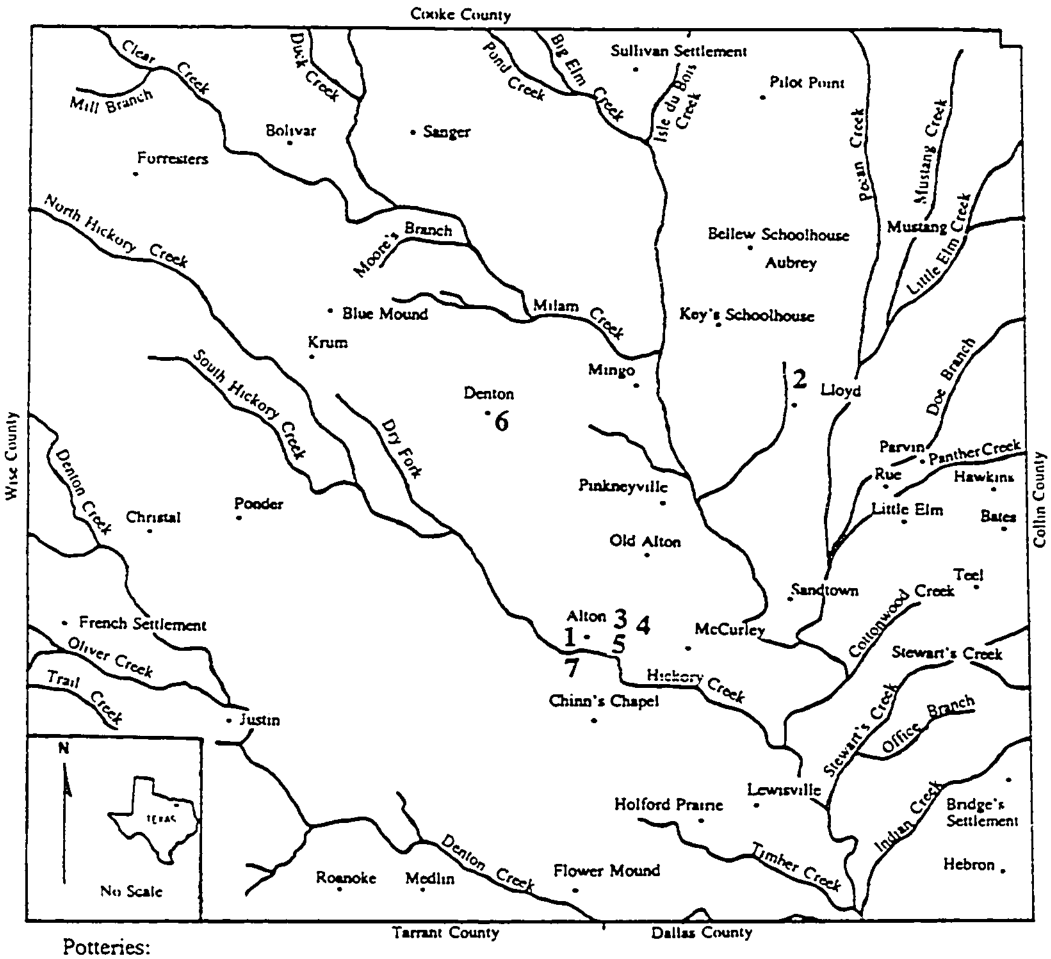
While the clays in Denton County have not been well studied, work conducted by Heinrich Ries (1908) at the turn of the century provided for a correlation of clay deposits and clay products, such as stonewares and bricks, that has proven invaluable for defining pottery production in the area. Later studies on geological formations by Winton in 1925 and modern research by the Texas Bureau of Economic Geology have added only slightly to this pioneering work.

Cultural Setting

Anglo- and Euro-American settlers were in present-day Denton County as early as the 1830s, but permanent settlements were not established until the 1840s. Settlement was encouraged by the Texas government through the organization of new counties and immigration companies, advertisements, and the establishment of new trails and a line of defensive forts (Connor 1959; Ferring and Reese 1982; Odom and Lowry 1975; Richardson et al. 1988; Skinner et al. 1982a; Smith 1955). These early settlements were located in the southeastern corner of the county along the Trinity River and its tributaries (Figure 4.2). Settlers came as clusters of neighbors or related families, the majority from the South. Very few settlers owned slaves, and only one potter, John Cranston, had slaves he acquired after settling near Alton (see Appendix A); altogether, in 1860, slaves accounted for less than 1% of the county's population (Odom and Lowry 1975).

After the Civil War, immigration continued to be primarily from southern states, although an increasing percentage of midwestern and foreign-born settlers also immigrated to the county (Jordan 1976; Kerr 1953, 1966). This immigration was spurred, in part, by the completion of several railroad lines that linked Denton County with other parts of Texas and with surrounding states (Ferring and Reese 1982; Reese et al. 1988; Richner and Bagot 1978).

Settlers in Denton County were largely self-sufficient, and industries were operated often on a seasonal basis by individuals whose primary occupation was



Potteries:

1 Cranston-Donaldson (41DN16)
2 Roark-Griffith (41DN18)
3 Wilson (41DN19)
4 Lambert (41DN74)
5 Serren (41DN75)
6 B. and D. B. Daugherty
7 T. J. Donaldson (?)

Figure 4.2 The distribution of communities and stoneware potteries in Denton County.

farming. The population doubled during the 1850s, and commercial milling, blacksmithing, and brick and pottery production enterprises were established in both farm and town settings (Bridges 1978; Lebo 1991a; Odom and Lowry 1975).

Until the Civil War, the commercial raising of crops and animals was relatively unimportant in Northcentral Texas (Lowe and Campbell 1987). Although cattle production became an increasingly important part of the regional economy during the 1860s and after the war (Bridges 1978), many farmers continued to raise crops and animals primarily for home consumption. During the postwar period, tenant farming was to become a common practice with corn, wheat, and cotton as the principal cash crops (Green 1977; Skinner et al. 1982a; Skinner and Baird 1985). By 1880, one-third of the farmers in Denton County were tenants, but by 1900 half were to fit into this category. This trend continued into the early 1900s (Belo 1914, 1929, 1939-1940).

Stoneware Production

The earliest Denton County potteries were located on farms near the community of Alton, which was the county seat from 1851 to 1857 (see Figure 4.2). This area was an excellent location for stoneware production because of its proximity to the county's population, major transportation routes, and suitable clay outcrops. With the exception of the J. C. Lambert Pottery, which produced stonewares for only two years (1859-1860), these early potteries were successful, each operating at least 10 years and only ceasing when the master potter and founder died. These potteries overlap temporally, with the first and longest operating pottery being the Cranston-Donaldson Pottery, which began in 1854 and ceased production between 1879 and 1882 (Table 4.1). The first pottery to be established outside the Alton area was the Roark-Griffith Pottery begun by J. Roark and J. Smith in 1873 near the community of Lloyd. While Roark was trained as a potter at the Cranston-Donaldson Pottery, he selected a site located about 12 miles northeast of Alton and 6 miles east of Denton. This location placed him closer to the growing population of Denton County and counties immediately to the east and north, where there were no potteries, and away from Alton, which had increasingly become economically and socially isolated once the county seat had shifted to Denton in 1857. By the late 1870s when the railroads had reached Denton (Bridges 1978; Burke's Texas Almanac 1882), the pottery-making transition away from Alton was complete.

As potteries shifted from Alton, potters were faced with locating new suitable clay outcrops or hauling clay from Alton to their potteries in Lloyd or Denton. Several potters, such as James Roark, established their potteries on lands where they found clay outcrops, while others such as Boone Daugherty, initially met their clay needs by freighting clays from Alton and only later acquired clays from closer outcrops. Later, suitable clays were found east of Denton and by the 1890s, potteries in Denton acquired their clays from several pits 2 miles east of town.

Table 4.1 Stoneware Pottery Owners in Denton County.[1]

Pottery	Ownership Dates
G. Cranston Pottery	
George Cranston	1879-1890s
Cranston-Donaldson Pottery	
John Cranston	1854-1867
Nancy Cranston	1868-1869
George Cranston	1869-1875
J. W. Moore	1875
T. J. Donaldson	1876-1881
L. M. Tipton	1879
William Bradford	1882
B. and D. B. Daugherty Pottery	
Boone Daugherty	1884-1901
Daniel Boone Daugherty	1901-1904
T. J. Donaldson (?) Pottery	
T. J. Donaldson	1872-1876?
Kimbrough-Kingdon-Tipton-Moss Pottery	
J. Kimbrough	1880s-1903
H. Kingdon	1902-1903
J. Tipton	1902-1903
C. Moss	1903-?
J. C. Lambert Pottery	
J. C. Lambert	1859-1860

Table 4.1 Stoneware Pottery Owners in Denton County (continued).[1]

Pottery	Ownership Dates
Roark-Griffith Pottery	
J. M. Roark and J. Smith	1873-1878
J. Roark	1879-1884
M. Griffith	1884-1920s?
J. Griffith	1909-1910?
A. H. Serren Pottery	
A. H. Serren	1856-1878
Wilson-Donaldson Pottery	
W. Wilson	1869-1879

[1] Data compiled from Deed/Title Records (Appendix B) and Tax Rolls (Appendix C).

Most of these potteries, both earlier and later ones, operated only on a seasonal basis, as a number of potters were also farmers or ranchers with sizable acreage and stock (see Appendix C). According to Greer (1977a, 1977c), seasonal operation of potteries was a common practice among early potters in the South. Both kin- and nonkin-related individuals worked in stoneware potteries (Burrison 1975; Greer 1981; Guilland 1971; Sweezy 1984), and most potteries in Denton County, as well as other parts of Texas, began as family operations of uncles, brothers, sons, and nephews, producing stonewares for local use (Greer 1981). Most potters in Denton County began as unskilled apprentices or hired laborers or married into pottery-making families, as was common elsewhere in the South (Burrison 1975; Greer 1981; Sweezy 1984; Zug 1986). All potteries in Denton County were operated by male potters and pottery laborers.

Of the nine stoneware potteries in the county that operated between 1854 and 1920 (Table 4.2), four were begun by master potters who brought their pottery-making skills with them. Among these potters were John Cranston, J. C. Lambert, A. H. Serren, and William Wilson. Four pottery owners learned their skills at one of these Denton County potteries and later operated their own pottery. These include George Cranston, T. J. Donaldson, J. M. Roark, and Boone Daugherty. The ninth pottery, the Kimbrough-Kingdon-Tipton-Moss Pottery, was begun in the 1880s and was operated by a series of entrepreneurs (see Table 4.2 and Appendices A and C). These entrepreneurs were not potters, but instead hired potters and laborers to produce the stonewares, which they in turn sold. The Kimbrough-Kingdon-Tipton-

Table 4.2 Potters and Pottery Laborers in Denton County for the 1850-1920 Period.[1]

Pottery/Potters & Laborers	Production Dates
G. Cranston Pottery	1879-1890s
G. Cranston (Master Potter)	
B. and D. B. Daugherty Pottery	1884-1930s
B. Daugherty (Potter)	
D. B. Daugherty (son, Potter)	
R. Bradford (Laborer, later Potter)	
J. Bradford (son, Potter)	
J. Crites (Kiln burner)	
Cranston-Donaldson Pottery	1854-1882
J. Cranston (Master Potter)	
G. Cranston (son; Apprentice Potter)	
N. Cranston (Proprietress 1868-1869)	
T. Donaldson (Potter)	
G. Stephens (Apprentice Potter)	
J. Donaldson (Apprentice Potter)	
T. J. Donaldson (Apprentice Potter)	
T. J. Donaldson(?) Pottery	1872-1876
T. J. Donaldson (Potter)	
Kimbrough-Kingdon-Tipton-Moss	1880s-1903
J. Kimbrough (Proprietor)	
H. Kingdon (Proprietor)	
J. Tipton (Owner)	
C. Moss (Owner)	
J. C. Lambert Pottery	1859-1860
J. C. Lambert (Master Potter)	
S. Right (Potter Hand)	

Table 4.2 Potters and Pottery Laborers in Denton County for the 1850-1920 Period (continued).[1]

Pottery/Potters & Laborers	Production Dates
Roark-Griffith Pottery	1871-1910+
J. M. Roark (Potter)	
J. Roark (son, Potter)	
M. Griffith (Potter)	
J. Griffith (son, Potter)	
S. Turner (Potter)	
A. H. Serren Pottery	1856-1878
A. H. Serren (Master Potter)	
J. Campbell (Potter)	
M. Hines (Potter)	
C. Bowers (Pottery Laborer)	
R. Bradford (Pottery Laborer)	
D. France (Pottery Laborer)	
M. Griffith (Potter)	
J. Griffith (son, Potter)	
J. Tate (Pottery Laborer)	
Wilson-Donaldson Pottery	1869-1879
W. Wilson (Potter)	
M. Warren (Potter)	

[1] Data compiled from Population Census Schedules (Appendix A), Deed/Title (Appendix B), and Tax Roll (Appendix C) records.

Moss Pottery is identified in local newspaper advertisements as the Denton Pottery Works (Denton County News, September 27, 1900, p. 4, col. 5), the Kingdon Pottery Works (Denton County Record, April 25, 1901, p. 4, col. 7), and in Ries (1908) as the Moss Pottery. For brevity, this pottery is referred to hereafter in the text as the Kimbrough Pottery.

Stoneware Pottery Production Loci

The general locations of the potteries that operated in Denton County during this 1854 to 1920 period were determined by correlating archaeological data with historical information garnered from deed/title records, tax rolls, population censuses, maps, and newspaper advertisements, although the exact location of the G. Cranston Pottery has not been determined. Archaeological and/or architectural remains of the kiln(s), buildings, and waster sherds were found for seven of the potteries (Table 4.3). Archaeological data are most complete for the Cranston-Donaldson and Roark-Griffith potteries where there are extant kiln remains, abundant waster sherds, and intact buried deposits. Figures 4.3 through 4.5 illustrate the locations of each of the potteries and clay outcrops for which archaeological data were obtained. Historical photographs provide information about the destroyed Daugherty (Figure 4.6) and Kimbrough (Figure 4.7) potteries.

Table 4.3 Archaeological and Architectural Remains of the Stoneware Potteries in Denton County.

Pottery	Kilns Remains	Support Buildings	Sherd Piles	Buried Deposits
G. Cranston[1]				
J. Cranston-Donaldson	X		X	X
B. & D. B. Daugherty[2,4]			surface scatter	
T. J. Donaldson	X		surface scatter	X
Kimbrough-Kingdon-Tipton-Moss[1]				
J. C. Lambert[3]	X		surface scatter	X
Roark-Griffith	X	X	X	X
A. H. Serren[4]	X		X	X
Wilson-Donaldson[4]	X		X	X

[1] Data not found.

[2] The sherd scatter from the Daugherty Pottery was largely found off site along the railroad right-of-way on the west side of the pottery property.

[3] Much of the J. C. Lambert pottery sherd scatter has been removed by a road and only a few sherds were collected from the surface.

[4] The Daugherty, Serren, and Wilson-Donaldson potteries have been disturbed by recent occupations, but the subsurface extent of these disturbances is unknown.

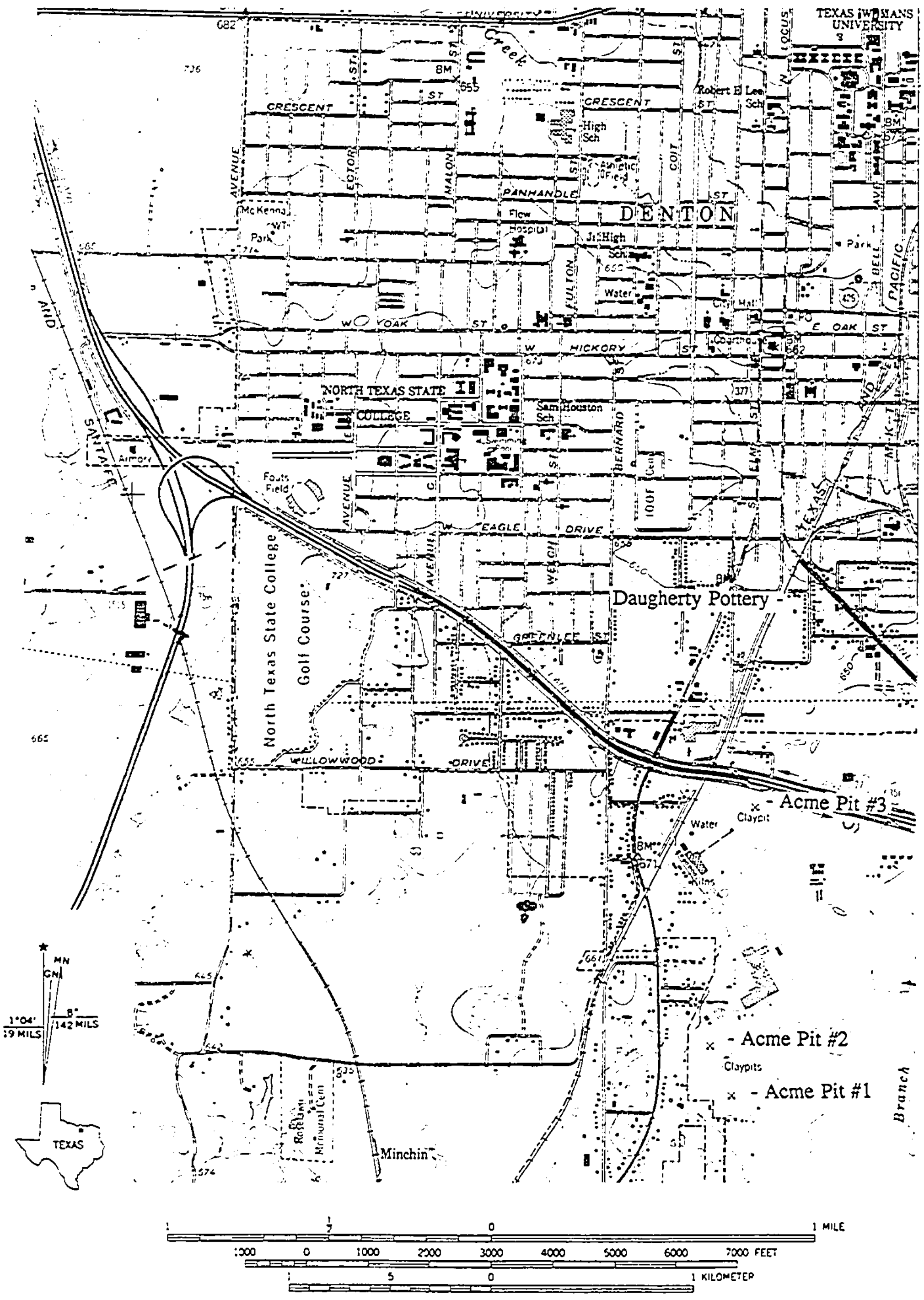


Figure 4.3 Distribution of Acme Pits #1-3 and the Daugherty Pottery.

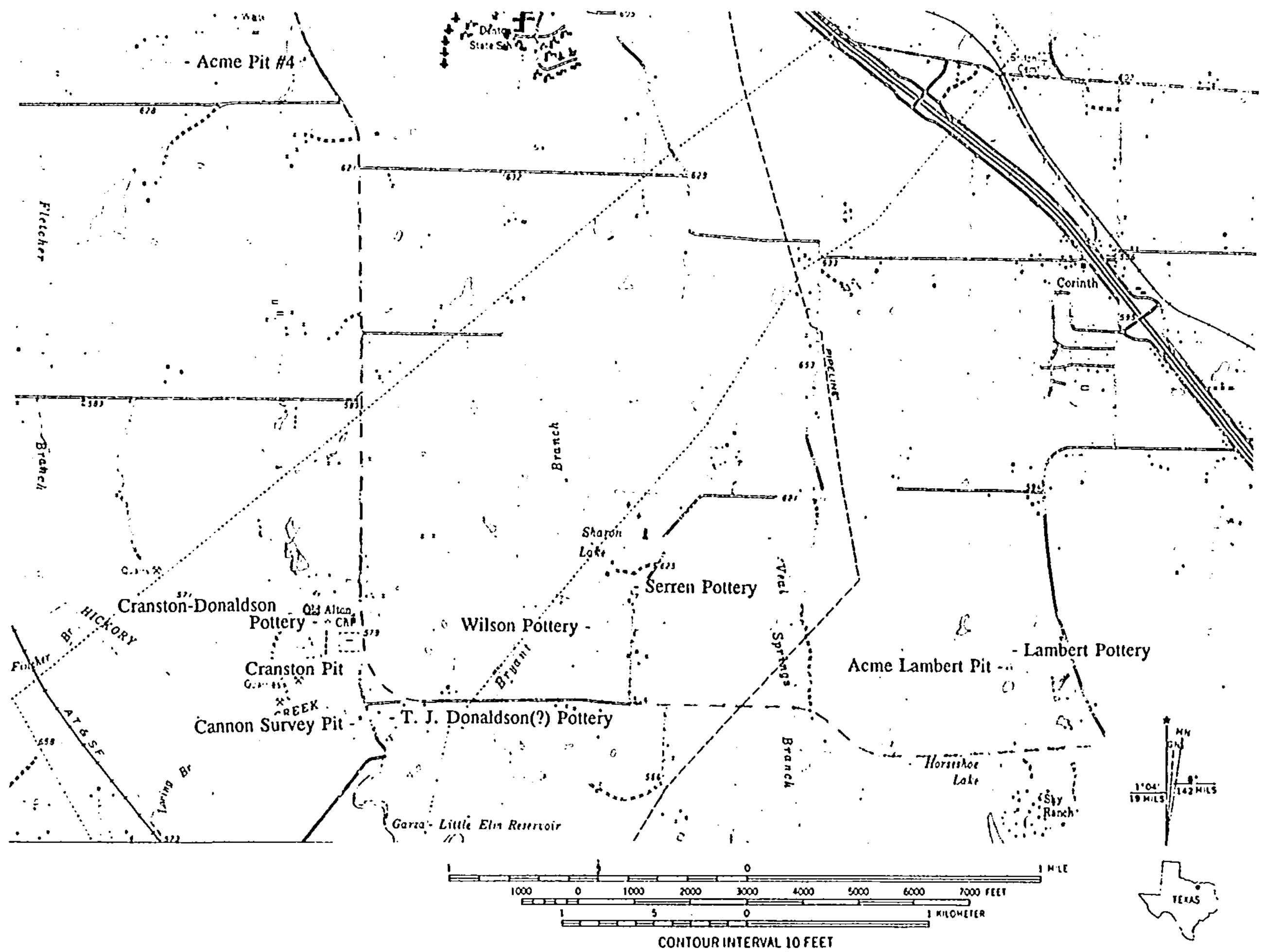


Figure 4.4 Distribution of the Cranston-Donaldson, T. J. Donaldson (?), Wilson, Serren, and Lambert potteries, and the Cranston, Cannon survey, Acme Lambert, and Acme Pit #4 clay outcrops.

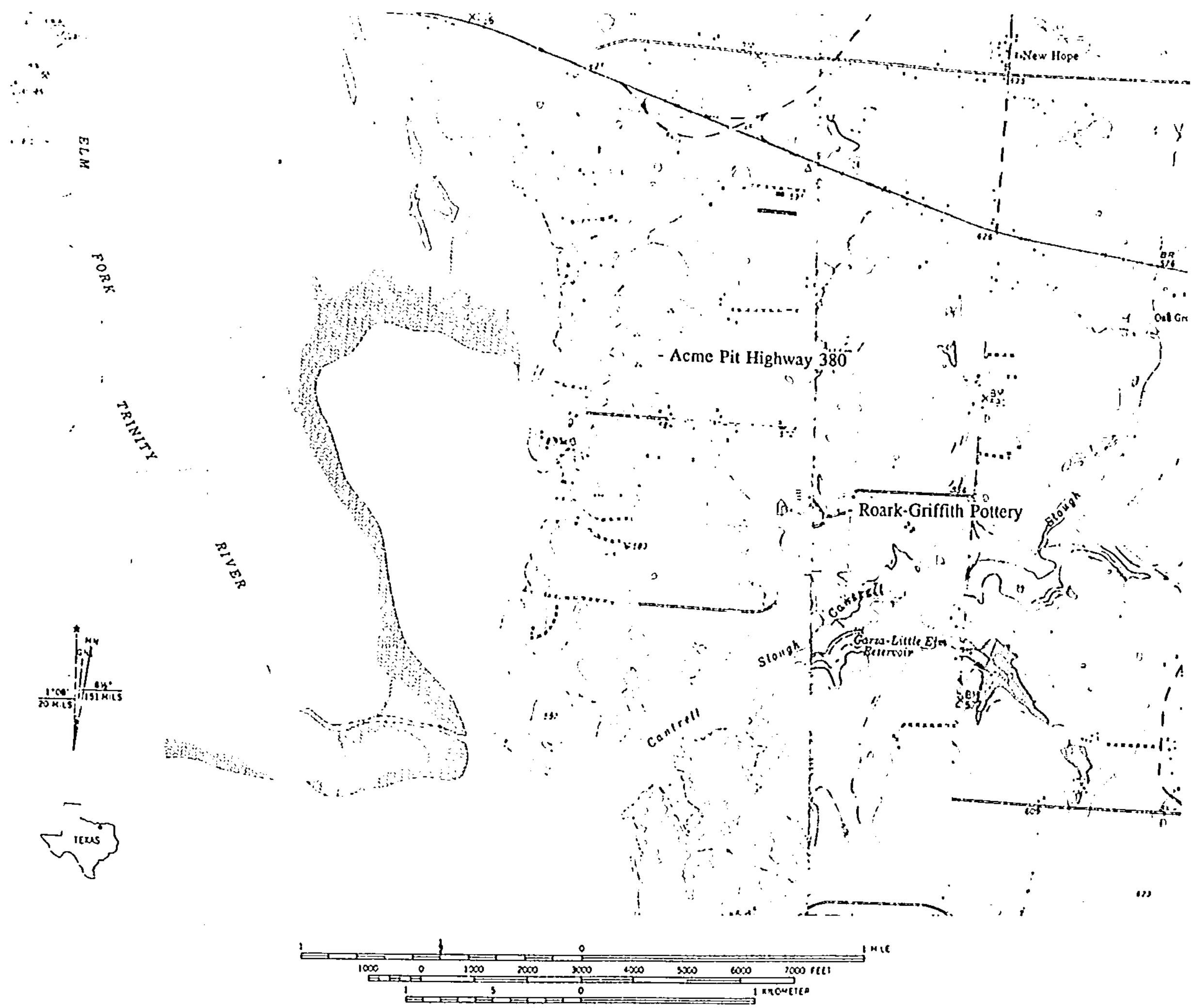


Figure 4.5 Distribution of the Roark-Griffith Pottery and the Acme Pit Highway 380 clay outcrop.

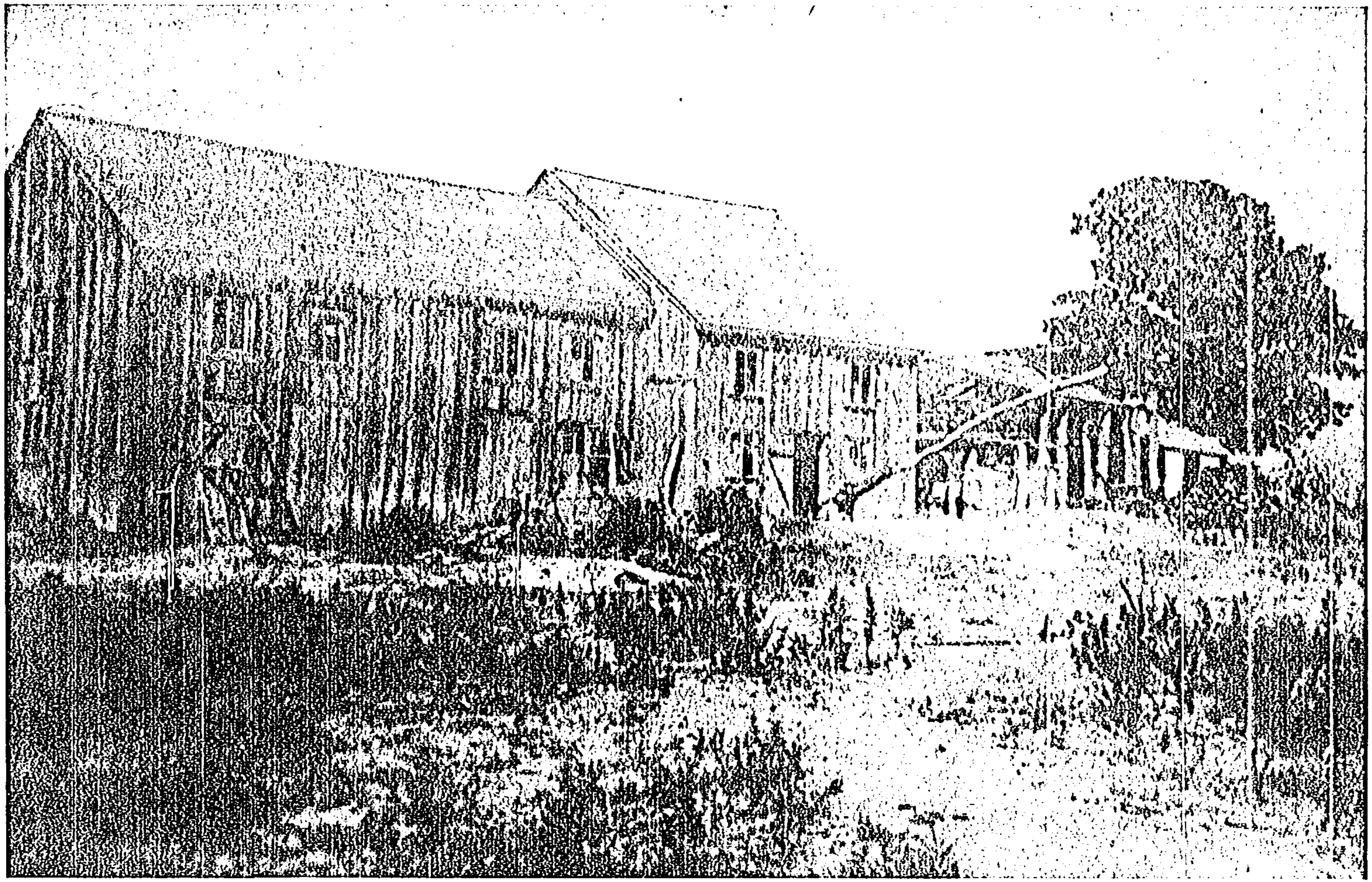


Figure 4.6 B. and D. B. Daugherty Pottery circa 1890s (photo courtesy of the Denton-Record Chronicle).

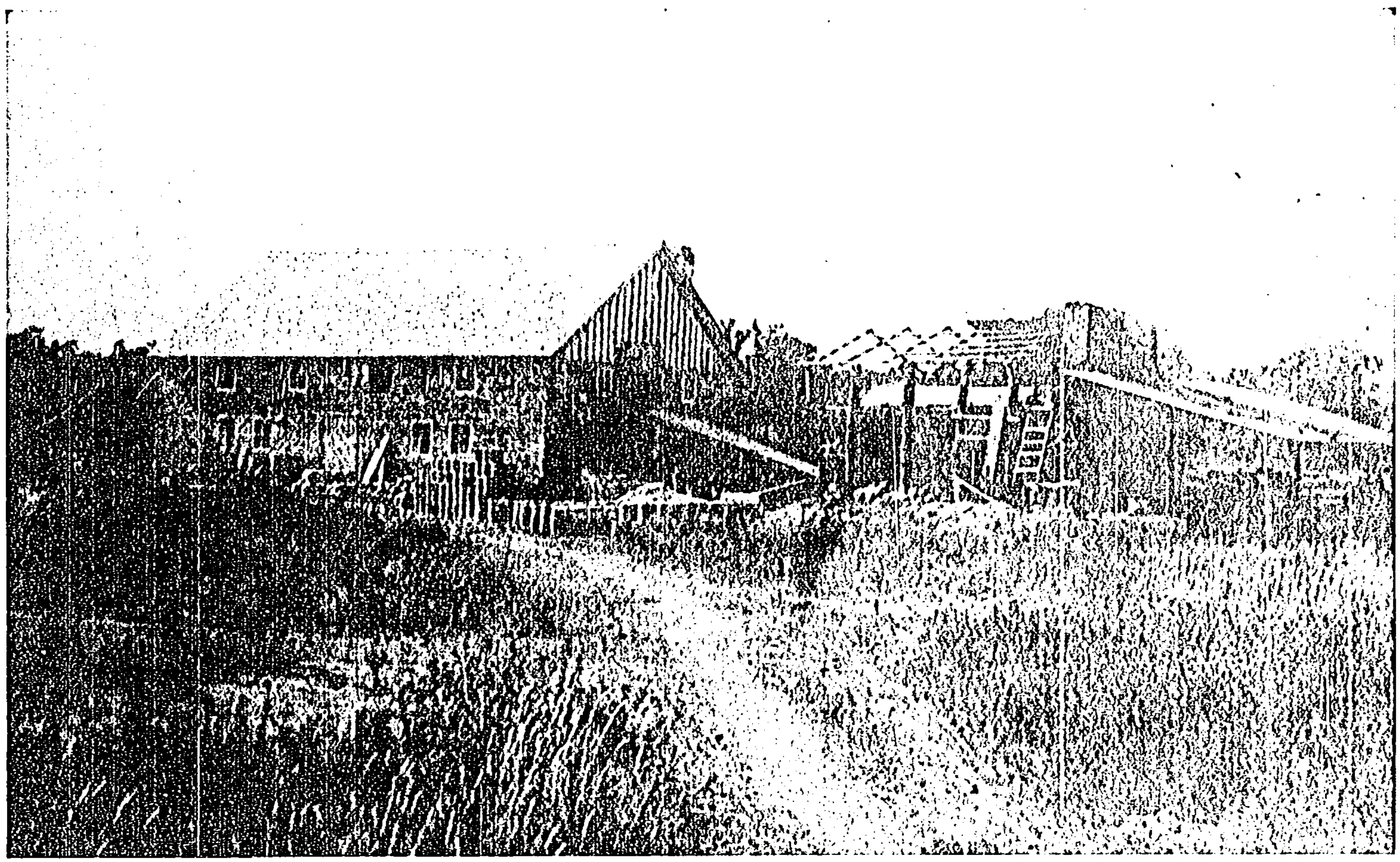


Figure 4.7 Kimbrough Pottery circa 1880s (photo courtesy of the Denton-Record Chronicle).

Cranston-Donaldson Pottery (41DN16)

The Cranston-Donaldson Pottery (see Figure 4.2 and Figure 4.4) operated between 1854 and 1882 and was begun by John Cranston. John Cranston's name first appears in the 1860 population schedules for Denton County (Appendix A). He was born in Ireland and his family resided in Missouri before moving to Texas. John Cranston's wife Nancy operated the pottery for a short time after John's death and, in 1869, their son George became owner. His occupation is identified as potter in the 1870 population census schedules for Denton County (Appendix A). In 1880, he is reported as a retire potter, unemployed for six months.

Thomas J. Donaldson, a potter at the Cranston-Donaldson Pottery, is listed as a 21-year old potter in the 1860 population census schedules for Denton County (Appendix A). His name does not appear in the 1870 population census for the county. He purchased and operated the Cranston-Donaldson Pottery from 1876 to 1882. His name appears in the 1880 population census schedules where he is listed as a retired potter, having been unemployed for nine months (Appendix A).

Several rectangular tunnel kilns (originally incorrectly identified as groundhog kilns) were partially excavated in 1968-1969 at the Cranston-Donaldson Pottery (Greer and Gilmore 1978; Myers 1970). Stoneware sherds were collected from the large waster pile (Figure 4.8) and from excavated units.

Figure 4.8 Stoneware waster pile at the Cranston-Donaldson Pottery (photo courtesy of Georgeanna Greer).

Roark-Griffith Pottery (41DN18)

The Roark-Griffith Pottery (see Figure 4.2 and Figure 4.5) was begun in 1871 by James M. Roark who first appears in the population census schedules for Denton County in 1870 (Appendix A). He is identified as a master potter from Missouri, having settled in Rusk County, Texas before moving on to Denton County (Greer 1990). He sold the pottery to Monterville B. Griffith and his son James F. Griffith in 1884 (see Appendix B). James Roark and his son J. F. Roark are listed as potters in the 1880 population census schedules along with Monterville B. Griffith. Samuel Turner, potter from Arkansas, also probably worked at the pottery (Appendix A).

A downdraft (previously identified as updraft) beehive kiln remains at the Roark-Griffith Pottery (Figure 4.9). Myers (1970:3) also reports that "there was a two-story potter's shed just east of the kiln with a ramp running down to the kiln from the second-story drying floor." The foundation of this shed remains and is northwest rather than east of the kiln. The large waster sherd pile is west of the kiln and a stone dwelling was built between these two features about 1900.

Wilson Pottery (41DN19)

This pottery (see Figure 4.2 and Figure 4.4) is sometimes called the Wilson-Donaldson Pottery. Although Donaldson never owned the pottery and his association with the pottery is unclear, several sherds stamped DONALDSON were found (Figure 4.10). The pottery was begun by William Wilson in 1869 and operated until 1879.

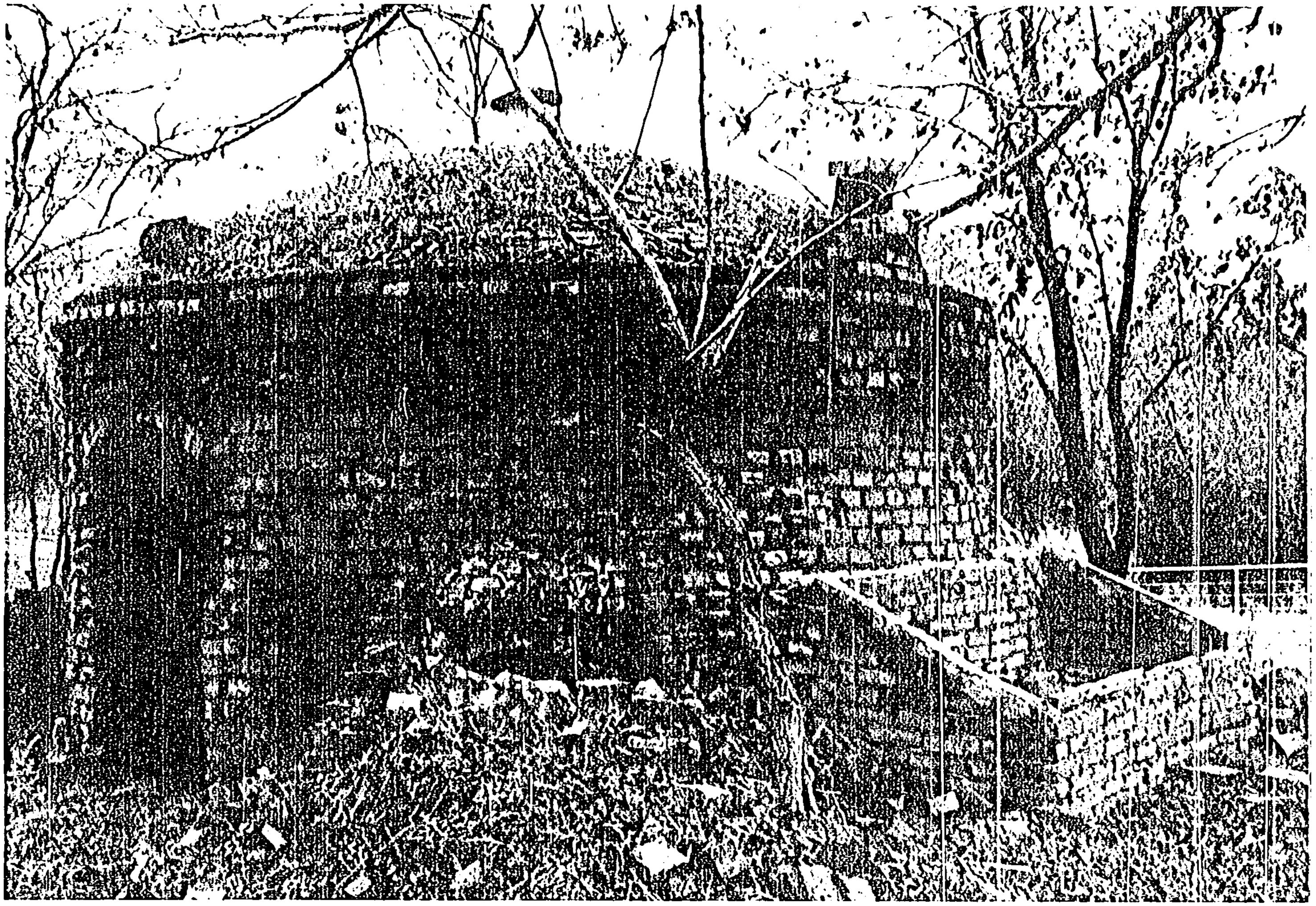


Figure 4.9 Beehive downdraft kiln at the Roark-Griffith Pottery.

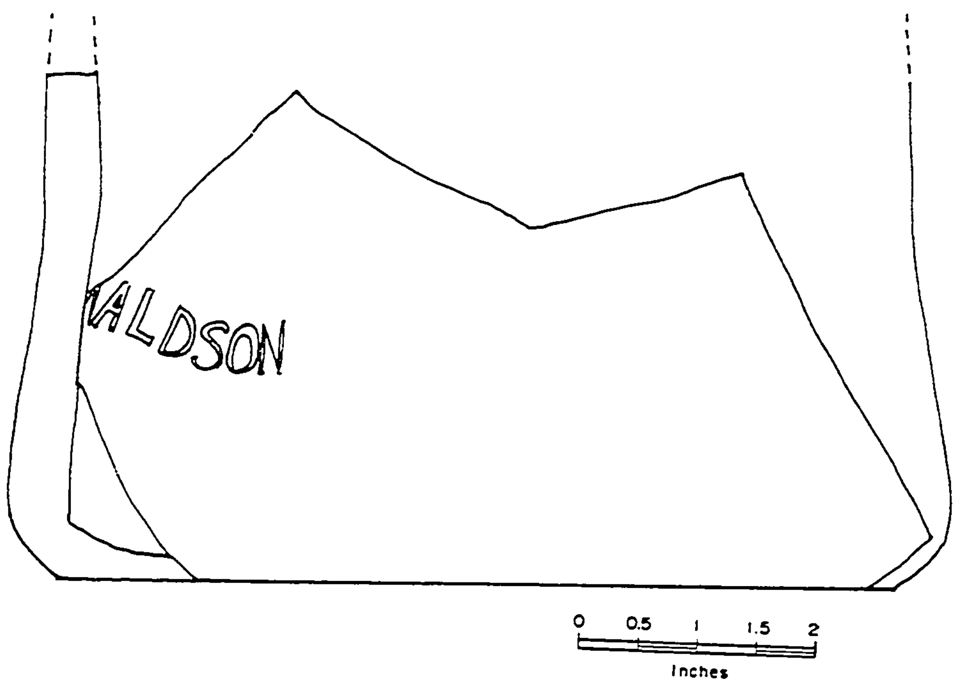


Figure 4.10 Marked DONALDSON sherd from the Wilson Pottery.

William Wilson first appears in the population census schedules for the county in 1870 where his occupation is recorded as potter. He was born in Indiana, and is identified as a retired potter in the 1880 population census schedules (Appendix A).

Martin Warren is identified as a potter living next door to William Wilson in the 1870 population census schedules. As he did not own a pottery, it is probable that he worked at the Wilson Pottery. He was born in Missouri and his name does not appear in the 1880 census (Appendix A).

Malone (1972) reported that based on a letter from Sandra Myers, one kiln at the Wilson Pottery was "demolished when the Methodist Church built their encampment on Lake Sharon" and a groundhog kiln is visible at the site just on the edge of the church property. However, Greer and Gilmore (1979) indicated that two potteries were located here, 41DN19 (Wilson) and 41DN75 (Serren). Several of the kilns mentioned by Malone belong to the Serren Pottery. At least one of the kilns at the Wilson Pottery was a beehive kiln (Greer and Gilmore 1979). Several waster piles were also found.

Lambert Pottery (41DN74)

The Lambert Pottery (see Figure 4.2 and Figure 4.4) was operated by James C. Lambert (ca. 1859-1860) who was identified as a "Potter Master" in the 1860 population census schedules for Denton County (Appendix A). He is not listed in the 1870 or 1880 population census schedules, and, based on the tax roll data, he did not pay taxes on the Lambert Pottery property after 1860 (Appendix C). The deed/title records for Lambert's property were lost when the Denton County Courthouse burned in 1876.

Samuel Right resided as a boarder in the dwelling next door to the Lambert family. His occupation is identified as "Potter Hand" in the 1860 population census schedule for Denton County (Appendix A). He was born in New York and based on his residential location, probably worked at the Lambert Pottery. His name does not appear in the 1870 or 1880 population census schedules.

Greer and Gilmore (1978) reported the remains of a handmade-brick beehive kiln at the Lambert Pottery. Small fired stoneware sherds were found in the vicinity of the kiln, but no large waster pile was located. An elderly resident remembered that at one time a waster pile was located south of the fence surrounding the clay pit owned by the Acme Clay Products Company of Denton. This clay pit was originally mined by Lambert and now is mined to produce bricks in Denton.

Serren Pottery (41DN75)

The Serren Pottery (see Figure 4.2 and Figure 4.4) was owned and operated by Augustus H. Serren between 1854 and the late 1870s. Augustus Serren was born in New York and his name first appears in the population census schedules for the county in 1860 (Appendix A).

Several potters working at the Serren Pottery in 1860 include J. A. Campbell from Virginia and Thomas Donaldson from Missouri. Hired hands undoubtedly worked at the pottery and are listed in the census schedules only as "Hired Hand," making it difficult to identify which individuals were involved in the pottery operation. One possible hired hand is William Albert who lived next door to Augustus Serren. Potter Thomas Donaldson boarded with the Albert family (Appendix A).

J. A. Campbell and Thomas Donaldson are not listed as potters in the 1870 population census schedule for Denton County (Appendix A). However, Melville Hines is listed in the 1870 census most probably worked at the Serren Pottery. He is listed as a 42-year old potter from Alabama living next door to the Serren family (Appendix A).

Augustus Serren died in the late 1870s. His family is listed in the 1880 population census schedule for Denton County along with a boarder named Charley Bowers, a "Potter Laborer and Servant" born in Germany (Appendix A). Apparently he boarded with the Serren family while apprenticing at the Serren Pottery. Other pottery laborers listed in the 1880 population census schedule that may have worked at the Serren Pottery include John H. Tate, David France, and Robert Bradford (Appendix A).

John Serren, a son of Augustus Serren, is listed in the 1880 population census schedule as a 13-year old born in Texas. In 1900, he is identified as the head of a household and a "Pottery Man." It is unclear whether John Serren was a potter or if he was a pottery salesman. He is not identified by Ries (1908) as operating a pottery in Denton County in the 1903-1904 period. This suggests that if he was a potter, his pottery closed before 1903. Contrastively, if he was a salesman working for one of the local potteries, he might well not have been identified by Ries.

Greer and Gilmore (1979) reported that at least five beehive kilns were still visible from the Serren Pottery operation in 1930 and huge waster piles (Figure 4.11) were located about the area. These remains were destroyed by the landowner in the 1930s to build several outbuildings.

B. and D. B. Daugherty Pottery

The Boone and D. B. Daugherty Pottery (see Figure 4.2 and Figure 4.3) was originally owned and operated by Boone (or Boon) Daugherty. While the Daugherty family settled in the Alton community about 1851, no evidence was found that any of them were potters in the Alton area. The first evidence of their potting activity is associated with the establishment of this pottery about 1884 (Appendices B and C).

Boone Daugherty does not appear in the 1870, 1880, or 1900 population census schedules as a potter. In 1900, Boone Daugherty's son Daniel Boone (also called D. B.) is identified as a potter in the population census schedule (Appendix A). He is reported as residing in Dwelling No. 26 with his wife, children, and three boarders--Herman Schroder, a 20-year old teamster from Germany; J. R. Byers, a 36-year old teamster from Illinois; and J. W. Brogan, a 26-year old potter from Massachusetts. J. W. Brogan is reported as having been unemployed for three months (Appendix A).

Three additional individuals listed in the 1900 population census schedule for the City of Denton probably worked at the Boone and D. B. Daugherty Pottery. R. H.

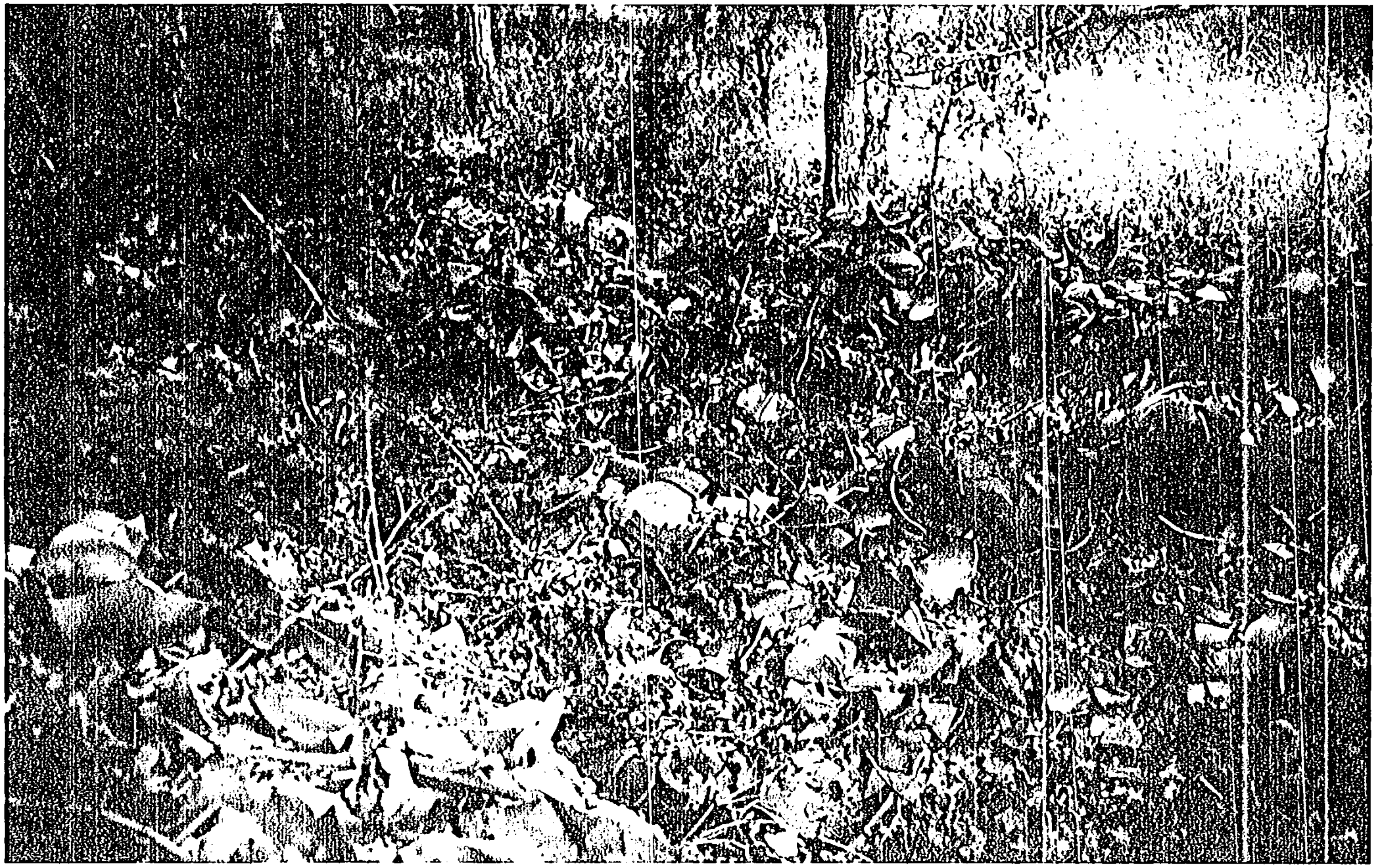


Figure 4.11 Stoneware waster sherd pile at the Serren Pottery (photo courtesy of Georgeanna Greer).

Bradford and his son John Bradford lived in Dwelling No. 120, were born in Texas, and are listed as "Potter." John reported he had been unemployed for two months. Jacob Crites, living in Dwelling No. 153, is identified as a "Kiln Burner" born in Missouri (Appendix A).

Ries (1908:132) reported that this pottery was still operating when he did his geology fieldwork in 1903-1904. He did not provide a description of the pottery, however. The pottery has been destroyed, bricks from structures on the property, possibly including the kiln, occur along the railroad right-of-way that extends north-south on the western boundary of the pottery property. A historical photograph of this pottery was found among the archival files at the Denton-Record Chronicle, the City of Denton newspaper (see Figure 4.6).

This pottery continued to operate into the 1900s, closing before 1910. Data from the population census schedules (1910 and 1920) and Denton city directories indicate that D. B. Daugherty worked both as a farmer and a potter during the early 1900s. The Denton Texas City Directory was examined for the available years of 1913, 1916, 1923, 1925, 1929, 1936, 1939, and 1947. D. B. Daugherty is identified as a "Potter" in the 1929 and 1936 directories. His name appears in the 1939 directory, but no occupation is given.

T. J. Donaldson (?) Pottery

Very little information is available concerning this pottery on the A. E. Cannon survey (A-232) (see Figure 4.2 and Figure 4.4). A buried kiln has been identified by a local individual living on the property; excavation is required to identify the kiln type. A small number of waster sherds have been found on the surface, but the waster pile and clay pits appear to have been destroyed by a clay mining operation on the southern extent of the property.

John Cranston owned 2 acres of the A. E. Cannon survey (A-232) from 1861 to 1872 when T. J. Donaldson purchased 7 acres. By 1877, T. J. Donaldson owned 116 acres of this survey, but by this same year Donaldson also owned the Cranston-Donaldson Pottery (Appendices B and C). As the few stoneware sherds recovered from the pottery on the Cannon survey are similar in form to early vessels from the Cranston-Donaldson Pottery, the pottery on this property most probably operated for a short time between 1861 and 1876. Given that John Cranston had a successful business at the Cranston-Donaldson Pottery, it is unlikely that he worked at this second pottery. Several apprentice potters, including T. J. Donaldson may have worked here.

Production Process

Although there were variations in implementation among potters that gave vessels from different potteries some distinguishing characteristics, the production process was similar at all nine potteries. Stoneware clays were dug from a pit, softened with water, and then ground in a horse- or mule-driven mill. Once the potter had removed visible debris such as roots and pebbles, the clay was then wedged and kneaded, weighed, turned on the potter's wheel, with uniform vessel sizes determined by the weight of the clay ball and by gauges set for the base thickness, vessel height, and rim diameter (Burrison 1983; Greer 1981; Rinzler and Sayers 1981; Sweezy 1984; Zug 1986). The center hole in large jars or crocks was produced using a ball opener, a lever-like instrument attached to the side of the wheel frame, unique to southern potteries. This device also served as a bottom gauge, producing a uniform base thickness, usually 1/2 inch.

After throwing, one or more parallel lines were often incised to mark the locations for handles, makers' marks, and gallon capacity numbers. The vessels were then cut from the wheel with a thin wire and set to air dry. After the vessels had stiffened slightly, handles were applied. The gallon capacity, if greater than one gallon, was incised or stamped onto the vessel, and the vessel was ready for final drying before glazing. The glaze was then applied, and the vessel was set for final drying before firing. The completed vessels were then loaded in the kiln, stacked or unstacked depending on the size, type of kiln, and glazes. Firing usually took several days (Burrison 1983; Greer 1981; Rinzler and Sayers 1981; Sweezy 1984; Zug 1986).

Throwing pots on the potter's wheel, usually a treadle or jigger wheel, was the most common method of producing stonewares in Texas during the nineteenth and early twentieth century (Potter and McKnight 1931). The treadle wheel was favored by southern potters during the nineteenth century (Burrison 1983), whereas the jigger wheel (also called jigger and jolly machine) was primarily used at industrialized potteries until the turn of the century. During the twentieth century, jigger wheels were commonly used to produce shouldered jugs made in two-piece molds, flower pots, and crocks (Greer 1981; Potter and McKnight 1931).

Kilns

Beehive kilns (Figure 4.12) and rectangular tunnel kilns (Figure 4.13) (Burrison 1983; Greer 1979, 1981; Potter and McKnight 1931; Sweezy 1984; Zug 1986) were used in Denton County, with beehive kilns being utilized at at least four of the early potteries: Lambert, Roark-Griffith (Figure 4.12), Serren, and Wilson-Donaldson. Cranston-Donaldson (Figure 4.13) used rectangular tunnel kilns, while the kiln types at the Daugherty (see Figure 4.6), and Kimbrough (see Figure 4.7) are unknown. The largely buried kiln at the T. J. Donaldson(?) Pottery may have been a rectangular tunnel kiln. The George Cranston kiln in Denton was mentioned by Bridges (1978) and has not been found.

Beehive kilns are distinguished primarily by their "beehive shape" and include both updraft and downdraft varieties. The downdraft beehive kiln at the Roark-Griffith Pottery is illustrated in Figure 4.14. The downdraft rectangular kiln, an above-ground variety of the groundhog, was most common beginning near the turn of the century (Greer 1981; Sweezy 1984). Several downdraft rectangular tunnel kilns occur at the Cranston-Donaldson Pottery.

Both wheel-thrown and handmade kiln furniture were used in Denton County by potters for burning stacked stonewares. Saggers, large rings or discs, and flat strips or squares of clay were wheel-thrown for use between vessels. Since no shelves were

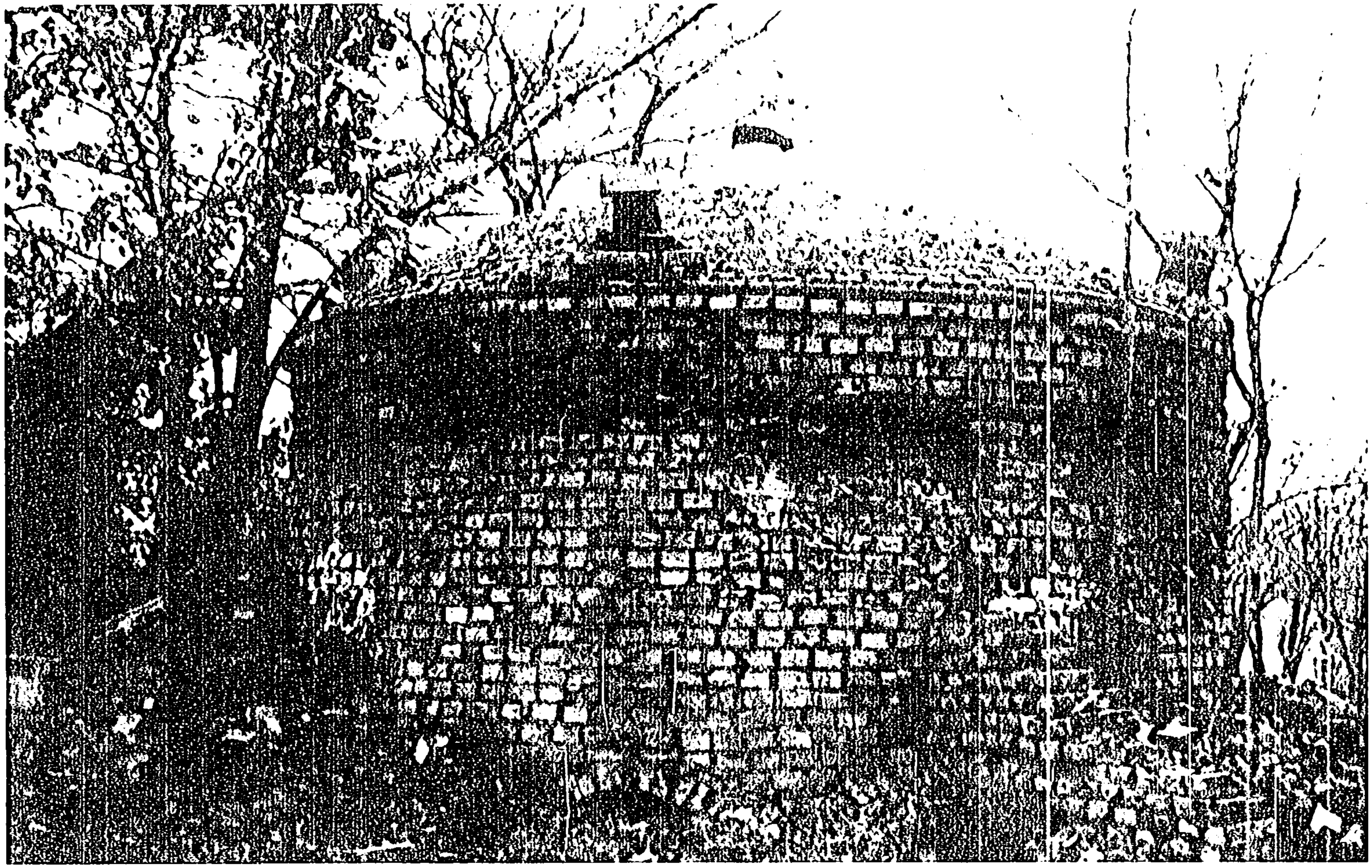


Figure 4.12 Beehive downdraft kiln at the Roark-Griffith Pottery.

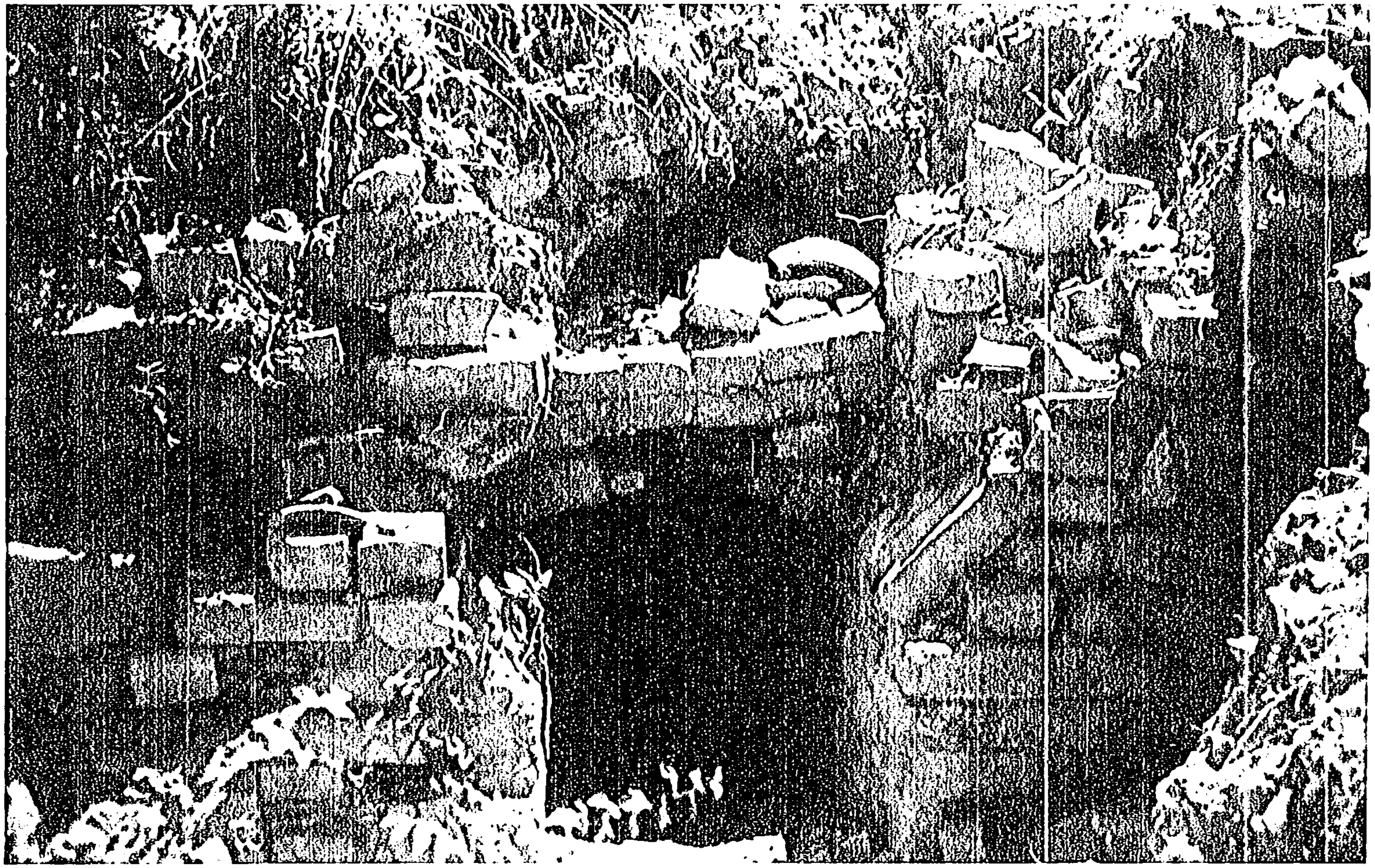


Figure 4.13 Rectangular tunnel kiln at the Cranston-Donaldson Pottery.

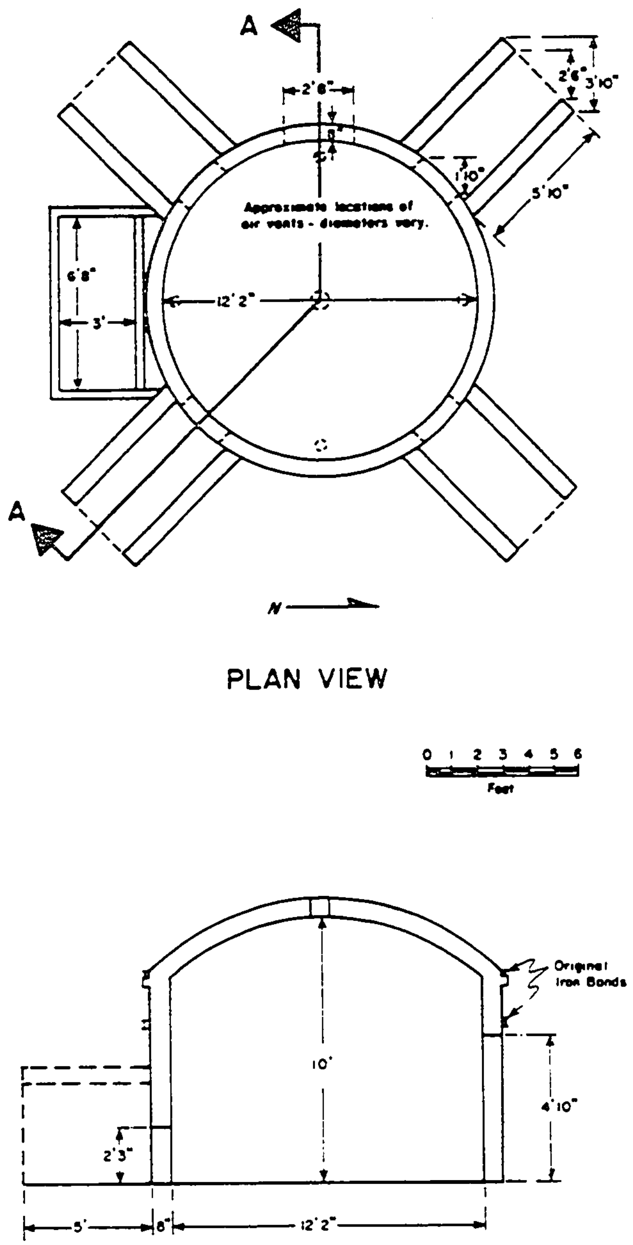


Figure 4.14 Floorplan and elevational drawing of the beehive kiln at the Roark-Griffith Pottery.

used in these potteries, handmade furniture (Figure 4.15) in the form of coils, spools, and patties were made at the time of loading to keep the vessel stacks level and separated (Burrison 1983; Greer 1981; Zug 1986). The most complete assemblages of kiln furniture are from the Cranston-Donaldson and Roark-Griffith potteries.

Guild System

Most stoneware potteries in Denton County probably relied on a guild system of laborers and kiln burners, apprentices, journeymen, and master potters, as county population census schedules list these occupations and in some instances show a progression from one to another (see Appendix A). An apprentice was trained to throw pots and carry out a wide variety of menial, but important tasks, including making clay balls for throwing, making handles, preparing clay, and loading and helping in the firing of the kiln (Greer 1981:37). Apprenticeships generally lasted two years followed by a two-year journeyman position where the potter continued to work on improving his throwing skills and performed fewer menial tasks. A master potter would prepare the glazes, throw the larger and more difficult wares, oversee the pottery and the firing of the kiln, and arrange for marketing of the finished wares (Greer 1981).

Some master potters moved from shop to shop, helping the owner by throwing pots to fill the shop and then moving on to another shop to do the same (Greer 1981). An early Denton County master, Thomas Donaldson, may have been such a potter. Vessels marked with his name occur in the waster sherd piles at the Cranston-

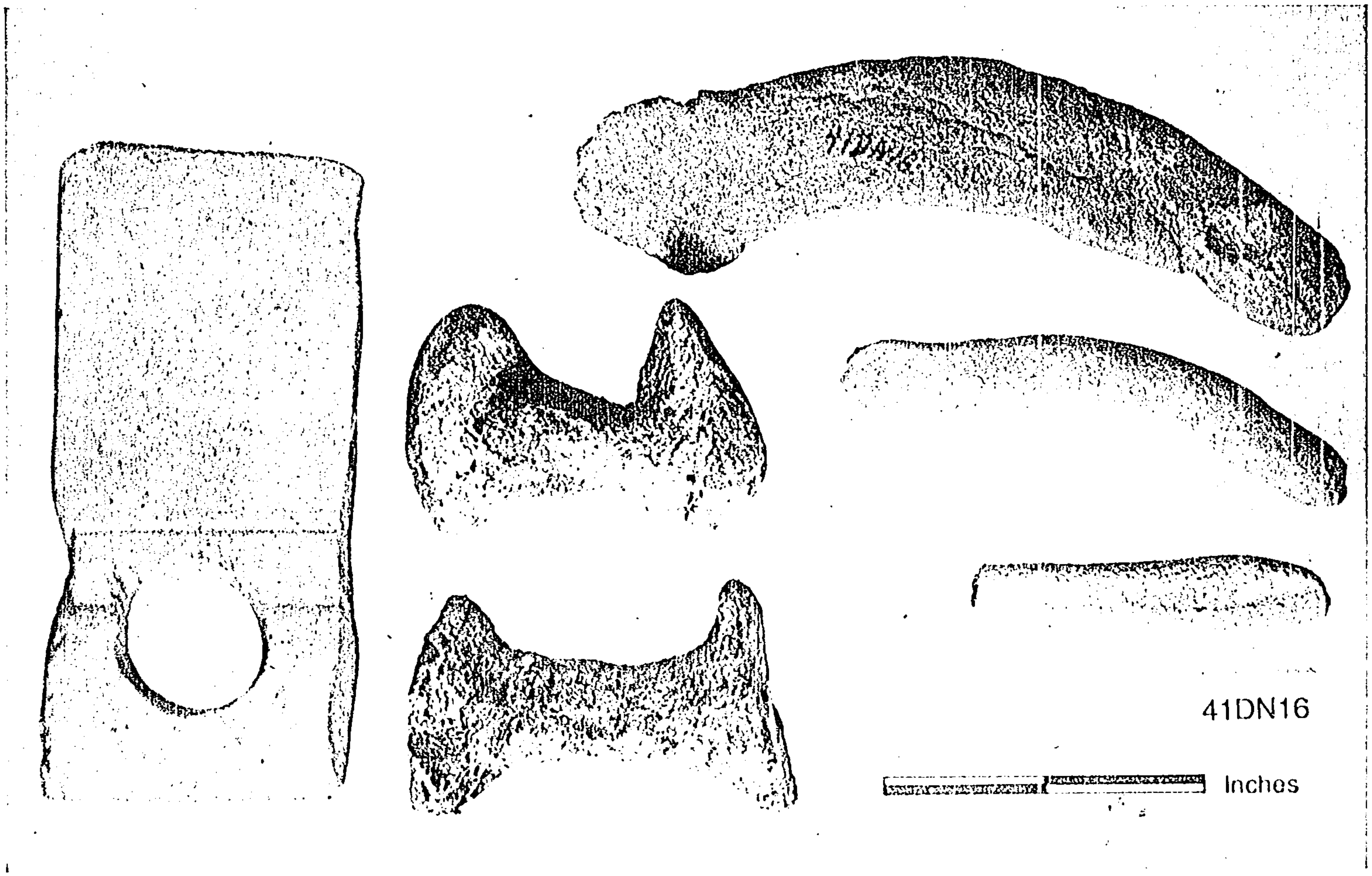


Figure 4.15 Handmade kiln furniture from the Cranston-Donaldson Pottery.

Donaldson Pottery and the Wilson-Donaldson Pottery, although he was not owner at either shop. Given the volume of sherds marked "DONALDSON" at the Cranston-Donaldson Pottery, this is probably where most of his potting was conducted.

Vessel Types

Although not all types of vessels were recovered from all of the potteries in Denton County, each pottery appears to have produced a similar variety of utilitarian stoneware vessels to meet the food preservation and storage needs of a predominantly rural population (Table 4.4). Among the major utilitarian vessel forms produced in the county are jugs, churns, crocks or wide-mouth jars, and milkpans or bowls (Figure 4.16). Less common forms include preserve or narrow-mouth jars, pitchers, tobacco pipes, and whimsical items. Temporal changes in vessel forms, however, are evident among potteries. By the 1890s, these changes include the added production of stoneware flowerpots, sewer pipes, and tiles, a trend away from bulbous vessel forms to straight-sided crocks, churns, and shouldered jugs which could be produced in molds, and a reduction in the number of vessels being produced with decorative motifs. Poultry feeders, chamber pots, ant traps, and cemetery markers were produced at some Texas potteries, but none have been identified from Denton County.

Glaze Types

Only two--salt glazes and natural clay slips--of the four major stoneware glazes utilized by U.S. potters were used in Denton County during the 1854 to 1920 period.

Table 4.4 Vessel Types at Denton County Potteries.[1]

Pottery	Milk Bowl	Churn	Crock	Jug	Preserve Jar	Flask, Bottle	Animal Dish	Flower Pot	Sewer Pipe
G. Cranston[2]									
B. and D. B. Daugherty	X	X	X	X	X			X	X
Cranston-Donaldson[3]	X	X	X	X	X	X	X	X	
T. J.(?) Donaldson			X						
Kimbrough-Kingdon-Tipton-Moss[4]	?	X	X	X	?			X	X
J. C. Lambert	X	X	X	?	?				
Roark-Griffith	X	X	X	X	X				
A. H. Serren	X	X	X	X	X				
Wilson-Donaldson	X	X	X	X	X		X		

[1] Compiled from sherd samples collected from each pottery.
[2] No available data.
[3] Toys or whimsical items were reportedly made at this pottery; see Myers' private collection.
[4] Information is compiled from historical accounts only.

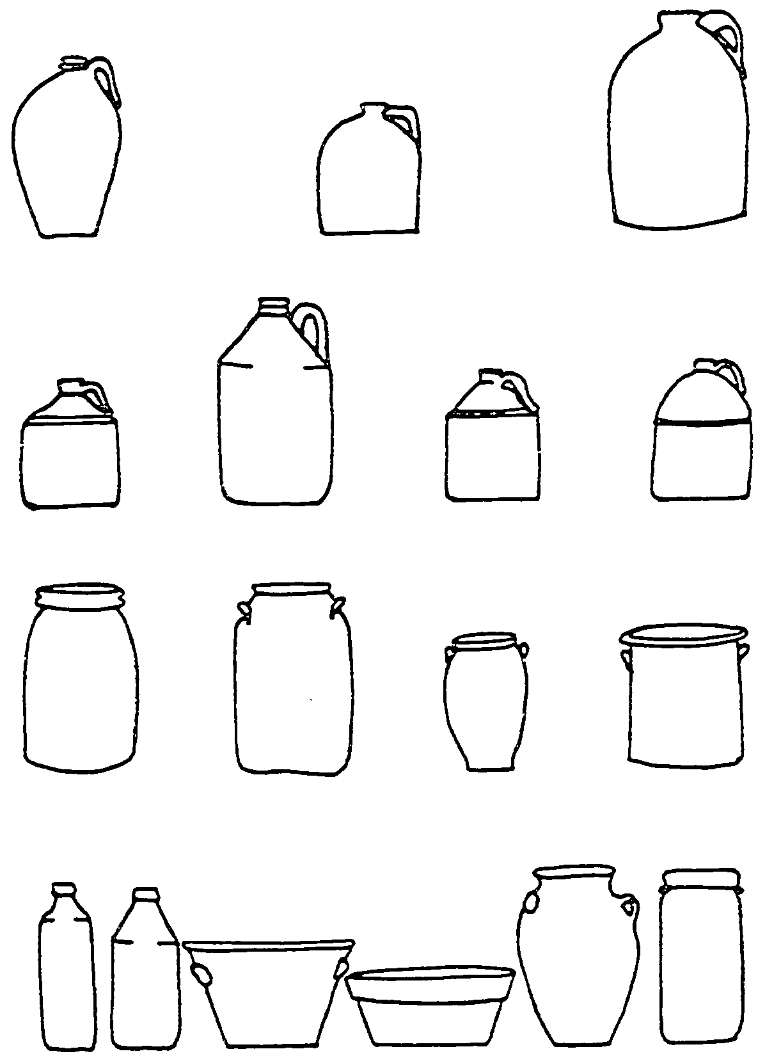


Figure 4.16 Vessel forms produced in Denton County, including jugs (top row), shouldered jugs (second row from top), wide-mouth jars, churns, and crocks (second row from bottom), bottles, milkpans and milkbowls, churns and crocks (left to right, bottom row).

Alkaline glazes, which were common throughout the South, including East Texas, were not produced in Denton County, although alkaline-glazed stonewares have been recovered from Denton County farmsteads. Bristol glazes were popular in East Texas by the turn of the century, but apparently were not used in Denton County until the 1920s.

Salt glaze was the most frequently used glaze for covering the exterior of stoneware vessels during the nineteenth century (Greer 1981; Sweezy 1984), and it was the first stoneware glaze used in Texas (ca. 1840). Salt glazing was accomplished through vaporization of salt, which when combined with a sufficient silica-free ceramic surface produced a translucent sodium silicate glaze. Salt may have been introduced into the heated kiln three or four times during a single firing to assure adequate glazing (Greer 1981; Rhodes 1957; Sweezy 1984).

Natural clay slips or glazes became popular in Denton County, as elsewhere in the South, about 1875 and continued to be used by potters during the early 1900s (Burrison 1975; Carnes 1978; Greer 1981; Sweezy 1984). These glazes, some of which were shipped to the South from Indiana, Michigan, and New York, had been available to local potters prior to the Civil War, but their substantial costs limited their use by many southern potters (Greer 1981). Shipments to the South were interrupted by the Civil War, but resumed once trade was firmly reestablished in the 1870s. By 1875, natural clay glazes were the most commonly used glazes in Denton County. Initially, natural clay glazes were used only to cover the interior of vessels, and a salt glaze continued to be used to cover the exterior. Depending on the extent of the vessel to be covered, glazing was accomplished by either dipping the vessel into a container filled with prepared slip or by pouring the slip over the vessel (Greer 1981; Sweezy 1984).

Bristol glazes became popular during the Victorian period in England at a time when the public was concerned about sanitation and cleanliness (Greer 1981; Sweezy 1984). These glazes were introduced into the United States in the 1880s and became popular in the North and Midwest by the 1890s. They were not widely used in the South until the early 1900s, although they had been previously used in some southern industrial potteries. Early bristol glazes were used in conjunction with a natural clay glaze on the shoulder, mouth, and interior. These vessels were glazed to imitate British stoneware ale bottles (Greer 1981). Bristol glazes were used at the Daugherty Art Pottery, which began operation about 1920 or 1924 in Denton County (see Appendix B for a brief mention of this pottery), but there is no evidence of their use at any other potteries in the county prior to that time.

Utilitarian and Decorative Motifs

Although the majority of the stonewares produced in Denton County were undecorated, utilitarian and decorative motifs were utilized by potters in the county from the earliest period forward (Table 4.5). Applied utilitarian decorations included makers' marks (Figure 4.17), and gallon-capacity numbers (Figure 4.18), which were usually handpainted, incised, or applied with stamps. On those vessels with decorations, gallon-capacity numbers were commonly used, while only Thomas

Table 4.5 Major Decorations at Denton County Potteries.[1]

Pottery	Incising	Stamps	Stencils	Handpainting	None	Unknown
G. Cranston						X
B. and D. B. Daugherty		X				
Cranston-Donaldson		X	X	X	X	
T. J. Donaldson	X					
Kimbrough-Kingdon-Tipton-Moss						X
J. C. Lambert		X				
Roark-Griffith	X	X	X	X		
A. H. Serren					X	
W. Wilson	X	X		X		

[1] Compiled from sherd samples collected from each pottery.

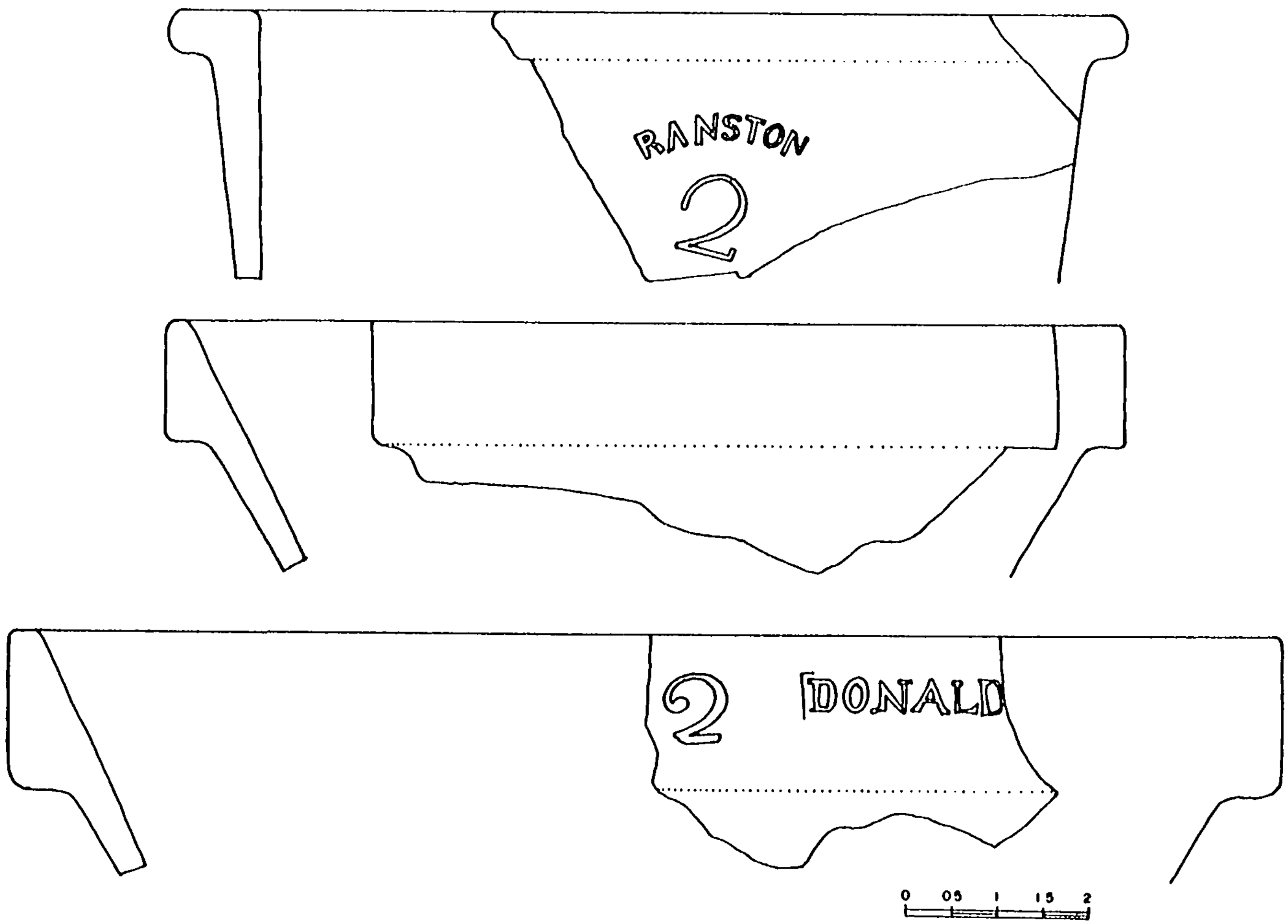


Figure 4.17 Milkpan (top) and Milkbowl (middle and bottom) vessel sherds from the Cranston-Donaldson Pottery with stamped makers' marks.

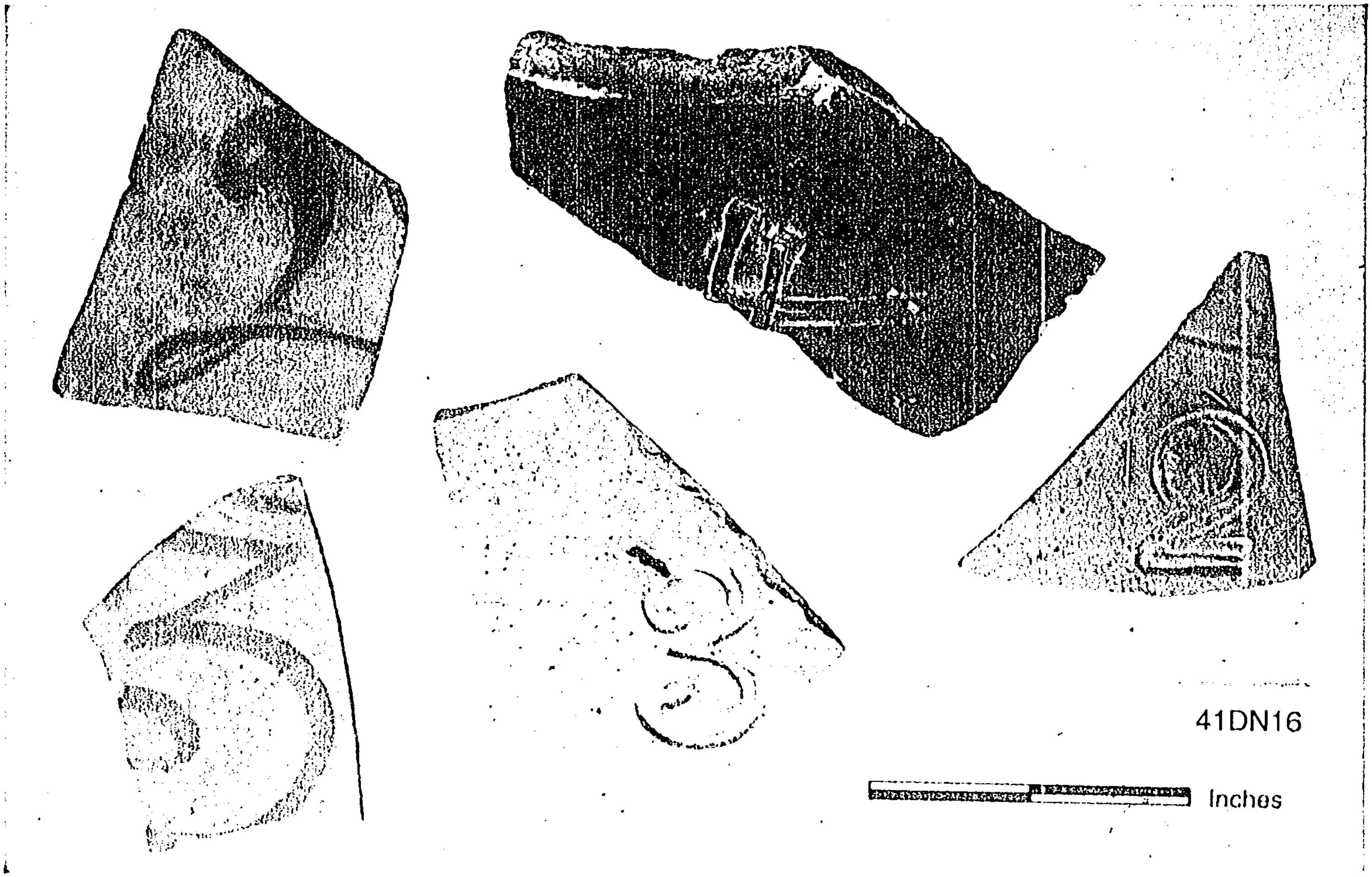


Figure 4.18 Sherds with handpainted (top and bottom left), incised (center top), and stamped (bottom right and far right) gallon numbers from the Cranston-Donaldson Pottery.

Donaldson, working at the Cranston-Donaldson Pottery, produced a large number of vessels with stamped or stencilled numbers or makers' marks (Figure 4.19) and handpainted motifs (Figure 4.20). Incised lines also appear on the shoulders, and less commonly on the body, of many open vessels such as crocks, churns, and bowls.

Incised lines are fine, shallow grooves made with a thin tool in the moist clay before firing. They most commonly occur as straight lines that extend around the circumference of the vessel between the rim and the base of the handle. Greer (1981) reports that these lines may not have been intended as decoration being primarily incised to mark the locations for applied handles.

Stoneware sherd evidence indicates that Denton County potters used stamps for applying gallon numbers and makers' marks. While none of these stamps have been recovered, metal, hand-carved wood, plaster of paris, or biscuit-fired clay stamps were commonly used in the South in the nineteenth century. Roulette-wheel stamps, rubber stamps, and marks on wares made in a jolly mold were less common. Stamps were rarely applied to vessels smaller than two gallons but were common on larger vessels (Greer 1981); marked sherds from the Cranston-Donaldson Pottery range from two to eight gallons. Marked pieces from Denton County potteries predominately bear the name of the master potter, although some vessels bear the names of owners, business partners, or advertisement. Among the vessels from the Cranston-Donaldson Pottery are vessels marked "CRANSTON," "DONALDSON," and "MOORE & DONALDSON" (Figures 4.21 and 4.22). Both Cranston and Donaldson were potters, Moore was a business partner or part-owner. Several vessels are marked

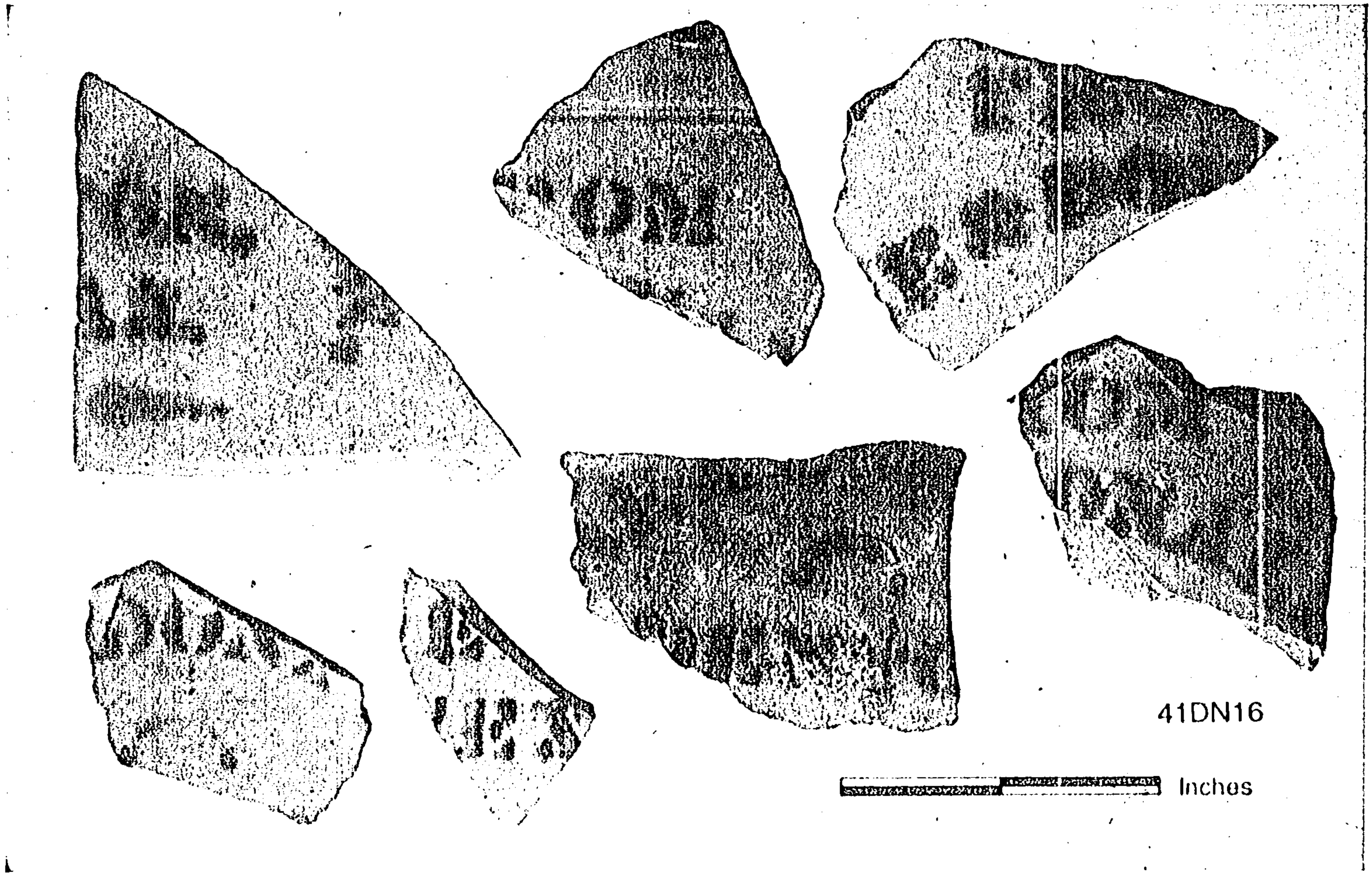


Figure 4.19 Sherds with stencilled maker's marks from the Cranston-Donaldson Pottery.

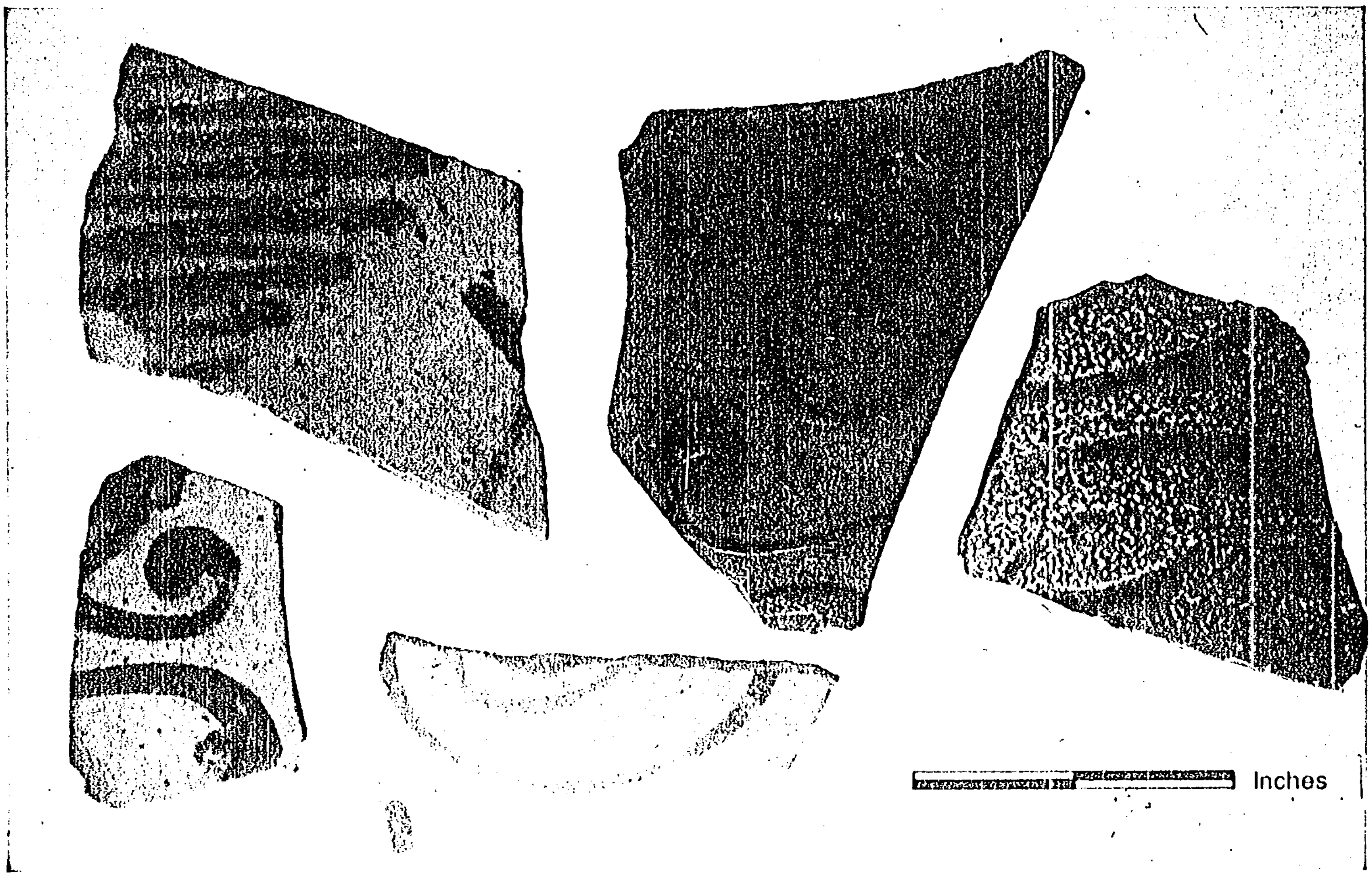


Figure 4.20 Sherds with handpainted motifs from the Cranston-Donaldson Pottery.

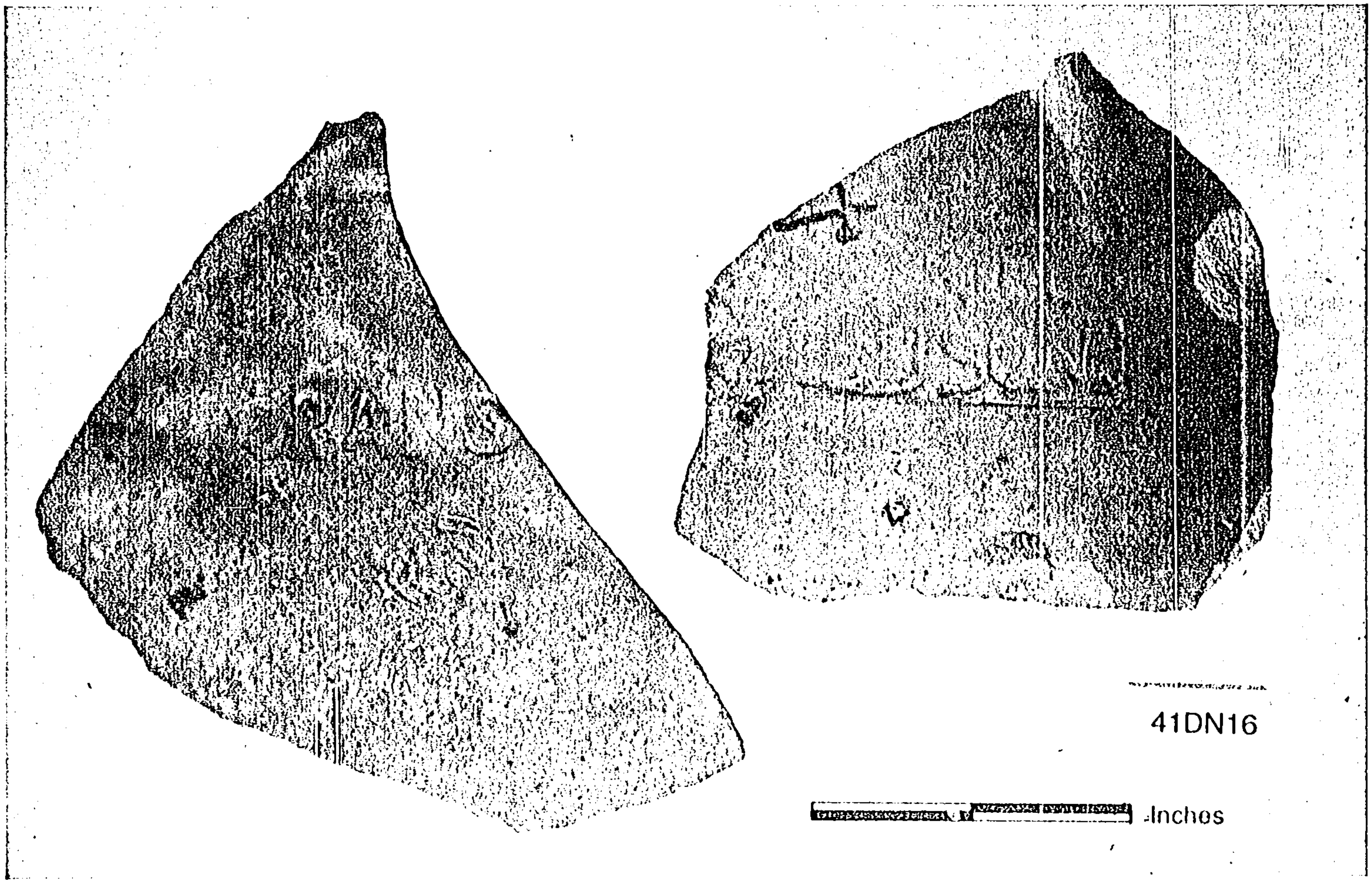


Figure 4.21 Marked CRANSTON and DONALDSON sherds from the Cranston-Donaldson Pottery.

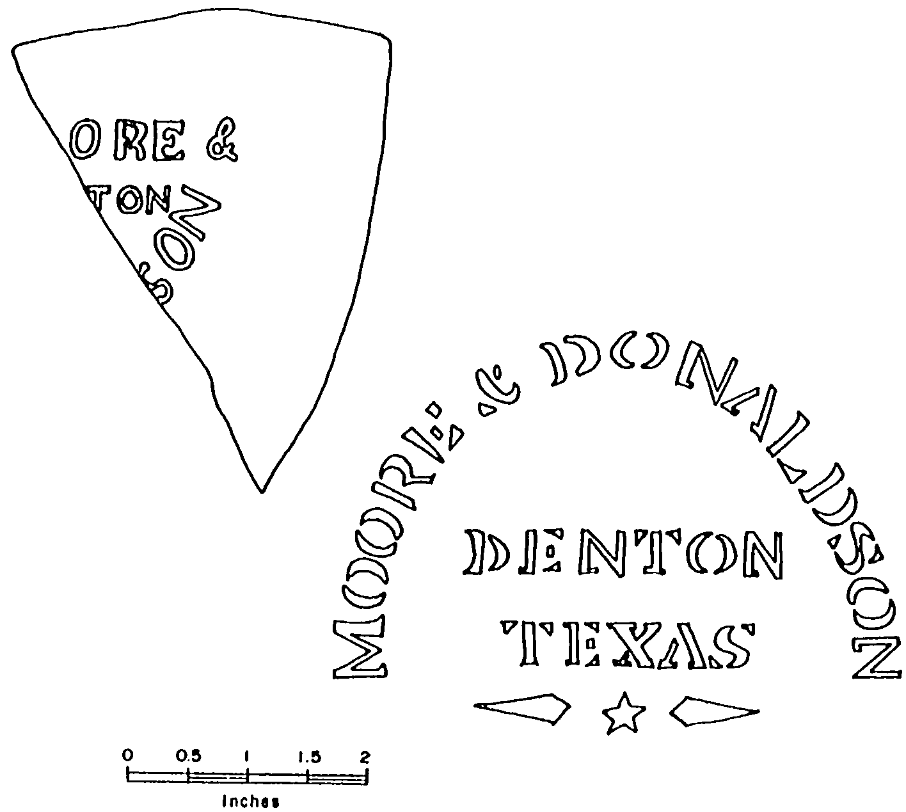


Figure 4.22 Two makers' marks identified on sherds from the Cranston-Donaldson Pottery made by T. J. Donaldson and marked MOORE & DONALDSON (drawing by Carin E. Horn).

with Nancy V. Cranston's name (Greer 1990) who was proprietress of the pottery in 1868-1869, but was not a potter.

During the nineteenth and early twentieth centuries, stencilling was most common on late salt-glazed and Bristol-glazed stonewares (Greer 1981), and this pattern is reflected in the use of stencils on salt glaze, and on Bristol after 1920 in Denton County. The stencilling of numbers and makers' marks involved the application of a coloring oxide such as cobalt to the dried vessel surface. Stencilled pieces were found only at two Denton County potteries, the Cranston-Donaldson and the Roark-Griffith. Of the stencilled vessels from the Cranston-Donaldson Pottery, all were produced by Thomas Donaldson prior to 1880 (see Figure 4.19). Several stencilled wares produced after this time were found at the Roark-Griffith Pottery (Figure 4.23) marked "GRIFFITH AND SONS."

Few vessels produced in Denton County had handpainted motifs. Of these, the majority were produced by Thomas Donaldson at the Cranston-Donaldson Pottery. Greer (1981) reports that handpainted motifs were most common on salt-glazed vessels and primarily consisted of the application of a solution of clay slip containing a metallic oxide to the vessel surface. Cobalt was the most commonly used oxide, while iron and manganese were rare, occurring only on several vessels at the Roark-Griffith Pottery.

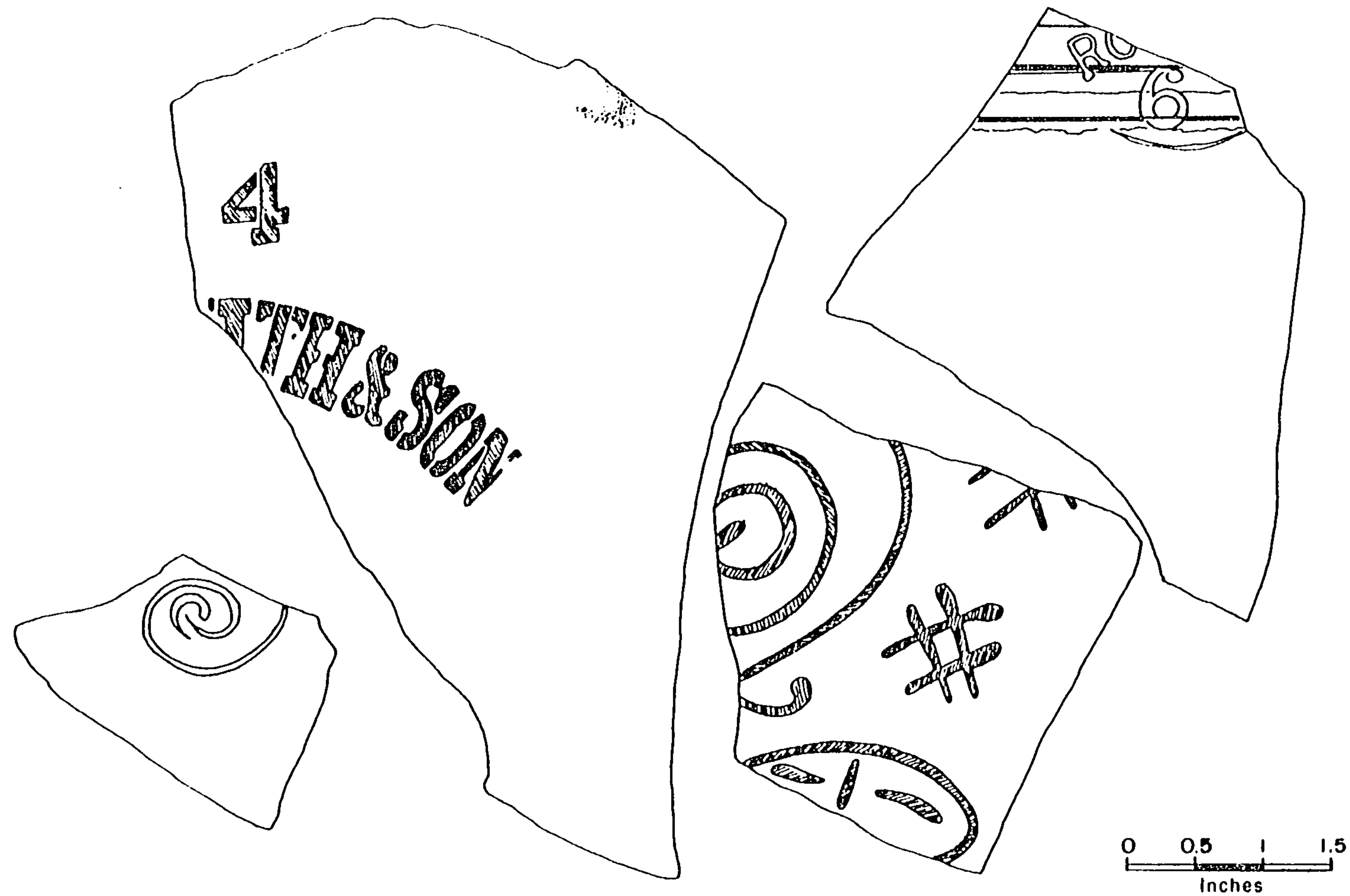


Figure 4.23 Sherds from the Roark-Griffith Pottery, including a sherd with a stencilled mark: GRIFFITH & SON (upper left), a sherd stamped ROARK 6 (upper right), and two handpainted cobalt-blue decorated sherds (bottom).

Distribution of Finished Wares

Stoneware potters in Denton County, like other potters in Texas, probably shipped their vessels by freight wagon or railroad within a 100-mile radius of the pottery (Byrd 1971; Greer 1981). Freight wagons remained the major mode of transporting stonewares in Texas until the 1930s (Greer 1981). Some of these loads were transported by the master potter and/or other individuals working at the pottery, while others were transported by professional wagoneers or potterymen (Burrison 1983; see John Serren in Appendix A).

Some potteries had small shops for selling finished wares, and families that lived near a stoneware pottery often traveled to the pottery and bought their wares directly from the potter. Others acquired their stonewares from community stores. An 1868 advertisement for the Cranston-Donaldson Pottery mentions that stonewares are available at both wholesale and retail prices from the pottery (Denton Monitor, August 15, 1868). Similar advertisements occur for several potteries in the town of Denton for the 1890s period, including the G. Cranston Pottery and the Kimbrough Pottery (called the Denton Pottery Works or the Kimbrough Pottery Works) (Bridges 1978; Denton County News, vol. 9, No. 22, September 27, 1990; Record and Chronicle, vol. 19, No. 38, April 25, 1901).

Pottery Production Ends

While the relative length of operation among potteries was similar, early potteries primarily appear to have ceased operation when the master potter-owner died, and the business was not successfully transferred to a potting son, relative, or nonkin-related potter. As early as the 1890s, however, Denton County potters had begun facing competition from industrialized potteries in the Midwest, that shipped stonewares to Missouri, Arkansas, and Texas (Greer 1981). Other innovations reduced the need, use, and distribution of stoneware storage vessels during the early twentieth century. Less expensive, mass-produced metal and glass containers deeply cut into the market formerly held by local potteries. New preservation techniques, including changes in canning, pickling, and refrigeration, slowly reduced the need for large stoneware vessels (Greer 1981; Sweezy 1984). Most Denton County potteries stopped production between 1920 and 1930.

Like many other Texas stoneware potteries, those that survived produced a limited range of vessels designed to capitalize on a different market (Greer 1981; Potter and McKnight 1931; Sweezy 1984). In Denton County, the Daugherty Art Pottery began production about 1920 or 1924 and continued to operate into the late 1930s. This pottery turned out vases, candlesticks, wall flowerpots, jardinieres, and other "show crockery" and conducted experiments, including the successful burning of "handpainted" pottery (Denton Record-Chronicle, Saturday, January 5, 1924:6).

Nonproduction Sites

The five farmsteads included in this study were selected to provide both temporal and regional coverage relevant to the production of stonewares in Denton County.

These farmsteads were occupied for time periods ranging from as little as 5 to 15 years (41DN289) to 65 years (41DN77). All were abandoned by the late 1930s and have adequate stoneware assemblages to determine ceramic specialization. These farmsteads were selected from the two archaeological project areas investigated in eastern Denton County, the Ray Roberts Lake and Lewisville Lake areas (see Figure 4.1). The farmsteads from Ray Roberts Lake provide data on stoneware acquisition by rural families north of Denton, while farmsteads at Lewisville Lake are spatially closer to stoneware potteries in the Alton and Lloyd communities. Although the earliest farmsteads documented in both project areas were initially occupied in the 1850s, at least one farmstead settled after the railroads arrived in the 1870s was selected from each area. These five farmsteads include 41DN77, 41DN79, and 41DN466 at Ray Roberts Lake (Figure 4.24), and 41DN289 and 41DN410 at Lewisville Lake (Figure 4.25). Much of the information pertaining to these five farmsteads, including site maps, has been published elsewhere or is forthcoming (Brown and Lebo 1991; Cliff and Moir 1985; Lebo 1991a, 1991b; Lebo and Brown 1990). A summary of these sites is provided in Table 4.6.

Of these five farmsteads, two were abandoned before the turn of the century (41DN79 and 41DN289), including one that may have been abandoned before railroads reached Denton County (41DN289); two were abandoned between 1890 and 1910 (41DN410 and 41DN466); one continued to be occupied into the 1930s (41DN77). Four of the farmsteads contained datable, buried domestic artifacts and architectural remains; only 41DN289 occurred as a surface site. The architectural remains suggest that the dwellings at these farmsteads were probably small single- or double-pen log houses with few windows, a native stone or handmade brick chimney, a full length front porch, and a shed kitchen addition (Brown and Lebo 1991; Lebo 1991a, 1991b)--common house styles in the region (Jordan 1978). The most common buried features associated with these farmsteads were collapsed cellars and ash-filled trash pits containing numerous food bones, domestic artifacts, and architectural remains. Elsewhere on these farmsteads, domestic artifacts were recovered from broad, shallow midden deposits often less than 20 cm deep that covered the main site area, concentrating near the dwelling location.

Most of these farmsteads like other farm sites in Denton County, contain sherds from stonewares utilized by farm families for daily household needs. Although many early farmstead assemblages contain sherds from a few vessels brought by the family as they immigrated to Denton County, most sherds are from stonewares produced in the county. Among the farmsteads occupied after the turn of the century, there are higher sherd percentages from straight-sided vessels produced at potteries outside Denton County, including potteries from the Midwest. Similarly, these farmstead assemblages contain fewer European stonewares and fewer less common vessel forms such as tobacco pipes, preserve jars, and children's toys that were produced locally.

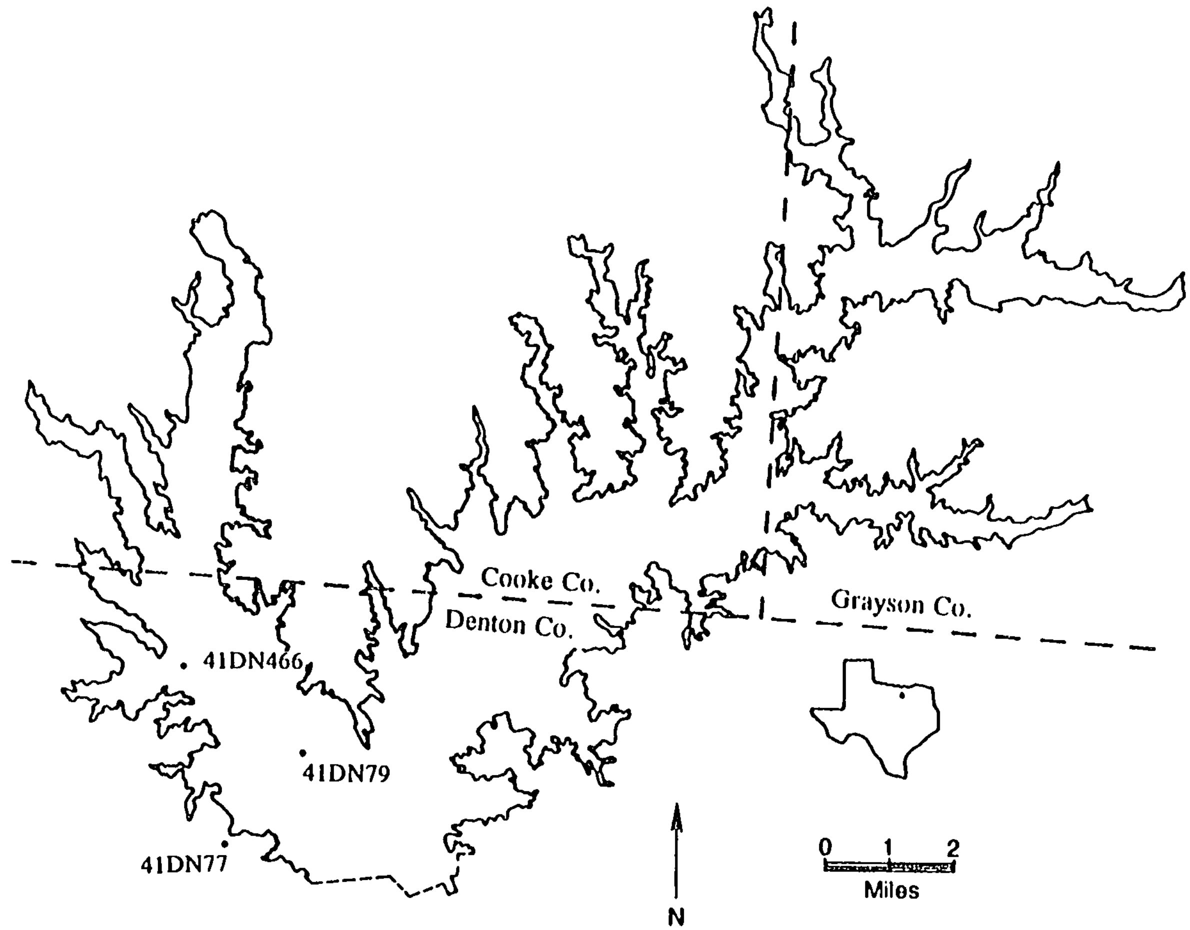


Figure 4.24 Locations of farmsteads 41DN77, 41DN79, and 41DN466 in the Ray Roberts Lake area.

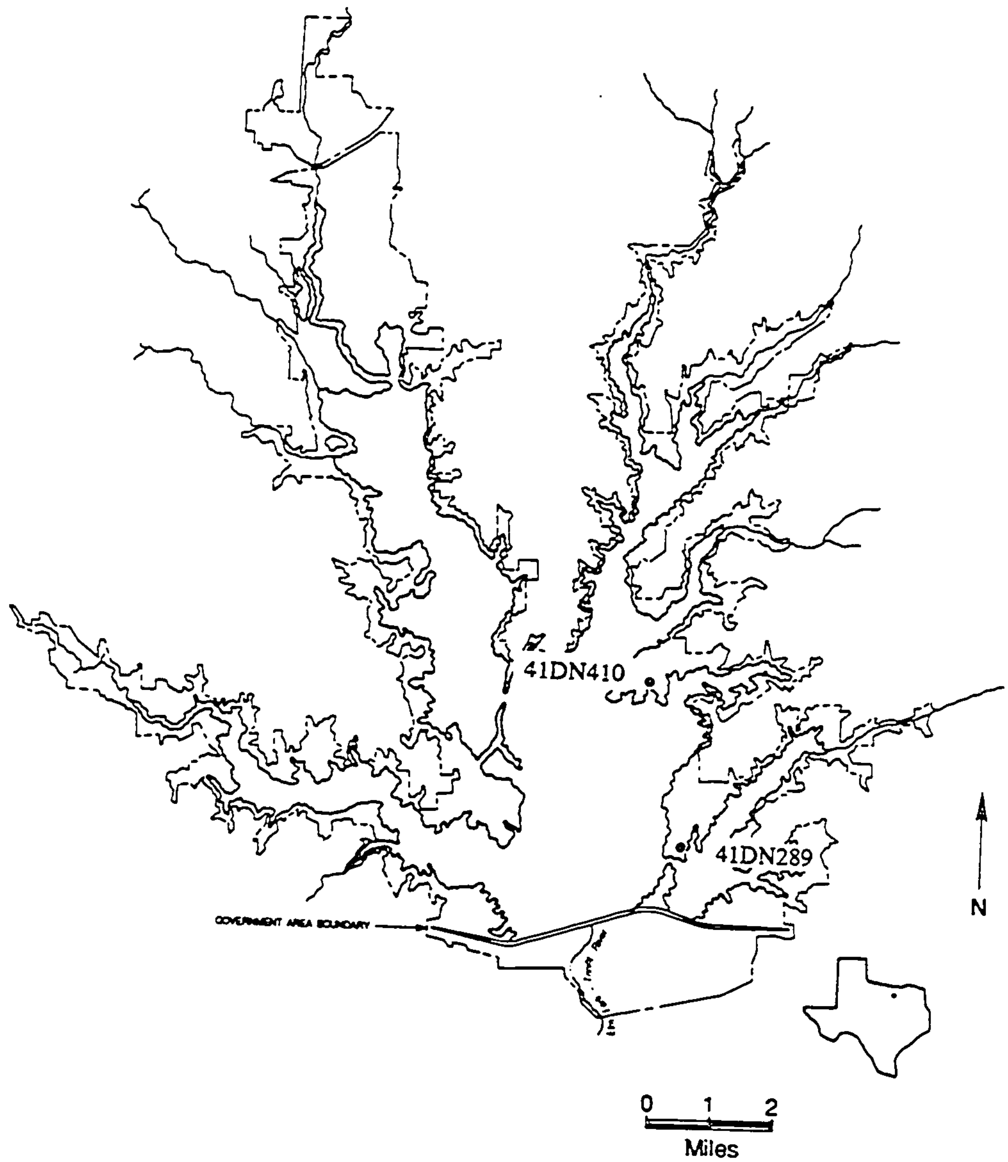


Figure 4.25 Locations of farmsteads 41DN289 and 41DN410 in the Lewisville Lake area.

Table 4.6 Summary of Nonproduction Farmstead Sites.[1]

Site	Occupant	Historic Features	Stoneware Assemblage	Date Range
41DN77	Landowner, tenants	Cellar, well	121 sherds[2]	ca. 1877 to 1930s
41DN79	Landowner	Trash pit	53 sherds	ca. 1850 to 1870s
41DN289	Landowner	None	56 sherds	ca. 1850 to 1870s
41DN410	Freedman Landowner	None	28 sherds	ca. 1873 to 1910
41DN466	Landowner	Two cellars, outbuilding	226 sherds	ca. 1856 to 1890s

[1] Data are compiled from Brown and Lebo 1991; Lebo 1991a; Lebo and Brown 1991.

[2] Sherd count for 41DN77 does not include unprovenienced vessel sherds collected by Environmental Consultants, Inc.

41DN77

Site 41DN77 was occupied between the 1870s and the 1930s and contains little evidence of modern disturbance. Among the features identified at 41DN77 is a limestone-lined well, two collapsed cellars, native sandstone piers and house mound, and several barbed wire fences. The dwelling was gone, but at least one oral informant recalled that the house was a single-story frame dwelling.

This farmstead was situated south of Vaughantown which was settled in the 1870s and remained a viable community into the 1940s (Lebo 1991a). This community included a Baptist church, a grocery store, a blacksmith shop, and a grist mill. It also had a post office and a dry goods store (Skinner and Baird 1985). The local children attended the Prairie Chapel School.

The earliest occupation at 41DN77 dates about 1877 when F. M. Ready and W. A. Ready purchased 182.39 acres of the Carmel Manchaca survey (A-790). Although this survey was patented in 1838, no evidence was found that indicated it was occupied before 1877 (Appendix D). The Ready family resided at 41DN77 until they sold the farmstead to J. Y. Stewart and his wife in 1886 (Denton County Deed Record 34:542). The Stewarts lived there until 1899, and between 1899 and 1930, at least four families serially occupied the farm at 41DN77 (Appendix D). According to Skinner and Baird (1985:9-3), a tenant family lived at 41DN77 in 1937. Based on the 1937 tax appraisal card, a dwelling and a barn (both built in 1915) were located on the farm (Skinner and Baird 1985). The archaeological data from 41DN77 indicates the dwelling was built during the late nineteenth century with modifications or additions being made in the early twentieth century. The barn was not found during the excavations at 41DN77.

Tax roll data for W. A. Ready indicates he was a small landowner with several horses/mules, head of cattle, and hogs (Appendix E). J. Y. Stewart was also a small landowner, but he raised a small cattle herd for market. No data were found that he raised hogs or sheep (Appendix E). By 1890, he became a large landholder and may have moved to Pilot Point as indicated by his having purchased a residential lot in town (Appendix E).

The archaeological deposits at 41DN77 reflect a small farmstead initially occupied in the 1870s period. The domestic midden was largely confined to an area 50 meters by 60 meters in size. The cellars had wood support posts, roof beams, and doors, and earthen floors, walls, and roof, indicating that little expense had been made in their construction. More expensive cellars at other farmsteads were constructed of native stone, brick, and/or concrete.

41DN79

Site 41DN79 is a multicomponent site containing evidence of both prehistoric and historic occupations. The historic occupation was short-term, possibly dating before 1855 up to the 1870s. No 1880s to twentieth-century occupation is indicated. This mid-nineteenth century component contains evidence of Native American, European, and Euro-American artifacts (Lebo 1991a).

Sullivan Settlement was the earliest community situated near this farmstead and was established in 1847 (Bates 1918, 1976). This community was named after the Sullivan families that settled this area in 1850. A historic Native American village is also reported in this location during the nineteenth century (Genealogy of the True & Bevers (Beavers) Families 1983).

In 1855, William H. Downard acquired two surveys containing 320 acres each (Minor Marsh A-880 and Minor Marsh A-881), with the farmstead at 41DN79 being situated on Minor Marsh survey A-881. William H. Downard first appears in the tax rolls for Denton County in 1854 (Appendix E), but is shown as not owning any property. In 1855, he owned 960 acres, including the property containing 41DN79, 8 horses/mules, 350 head of cattle, 2 wagons, with his total property valued at $4,865.

While domestic remains were found at 41DN79 dating to the 1850s-1870s no deposits indicative of a well-to-do rancher were uncovered. Instead, the exposed archaeological deposits suggest an early frontier single room log dwelling, with mudcat chimney, and no evidence of a dug well or any support structures. These deposits may be associated with a dwelling occupied by William H. Downard and his family for a short period.

William H. Downard appears in the tax rolls for this property for the years 1855 to 1860. His name was not found in the tax rolls for the years 1861 to 1876, and in 1877, his son Washington Downard appears as owner of 480 acres of the Minor Marsh surveys (Appendices D and E). In 1883, William H. Downard again appears in the Denton County tax rolls, but is recorded as residing in Cooke County, indicating that this site was probably not occupied by him after 1861, and only briefly by his son in the 1870s.

By 1884, both Minor Marsh surveys were acquired by J. R. Sullivan whose residence was not at 41DN79. This historical information correlates with the archaeological assemblage from 41DN79 which does not indicate the farmstead was occupied during the 1880s to early twentieth century period. Several historic farms were located in the vicinity of this site during the twentieth century, and activities impacting the cultural deposits at 41DN79 during this period include plowing, the construction of several two-track dirt roads, an earthen stockpond, and barbed wire fences. No twentieth century buildings were found associated with 41DN79.

A single trash feature--Feature 18--produced a large quantity of bone, metal, bottle glass, and ceramics (Lebo 1991a:Table 8-11). This feature was found in the dwelling area and contains primarily European American domestic debris, as well as a small number of Native American trade items. Among these trade items are turkey bone tubular beads. These "hair pipe" beads are similar to trade goods recovered from mid to late nineteenth-century Texas forts or trading posts such as at Adobe Walls, an 1874 trading post in Hutchinson County, Texas (Baker and Harrison 1986:255). Other trade items recovered from 41DN79 include a gunflint. A blue glass mandrel wound bead was also found.

This trash feature is associated with the circa 1850s to 1870s occupation of 41DN79. Mean beginning dates obtained for stonewares, refined earthenwares, and bottle glass both within this feature and the surrounding deposits range from 1852 to

1875 (Lebo 1991a:Table 8-12). Within the trash feature these dates range from 1852 to 1853 for refined earthenwares and bottle glass. No stonewares were found, correlating with historical data that the earliest stoneware pottery in Denton County began production in 1854. In the assemblage surrounding the trash feature, stonewares yielded a mean beginning date of 1861 (Lebo 1991a:Tables 8-12, 8-13).

41DN289

Site 41DN289 was reported by Cliff and Moir (1985:A-11) as a circa 1850-1855 domestic artifact scatter associated with an early settler's homestead. This scatter, exposed along the margins of Lewisville Lake, contained largely untumbled refined earthenwares, stonewares, bottle glass, handmade brick, window glass, and metal. All of the surface artifacts were piece plotted to the nearest square meter and 100% recovery of this material was obtained. Thirty-three shovel test pits were excavated, all of which were sterile. No structures or features were found.

Cliff and Moir (1985:A-12) concluded that the hand-painted ironstone, sponge decorated ironstone, shell-edged ironstone, bottle pontils, and dry and light vapor local stoneware sherds all supported an occupation date of about 1850 $\pm$ 5 years. Such a date would indicate that this site was occupied less than 10 years after permanent settlement began in Denton County.

The earliest permanent settlements in this part of Denton County date to 1843 or 1844 (see Figure 4.2). The first such settlement was Bridge's Settlement, later Hebronville, established in 1843. Other communities included Stewarts Creek, Little

Elm, and Ritters Lake established in 1844 (Bates 1918; Bridges 1978; Odom and Lowry 1975).

Site 41DN289 is situated on the L. T. Higgins survey (A-534) acquired by Higgins in 1852. Before acquiring a land patent, settlers were required to reside on property they wished to acquire for at least three years. L. T. Higgins appears in the tax rolls in 1850 and 1851, during which time he did not own land (Appendix E). Between 1850 and 1855, he owned several horses and as many as 15 head of cattle. By 1857, he was a large cattle owner, with 110 head of cattle and personal and property value in excess of $1,800 (Appendix E). By 1858, he began acquiring additional land and although his original homestead may have been at 41DN289, he established a farmstead elsewhere on his 580-acre survey. In 1865, he began selling part of his survey, and by 1869, he continued to own only 280 acres of the original 580 acres (Appendix E). The 70-acre property containing 41DN289 was sold by L. T. Higgins during the 1860s and was serially occupied into the twentieth century. Based on the archaeological remains, several farm families (Appendix E) may have resided at 41DN289 during the 1860 to 1880 period, but no artifacts from the 1880 to 1900 period were found at the site, suggesting that later owners resided elsewhere on this 70-acre property.

41DN410

Site 41DN410 was a small farmstead occupied by Jacob and Melinda Casidy (also spelled Cassaday, Casaday, and Casady) from 1873 until about 1910 (Appendix E).

Jacob Casidy first appears in the 1867 tax rolls for Denton County where he is identified as a Freedman with no land, eight head of cattle, and miscellaneous goods valued at $20 (Appendix E). Tax records for this farm through the end of the nineteenth century indicate that Jacob and Melinda Casidy were small landowners with up to 15 horses/mules, 15 head of cattle, and 15 hogs in any given year. Their farmstead was located on 93 acres of the William Loving survey (A-747) of 320 acres. This survey was acquired by Peter Teel, assignee of William Loving from the State of Texas in 1850. No evidence was found that 41DN410 was settled before Jacob and Melinda Casidy purchased the land in 1867.

The archaeological investigations at 41DN410 (Brown and Lebo 1991; Lebo 1991; Lebo and Brown 1991) revealed a low-density domestic midden containing refined earthenwares, stonewares, bottle glass, metal, and architectural remains such as machine-cut nails, window glass, and handmade brick. The locations of the dwelling and outbuildings were not determined. Based on the architectural remains from other small farmsteads dating to this period, the dwelling was probably a single-pen log house (Lebo 1991). No well was found. The site has been disturbed by slope wash and erosion.

41DN466

Site 41DN466 was occupied from circa 1856 to the turn of the century and the extensive, shallow artifact midden has been plowed in recent years. Among the buried cultural features visible below the plowzone were an earthen cellar, a handmade brick cellar, and an outbuilding area. The dwelling and house mound are gone, but were probably located close to both cellars. No well was found. This farmstead was situated between the communities of Union Hill on the west and Sullivan Settlement on the east.

The earliest occupation at 41DN466 dates circa 1856, when J. J. Lytle first appears in the Denton County tax rolls (Appendix E) as paying taxes on his survey of 160 acres (J. J. Lytle survey A-757). In 1858, J. J. Lytle and his wife Hester Ann conveyed the entire survey to George W. Lytle (Denton County Deed Record G:92). By 1862, however, George's wife Dory (also Dorie) is shown as paying the taxes on this property. This property changed ownership several times during the 1860 to 1890 period, with each of the small landholding families at 41DN466 having several horses, a small number of cattle, and sometimes a few sheep (Appendix E).

The archaeological deposits at 41DN466 correlate with the historical information. Mean beginning dates calculated for the refined earthenwares, stonewares, and bottle glass remains in the area of the dwelling and cellars (designated Block 1) range from 1857 to 1867, with a mean combined date of 1861 for these three classes (Lebo 1991a:Table 8-56). The architectural remains in this area include over 496 pieces of window glass, 689 machine-cut nails, 87 wire nails, and 685 pieces of building debris. Handmade brick fragments from the brick cellar and dwelling piers (?) totaled over 1,000 (Lebo 1991a:Table 8-55). Other cultural remains included metal household items, horse and stable gear, tools, ammunition, and personal items. Similar artifacts were recovered from the cultural midden outside the dwelling area, with mean beginning dates for ceramics and bottle glass ranging from 1856 to 1873, with a mean of 1861 for the three classes.

Site 41DN466 may have been abandoned by 1890 when L. G. Harris and his wife Edith A. Harris filed for a homestead on their property, which included both 100 acres of the J. J. Lytle survey and 310 acres of the J. Brent survey (A-106). No evidence was found that 41DN466 was occupied during the twentieth century.

Clay Outcrops in Denton County

According to geologists Ries (1908) and Winton (1925), who conducted extensive surveys of the region in the early twentieth century, stoneware potters in Denton County utilized clays exclusively from the Woodbine Formation of the Cretaceous, which extends in a broad belt through Denton County and Northcentral Texas (Figure 4.26). This nearshore deposit contains considerable decomposed volcanic material and may represent outwash on a rather flat depositional plain as well as marine deposits closely associated with beds containing invertebrate fossils (Ries 1908; Sellards et al. 1981; Winton 1925). These secondary, high-refractory clays are primarily kaolin, containing small amounts of montmorillinite and illite deposited in nearshore and marine environs. The source material for these clays is terrigenous sediments from the Washita, Arbuckle, Ouachita, and Rocky Mountain areas. These clays are high in silica and alumina, but variability in composition and physical properties occurs among clay exposures (Sellards et al. 1981; Winton 1925).

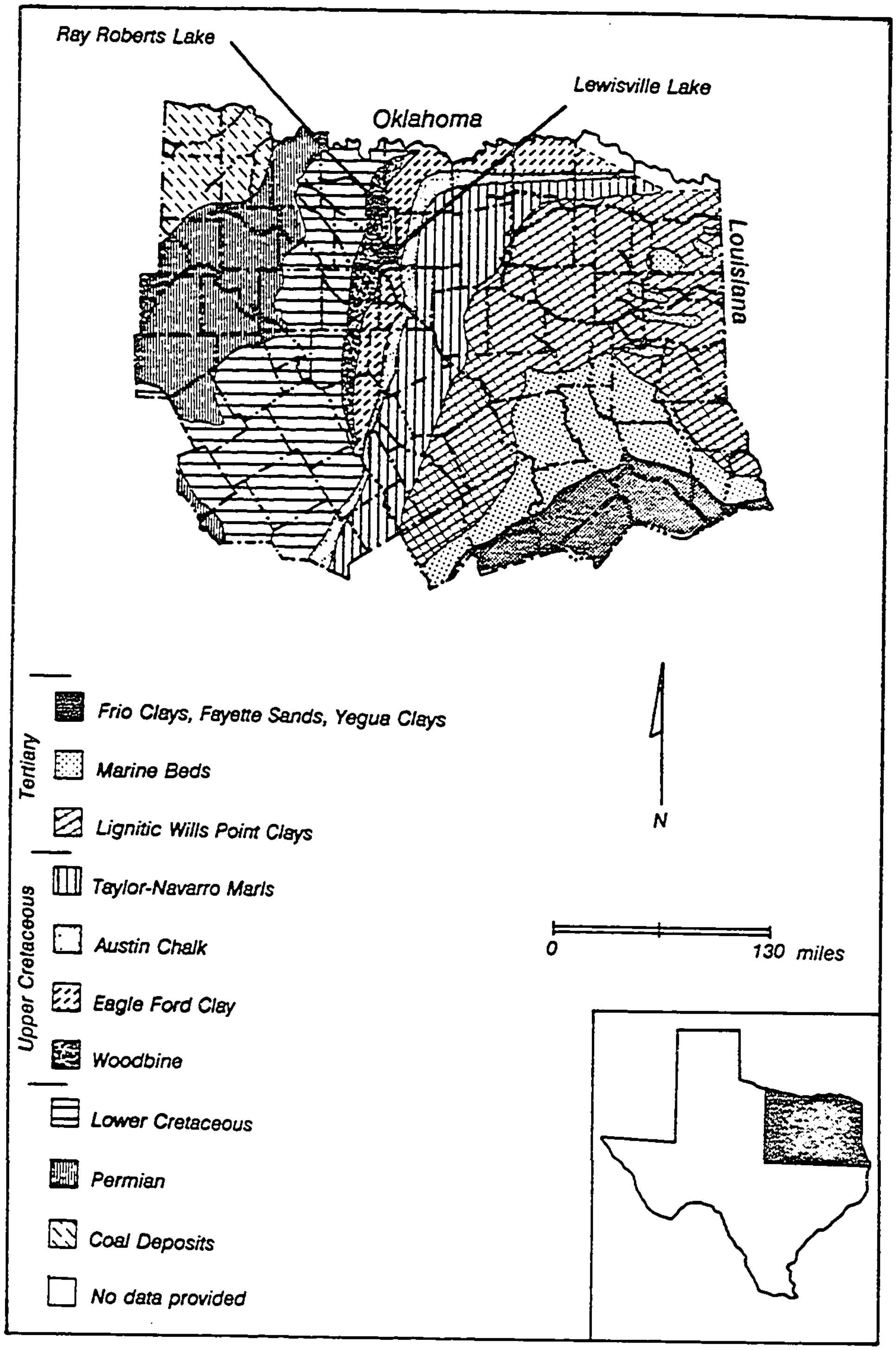


Figure 4.26 Distribution of major geological formations in northeastern Texas (adapted from Ries 1908).

The primary elements found in the Woodbine clays are silicon (Si), aluminum (Al), iron (Fe), calcium (Ca), magnesium (Mg), potassium (K), titanium (Ti), sulphur (S), and carbon (C) (Potter and McKnight 1931; Ries 1908). Among the possible accessory minerals in the Woodbine Formation are quartz, biotite, muscovite, feldspar, calcite, gypsum, hematite, pyrite, dolomite, hornblende, limonite, and magnetite (Fisher 1965; Potter and McKnight 1931; Ries 1908; Sellards et al. 1981; Barnes 1967).

Ries (1908) observed several stoneware potteries in operation during his geologic fieldwork in Denton County in 1903, including the Daugherty, Kimbrough and Roark-Griffith potteries. He reports that these potteries acquired clay from outcrops east of the town of Denton. The Daugherty and Kimbrough potteries obtained clays from along a road at the J. Sublitz farm two miles east of Denton. The Roark-Griffith Pottery obtained clay at Lloyd, six miles east of Denton and one-fourth mile south of the railroad line (Ries 1908). Each of these potteries produced utilitarian stonewares, which were glazed with an imported Albany slip rather than with local clay slips, which reportedly did not glaze well (Ries 1908).

From the historical data, I have been able to identify 14 Woodbine clay exposures in southeastern Denton County, eight of which are directly associated and two that are indirectly associated, with the nine potteries operating in the county for the period under study (Table 4.7). Clay samples were obtained from three of the eight, including two outcrops used by the Cranston-Donaldson Pottery on the N. Britton (Acme Pit #4) and J. S. Dickson (Cranston Pit) surveys (see Figure 4.4), and one

Table 4.7 Clay Pits Used by Potters in Denton County.

Clay Pit/Location	Pottery	Samples
Acme Lambert Pit (B. Beall survey)	J. C. Lambert	7; 2 from mixed deposits at Acme Pit
Acme Pit #4 (N. Britton survey)	Cranston-Donaldson	2 from Acme Pit #4
Cannon Survey Pit (A. E. Cannon survey)	Cranston-Donaldson T. J. Donaldson	1- filled pit, no samples; 2- 2 from creekbank
Cranston Pit (J. S. Dickson survey)	Cranston-Donaldson T. J. Donaldson B. and D. B. Daugherty	2 from filled pit at pottery
Daugherty Pottery (A. Hill survey)	B. and D. B. Daugherty	2 from west side of Daugherty Pottery property
Acme Pits #1-3 (A. Hill survey)	None, but pits are within 1 to 2 miles of Daugherty Pottery	5 (Pit #1) 4 (Pit #2) 3 (Pit #3)
Acme Pit Hwy 380 (4 miles east of Denton)	None, < 1 mile of Roark-Griffith & 3 miles of the G. Cranston, Kimbrough and Daugherty potteries	4
Roark-Griffith Pottery Pit (R. J. Mosely survey)	Roark-Griffith	none; pit filled
Roark-Griffith Pottery Pit (W. Durham survey)	Roark-Griffith	none; pit not found
Wilson Pottery Pit (W. McGlothlin survey)	Cranston-Donaldson A. H. Serren Wilson-Donaldson	none; access denied
J. Sublitz Farm Pit (H. Sisco survey)	G. Cranston B. and D. B. Daugherty Kimbrough	none; pit not found

outcrop used by the J. C. Lambert Pottery (Acme Lambert Pit) on the B. Beall survey (see Figure 4.4). Clays sampled that are indirectly associated with specific potteries include an exposed outcrop along the railroad right-of-way on the west side of the Daugherty Pottery (see Figure 4.3) and a clay outcrop in the creekbank of Hickory Creek (Cannon Survey Pit) between the J. T. Donaldson and Cranston-Donaldson potteries (see Figure 4.4). The remaining three outcrops associated with potteries include one outcrop each on the W. Durham (Roark-Griffith Pottery) and H. Sisco (J. Sublitz farm) surveys, and one on the W. McGlothlin survey (Wilson Pottery) for which access was denied. Although not associated with specific potteries, four outcrops, including three clay pits in Denton (Acme Pits #1-3; see Figure 4.3) and one east of Denton (Acme Pit Highway 380; see Figure 4.5) currently used for brick production, were sampled because of their proximity to potteries in the county. The three clay pits in Denton are located on the same survey as the Daugherty Pottery, while the pit east of Denton is located within one-half mile of the Roark-Griffith Pottery and within three miles of the G. Cranston, Kimbrough, and Daugherty potteries. In all, thirty one clay samples were taken (see Table 4.7 and Chapter 5 for detailed analysis).

It is evident from historical data that several potters mixed clays from different pits or outcrops, while others utilized clays from a single location. The most widely used clay outcrop was situated on the property of the Cranston-Donaldson Pottery on the J. S. Dickson survey (see Table 4.7). Potters from the Cranston-Donaldson, T. J. Donaldson, and the B. and D. B. Daugherty potteries all acquired ownership of these clays for part or all of the period during which they produced stonewares; none, however, utilized these clays exclusively or utilized the same combination of clay outcrops. Only J. C. Lambert and Roark-Griffith used clays from outcrops not shared with other potters.

Summary

A preliminary analysis of the nine production sites and associated clay outcrops shows strong evidence to support the existence of ceramic specialization among Denton County potteries for the period 1854 to 1920. Primary among these was the operation of potteries in the county by a limited number of skilled potters who produced stonewares for use by households in rural and urban settings in Denton County and elsewhere in Northcentral Texas. Most potteries were established in a rural setting, often near the outskirts of a community, although some potteries established shops in the business district of Denton in the 1890s. The master potters at these potteries shared their potting knowledge and skills, personnel, and resources, including clay outcrops, and produced a similar range of vessel forms, glazes, and decorations for the same markets. Although similar production methods were used and similar vessels were produced, ceramic variability is evident in rim and handle forms, makers' marks, and gallon numbers among potters and potteries.

Although much of this Denton County stoneware data appears to support some of Rice's assumptions about ceramic specialization, providing evidence that production was not at the household level, production loci were concentrated, and finished wares were distributed across households, other assumed correlations between specialization and production cannot be supported. Among these unsupportable assertions is evidence that:

- o resource access, including clay outcrops, was not restricted and some late potteries utilized clays not used for stoneware production by early potters,
- o both early and late potteries produced stonewares for use by rural and urban households of varying socio-economic status and not merely high-status households,
- o many early potteries operated on a seasonal basis, possibly by both full- and part-time potters, and production was controlled by potters and market demands rather than high-status (elite) individuals, and
- o though temporal changes in production loci, methods, vessel forms, glazes, and decorative attributes are evident for Denton County stoneware production, the predicted reduction in the variability of these attributes and paste composition is not apparent.

Further analysis of these data in Chapters 5 and 6 will provide quantitative evaluation of these assumptions posited by Rice, including stoneware data from the five nonproduction farmstead sites. These sites provide a unique opportunity to analyze stonewares from nonproduction sites in a region where the production loci and clay outcrops have been identified, and the production process and the products from these production sites can be characterized. Similar data sets have not been utilized for testing Rice's model.

CHAPTER 5

COMPOSITIONAL ANALYSIS OF NORTHCENTRAL TEXAS STONEWARES

Introduction

A major tenet of Rice's (1981) model is an assumption that a change from nonspecialized to specialized production involves a reduction in resource access and variation, which is first evident in paste composition. This decrease in paste composition is assumed to occur when the access to raw materials necessary for ceramic production becomes restricted to a particular social segment as social complexity increases and stratified societies appear (Rice 1981:220). In this context, the restriction of raw material access has serious implications for ceramic production, which Rice proposes can best be addressed through the precise characterization of ceramic raw materials and the development of a theoretical structure capable of providing a "basis for inferring the existence of specialists" (Rice 1981:220).

Rice asserts that nonspecialized production will be characterized by ceramics "reflecting individual differences in raw material sources and/or methods of production," where the number of, kinds of, and access to resources and the combining of resources during production will be unregulated and exhibit "little uniformity" (Rice 1981:222). As production becomes more specialized, standardization of paste composition will increase, but a divergence may occur as a result of "competition and rapid differentiation among social groups," resulting in the production of ceramics, which may be highly variable in paste composition, possibly representing the use of rare or exotic materials (Rice 1981:223). Full-scale specialized production, however, will be characterized by uniform paste composition among both utilitarian and elite ceramics (Rice 1981:223). Such uniform paste composition is expected to occur if a limited number of specialists adhering to an "ideal type" are involved in ceramic production. Minimally, this would involve "... (1) an increasingly narrow concept or standard, on the part of manufacturers and buyers alike, of what constitutes an acceptable ceramic vessel ... and (2) increasing skill of potters in achieving that standard" (Rice 1981:222).

Rice (1981) asserts that these changes in paste composition can be identified through an examination of the standardization or diversity of ceramic assemblages from production and nonproduction sites. In this context, utilitarian ceramics with standardized paste compositions will be broadly distributed across households, while elite ceramics with variable or standardized paste compositions will exhibit a restricted spatial distribution, being closely associated with specific site areas or contexts (e.g., elite residences, ceremonial, mortuary) (Rice 1981:223).

In order to determine the paste composition of the ceramics produced by specialized stoneware potters in Denton County and their spatial distributions, historical data were obtained on clay outcrops and "clay rights" associated with specific potters (see Chapter 4). Using this information, clay samples were obtained from outcrops in the county, which could be compared with the paste compositional data of stoneware samples from two pottery-kiln sites, the Cranston-Donaldson and

Roark-Griffith potteries, and five farmstead sites. Secondary attention is given to paste compositional data for vessel sherds from other potteries in the county.

My compositional analysis of these clay samples and stoneware pastes from the pottery-kiln and farmstead sites is presented in this chapter. The elemental microanalysis of these samples is accomplished using a scanning electron microscope connected to an energy dispersive x-ray spectrometer (SEM/EDS). The SEM/EDS elemental microanalysis of the paste is conducted to identify patterns of compositional variability or signatures indicative of specific pottery-kiln sites, which can be related to specific clay outcrops and samples, and to determine the spatial distribution of vessel sherds among farmstead households.

Sampling

Obtaining a small, nested sample of stoneware sherds and clays for microanalysis from larger samples is difficult, but essential (Bishop, Rands, and Holley 1982; Cowgill 1964; Rands and Bishop 1980; Wilson 1978). A number of criteria and sources of error need to be considered in obtaining sherd samples for characterizing composition types, including sampling methods, analytical techniques, and the number of elements to be examined (Peacock 1970; Rice 1987b; Wilson 1978). Sampling bias, sample size, and systematic (bias) and random (precision) analysis errors may affect the ability to identify ceramics of different paste compositions (Bishop, Rands, and Holley 1982; Rice 1987b; Wilson 1978).

I obtained six sherd and clay samples for elemental analysis: three are simple random samples and three were obtained through stratified sampling. Because of the potential of uncontrolled biases, random sampling--the most commonly utilized method--is not recommended if stratified sampling is possible. Uncontrolled biases prevent the analytical results from being related back to the assemblage as a whole, except at a nominal level. Random sampling, however, is useful for obtaining a test sample when little information is known about a collection.

I used random sampling to obtain small sherd samples from each pottery in order to determine if elemental microanalysis was appropriate for characterizing the paste composition of relatively high-fired (1200° to 1300° C) stoneware ceramics. I similarly used this method for obtaining and characterizing clay samples from local clay outcrops.

Stratified sampling was used to obtain a sample of sherds from each farmstead, a sample of marked sherds from my two primary potteries--the Cranston-Donaldson and Roark-Griffith potteries--and a sample of sherds with decorations and/or gallon numbers from the Cranston-Donaldson Pottery. These samples were obtained after completing the macroanalysis of the stoneware assemblages from the farmsteads and the Cranston-Donaldson and Roark-Griffith potteries. This macroanalysis was accomplished using a suite of attributes specified by Rice (see Chapter 6).

Sample 1 was obtained to determine if the paste composition is uniform for vessel sherds from each of these pottery-kiln sites, and if a nonoverlapping, diagnostic paste signature could be identified for each pottery-kiln site. If, as Rice asserts, uniform paste composition can be correlated with specialized production, the paste data from these pottery-kiln sites should be standardized within each pottery. Nonoverlapping, standardized signatures would indicate each pottery utilized a limited range of clays they had "restricted" access to, while overlapping signatures would indicate either "overlapping" access, or the utilization of clay outcrops with similar compositions.

Sample 1 is a random sample of 69 sherds comprised of ten rim sherds each from six pottery-kiln site assemblages--Cranston-Donaldson, Lambert, Roark-Griffith, Serren, Wilson-Donaldson, and the possible Donaldson Pottery on the Cannon survey--and nine sherds from the Daugherty Pottery.

Sample 2 contains 25 sherds that were selected from Sample 1 and analyzed a second time to determine the replicability of the paste compositional results. Sample 2 was obtained through the random selection of five of the ten sherds obtained from each of the five smaller pottery-kiln sites in Sample 1 (i.e., Lambert, Wilson, Serren, Daugherty, and Donaldson).

Sample 3 was obtained to determine frequency distributions of completed vessels from Denton County pottery-kiln sites among the five farmsteads based on elemental analysis of the pastes of the farmstead sherds. Sample 3 was obtained from the farmstead assemblages, where the macroanalysis attributes (see Chapter 6) were used to group sherds into vessels, after which one sherd was selected from each vessel for elemental microanalysis. All stoneware marbles, tobacco pipes, and European bottles were excluded from this analysis. This sampling process resulted in the selection of

134 sherds from five farmsteads--41DN77, 41DN79, 41DN91, 41DN410, and 41DN466.

Sample 4 was obtained in order to identify and compare the paste composition of vessels made by specific potters, allowing for a test of Rice's asserted relationship between uniform paste composition and specialized production at the scale of potter rather than the scale of pottery-kiln site. This sample contains 29 clay samples from the 14 clay outcrops (see Chapter 4), while Sample 5 contains 43 sherds obtained through a stratified sampling of the Cranston-Donaldson and Roark-Griffith pottery collections. Fifteen sherds are marked "CRANSTON," 15 are marked "DONALDSON," and 13 are from Units 3 and 7 at the Roark-Griffith Pottery, in which all marked sherds are stamped "ROARK."

Sample 6 is a stratified random sample of 44 sherds selected from three attribute classes occurring in the Cranston-Donaldson assemblage--decorated sherds, sherds with makers' marks, and sherds with gallon numbers. This sample was obtained to determine if particular macroscopic attributes--e.g., hand-painted cobalt-blue decoration and gallon numbers, incised and stamped gallon numbers--could be identified with specific potters. If a strong correlation between paste composition and specific potters could be identified, it would be possible to characterize and compare the range and standardization of vessels produced by different potters.

Theoretical Background

Elemental Microanalysis

Elemental microanalysis was conducted by the author on a Tracor Northern Joel-5500 scanning electron microscope (SEM) coupled with an electron dispersive x-ray analyzer (EDX) in the Electron Microscopy Laboratory, Department of Biology, University of North Texas. Access and training were provided by Dr. Stephen Kester and Dr. L. Ann Foster.

The SEM provided a visual image of the sample that can be used for qualitative and quantitative elemental analysis and for producing microphotographs of the sample or portions of the sample. It was used to characterize both macroscopic and microscopic samples. With these ceramic samples, it was possible to characterize the paste alone, individual inclusions, or slips and glazes. Point-counting methods can be used to characterize the distribution of inclusions or particular paste or slip/glaze attributes, determine relative vitrification, and so forth. Point-counting and visual mapping were utilized for several test samples.

The EDX provided both visual and hard-copy images of the qualitative or quantitative data. These data were processed by a built-in computer and can be stored on floppy disk. Both the elemental compositional spectrum and data tables were created and stored.

SEM/EDX microanalysis provided both qualitative and quantitative compositional information using characteristic x-ray lines, with a spatial resolution of 1 um, little or no destruction of the sample, and an accuracy of 1% - 2% of the amount present for a given element (5% - 10%) for biological samples (Goldstein et al. 1981:9). Photomicrographs, spectral diagrams, and elemental maps can be generated.

SEM/EDS microanalysis of the chemical composition of samples is based on the theory that the measured x-ray intensities can be converted to chemical composition values. This is accomplished by measuring the intensity of a characteristic line of an element emitted by a spectrum and the intensity of a line emitted by a standard of that element. The ratio of these two readings is proportional to the mass concentration of the element in the reading area (Goldstein et al. 1981:15). SEM/EDS microanalysis can be accomplished using pure element standards or conducting semi-standardless quantitative analysis using computer standards. This latter approach is the system available at the University of North Texas.

The SEM uses an electron beam to probe the sample. This process results in the emission of various particles, including secondary electrons, backscattered electrons, and photons of various frequencies, i.e., x-rays, ultraviolet radiation, visible light, and infrared radiation (Postek et al. 1980:60). The x-rays produced provide an information signal that can be used to identify the relative abundance of different elements in the sample. When the x-rays from the sample are detected by a lithium-drifted silicon Si(Li) crystal, they are scattered by electrons in the crystal, sorted, and converted to an electronic signal.

Since the wavelengths of the emitted x-rays will be characteristic of individual elements, the wavelength sorting by the crystal allows the presence and relative abundance of each element to be determined (Postek et al. 1980:76). Elements with atomic numbers between 10 (Na=11) and 100 (Es=99) are detectable under normal working conditions.

Measurement Accuracy and Precision

Several important factors affect the accuracy and precision of the microanalysis. These include sample preparation (e.g., selecting, preparing, mounting, coating), count rate, accelerating voltage, take-off angle and working distance, and wavelength overlap (Postek et al. 1980). Accuracy is defined as conformity with the true value, i.e., the ability to obtain correct or valid results. Precision is defined as the replicability or closeness of repeated measurements, recognizing that precision can occur without regard to the true value.

Several factors affect the size of x-ray peaks generated during microanalysis, preventing a direct conversion of peak size or intensity to elemental composition. The most important of these factors are designated as the ZAF Factors. The most common method for compensating for ZAF Factors is the comparison of unknown specimens with standards and computed corrections (Postek et al. 1980:103):

Z designates the effect of atomic number on the rate of x-ray production--heavy elements produce more x-rays than light elements. A designates the reabsorption of x-rays which is affected by specimen density, accelerating voltage, take-off angle, system geometry, and specimen current, among others. Absorption is minor for light elements and low accelerating voltage, but may be large for heavy elements and high voltage (Postek et al. 1980:107). F designates fluorescence effects, that include the generation of new x-rays called secondary fluorescence.

Microanalysis of the stonewares in this study utilized the ZAF correction method. Once the raw x-ray counts were obtained, a k-ratio was calculated by the comparison of the x-ray intensity obtained for each element in the specimen and standards of those elements. This was accomplished by the computer software within the SEM/EDS system. Theoretical ZAF corrections were then computed to compensate for the ZAF Factors, which, if uncorrected, would affect the accuracy and precision of the compositional results (Goldstein et al. 1981:307-308; Postek et al. 1980:105-108).

A goodness of fit procedure is used by the computer to determine the accuracy of each x-ray peak intensity. This procedure utilizes a chi-square criterion that calculates how close the calculated peak of each element in the specimen is to the computer peak standard for that element. A chi-square value approximating 1 is a good fit, while a value greater than 1 represents a poor fit (Goldstein et al. 1981:412). This procedure tests the accuracy of the x-ray peak's assignment to a particular element, but not the intensity of that peak (e.g., 1.5% or 0.55%).

The final peak-intensity values represent the percent weight of each element within the area microscopically examined in the sample. To relate these values to the sample as a whole, multiple areas of the sample must be examined and sample homogeneity must be determined.

Measurement error was evaluated by recording multiple x-ray analyses on several sample sherds over the duration of the study. Further, multiple x-ray analyses were recorded for each specimen for several pottery-kiln and farmstead sites. These multiple analyses were conducted using the same specimens, but the location of the measurements and/or penetration of the electron beam varied, providing data on the relative sample homogeneity.

Analytical Conditions

Sherds selected for inclusion in this study were cut using a diamond blade saw. These sherds were cross-sectioned with a small block being removed that includes the interior glazed surface, the body, and the exterior glazed surface. The small specimen blocks were washed to remove contaminants from the saw (e.g., clay dust). The specimens were then placed in a small oven heated to 130°F for 20 minutes to dry completely.

The specimens from Samples 1 through 3 were impregnated with clear epoxy casting resin, while specimens from Samples 5 and 6 were not. In order to determine if my compositional results were affected by the use of the epoxy casting resin, the clay specimens in Sample 4 were cut twice, with one specimen being placed in epoxy and the second being untreated and mounted with carbon tape.

To further facilitate identification, small paper provenience labels were placed in the epoxy resin before it hardened. Once the resin hardened, the provenience data were recorded on an exterior surface with waterproof ink. This epoxy impregnation process facilitated long-term curation and reuse of the specimens for additional studies.

The hardened resin blocks containing the sherds were polished on one side using increasingly fine diamond paste, stopping at 600 grit size. This process resulted in obtaining a flat, polished surface to reduce errors resulting from the electron beam in the microscope bouncing off an irregular surface. After the specimens were polished, they were washed, dried, and coated.

The epoxy specimens were then partially coated with carbon paint to remove charging effects that could cause distortions of the SEM image, spurious x-ray emissions, and specimen damage (Goldstein et al. 1981:461; Postek et al. 1980:152). These specimens were placed in aluminum specimen holders and carbon paint was drawn to form a contact from the specimen edge to the specimen holder. Sputter coating of the specimens with carbon was found to be an unnecessary expenditure of time and effort. The uncoated specimens with carbon paint proved sufficiently conductive for microanalysis under normal conditions.

The untreated specimens from Samples 5 and 6 were also cut with a diamond blade saw and dried in an oven to remove water. These specimens were placed on aluminum stubs, being held in place with double-stick carbon tape. The tape formed a contact with the holder and prevented charging, greatly reducing the preparation time and increasing the number of samples that could be analyzed.

An accelerating voltage of 15 kV was selected because low voltages (10 kV to 20 kV) enhance detector efficiency and reduce the amount of backscatter x-rays and background noise by reducing the depth of penetration of the specimen by the electron beam (Postek et al. 1980:85). Spatial resolution is also enhanced by low accelerating voltage (Goldstein et al. 1981).

While undergoing microanalysis, the specimens were viewed on the CRT of the SEM. The sample point was selected under low magnification (35x). The magnification was increased to 10,000x to inspect the selected point for inclusions or other anomalies. The magnification was then decreased to 150x for conducting the microanalysis.

X-ray collection was accomplished at a working distance of 40mm, 40 degree take-off angle, for 300 seconds. Test data were obtained for a sample of specimens using collection times of 100, 150, 200, and 300 seconds. Many trace elements were not detected with the lower collection times.

An x-ray count rate of between 1500 and 2000 counts per second was selected to reduce the potential of analytic bias, which can result if x-ray pulses are rejected. As Postek et al. (1980:86) point out, count rate (i.e., the number of x-rays reaching the detector per unit time) affects the accuracy and precision of the analysis and a count rate of 1500 to 2000 counts per second is sufficiently rapid that few pulses are rejected and dead time is low.

All samples selected for elemental microanalysis were characterized more than once to assure accurate and reliable compositional data. All compositional measurements were taken on the body (paste) with the point location selected under low magnification. All measurements were stored on computer disk allowing them to be reinspected or reanalyzed as needed.

Twelve major and minor elements were selected for analysis based on the clay studies conducted by Ries (1908) in Denton County and include Na, Mg, Al, Si, S, Cl, K, Ca, Ti, Fe, Cu, and Zn. These elements occurred in sufficient concentrations to be reliably detected within the limits of the instrument. Tests were run to determine if additional elements occurred in sufficient concentrations to be useful in identifying clay or ceramic samples with particular sources; none were found. Of the twelve elements selected for analysis, several occur primarily within the glazes and/or clay samples (Na, Mg, S, and Cl), while the other elements (Al, Si, K, Ca, Ti, Fe, Cu, and Zn) occur in clay, paste, and glaze samples.

Quantitative Analysis of Paste Elemental Data

Elemental paste data were obtained for each of the six sherd/clay samples. Each element was recorded as a corrected weight percentage. This weight percentage was calculated by the computer for each sherd/clay sample for the selected elements. Unmeasured elements occurring in these sherd samples were not included in the calculation of weight percentage. The weight percentages were recorded as continuous variables (e.g., 01.54, 19.01) carried to two decimal places.

These 12 selected elements were measured to identify meaningful paste compositional groups that could be reliably related to specific clay outcrops and pottery-kiln sites. Identification of such relations is important in understanding production methods, production locations, and the distribution of completed vessels in the cultural system. Meaningful compositional groups in this study are based on compositional differences that can be reliably inferred to represent discrete pottery-kiln sites or the products of specific potters and the clay sources utilized by specific pottery-kiln sites and/or potters.

Identifying stonewares that were made at specific pottery-kiln sites requires that paste composition be separable at the scale of pottery-kiln site. Separation into compositional groups is almost always a multivariate statistical problem and is particularly difficult in regions characterized by geological homogeneity (Bishop et al. 1982) or where potters from several kiln sites utilized the same resources, whether local or imported. Bishop et al. (1982:294), however, report that "even in a region considered to be relatively homogeneous in its gross geologic characteristics, significant mineralogical and chemical differences may be discerned between clay deposits."

Underlying the application of multivariate techniques to identify compositional groups is the assumption that some form of identifiable structure exists that correlates with a particular pottery-kiln site and that this structure can be identified using multivariate analysis (Bishop et al. 1982; Peacock 1970; Rice 1987b; Wilson 1978). In order to identify the compositional structure associated with specific pottery-kiln sites, pottery from those kiln sites must be analyzed, allowing the elemental concentrations characteristic of each pottery to be defined. Compositional analysis of local clay outcrops provides additional data on the clay and tempering materials comprising the compositional structure of each pottery (Wilson 1978). As indicated by Bishop et al. (1982:280), "Under the most favorable conditions, a compositional 'match' may be found between the raw material and the pottery. ... [M]ore likely, the clay analysis will provide a ... perspective from which to view the variability found in the ceramic pastes."

The selective advantage of multivariate techniques for identifying the underlying structure is expressed by Wilson (1978:229) as the objective assignment of specimens to compositional types directly from the raw analytical data, utilizing the n measured concentrations simultaneously available for each specimen. These specimens can be represented as points in an n-dimensional space, with composition types corresponding to clusters grouped around a centroid and the separation of points in a cluster being smaller than those between clusters (Bishop et al. 1982; Wilson 1978).

These clusters are assumed to correlate with the underlying compositional structure of different pottery-kiln sites and which, under ideal conditions, reflect differences in the raw material used in pottery manufacture. The elemental concentrations defined for each cluster, however, may be affected by several factors not associated with the underlying compositional structure of the clay outcrops or the pottery from specific kiln sites. These factors may include physical or chemical weathering, the addition of tempers, and changes in raw material choices (Bishop et al. 1982; Mommsen et al. 1988; Neff et al. 1989; Rands and Bishop 1980; Wilson 1978).

Selection of Elements

In order to identify the chemical structure of stonewares from specific pottery-kiln sites a large sample of elements is recommended (Bishop et al. 1982; Wilson 1978). The greater susceptibility of some elements to post-depositional alteration or elemental substitution should be considered in selecting elements for study. Other elements may covary, providing largely redundant information. Failure to identify covarying elements ignores their impact on the elemental structure of the pottery and the results of various multivariate analyses. Wilson (1978:223) reports that "many statistical techniques that have been applied to the interpretation of [elemental analysis] results assume that the concentrations are uncorrelated; there has been no discussion of the effect of this assumption being incorrect." Others have argued that inclusion of dependent elements may unduly weight the statistical calculations (see Perlman and Asaro 1969; Bishop et al. 1982).

Data Ordination

Chemical and nonchemical data can be effectively ordered in spatial plots to show clustering or variability relationships. Scattergrams and triangular diagrams are two commonly used spatial plots. Scattergrams provide ordination in which the relationship of two variables is shown, while triangular diagrams provide ordination of three variables (Bishop et al. 1982).

Group Formation

The formation of compositional groups that correlate with specific pottery-kiln sites is a primary goal in identifying the chemical structure of the ceramics from each pottery. Two major types of clustering procedures are commonly used to identify compositional groups--agglomerative hierarchical methods and iterative procedures (Bishop et al. 1982; Harbottle 1976; Mommsen et al. 1988). Agglomerative hierarchical methods often display the clusters as dendrograms.

Cluster analysis is a primary approach for assessing chemical structure in a ceramic data set (Wilson 1978). Cluster analyses divide data sets into small homogeneous groups with closely similar specimens being linked at a low level and linkage continuing until all specimens are grouped into a single large cluster. The later two groups are linked, the more dissimilar they are. A wide range of clustering criteria exists (Harbottle 1976; Mommsen et al. 1988; Wilson 1978), most of which operate on an N x N matrix of similarity or distance (dissimilarity) values. Clusters are formed by scanning the matrix and grouping similar specimens or by successively subdividing the matrix (Rice and Saffer 1982:399).

Cluster analysis is not without serious problems. Each clustering technique operates on basic assumptions about the underlying structure of the data set, but the appropriateness of these assumptions is unknown (Bishop et al. 1982:310). Further, distortion in the similarity among specimens is greater among higher linkages than among specimens linked lower on the dendrogram (Bishop et al. 1982:310), and interpretation of the dendrogram is difficult and often a matter of judgment (Wilson

1978:231). Utilization of different algorithms increases the interpretative reliability of the resulting clusters, allowing a "relative correctness," but not a quantitative correctness of the clustering solution. Only clusters that occur in repeated analyses utilizing different algorithms can be interpreted as empirical, i.e., an artifact of the algorithm.

Compositional Analyses of the Denton County Pottery-Kiln and Farmstead Sherd Assemblages

Selection of Elements

Although multivariate analyses of compositional structure ideally should include as many variables as possible, some elements may not relate to the parameters of interest. Other elements may co-vary, providing redundant information. Between 8 and 38 elements are commonly measured (Wilson 1978); 12 elements were selected for this study. Four of the 12 elements analyzed--Na, Mg, S, and Cl--did not occur in sufficient quantities in the epoxy-impregnated sherds to be useful in distinguishing stoneware pastes from different pottery-kiln sites; they were more useful in examining glazes where they reflect both glaze composition and firing methods. Two of these elements, Na and Mg, however, were useful for distinguishing between vessel sherds made by Cranston and those made by Donaldson. Sodium (Na) was most common in salt glazes, but was not limited to this glaze type. Sodium also occurred in the clay samples from deposits probably used by Cranston and Donaldson on the Cannon survey (see Chapter 4). All other elements--Al, Si, K, Ca, Ti, Fe, Cu, and Zn--

occurred in widely varying frequencies in both pastes and glazes. Each of these elements occur in the local clays, being derived either from terrigenous igneous deposits from the Rockies and the Quachita Mountains or Tertiary marine deposits (see Chapter 4). Some of the potassium (K) may reflect firing or post-depositional alteration. High potassium and argon frequencies have been identified for some glaze specimens and may reflect firing or post-depositional changes, but their concentrations within the pastes are low and correlate well with the other less frequent elements--Ca, Ti, Fe, Cu, and Zn. Considering these factors, all twelve elements were measured and ten elements--Na, Mg, Al, S, Cl, K, Ca, Ti, Fe, and Cu--were consistently useful in the multivariate analyses. Because the frequencies of Al and Si were closely related, both were not included together in the analyses.

Data Ordination

All elemental concentrations were compared in scatterplots. Discriminant analysis scatterplots were used to examine the distribution of specimens across specific variables (Norusis 1990a). Separate scatterplots were obtained for each of the sherd/clay samples, which were used to examine the multidimensional distribution of the clusters obtained using cluster analysis.

Group Formation

The stoneware paste elemental data were analyzed using two agglomerative hierarchical clustering criteria--complete linkage (furthest neighbor) and average linkage (between groups) in SPSS version 4 (SPSS-X™ Release 4) (Norusis 1990b). Complete linkage was selected to maximize the compositional differences among specimens, given historical information that several potters utilized clays from the same outcrops or closely located outcrops. Average linkage was selected as a comparative linkage algorithm, which would be less affected by spurious specimens and weighting. The city-block or Manhattan distances measure was utilized, in which the distance between two cases is the sum of the absolute value differences for each variable (Norusis 1990b:365).

The results of these clustering procedures were plotted as dendrograms, allowing the grouping of sherd and/or clay specimens to be examined. Only those specimens that occurred in the same cluster for both algorithms (average and complete) were interpreted as reliably identified. Specimens that differed in their cluster assignments across algorithms were considered unassigned or of unknown cluster membership. The clustering results were also examined to determine the compositional homogeneity (or variability) of the samples obtained from each pottery-kiln site and the overlap of compositions among pottery-kiln sites. These results were then compared using discriminant analysis scatterplots.

Clustering Results

Twelve clustering analyses were conducted using the six sherd and clay samples. These analyses examine the compositional group assignments of the pottery-kiln sherds, farmstead sherds, and clay specimens and were undertaken to reliably identify associations between specific farmstead and pottery-kiln sherds and/or clay specimens. Sherds and/or clay specimens occurring in identical clusters on the average and complete dendrograms were considered to be reliably identified. Those sherds not assigned to the same clusters in both dendrograms for each analysis are designated as unassigned.

The clustering results reveal that some identifications are supported in both analyses, while others are not. Several types of sherd clusters occur in each dendrogram, including clusters containing both farmstead and pottery-kiln sherds, some containing only farmstead sherds, and still others represented only by pottery-kiln sherds. Clusters containing only farmstead sherds are designated "farmstead clusters" to indicate that these sherds are more similar to each other than to any specific pottery or cluster of potteries. Outliers are identified as those sherds that are not closely related to any cluster.

The precision and accuracy of the clustering results were affected by several factors, including sample preparation, i.e., epoxy versus carbon tape, sample size, and clay acquisition patterns. Minor elemental frequencies (e.g., Na, Mg, S, and Cl) were recorded more often for carbon-tape specimens than those embedded in epoxy, and the relative weight frequency of all elements was improved among the carbon-tape specimens. This improvement suggests that the epoxy masked minor elemental frequencies and inflated the frequency of Si, resulting from the seepage of the silicon-based epoxy into the pores of the ceramic paste.

A sample size of ten sherds from each pottery-kiln site proved to be inadequate to reliably differentiate some of the potteries for which widely diverse paste compositions occur within the sherd sample. The adverse impact of sample size is illustrated in a comparison of marked sherds from the Cranston-Donaldson Pottery (see discussion later in this chapter). While the original sample of ten sherds from the Cranston-Donaldson Pottery was characterized by widely divergent compositions, the sample of marked sherds revealed two compositional clusters. One cluster correlates with vessels made by Cranston, while the other contains vessels made by Donaldson. Compositional variability occurs in both clusters, but variability is greater between than within clusters. A sample of marked sherds from the Roark-Griffith Pottery proved reliable in identifying a compositional structure for this kiln site when compared directly with marked sherds from the Cranston-Donaldson Pottery. These sherds marked ROARK did not exhibit any strong clustering when sherds from the Wilson, Serren, Lambert, and Daugherty potteries were included in the analyses. These results indicate compositional overlap between the Roark sherds and sherds from these other pottery-kiln sites.

These efforts to identify compositional structures for the more poorly sampled kiln sites are hampered to date by both small sherd collections and the paucity of marked sherds. Other factors, including clay acquisition patterns and spatial distance may also account for low success in the compositional differentiation of vessels from specific potteries. The greatest overlap occurs among the Wilson (41DN19) and

Serren (41DN75) potteries, which utilized clays from the same clay pits or from different, closely spaced exposures.

Cluster Analysis 1: Clay Specimens

In order to determine if the clay sources used by the Denton County potters could be distinguished based on elemental composition, clustering analysis was conducted on the 29 clay specimens comprising Sample 2. These specimens were obtained from nine of the 14 identified outcrops (see Chapter 4). For the purpose of this analysis, the clay specimens from Acme Pits #1-3 and the Daugherty Pottery are grouped together because of their spatial proximity, all occurring within one-half mile of each other. Six clay outcrops are defined, including (1) the Cranston Pottery, (2) the Acme Pit at the Lambert Pottery, (3) Acme Pits #1-3 and the Daugherty Pottery, (4) the Acme Pit on Highway 380, (5) the clays on the Cannon survey, and (6) Acme Pit #4 on the Britton survey. The 29 clay specimens were prepared with carbon tape and analyzed using ten elements--Na, Mg, Al, S, Cl, K, Ca, Ti, Fe, and Cu.

Eight comparable clusters were identified in the average linkage (Figure 5.1) and complete linkage (Figure 5.2) dendrograms. The clay specimens in each cluster are summarized in Table 5.1.

These clustering results indicate that the clay specimens from the Cranston Pottery and the Cannon survey are significantly different from the clays obtained from the other outcrops. The Cranston and Cannon clays cluster closest to each other, combining with other clusters at a distance of 25 on a similarity or distance scale

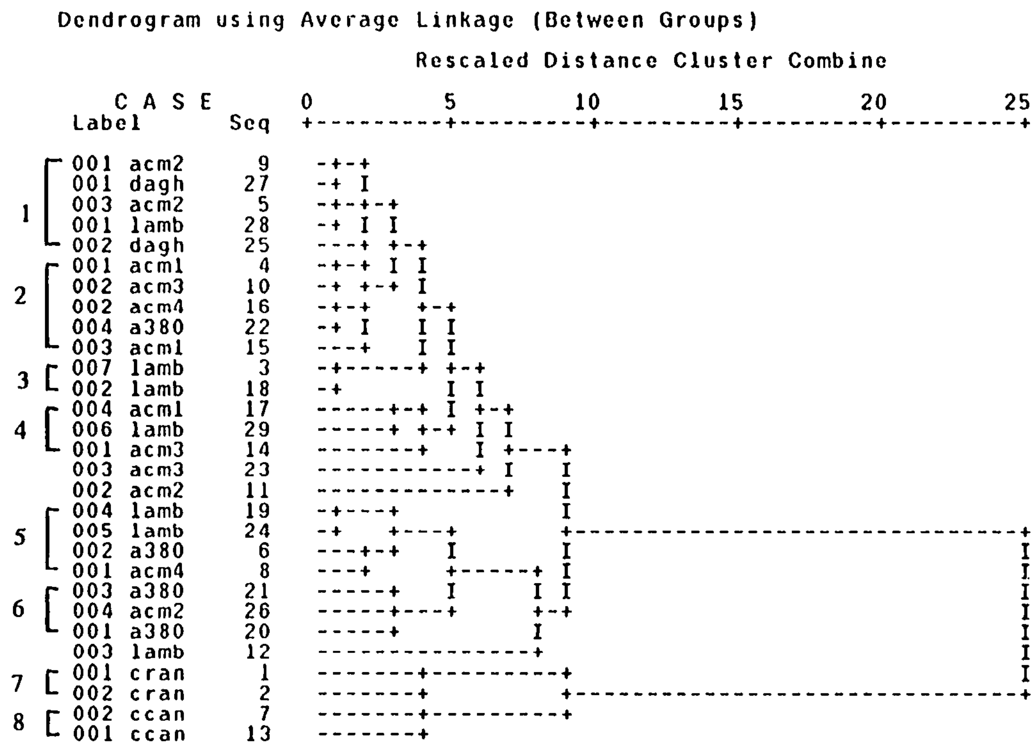


Figure 5.1 Dendrogram of the clay specimens using average (between groups) linkage. Specimens that were not placed in the same cluster in both dendrogram solutions remain unassigned.

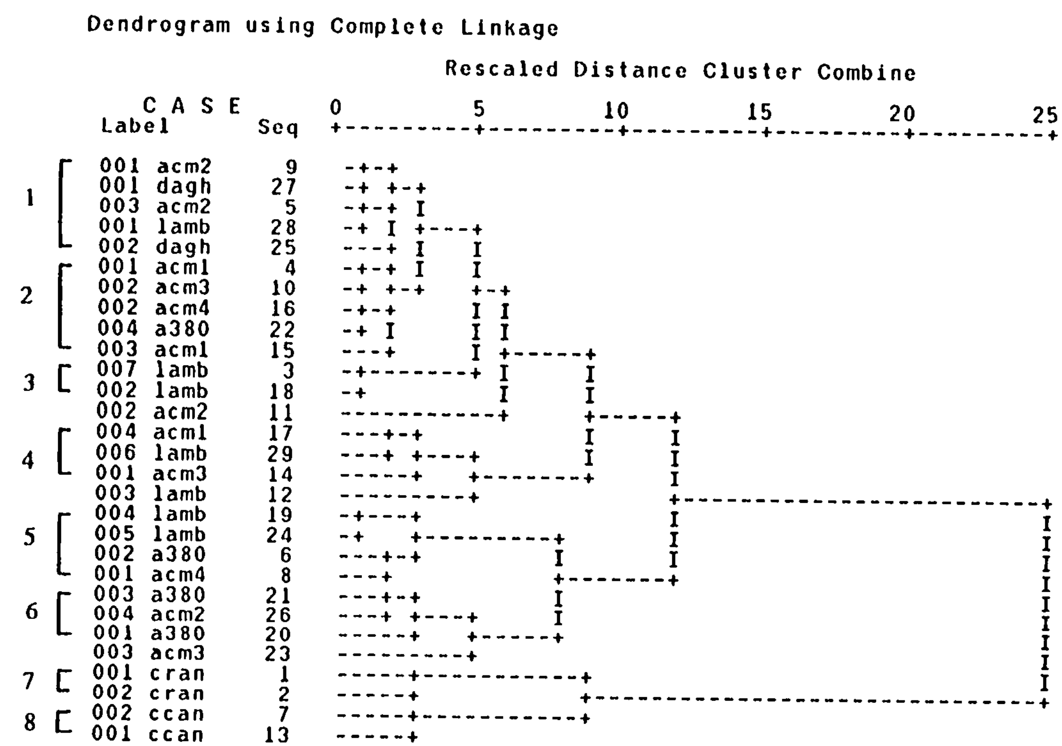


Figure 5.2 Dendrogram of the clay specimens using complete linkage. Specimens that were not placed in the same cluster in both dendrogram solutions remain unassigned.

Table 5.1 Cluster Assignments for the Denton-County Clay Specimens.

Cluster	Clay Outcrop Group	# of Specimens
1	(2) Lambert	1
	(3) Acme #1-3, Daugherty	4
2	(3) Acme #1-3, Daugherty	3
	(4) Acme Highway 380	1
	(6) Acme #4	1
3	(2) Lambert	2
4	(2) Lambert	1
	(3) Acme #1-3, Daugherty	3
5	(2) Lambert	2
	(4) Acme Highway 380	1
	(6) Acme #4	1
6	(3) Acme #1-3, Daugherty	1
	(4) Acme Highway 380	2
7	(1) Cranston	2
8	(5) Cannon survey	2
Not Assigned	(2) Lambert	1
	(3) Acme #1-3, Daugherty	2

ranging from 0 (most similar) to 25 (least similar). All of the clay specimens from the other outcrops combine into a single cluster at a distance of about 9 on this scale.

The cluster assignments from the average linkage (Figure 5.1) and complete linkage (Figure 5.2) solutions were analyzed and plotted against first and second discriminant functions. This scatterplot of discriminant function scores (Figure 5.3) illustrates that although compositional overlap occurs among clay outcrops in the cluster assignments, 89.7% of the clay specimens are reliably identified to the six clay outcrop groups from which they were obtained (Table 5.2). These results indicate that the elemental composition of the six clay outcrop groups differ sufficiently to allow for reliable assignment of clay samples to their clay outcrop group (Groups 1 through 6).

As Figure 5.3 illustrates, the elemental composition of the clays from the Cranston and Cannon outcrops is significantly different from the clays obtained from the other outcrops. The Lambert Pottery clays and the specimens from Acme Pit #4 are distinguishable from each other and all of the outcrops, but are closely similar to the clays obtained from Denton (Acme Pits #1-3 and Daugherty) and the Acme Pit on Highway 380 situated several miles east of Denton.

These results indicate that the Cannon survey and Cranston Pottery clays are the most distinct based on an analysis of elemental composition, and although compositional overlap occurs among the other outcrops, they can be sufficiently reliably distinguished to indicate that it may be possible to assign pottery sherds from

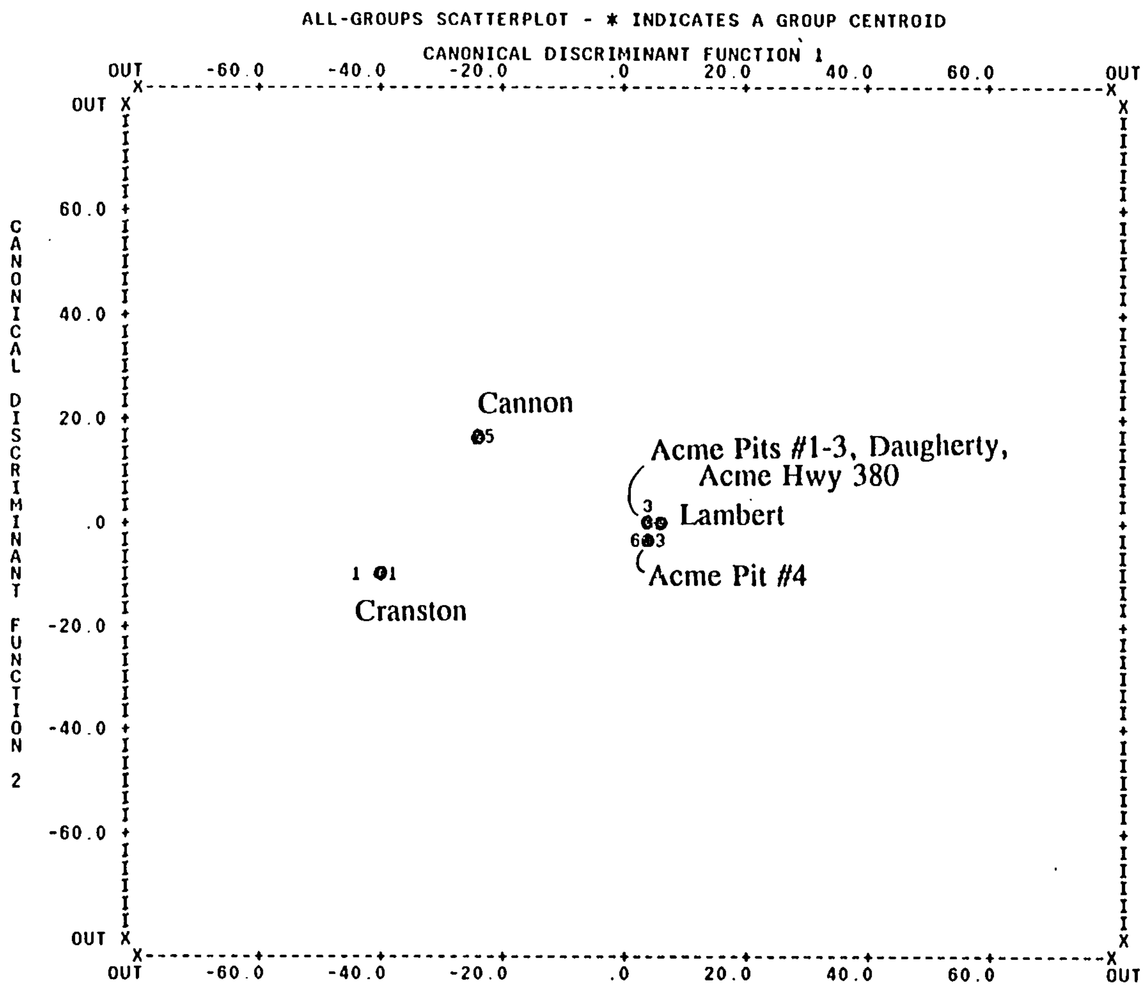


Figure 5.3 Scatterplot of discriminant function scores for the clays; Cranston (1), Lambert (2), Acme Pits #1-3 and Daugherty (3), Highway 380 (4), Cannon survey (5), and Acme Pit #4 (6).

Table 5.2 Discriminant analysis results for the Denton County clays. Cranston (Group 1), Lambert (Group 2), Acme Pits #1-3 and Daugherty (Group 3), Acme Pit on Highway 380 (Group 4), Cannon survey (Group 5), and Acme Pit #4 on the Britton survey (Group 6).

CLASSIFICATION RESULTS -

ACTUAL GROUP	NO. OF CASES	PREDICTED GROUP MEMBERSHIP 1	2	3	4	5	6
GROUP 1	2	2 100.0%	0 0.0%	0 0.0%	0 0.0%	0 0.0%	0 0.0%
GROUP 2	7	0 0.0%	6 85.7%	0 0.0%	0 0.0%	0 0.0%	1 14.3%
GROUP 3	12	0 0.0%	0 0.0%	10 83.3%	1 8.3%	0 0.0%	1 8.3%
GROUP 4	4	0 0.0%	0 0.0%	0 0.0%	4 100.0%	0 0.0%	0 0.0%
GROUP 5	2	0 0.0%	0 0.0%	0 0.0%	0 0.0%	2 100.0%	0 0.0%
GROUP 6	2	0 0.0%	0 0.0%	0 0.0%	0 0.0%	0 0.0%	2 100.0%

PERCENT OF "GROUPED" CASES CORRECTLY CLASSIFIED: 89.66%

CANONICAL DISCRIMINANT FUNCTIONS

FUNCTION	EIGENVALUE	PERCENT OF VARIANCE	CUMULATIVE PERCENT	CANONICAL CORRELATION	AFTER FUNCTION	WILKS' LAMBDA	CHI-SQUARED	D.F.	SIGNIFICANCE
					0	0.0000268	210.55	50	0.0000
1*	220.30460	85.45	85.45	0.9977381	1	0.0059291	102.56	36	0.0000
2*	35.32110	13.70	99.15	0.9861378	2	0.2153526	30.710	24	0.1623
3*	1.34777	0.52	99.67	0.7576700	3	0.5055982	13.640	14	0.4768
4*	0.62356	0.24	99.92	0.6197342	4	0.8208702	3.9478	6	0.8837
5*	0.21822	0.08	100.00	0.4232373					

archaeological sites to specific pottery-kiln sites where they were manufactured and/or identify such sherds to specific potters.

Cluster Analysis 2: Pottery-Kiln and Clay Specimens

In order to determine the distribution of the clay specimens across pottery-kiln sites, clustering analysis was undertaken using 97 specimens. These specimens include the 25 sherds in Sample 2 (five sherds each from the Serren, Wilson, Lambert, Daugherty, and Donaldson potteries), the 29 clay specimens in Sample 4, and the 43 sherds from the Cranston-Donaldson and Roark-Griffith potteries in Sample 5. Each specimen was prepared with carbon tape. Ten elements were included in the elemental analysis, including Na, Mg, Al, S, Cl, K, Ca, Ti, Fe, and Cu.

Twenty comparable clusters were identified in the average linkage (Figure 5.4) and complete linkage (Figure 5.5) dendrograms. The sherds and clay specimens in each cluster are summarized in Table 5.3.

These clustering results indicate that the sherds from the seven pottery-kiln sites and clay specimens exhibit predominantly nonoverlapping compositional signatures, with no direct association occurring between specific clay outcrops and pottery-kiln sites. This lack of association is evident at the Cranston, Donaldson (Cannon survey), and Lambert potteries, although the clay outcrops at each of these potteries were included in this analysis. These results indicate that elemental composition of the pottery-kiln sherds differs significantly from the raw clay compositions and considerable

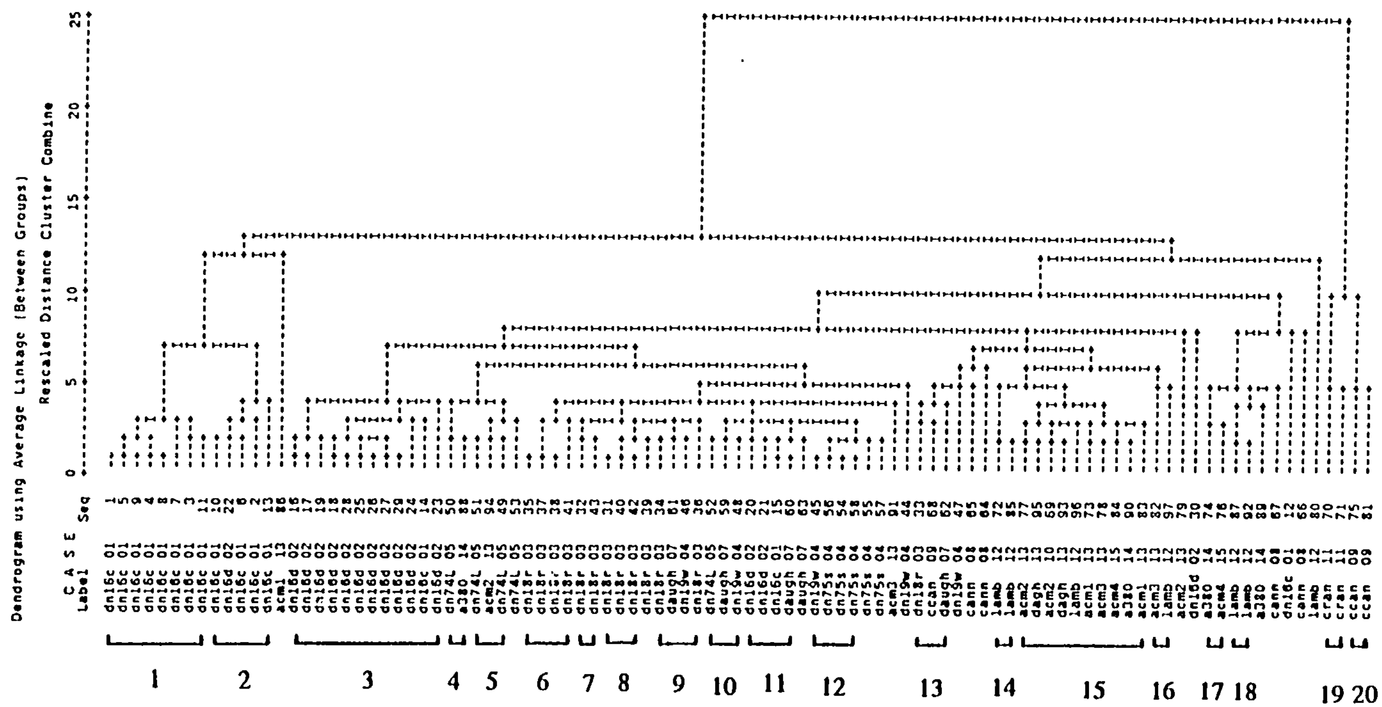


Figure 5.4 Dendrogram of the pottery-kiln sherds and the clay specimens using average (between groups) linkage. Sherds and clay specimens not placed in the same cluster in both dendrogram solutions remain unassigned.

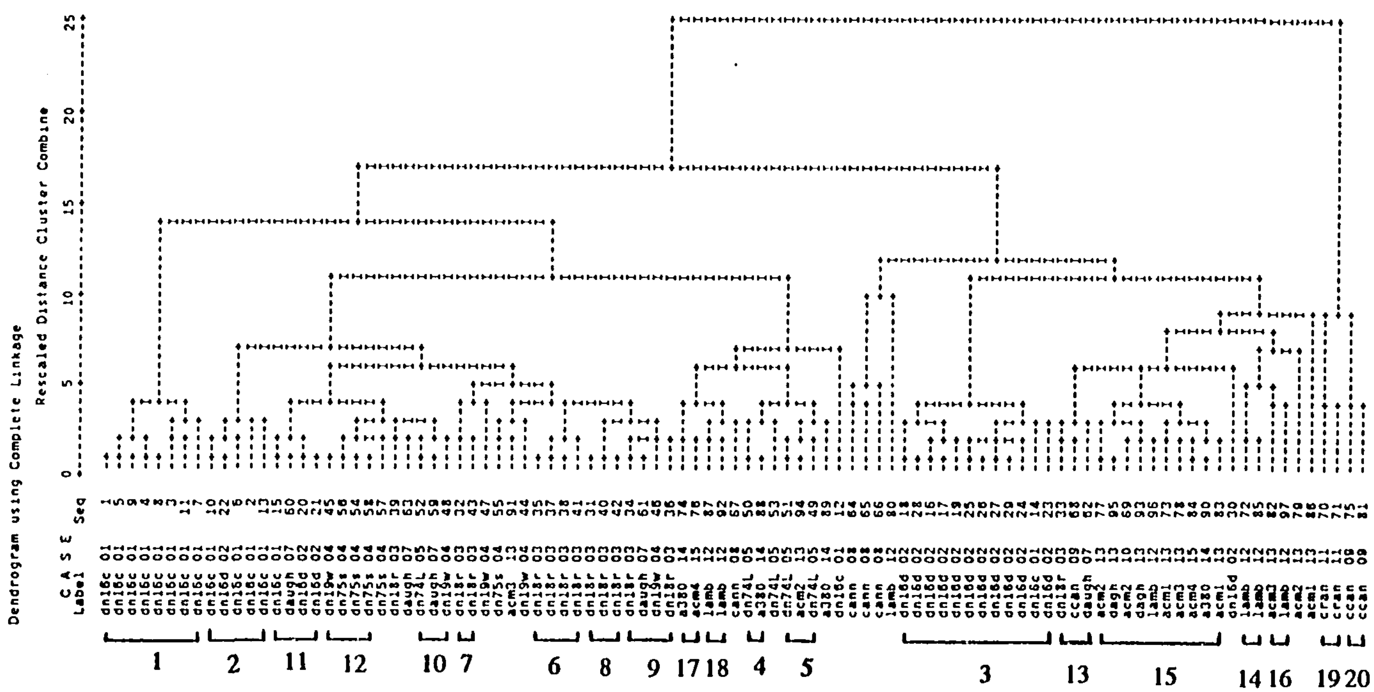


Figure 5.5 Dendrogram of the pottery-kiln sherds and the clay specimens using complete linkage. Sherds and clay specimens not placed in the same cluster in both dendrogram solutions remain unassigned.

Table 5.3 Cluster Assignments of the Pottery-Kiln and Clay Specimens from Samples 2, 4, and 5.

Cluster	Pottery Kiln	Clay Outcrop
1	DN16c	
2	DN16c DN16d	
3	DN16d DN16c	
4	DN74	(4) Acme Highway 380
5	DN74	(3) Acme #1-3, Daugherty
6	DN18	
7	DN18	
8	DN18	
9	DN18 DN19 Daugherty	
10	DN19 DN74 Daugherty	
11	DN16c DN16d Daugherty	

Table 5.3 Cluster Assignments of the Pottery-Kiln and Clay Specimens from Samples 2, 4, and 5 (cont'd).

Cluster	Pottery Kiln	Clay Outcrop
12	DN19 DN75	
13	DN18 Daugherty	(5) Cannon
14		(2) Lambert
15		(2) Lambert (3) Acme #1-3, Daugherty (4) Acme Highway 380
16		(2) Lambert (3) Acme #1-3, Daugherty
17		(4) Acme Highway 380 (6) Acme #4
18		(2) Lambert
19		(1) Cranston
20		(5) Cannon
Not Assigned	DN16c (1 sherd) DN16d (1 sherd) DN18 (1 sherd) DN19 (2 sherds) DN74 (1 sherd) DN75 (2 sherds) Daugherty (1 sherd) Donaldson (4 sherds)	(2) Lambert (1 specimen) (3) Acme #1-3, Daugherty (3 specimens) (4) Acme Highway 380 (1 specimen)

compositional variation occurs within the sherd samples from each pottery. This within pottery-kiln compositional variation is particularly evident among the larger sherd samples from the Cranston (dn16c) - Donaldson (dn16d) Pottery and the Roark-Griffith (dn18r) Pottery (Figure 5.4 and Figure 5.5). The Cranston-Donaldson Pottery sherds occur in three major clusters (Clusters #1-3), with the Cranston sherds (dn16c) being less similar to the Donaldson sherds (dn16d) from the same pottery than the Donaldson sherds are to all the sherds from the other six potteries (Roark-Griffith, Wilson, Serren, Donaldson (Cannon survey), Daugherty, and Lambert).

The cluster assignments from the average linkage (Figure 5.4) and complete linkage (Figure 5.5) solutions were analyzed and plotted against first and second discriminant functions. The results of this discriminant analysis reveal that 79.38% of the sherds and clay specimens can be reliably assigned to their source (Table 5.4) and the hypothesis that the different pottery-kiln and clay outcrops are characterized by the same elemental composition is rejected. The most reliable assignments were obtained for the Roark-Griffith and Donaldson (Cannon survey) potteries and the Cranston and Acme Pit #4 (Britton survey) clay outcrops.

Cluster Analysis 3: Pottery-Kiln Sherds Only

In order to determine the compositional relations among the 68 sherds from the Denton County potteries, clustering analysis was undertaken using Samples 2 and 5. These samples include five sherds each from the Serren, Wilson, Lambert,

Table 5.4 Discriminant analysis results for the Denton County pottery-kiln sites and clay outcrops. Cranston DN16c (Group 1), Donaldson DN16d (Group 2), Roark DN18 (Group 3), Wilson/Serren DN19/DN75 (Group 4), Lambert DN74 (Group 5), Daugherty (Group 7), Donaldson (Group 8), Cannon clay (Group 9), Cranston clay (Group 11), Lambert clay (Group 12), Acme Pits #1-3 and Daugherty clay (Group 13), Acme Pit-Highway 380 clay (Group 14), and Acme Pit #4 (Group 15). Note: no Group 6 or 10.

CLASSIFICATION RESULTS -

ACTUAL GROUP	NO. OF CASES	PREDICTED GROUP MEMBERSHIP 1	2	3	4	5	7	8	9	11	12	13	14	15
GROUP 1	15	11 73.3%	1 6.7%	0 0.0%	2 13.3%	0 0.0%	0 0.0%	0 0.0%	0 0.0%	0 0.0%	0 0.0%	0 0.0%	1 6.7%	0 0.0%
GROUP 2	15	1 6.7%	11 73.3%	0 0.0%	2 13.3%	0 0.0%	1 6.7%	0 0.0%	0 0.0%	0 0.0%	0 0.0%	0 0.0%	0 0.0%	0 0.0%
GROUP 3	13	0 0.0%	0 0.0%	13 100.0%	0 0.0%	0 0.0%	0 0.0%	0 0.0%	0 0.0%	0 0.0%	0 0.0%	0 0.0%	0 0.0%	0 0.0%
GROUP 4	10	0 0.0%	0 0.0%	0 0.0%	9 90.0%	0 0.0%	0 0.0%	0 0.0%	0 0.0%	0 0.0%	0 0.0%	0 0.0%	0 0.0%	1 10.0%
GROUP 5	5	0 0.0%	0 0.0%	0 0.0%	1 20.0%	4 80.0%	0 0.0%	0 0.0%	0 0.0%	0 0.0%	0 0.0%	0 0.0%	0 0.0%	0 0.0%
GROUP 7	5	0 0.0%	0 0.0%	0 0.0%	0 0.0%	0 0.0%	4 80.0%	0 0.0%	0 0.0%	0 0.0%	0 0.0%	1 20.0%	0 0.0%	0 0.0%
GROUP 8	4	0 0.0%	0 0.0%	0 0.0%	0 0.0%	0 0.0%	0 0.0%	4 100.0%	0 0.0%	0 0.0%	0 0.0%	0 0.0%	0 0.0%	0 0.0%
GROUP 9	3	0 0.0%	0 0.0%	1 33.3%	0 0.0%	0 0.0%	0 0.0%	0 0.0%	2 66.7%	0 0.0%	0 0.0%	0 0.0%	0 0.0%	0 0.0%
GROUP 11	2	0 0.0%	0 0.0%	0 0.0%	0 0.0%	0 0.0%	0 0.0%	0 0.0%	0 0.0%	2 100.0%	0 0.0%	0 0.0%	0 0.0%	0 0.0%
GROUP 12	7	0 0.0%	0 0.0%	0 0.0%	0 0.0%	0 0.0%	0 0.0%	0 0.0%	0 0.0%	0 0.0%	4 57.1%	1 14.3%	2 28.6%	0 0.0%
GROUP 13	12	0 0.0%	0 0.0%	0 0.0%	0 0.0%	1 8.3%	1 8.3%	0 0.0%	0 0.0%	0 0.0%	1 8.3%	8 66.7%	0 0.0%	1 8.3%
GROUP 14	4	0 0.0%	0 0.0%	0 0.0%	0 0.0%	0 0.0%	0 0.0%	0 0.0%	0 0.0%	0 0.0%	0 0.0%	1 25.0%	3 75.0%	0 0.0%
GROUP 15	2	0 0.0%	0 0.0%	0 0.0%	0 0.0%	0 0.0%	0 0.0%	0 0.0%	0 0.0%	0 0.0%	0 0.0%	0 0.0%	0 0.0%	2 100.0%

PERCENT OF "GROUPED" CASES CORRECTLY CLASSIFIED 78.38%

Daugherty, and Donaldson potteries, 15 sherds stamped CRANSTON, 15 sherds stamped DONALDSON, and 13 sherds stamped ROARK. Each of these specimens was prepared with carbon tape and ten elements were included in the elemental analysis--Na, Mg, Al, S, Cl, K, Ca, Ti, Fe, and Cu.

Fourteen comparable clusters were identified in the average linkage (Figure 5.6) and complete linkage (Figure 5.7) dendrograms. The sherds in each cluster are summarized in Table 5.5.

These clustering results reveal that the sherds from at least four of the seven pottery-kiln sites can be reliably distinguished from each other based on paste composition alone. These four kiln sites include the Cranston-Donaldson, Roark-Griffith, Lambert, and Serren potteries. Comparatively, the Donaldson (Cannon survey), Daugherty, and Wilson potteries exhibited less reliable compositional signatures, with no unique clusters being associated with the Daugherty or Wilson potteries. A small cluster occurred for several sherds from the Donaldson (Cannon survey) Pottery; most of the sherds from this kiln site occur as outliers, being joined with clusters from other potteries at a distance between 13 and 18 on a similarity or distance scale ranging from 0 (most similar) to 25 (least similar).

These clustering assignments were analyzed and plotted against first and second discriminant functions. The results of this discriminant analysis (Figure 5.8) reveal that at least 85.29% of the sherds were correctly assigned to pottery-kiln site and that the hypothesis that the different potteries are characterized by the same elemental composition is rejected (Table 5.6). The most reliable assignments were obtained for

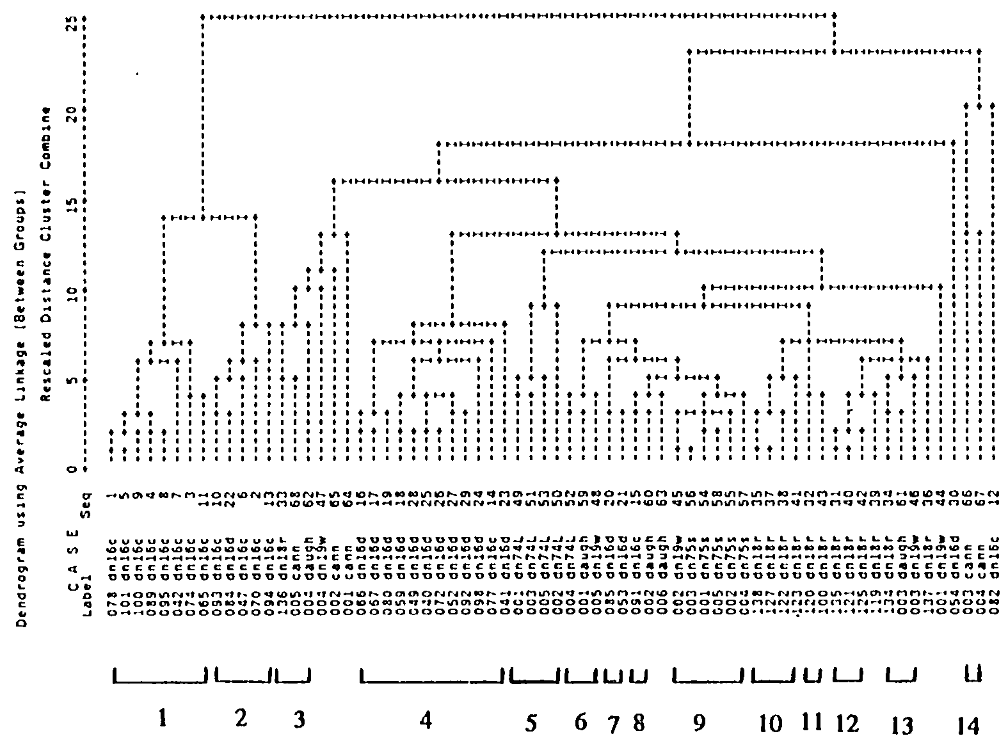


Figure 5.6 Dendrogram of the pottery-kiln sherds using average (between groups) linkage. Sherds that were not placed in the same cluster in both dendrogram solutions remain unassigned.

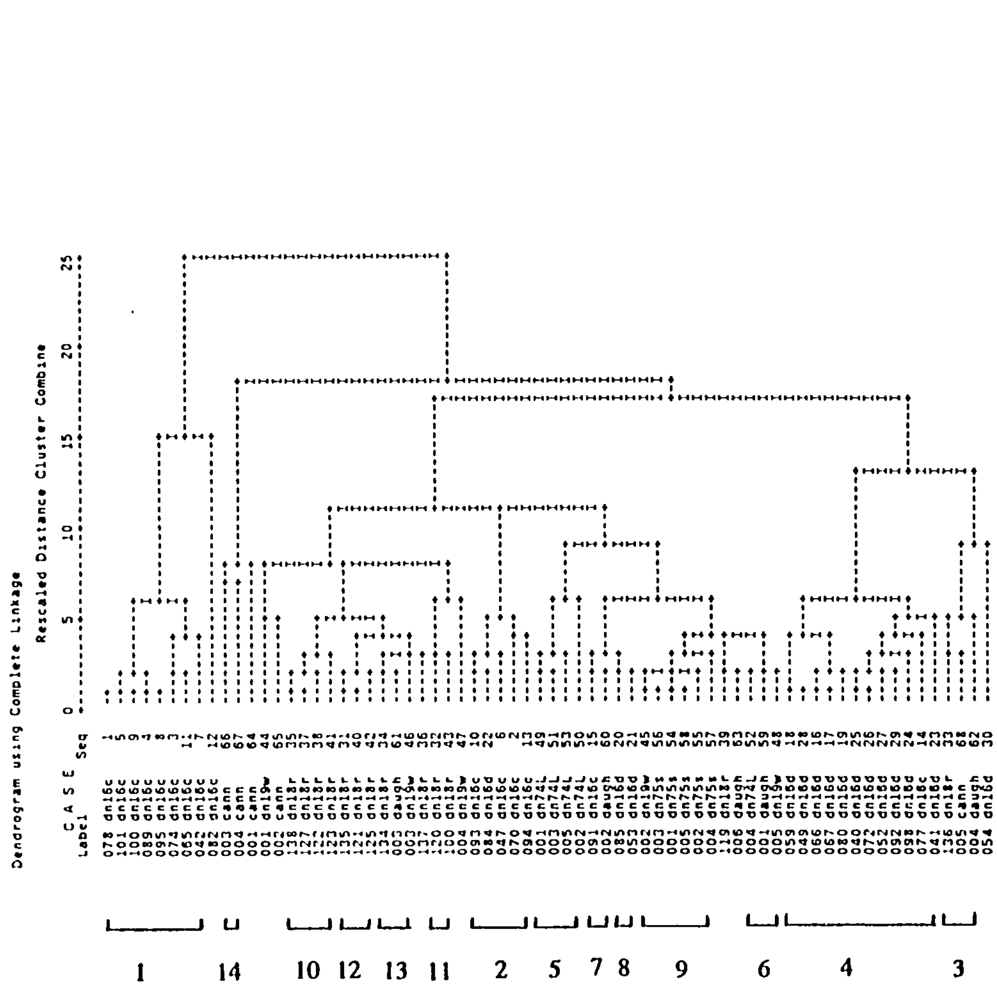


Figure 5.7 Dendrogram of the pottery-kiln sherds using complete linkage. Sherds that were not placed in the same cluster in both dendrogram solutions remain unassigned.

Table 5.5 Cluster Assignments of all Pottery-Kiln Sherds from Samples 2 and 5.

Cluster	Pottery Kiln	Sherd #s
1	DN16c	#41, 65, 74, 78
		#89, 95, 100, 101
2	DN16c	#70, 93, 94
	DN16d	#84
3	DN18r	#136
	Daugherty	#4
	Donaldson (Cannon)	#5
4	DN16c	#77
	DN16d	#40, 41, 49, 52,
		#59, 66, 67, 72,
		#80, 92, 98
5	DN74L	#1, 2, 3, 5
6	DN19w	#5
	DN74L	#4
	Daugherty	#1
7	DN16c	#91
	Daugherty	#2
8	DN16d	#53, 85
9	DN75s	#1, 2, 3, 4, 5
10	DN18r	#122, 123, 127, 138
11	DN18r	#100, 120
12	DN18r	#121, 125, 135
13	DN19w	#3
	Daugherty	#3

Table 5.5 Cluster Assignments of all Pottery-Kiln Sherds from Samples 2 and 5 (cont'd).

Cluster	Pottery Kiln	Sherd #s
14	Donaldson (Cannon)	#3, 4
Not Assigned		
	DN16c	#2
	DN16d	#54
	DN18r	#119, 137
	DN19w	#1, 4
	Daugherty	#6
	Donaldson (Cannon)	#1, 2

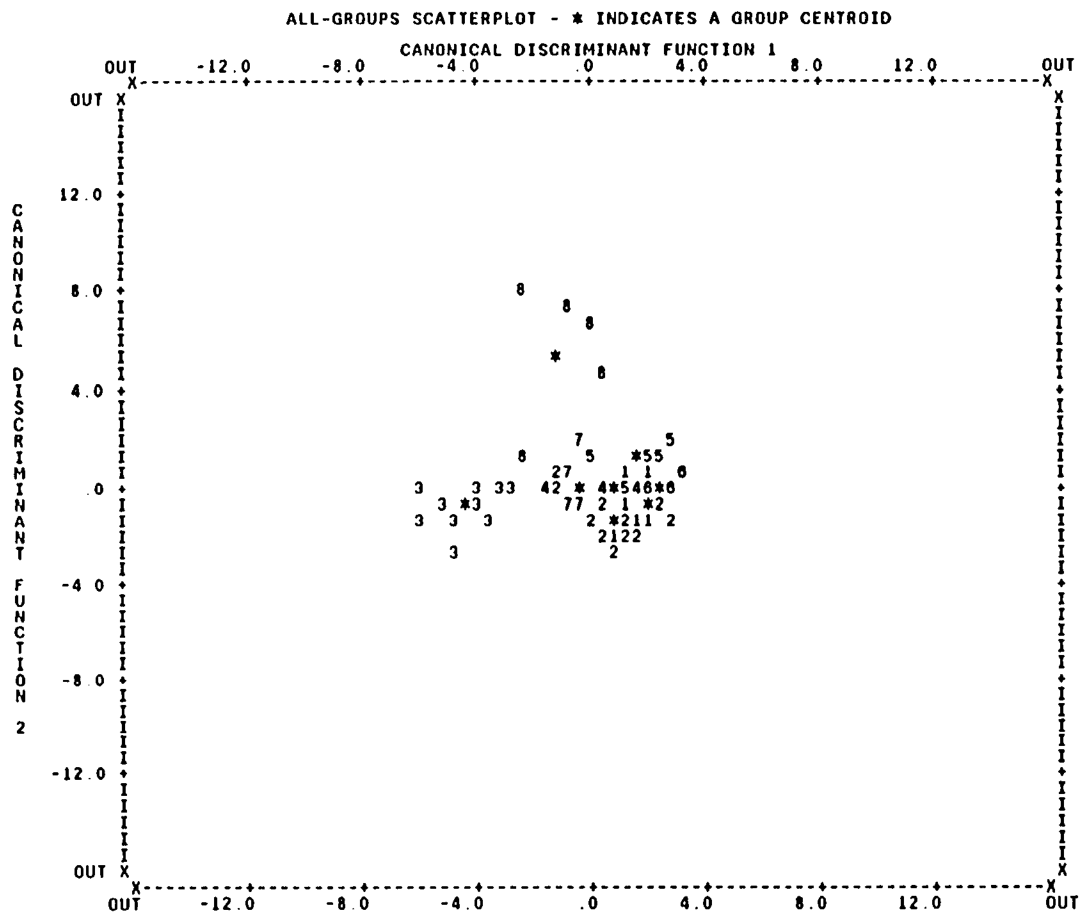


Figure 5.8 Scatterplot of discriminant function scores for the pottery-kiln sites; Cranston DN16c (1), Donaldson DN16d (2), Roark DN18r (3), Wilson DN19w (4), Lambert DN74l (5), Serren DN75s (6), Daugherty (7), Donaldson (8).

Table 5.6 Discriminant analysis results for the Denton County pottery-kiln sites. Cranston DN16c (Group 1), Donaldson DN16d (Group 2), Roark DN18r (Group 3), Wilson DN19w (Group 4), Lambert DN74l (Group 5), Serren DN75s (Group 6), Daugherty (Group 7), and Donaldson (Cannon-survey) (Group 8).

CLASSIFICATION RESULTS -

ACTUAL GROUP	NO. OF CASES	PREDICTED GROUP MEMBERSHIP 1	2	3	4	5	6	7	8
GROUP 1	15	12 80.0%	1 6.7%	0 0.0%	0 0.0%	1 6.7%	0 0.0%	1 6.7%	0 0.0%
GROUP 2	15	1 6.7%	12 80.0%	0 0.0%	0 0.0%	0 0.0%	1 6.7%	1 6.7%	0 0.0%
GROUP 3	13	0 0.0%	0 0.0%	13 100.0%	0 0.0%	0 0.0%	0 0.0%	0 0.0%	0 0.0%
GROUP 4	5	0 0.0%	0 0.0%	0 0.0%	3 60.0%	1 20.0%	1 20.0%	0 0.0%	0 0.0%
GROUP 5	5	0 0.0%	0 0.0%	0 0.0%	0 0.0%	5 100.0%	0 0.0%	0 0.0%	0 0.0%
GROUP 6	5	0 0.0%	0 0.0%	0 0.0%	0 0.0%	0 0.0%	5 100.0%	0 0.0%	0 0.0%
GROUP 7	5	0 0.0%	0 0.0%	0 0.0%	0 0.0%	1 20.0%	0 0.0%	4 80.0%	0 0.0%
GROUP 8	5	0 0.0%	0 0.0%	0 0.0%	0 0.0%	0 0.0%	0 0.0%	1 20.0%	4 80.0%

PERCENT OF "GROUPED" CASES CORRECTLY CLASSIFIED: 85.29%

CANONICAL DISCRIMINANT FUNCTIONS

FUNCTION	EIGENVALUE	PERCENT OF VARIANCE	CUMULATIVE PERCENT	CANONICAL CORRELATION	AFTER FUNCTION	WILKS' LAMBDA	CHI-SQUARED	D.F.	SIGNIFICANCE
					0	0.0021745	358.66	63	0.0000
1*	6.27605	43.89	43.89	0.9287426	1	0.0158218	242.56	48	0.0000
2*	3.32435	23.25	67.13	0.8767847	2	0.0684192	156.90	35	0.0000
3*	2.51887	17.61	84.75	0.8460604	3	0.2407585	83.302	24	0.0000
4*	1.70994	11.96	96.70	0.7943473	4	0.6524402	24.982	15	0.0502
5*	0.23664	1.65	98.36	0.4374467	5	0.8068360	12.556	8	0.1281
6*	0.21292	1.49	99.85	0.4189788	6	0.9786275	1.2638	3	0.7377
7*	0.02184	0.15	100.00	0.1461935					

the Roark, Lambert, and Serren potteries, with a small overlap occurring between the CRANSTON and DONALDSON sherds from the Cranston-Donaldson Pottery.

Cluster Analysis 4: Cranston-Donaldson and Roark-Griffith Pottery Sherds and the Clay Specimens

Clustering analysis was undertaken using Sample 5 comprised of 15 sherds stamped CRANSTON, 15 stamped DONALDSON, 13 stamped ROARK, and 28 clay specimens (Sample 4) in order to determine the compositional relations among the sherds from the Cranston-Donaldson Pottery, the Roark-Griffith Pottery, and the Denton County clay specimens. Both samples were prepared with carbon tape and were analyzed using ten elements--Na, Mg, Al, S, Cl, K, Ca, Ti, Fe, and Cu.

The average linkage clustering results are shown in Figure 5.9 and the complete linkage results are given in Figure 5.10, and these figures reveal that the sherds from the Cranston-Donaldson (DN16c and DN16d) and Roark-Griffith (DN18r) potteries can be distinguished from each other based on elemental composition. No overlap occurs, with none of the sherds from either of these two potteries occurring in the same cluster (Table 5.7).

No association is found between the sherds from the Cranston-Donaldson and Roark-Griffith potteries with the clay samples (Figure 5.9 and Figure 5.10). Only one sherd from the Roark-Griffith Pottery occurs in a cluster containing clay specimens (Cluster 12). Further, among the clay specimens, only the clays from the Cranston Pottery outcrop and the clays from the adjacent Cannon survey outcrop are unique. These two clay outcrops occur as outliers in the average and complete

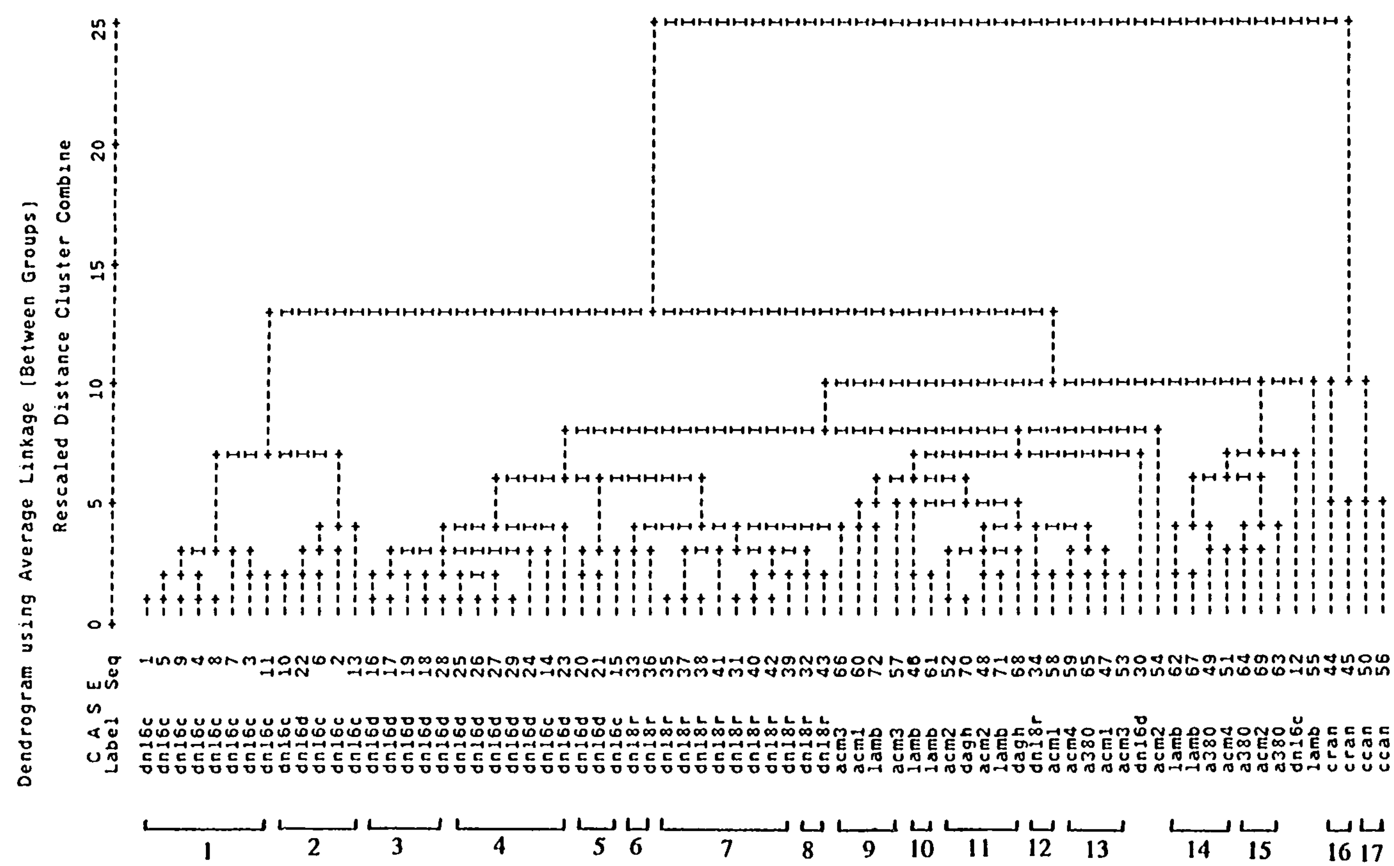


Figure 5.9 Dendrogram of the Cranston-Donaldson and Roark-Griffith sherds and the clay specimens using average (between groups) linkage. Sherds and clay specimens that were not placed in the same cluster in both dendrogram solutions remain unassigned.

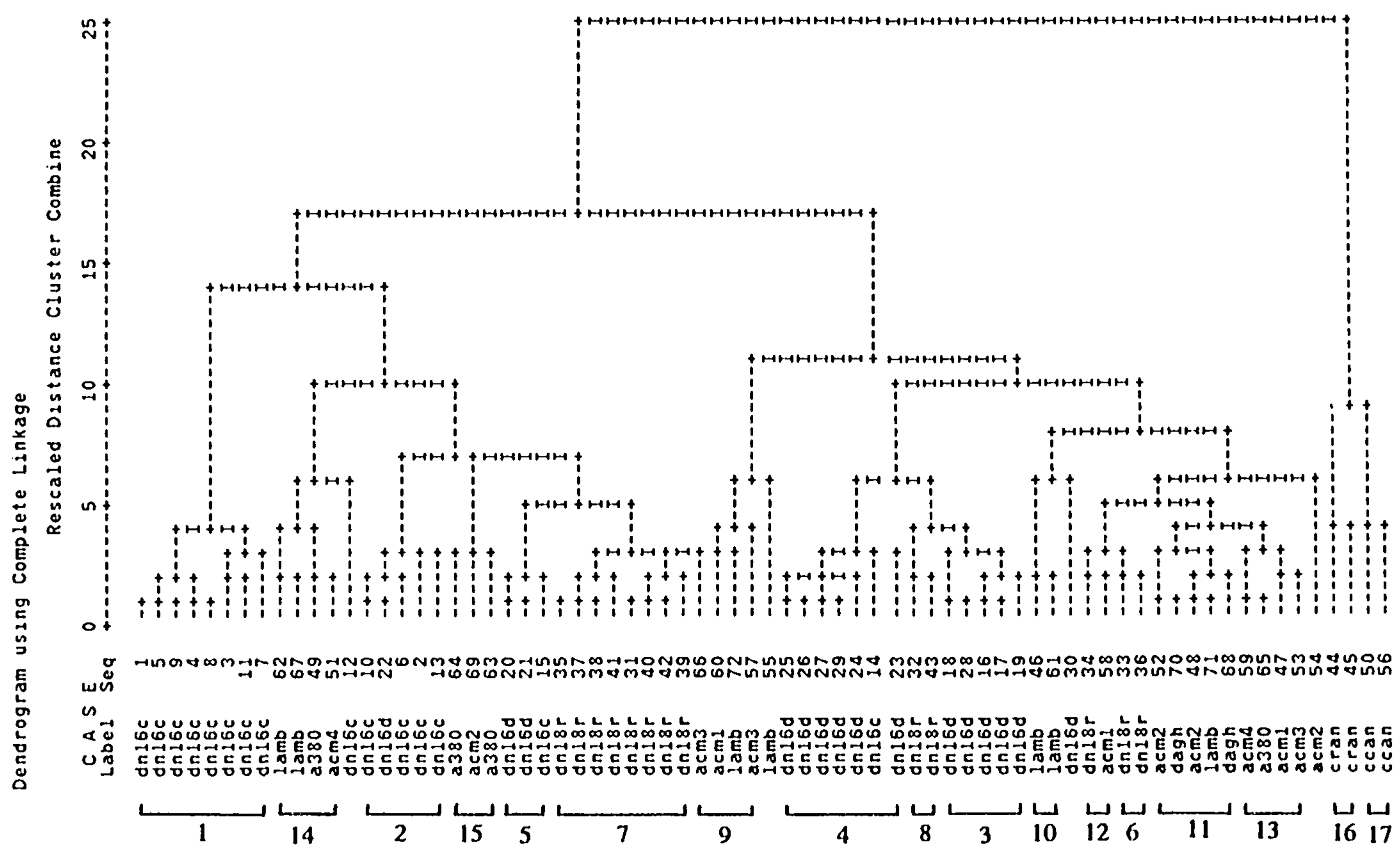


Figure 5.10 Dendrogram of the Cranston-Donaldson and Roark-Griffith sherds and the clay specimens using complete linkage. Sherds and clay specimens that were not placed in the same cluster in both dendrogram solutions remain unassigned.

Table 5.7 Cluster Assignments of the Pottery-Kiln and Clay Specimens from Samples 4 and 5.

Cluster	Pottery Kiln	Clay Outcrop
1	DN16c (8 sherds)	
2	DN16c (4 sherds) DN16d (1 sherd)	
3	DN16d (5 sherds)	
4	DN16c (1 sherd) DN16d (6 sherds)	
5	DN16c (1 sherd) DN16d (2 sherds)	
6	DN18r (2 sherds)	
7	DN18r (8 sherds)	
8	DN18r (2 sherds)	
9		(2) Lambert (3) Acme 1-3, Daugh
10		(2) Lambert
11		(2) Lambert (3) Acme 1-3, Daugh
12	DN18r (1 sherd)	(3) Acme 1-3, Daugh
13		(3) Acme 1-3, Daugh (4) Acme Highway 380 (6) Acme 4

Table 5.7 Cluster Assignments of the Pottery-Kiln and Clay Specimens from Samples 4 and 5 (cont'd).

Cluster	Pottery Kiln	Clay Outcrop
14		(2) Lambert (4) Acme Highway 380 (6) Acme 4
15		(3) Acme 1-3, Daugh (4) Acme Highway 380
16		(1) Cranston
17		(5) Cannon
Not Assigned	DN16c (1 sherd) DN16d (1 sherd)	(2) Lambert (1 sherd) (3) Acme 1-3, Daugh (1 sherd)

linkage dendrograms, clustering with the other clays at a distance of 25 on a scale ranging from 0 to 25, with 25 being the furthest distance possible. Neither of these clay samples is found to be associated with the sherds from the Cranston-Donaldson Pottery, although the Cranston clays came from an outcrop on the pottery property.

Among the sherds from the Cranston-Donaldson and Roark-Griffith potteries, compositional variation is not only evident, but is significant. With the exception of three sherds marked CRANSTON (DN16c), the CRANSTON sherds do not occur in the same cluster(s) as sherds marked DONALDSON (DN16d) although both sets of sherds are from the same pottery. In addition, the CRANSTON sherds (Clusters 1 and 2) do not join the clusters containing the DONALDSON sherds (Clusters 3, 4, and 5) until all of the sherds from the Roark-Griffith Pottery (DN18r) and the clay specimens, excluding the Cranston and Cannon specimens, are combined at about 13 on the distance scale. These results indicate that the DONALDSON sherds are more similar in composition to the Roark-Griffith sherds, followed by the clay specimens, than they are to the CRANSTON sherds.

This evidence of significant compositional variation among the sherds from the Cranston-Donaldson Pottery, and the lack of compositional association among the sherds from the Cranston-Donaldson and Roark-Griffith potteries with any of the examined clay outcrops indicates that Rice's assertions about compositional variation and specialization are not supported with the Denton County stoneware data. Compositional variation occurs within both potteries, with the greatest being evident among the Cranston-Donaldson sherds; historic documentation demonstrates this variation cannot be explained by a change from nonspecialized to specialized production.

Cluster Analysis 6: Cranston-Donaldson and Roark-Griffith Sherds Only

The Cluster Analysis 5 findings are further supported by a cluster analysis of only marked sherds from the Cranston-Donaldson and Roark-Griffith potteries. This analysis was undertaken using 15 sherds marked CRANSTON, 13 marked DONALDSON, and 13 marked ROARK from Sample 5. The average linkage (Figure 5.11) and complete linkage (Figure 5.12) results indicate no compositional overlap among sherds from the Roark-Griffith Pottery and those marked CRANSTON. The DONALDSON sherds are more similar to those from the Roark-Griffith Pottery than the sherds marked CRANSTON. Greater compositional variation is evident within the CRANSTON sample than among the DONALDSON and ROARK samples.

Cluster assignments from the average linkage and complete linkage solutions were analyzed and plotted against first and second discriminant functions. This scatterplot of discriminant function scores (Figure 5.13) illustrates that the marked CRANSTON, DONALDSON, and ROARK sherds can be reliably identified from each other by paste composition alone. No compositional overlap occurs between the CRANSTON and ROARK sherds or the DONALDSON and ROARK sherds (Table 5.8 and Table 5.9), although a small percentage of overlap occurs among the CRANSTON and DONALDSON sherds. Although the CRANSTON and DONALDSON sherds are

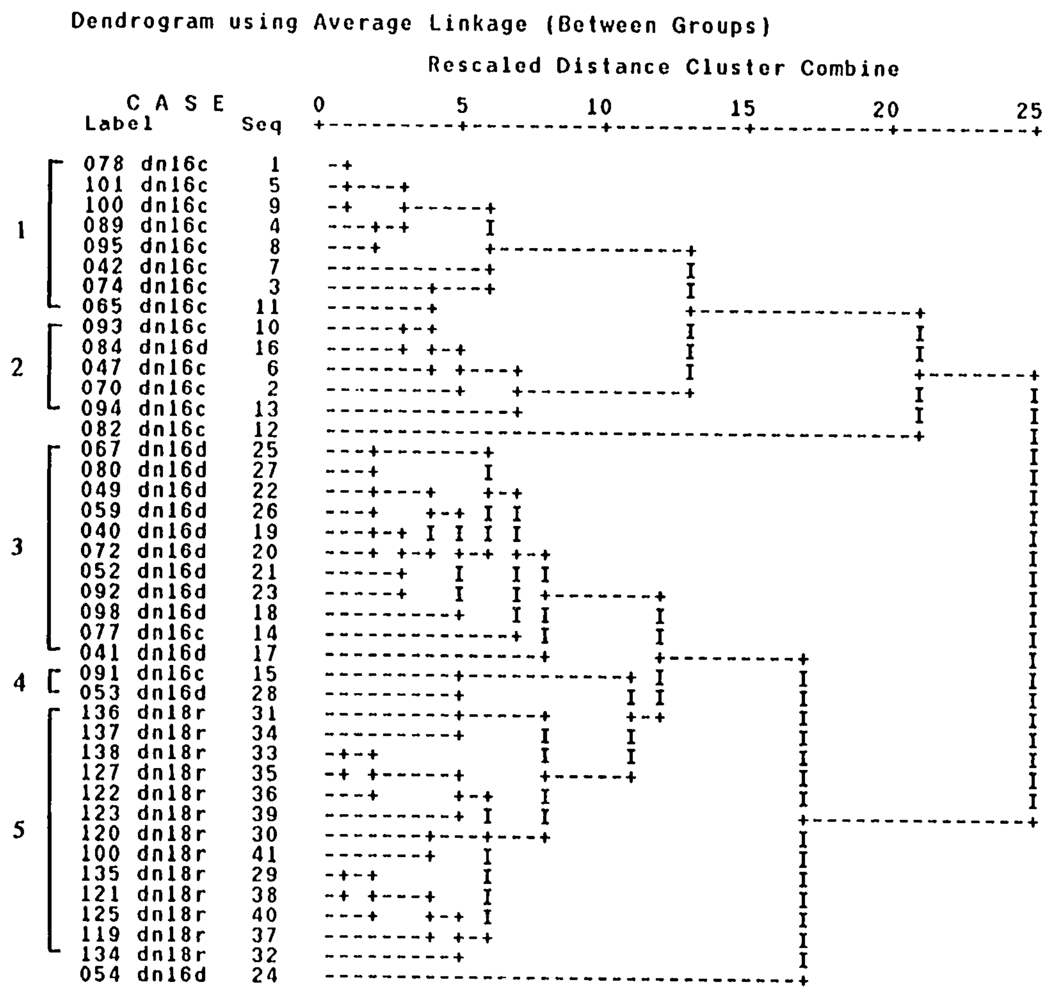


Figure 5.11 Dendrogram of the Cranston-Donaldson and Roark-Griffith sherds using average (between groups) linkage. Sherds that were not placed in the same cluster in both dendrogram solutions remain unassigned.

```
Dendrogram using Complete Linkage

                         Rescaled Distance Cluster Combine

    C A S E      0         5        10        15        20        25
  Label      Seq +---------+---------+---------+---------+---------+

  078 dn16c    1  -+
  101 dn16c    5  -+-+
  100 dn16c    9  -+ +-------+
  089 dn16c    4  -+-+       I
1 095 dn16c    8  -+         +---------------------+
  074 dn16c    3  ---+---+   I                     I
  065 dn16c   11  ---+   +---+                     I
  042 dn16c    7  -------+                         I
2 091 dn16c   15  -----+---------------+           +---------------+
  053 dn16d   28  -----+               I           I               I
  093 dn16c   10  ---+-+               +---+       I               I
  084 dn16d   16  ---+ +---+           I   I       I               I
3 047 dn16c    6  -----+   +-----------+   +-------+               I
  070 dn16c    2  -------+-+               I                       I
  094 dn16c   13  -------+                 I                       I
  082 dn16c   12  -------------------------+                       I
  049 dn16d   22  -+---+                                           I
  059 dn16d   26  -+   +-+                                         I
  067 dn16d   25  ---+-+ +---+                                     I
  080 dn16d   27  ---+   I   I                                     I
  077 dn16c   14  -------+   I                                     I
4 040 dn16d   19  -+-+       +---------+                           I
  072 dn16d   20  -+ +-+     I         I                           I
  052 dn16d   21  ---+ +---+ I         I                           I
  092 dn16d   23  ---+ I   +-+         I                           I
  098 dn16d   18  -----+   I           +---+                       I
  041 dn16d   17  ---------+           I   I                       I
  136 dn18r   31  -----+-------+       I   I                       I
  137 dn18r   34  -----+       I       I   I                       I
  120 dn18r   30  -----+-----+ +-------+   I                       I
  100 dn18r   41  -----+     I I           I                       I
  138 dn18r   33  -+-+       I I           I                       I
5 127 dn18r   35  -+ +-+     +-+           +-----------------------+
  122 dn18r   36  ---+ +-+   I             I
  123 dn18r   39  -----+ I   I             I
  135 dn18r   29  -+-+   +---+             I
  121 dn18r   38  -+ +-+ I                 I
  125 dn18r   40  ---+ +-+                 I
  119 dn18r   37  -----+ I                 I
  134 dn18r   32  -------+                 I
  054 dn16d   24  -------------------------+
```

Figure 5.12 Dendrogram of the Cranston-Donaldson and Roark-Griffith sherds using complete linkage. Sherds that were not placed in the same cluster in both dendrogram solutions remain unassigned.

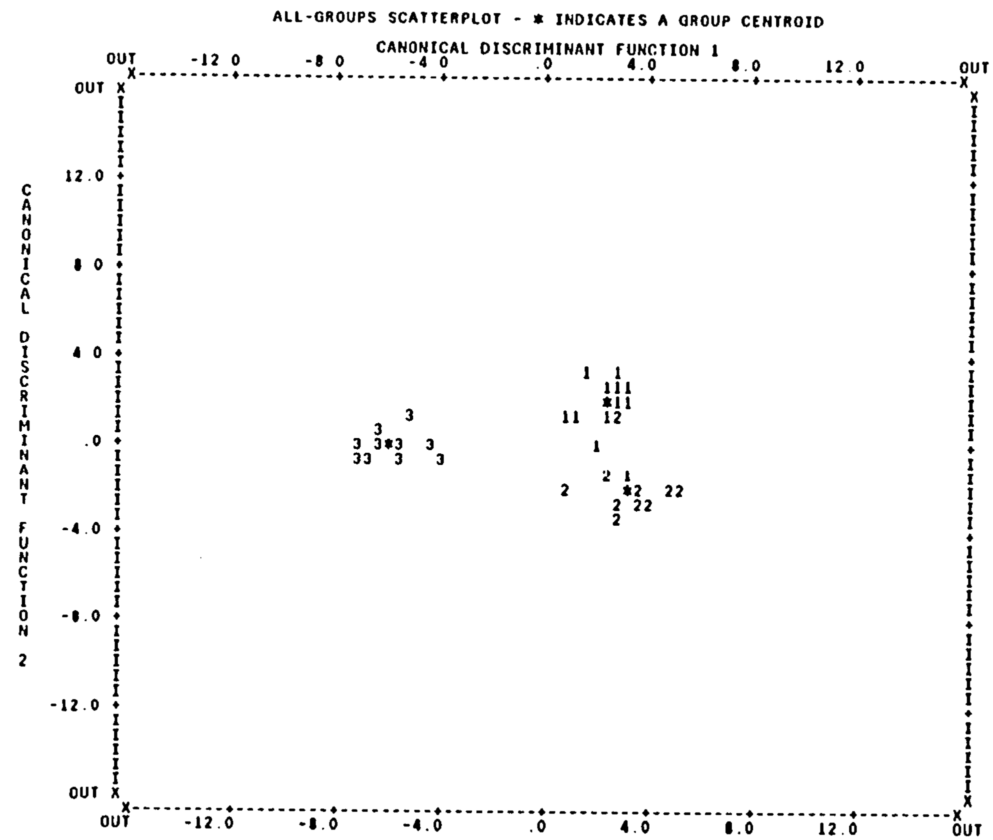


Figure 5.13 Scatterplot of discriminant function scores for the Cranston-Donaldson and Roark-Griffith sherds.

Table 5.8 Cluster Assignments of the CRANSTON, DONALDSON, and ROARK Sherds from Sample 5.

Cluster	Pottery Kiln	Sherd #s
1	DN16c	#42, 65, 74, 78 89, 95, 100, 101
2	DN16c	#47, 70, 93, 94
	DN16d	#84
3	DN16c	#77
	DN16d	#40, 49, 52, 59 #67, 72, 77, 80 #92, 98
4	DN16c	#91
	DN16d	#53
5	DN18r	#100, 119, 120, 121 #122, 123, 125, 127 #134, 135, 136, 137 #138
Not Assigned		
	DN16c	#82
	DN16d	#54

Table 5.9 Discriminant analysis results for the Cranston-Donaldson and Roark-Griffth sherds. Cranston DN16c (Group 1), Donaldson DN16d (Group 2), and Roark DN18r (Group 3).

CLASSIFICATION RESULTS -

ACTUAL GROUP	NO. OF CASES	PREDICTED GROUP MEMBERSHIP 1	2	3
GROUP 1	15	14 93.3%	1 6.7%	0 0.0%
GROUP 2	13	1 7.7%	12 92.3%	0 0.0%
GROUP 3	13	0 0.0%	0 0.0%	13 100.0%

PERCENT OF "GROUPED" CASES CORRECTLY CLASSIFIED: 95.12%

CANONICAL DISCRIMINANT FUNCTIONS

FUNCTION	EIGENVALUE	PERCENT OF VARIANCE	CUMULATIVE PERCENT	CANONICAL CORRELATION	AFTER FUNCTION	WILKS' LAMBDA	CHI-SQUARED	D.F.	SIGNIFICANCE
1*	17.72143	87.56	87.56	0.9729261	0	0.0151832	142.38	18	0.0000
2*	2.51803	12.44	100.00	0.8460200	1	0.2842502	42.769	8	0.0000

from the same pottery, the hypothesis that these sherds are characterized by the same elemental composition and are from the same population is rejected. Both the Wilks' Lambda and Chi-Square values reveal that a significant difference occurs in the relative frequency of different elements among these samples, as well as among these samples and the sample from the Roark-Griffith Pottery.

Cluster Analysis 7: Marked and Unmarked Cranston-Donaldson Sherds Only

A total of 74 sherds, including the 30 marked CRANSTON and DONALDSON sherds in Sample 5 and 44 unmarked sherds in Sample 6, were analyzed together to determine if particular macroscopic stylistic attributes could be identified with specific potters based on the elemental paste composition. The marked sherds provide a control sample for identifying the reliability of the cluster assignments. The stylistic attributes of the 74 sherds are summarized in Table 5.10.

A stylistic dichotomy is evident within the CRANSTON sample (Figure 5.14 and Figure 5.15), suggesting possible significant relations among stylistic attributes (e.g., use of cobalt blue decoration) and particular potters. These clustering results indicate that almost half of the CRANSTON sherds occur in Clusters 1 and 3 which exhibit the least similarity in paste composition with the DONALDSON and unmarked sherds (Table 5.11). All of the CRANSTON sherds have stamped makers' marks and/or makers' marks and gallon numbers. None have additional decorations such as cobalt blue motifs.

Table 5.10 Stylistic attributes of 74 marked and unmarked sherds from the Cranston-Donaldson Pottery (Samples 5 and 6).

	DN16c (Cranston)	DN16d (Donaldson)	Unmarked
Undecorated			#433, 434, 437, 438, 439, 442, 444
Stamped Makers' Mark Only	#42, 47, 71, 74 75, 76, 77, 82 91, 95, 96, 99, 100	#64, 66, 85, 98	
Stamped Makers' Mark & Gallon #	#65, 70, 78, 79 81, 89, 93, 94 101	#40, 41, 67, 72 73, 92	
Stamped Makers' Mark & Cobalt Blue Decoration		#54	
Stencilled Makers' Mark		#53, 54, 59	
Stamped Gallon # Only			#130, 131, 136, 143, 168, 169 191, 198, 213, 215
Incised Gallon # Only			#149, 179, 189, 190
Incised Script Only			#69, 86

Table 5.10 Stylistic attributes of 74 marked and unmarked sherds from the Cranston-Donaldson Pottery (Samples 5 and 6) (cont'd).

	DN16c (Cranston)	DN16d (Donaldson)	Unmarked
Cobalt Blue Gallon # Only			#357, 436
Cobalt Blue Decoration Only			#441
Cobalt Blue Decoration & Gallon #			#107, 115, 119, 121, 340
Cobalt Blue Decoration & Stamped Gallon #			#187
Rolled or Molded? Ribbed Decoration			#361, 393
Total	23 sherd	17 sherds	34 sherds

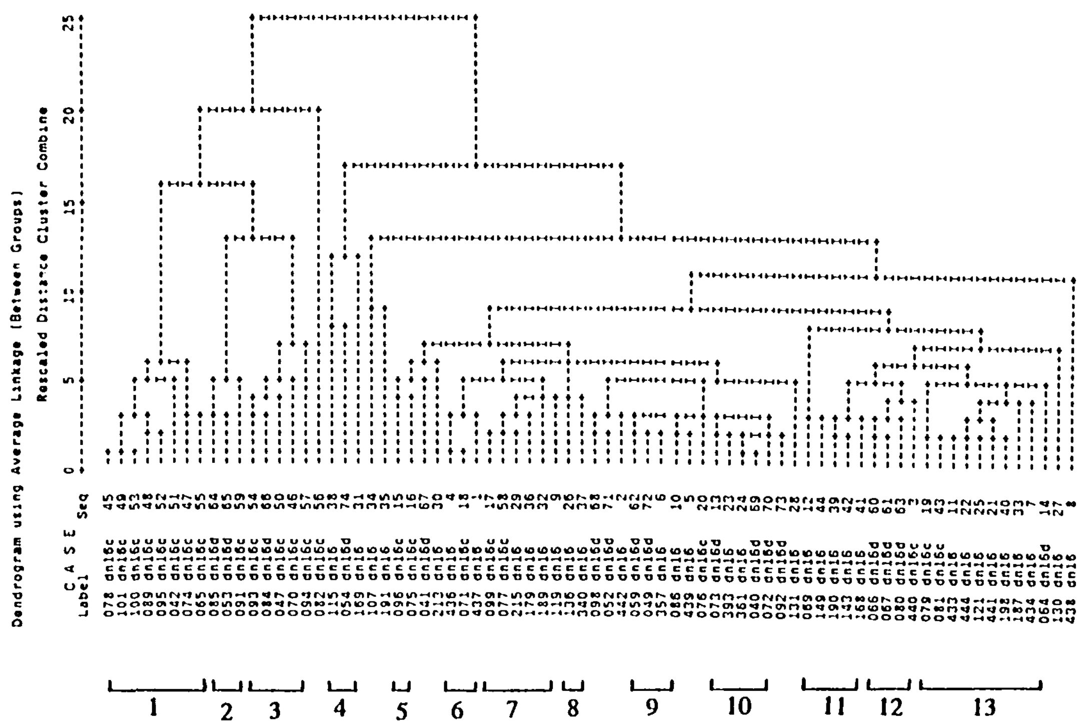


Figure 5.14 Dendrogram of the marked and unmarked Cranston-Donaldson sherds using average (between groups) linkage. Sherds that were not placed in the same cluster in both dendrogram solutions remain unassigned.

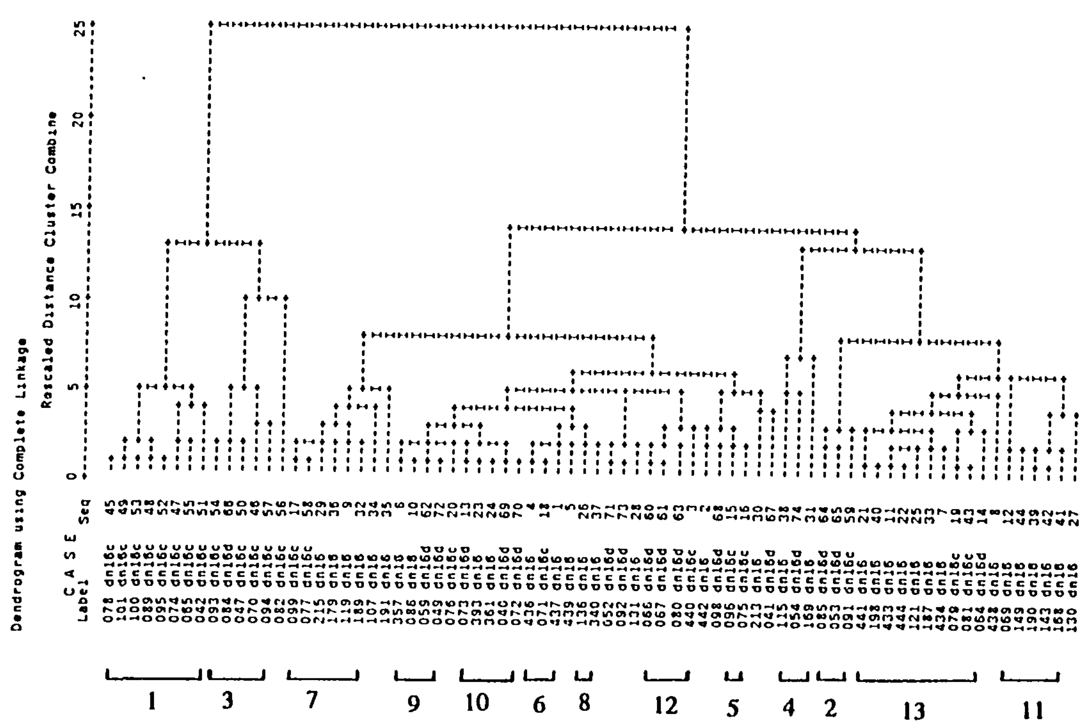


Figure 5.15 Dendrogram of the marked and unmarked Cranston-Donaldson sherds using complete linkage. Sherds that were not placed in the same cluster in both dendrogram solutions remain unassigned.

Table 5.11 Cluster Assignments of the CRANSTON, DONALDSON, and Unmarked Sherds from Sample 5.

Cluster	Cranston-Donaldson/Sherd #s	Unmarked Sherd #s
1	DN16c #42, 65, 74, 78, 89, 95, 100, 101	
2	DN16c #91 DN16d #53, 85	
3	DN16c #47, 70, 93, 94 DN16d #84	
4	DN16d #54	#115, 169
5	DN16c #75, 96	
6	DN16c #71	#436, 437
7	DN16c #77, 999	#119, 179, 189, 215
8		#136, 340
9	DN16d #49, 59	#86, 357
10	DN16d #40, 72, 73	#361, 393
11		#69, 143, 149, 190
12	DN16c #440 DN16d #66, 67, 80	
13	DN16c #79, 81 DN16d #64	#121, 187, 198, 433, #434, 444
Not Assigned	DN16c #76, 82 DN16d #52, 92, 98	#107, 130, 131, 191, #213, 438, 439, 442
Total	39 sherds	32 sherds

CRANSTON sherds with similar paste compositions to the DONALDSON sherds (Figure 5.14 and Figure 5.15) exhibit similar stylistic attributes. Unmarked sherds with stamped and/or incised gallon numbers are not associated with a specific potter, although some particular number stamps or incised number forms or shapes can be assigned to individual potters. Sherds with cobalt blue oxide decorations and/or gallon numbers cluster with both CRANSTON and DONALDSON sherds, but appear to be more frequently found in clusters with paste compositions most similar to the stamped DONALDSON sherds, noting the small sample size. All of the marked sherds with cobalt blue oxide are stamped DONALDSON or have cobalt blue stencils reading MOORE, MOORE & DONALDSON, or DONALDSON. Of the two sherds with incised script (#69 and 86), one occurs in Cluster 9 associated with DONALDSON and the other is not identified with a specific potter. Similarly, the two unmarked sherds with a rolled or ribbed decoration (#361 and 393) occur in Cluster 9 with sherds marked DONALDSON. Among the sherds with incised gallon numbers (#179, 189, 149, and 190), two occur in Cluster 7 with sherds marked CRANSTON, and the other two are not assigned to a particular potter; all occur in clusters exhibiting paste compositions to the marked DONALDSON sherds. None of the sherds with a stamped gallon number on the rim (#130, 131, 136, and 143) were assigned to either potter, but are most similar in paste composition with the DONALDSON sherds. Among the marked sherds with stamped gallon numbers on the rim, all are stamped DONALDSON.

Farmstead Samples

The compositional data for the farmstead assemblages reveals that acquisition patterns were variable among farm families. Some of this variability can be identified with temporal or spatial factors, while other sources of variability include cultural choices. Several early potteries are poorly represented in the farmstead assemblages, including the Cranston-Donaldson and Serren potteries. The Daugherty Pottery, on the other hand, is well represented among farmsteads occupied after 1880. Several farmsteads reveal evidence that the spatial distance to specific potteries may be reflected in the lower frequency of sherds from more distant kiln sites. Cultural preference, style, is also evident as reflected by the paucity of alkaline-glazed vessels, which were commonly produced in East Texas and other southern states during the second half of the nineteenth century. Several alkaline-glazed stonewares occur in the assemblage from the farmstead at 41DN466. Among farmsteads in northcentral Texas, these stonewares occur primarily only on farms occupied by families from the Deep South.

Cluster Analysis 8: 41DN77

Of the 35 vessels identified from 41DN77, 28 were determined to be potentially locally-made and were included in the clustering analyses. The omitted vessels included bristol-glazed jugs and churns, and a British ale bottle. Of the 28 local vessels from 41DN77, compositional analysis was conducted on one sherd from each and compared with similar data for 68 pottery-kiln sherds (total n=96 sherds). These 96 sherds were analyzed using ten elements--Na, Mg, Al, S, Cl, K, Ca, Ti, Fe, and Cu.

Twenty-seven of the sherds from 41DN77 occurred in comparable clusters in both the average linkage (Figure 5.16) and complete linkage (Figure 5.17) dendrograms, of which two sherds--#2 and #23 were outliers. Only one sherd (#29) from 41DN77 was unassigned, not occurring in comparable clusters in both dendrograms (Table 5.12). The compositional variation among the farmstead sherds from 41DN77 is relatively low based on the complete linkage results (Figure 5.17).

Of the sherds from 41DN77, sherd #10 was reliably assigned to the Wilson Pottery, sherds #3 and 7 were assigned to the Daugherty Pottery, sherds #20 and 25 were assigned to the Lambert Pottery, and sherds #29, 21, and 33 were assigned to the Donaldson Pottery on the Cannon survey (Table 5.12). Farmstead sherds #28, 32, and 35 cluster with sherds from the Roark-Griffith and Daugherty potteries, while farmstead sherds #6, 11, and 15 cluster with sherds from the Roark-Griffith and Wilson potteries; each of these clusters is dominated by sherds from the Roark-Griffith Pottery, suggesting this is the probable source of the farmstead vessels represented in these clusters.

Nine farmstead sherds--#1, 4, 8, 14, 18, 24, 26, 30, and 34--were not assigned to clusters containing sherds from one of the pottery-kiln sites (Table 5.12), but exhibit paste compositions well within the range defined for the Denton County potteries. Two farmstead sherds occur as outliers, #2 and #23, being the least similar to any of

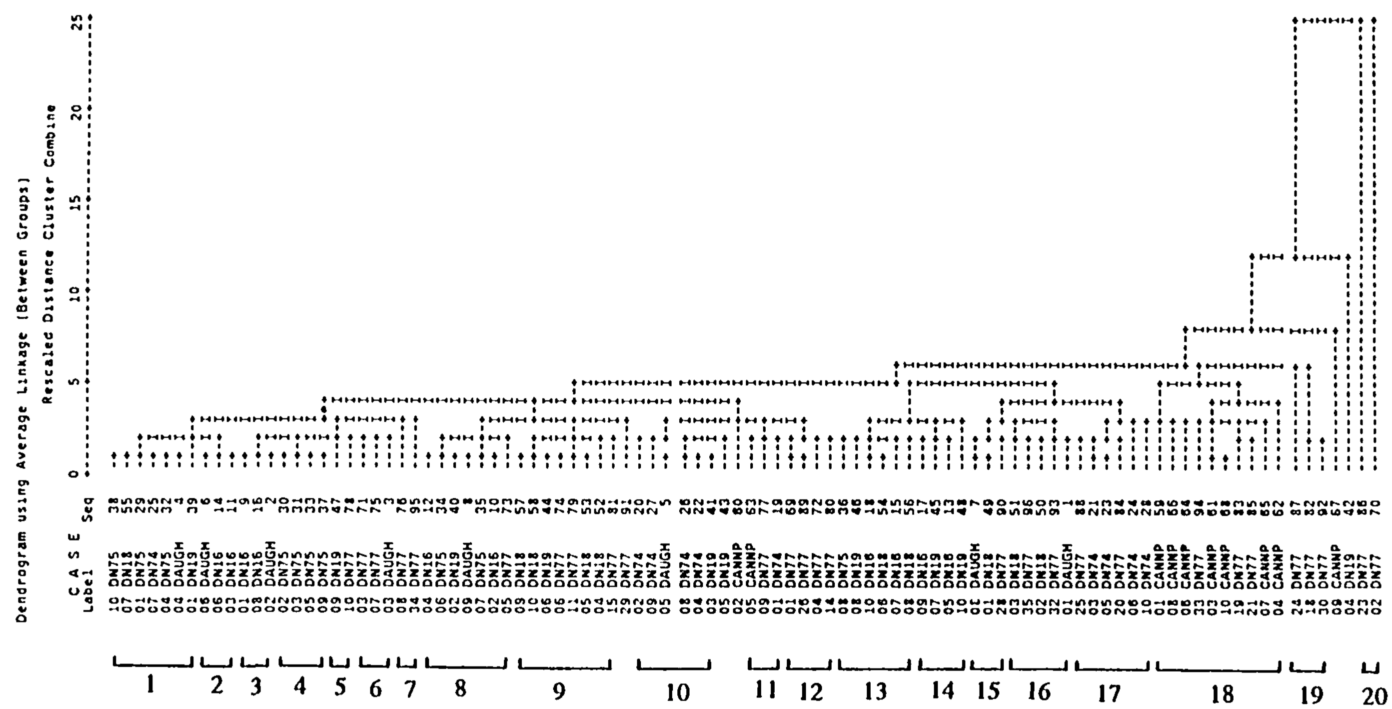


Figure 5.16 Dendrogram of the 41DN77 farmstead sherds and the pottery-kiln sherds using average (between groups) linkage. Sherds that were not placed in the same cluster in both dendrogram solutions remain unassigned.

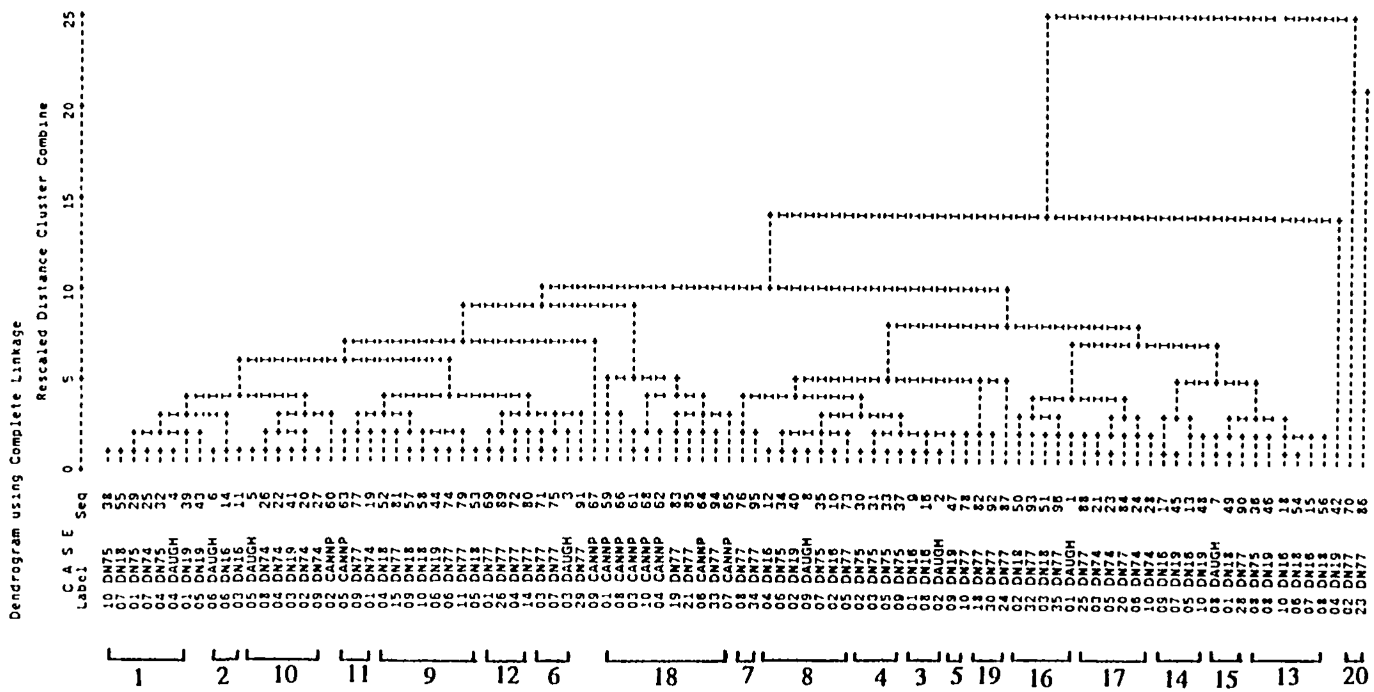


Figure 5.17 Dendrogram of the 41DN77 farmstead sherds and the pottery-kiln sherds using complete linkage. Sherds that were not placed in the same cluster in both dendrogram solutions remain unassigned.

Table 5.12 Identifiable Vessel Sherds from 41DN77.

Cluster	Kiln/Sherd #s	Farmstead/Sherd #s
1	DN18 #7 DN19 #1 DN74 #7 DN75 #4, 10 Daugherty #4	
2	DN16 #3, 6 Daugherty #6	
3	DN16 #1, 8 Daugherty #2	
4	DN75 #2, 3, 5, 9	
5	DN19 #9	DN77 #10
6	Daugherty #3	DN77 #3, 7
7		DN77 #8, 34
8	DN16 #2, 4 DN19 #2 DN75 #6, 7 Daugherty #9	DN77 #5
9	DN18 #4, 5, 9, 10 DN19 #6	DN77 #6, 11, 15
10	DN19 #3 DN74 #2, 4, 8, 9 Daugherty #5	
11	DN74 #1 Cannon #5	DN77 #9

Table 5.12 Identifiable Vessel Sherds from 41DN77 (cont'd).

Cluster	Kiln/Sherd #s	Farmstead/Sherd #s
12		DN77 #1, 4, 14, 26
13	DN16 #7, 10 DN18 #6, 8 DN19 #8 DN75 #8	
14	DN16 #5, 9 DN19 #7	
15	DN18 #1 Daugherty #8	DN77 #28
16	DN18 #2, 3 Daugherty #1	DN77 #32, 35
17	DN74 #3, 5, 6, 10	DN77 #20, 25
18	Cannon #1, 3, 4, 6 Cannon #7, 8, 10	DN77 #19, 21, 33
19		DN77 #18, 24, 30
20	(outliers)	DN77 #2, 23
Not Assigned	DN19 #4, 5 Cannon #2, 9	DN77 #29

the other farmstead sherds or the pottery-kiln sherds, indicating they may be foreign.

None of the sherds from 41DN77 were found to be associated with the two earliest and longest operating nineteenth-century Denton County potteries--the Cranston-Donaldson and Serren potteries. The identification of sherds at 41DN77 from the Lambert Pottery (41DN74) does not correlate with the initial occupation date assigned to this farmstead (see Chapter 4). As the Lambert Pottery only operated between 1859 and 1860, and the initial settlement at 41DN77 is assumed to be about 1870, either this latter date is incorrect or the family at this farmstead acquired stonewares from the Lambert Pottery while occupying an earlier farmstead elsewhere in the county, or stonewares from the Lambert Pottery were still available in area stores for a period after this pottery ceased operating. Only sherd #10 was assigned to the Wilson Pottery which operated between 1869 and 1879.

Stoneware vessels were also purchased from the Roark-Griffith and Daugherty potteries in Denton County between 1871 and when the farm was abandoned, while the recovery of foreign sherds (bristol glazed) reveals that the family at 41DN77 purchased stonewares that were shipped to Denton County from other areas in the twentieth century.

Cluster Analysis 9: 41DN79

A total of 78 sherds were included in the clustering analyses for 41DN79, of which ten are farmstead sherds and 68 are pottery-kiln sherds (n=78 sherds). Of the 16 vessels identified from this farmstead, six were excluded as foreign, including two

British ale bottles, one bristol jug, one alkaline-glazed vessel, and two tobacco pipes. The Sixty-nine sherds were included from the pottery-kiln sites. The 78 sherds were analyzed using ten elements--Na, Mg, Al, S, Cl, K, Ca, Ti, Fe, and Cu.

Eight of the ten sherds from 41DN79 occurred in comparable clusters in both the average linkage (Figure 5.18) and complete linkage (Figure 5.19) dendrograms. Only two sherds from 41DN79 were unassigned, not occurring in comparable clusters in both dendrograms (Table 5.13). Strong compositional differences are evident between clusters.

Of the sherds from 41DN79, sherds #8, 10, and 12 were reliably assigned to the Roark-Griffith/Daugherty potteries in Cluster #9 and sherd #5 was assigned to the Lambert/Cannon potteries (Cluster #5) (Table 5.13). Sherds #2, 7, and 14 (Cluster 2) were reliably assigned to a cluster containing sherds from each of the Denton County potteries. Farmstead 41DN79 sherd #2 is most closely associated with sherd #5 from the Wilson Pottery (41DN19), and farmstead 41DN79 sherd #14 is most associated with sherd #4 from the Daugherty Pottery (Table 5.13 and Figures 5.18 and 5.19). Farmstead sherd #7 could not be identified to a single pottery.

Two sherds from 41DN79 (sherds #11 and 13) were not reliably assigned in both clusters (Table 5.13). Sherd #9 from 41DN79 is an outlier and is most similar to sherd #4 from the Wilson pottery (41DN19). None of the sherds from 41DN79 were found to be associated with the two earliest and longest operating nineteenth-century Denton County potteries--the Cranston-Donaldson and Serren potteries.

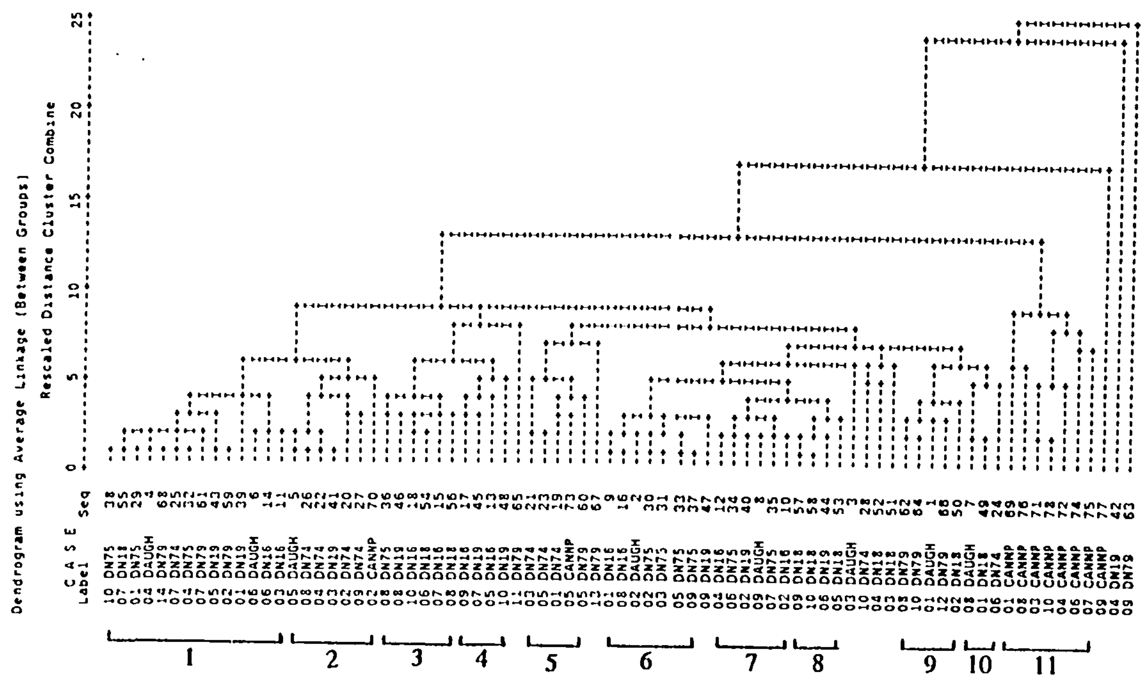


Figure 5.18 Dendrogram of the 41DN79 farmstead sherds and the pottery-kiln sherds using average (between groups) linkage. Sherds that were not placed in the same cluster in both dendrogram solutions remain unassigned.

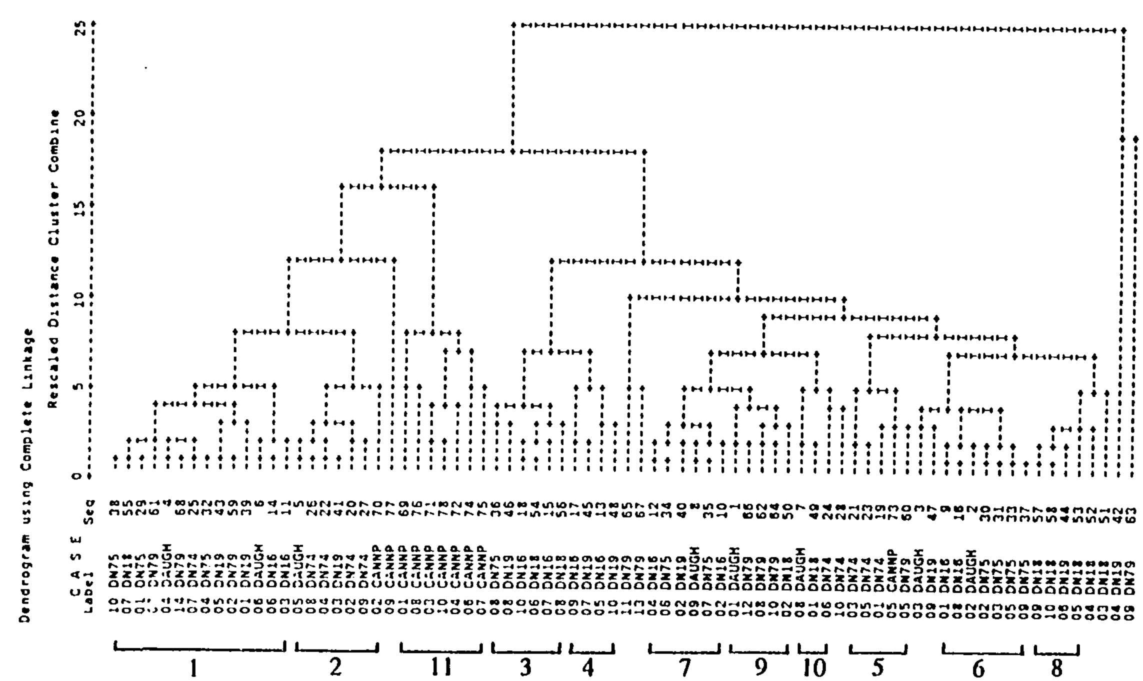


Figure 5.19 Dendrogram of the 41DN79 farmstead sherds and the pottery-kiln sherds using complete linkage. Sherds that were not placed in the same cluster in both dendrogram solutions remain unassigned.

Table 5.13 Identifiable Vessel Sherds from 41DN79.

Cluster	Kiln/Sherd #s	Farmstead/Sherd #s
1	DN16 #3, 6 DN18 #7 DN19 #1, 5 DN74 #7 DN75 #1, 4, 10 Daugherty #4, 6	DN79 #2, 7, 14
2	DN19 #41 DN74 #2, 4, 8, 9 Cannon #2 Daugherty #5	
3	DN16 #7, 10 DN18 #6, 8 DN19 #8 DN75 #8	
4	DN16 #5, 9 DN19 #7, 10	
5	DN74 #1, 3, 5 Cannon #5	DN79 #5
6	DN16 #1, 8 DN75 #2, 3, 5, 9 Daugherty #2	
7	DN16 #2, 4 DN19 #2 DN75 #6, 7 Daugherty #9	
8	DN18 #5, 9, 10 DN19 #6	
9	DN18 #2 Daugherty #1	DN79 #8, 10, 12

Table 5.13 Identifiable Vessel Sherds from 41DN79 (cont'd).

Cluster	Kiln/Sherd #s	Farmstead/Sherd #s
10	DN18 #1	
	DN74 #6	
	Daugherty #8	
11	Cannon #1, 3, 4, 6, 7	
	Cannon #8, 9	
12	(outlier)	
	DN19 #4	DN79 #9
Not Assigned		
	DN18 #3, 4	DN79 #11, 13
	DN19 #9	
	DN74 #10	
	Cannon #9	
	Daugherty #3	

The identification of sherds at 41DN79 from the Lambert (41DN74) indicates this farmstead was probably occupied in the late 1850s or early 1860s, corresponding with the ca. 1850-1870 occupation date for the early historic component at 41DN79. The sherds from the Wilson Pottery also date to this early component. The sherds identified to the Roark-Griffith (41DN18) and Daugherty potteries along with the bristol-glazed sherds correlate with the second historic occupation during the last quarter of the nineteenth century.

Cluster Analysis 10: 41DN289

A total of 88 sherds were included in the clustering analyses for 41DN289, of which 20 were from 41DN289 and 68 sherds were from the pottery-kiln sites. These 88 sherds were analyzed using ten elements--Na, Mg, Al, S, Cl, K, Ca, Ti, Fe, and Cu.

Sixteen of the sherds from 41DN289 occurred in comparable clusters in both the average linkage (Figure 5.20) and complete linkage (Figure 5.21) dendrograms (Table 5.14). These clustering results do not support the early occupation date (ca. 1850-1855) assigned to the farmstead at 41DN289. The only pottery operating in Denton County during this period was the Cranston-Donaldson Pottery and none of the farmstead sherds from 41DN289 were assigned to this pottery. Similarly, the Serren Pottery operated ca. 1856 to 1878, and none of the 41DN289 sherds were assigned to this pottery. Several 41DN289 farmstead sherds occur in clusters containing sherds from the Lambert Pottery (ca. 1859-1860), the Wilson Pottery (ca. 1869-1879), the

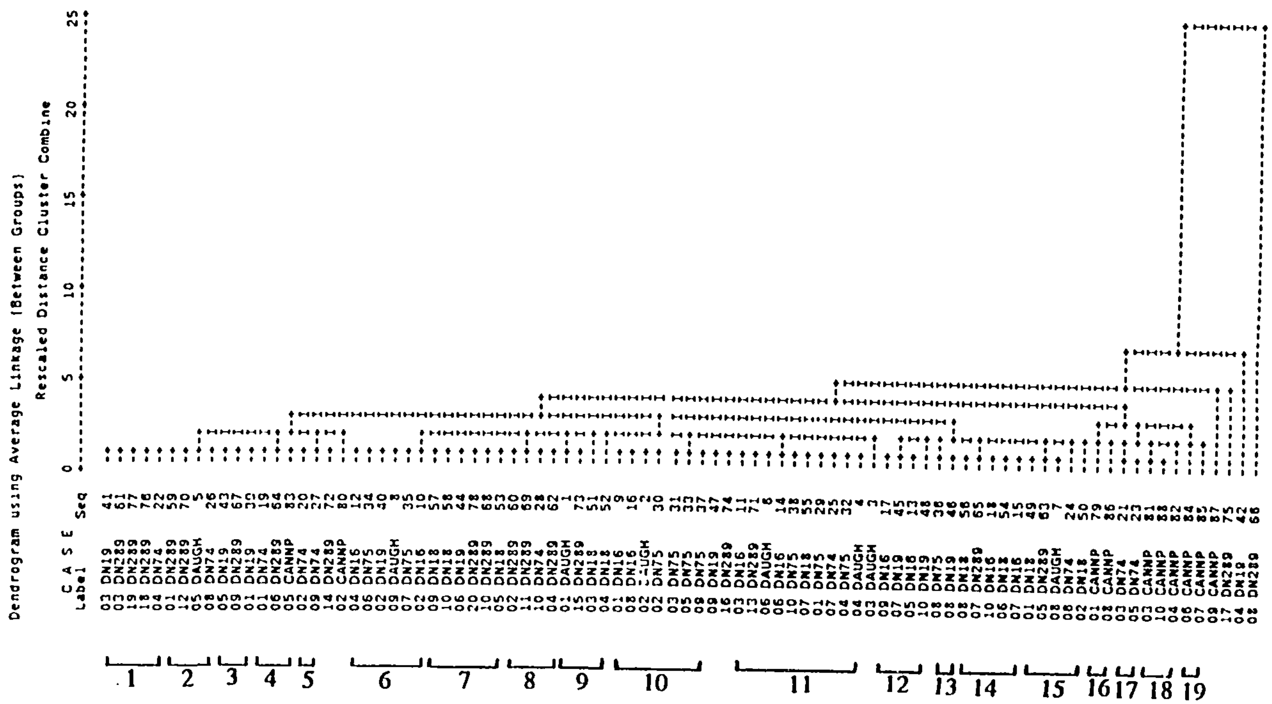


Figure 5.20 Dendrogram of the 41DN289 farmstead sherds and the pottery-kiln sherds using average (between groups) linkage. Sherds that were not placed in the same cluster in both dendrogram solutions remain unassigned.

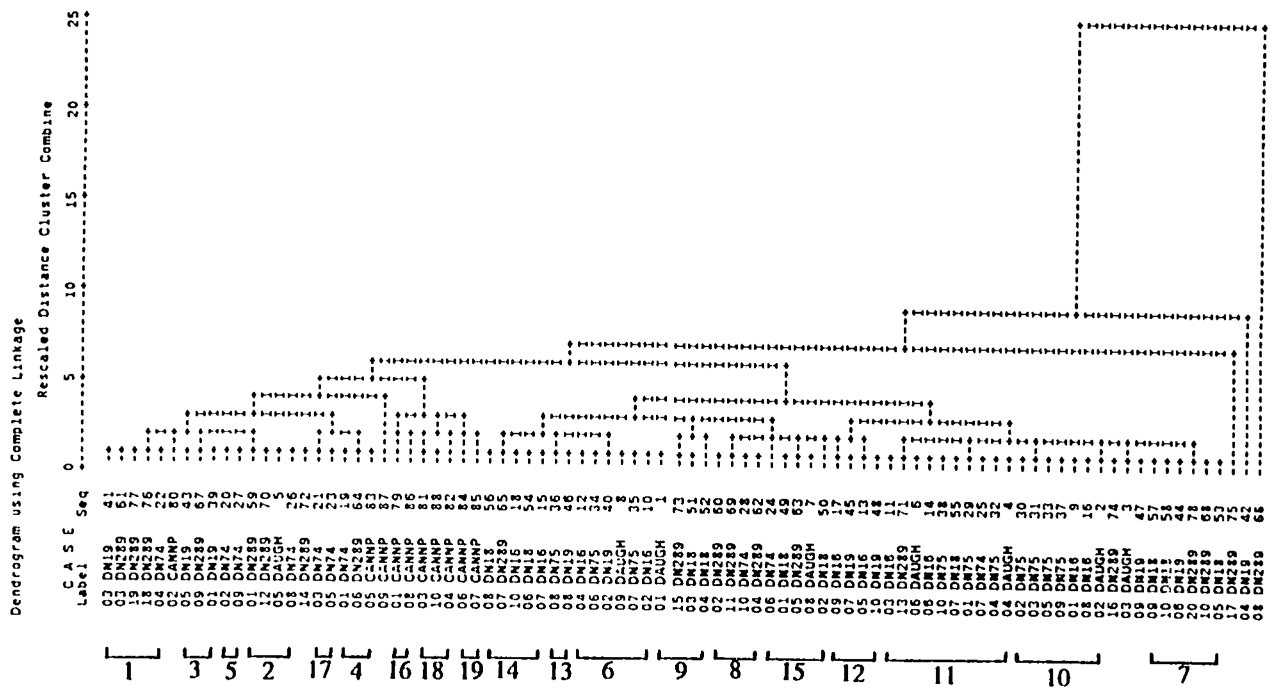


Figure 5.21 Dendrogram of the 41DN289 farmstead sherds and the pottery-kiln sherds using complete linkage. Sherds that were not placed in the same cluster in both dendrogram solutions remain unassigned.

Table 5.14 Identifiable Vessel Sherds from 41DN289.

Cluster	Kiln/Sherd #s	Farmstead/Sherd #s
1	DN19 #3 DN74 #4	DN289 #3, 18, 19
2	DN74 #8 Daugherty #5	DN289 #1, 12
3	DN19 #1, 5	DN289 #9
4	DN74 #1 Cannon #5	DN289 #6
5	DN74 #2, 9	
6	DN16 #2, 4 DN19 #2 DN75 #6, 7 Daugherty #9	
7	DN18 #5, 9, 10 DN19 #6	DN289 #10, 20
8	DN74 #10	DN289 #2, 4, 11
9	DN18 #3, 4 Daugherty #1	DN289 #15
10	DN16 #1, 8 DN75 #2, 3, 5, 9 Daugherty #2	
11	DN16 #3, 6 DN18 #7 DN74 #7 DN75 #4, 10 Daugherty #4, 6	DN289 #13

Table 5.14 Identifiable Vessel Sherds from 41DN289 (cont'd).

Cluster	Kiln/Sherd #s	Farmstead/Sherd #s
12	DN16 #5, 9 DN19 #7, 10	
13	DN19 #8 DN75 #8	
14	DN16 #7, 10 DN18 #6, 8	DN289 #7
15	DN18 #1, 2 DN74 #6 Daugherty #8	DN289 #5
16	Cannon #1, 8	
17	DN74 #3, 5	
18	Cannon #3, 4, 10	
19	Cannon #6, 7	
Not Assigned	DN19 #4, 9 Cannon #2, 9 Daugherty #30	DN289 #8, 16, 17

Roark-Griffith (ca. 1871-ca. 1920), and the Daugherty Pottery (ca. 1884-1930s), indicating this farm was occupied or re-occupied during the 1860-1880s period.

Three sherds, including one sherd from the Wilson Pottery (sherd #4) and two from 41DN289 (sherds #8 and 17) occurred as outliers (Figure 5.20 and Figure 5.21). Based on the distance (about 24 on a scale from 0 to 25) between the two outermost outliers suggests that 41DN289 sherd #8 may be foreign.

Cluster Analysis 11: 41DN410

A total of 82 sherds were included in the analyses, including 14 sherds from 41DN410 and 68 sherds from the six pottery-kiln sites (Cranston/Donaldson, Daugherty, Donaldson, Lambert, Serren, and Wilson). These sherds were analyzed using ten elements--Na, Mg, Al, S, Cl, K, Ca, Ti, Fe, and Cu.

Ten of the 14 sherds from 41DN410 occurred in comparable clusters in both the average linkage (Figure 5.22) and complete linkage (Figure 5.23) dendrograms, with strong compositional differences occurring between clusters. Of these ten sherds, four sherds--#7, 12, 13, and 14--in clusters #6 and 19 are more similar to each other than to any of the pottery-kiln sites (Table 5.15). The elemental compositions of these sherds fall well within the compositional range of the sherds from the Denton County potteries, indicating they were locally made but cannot be reliably assigned to a specific pottery-kiln site.

Of the sherds from 41DN410, sherds #2, 5, and 8 were reliably assigned to the Lambert Pottery (Clusters #7 and 8) and sherd #6 was identified to the Cannon

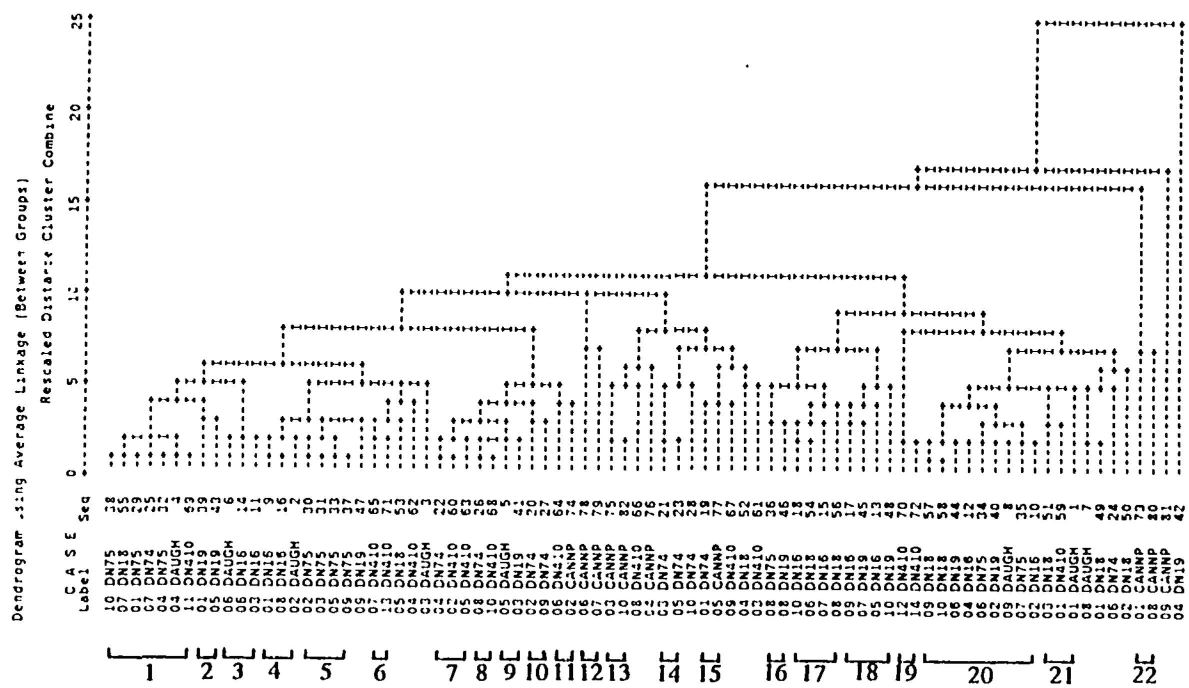


Figure 5.22 Dendrogram of the 41DN410 farmstead sherds and the pottery-kiln sherds using average (between groups) linkage. Sherds that were not placed in the same cluster in both dendrogram solutions remain unassigned.

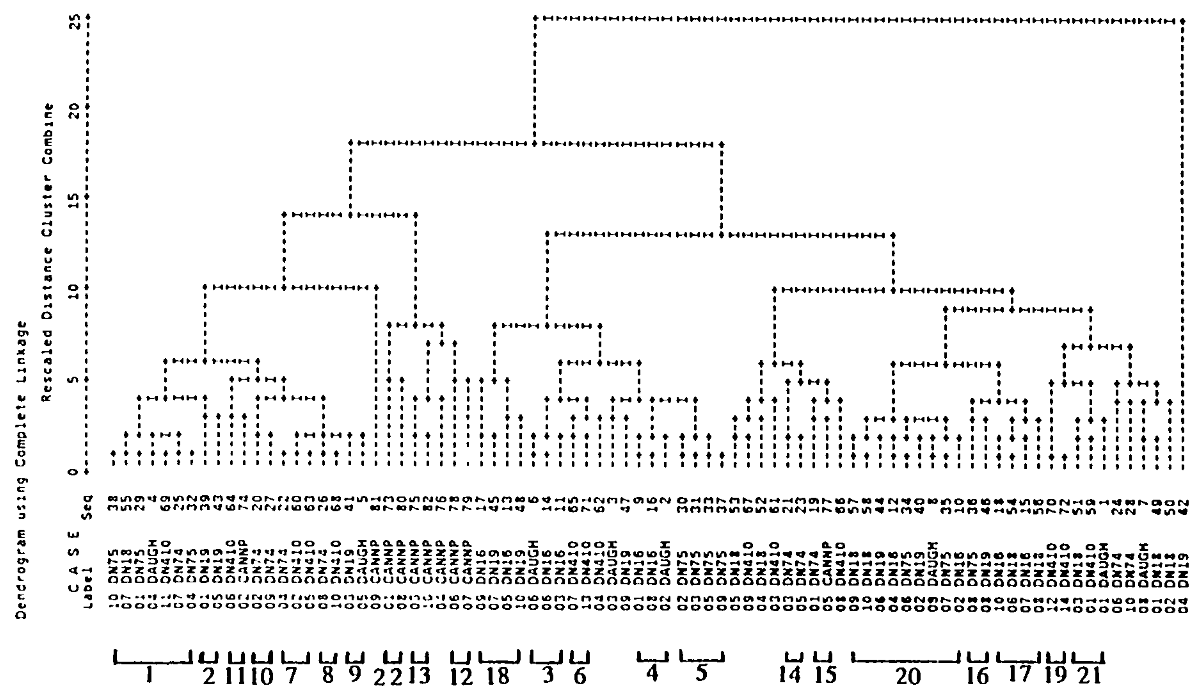


Figure 5.23 Dendrogram of the 41DN410 farmstead sherds and the pottery-kiln sherds using complete linkage. Sherds that were not placed in the same cluster in both dendrogram solutions remain unassigned.

Table 5.15 Identifiable Vessel Sherds from 41DN410.

Cluster	Kiln/Sherd #s	Farmstead/Sherd #s
1	DN18 #7 DN74 #7 DN75 #1, 10 Daugherty #4	DN410 #11
2	DN19 #1, 5	
3	DN16 #3, 6 Daugherty #6	
4	DN16 #1, 8 Daugherty #2	
5	DN75 #2, 3, 5, 9	
6		DN410 #7, 13
7	DN74 #4	DN410 #2, 5
8	DN74 #8	DN410 #10
9	DN19 #3 Daugherty #5	
10	DN74 #2, 9	
11	Cannon #2	DN410 #6
12	Cannon #6, 7	
13	Cannon #3, 10	
14	DN74 #3, 5	
15	DN74 #1 Cannon #5	

Table 5.15 Identifiable Vessel Sherds from 41DN410 (cont'd).

Cluster	Kiln/Sherd #s	Farmstead/Sherd #s
16	DN19 #8	
	DN75 #8	
17	DN16 #7, 10	
	DN18 #6, 8	
18	DN16 #5, 9	
	DN19 #7, 10	
19		DN410 #12, 14
20	DN16 #4	
	DN18 #9, 10	
	DN19 #2, 6	
	DN75 #6, 7	
	Daugherty #9	
21	Daugherty #1	DN410 #1
22	Cannon #1, 8	
Not Assigned		
	DN18 #1, 2, 4, 5	DN410 #3, 4, 8, 9
	DN19 #4, 9	
	DN74 #6, 10	
	Cannon #4, 9	
	Daugherty #3,8	

Pottery (Cluster #11). Sherds #1 and 11 were assigned to closely related potteries in Clusters #1 and 21.

The identification of sherds at 41DN410 from the Lambert (41DN74) indicates this farmstead was probably occupied in the early 1860s, which is earlier than the 1867-1910 date assigned to 41DN410, or stonewares from the Lambert Pottery were still available from merchants or after the pottery ceased operating. The Lambert Pottery was the closest pottery to the farmstead at 41DN410, with the Serren and Wilson potteries being the next nearest pottery-kiln sites. The Cannon Pottery, at which sherd #6 is assigned, is located less than a mile southwest of these three potteries. No sherds were identified to the Cranston-Donaldson (41DN16) although this pottery continued to operate until about 1882. Sherds #1 and 11 from 41DN410 (Clusters #1 and 21) indicate that several vessels may have been purchased from the Roark-Griffith (41DN18), Serren (41DN75), or Daugherty potteries, but a reliable identification could not be made to these potteries.

Cluster Analysis 12: 41DN466

A total of 119 sherds were included in the clustering analyses for 41DN466--51 farmstead sherds and 68 pottery-kiln sherds. These sherds were analyzed using ten elements--Na, Mg, Al, S, Cl, K, Ca, Ti, Fe, and Cu.

All but one sherd (#3) from 41DN410 occurred in comparable clusters in both the average linkage (Figure 5.24) and complete linkage (Figure 5.25), with 19 farmstead sherds being reliably assigned to specific potteries (Table 5.16). Of these 19 sherds,

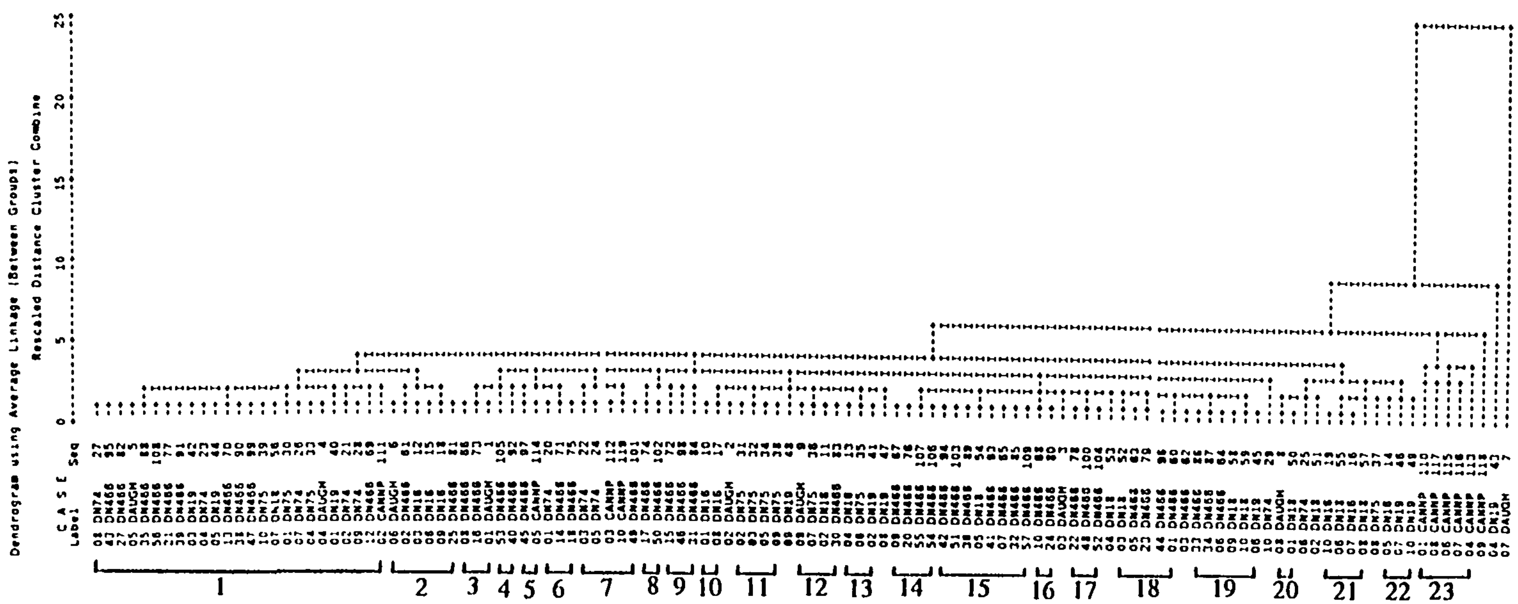


Figure 5.24 Dendrogram of the 41DN466 farmstead sherds and the pottery-kiln sherds using average (between groups) linkage. Sherds that were not placed in the same cluster in both dendrogram solutions remain unassigned.

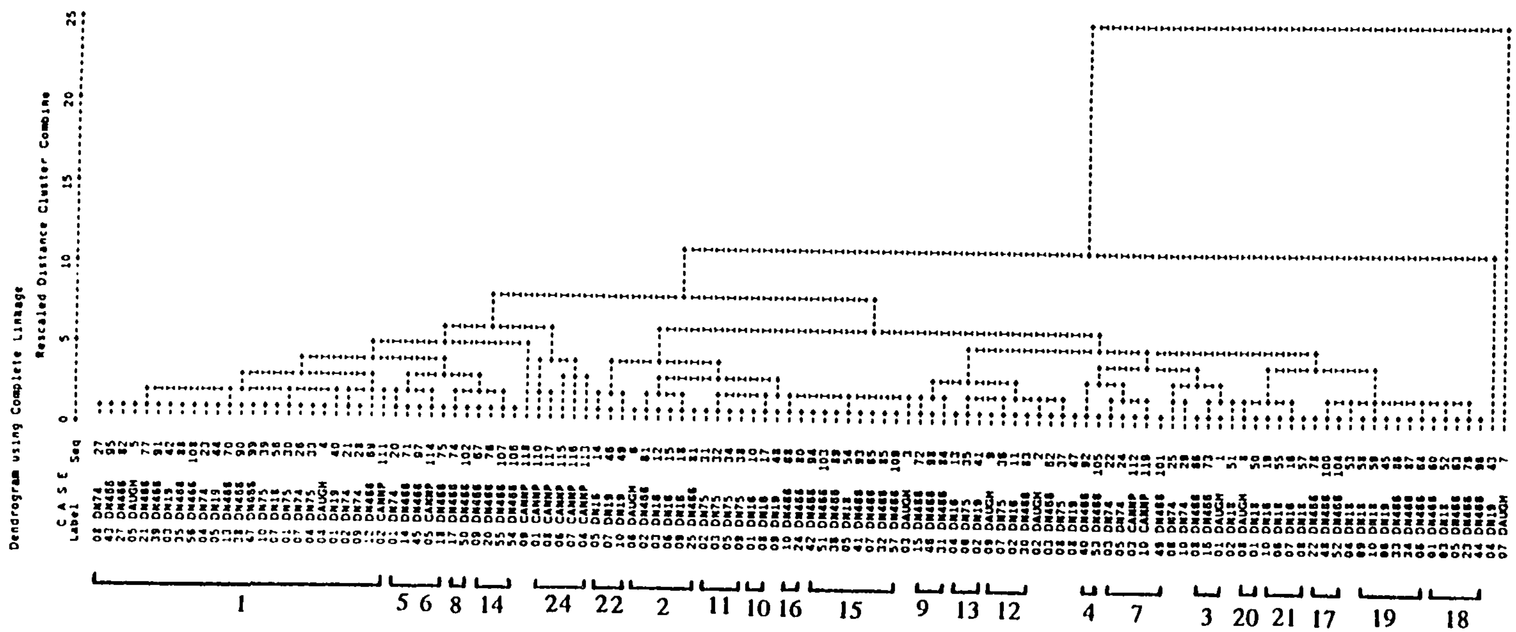


Figure 5.25 Dendrogram of the 41DN466 farmstead sherds and the pottery-kiln sherds using complete linkage. Sherds that were not placed in the same cluster in both dendrogram solutions remain unassigned.

Table 5.16 Identifiable Vessel Sherds from 41DN466.

Cluster	Kiln/Sherd #s	Farmstead/Sherd #s
1	DN18 #7 DN19 #1, 3, 5 DN74 #2, 4, 7, 8, 9 DN75 #1, 4, 10 Cannon #2 Daugherty #4, 5	DN466 #12, 13, 21, #27, 35, 38, 39, #43, 47, 56
2	DN16 #3, 6, 9 Daugherty #6	DN466 #2, 25
3	Daugherty #1	DN466 #8, 16
4		DN466 #40, 53
5	Cannon #5	DN466 #45
6	DN74 #1	DN466 #14, 18
7	DN74 #3, 5 Cannon #3, 10	
8		DN466 #17, 50
9		DN466 #15, 31, 46
10	DN16 #1, 8	
11	DN75 #2, 3, 5, 9	
12	DN16 #2 DN75 #7 Daugherty #9	DN466 #30
13	DN16 #4 DN19 #2 DN75 #6	

Table 5.16 Identifiable Vessel Sherds from 41DN466 (cont'd).

Cluster	Kiln/Sherd #s	Farmstead/Sherd #s
14		DN466 #9, 20, 54, 55
15	DN18 #5	DN466 #7, 32, 36, #41, 42, 51, 57
16		DN466 #10, 24
17	DN18 #4	DN466 #22, 48, 52
18	DN18 #3	DN466 #1, 5, 23, 44
19	DN18 #9, 10 DN19 #6	DN466 #6, 33, 34
20	DN18 #1 Daugherty #8	
21	DN16 #7, 10 DN18 #6, 8	
22	DN16 #5 DN19 #7, 10	
23	Cannon #1, 4, 6, 7, 8	
24	Outliers DN19 #4 Daugherty #7	
Not Assigned	DN18 #2 DN19 #4, 8 DN74 #6, 10 Cannon #9 Daugherty #2, 3	DN466 #3

two were assigned to the Daugherty Pottery (#8 and 16), one to the Donaldson (Cannon) Pottery (#45), two to the Lambert Pottery (#14 and 18), and 14 to the Roark-Griffith Pottery (#1, 5, 7, 10, 22, 23, 32, 36, 41, 42, 44, 48, 51, and 57).

The earliest vessels acquired by the family at 41DN466 were from the Lambert Pottery (ca. 1859-1860). None of the farmstead sherds were assigned to the Cranston-Donaldson (ca. 1854-1882), Serren (ca. 1856-1878), or Wilson (ca. 1869-1879) potteries. During the 1870s, vessels were acquired from the Donaldson Pottery and Roark-Griffith Pottery.

A small number of farmstead sherds were assigned to clusters containing sherds from several potteries, while five clusters--#4, 8, 9, 14, and 16--contain only farmstead sherds (Table 5.16). The sherds in these five clusters are more similar to each other than to any of the pottery-kiln sites. Their elemental compositions fall well within the range identified for the sherds from the Denton County potteries, indicating they were locally made but cannot be reliably assigned to a specific pottery-kiln site. None of the farmstead sherds occurred as outliers.

Overwhelmingly, most of the farmstead sherds were assigned to the Roark-Griffith Pottery, which was the closest pottery to 41DN466 between 1871 and 1884. After 1884, the Daugherty Pottery began operating and located several miles closer to 41DN466. Few vessels in the assemblage from 41DN466 were assigned to the Daugherty Pottery, suggesting that the family at 41DN466 continued to purchase stonewares from the Roark-Griffith Pottery although a closer source was available and/or that few vessels acquired from the Daugherty Pottery became broken and were deposited in the archaeological record at this site. No twentieth-century bristol-glazed stonewares and only one European stoneware was recovered from 41DN466 (see Chapter 6).

Summary

Rice's asserted relations between paste composition and production mode are not supported by my analyses of stonewares from seven pottery-kiln sites and five farmsteads in Denton County. Rice assumes (1981:219-220) that ceramic attribute variability is universally and directly correlated with specialization, such that specialization can be identified by measuring changes in the relative attribute variability of the finished ceramics. While this assumption remains a pivotal part of her model (Rice 1989, 1991), Rice acknowledges that "Models relating product standardization to the organization of production have not been widely or adequately tested, either with ethnographic or archaeological data..." (Rice 1989:117).

Rice (1981) defines the change from nonspecialized to specialized production as involving a reduction in resource access and ceramic attribute variation, with the first evidence of this change being evident in paste composition. The paste composition of ceramics produced by nonspecialized potters working at the household level are assumed to be highly variable among potters and pottery-kiln sites, whereas less variable paste compositions are expected for ceramics produced by specialists (Rice

1981). To test this assumption, the compositional relations among paste (clay and temper) sources and the finished pottery-kiln ceramic pastes must be measurable.

This reduction in paste composition is attributed to several changes in production behavior, including restricting resource access to specific individuals, competition, and production for specialized markets (e.g., elite vs. utilitarian) (Rice 1981). Among nonspecialized potters, paste composition is determined by the individual potter at the household level, not excluding the variability and suitability of clay and tempering resources. The paste composition of ceramics produced by specialized potters, however, is determined by changing social parameters that affect access to resource materials, such as clays and tempers, and production technology. While nonspecialized potters are assumed to produce pots of variable paste composition for limited distribution, specialized potters are assumed to produce ceramics for large markets using cost-effective, routinized, or standardized production methods aimed at turning out highly standardized vessels exhibiting little compositional variation (Rice 1981). In this framework, variation in the paste composition among vessels produced by potters working in a specialized pottery-kiln site is attributed to differences in potting skills, the production of several kinds of vessels intended for different markets (e.g., utilitarian vs. elite vessels), or temporal changes in potting technology and the definition of what is an "ideal" pot (Rice 1981).

The paste composition data for the seven Denton County pottery-kiln sites and the five farmsteads fail to support Rice's asserted relations between paste composition and specialized ceramic production. While the historical record indicates that stoneware production during the nineteenth and early twentieth centuries in Denton County was specialized--i.e., being carried out by a small number of "skilled" individuals working in a specialized location and producing wares for use by multiple households--considerable paste variation occurs within and among the assemblages from the seven pottery-kiln sites. These data contradict Rice's assumption that among specialized potteries paste composition would largely be standardized at the scale of pottery-kiln site.

Although the analysis of the clay specimens revealed that the clays from six major outcrop groups could be distinguished from each other, no compositional associations were found among the clay specimens and the sherds from any of the pottery-kiln sites. These results indicate that all of the clay specimens, with the possible exception of the clays from the Cannon survey, fall within the compositional range defined for the Denton County pottery-kiln sherds. However, the compositional data for these clay specimens can not be used to identify the distribution of production loci within the county nor to characterize the paste compositions of the sherds produced at any of the pottery-kiln sites either at the scale of production locus, at the scale of potter, or the scale of attribute classes such as vessel form.

These clay compositional results also do not provide any data on spatial or temporal changes in stoneware production in Denton County. No evidence was found to support Rice's assertion that specialization would occur in tandem or as a result of a reduction in resource access. The number of clay outcrops utilized by Denton County stoneware potters increased rather than decreased during the late nineteenth and early twentieth centuries (see Chapter 4). This increase in the number of utilized outcrops reflects, in part, an increase in the number of potters and/or changes in their spatial distribution within the county as the location of major population centers changed. Some clay pits that were abandoned by potters when they ceased their pottery operations were acquired by other potters (e.g., Cranston and Lambert clay pits), while other clay pits were not (e.g., Cranston pits on Britton survey). Some potters obtained clays from previously known, but unused, outcrops (e.g., Daugherty and Roark-Griffith). Several contemporaneous potters utilized clays from the same outcrop (e.g., Wilson and Serren), with one or more of these potters also utilizing clays from other sources. Many potters obtained clays near their pottery, while several hauled clays from over five miles away instead of utilizing more closely available clays (e.g., Daugherty).

The paste compositional data from the Denton County pottery-kiln sites also fail to support Rice's assertion that the first evidence of specialization will be a reduction in paste variability, with the vessel assemblages from each pottery being characterized by highly standardized pastes. The paste data from the marked sherds at the Cranston-Donaldson Pottery provide excellent evidence that a reduction in paste variability is not directly correlated with specialization. A single, highly standardized paste composition was not identified for this pottery. Instead, two major paste clusters were revealed, with one cluster corresponding with sherds marked CRANSTON and the second cluster correlating with sherds marked DONALDSON.

Considerable variability occurred within each of these clusters, particularly among the sherds marked CRANSTON.

Standardized paste compositions were not identified for the Daugherty, Wilson, or Donaldson (Cannon survey) potteries. The sherds from the Wilson and Daugherty potteries exhibited highly variable paste compositions, with no paste clusters being identified for these potteries. Similarly, the Donaldson Pottery sherds exhibit high within-pottery paste composition variation and are largely distinguishable from sherds from the other potteries.

Rice's posited relation between competition and paste variability also are not supported by the Denton County pottery and farmstead assemblages. Competition among these potteries is indicated both by the number of contemporaneous kiln sites and the acquisition of vessels from multiple potteries by individual farm families. Rice assumes a direct correlation between competition and paste variability, with standardized pastes characterizing potteries largely unaffected by competition (Rice 1981:223, Table 1). In contrast, she asserts that specialized ceramics characterized by highly variable paste composition reflect production competition (Rice 1981:223; Table 1).

Rice further asserts that the change from variable to standardized paste composition will occur at different rates for utilitarian and elite ceramics and will be the result of different socioeconomic factors, with utilitarian ceramic production being governed by principles of cost-efficiency and mass-production. Among utilitarian ceramics, paste composition will become standardized more quickly than for elite wares and will possibly occur as some "... household cannot or chooses not to make pottery," and some "individuals or families who by chance or design live closer to clay sources or are better potters find themselves making more and more pottery" (Rice 1981:222). The ceramics produced by these individuals may reflect a "greater exploitation of particular kinds of clays or tempers that work satisfactorily and/or to which potters have use rights" (Rice 1981:223). In contrast, the paste composition of elite ceramics may be either variable or standardized depending, in part, on competition, which would fuel innovation and elaboration and may include the use of rare or exotic materials (Rice 1981:223, Table 1).

The historical data available on the Denton County stoneware potteries (see Chapter 4) do not support Rice's behavioral assertions about why some individuals became potters and others did not. These historical data also indicate that while specific potters owned particular clay outcrops, these outcrops were shared, and all potters had access to one or more available outcrops and any imported foreign raw materials (e.g., glazing materials). No evidence was found at either the Denton County pottery-kiln sites or the farmstead sites that elite stoneware ceramics were produced in Denton County, although competition occurred among potteries as indicated by historical advertisements and the distribution of stonewares across rural households. In addition, many of the potteries produced stonewares for over 10 to 15 years or more (e.g., Cranston-Donaldson, Roark-Griffith, Daugherty, Wilson, and Serren) and no evidence was found that paste composition changed at these kiln-sites as a result of competition. The same clay pits were used by the potters at the Roark-Griffith, Wilson, and Serren potteries during their entire span of operations. The clays utilized by the Daugherty's changed in response to "new" clay exposures being found that were more closely located to their pottery. Among the potters at the Cranston-Donaldson Pottery, differences in paste composition reflect John Cranston's use of three or four clay outcrops (e.g., Dickson, Britton, Cannon, McGlothlin surveys), while Donaldson appears to have used clays primarily from only one or two outcrops (e.g., Dickson, Cannon, and/or Beall (Lambert) surveys). Both of these potters, however, produced similar vessels intended for the same consumer markets. The identification of some CRANSTON sherds with paste compositions that cluster with sherds marked DONALDSON suggests that for a given period, both potters utilized the same clays.

In summary, the elemental microanalysis of the paste composition of sherds from the Denton County stoneware pottery-kiln and farmstead assemblages does not support Rice's asserted relations between paste composition variability and specialized production. These results, however, indicate that elemental microanalysis of paste composition can be used to reliably identify paste composition standardization and/or variability within and among potteries.

Although the paste data for the marked sherds from the Cranston-Donaldson Pottery indicate that some of the paste variability evident in this assemblage may be related to specific potters, some variability may reflect temporal changes as well, e.g., overlap among some CRANSTON sherds and the DONALDSON sample. However, it is unknown at present if these overlapping sherds were all produced contemporaneously, or whether the greatest compositional variation among the CRANSTON and DONALDSON sherds correlate with early or late vessels made at the Cranston-Donaldson Pottery.

Temporal changes in paste variability are not evident among the other pottery-kiln sites. If such changes occurred, larger samples will be necessary. Among the sample from the Roark-Griffith Pottery, paste compositional variation is evident, but distinct nonoverlapping clusters do not occur. The lack of identifiable paste cluster(s) for the Daugherty Pottery probably reflects the acquisition of clays from several sources rather than identifiable temporal change.

Temporal change may also be evident in the paste compositional data from the farmstead sites. By comparing the results of the complete linkage clustering analysis for each farmstead, it is apparent that the relative distance (ranging from 0 to 25) among clusters is significantly variable among the farmsteads. At 41DN77, 41DN289, and 41DN466 all of the sherds, excluding extreme outliers, are combined into a single cluster between 8 and 10 on the distance scale, while at 41DN79 and 41DN410, a single cluster is formed at about 18 on this scale. These results indicate that the stoneware assemblages from 41DN79 and 41DN410 exhibit greater elemental paste variability than the assemblages from 41DN77, 41DN289, and 41DN466.

Several factors may account for this variability, including length of occupation, the distance between each farmstead and the nearest pottery-kiln sites and/or store selling stonewares, the stoneware acquisition and breakage patterns of different families, and paste variation within and among pottery-kiln sites. However, none of these factors are sufficient to explain the paste variation evident among the farmstead assemblages.

Only two potteries were operating in Denton County when 41DN79 and 41DN289 were initially occupied, including the Cranston-Donaldson and Serren potteries in the Alton area. During the occupation of 41DN79 and 41DN410, each of the seven potteries (Cranston-Donaldson, Daugherty, Donaldson (Cannon), Lambert, Roark-Griffith, Serren, and Wilson) were potential sources for stoneware vessels. Only the Cranston-Donaldson, Serren, and possibly the Lambert potteries produced stonewares while 41DN289 was occupied based on the occupation dates assigned by Cliff and Moir (1986). However, it is more probable given the paste compositional data, that this farmstead was occupied into the 1870s, with all but the Daugherty Pottery being possible production sources of stoneware vessels. Six of the potteries operated during the periods when 41DN77 and 44DN466 were occupied, with the Lambert Pottery having ceased operations before these sites were settled.

The five potteries at Alton, including the Cranston-Donaldson, Donaldson, Lambert, Serren, and Wilson potteries were the closest source of stonewares for each of the farmsteads when they were initially occupied. For the family at 41DN289, the nearest pottery was the Lambert Pottery. At 41DN410, the Lambert Pottery was the nearest until the Roark-Griffith Pottery began production about 1871. At 41DN77, 41DN79, and 41DN466, the closest source changed from the Alton community to Denton with the opening of the Daugherty Pottery about 1884.

In summary, both the pottery-kiln and farmstead data fail to support Rice's asserted relations between paste composition, artifact variation, and specialization. While the historical data indicate that stoneware production was specialized, paste variation is not standardized at either the kiln sites or the farmsteads. Further, paste variation among the farmstead may be associated with a number of factors, including initial occupation date, length of occupation, distance to nearest pottery-kiln site, transportation, and acquisition and breakage patterns.

CHAPTER 6

ATTRIBUTE ANALYSIS OF NORTHCENTRAL TEXAS STONEWARES

Introduction

Rice's model for ceramic specialization posits that an examination of ceramic assemblage variability alone should reveal if ceramic production was specialized. According to Rice, this variability can be determined using attributes from four major ceramic classes: resources, manufacturing technology, vessel form, and decoration/style. Specific relations are assumed between each of these classes and production strategies, i.e., specialized and nonspecialized, with the selection of resources and manufacturing technology being the most important.

Rice further asserts that low variability among resource attributes, such as clay, temper, or glaze, are interpretable in terms of restricted access to resources and standardization of production activities (Rice 1981, 1989, 1991). Similarly, a level of technological development involving the use of wheels or molds and low variability among manufacturing attributes, e.g., firing methods, can be correlated with specific degrees of standardization, mass production, or specialization. Form and decoration/style, according to Rice, are more difficult to correlate with specialization because they may be more sensitive to factors not directly associated with production strategies. In this context, variability in the range of vessel forms is less reliable for identifying specialization than attribute variability within form classes such as rim shape, rim diameter, base shape, and handles and feet. The weakest correlation occurs among decorative or stylistic attributes, with decorative methods, e.g., painting and incising, yielding the more direct information on the production process (Rice 1989).

In discussing appropriate variables, Rice states that interpretations about ceramic specialization are strengthened by emphasizing a combination of these classes, as not all variability among or within these classes will directly relate to production specialization (Rice 1989, 1991). By examining variability within and among several classes, it becomes possible to distinguish between variability correlating with production specialization and variability reflecting factors such as resource access patterns (Rice 1991).

In an attempt to test Rice's assertions of a correlation between ceramic assemblage variability and production specialization, In this chapter I examine those categories posited by Rice as relevant for identifying ceramic production specialization in Denton County. My analysis focuses on examining stoneware variability at both production and nonproduction sites, using at least one attribute selected from each of the four attribute classes- specified by Rice-resources, manufacturing technology, form, and decoration/style (Rice 1981, 1987, 1989). Primary attention is directed toward quantifying ceramic variability from data from two potteries, the Cranston-Donaldson and the Roark-Griffith, that together span the entire period of stoneware production in Denton County, 1854-1920.

Where relevant, this discussion includes supporting ceramic variability data from other potteries in the county. Secondary attention is given to ceramic variability among five Denton County farmsteads.

Since the concept of standardization, as opposed to diversity, is most often used to examine ceramic assemblage variability (Rice 1991), and because my use of diversity indices could in some instances be affected by low sample sizes (Leonard and Jones 1989), I use standardization to measure ceramic variability. Specifically, I use histograms, contingency tables, and descriptive statistics, including mean, standard deviation, skewness, kurtosis, and variance as a means of measuring standardization (cf. Rice 1981, 1991). Finally, I discuss the implications of these data on Rice's correlative assumptions between production specialization and ceramic assemblage variability.

Ceramic Attribute Analysis

Sampling

In sampling the archaeological assemblages, an attempt was made to extract a representative subset of each assemblage so that the variability of the sample reflects the variability of the site assemblage. Two types of samples were required for ceramic variability analyses of the Denton County pottery-kiln and farmstead stoneware assemblages--large samples to quantify manufacturing, functional, and decorative/stylistic attributes for each site assemblage; and smaller subsamples from each assemblage for elemental analysis of the pastes from representative ceramics.

Representative surface and excavated waster sherd samples were obtained for my two primary pottery-kiln sites, Cranston-Donaldson and Roark-Griffith, while only small surface samples were recovered from four additional potteries (Table 6.1). A total of 1,658 vessel sherds were analyzed from the Cranston-Donaldson Pottery and 2,628

Table 6.1 Pottery-Kiln Sherd Assemblages.[1]

Pottery-Kiln Site	UNT	UTSA	UNT-L	Total
Cranston-Donaldson	1,658	183	---	1,841
Roark-Griffith	25	32	2,628	2,685
Daugherty	--	--	60	60
Donaldson	--	--	12	12
Lambert	17	82	--	99
Serren	99	--	--	99
Wilson	48	35	--	83
Totals	1,847	332	2,700	4,879

[1] As the University of North Texas (UNT) and University of Texas at San Antonio (UTSA) collections were made by the same individuals, the same collecting bias can be assumed for these samples. No provenience data remains for the sherds from the Cranston-Donaldson Pottery; all sherds are provenienced to site. Only sherds from units #3 and #7 are included in the sample for the Roark-Griffith Pottery.

vessel sherds from the Roark-Griffith Pottery. The Cranston-Donaldson sherds are from the University of North Texas collection and are unprovenienced. The Roark-Griffith sherds are from excavation units #3 and #7 in the waster pile. These sherds were collected from test excavations conducted by the writer (Lebo, Green, and Crass 1988). Tobacco pipes, lids, and whimsical items from these potteries are not included in this study as some of the examples of these items were removed from the Cranston-Donaldson Pottery assemblage and are in private hands, and therefore are inaccessible to this researcher.

Stoneware sherd assemblages recovered from the five farmstead sites are summarized in Table 6.2. With the exception of 41DN77, these stonewares represent all of the stoneware sherds recovered during excavations at each site. Poorly provenienced stonewares from an earlier testing phase at 41DN77 conducted by a private company, Environment Consultants, Inc. in 1981-1982 (Skinner et al. 1985), were excluded. Among the stonewares collected from these five farmsteads were a small number of sherds from European ale and mineral water bottles, and American tobacco smoking pipes and children's marbles. These classes were excluded from this research as they were produced elsewhere in the United States or Europe and therefore do not directly relate to stoneware production in Denton County.

The sherds from the large pottery and farmstead samples were identified and quantified for attributes using the four ceramic classes specified by Rice. These data were then utilized to select a subsample of ten sherds from each pottery-kiln site assemblage, representing ten mutually exclusive vessels, for elemental microanalysis.

Among the farmstead assemblages, these attributes were used to group sherds into vessels, after which one sherd was selected from each vessel for elemental microanalysis (see Chapter 5). Each of the attribute dimensions of the four ceramic classes is described below.

Classification

Using Rice's classes, I selected observational units that would, if production was specialized, be sensitive to empirical variation and would allow me to measure standardization within and among ceramic assemblages. In my analysis, I attempted to utilize those variables used by Rice (1981, 1989) in applying her model to Mayan ceramics at the Barton Ramie site in Belize that were suitable for examining Denton County stonewares. These variables include (1) glaze type, (2) manufacturing methods, (3) vessel form and measurements, and (4) decoration methods and styles. Glazes, like other raw materials such as paste and temper, are assumed to become standardized under ceramic specialization, resulting from a reduction in access to resources (Rice 1981). Rice utilized glazes (or slips) as her major attribute for examining changes in production specialization based on frequency changes of technological, functional, and stylistic attributes within and between glaze (slip) classes (Rice 1981, 1989). According to Rice (1981, 1987b, 1989), production methods can be inferred by recovering and examining manufacturing tools and molds, and vessel forms (types), although a correlation may not always occur between vessel form and specialized production. Some vessel forms, however, may provide direct

Table 6.2 Farmstead Sherd Assemblages.[1]

Site	Sherd Total	Vessel Total	Selected Sherds	Selected Vessels	Excluded Sherds
41DN77	121	35	121	35	0
41DN79	55	14	49	11	6
41DN289	58	20	56	20	2
41DN410	28	14	28	14	0
41DN466	230	57	222	56	8
Totals	492	140	476	236	16

[1] Includes all sherds recovered from these farmsteads except the surface sherds collected Environment Consultants, Inc. from 41DN77 (see Lebo 1991a). Excluded sherds include European stonewares, marbles, tobacco pipes, sewer pipe sherds, and all unidentifiable sherds (i.e., too fragmentary or missing vessel surfaces). A single piece of kiln furniture was found at 41DN466 and is not included in the totals.

information about production organization, e.g., utilitarian vs. elite vessels, and standardized vs. nonstandardized vessel shapes and dimensions. Also an examination of decorative methods and styles should reveal a correlation between vessel forms (e.g., utilitarian vessels) and decorative attributes (Rice 1981, 1987, 1989).

Several of Rice's variables were not useful, including temper, paste color, glaze color, and texture. Temper was not examined because the clays available in Denton County were suitable for stoneware production without the use of temper. Also I found paste color, glaze color, and texture to be highly variable within individual vessels, since they were affected by a number of factors including firing temperature and time, and glaze and vessel thickness, among others.

Glaze Type

My study of the glazes utilized at the Denton County potteries did not indicate a correlation among glazes, pastes, and specialized production, since the same pastes were used across glaze classes, and glaze classes were used across potteries (see Chapter 4). My glaze analysis, however, proved useful for isolating those pottery sherds recovered at farmsteads that could not have been made locally, including those with Bristol, Alkaline, and European glazes (see Table 6.2). Glaze alone, however, proved inadequate for identifying production origin for salt and natural clay-slipped sherds, because sherds with these glazes were produced elsewhere in Texas during this same period. Furthermore, the glazes were useful in identifying correlations between glaze classes and other ceramic attributes, e.g., decorations and vessel forms, that provided information about ceramic assemblage variability.

Of the pottery sherd samples obtained from pottery-kiln sites in Denton County (see Table 6.1), the majority were found to be glazed with a natural clay slip on the interior and salt glaze on the exterior (NC/S), followed by vessels with natural clay slipped interiors and exteriors (NC/NC). Sometimes both a salt glaze and a natural clay slip were used together on the exterior of the vessel (NC/S+NC). When this occurred, the natural clay slip covered the interior and exterior body, while the salt glaze was applied to the rim exterior. This glaze combination occurred on the exterior of milkpans (crock or bowl form). No unglazed sherds were found at the Cranston-Donaldson or Roark-Griffith potteries.

My examination of interior and exterior glazes with vessel form and decorative/stylistic attributes at the Cranston-Donaldson and Roark-Griffith potteries indicates several significant patterns relating to production choices and production skill. The frequency of sherds in classes defined by interior and exterior glazes for the Cranston-Donaldson Pottery is shown in Table 6.3. Similar data are provided for the Roark-Griffith Pottery in Table 6.4. All vessels were glazed on the interior with natural clay slips (NC), although salt-glazed exteriors (S) dominated at both potteries (note: the higher frequency of unidentifiable (unid) glazes at the Roark-Griffith Pottery correlates with small sherd size. The sherds from the Cranston-Donaldson Pottery were often larger than those from the Roark-Griffith Pottery).

Table 6.3 Crosstabulation of Interior Glaze (IGLAZE) and Exterior Glaze (EGLAZE) for all Stoneware Sherds from the Cranston-Donaldson Pottery.

IGLAZE by EGLAZE

IGLAZE	EGLAZE: Count / Row Pct / Col Pct / Tot Pct	UNID 0	NAT CLAY 1	SALT 2	TWO-TONE 4	Row Total
UNID 0	Count	2		2		4
	Row Pct	50.0		50.0		.2
	Col Pct	7.7		.2		
	Tot Pct	.1		.1		
NAT CLAY 1	Count	24	478	1076	76	1654
	Row Pct	1.5	28.9	65.1	4.6	99.8
	Col Pct	92.3	100.0	99.8	100.0	
	Tot Pct	1.4	28.8	64.9	4.6	
Column Total		26	478	1078	76	1658
		1.6	28.8	65.0	4.6	100.0

Chi-Square	Value	DF	Significance
Pearson	61.45549	3	.00000
Likelihood Ratio	12.94857	3	.00475
Mantel-Haenszel	4.95096	1	.02608

Minimum Expected Frequency - .063
Cells with Expected Frequency < 5 - 4 OF 8 (50.0%)

Number of Missing Observations: 0

Table 6.4 Crosstabulation of Interior Glaze (IGLAZE) and Exterior Glaze (EGLAZE) for all Stoneware Sherds from the Roark-Griffith Pottery.

IGLAZE

Value Label	Value	Frequency	Percent	Valid Percent	Cum Percent
UNID	0	935	35.6	35.6	35.6
NAT CLAY	1	1693	64.4	64.4	100.0
	Total	2628	100.0	100.0	

EGLAZE

Value Label	Value	Frequency	Percent	Valid Percent	Cum Percent
UNID	0	1015	38.6	38.6	38.6
NAT CLAY	1	137	5.2	5.2	43.8
SALT	2	1474	56.1	56.1	99.9
TWO-TONE	4	2	.1	.1	100.0
	Total	2628	100.0	100.0	

IGLAZE by EGLAZE

IGLAZE	Count / Row Pct / Col Pct / Tot Pct	EGLAZE NAT CLAY 1	SALT 2	TWO-TONE 4	Row Total
NAT CLAY	1	137	1460	2	1599
		8.6	91.3	.1	100.0
		100.0	100.0	100.0	
		8.6	91.3	.1	
	Column Total	137	1460	2	1599
		8.6	91.3	.1	100.0

The relations among exterior glazes and vessel forms for these potteries are stylistic, whereas interior glazes are functional across vessel classes. On the one hand, the NC/S vessel sherds predominate at the Roark-Griffith Pottery although this pottery primarily operated during the period when NC/NC styles (1875-1900) and bristol glazed interior and exterior (Br/Br) styles (1890-mid-twentieth century) were popular both regionally and nationally. This preference for NC/S glazed vessels at this pottery may reflect the fact that both master potters at the Roark-Griffith Pottery trained at the Cranston-Donaldson Pottery during the 1850-1870 period when exterior salt-glazed vessels were most popular. Conservatism in exterior glaze preferences is suggested for the Roark-Griffith potters who adhered to old styles. Vessels with natural clay slipped exteriors only accounted for 8.6% of the assemblage from the Roark-Griffith Pottery, which began operation in 1871, while they represented almost 29% of the vessels from the Cranston-Donaldson Pottery assemblage (28.9%). Similar evidence of conservatism is evident in the absence of Bristol-glazed vessels at the Roark-Griffith Pottery, although this glaze was in use elsewhere 10 to 30 years before this pottery ceased operations.

Interior glaze choices in Denton County, on the other hand, tended to be functional. The Cranston-Donaldson and Roark-Griffith potters (see Table 6.3 and Table 6.4), along with other nineteenth-century potters in Denton County, glazed the interior of their vessels with natural clay slips. These glazes were selected because clay slips were less permeable than salt glazes, often adhered better, and were more resistant to acidic or alkaline compounds, providing selective advantages over salt glazing, particularly on the interior "working" surface. Poorly, sometimes underfired, salt-glazed vessels, often exhibiting a slightly "toasted" appearance, were identified in the stoneware assemblage from the Cranston-Donaldson Pottery but not at the Roark-Griffith Pottery. This "toasted" appearance may have resulted from introducing salt too early into the kiln or from using clays with a very high alumina content which did not salt glaze well; local clays have a high alumina content. Also found at the Cranston-Donaldson Pottery were a number of sherds, which appeared to be primarily from jugs, with poorly glazed clay-slipped interiors. These vessels give the appearance that only a small amount of clay slip glaze was poured into the top of the vessel and no care was taken to cover the entire surface. In contrast, greater care is evident among open vessel forms, i.e., crocks, churns, and milkpans. Warped sherds and sherds with burned exterior glazes were found at all early potteries, indicating difficulty in controlling firing conditions. Some poorly fired or glazed vessels were sold, occurring in farmstead assemblages.

The stylistic nature of exterior glazes makes them valuable for examining standardization as well as temporal change (Greer 1981; Lebo 1987, 1988). Standardization of exterior glaze classes varies within and between the Cranston-Donaldson (Table 6.5) and the Roark-Griffith (Table 6.6) potteries although exterior glazes are significantly associated with specific vessel forms at both potteries. The frequency of sherds in classes defined by exterior glaze and vessel form indicate that specific vessel forms predominantly are characterized by a single exterior glaze class.

Table 6.5 Crosstabulation of Vessel Form (VFORM) and Exterior Glaze (EGLAZE) for all identifiable Stoneware Sherds from the Cranston-Donaldson Pottery.

VFORM by EGLAZE

VFORM	Count / Row Pct / Col Pct / Tot Pct	NAT CLAY 1	SALT 2	TWO-TONE 4	Row Total
MILKCROCK	1	10 11.4 5.0 1.7	3 3.4 .9 .5	75 85.2 100.0 12.6	88 14.8
MILKPAN	2		33 100.0 10.3 5.5		33 5.5
JAR/CHURN	3	47 18.7 23.6 7.9	204 81.3 63.6 34.3		251 42.2
JAR/CROCK	4	19 27.5 9.5 3.2	50 72.5 15.6 8.4		69 11.6
JUG	6	123 79.9 61.8 20.7	31 20.1 9.7 5.2		154 25.9
	Column Total	199 33.4	321 53.9	75 12.6	595 100.0

Chi-Square	Value	DF	Significance
Pearson	698.59898	8	.00000
Likelihood Ratio	577.05658	8	.00000
Mantel-Haenszel	296.46547	1	.00000

Minimum Expected Frequency - 4.160
Cells with Expected Frequency < 5 - 1 OF 15 (6.7%)

Table 6.6 Crosstabulation of Vessel Form (VFORM) and Exterior Glaze (EGLAZE) for all Identifiable Stoneware Sherds from the Roark-Griffith Pottery.

VFORM by EGLAZE

VFORM	EGLAZE / Count / Row Pct / Col Pct / Tot Pct	INAT CLAY 1	SALT 2	TWO-TONE 4	Row Total
MILKCROCK	1			2 100.0 100.0 .9	2 .9
MILKPAN	2	.	41 100.0 20.6 18.4		41 18.4
JAR/CHURN	3	2 3.2 9.1 .9	61 96.8 30.7 27.4		63 28.3
JAR/CROCK	4	6 9.8 27.3 2.7	55 90.2 27.6 24.7		61 27.4
JUG	6	11 20.8 50.0 4.9	42 79.2 21.1 18.8		53 23.8
PRESERVE JAR	7	3 100.0 13.6 1.3			3 1.3
	Column Total	22 9.9	199 89.2	2 .9	223 100.0

Chi-Square	Value	DF	Significance
Pearson	265.17559	10	.00000
Likelihood Ratio	54.99712	10	.00000
Mantel-Haenszel	31.34993	1	.00000

Minimum Expected Frequency - .018
Cells with Expected Frequency < 5 - 11 OF 18 (61.1%)

Exterior glaze standardization ranges from a high of 100% among milkpans at both potteries to a low of 72.5% among jars/crocks at the Cranston-Donaldson pottery.

Overall, the standardization of exterior glazes with vessel form is greater at the Roark-Griffith Pottery. With the exception of jugs, over 90% of sherds in each vessel form class are characterized by the same exterior glaze. However, because of small sample sizes, the reliability of the association between exterior glaze classes and vessel form cannot be reliably determined for milkcrocks and preserve jars at the Roark-Griffith Pottery. In contrast, exterior glaze standardization for specific vessel form classes is lower at the Cranston-Donaldson Pottery where sufficient sample sizes occurred for all vessel classes. Only milkpans are characterized at a 90% level or greater by a single exterior glaze class.

The greater variability in exterior glaze frequencies among vessel classes at the Cranston-Donaldson Pottery cannot be adequately explained by some of the factors suggested by Rice--skill, restriction in access to resources, an operational definition of an "ideal type," level of production specialization, consumer population, or temporal change. John Cranston and Thomas Donaldson were master potters, and Cranston's wealth allowed him greater access to resources (see Appendices A and C) than many potters in the county. The range of glazes is the same at both potteries, as was the consumer population. And as mentioned above, if the variability in exterior glaze frequencies among these vessel form classes could be explained entirely by temporal change, all vessel types that continued to be made into the twentieth century (excluding milkpans) should predominantly exhibit salt-glazed exteriors at the

Cranston-Donaldson Pottery and natural clay-slipped exteriors at the Roark-Griffith. Although this pattern is evident at the scale of pottery-kiln assemblage, it is not evident for specific vessel form assemblages. These results suggest that either representative samples were not obtained for all vessel form classes or that exterior glaze choices changed at different rates among vessel form classes. This latter interpretation is supported by the analysis of other vessel attributes such as rim shape, vessel shape, and decoration (see discussion later in this chapter).

Manufacturing Methods

I found that with few exceptions, the potters in Denton County produced their stonewares using a potter's wheel (see Chapter 4). The only exceptions found were a small number of unglazed flower pot sherds and salt-glazed sewer pipes, which were produced at the Daugherty Pottery (1884-1930s) using molds. Hand-formed techniques were used in producing handles and some types of kiln furniture (Greer 1981; Lebo, Green, Crass 1988; Myers 1970).

Because the stoneware sherds recovered from the Denton County potteries were glazed, these waster sherds represent vessels that broke during firing, removal from the kiln, or while they were being prepared for shipment. No unglazed or unfired vessels were found. Both small sherds and almost complete vessels found at the Cranston-Donaldson and Roark-Griffith potteries have underfired or unevenly fired paste and glazes. An examination of the sherds selected for elemental analysis from these potteries and the farmstead sites indicates that many completed vessels purchased by farm families were also underfired, unevenly fired, or in some instances, had burned exterior surfaces. These data illustrate the difficulty Denton County potters faced in controlling firing temperatures.

By examining base sherds, I was able to identify the method(s) used by potters in Denton County for removing completed vessels from the potter's wheel. Three major stylistic base forms occur: (1) a straight ribbed pattern, (2) a plain cut-smooth pattern, and (3) a circular ribbed pattern. A straight ribbed pattern was produced by using a twisted wire pulled evenly across the wheel to cut the base free from the potter's wheel. A circular ribbed pattern was produced by a crossed-twisted wire pulled under the vessel in a loop. A smooth base occurred from using a single plain wire rather than a twisted one. Greer (1981:67-68) reports that this "is the most common cut, although it appears about the same as one of the other forms which has been smoothed with a damp sponge after cutting."

Smooth bases predominate in the stoneware sherd assemblages from the Cranston-Donaldson (Table 6.7) and Roark-Griffith (Table 6.8) potteries, although all three base types occur. These data indicate that the method for removing vessels from the potter's wheel was not standardized at either pottery. Further, whereas the straight ribbed pattern is second most frequent at the Cranston-Donaldson Pottery and the circular ribbed pattern is rare, the opposite is true for the Roark-Griffith assemblage.

When the frequency of sherds in classes defined by base type and vessel exterior glaze are determined, a significant difference is recorded for the Roark-Griffith assemblage, but not for the Cranston-Donaldson Pottery. Base type tends to be standardized only for natural clay-slipped vessels at the Roark-Griffith Pottery, of which over 90% have smooth bases. In contrast, 63.5% of the salt-glazed sherds have similar bases, with circular patterned-bases accounting for 30% of the salt-glazed vessel bases. Natural clay-slipped bases also exhibit greater standardization at the Cranston-Donaldson Pottery, but only 79.8% of these bases are smooth. Variability in base type is high among salt-glazed vessels and only 76.2% of the two-tone milkcrocks exhibited smooth bases. With the exception of milkcrocks, few bases could be identified to vessel form classes, preventing an examination of relationships between base types and vessel forms.

Vessel Form

An examination of the vessel forms made at Denton County potteries revealed that only utilitarian vessels were made, ruling out the possibility of testing Rice's assumption that specialization would first be associated with elite vessels or that elite vessels would initially be less standardized than utilitarian vessels. Nevertheless, standardized vessel forms are evident for the stoneware assemblages, in particular from the Cranston-Donaldson and Roark-Griffith potteries. Not only is the range of vessel forms similar at both potteries, sherds with makers' marks at the Cranston-Donaldson Pottery demonstrate that both potters produced a similar range of vessels,

Table 6.7 Frequencies Tabulations of Base Types and Crosstabulations of Base Type (BASE) and Exterior Glaze (EGLAZE) for all Identifiable Stoneware Sherds from the Cranston-Donaldson Pottery.

BASE

Value Label	Value	Frequency	Percent	Valid Percent	Cum Percent
CIRC PATTERN	1	8	3.6	3.6	3.6
SMOOTH	2	151	67.4	67.4	71.0
STRAIGHT PAT	3	65	29.0	29.0	100.0
	Total	224	100.0	100.0	

Valid cases 224 Missing cases 0

BASE by EGLAZE

BASE (Count / Row Pct / Col Pct / Tot Pct)	EGLAZE: NAT CLAY 1	SALT 2	TWO-TONE 4	Row Total
1 CIRC PATTERN	1 25.0 1.1 .5	2 50.0 2.3 1.0	1 25.0 4.8 .5	4 2.0
2 SMOOTH	75 51.7 79.8 37.1	54 37.2 62.1 26.7	16 11.0 76.2 7.9	145 71.8
3 STRAIGHT PAT	18 34.0 19.1 8.9	31 58.5 35.6 15.3	4 7.5 19.0 2.0	53 26.2
Column Total	94 46.5	87 43.1	21 10.4	202 100.0

Chi-Square	Value	DF	Significance
Pearson	8.44384	4	.07661
Likelihood Ratio	8.24861	4	.08288
Mantel-Haenszel	.07049	1	.79062

Minimum Expected Frequency - .416
Cells with Expected Frequency < 5 - 3 OF 9 (33.3%)

Table 6.8 Frequencies Tabulations of Base Types and Crosstabulation of Base Type (BASE) and Exterior Glaze (EGLAZE) for all Identifiable Stoneware Sherds from the Roark-Griffith Pottery.

BASE

Value Label	Value	Frequency	Percent	Valid Percent	Cum Percent
CIRC PATTERN	1	90	19.7	19.7	19.7
SMOOTH	2	345	75.7	75.7	95.4
STRAIGHT PAT	3	21	4.6	4.6	100.0
	Total	456	100.0	100.0	

BASE by EGLAZE

BASE (Count / Row Pct / Col Pct / Tot Pct)		EGLAZE: NAT CLAY 1	SALT 2	Row Total
CIRC PATTERN	1	2 2.4 2.4 .6	83 97.6 30.0 23.0	85 23.5
SMOOTH	2	79 31.0 94.0 21.9	176 69.0 63.5 48.8	255 70.6
STRAIGHT PAT	3	3 14.3 3.6 .8	18 85.7 6.5 5.0	21 5.8
Column Total		84 23.3	277 76.7	361 100.0

Chi-Square	Value	DF	Significance
Pearson	30.26951	2	.00000
Likelihood Ratio	39.85010	2	.00000
Mantel-Haenszel	14.90281	1	.00011

Minimum Expected Frequency - 4.886
Cells with Expected Frequency < 5 - 1 OF 6 (16.7%)

although these vessels were not all produced at the same time. Illustrations of a sample of vessels from the Cranston-Donaldson and Roark-Griffith potteries are provided in Appendix K.

The frequency of sherds in each vessel form class is variable between the Cranston-Donaldson Pottery (Table 6.9) and the Roark-Griffith Pottery (Table 6.10), but does not appear significant when like forms are grouped. Milkcrocks and milkpans, which served the same function, represent about 20% of the vessels in both assemblages. Similarly jugs average 25%, while food processing jars/crocks/churns total about 55% of each assemblage. Preserve jars occur only in the Roark-Griffith collection.

These vessel forms, however, exhibit variability in a number of attributes both within form classes, within potteries, and between potteries. Two of these attributes--rim diameter and handle forms--are examined here. The interior diameter of jug rims was measured across the broadest part of the interior, and the exterior diameter was measured across the broadest part of the exterior. Both measurements were recorded in inches using electronic calipers. Rim diameter for larger vessels (e.g., crocks, churns, jars, and so forth) was measured at the exterior top of the rim using a rigid mat surface marked in 1/2-inch circumference arcs with a compass. Each rim sherd was measured against these arcs until a match was found, allowing the rim diameter for these sherds to be recorded in whole inches (e.g., 7 inches, 8 inches, and so forth).

Vessel Form and Rim Diameter

The frequency of sherds in classes defined by vessel form and rim diameter is shown for open-vessel forms at the Cranston-Donaldson Pottery in Table 6.11 and the Roark-Griffith Pottery in Table 6.12. These results revealed a significant difference in rim diameter among vessel forms at both potteries.

Further examination of each vessel form class at these potteries (Table 6.13 and Table 6.14) indicates that the rim diameter results do not support the statistical distributions asserted by Rice (1981) for standardized vessels. She hypothesized that standardized vessels will exhibit unimodal skewed distributions, with high kurtosis or peakedness values, or multimodal distributions capable of being separated into several skewed distributions with high positive kurtosis. In this context, unimodality reflects the degree of consistency of potters in achieving the "ideal type," while multimodality indicates multiple producers or variable "ideal types" (Rice 1981:221-2).

A four- to six-inch range of variation in rim diameters was identified for all open-vessel form classes at both potteries (Table 6.13 and Table 6.14). Unimodal rim diameter distributions with low positive or negative kurtosis and skewness were recorded for the majority of the vessel form classes. Only milkcrocks at the Cranston-Donaldson Pottery (Table 6.13) and jar/crock vessels at the Roark-Griffith Pottery (Table 6.14) exhibited multimodality.

The frequency of sherds in classes defined by gallon size and rim diameter for the Cranston-Donaldson Pottery (Table 6.15) revealed that gallon size--based on gallon

Table 6.9 Frequencies Tabulation of Vessel Form (VFORM) Classes at the Cranston-Donaldson Pottery.

VFORM

Value Label	Value	Frequency	Percent	Valid Percent	Cum Percent
MILKCROCK	1	88	14.7	14.7	14.7
MILKPAN	2	33	5.5	5.5	20.3
JAR/CHURN	3	251	42.0	42.0	62.3
JAR/CROCK	4	69	11.6	11.6	73.9
JUG	6	156	26.1	26.1	100.0
	Total	597	100.0	100.0	

Table 6.10 Frequencies Tabulation of Vessel Form (VFORM) Classes at the Roark-Griffith Pottery.

VFORM

Value Label	Value	Frequency	Percent	Valid Percent	Cum Percent
MILKCROCK	1	2	.9	.9	.9
MILKPAN	2	41	18.3	18.3	19.2
JAR/CHURN	3	63	28.1	28.1	47.3
JAR/CROCK	4	61	27.2	27.2	74.6
JUG	6	54	24.1	24.1	98.7
PRESERVE JAR	7	3	1.3	1.3	100.0
	Total	224	100.0	100.0	

Table 6.11 Crosstabulation of Vessel Form (VFORM) and Rim Diameter (RIMDIA) Measurements (inches) for Open Vessels at the Cranston-Donaldson Pottery.

VFORM by RIMDIA

VFORM	RIMDIA: Count / Row Pct / Col Pct / Tot Pct	5	6	7	8	9	10	11	12	14	Row Total
1 MILKCROCK	Count					2	16	4	41	2	65
	Row Pct					3.1	24.6	6.2	63.1	3.1	17.8
	Col Pct					1.9	15.5	22.2	89.1	100.0	
	Tot Pct					.5	4.4	1.1	11.2	.5	
2 MILKPAN	Count				1	9	13	3	3		29
	Row Pct				3.4	31.0	44.8	10.3	10.3		7.9
	Col Pct				1.7	8.7	12.6	16.7	6.5		
	Tot Pct				.3	2.5	3.6	.8	.8		
3 JAR/CHURN	Count	3	6	14	47	78	64	6			218
	Row Pct	1.4	2.8	6.4	21.6	35.8	29.4	2.8			59.7
	Col Pct	100.0	60.0	70.0	79.7	75.0	62.1	33.3			
	Tot Pct	.8	1.6	3.8	12.9	21.4	17.5	1.6			
4 JAR/CROCK	Count		4	6	11	15	10	5	2		53
	Row Pct		7.5	11.3	20.8	28.3	18.9	9.4	3.8		14.5
	Col Pct		40.0	30.0	18.6	14.4	9.7	27.8	4.3		
	Tot Pct		1.1	1.6	3.0	4.1	2.7	1.4	.5		
Column Total		3	10	20	59	104	103	18	46	2	365
		.8	2.7	5.5	16.2	28.5	28.2	4.9	12.6	.5	100.0

Chi-Square	Value	DF	Significance
Pearson	237.33580	24	.00000
Likelihood Ratio	225.17374	24	.00000
Mantel-Haenszel	129.04071	1	.00000

Minimum Expected Frequency - .159
Cells with Expected Frequency < 5 - 19 OF 36 (52.8%)

Table 6.12 Crosstabulation of Vessel Form (VFORM) and Rim Diameter (RIMDIA) Measurements (inches) for Open Vessels at the Roark-Griffith Pottery.

VFORM by RIMDIA

VFORM	Count Row Pct Col Pct Tot Pct	RIMDIA 4	5	6	7	8	9	10	11	12	13	Row Total
MILKPAN	2					1 3.3 5.3 1.0	2 6.7 11.8 2.0	5 16.7 27.8 5.0	12 40.0 85.7 11.9	8 26.7 80.0 7.9	2 6.7 100.0 2.0	30 29.7
JAR/CHURN	3		3 9.1 75.0 3.0	1 3.0 20.0 1.0	4 12.1 44.4 4.0	11 33.3 57.9 10.9	11 33.3 64.7 10.9	3 9.1 16.7 3.0				33 32.7
JAR/CROCK	4		1 2.9 25.0 1.0	4 11.4 80.0 4.0	5 14.3 55.6 5.0	7 20.0 36.8 6.9	4 11.4 23.5 4.0	10 28.6 55.6 9.9	2 5.7 14.3 2.0	2 5.7 20.0 2.0		35 34.7
PRESERVE JAR	7	3 100.0 100.0 3.0										3 3.0
	Column Total	3 3.0	4 4.0	5 5.0	9 8.9	19 18.8	17 16.8	18 17.8	14 13.9	10 9.9	2 2.0	101 100.0

Chi-Square	Value	DF	Significance
Pearson	170.43940	27	.00000
Likelihood Ratio	101.66710	27	.00000
Mantel-Haenszel	37.01543	1	.00000

Minimum Expected Frequency - .059
Cells with Expected Frequency < 5 - 31 OF 40 (77.5%)

Table 6.13 Frequencies Tabulations and Basic Statistics of Rim Diameter (RIMDIA) Measurements (inches) for Open Vessel Forms at the Cranston-Donaldson Pottery: (a) milkcrocks, (b) milkpans, (c) jar/churns, and (d) jar/crocks.

a RIMDIA

Value Label	Value	Frequency	Percent	Valid Percent	Cum Percent
	9	2	3.1	3.1	3.1
	10	16	24.6	24.6	27.7
	11	4	6.2	6.2	33.8
	12	41	63.1	63.1	96.9
	14	2	3.1	3.1	100.0
	Total	65	100.0	100.0	

Mean	11.415	Std dev	1.059	Variance	1.122
Kurtosis	-.057	Skewness	-.422		

b RIMDIA

Value Label	Value	Frequency	Percent	Valid Percent	Cum Percent
	8	1	3.4	3.4	3.4
	9	9	31.0	31.0	34.5
	10	13	44.8	44.8	79.3
	11	3	10.3	10.3	89.7
	12	3	10.3	10.3	100.0
	Total	29	100.0	100.0	

Mean	9.931	Std dev	.998	Variance	.995
Kurtosis	.206	Skewness	.610		
Valid cases	29	Missing cases	0		

c RIMDIA

Value Label	Value	Frequency	Percent	Valid Percent	Cum Percent
	5	3	1.4	1.4	1.4
	6	6	2.8	2.8	4.1
	7	14	6.4	6.4	10.6
	8	47	21.6	21.6	32.1
	9	78	35.8	35.8	67.9
	10	64	29.4	29.4	97.2
	11	6	2.8	2.8	100.0
	Total	218	100.0	100.0	

Mean	8.867	Std dev	1.154	Variance	1.332
Kurtosis	.967	Skewness	-.862		
Valid cases	218	Missing cases	0		

d RIMDIA

Value Label	Value	Frequency	Percent	Valid Percent	Cum Percent
	6	4	7.5	7.5	7.5
	7	6	11.3	11.3	18.9
	8	11	20.8	20.8	39.6
	9	15	28.3	28.3	67.9
	10	10	18.9	18.9	86.8
	11	5	9.4	9.4	96.2
	12	2	3.8	3.8	100.0
	Total	53	100.0	100.0	

Mean	8.830	Std dev	1.503	Variance	2.259
Kurtosis	-.387	Skewness	-.017		

Table 6.14 Frequencies Tabulations and Basic Statistics of Rim Diameter (RIMDIA) Measurements (inches) for Open Vessel Forms at the Roark-Griffith Pottery: (a) milkcrocks, (b) milkpans, (c) jar/churns, and (d) jar/crocks.

a RIMDIA

Value Label	Value	Frequency	Percent	Valid Percent	Cum Percent
	Total	0	100.0	100.0	

b RIMDIA

Value Label	Value	Frequency	Percent	Valid Percent	Cum Percent
	8	1	3.3	3.3	3.3
	9	2	6.7	6.7	10.0
	10	5	16.7	16.7	26.7
	11	12	40.0	40.0	66.7
	12	8	26.7	26.7	93.3
	13	2	6.7	6.7	100.0
	Total	30	100.0	100.0	

Mean	11.000	Std dev	1.145	Variance	1.310
Kurtosis	.566	Skewness	-.591		

c RIMDIA

Value Label	Value	Frequency	Percent	Valid Percent	Cum Percent
	5	3	9.1	9.1	9.1
	6	1	3.0	3.0	12.1
	7	4	12.1	12.1	24.2
	8	11	33.3	33.3	57.6
	9	11	33.3	33.3	90.9
	10	3	9.1	9.1	100.0
	Total	33	100.0	100.0	

Mean	8.061	Std dev	1.345	Variance	1.809
Kurtosis	.584	Skewness	-.937		

d RIMDIA

Value Label	Value	Frequency	Percent	Valid Percent	Cum Percent
	5	1	2.9	2.9	2.9
	6	4	11.4	11.4	14.3
	7	5	14.3	14.3	28.6
	8	7	20.0	20.0	48.6
	9	4	11.4	11.4	60.0
	10	10	28.6	28.6	88.6
	11	2	5.7	5.7	94.3
	12	2	5.7	5.7	100.0
	Total	35	100.0	100.0	

Mean	8.629	Std dev	1.800	Variance	3.240
Kurtosis	-.752	Skewness	-.077		

Table 6.15 Comparison of Gallon Size (GALSIZE) and Rim Diameter (RIMDIA) Measurements (inches) for sherds from the Cranston-Donaldson Pottery.

GALSIZE by RIMDIA

GALSIZE \ RIMDIA (Count / Row Pct / Col Pct / Tot Pct)	6	7	8	9	10	11	12	14	Row Total
2	1 2.7 100.0 1.3	1 2.7 25.0 1.3	11 29.7 55.0 14.3	9 24.3 34.6 11.7	7 18.9 38.9 9.1	1 2.7 100.0 1.3	6 16.2 100.0 7.8	1 2.7 100.0 1.3	37 48.1
3		3 15.8 75.0 3.9	8 42.1 40.0 10.4	5 26.3 19.2 6.5	3 15.8 16.7 3.9				19 24.7
4				10 83.3 38.5 13.0	2 16.7 11.1 2.6				12 15.6
5			1 14.3 5.0 1.3	1 14.3 3.8 1.3	5 71.4 27.8 6.5				7 9.1
6					1 100.0 5.6 1.3				1 1.3
7				1 100.0 3.8 1.3					1 1.3
Column Total	1 1.3	4 5.2	20 26.0	26 33.8	18 23.4	1 1.3	6 7.8	1 1.3	77 100.0

Chi-Square	Value	DF	Significance
Pearson	44.59457	35	.12835
Likelihood Ratio	45.58881	35	.10849
Mantel-Haenszel	.02926	1	.86418

Minimum Expected Frequency - .013
Cells with Expected Frequency < 5 - 44 OF 48 (91.7%)

marks--is not significantly associated with rim diameter. Among 2-gallon vessels, rims ranged from 6 inches to 14 inches in diameter. Similarly, vessels varying in gallon size exhibited identical rim diameters.

These results cannot be used to discount ceramic specialization although they fail to support Rice's hypothesis about attribute standardization for vessels produced by ceramic specialists. Few studies have examined the variability or standardization of rim diameter, rim orientation, rim shape, and so forth, of ceramics from historically-documented archaeological and ethnographic specialist assemblages in order to determine the relations among these attributes and specialized production. For example, Sinopoli's (1988) ethnographic study of four specialist workshops revealed that attribute variability may change from day to day, pot to pot, or from potter to potter, indicating that a direct correlation may not exist between specialized production and attribute standardization. This is particularly significant for ceramics produced by hand-forming or wheel-throwing techniques.

Although the stoneware potters in Denton County utilized several methods for producing relatively standardized vessels, including weighing the clay and using a ball-opener (see Chapter 4), the completed vessels exhibit measurable variability. Within each gallon size class, this variability is reflected by differences in rim diameter, vessel height, vessel wall thickness, and so forth.

The rim-diameter data for jug sherds from both potteries are highly variable, ranging from 1 inch to 2 1/2 inches at the Cranston-Donaldson Pottery (Table 6.16) and from less than 1/2 inch to 1 3/4 inches at the Roark-Griffith Pottery (Table 6.17).

Rim diameter data approximate a normal distribution with small kurtosis and skewness at the Cranston-Donaldson Pottery, indicating variability not unexpected using pottery-wheel methods rather than molds. A very small jug rim sample from the Roark-Griffith Pottery indicates two distinct clusters, with small rims measuring less than 3/4 inch in diameter, and large rims clustering around 1 3/4 inches in diameter. Within these two rim clusters, rim diameter variability is small.

Vessel Form and Handle Type

Two types of handles--strap and lug--occurred in the sherd assemblages from the Cranston-Donaldson and Roark-Griffith potteries (see Chapter 4). Strap handles occur only on jug and pitcher forms in Denton County, while lug handles occur on open vessels--bowls, crocks, churns, and jars. Both types are applied to the dried vessel before glazing and firing. Three types of handle placement were identified for both strap and lug handles at both potteries: (1) attached to upper body (shoulder/body on jugs), (2) rim, and (3) unknown (insufficient data).

The frequency of sherds in classes defined by vessel form and handle type revealed that preserve jars, milkpans, and milkbowls lacked handles (Table 6.18). Crocks seldom had handles, and lug handles were most frequently found on churns, being attached to the upper body. No lug handles were identified among the jug assemblage, and none occurred on the rims of open vessels. Strap handle placement on jugs was more variable. At the Cranston-Donaldson Pottery (n=126 vessels),

Table 6.16 Frequencies Tabulations and Basic Statistics for (a) Rim Diameter (RIMDIA) Measurements (inches) for Open Vessels and (b) Rim Diameter (JUGRIM) Measurements (0.00 inches) for Jugs from the Cranston-Donaldson Pottery.

a. RIMDIA

Inches Value	Frequency	Percent	Valid Percent	Cum Percent
5	3	0.8	0.8	0.8
6	10	2.7	2.7	3.5
7	20	5.4	5.4	9.0
8	59	16.1	16.1	25.1
9	106	28.9	28.1	54.0
10	103	28.1	28.1	82.0
11	18	4.9	4.9	86.9
12	46	12.5	12.5	99.0
14	2	0.5	0.5	100.0

Mean 9.398 Std dev 1.531 Kurtosis 0.252 Skewness 0.008
Variance 2.344 Valid Cases 367

Table 6.16 Frequencies Tabulations and Basic Statistics for (a) Rim Diameter (RIMDIA) Measurements (inches) for Open Vessels and (b) Rim Diameter (JUGRIM) Measurements (0.00 inches) for Jugs from the Cranston-Donaldson Pottery (continued).

b. JUGRIM

Value	Frequency	Percent	Cum Percent	Value	Frequency	Percent	Cum Percent
1.14	1	1	1	1.73	1	1	52
1.15	1	1	2	1.74	1	1	53
1.24	1	1	4	1.75	2	2	56
1.29	2	2	6	1.76	1	1	57
1.33	1	1	7	1.77	2	2	59
1.35	1	1	9	1.83	1	1	60
1.36	1	1	10	1.84	2	2	63
1.37	1	1	11	1.86	1	1	64
1.40	2	2	14	1.87	1	1	65
1.41	1	1	15	1.89	1	1	67
1.42	1	1	16	1.90	1	1	68
1.43	1	1	17	1.91	1	1	69
1.44	1	1	19	1.94	4	5	74
1.47	2	2	21	1.95	2	2	77
1.48	1	1	22	1.96	1	1	78
1.50	1	1	23	1.97	1	1	79
1.53	1	1	25	1.98	1	1	80
1.54	2	2	27	1.99	2	2	83
1.55	1	1	28	2.01	2	2	85
1.56	4	5	33	2.03	1	1	86
1.58	1	1	35	2.04	1	1	88
1.59	2	2	37	2.05	2	2	90
1.60	1	1	38	2.06	3	4	94
1.62	3	4	42	2.10	3	4	98
1.68	1	1	43	2.17	1	1	99
1.70	2	2	46	2.34	1	1	100
1.71	1	1	47				
1.72	3	4	51				

Mean 172.160 Std dev 26.676 Kurtosis -.776 Skewness -.119
Variance 711.611 Valid Cases 81

Table 6.17 Frequencies Tabulations and Basic Statistics for (a) Rim Diameter (RIMDIA) Measurements (inches) for Open Vessels and (b) Rim Diameter (JUGRIM)Measurements (0.00 inches) for Jugs from the Roark-Griffith Pottery.

a RIMDIA

Value Label	Value	Frequency	Percent	Valid Percent	Cum Percent
	4	3	3.0	3.0	3.0
	5	4	4.0	4.0	6.9
	6	5	5.0	5.0	11.9
	7	9	8.9	8.9	20.8
	8	19	18.8	18.8	39.6
	9	17	16.8	16.8	56.4
	10	18	17.8	17.8	74.3
	11	14	13.9	13.9	88.1
	12	10	9.9	9.9	98.0
	13	2	2.0	2.0	100.0
	Total	101	100.0	100.0	

Mean	9.010	Std dev	2.086	Minimum	4.000
Maximum	13.000				

b JUGRIM

Value Label	Value	Frequency	Percent	Valid Percent	Cum Percent
	.43	1	5.3	5.3	5.3
	.45	1	5.3	5.3	10.5
	.50	1	5.3	5.3	15.8
	.51	2	10.5	10.5	26.3
	.53	1	5.3	5.3	31.6
	.55	1	5.3	5.3	36.8
	.56	1	5.3	5.3	42.1
	.57	2	10.5	10.5	52.6
	.62	4	21.1	21.1	73.7
	.65	1	5.3	5.3	78.9
	.68	1	5.3	5.3	84.2
	1.70	1	5.3	5.3	89.5
	1.75	1	5.3	5.3	94.7
	1.76	1	5.3	5.3	100.0
	Total	19	100.0	100.0	

Mean	.747	Std dev	.445	Minimum	.430
Maximum	1.760				

Table 6.18 Handle Percentages by Vessel Form Classes at the Cranston-Donaldson and Roark-Griffith Potteries.

Vessel Form	Cranston-Donaldson Vessel N	Cranston-Donaldson Handle N	Roark-Griffith Vessel N	Roark-Griffith Handle N
Milkcrocks	88		2	
Milkpans	33		41	
Jar/Churns	251	87	63	4
Jar/Crocks	69	6	61	
Jugs	156	126	54	14
Preserve Jars			3	
Total	597	219	224	18

81.7% of the jug handles were attached to the rim, 2.4% were attached to the shoulder, below the rim, while 15.9% were unknown. At the Roark-Griffith Pottery (n=14 vessels), 14.3% of the strap handles on jugs were attached to the rim, 35.7% were attached to the shoulder below the rim, and 50% were unknown. These results indicate that handle placement was largely standardized but still variable at the Cranston-Donaldson Pottery, and remains unknown at the Roark-Griffith Pottery.

Decoration Methods and Styles

My analysis of decoration methods and styles revealed that although the overwhelming majority of the vessel sherds from both potteries were undecorated, a significant correlation was found between exterior glaze and the presence or absence of decoration at the Cranston-Donaldson Pottery (Table 6.19). A total of 81.6% of the sherds from the Cranston-Donaldson Pottery were undecorated compared with 97.6% of the Roark-Griffith Pottery sherds. Cobalt blue decorations account for 99.6% of all decorations on vessels from the Cranston-Donaldson Pottery. Other decorations include three vessels with a "molded" rib design, three with manganese-oxide decoration, and two with multiple incised lines. At the Roark-Griffith Pottery, cobalt blue decoration accounts for 100% of the decorated sherds (i.e., 63 sherds with salt-glazed exteriors). No decorations occurred on vessel sherds with a natural clay-slipped or two-toned exterior.

The frequency of sherds defined by vessel form and decoration for the Cranston-Donaldson Pottery are shown in Table 6.20, revealing that the highest frequency of decorated vessels occurs for jar/crocks. Milkpans and milkcrocks are least often decorated. Only six sherds from the Roark-Griffith Pottery are decorated, including three milkpans, two jar/churns, and one jar/crock.

Makers' Marks and Gallon Numbers

While makers' marks and gallon numbers occur infrequently on vessel sherds from both potteries, their examination provides direct information about the relative standardization of stoneware production by allowing the wares produced by specific potters to be identified and compared. Each potter during his years of production, utilized several different makers' marks, largely limiting their use of marks to salt-glazed open-mouth vessels, applying the stamps to the upper body of the vessel.

The makers' marks from the Cranston-Donaldson Pottery are illustrated in Figure 6.1, while those used by James Roark are shown in Figure 6.2. The gallon numbers associated with these marks were recorded and, where possible, these numbers were used to identify the potter associated with unmarked sherds bearing similar gallon numbers (see Chapter 5).

Makers' marks occur on 4.0% of the sherd assemblage (Table 6.21) from the Cranston-Donaldson Pottery (5.7% of the sherds identified to vessel form) and only 0.7% of the Roark-Griffith assemblage (2.8% of the sherds identified to vessel form) (Table 6.22). Two methods were used for marking vessels--stamps and stencils. Stamped makers' marks account for 81.6% of the marked sherds from the Cranston-

Table 6.19 Crosstabulation of Exterior Glaze (EGLAZE) and Decoration (DEC) for all Identifiable Vessel Sherds from the Cranston-Donaldson Pottery.

EGLAZE by DEC

EGLAZE	Count / Row Pct / Col Pct / Tot Pct	DEC: NONE 0	COBALT BLUE 1	OTHER 2	Row Total
1 NAT CLAY	Count	478			478
	Row Pct	100.0			29.3
	Col Pct	35.0			
	Tot Pct	29.3			
2 SALT	Count	812	258	8	1078
	Row Pct	75.3	23.9	.7	66.1
	Col Pct	59.5	99.6	100.0	
	Tot Pct	49.8	15.8	.5	
4 TWO-TONE	Count	75	1		76
	Row Pct	98.7	1.3		4.7
	Col Pct	5.5	.4		
	Tot Pct	4.6	.1		
Column Total		1365	259	8	1632
		83.6	15.9	.5	100.0

Chi-Square	Value	DF	Significance
Pearson	160.54062	4	.00000
Likelihood Ratio	239.19544	4	.00000
Mantel-Haenszel	30.14148	1	.00000

Minimum Expected Frequency - .373
Cells with Expected Frequency < 5 - 2 OF 9 (22.2%)

Table. 6.20 Crosstabulation of Vessel Form (VFORM) and Decoration (DEC) for all Identifiable Vessel Sherds from the Cranston-Donaldson Pottery.

VFORM by DEC

VFORM	DEC: Count / Row Pct / Col Pct / Tot Pct	NONE 0	COBALT BLUE 1	OTHER 2	Row Total
MILKCROCK	1	87	1		88
		98.9	1.1		14.7
		15.8	2.4		
		14.6	.2		
MILKPAN	2	33			33
		100.0			5.5
		6.0			
		5.5			
JAR/CHURN	3	215	32	4	251
		85.7	12.7	1.6	42.0
		39.2	76.2	66.7	
		36.0	5.4	.7	
JAR/CROCK	4	64	3	2	69
		92.8	4.3	2.9	11.6
		11.7	7.1	33.3	
		10.7	.5	.3	
JUG	5	150	6		156
		96.2	3.8		26.1
		27.3	14.3		
		25.1	1.0		
	Column Total	549	42	6	597
		92.0	7.0	1.0	100.0

Chi-Square	Value	DF	Significance
Pearson	29.47167	8	.00026
Likelihood Ratio	34.27365	8	.00004
Mantel-Haenszel	.25846	1	.61118

Minimum Expected Frequency - .332
Cells with Expected Frequency < 5 - 7 OF 15 (46.7%)

Table 6.21 Frequencies Tabulation of Stamp and Cobalt Blue-Oxide Makers' Marks by Vessel Form Classes at the Cranston-Donaldson Pottery.

Vessel Forms	Undec.	Stamp	%	Cobalt	%	Total
Unidentifiable	1,061	22	2.1	13	1.2	3.3
Milkcrocks	88	4	4.5			4.5
Milkpans	33	1	3.0			3.0
Jar/Churns	251	12	4.8			4.8
Jar/Crocks	69	15	21.8			21.8
Jugs	156		0.0			0.0
Total (all vessels)	1,658	54		13		4.0

Table 6.22 Frequencies Tabulation of Stamp and Cobalt Blue-Oxide Makers' Marks by Vessel Form Classes at the Roark-Griffith Pottery.

Vessel Forms	Undec.	Stamp	%
Unidentifiable	2,391	13	0.5
Milkcrocks	2		0.0
Milkpans	39	2	4.9
Jar/Churns	60	3	5.0
Jar/Crocks	60	1	1.6
Jugs	54		0.0
Preserve Jars	3		0.0
Total (all vessels)	2,609	19	0.7
Unidentifiable	2,391	13	

a. CRANSTON

b. J. CRANSTON

c. CRANSTON
2

d. CRANSTON

e. CRANSTON
7

f. CRANSTON
8

g. CRANSTON
5

h. CRANSTON
( ) unreadable #

i. 3
CRANSTON

j. see f. (diff. letter size)

k. 3 DONALDSON

l. DONALDSON

m. 4
DONALDSON

n. DONALDSON
5

o. 5
DONALDSON

p. DONALDSON 2

q. (skipped)

r. DONALDSON
2 (or 3) unreadable

s. MOORE
DENTON

t. (incised script) unreadable

u. MOORE & DONALDSON
DENTON
TEXAS

Figure 6.1 Identified makers' marks for sherds from the Cranston-Donaldson Pottery.

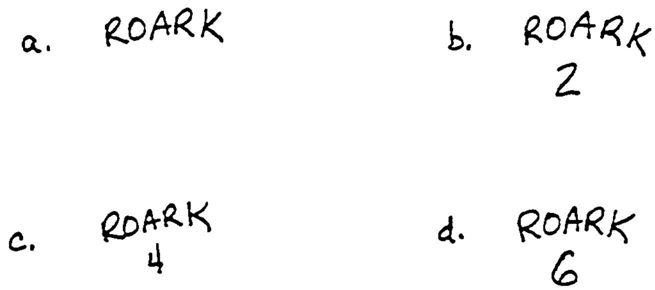


Figure 6.2 Identified makers' marks for sherds from Units 3 and 7 at the Roark-Griffith Pottery.

Donaldson Pottery and were used by both Cranston and Donaldson; one stamped mark includes Moore, a partner of Donaldson. All of the vessels with stencilled marks were produced during Donaldson and Moore's partnership; none are marked Cranston. A single stencilled mark: GRIFFITH & SON with a 4-gallon number (see Lebo, Green, and Crass 1988: Figure 10) occurs on a surface sherd from the Roark-Griffith Pottery. This sherd indicates that Griffith used stencils, but their relative frequency and his use of stamps is unknown.

Cranston used four basic makers' mark stamps--Figure 6.1a, b, d, and j--and their frequencies are illustrated in Table 6.23. The variations shown in Figure 6.1c, e, g, and i illustrate his use of gallon number stamps. Note that in Figure 6.1f the gallon number is upside down. Based on oral-informant data, the arched stamp is an earlier style dating to the 1850s and 1860s. This has not been verified, and while it appears to be supported by the absence of arched stamps associated with Donaldson (Figure 6.1)--who produced vessels mostly during the 1870s--the Roark stamps (Figure 6.2) do not lend support.

Donaldson's use of both stamp and stencil methods, however, does appear to reflect a temporal change. While he used stamps on his early vessels, the stencilled sherds can be dated to near the end of the pottery operation, after J. W. Moore and T. Donaldson became partners in 1875 (see Figure 6.1). The less common decorative methods and style classes, including incised script and gallon numbers, could not be identified to potter without the use of elemental analysis (see Chapter 5).

The relative paucity of marked sherds from Units 3 and 7 at the Roark-Griffith Pottery suggests that they did not mark their vessels as commonly as Cranston and Donaldson. Additional sampling, however, is needed to verify this. All of the marked Griffith sherds were found on the surface of the waster pile; none occurred in Units 3 and 7.

All of the makers' marks at both potteries occurred on vessels with salt-glazed exteriors, with the exception of four two-tone milkcrocks stamped DONALDSON and three natural clay-slipped sherds. Makers' marks occur in very low frequencies on all open-mouth vessels except jar/crocks at the Cranston-Donaldson Pottery where they accounted for 21.8% of the vessel sherds in this form class (see Table 6.21). This frequency, if representative, suggests that jar/crocks were more commonly marked than other vessels. The significance of this is unclear. No makers' marks were found on jugs and preserve jars (see Table 6.21).

Makers' marks on vessels from the Cranston-Donaldson Pottery were primarily located on the vessel body (n=60), and rarely on the rim (n=4), near the base (n=2), or on the underside of the vessel (n=1). Insufficient data are available for the Roark-Griffith Pottery where only 19 sherds with makers' marks were found (see Table 6.22).

<u>Gallon numbers</u>

Gallon numbers yielded information about the range of vessel sizes produced by Denton County potters. Gallon numbers were recorded for 78 sherds from the

Table 6.23 Frequencies Tabulations of Makers' Marks from the Cranston-Donaldson Pottery (see Figure 6.1).

Cranston		Donaldson	
Mark	Frequency	Mark	Frequency
a	13	k	2
b	1	l	14
c	2	m	1
d	2	o	1
e	4	p	2
f	1	r	2
g	2	s	1
h	1	u	13
i	2		
j	1		
t	2		
Total	32	Total	37

Cranston-Donaldson Pottery and nine sherds from Units 3 and 7 at the Roark-Griffith Pottery. Gallon numbers were not used on one-gallon vessels, which were probably the most common size produced. Of the 78 Cranston-Donaldson sherds, gallon numbers ranged from 2 to 8, with 2-gallon vessels accounting for 48% of the assemblage and 6-, 7-, and 8-gallon vessels represented by one sherd each. Three-gallon vessels accounted for 24% of the assemblage, while 4-gallon vessels totaled 15% of the total. Only three gallon sizes were represented in the Roark-Griffith assemblage. Two-gallon vessel sherds totaled 6, followed by two 6-gallon sherds and one 4-gallon sherd.

The frequency of sherds defined by exterior glaze and gallon number type at the Cranston-Donaldson Pottery is shown in Table 6.24. Gallon numbers occur on all glaze types, being most frequent on exterior salt-glazed vessels. Gallon numbers were predominantly stamped, with only 24.9% of all gallon numbers being incised or hand-painted cobalt-blue oxide. While a significant relationship was identified for exterior glaze and gallon number classes, gallon numbers were not highly standardized for each exterior glaze type. Incised numbers were most common on natural clay-slipped vessels, but nearly one-half of these vessels had stamped gallon numbers. The greatest variability occurred among salt-glazed vessels.

The frequency of sherds in classes defined by vessel form and gallon number type is shown in Table 6.25. Stamped gallon numbers are the most common type across all vessel form classes, with jar/churns exhibiting the greatest variability. No variability occurs among milkcrocks and milkpans, while the sample for jugs is too small to be reliable. Similarly, when the frequency of sherds in classes defined by vessel form and the location of gallon numbers is examined (Table 6.26), little variability is evident. Gallon numbers occur most commonly on the upper body of all vessel forms, with the greatest variability occurring among milkcrocks and jar/churns. This variability, however, represents only 4.5% of all sherds with gallon marks.

The location of gallon numbers, however, is variable across gallon number types (Table 6.27). While all gallon number types most commonly occur on the upper body, almost 40% of all incised numbers occur inside jar/churn or jar/crock handles, over three times the rate for stamped numbers and eight times the rate for cobalt blue numbers. Few numbers occur near the base, but 7% to 10% stamped and cobalt-blue numbers occur on rims.

Denton County Farmsteads

Ceramic variability is low for all attribute classes among the stoneware assemblages from the five farmsteads. While assemblage sizes are small, at a general level, the attribute analysis of the stonewares from each farmstead appears to support Rice's assertion that low assemblage variability can be correlated with specialized ceramic production. This correlation, however, is open to question. The low variability among these farmstead assemblages may reflect several factors other than production specialization. Three factors are identified: (1) these ceramic assemblages do not contain "elite" stoneware ceramics, which often exhibit greater variation than

Table 6.24 Crosstabulation of Exterior Glaze (EGLAZE) and Gallon Number Type (GAL#) for all Identifiable Vessel Sherds from the Cranston-Donaldson Pottery.

EGLAZE by GAL#

EGLAZE	Count / Row Pct / Col Pct / Tot Pct	GAL# STAMPED 1	INCISED 2	COBALT BLUE 3	Row Total
NAT CLAY	1	9 45.0 7.6 5.7	11 55.0 61.1 7.0		20 12.7
SALT	2	102 78.5 86.4 65.0	7 5.4 38.9 4.5	21 16.2 100.0 13.4	130 82.8
TWO-TONE	4	7 100.0 5.9 4.5			7 4.5
	Column Total	118 75.2	18 11.5	21 13.4	157 100.0

Chi-Square	Value	DF	Significance
Pearson	45.60231	4	.00000
Likelihood Ratio	35.37875	4	.00000
Mantel-Haenszel	3.13104	1	.07681

Minimum Expected Frequency - .803
Cells with Expected Frequency < 5 - 4 OF 9 (44.4%)

Table 6.25 Crosstabulation of Vessel Form (VFORM) and Gallon Number Type (GAL#) for all Identifiable Vessel Sherds from the Cranston-Donaldson Pottery.

VFORM by GAL#

VFORM		Count / Row Pct / Col Pct / Tot Pct	GAL# STAMPED 1	INCISED 2	COBALT BLUE 3	Row Total
MILKCROCK	1	Count	8			8
		Row Pct	100.0			8.2
		Col Pct	9.6			
		Tot Pct	8.2			
MILKPAN	2	Count	8			8
		Row Pct	100.0			8.2
		Col Pct	9.6			
		Tot Pct	8.2			
JAR/CHURN	3	Count	47	10	2	59
		Row Pct	79.7	16.9	3.4	60.2
		Col Pct	56.6	76.9	100.0	
		Tot Pct	48.0	10.2	2.0	
JAR/CROCK	4	Count	18	2		20
		Row Pct	90.0	10.0		20.4
		Col Pct	21.7	15.4		
		Tot Pct	18.4	2.0		
JUG	6	Count	2	1		3
		Row Pct	66.7	33.3		3.1
		Col Pct	2.4	7.7		
		Tot Pct	2.0	1.0		
		Column Total	83	13	2	98
			84.7	13.3	2.0	100.0

Chi-Square	Value	DF	Significance
Pearson	5.92024	8	.65617
Likelihood Ratio	8.43116	8	.39253
Mantel-Haenszel	1.05800	1	.30367

Minimum Expected Frequency - .061
Cells with Expected Frequency < 5 - 10 OF 15 (66.7%)

Table 6.26 Crosstabulation of Vessel Form (VFORM) and Gallon Number Location (GALLOC) for all Identifiable Vessel Sherds from the Cranston-Donaldson Pottery.

VFORM by GALLOC

VFORM	Count / Row Pct / Col Pct / Tot Pct	GALLOC: BODY 1	INSIDE ANDLE 2	H ON RIM 3	Row Total
MILKCROCK	1	80 90.9 14.0 13.4		8 9.1 88.9 1.3	88 14.7
MILKPAN	2	32 97.0 5.6 5.4		1 3.0 11.1 .2	33 5.5
JAR/CHURN	3	233 92.8 40.9 39.0	18 7.2 100.0 3.0		251 42.0
JAR/CROCK	4	69 100.0 12.1 11.6			69 11.6
JUG	6	156 100.0 27.4 26.1			156 26.1
	Column Total	570 95.5	18 3.0	9 1.5	597 100.0

Chi-Square	Value	DF	Significance
Pearson	66.93178	8	.00000
Likelihood Ratio	62.20156	8	.00000
Mantel-Haenszel	19.82247	1	.00001

Minimum Expected Frequency - .497
Cells with Expected Frequency < 5 - 9 OF 15 (60.0%)

Table 6.27 Crosstabulation of Gallon Number Type (GAL#) and Gallon Number Location (GALLOC) for all Identifiable Vessel Sherds from the Cranston-Donaldson Pottery.

GAL# by GALLOC

GAL#	Count / Row Pct / Col Pct / Tot Pct	GALLOC: BODY 1	INSIDE HANDLE 2	ON RIM 3	BODY NEAR BASE 5	Row Total
STAMPED	1	94	14	9	1	118
		79.7	11.9	7.6	.8	75.2
		77.0	63.6	81.8	50.0	
		59.9	8.9	5.7	.6	
INCISED	2	10	7		1	18
		55.6	38.9		5.6	11.5
		8.2	31.8		50.0	
		6.4	4.5		.6	
COBALT BLUE	3	18	1	2		21
		85.7	4.8	9.5		13.4
		14.8	4.5	18.2		
		11.5	.6	1.3		
Column Total		122	22	11	2	157
		77.7	14.0	7.0	1.3	100.0

Chi-Square	Value	DF	Significance
Pearson	15.53045	6	.01651
Likelihood Ratio	13.84643	6	.03140
Mantel-Haenszel	.03104	1	.86014

Minimum Expected Frequency - .229
Cells with Expected Frequency < 5 - 7 OF 12 (58.3%)

utilitarian ceramics (Rice 1981); (2) sample size can affect variation, particularly for small samples; and (3) access to nonlocal stonewares was restricted during the nineteenth century in Denton County, and few farmstead families would have been able to obtain stonewares made elsewhere. This restricted access effectively put an upper limit on the range of variability that was far less than would have been possible if access to nonlocal ceramics had not been restricted.

Some 66.7% to 100% of the vessels from these farmstead assemblages are from Denton County potteries. No nonlocal vessels were found among the stonewares recovered from 41DN289 and 41DN410. Of the other three farmsteads, the highest number of foreign vessels occurred at 41DN79, with 33.3% nonlocal, followed by 41DN77 with 17.1%, and 41DN466 with 5.4% nonlocal vessels. This variability in local versus nonlocal stoneware vessels at these farmsteads reflects both access (41DN79) and temporal (41DN77) differences. Of the nonlocal stoneware vessels at 41DN79, two were European ale bottles and two were utilitarian vessels from East Texas potteries. One East Texas vessel has an alkaline glaze, while the other is bristol glazed. At 41DN77, however, all of the nonlocal vessels were acquired during the early 1900s near the end of site occupation and are bristol glazed on the interior and exterior.

Like the Denton County pottery-kiln assemblages, the majority of the vessel sherds from these five farmsteads have natural clay slips on the interior and salt glazes on the exterior (Table 6.28). Excluding nonlocal vessel sherds, the remainder have a natural clay slip interior and exterior. The absence of natural clay interior and

Table 6.28 Interior and Exterior Glaze Frequencies for the Farmstead Sherds/Vessels.

Farmstead	NC/Salt		NC/NClay		NC/Br		Alk/Alk		Br/Br		European	
Site	S	V	S	V	S	V	S	V	S	V	S	V
41DN77	35	18	17	11	4	1			11	5		
41DN79	41	8					3	1	1	1	3	2
41DN289	56	20										
41DN410	28	14										
41DN466	155	36	58	14			8	2			1	1
Totals	315	96	75	25	4	1	11	3	12	6	4	3

exterior vessels at 41DN79, 41DN289, and 41DN410 suggests that the families at these farmsteads continued to purchase only NC/Salt vessels although other glaze types were available. Only 41DN289 was abandoned before NC/NC vessels became common. The longer occupation spans at 41DN77 and 41DN466 (see Chapter 4) are supported by the stoneware data, with bristol-glazed vessels common in the early twentieth century (NC/Br and Br/Br) occurring in these assemblages.

The vessel forms, rim profiles, manufacturing methods, and decorative methods and forms found in the farmstead assemblage exhibit low variability and correlate with those occurring at the Denton County potteries. While the number of rim sherds recovered from the farmsteads was low, vessel forms included bottles, jugs, churns, crocks, pitchers, and churn/crock/milkbowls (Table 6.29). Bottles, preserve jars, and pitchers, which were uncommon forms at the Denton County potteries, were similarly uncommon at the farmstead sites. Of the vessels represented by base sherds, all but two vessels from the farmsteads were made on a potter's wheel; one vessel each from 41DN77 and 41DN466 have jolly mold bases, indicating these vessels are probably nonlocal in origin. Smooth bases were most common, but variability occurs within and among farm assemblages similar to the variability evident in the Cranston-Donaldson and Roark-Griffith sherd collections. Cobalt blue hand-painted motifs occurred on two vessels from 41DN77 and four vessels from 41DN466; all appear to have been made in Denton County. One vessel from 41DN466 has a cobalt blue stencil makers' mark and appears to be nonlocal in origin. Like the pottery-kiln

Table 6.29 Vessel Form Frequencies for the Farmstead Sherds/Vessels.

Farmstead Site	Bottle V	Bottle S	Jug V	Jug S	Churn V	Churn S	Crock V	Crock S	Pitcher V	Pitcher S	Churn/Crock[1] V	Churn/Crock[1] SV
41DN77			7	4	5	2	2	2			5	1
41DN79			1	1							19	2
41DN289											17	4
41DN410			2	1			6	2			2	2
41DN466	1	1	6	2	28	5	22	4	3	1	43	5
Totals	1	1	16	8	33	7	30	8	3	1	86	14

[1] Churn/Crock includes all sherds that could not be distinguished between these two forms.

assemblages, cobalt blue decorations occur only on farmstead vessels with salt-glazed exteriors (NC/Salt). An incised #2 gallon number appears on a Denton County NC/Salt vessel at 41DN289. The remaining vessels from each of these assemblages are undecorated like the majority of the vessels made at the Denton County potteries.

The farmstead assemblages exhibit greater attribute variability than the pottery-kiln assemblages. This greater variability reflects the acquisition of stonewares from several Denton County pottery-kilns, as well as vessels from potteries outside Denton County. This variability includes acquisition of a wider range of glaze styles and vessel forms not produced at the Denton County potteries.

Summary Vis-A-Vis Rice's Model

Pottery-Kiln Sites

The ceramic attribute analysis of sherds from the Cranston-Donaldson and Roark-Griffith potteries and the five farmstead sites in Denton County reveals that many of the correlations between ceramic attributes and production specialization asserted by Rice (1981) are not supported by an examination of these ceramic assemblages (Table 6.30). Rice posited that in the absence of identifiable production loci, archaeologists must study ceramic assemblage variability in order to infer production strategy, i.e., specialized or nonspecialized. She selected four attribute classes: resources, manufacturing method, vessel form, and decoration/style and specified that for utilitarian ceramics:

> Standardization may emphasize reduced variety in behavior and in the product. Standardization of utilization of raw materials, standardization or simplification of manufacturing methods (mass production, routinization), standardization of shapes, sizes, colors, etc., all would fall into this realm (Rice 1981:220).

Resource Attributes

Specifically, Rice makes three assertions about resource attributes: (1) resource attributes will exhibit the first evidence of a change in production from nonspecialized to specialized (Rice 1981), (2) very limited diversity in the resource attributes in a ceramic assemblage may be interpretable in terms of restricted access to resources and/or standardization of production activities, for example in clay or glaze preparation (Rice 1989:113), and (3) specialized production represents a situation in which resource access is restricted to a particular social segment, or subset of the population (Rice 1981:220; 1991:259). These assumptions remain an integral part of her model today (Rice 1991).

Among the explanations Rice evokes for the change from nonspecialized to specialized production is the assumption that this change will result as "individuals or families who by chance or design live closer to clay sources or are better potters find themselves making more and more pottery, with which they may enter into exchange relationships" (Rice 1981:220). This reduction in the number and/or kinds of resources utilized by potters is expected to represent greater exploitation of particular resources that work satisfactorily and/or to which potters have use rights (Rice 1981).

Table 6.30 Summary of the Relative Standardization or Variability of Specific Ceramic Attributes within the Four Major Ceramic Classes Defined by Rice (1981).

Attributes	Pottery-Kiln Sites	Farmstead Sites
Resources:		
Interior glaze	standardized to type (composition not examined)	variable to type--natural clay, alkaline, bristol
Exterior glaze	standardized to type (composition not examined	variable to type--salt, natural clay, alkaline, bristol
Paste	variable--see Chapter 5	variable--see Chapter 5
Manufacturing:		
Method	relative standardization-- a. hand-throwing limited to handles and kiln furniture b. potter's wheel used for all vessel forms c. molds used for flower pots, pipes, and tiles	relative standardization-- a. almost all vessels were made on a potter's wheel b. molded vessels limited to late forms dating near the turn of the century or to the 20th century
Bases	variable-- a. several types used b. not standardized to vessel form or exterior glaze	variable-- a. same as for kiln sites
Vessel Form:		
Utilitarian vs. Elite	standardized--only utilitarian vessels made	standardized--only utilitarian vessels found
Vessel Types	standardized-- a. limited range of vessel forms produced at each pottery-kiln site b. similar frequency of vessel types at Cranston-Donaldson and Roark-Griffith potteries	variable to standardized-- a. similar, limited range of vessel forms found at each farmstead, but b. some foreign vessels c. frequency of vessel form types varies among farmsteads (some of which may reflect sample size)

Table 6.30 Summary of the Relative Standardization or Variability of Specific Ceramic Attributes within the Four Major Ceramic Classes Defined by Rice (1981) (continued).

Attributes	Pottery-Kiln Sites	Farmstead Sites
Interior Glazes	standardized across vessel form classes	variable across vessel form classes
Exterior Glazes	variable across vessel form classes	variable across vessel form classes
Rim Diameter	variable across vessel form classes	variable across vessel form classes; insufficient sample sizes
Handle Type	relatively standardized to vessel form, some variability within specific form classes	insufficient sample
Decoration:		
Presence/ Absence of Decoration	relatively standardized--low frequency of decorated vessels	relatively standardized--low frequency of decorated vessels
Decoration Type	largely standardized--primarily cobalt blue oxide; highly variable motifs	insufficient sample
Vessel Form	variable across vessel form classes	insufficient sample
Presence/ Absence of Makers' Marks	relatively standardized--primarily unmarked	insufficient sample
Makers' Marks	relatively standardized--primarily stamped; some temporal variation	insufficient sample
Exterior Glaze/Makers' Marks	relatively standardized--makers' marks and decoration largely limited to salt-glazed vessels	insufficient sample

Table 6.30 Summary of the Relative Standardization or Variability of Specific Ceramic Attributes within the Four Major Ceramic Classes Defined by Rice (1981) (continued).

Attributes	Pottery-Kiln Sites	Farmstead Sites
Location of Makers' Marks	relatively standardized--predominately limited to upper body of vessel	insufficient sample
Gallon Number Type	variable--primarily stamped but other types occur and are variable across vessel form classes	insufficient sample
Exterior Glaze/Gallon Number	variable across exterior glaze classes	insufficient sample
Location of Gallon Number	variable across exterior glaze and vessel form classes	insufficient sample

Among the resources that may become restricted are clays and slips or glazes. Changes in glaze access are discussed here, while clay access is discussed in Chapter 5.

Clearly we cannot excavate the "reasons" particular individuals began producing ceramics for use by other households or what "rights" these individuals had or did not have with respect to particular resources. Similarly, our understanding of ceramic specialization is not dependent on knowing these behavioral aspects of production. While these behaviors may be appropriate for ethnographic studies of production, they are not necessarily appropriate for an empirical examination of ceramic production in the archaeological record.

By assuming that ceramic specialization correlates with a reduction in resource variability, Rice's model negates the possibility that specialized production may occur without a change in resource procurement or preparation. Similarly, such a correlation does not allow for the utilization of new resources or experimentation except in the production of "elite" ceramics (Rice 1981).

Rice asserts that this reduction in resource variability is associated with a change in production specialization and social complexity, but acknowledges that this change from nonspecialized to specialized production has not been adequately addressed (Rice 1991:259). She further indicates that in order to examine this reduction in resource access, archaeologists must have an understanding of the geological variability of the local environment, including the availability of clay and temper sources (Rice 1989). Although such an examination of the geological variability of Denton County (Chapter

4) revealed that a number of suitable clay outcrops were available to stoneware potters in the county, these data do not indicate that clay or glaze resource access was restricted (Chapter 5).

My examination of the glaze types used by potters in Denton County revealed that some potters were conservative in their selection of glazes. This conservatism, however, cannot be correlated with a restriction in resource access. Alkaline glazes were used throughout the South, including East Texas, but none of the potters in Denton County produced alkaline-glazed vessels. Further, although bristol glazes were being used elsewhere in Texas, Ries (1908) reported that the potters at both the Roark-Griffith and Kimbrough potteries produced only salt and natural clay slipped vessels. This continued use of salt and natural clay slip glazes by Denton County potters, after other glazes became available, indicates that glaze production and usage was largely standardized during the period being studied (see Chapter 4 for production process).

By assuming that ceramic specialization correlates with a reduction in resource variability, Rice's model fails to account for the possibility that specialized production may occur without a change in resource procurement access patterns or preparation, nor the utilization of new resources or experimentation except in the production of "elite" ceramics (Rice 1981). When Texas potters began using bristol glazes, they applied them to their traditional utilitarian vessel forms.

Manufacturing Methods

Rice suggests several avenues for identifying production methods. One approach focuses on identifying the relative skill of the potters based on the "apparent proficiency" necessary to produce specific ceramic classes or "apparent mass production," which will be evident by the recovery of numerous identical and/or standardized ceramics. A second approach involves the recovery of production tools, raw materials, and waster vessels and sherds from production loci (Rice 1981). The first approach is more commonly applied than the second, and relies on the assumption that ceramic variability can be correlated with production methods and the "intended" consumers. In this framework, skill is associated with elite ceramics, while mass production is associated with utilitarian ceramics (Rice 1981; 1991:266). Not only are there no criteria or scales of measurement for defining skill, but no theory exists to explain these assumed correlations.

Rice (1981:223) further posits that the production of elite ceramics will be the first in which specialized production will take place, and this change from nonspecialized to specialized production will occur as competition and differentiation increase among social groups. While the importance of socio-economic-political change in this process is less evident in later discussions (Rice 1989, 1991), the correlation between elites and specialized production continues to be part of Rice's model (Rice 1991).

Setting aside this assumption, it is possible to address Rice's assumptions about utilitarian ceramic production. Rice asserts that while elite ceramics will initially exhibit elaboration (an increase in variability among attribute classes), utilitarian ceramics will become standardized. This standardization will include technological changes in production methods, such as the use of kilns, molds, and an "assembly-line" routinized approach to production (Rice 1981, 1987). Further, "the premise is that a small number of skilled producers manufacturing pottery will adhere to a greater or lesser extent to principles of cost effectiveness, quality control, and mass production, leading to homogeneity or standardization of the products" (Rice 1987:203).

While ceramic attributes can be used to examine manufacturing methods or technology, e.g., firing temperature, firing conditions, temper types, and forming techniques (i.e., hand-formed, wheel-thrown, molded), Rice's assertions about correlations between specific methods (as indicated by molds, stackable vessels, uniform shapes and sizes, and the like) and specialization may not be supported (Rice 1981, 1987). Specialized production can occur if production is by hand techniques, without the potter's wheel or molds. Specialized production does not refer to <u>how</u> the ceramics were made, but rather to who was involved in production, where production occurred, and the distribution of the finished ceramics. In other words, specialized production is defined as a production carried out by a few producers outside the realm of individual households, with the distribution of the finished ceramics occurring across nonproducing households (cf. Rice 1981:219).

My ceramic analysis of stoneware production in Denton County revealed that production was specialized, being carried out by a small number of potters using both potters' wheels and hand-throwing techniques. This production occurred at a few specialized activity areas, i.e., stoneware pottery-kiln sites, and evidence of kilns, waster sherds, and specialized buildings (e.g., work sheds) was found (see Chapter 4). Ceramics made at these pottery-kiln sites were recovered from farmstead sites in this county (see above discussion of farmsteads and Chapter 5). Among the sherds from both the pottery-kiln sites and the farmstead sites are sherds that are poorly fired, incompletely fired, have burned glazes, are warped or misshapened, or are poorly glazed, indicating the difficulty in sometimes controlling firing conditions. Overall, however, the recovery of similar vessel forms, shapes, and glazes from the ceramic assemblages at pottery-kiln sites in Denton County indicates that production methods were similar across potteries (see Table 6.30).

Vessel Form

Rice makes contradictory assertions about the relations among vessel form and production specialization. Foremost, she correlates elite vessels with the initial appearance of specialization, and asserts that specialized utilitarian ceramics will be produced in large volumes and characterized by standardized forms, types, pastes, and the like, while low volume elite ceramics may be characterized by either variable or standardized attributes (Rice 1981:223). In 1991, however, Rice notes that whether or not large volumes of waster sherds can be correlated with specialized production and low volumes with nonspecialized production remains untested (Rice 1991). Also, while Rice (1981, 1989) applied her specialization model to Mayan ceramics from the Barton Ramie site in Belize, utilizing several dimensions, including vessel form, she asserts that vessel form (shape, type, or function) may or may not be highly variable, being less likely than vessel measurements to provide information on production (Rice 1989:113).

If, as Rice proposed, specialized production of utilitarian ceramics is directed by considerations of cost-effectiveness and quality control, the finished ceramics should be highly standardized in form, type, paste, and vessel measurements, and these relations should be visible within ceramic assemblages (Rice 1981, 1987, 1989, 1991). In order to determine if these ceramics were made by specialists, Rice (1981:221) suggested the use of distribution curves and several statistics, including range, mode, skewness, and kurtosis to assess how well the potters achieved the "ideal type," all the while, recognizing that a number of factors may affect the results, e.g., sampling, skill, multiple producers, and purposeful manufacturing of several distinct types (Rice 1981:221-222).

Although Rice's assertion--that the goal or outcome of specialized utilitarian ceramic production is to produce a large volume of standardized ceramics--may be appropriate for some modern workshops, it may not be appropriate for all prehistoric or historic potters. This assertion is largely untested both in ethnographic and archaeological contexts. The archaeological assemblages at the Denton County potteries provide a record of the discarded waster sherds, but no indication of the volume of vessels produced on a seasonal or yearly basis.

My analysis of the stonewares from waster piles at potteries in Denton County revealed that the local potters produced a limited range of fairly standardized utilitarian stonewares. These sherds indicate that potters in Denton County produced a limited range of vessel forms, and that these forms were similar across potteries. Within vessel form categories, e.g., jugs, only a small range of shapes and rim forms were made at each pottery. Variations in vessel shapes, rim forms, and vessel measurements largely represent nonsignificant deviations. Without manufacturing methods for ensuring standardization, e.g., molds, the finished ceramics will be variable, even though production was limited to a small number of skilled potters. In this context, variation in vessel form, rim form, or vessel measurements may or may not provide direct indications of vessel specialization (see Table 6.30).

Since Rice's model was published in 1981, a number of researchers using standardization have found variability in vessel forms, size classes, and vessel measurements among modern craft specialists, leading Rice (1991:278) to state,

> Expectations revolve around degrees of standardization or diversity of the pottery and may be measured on dimensional, formal, decorative, or technological variables. This strategy for investigating production is an attractive one, ... [however] we do not know the truth of these assumptions about variability in pottery or the direction and strength of their relationship to production organization. It is important to test them in ethnographic situations where productive arrangements can be known in order to determine whether the products of specialists really are more standardized (and, if so, in which attributes) and whether those of nonspecialists are less" [emphasis added].

Decoration/Style

Although Rice (1987, 1989) assumes that of her four classes, attributes pertaining to decorative methods and styles will be most affected by nonproduction related factors, she asserts that elite vessels, which are intended for limited distribution among a particular social segment, will exhibit "elaboration" of decoration/style followed by standardization (Rice 1981, 1987, 1989). This change in decoration/style among elite ceramics, however, is not correlated with production specialization in a predictable way, since Rice indicates that some elite ceramics may be standardized, while other elite vessels exhibit elaboration, with no "one-to-one relationship between the degree of standardization, diversity, or elaboration in the decorative attribute system and the actual productive arrangements" (Rice 1989:113). However, among utilitarian ceramics intended for the "general populace" decoration/style will be more standardized in specialized production strategies than nonspecialized arrangements (Rice 1981).

My analysis of decorative attributes among Denton County stonewares indicates that local potters produced largely undecorated ceramics for household consumption across social segments. No evidence was found indicating that the presence or absence of decorative attributes, or the occurrence of particular decorative methods or styles is directly associated with production strategies or social status. Some decorative variability, however, may be associated with specific potters, e.g., T. J. Donaldson at the Cranston-Donaldson Pottery. While hand-painted motifs were only found associated with salt-glazed stonewares, other decorations, such as gallon numbers and makers' marks occurred across glaze types, vessel types, and potters (see Table 6.30). Each of these decorations, however, was more common on particular vessel forms, with milkpans, preserve jars, and jugs being less commonly decorated.

Farmstead Sites

My study of ceramic assemblage variability at these five farmsteads indicates that stonewares were obtained from pottery-kiln sites not directly associated with any of the farmsteads. Further, farm families acquired stonewares from several Denton County pottery-kiln sites, as well as manufacturing sources outside the county. These archaeological findings support the historical information that indicates production was carried out by a small number of individuals at specialized sites rather than at the household level.

Like the pottery-kiln assemblages, these farmstead samples contain primarily undecorated body sherds, with smaller frequencies of bases and rim sherds. These sherds are predominantly from locally-made natural clay slipped or salt-glazed crocks, churns, jugs, and jars; a few imported sherds were found, including several British ale bottle fragments. Rim diameters could not be measured because of the paucity and fragmentary nature of the rim sherds.

The stoneware assemblage variability of these farmsteads reflects not only the attribute variation among the Denton County pottery-kiln sites, but also manufacturing sources from outside the county (see Table 6.30). Further, the variability evident among these farmstead assemblages may reflect variation resulting from differential patterns of stoneware acquisition, breakage, and discard by individual farm families, which may not represent the range of stonewares acquired by these families or available to them by any single pottery or group of stoneware potteries operating in Denton County.

CHAPTER 7

SUMMARY, EVALUATION, AND CONCLUSIONS

Introduction

Rice's pioneering, yet discordant model of ceramic specialization (Rice 1981) has undergone both modification and criticism since it was published in 1981, but continues to be the mainstay of current specialization research. In her model, Rice addresses the critical need for theoretical evaluation of production specialization in archaeology, emphasizing that a long-standing reliance on ethnographic criteria has resulted in poorly developed archaeological definitions of specialization and few empirical archaeological correlates for identifying specialization (Rice 1981:219). Although a number of specialization studies (see Chapters 1 and 2) have been conducted in the twelve years since she first published her model, Rice, as well as others, continues to struggle with the absence of a unifying theory of specialization, most particularly an accepted definition of <u>what specialization is</u> or <u>how it can be identified</u> in the archaeological record (e.g., Arnold 1991; Clark and Parry 1990; Costin 1991; London 1991; Rice 1991).

Two critical components continue to underpin Rice's model: an <u>attribute model</u> specifying that a correlation exists between specialization and kinds of artifact attributes and a <u>distribution model</u> that specifies that a correlation occurs among specialization and the distributions of production loci and the finished products (see Chapters 2, 5, and 6). Specifically, Rice asserts that specialization can be identified in the archaeological record by examining either of two scales of artifact attribute analysis--"[the] internal variability of the products, or by studying the standardization or lack of variability evident in the collection" (Rice 1989:110). Whereas the attribute model is widely held by many researchers, Rice argues that models relating product standardization, i.e., attributes, to the organization of production have not been widely or adequately tested with either with ethnographic or archaeological data (Rice 1989:117). Rice emphasizes that the primary importance of the attribute model to specialization studies exists primarily because archaeologists often lack direct indicators, i.e., production loci, resource loci, and processing areas and, therefore, must rely on available information--pottery sherds (Rice 1989:110).

Attribute Model

The attribute model specifies that ceramic attribute and assemblage variability are directly correlated with specialization, allowing specialization to be identified in the archaeological record by measuring changes in the relative attribute variability of both finished vessels and assemblages recovered from production and nonproduction sites (Rice 1981, 1989, 1991). The attribute model arose, in part, from generalizations about prehistoric ceramic production obtained from ethnographic studies of potters and from early archaeological studies of complex societies, but remains largely untested.

The attribute model is increasingly challenged as possibly inappropriate, while the distribution model is widely accepted as appropriate for identifying specialization (Chapters 5 and 6; see also Arnold 1991; Costin 1991). Given that researchers formulated the attribute model because the distribution model was touted as untestable in many prehistoric contexts, a serious void in identifying specialization in the archaeological record occurs if the attribute model is rejected in turn.

The attribute model specifies relations between specialization and two scales of attribute variation: (1) artifact attributes, and (2) assemblage attributes. At the artifact attribute scale, ceramics produced by specialists will exhibit highly standardized attributes, and those made by nonspecialists will be highly variable. This generalization, widely accepted by many archaeologists and ethnographers alike, does not specify which attributes will be standardized, which will become standardized first, or how that standardization will be exhibited for each attribute. This lack of specificity arises in consequence of a lack of theory, in particular mechanisms such as selection, which are responsible for attribute states.

Rice, however, specifies paste composition as the most reliable attribute for identifying specialization. She asserts a causal relation between the appearance of specialized production and a reduction in resource access to a small subset of the population. By asserting this causal relationship, Rice's model specifies that a reduction in resource access will always result in specialization, and specialization will not occur if resource access is not reduced. No critical level of access is specified.

This relation between paste composition and specialization does not remain constant in Rice's model, however (Chapter 2). This fluctuating relation is most evident among elite ceramics, which may include both vessel classes with highly standardized paste compositions and vessel classes with highly variable paste compositions. In order to address this fluctuating relation, Rice proposes that variable vessel classes occur because of competition among potters (Rice 1981).

Among the wide range of other ceramic attribute classes, Rice specifies relations for only two attribute classes--technological attributes and functional attributes--which are assumed to be highly standardized, resulting from the use of routinized and/or mass-production methods (Chapters 2, 5, and 6). Within this framework, Rice makes two critical assumptions: (1) nonspecialists do not utilize routinized or mass-production methods, and (2) standardized technological or dimensional attributes cannot be achieved without routinized or mass-production methods. Because Rice assumes vessel form and decoration/style are more vulnerable to factors not related to specialized production (Rice 1981, 1987, 1991), she does not specify empirical relations between these attribute classes and specialization (Chapter 6).

Distribution Model

The distribution model specifies that specialization involves a change in the distributions of production loci and the finished ceramics (Chapters 2 and 5). Specifically, nonspecialized production occurs at the household level with each family producing ceramics for their own use, whereas specialized production is carried out by a subset of the population with the finished ceramics distributed across nonproducing households (Rice 1981, 1987, 1989, 1991). This distribution model has proved most useful in examining production evidence among complex societies because it approximates the definition of craft specialization current in anthropology and is more widely accepted than the attribute model.

The distribution model specifies two criteria for identifying specialization: (1) the distribution of production loci, and (2) product distributions, with specialization involving a change in the relations between production loci, the finished ceramics, and each household. While neither criteria is sufficient, Rice and others more frequently examine the distribution of the finished ceramics than the relations between production loci and household loci. This emphasis on the finished ceramics arose, in part, because of a poor ability to identify low-volume production loci such as those associated with households and specialized production loci where ceramics were fired in open-air hearths or shallow-pit hearths rather than kilns. Rice assumes that in a complex society, specialized production loci are identifiable by kilns, waster sherds, storage areas, unused clay, and tools, equipment, and molds.

Rice (1989) indicates that the two criteria specified in the distribution model can be inferred using several indirect indicators, particularly through the characterization of paste composition. She asserts that geochemical characterization methods, although not without problems, provide the most useful approach for identifying resource and/or production loci (Rice 1981, 1987, 1989). Specifically, the raw material sources used in ceramic production, the location of production sites, and the distribution of the finished ceramics can be identified through regional comparison of finished ceramics from production and nonproduction sites and clay and tempering material from raw material loci (Chapter 6).

Rice and others (e.g., Rice 1981; Brumfiel and Earle 1987; Peacock 1982; van der Leeuw 1977) continue to attach superfluous elements to the distribution model to the detriment of empirical examination of specialization (Chapter 2). Whether production is full-time or part-time, or whether specialists are "attached" or "not attached," i.e., produce for elite individuals or commoners, complicates the already archaeologically weak issue.

Rice provides a theoretical link between the attribute and distribution models through her emphasis on characterizing ceramic paste composition, which she takes to be the most critical ceramic attribute for identifying specialization. Particularly, specialization is defined by a reduction in paste compositional variability, which occurs as resource access is restricted to a small segment of the population (Rice 1981). Rice does not define similar causal correlations among other ceramic attributes and specialization (Rice 1981).

Predictive Expectations of Rice's Model

Attribute Model

The attribute model specifies a temporal change in ceramic attributes. Specifically, specialization involves a reduction in the range of paste types among ceramics, resulting from reduced resource access. Among the other ceramic attributes, the attribute model stipulates an empirical correlation between production methods and ceramic attribute standardization or variation.

To identify a reduction in paste compositional variability, this model requires that the number, distribution, and geochemical composition of all resource loci be known, and that the number of loci being utilized decreases through time (Chapter 6). Further, the empirical relations among these resource loci and the production loci must be determined and not assumed.

To identify a correlation between production methods and attribute variation, it is necessary to obtain <u>empirical</u> evidence of the production methods rather than relying on inferences <u>or</u> the relative standardization of specific ceramic attributes, e.g., vessel dimensions (Chapter 6). Particularly, the circular argument that "standardized" vessels indicate specialization, which is characterized by routinized or mass-production methods, must be replaced by independent evidence of the production mode, e.g., molds, potters' wheels, and coil lines on vessel sherds. This asserted correlation between production methods and attribute variation underpins Rice's model, although she acknowledges that it remains untested (Rice 1989, 1991).

Distribution Model

The distribution model assumes a spatial change in the relations among households, production loci, and the finished ceramics (Chapters 2 and 5). To identify specialization, this model requires that the distributions of household pottery-production sites be known, and that the finished ceramics can be identified to specific pottery-producing sites, thus indicating the relations between the production loci and each household.

North-Central Texas Stoneware Specialization

In order to test Rice's model, I gathered historical and archaeological data (Chapters 4, 5, and 6). Historical information was obtained on the temporal and spatial distributions of resource, production, and household loci, as well as data on production methods and specific potters. Archaeological data were obtained to verify this historical information and to examine those ceramic attributes that Rice identifies as appropriate for identifying specialization.

Historical Information

Historical data reveal that contemporaneous resource, production, and household loci were not coterminous as assumed by the distribution model. Among the potteries identified in the historical record are the Cranston-Donaldson, Daugherty, Donaldson (Cannon survey), Kimbrough, Lambert, Roark-Griffith, Serren, and the Wilson potteries. Early potteries were established near the outskirts of small communities, e.g., Alton and Lloyd; later potteries occur in Denton. While many potters were also farmers and established their pottery on the same property on which they resided, their house and domestic support buildings were spatially separate from the kiln, drying and processing sheds, and clay pits. Several potteries had clay pits located near the kiln(s), while many potters utilized clays from outcrops not located on the pottery property (Chapter 4). The available historical information revealed that clay outcrops occurred at four potteries--Cranston-Donaldson, Lambert, Roark-Griffith, and Wilson-Serren--with extant clay exposures occurring only at the Lambert Pottery.

This historical information reveals that while specialized pottery manufacture increased, the number of resource loci utilized by potters in Denton County also increased between 1850 and 1920 rather than decreased as expected in Rice's model (Chapter 4). While individual potters purchased rights to specific clay outcrops, some potters shared outcrops, and others obtained rights to newly identified outcrops and/or those abandoned by earlier potters. Additionally, several suitable clay outcrops, not utilized for stoneware production, were known historically (e.g., Acme Pits #1, 2, and 3 in Denton).

Information obtained from historical records on production methods revealed that many potters farmed and/or raised stock and, therefore, probably produced stonewares seasonally rather than year-round. Potters were trained using a guild system, and production methods and equipment included the use of a potter's wheel, weighing and measuring devices for determining vessel sizes and diameters, and some molds (Chapter 4).

The historical records (Chapter 3) were also used to recover information about each of the potters and pottery-laborers involved in stoneware production in Denton County. This information reveals that each pottery was operated by a small number of potters and laborers (Chapter 4 and Appendix A). Most of the Denton County potters who established potteries after 1870 were trained at the Cranston-Donaldson Pottery (e.g., Donaldson, Roark, and the Daughertys).

Archaeological Data

The archaeological data (Chapter 4) verified the historical information on production loci and provided information on: (1) artifact variability at two major potteries, (2) the spatial relations among production and nonproduction sites, and (3) the distribution of finished ceramics from specific potteries across households in the county. None of the household loci contained archaeological evidence of pottery production. The resource loci included large, open, mined clay pits (Acme Pits #1, 2, 3, and 4, Highway 380, and Lambert), filled pits at the Cranston-Donaldson and Roark-Griffith potteries, and clay exposures (Cannon survey and the Daugherty Pottery) (Chapter 4). The production loci were identified by waster sherd piles, kiln remains, outbuilding remains, and kiln furniture; no remains were found for the Kimbrough Pottery. Five nonproduction, consumer, loci were also considered. Each household locus was characterized by surface and/or subsurface domestic middens and remains of domestic structures.

In order to determine the relations among the resource, production, and household loci, microanalysis was conducted on clay samples from each of the resource loci and on the paste sherd samples from the production and household sites (Chapter 5), while macroanalysis was accomplished for all sherds from each of the production and household loci (Chapter 6). Paste composition was examined because Rice asserts that this is the most critical ceramic attribute for identifying specialization, and because of its potential for identifying resource loci, i.e., clay pits. The macroanalysis examined a suite of ceramic attributes that Rice (1981, 1987, 1989) selected as appropriate for identifying specialization. These attributes, grouped into four classes--resource, technology, vessel form/dimensions, and decoration/style--included glaze type, base type, vessel form, vessel dimensions, decoration, makers' marks, and gallon numbers.

No geochemical correlation was found between specific clay resource and production loci based on the microanalysis (Chapter 5). This lack of correlation may reflect several factors, including the mixing of clays from several pits, the addition of temper, or the alteration of the clay composition in the sherd pastes during production.

The microelemental analysis of the sherd pastes revealed that while some paste compositional overlap occurred among the Denton County potteries, at least 85% of the sherds were assigned to the pottery-kiln site where they were produced (Chapter

5). Among the marked CRANSTON, DONALDSON, and ROARK sherds, paste compositional signatures were identified for specific potters, i.e., John Cranston, Thomas Donaldson, and James Roark. The CRANSTON sherds exhibited greater paste variation than the DONALDSON and ROARK sherds, with two major compositional clusters being defined. One CRANSTON paste cluster was unique, not overlapping with either DONALDSON or ROARK, whereas the second overlapped with DONALDSON.

The microelemental paste analysis of the sherds from the five farmsteads revealed that each of these households acquired stoneware vessels from several pottery-kiln sites and their acquisition of stonewares reflected temporal and spatial changes in pottery production (Chapter 5). Early stonewares were purchased from potteries in the Alton area, whereas farmsteads occupied after 1870 acquired some stonewares from the Roark-Griffith Pottery in Lloyd and the Daugherty Pottery in Denton beginning in 1884. Few stonewares were recovered from the farmsteads that were assigned to the Cranston-Donaldson or Serren potteries although these were the two earliest potteries in the county and each operated for over 20 years. Farmstead sherds were most commonly assigned to the J. C. Lambert (ca. 1859-1860), Roark-Griffith (ca. 1871 to post 1920), and the B. and D. B. Daugherty Pottery (ca. 1884 to 1930s).

The macroanalysis proved largely unproductive for the sherds from the farmstead sites because of the small physical size of the recovered sherds. Few rim, base, or decorative sherds were found at the farmsteads (Chapter 6). Among the pottery-kiln sites, the large volume of sherds from the Cranston-Donaldson and Roark-Griffith potteries yielded valuable information on assemblage variation. While similar glazes, production methods, vessel forms, and decorative methods and motifs were used at both potteries, these attributes were variable within and between potteries (Chapter 5). Temporal changes are evident among many of these attributes such as vessel form, e.g., milkpans versus milkbowls, while other attributes exhibit evidence of cultural conservatism, e.g., glaze types, or potter-specific production choices, e.g., makers' marks and decoration methods and motifs.

In summary, the microanalysis of the clay and paste samples and the macroanalysis of the ceramic attributes fail to support Rice's attribute model. Although the historical data and the archaeological distribution data indicate that stoneware production in Denton County was specialized, no correlation was found between ceramic attribute standardization or variation and specialization, e.g., paste, vessel dimensions, vessel form, and rim shape.

The distribution model is supported by the microelemental paste analysis, which indicates that production loci and nonproduction loci were not coterminous as predicted for societies with specialized ceramic production. Each household locus acquired stoneware vessels from several contemporaneous pottery-kiln sites, all of which were spatially separate from the household sites examined in this study. None of the households that were studied were involved in the production of stoneware ceramics.

Significance of Rice's Model for Future

Specialization Studies

Rice's model of specialization is not unified as is indicated by her two discordant definitions of specialization, which are consistent with the attribute model and the distribution model respectively (Chapter 2). The attribute model defines specialization based on how the ceramics were made, i.e., with a high degree of skill or without, with routinized versus nonroutinized techniques, and with restricted or nonrestricted resources. Contrastively, the distribution model defines specialization based on who was involved in production, i.e., each household versus a small subset of the population, where production occurred, i.e., within each household or at specialized loci, and the distribution of the finished ceramics, i.e., within the households involved in production or across both ceramic producing and nonproducing households.

The discordant nature of Rice's account of specialization and the rejection of either or both the attribute and the distribution models has serious implications for specialization studies. Specialization models developed by Rice and others rely on both models to identify specialization in the archaeological record. The rejection of the attribute model based on my stoneware study invalidates Rice's model, which emphasizes the attribute model to compensate for a perceived lack of distribution data.

My stoneware study indicates that identifying specialization in the archaeological record requires: (1) rejecting the attribute model as it is currently defined. (2)

reemphazing acquiring empirical data appropriate to the distribution model, and (3) explicitly integrating these models of specialization into evolutionary theory, thereby providing a mechanism for examining production change. As used by Rice, the attribute model specifies correlations between production types, i.e., specialized or nonspecialized and specific attribute expressions. This model needs to be reformulated not to specify particular attribute expressions, but to define the relations between ceramic attributes and production type, e.g., geochemical analysis of paste composition to identify production loci or production methods. The attribute model fails fundamentally because specialization is functionally linked to who makes pottery not how it is made. As a result, the best this model can provide is a generalization about ceramic attribute expressions in different archaeological contexts. The distribution model of specialization is not rejected and can be strengthened by developing appropriate empirical criteria for identifying low-volume specialized production sites. Additionally, an explicit definition of the relations between ceramic attributes, including distributions, must be created within a framework capable of explaining attribute variation and change, utilizing mechanisms such as selection for examining change (Dunnell 1978, 1980, 1983; Leonard and Jones 1986; Wenke 1981).

Attribute Model

The temporal aspect of Rice's attribute model is critical to examining the change from nonspecialized to specialized production, but her predicted attribute changes, e.g., paste and dimensional standardization, are not supportable. These particularlistic attribute expressions must be replaced by a definition of the relations between attributes and specialization. Ceramic attributes are appropriate for examining production methods and establishing the empirical relations among resource, production, and nonproduction loci. Similarly, these attributes can be used to identify at which production sites sherds from particular households were produced, providing data sufficient for addressing the distribution model. Such an approach is needed to replace current emphasis on "inferring" production methods and on vessel and/or assemblage standardization or variation, the assumed "relative" level of skill involved in the production of particular vessels or vessel forms, and the like.

Distribution Model

Rice's distribution model is not rejected, although Rice and others have criticized its utility because of a lack of empirical distribution data in many prehistoric contexts. Several critical factors continue to affect our ability to adequately appreciate and utilize the distribution model: (1) the lack of a regional approach and poor criteria for identifying low-volume production sites without extant kiln remains, and (2) a long-standing emphasis on identifying resource loci or zones rather than both resource and production loci.

Poor criteria for identifying low-volume production sites reflect, in part, our initial identification of specialized production in the archaeological record at archaeological sites associated with complex societies. To identify specialization in less complex contexts, we must examine specialization on a regional scale and identify indications of low-volume ceramic production, e.g., small clusters of burned clay, unworked clay, waster sherds, tempering material, and hearths (Stark 1986), and artifact frequencies (Costin 1991).

In applying the distribution model, we also must address both resource and production loci. The identification of only resource loci or potential resource zones is inadequate for examining specialization. Without identifying production loci, we are left having to <u>infer</u> where production occurred and the attribute variation, e.g., paste composition, indicative of specific production sites.

Summary

In developing a model of specialization we need to explicitly define the relations between ceramic attributes and the distribution model. Many ceramic attributes are appropriate for identifying production methods, as well as for identifying resource and production loci and the distribution of the finished ceramics, although other attributes are more appropriate for examining production changes.

In order to identify specialization in the archaeological record we must strip Rice's model and others, of numerous untested and unsupportable assertions about the relations between specialization and particular ceramic attribute expressions. We must explicitly define empirical relations between ceramic attributes, e.g., paste composition and spatial distribution of the finished ceramics from individual production sites, and specialization within a framework, which defines mechanisms such as selection for explaining variation and change.

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APPENDIX A

POTTERS AND POTTERY LABORERS IN THE POPULATION CENSUS SCHEDULES FOR DENTON COUNTY, 1850-1920

This appendix was compiled from the population census schedules available for Denton County for the years of 1850, 1860, 1870, 1880, 1900, 1910, and 1920. The 1920 census schedules became available in 1992, and potters listed in this census are included here in order to better understand the changes in the stoneware industry in Denton County during the twentieth century. Both Robert Bradford and Monterville Griffith continued to work as potters into the 1920s, most probably at the Kimbrough Pottery, which became the Guy Daugherty Pottery in the 1920s.

The stoneware potters and pottery laborers are listed by post office (P.O) or district, dwelling number, and family number. The dwelling number and family number were assigned by the enumerator and reflects his census route. Based on the census data, five stoneware potteries were established in Denton County by 1860. The value of real estate and personal assets is listed for potters and pottery laborers when available.

1850 Denton County Census

No potters listed.

1860 Denton County Census

P. O. Denton

Dwelling No. 400 Family No. 401

Occupant	Age	Occupation	Birthplace
Lambert, Joseph C.	35	Master Potter	Ohio
, Mary K.	40	Wife	New York
, Joseph	5		Illinois
, Sarah L.	1		Texas

Value of Real Estate: $200.
Value of Personal Assets: $6000.

Dwelling No. 401 Family No. 402

Occupant*	Age	Occupation	Birthplace
Right, Samuel	19	Potter Hand	New York

* only boarder listed here

Value of Real Estate: $0.

Value of Personal Assets: $0.

Dwelling No. 527 Family No. 528

Occupant	Age	Occupation	Birthplace
Cranston, John	59	Master Potter	Ireland
, Nancy	49	Wife	Tennessee
, Mary J.	19		Missouri
Stephens, George*	15	Appr. Potter	Missouri

*George Stephens is probably incorrectly recorded and should be George S. Cranston, John and Nancy Cranston's son.

Value of Real Estate: $6000.
Value of Personal Assets: $3000.

Dwelling No. 534 Family No. 535

Occupant	Age	Occupation	Birthplace
Albert, William	26	Hired Hand	Illinois
, Mary A.	21	Wife	Illinois
, William F.	2		Texas
Donaldson, Thomas	21	Potter	Missouri

Value of Real Estate (Albert): $0.
Value of Personal Assets (Albert): $200.

Dwelling No. 535 Family No. 536

Occupant	Age	Occupation	Birthplace
Serren, Augustus	31	Master Potter	New York

Value of Real Estate: $5700.
Value of Personal Assets: $3500.

Dwelling No. 537 Family No. 538

Occupant	Age	Occupation	Birthplace
Campbell, J. A.	30	Potter	Virginia
, Clerrita	19	Wife	Illinois

Value of Real Estate: $0.
Value of Personal Assets: $250.

1870 Denton County Census

P. O. Denton Precinct 1

Dwelling No. 45 Family No. 45

Occupant	Age	Occupation	Birthplace
Serren, Augustus	41	Potter	New York
, Esther	24	Wife	Texas
, John L.	3		Texas
, James	2		Texas
, Mary F.	1		Texas
Barny, F.	30	Farmer	Iowa

Value of Real Estate: $2500.
Value of Personal Assets: $2500.

Dwelling No. 46 Family No. 46

Occupant	Age	Occupation	Birthplace
Hines, Melville L.	42	Potter	Alabama
, Francis	18	Wife	Texas
, George	3		Texas
, John G.	0.7		Texas

Value of Real Estate: $0.
Value of Personal Assets: $0.

Dwelling No. 50 Family No. 50

Occupant	Age	Occupation	Birthplace
Wilson, William	37	Potter	Indiana
, Susannah	42	Wife	Virginia
, Nancy J.	15		Illinois
, Mary	12		Texas
, Malinda	10		Texas
, Caroline	8		Texas
McChel, Sylvester	7		Texas

Value of Real Estate: $500.
Value of Personal Assets: $800.

Dwelling No. 51 Family No. 51

Occupant	Age	Occupation	Birthplace
Warren, Martin	28	Potter	Missouri
, Margaret	25	Wife	Arkansas
, Annis B.	5		Texas
, John C.	3		Texas
, Henderson	0.4		Texas
, James	0.4		Texas

Value of Real Estate: $500.
Value of Personal Assets: $600.

Dwelling No. 102 Family No. 102

Occupant	Age	Occupation	Birthplace
Cranston, Nancy	55	Wife	N. Carolina

Value of Real Estate: $483.
Value of Personal Assets: $375.

Dwelling No. 102 Family No. 103

Occupant	Age	Occupation	Birthplace
Cranston, George	32	Potter	Missouri
, Lucinda	26	Wife	Missouri
, Columbus	9		Texas

Value of Real Estate: $770.
Value of Personal Assets: $275.

Dwelling No. 102 Family No. 104

Occupant	Age	Occupation	Birthplace
Roark, James	33	Potter	Missouri
, John C.	6		Texas
, George M.	4		Texas
, William M.	4		Texas
, Charles H.	2		Texas
Dennis, Benjamin	15	Day Laborer	Louisiana
Donaldson, Allen	48	Physician	Tennessee

Value of Real Estate: $0.
Value of Personal Assets: $0.

Dwelling No. 103 Family No. 105

Occupant	Age	Occupation	Birthplace
Donaldson, John W.	39	Potter	Tennessee
, Nancy Turner	32	Wife	Arkansas
, Hannibal	10		Arkansas
, Thomas	6		Arkansas
, John	0.7		Texas
Murry, Huberd	15	Day Laborer	Arkansas

Value of Real Estate: $120.
Value of Personal Assets: $250.

1880 Denton County Census

District 102

Dwelling No. 80 Family No. 85

Occupant	Age	Occupation*	Birthplace
Cranston, George	43	Retired Potter	Missouri
, Lucinda	37	Wife	Missouri
, Chris C.	18	Unemployed Labor.	Texas
Donaldson, Allen	63	Retired Physician	N. Carolina

* George and Christopher Columbus Cranston are listed as having been unemployed 6 months (from Cranston Pottery), while Allen Donaldson, an uncle, has been unemployed for 12 months.

Dwelling No. 122 Family No. 126

Occupant	Age	Occupation	Birthplace
Donaldson, Thomas J.	40	Potter	Missouri
, Mary	31	Wife	Texas
, Mark T.	11		Texas
, Mary	7		Texas
, John	4		Texas
, Alice	2		Texas
, Eliza	0.4		Texas
Tipton, James	17	Servant*	Alabama

*James Tipton later involved in the Cranston Pottery and the Kimbrough Pottery

Dwelling No. 126 Family No. 131

Occupant	Age	Occupation	Birthplace
Griffith, Monterville	45	Potter	Illinois
, Amanda	64	Wife	Pennsylvania
, Mary J.	14		Illinois

Dwelling No. 126 Family No. 132

Occupant	Age	Occupation	Birthplace
Griffith, James	22	Potter	Illinois
, Pheba	24	Wife	Missouri
, Glessie	0.1		Texas

Dwelling No. 127 Family No. 133

Occupant	Age	Occupation	Birthplace
Tate, John H.	31	Pottery Laborer	Missouri
, Alace	19	Wife	Illinois
, Nellie	3		Missouri

Dwelling No. 130 Family No. 136

Occupant	Age	Occupation	Birthplace
France, David	39	Pottery Laborer	Ohio
, Ella	22	Wife	Texas
, Walter	6		Arkansas
, Harry	3		Texas

Dwelling No. 131 Family No. 137

Occupant	Age	Occupation	Birthplace
Bradford, Robert	25	Pottery Laborer	Texas
, Margaret	23	Wife	Kentucky
, Jessie	5		Texas
, Emily	0.6		Texas

Dwelling No. 132 Family No. 138

Occupant	Age	Occupation	Birthplace
Serren, Esther	33	Wife	Texas
, John L.	13		Texas
, Jessie	12		Texas
, Mary	10		Texas
, Martha	8		Texas

, Sarah E.	6		Texas
, William	5		Texas
, Green	2		Texas
Bowers, Charley	38	Pottery Laborer, Servant	Germany

Dwelling No. 162 Family No. 172

Occupant	Age	Occupation	Birthplace
Wilson, William	47	Potter*	Indiana
, Susanah	27	Wife	Virginia
, Caroline	1		Texas

* William Wilson is listed as having been unemployed for 9 months.

Precinct 6, District 108

Dwelling No. 367 Family 370

Occupant	Age	Occupation	Birthplace
Roark, James	43	Potter	Missouri
, Mary	30	Wife	Arkansas
, John	16	Potter	Texas
, George	14		Texas

Dwelling No. 370 Family 372

Occupant	Age	Occupation	Birthplace
Turner, Samuel	24	Potter	Arkansas
, Roda	64	Mother	Tennessee
Plumer, Melinda	27	Sister, Keeping House	Arkansas

1900 Denton County Census

Precinct 1

Dwelling No. 171 Family No. 171

Occupant	Age	Occupation	Birthplace
Serren, John L.	33	Pottery Man	Texas
, Ell Nora	25	Wife	Texas
, Eva L.	9		Texas

, Eula	6		Texas
, Clayal	1		Texas

City of Denton

<u>Dwelling No. 26 Family No. 26</u>

Occupant	Age	Occupation	Birthplace
Daugherty, D. B.	28	Potter	Texas
, Alma?	22	Wife	Texas
, Claude	5		Texas
, Boon (or Boone)	3		Texas
, Alma B.	1		Texas
Schroder, Herman	20	Boarder, Teamster	Germany
Brogan, J. W.	26	Boarder, Potter, unemployed 3 mos.	Massachusetts
Byers, J. R.	36	Boarder, Teamster	Illinois

<u>Dwelling No. 120 Family No. 122</u>

Occupant	Age	Occupation	Birthplace
Bradford, R. H.	45	Potter	Texas
, Maggie	43	Wife	Kentucky
, Edgar	18	Farm Laborer	Texas
, John	16	Potter, unemployed 2 mos.	Texas
, Gabe?	13	In school	Texas
, Bessie	10	In school	Texas
, Earl	7	In school	Texas

<u>Dwelling No. 153 Family No. 155</u>

Occupant	Age	Occupation	Birthplace
Crites, Jacob	36	Kiln Burner	Missouri
, Laura	13	In school	Missouri
, Jim?	9	In school	Missouri
, Percy	7	In school	Missouri
, Mackie	30	Sister, Keeps House	Missouri

Precinct 6

<u>Dwelling No. 101 Family No. 101</u>

Occupant	Age	Occupation	Birthplace
Griffith, Monterville	65	Potter	Illinois
, Amanda	70	Wife	Pennsylvania

1910 Denton County Census

City of Denton

Dwelling No. 147 Family No. 155

Occupant	Age	Occupation	Birthplace
Bradford, Robert	56	Potter & Farmer	Texas
, Margaret	55	Wife	Kentucky
, Henry	23	Laborer, odd jobs	Texas
, Earl	16	Laborer, odd jobs	Texas

1920 Denton County Census

City of Denton

East Sycamore Street,
Dwelling No. 64 Family No. 66

Occupant	Age	Occupation	Birthplace
Bradford, Robert	64	Potter at Potter Shop	Texas
, Margaret	64	Wife	Kentucky
, Henry	33	RR coal passer	Texas
, Earl	26	RR telegraph operator	Texas

Wilson Street,
Dwelling No. 211 Family 227

Occupant	Age	Occupation	Birthplace
Griffith, M.	85	Potter at Potter Shop	Illinois

APPENDIX B

DEED/TITLE HISTORY FOR THE DENTON COUNTY POTTERIES, 1850-1920

The data obtained from the deed/title (land tract) records archived at the Denton County Courthouse in Denton are summarized in this appendix. This data include information on the individuals who owned and operated stoneware potteries in Denton County during the 1850 to 1920s period. The Cranston-Donaldson and Roark-Griffith potteries are discussed first and in the greatest detail. Supplemental historical information from other sources such as newspapers, tax records, census records, historical monographs, and books is included where pertinent.

Cranston-Donaldson Pottery (41DN16)

The Cranston-Donaldson Pottery is located on the John S. Dickson survey (A-342) of 160 acres, which was patented in 1855. Before it became known that Thomas Donaldson worked at this pottery as a Master Potter and held partial ownership for a short period, the pottery was recorded as the Cranston Pottery. The Cranston-Donaldson Pottery is situated in the community of Alton which was settled about 1851 (sometimes called Old Alton and sometimes New Alton; see Chapter 4). It is located on the west edge of the Alton Church and Hickory Creek Cemetery property in the northeast corner of the John S. Dickson survey and on the east bank of a small branch of Hickory Creek. This pottery is located on the western fringe of Lewisville Lake and is about six miles south of Denton.

John Cranston purchased 3± acres in the northeastern corner of the John Dickson survey on August 23, 1854 for $239.30 (Denton County Deed Record A2:175; Denton County Deed Record A3:141). This same property was conveyed by Nancy Cranston (widow) to her son George Cranston on November 9, 1869 and included the "Cranston dwelling, outhouses, stone factories, fixtures," along with undivided interest in all potters' clay or clay mines located by A. H. Serren by virtue of Samuel Stephen's certificate conveyed by A. H. Serren to John Cranston on August 23, 1853, and exclusive right to clay on 64 acres on the George W. McGlothlin survey (A-888) conveyed by John S. Lovejoy to John Cranston on July 5, 1854 (Denton County Deed Record A2:177). Nancy Cranston sold the property and improvements to George Cranston for $500.00.

The next transaction occurred in 1875 when George H. Cranston and his wife Lucinda Cranston conveyed the 3 ± acre property to J. W. Moore for $600.00 on September 3, 1875 (Denton County Deed Records A2:179). Moore retained ownership for only a few months before selling one-half interest to T. J. Donaldson for $300.00 on May 5, 1876 (Denton County Deed Record B:422). The property description included reference to the pottery as the "tract of land upon which Cranston pottery is located." T. J. Donaldson acquired the remaining one-half interest from J. W. Moore and his wife, N. A. Moore on May 13, 1876 for $400.00 (Denton County Deed Record B:440).

The pottery was sold again in 1878. William Bradford and his wife Harriett sold the 3-acre Cranston Pottery tract to Lewis Tipton for $800.00 on December 2, 1878 (Denton County Deed Record K:223). Tipton sold the property back to T. J.

Donaldson and J. W. Moore on February 12, 1879 for $625.00 (Denton County Deed Record K:319). William Bradford re-acquired this property, selling it again on February 28, 1882 to John and James Tipton for $200.00 and two notes of $200.00 each. Bradford also sold them 1/2-undivided interest in the clay on the 2-acre tract formerly owned and used by Cranston on the N. Britton survey as deeded by J. A. Dunham to T. J. Donaldson on September 2, 1880. They also received the right to the clay on a tract owned by T. J. Donaldson on the south side of Hickory Creek (A. E. Cannon survey) for making "Pottery Ware" (Denton County Deed Record S:535).

An advertisement in the Denton Monitor, August 15, 1868, indicates that Nancy V. Cranston operated the Cranston Pottery as proprietress after her husband John Cranston died. This advertisement reads:

STONEWARE

Always on hand, a complete assortment of jars, jugs, churns, and all sorts and sizes of earthen vessels generally put up at a first class factory

WHOLESALE AND RETAIL

At Alton, six miles south of Denton

Nancy Cranston, Proprietress

July 4, 1868

In 1869, George Cranston began operation of the Cranston-Donaldson Pottery. A letter dated May 1, 1870 and published in Bates (1918:393) mentions the Cranston-Donaldson Pottery:

> There is no excuse for any one being idle in Denton now. The Cranston pottery is hunting laborers and is offering $20.00 a month and board ... so you see that any man who wants to can work at good wages. The pottery is running full time and needing more men.

Many of these laborers are not identified as "pottery laborers" in the census record, and therefore remain unknown.

James Roark, the first Master Potter at the Roark-Griffith Pottery may have worked at the Cranston-Donaldson Pottery during this period. James Roark is shown living with his three sons, a day laborer, and an uncle (Allen Donaldson) in the same dwelling as Nancy Cranston (widow) and her son George and his family (wife and son) in the 1870 census (see Appendix A).

Boone Daugherty may have apprenticed at the Cranston-Donaldson Pottery. He is reported in the 1875 and 1876 tax records as owning manufacturing tools and equipment (see Appendix C). He owned and resided on 157 acres of the 160-acre J. S. Dickson survey. The Cranston-Donaldson Pottery was located on the remaining 3 acres. The Daugherty family were neighbors of the Cranstons and did not own a pottery while living in the Alton community. They established their own pottery in Denton in 1884 (see Daugherty Pottery).

Myers (1970) reports that "George Cranston operated the pottery with Thomas Donaldson until 1882 when the partners moved to Winnsboro in Wood County." This information is not supported by the tax records (Appendix C) which indicate that George moved to Denton. It was George's son Christopher Columbus Cranston who moved to Winnsboro and established a pottery. While the deed/title data (see above) indicates George Cranston sold his interest in the pottery in 1876, it is clear he continued to produce pottery (see 1880 census in Appendix A). The tax data in Appendix C also indicates that he continued to produce pottery in the 1880s, although newspaper references reveal that he probably produced stonewares into the 1890s in Denton.

The Cranston and Daugherty potteries are identified as operating in Denton in the early 1890s (see Denton County News, August 2, 1892, September 15, 1892, April 20, 1893, June 7, 1894). While the location of this Cranston Pottery has not been verified, it appears to have been located on a 1-acre tract of the H. Sisco survey (A-1184) acquired by George Cranston in 1879.

Roark-Griffith Pottery (41DN18)

The Roark-Griffith Pottery is located on the Robert J. Mosely survey (A-803) which was surveyed in 1841. The Robert J. Mosely survey contains a league and labor of land and was surveyed for Robert Stevenson, administrator of the estate of Robert J. Mosely, deceased (Denton County Survey Record A:7).

The Roark-Griffith Pottery is situated near Lloyd on the east side of Lewisville Lake. During the late nineteenth century, the community of Lloyd had a grist mill, gin, at least one store, a church and cemetery, and the Roark-Griffith Pottery (Jagoe 1957:39). Jagoe (1957) reports that the general store was operated by A. T. Bates, the gin and grist mill were run by R. S. Thomas, and the pottery was operated by M. B. and J. T. Griffith. Grapes were grown in the area and a wine cellar was located on a farm about one mile south of the pottery. The pottery is situated on Mill Branch and sometimes the community in this area is referred to as Mill Valley (unattributed newspaper clipping in scrapbook on file at the Denton County Historical Commission, p. 102). At the turn of the century, the pottery was about ten miles east of Denton and one and a half miles northwest of the Lloyd Post Office (Ries 1908:132).

James M. Roark and J. A. Smith purchased 7 acres of the R. J. Mosely survey (A-803) from R. M. Cox and his wife Mary on July 15, 1871 at a cost of $100.00 (Denton County Deed Record I:147). They acquired an additional 1-1/2 acres from Cox and his wife on February 7, 1872 for $25.00 (Denton County Deed Record I:149). In 1878, James Roark sold 6 acres of this property to J. A. Smith (Denton County Deed Record Q:616) which included part of his share of the property and improvements. In 1884, James Roark and his wife Marian (or Marion) sold 20 acres, including the original 7 acres to M. B. Griffith and his son James F. Griffith (Denton County Deed Record 31:167). The Roarks sold the property for an initial payment of $100.00 and a $1000.00 promissory note of six equal payments of $166.66 and 2/3rds and "good merchantable stoneware at $0.08/gallon," and the transfer of all "right and title and interest in all of the potters clay on a certain tract formerly belonging to E. R. Baker and sold by Baker to Roark and mentioned in deed made from Baker to A. M. Cochran" (Denton County Deed Record 31:167). This clay is located on the William Durham survey (A-330) which is west of the southern half of the R. S. Mosely survey on which the Roark-Griffith Pottery is located.

In 1887, Monterville Griffith sold his one-half interest in the 20 acres and the pottery to his wife Amanda for $500.00 (Denton County Deed Record 41:401). James F. Griffith and his wife conveyed their one-half interest to Amanda Griffith in 1890 for $600.00 which included $350.00 in hand and a note for $250.00 (Denton County Deed Record 45:163). Based on these data, Amanda Griffith owned the entire Roark-Griffith Pottery in 1890.

In 1895, Amanda and Monterville Griffith sold 1/4-interest in the pottery (20± acres) to their son, G. M. Griffith for $400.00 (Denton County Deed Record 58:53). They sold an additional 1/4-interest in 1908 to J. F. Griffith for five notes of $125.00 each which were due in installments between 1909 and 1912 (Denton County Deed Record 135:444). The Roark-Griffith Pottery may have closed shortly after this, as none of these individuals are reported as potters in the 1910 population census records. Monterville Griffith is listed as a potter in the 1920 census schedules, working in Denton, possibly at the Kimbrough or Guy Daugherty Pottery.

Among the potters known to have worked at the Roark-Griffith Pottery are James Roark and his son John Roark, and Monterville Griffith and his son James Griffith.

Unidentified Pottery on A. E. Cannon Survey

The pottery found on the A. E. Cannon survey (A-232) in 1991 has not been identified. This property was owned on different occasions by several potters, but the deed/title transactions are incomplete, and no date has been determined for exactly when the pottery on this property operated. I have tentatively identified it as a pottery belonging to T. J. Donaldson who is listed as a potter in the 1880 census schedules, but not the 1870 schedule (Appendix A). He owned this property in the 1870s to 1884 (Appendix C). During this period he is known to have produced stoneware pottery and held the rights to clay on several tracts. Among the clays he owned were those on the A. E. Cannon survey and the pits on the old Cranston-Donaldson Pottery (Denton County Deed Record S:535). T. J. Donaldson and his wife sold the A. E. Cannon property to M. A. Steers for $1000.00 on July 9, 1884.

Wilson-Donaldson Pottery (41DN19)

This pottery has been referred to both as the Wilson Pottery and as the Wilson-Donaldson Pottery. It most accurately should be called the Wilson Pottery. Although a single sherd with a Donaldson makers' mark was found at this kiln-site, no evidence has been uncovered that he made pots here or was an owner or investor in this pottery. William Warren, identified as potter in the 1870 census and living next door to Wilson, probably worked at the Wilson Pottery (see Appendix A).

The Wilson-Donaldson Pottery is located on the George W. McGlothlin survey (A-888). The original survey was made for John L. Lovejoy, assignee of G. McGlothlin by virtue of a certificate for 320 acres in the Peters Colony (Denton County Survey Record E:41). The survey is also sometimes referred to as the William Meridith survey, also a Peters Colony certificate. The McGlothlin survey contains 64 acres or 67 acres (acreage differs among deeds) and was patented in 1854.

In 1869, William Wilson purchased the 67-acre survey for $500.00 from John T. Harrison of Marion County along with five acres of the adjoining A. Cannon survey (A-232) south of the John S. Dickson survey containing the Cranston-Donaldson Pottery, and a lot in the town of Alton (Denton County Deed Record I:532).

In February of 1879, William Wilson and his wife Susan sold the entire 67 acres to William Bays and Henry Welch for $600.00 and retired (Denton County Deed Record K:324). Wilson's retirement is supported by the 1880 census schedule where he is listed as an unemployed, retired potter (Appendix A).

In July, 1879, Henry Welch and his wife Sallie sold Elijah Bays their undivided 1/2 interest in the 67 acres for $450.00 ($300.00 in payment and $150.00 to be paid by Bays to Wilson to cancel a debt owed by Henry Welch) (Denton County Deed Record K:425). In November of 1879, William Bays and his wife Lucinda sold their 1/2 interest to M. B. Griffith (owner of the Roark-Griffith Pottery beginning in 1884) for $400.00, including $55.40 in cash and two notes (Denton County Deed Record K:510).

The acquisition of 1/2 interest in the Wilson-Donaldson Pottery by M. B. Griffith suggests he was looking to begin his own pottery business in 1879. Griffith, however, did not acquire the other 1/2 interest and in April, 1880, he sold his share to J. W. Moore for $462.50 (Denton County Deed Record N:100; see Moore's association with the Cranston-Donaldson Pottery).

These transactions during 1879 indicate that after William Wilson sold the pottery and retired, two individuals invested in the pottery, G. L. Walker and Elijah Bays. Neither of them are identified as potters in the 1880 census for Denton County, and it appears that they were unsuccessful in keeping the pottery operating.

In 1880, G. L. Walker and his wife Sarah sold Elijah Bays his (Walker's) undivided 1/2 interest in the property and pottery shop owned by Walker and Bays for $150.00 and Bay's undivided 1/2 interest in the other 65 acres of their jointly-held property (Denton County Deed Record O:153). This transaction states:

> The said Bays conveys to me [Walker] his undivided half interest in and to 65 acres, heretofore belonging to said Bays and myself and known as the Pottery Shop tract, [I] have granted, bargained and sold, and by these presents do grant bargain sell and convey unto the said Elijah Bays of said county [Denton] and State my undivided one half interest in and to the Potters Shop now owned by

myself and the said Elijah Bays together with 2 1/2 acres of land upon which said Potters Shop is situated...

In December, 1880, Elijah Bays and his wife Mary sold G. L. Walker the 65 acre tract (outside the 2-1/2 acre tract containing the pottery buildings) for $150.00, but reserved "all potters' clay on or in said 67 acres of land and the right of way over said land to the clay" (Denton County Deed Record N:282). These two transactions indicate Bays acquired complete ownership of the Wilson-Donaldson Pottery, including the buildings and the clay pit. The pottery is not mentioned in later deeds.

Lambert Pottery (41DN74)

The Lambert Pottery is located on the Brook Beall survey (A-58) about five miles south of Denton and one mile east of Alton. The Serren and Wilson-Donaldson potteries are located near the Lambert Pottery and about one mile east of the Cranston-Donaldson Pottery. Together, these potteries and the unidentified pottery (Donaldson? Pottery) on the A. E. Cannon survey formed a small potting community mid-nineteenth century.

The public records of Denton County were destroyed when the Denton County Courthouse burned in 1875. Some deeds were re-registered but no deed or probate records were found for Joseph C. Lambert. The absence of re-registered deeds in his name suggests that he had already ceased operating the pottery and had sold the property by 1875. This is supported by the tax data presented in Appendix C that indicates Lambert operated this pottery for only one or two years, between late 1859 and mid 1860.

Samuel Right is reported in the 1860 census schedule as a "Potter Hand" living next door to Joseph Lambert (Appendix A), suggesting he worked at this pottery.

Serren Pottery (41DN75)

The Augustus Serren Pottery (41DN75) was situated on the A. H. Serren survey (A-1198) patented to Serren in 1856 (Denton County Patent Record B:18). This survey contains 320 acres, and the pottery was located in the southwestern corner of the survey just north of the Wilson-Donaldson Pottery (41DN19). The Serren Pottery was situated about five miles south of Denton and one mile east of Alton. The pottery was located on property now owned by Highland Park Methodist Church as part of Camp Sharon.

No deed records were found indicating when the Serren Pottery ceased operating. A. H. Serren died in 1878, and his widow and children appear in the 1880 census (see Appendix A). Charley Bowers was listed as a pottery laborer and servant in the Serren household in the 1880 census. This suggests pottery may still have been produced here in the early 1880s. Augustus Serren's son John may have worked at this pottery as an apprentice potter. He was identified as a thirteen year old in the

1880 census. In the 1900 census, he was identified as a "potteryman," and was probably involved in the shipping and selling of pottery rather than in producing pots.

It is unclear who else assisted Augustus Serren in making pottery. Undoubtedly Thomas Donaldson probably worked at the Serren Pottery for a period in the 1850s and 1860s. In the 1860 census schedule (Appendix A) he lived next door to Serren in the Albert household. William Albert was identified as a hired hand. J. A. Campbell lived on the other side of Serren and was identified as a potter in the 1860 census (Appendix A). A third potter that worked at the Serren Pottery later joined Sam Bass' outlaw gang. Gard (1936:108) reported that:

> The first to join [outlaw Sam] Bass and Jackson was Seaborn Barnes, a rough young fellow who had worked in the pottery of A. H. Serren, five miles south of Denton ... He had been born in Cass County, [Texas].

Boone & D. B. Daugherty Pottery

Boone Daugherty purchased 22 acres of the Alexander Hill survey from J. M. Blount for $440.00 in 1884 (Denton County Deed Record Y:128). He acquired six more acres of the Alexander Hill survey in 1894 in two deeds from Alvin C. Owsley (Denton County Deed Record 52:391, 57:416). During this same year, Boone and his wife Loretta sold one acre to their son D. B. (Daniel Boone). This property included D. B. Daugherty's house (Denton County Deed Record 52:305). The Daugherty family continued to purchase and sell portions of the A. Hill survey into the early 1900s (see Appendix C).

In 1900, Boone and Loretta Daugherty sold one acre of their homestead tract for $500.00 to their son D. B. Daugherty, which contained the Daugherty Pottery. This tract is described as:

> ... land in Denton "known as the Boon Daugherty Potters Shop" and the ground upon which the same is situated the same being part of our homestead tract where we now live, ... containing 1 acre more or less, together with all the houses and kilns and all the improvements there on or situated or belonging thereto ... (Denton County Deed Record 77:425).

While this deed mentions houses and kilns, it is unclear if more than one kiln was located at the Daugherty Pottery. A historical photograph of this pottery dating to the late 1880s or early 1890s only shows one kiln. Sabra Parsons who lives on the property of the former Daugherty Pottery reports seeing a kiln and support buildings still standing on the tract in the early 1900s when she was a small girl (personal communication 1991). A complete crock made at this pottery remains in Sabra Parsons' possession along with a grinding stone or potters' wheel from the Daugherty Pottery.

Among the laborers identified at this pottery in the 1900 census (Appendix A) are teamsters Herman Schroder and J. R. Byers and potters J. W. Brogan, R. H. Bradford, and John Bradford. Jacob Crites is identified as a kiln burner.

An advertisement in the 1894 Denton Business Directory, p.51, for the Daugherty Pottery, also called the Denton Pottery Works, reads:

DENTON POTTERY WORKS
B. Daugherty, Prop.
Manufacturer and Dealer In
Stoneware, Flower Pots, Etc.
All Orders will Receive Prompt Attention.
DENTON, TEXAS

Kimbrough-Kingdon-Tipton-Moss-Daugherty Pottery

This pottery is referred to here as the Kimbrough-Kingdon-Tipton-Moss-Daugherty Pottery in an effort to recognize and identify all the potters and/or entrepreneurs involved in the operation of this pottery. Each of these individuals is identified in the order in which he was associated with the pottery. Only Moss and Daugherty have been identified in historical records as potters. Historical names associated with pottery include the Denton Pottery Works and the Kingdon Pottery Works.

J. E. Kimbrough operated a pottery on a small lot 1-1/4 miles south of the center of Denton beginning in the 1880s (see Appendix C). J. B. Tipton purchased this lot from J. E. Kimbrough on April 4, 1902 for $230.00 (Denton County Deed Record 84:579). He sold an undivided 1/2 interest in the lot to H. H. Kingdon, proprietor of the Denton Pottery Works or Kingdon Pottery Works on November 11, 1902 (Denton County Deed Record 84:580). This small lot is located on the J. Brock survey (A-55) and may be Lot 4, containing 1-1/2 acres. It is adjacent to the H. Sisco survey (see George Cranston in Appendix C). This pottery may be the Cranston Pottery mentioned in the town of Denton during the 1890s.

This property was sold by J. B. Tipton and his wife and H. H. Kingdon to Charles H. Moss on June 20, 1903 (Denton County Deed Record 89:60). No pottery is mentioned in these deeds, but this is the pottery mentioned by Ries (1908) belonging to A. H. Moss (incorrect initials).

The Tipton-Kingdon-Moss property was situated on the northwest corner of Wilson Street (McKinney) and Lewisville Road (now Dallas Drive, Highway 77, or Locust). The property was sold by Charles Moss' widow, Mrs. Ada Moss, to Guy Daugherty in 1920 for $243.05 (Denton County Deed Record 179:125).

The acquisition of this pottery by Guy Daugherty was reported in the Denton Record-Chronicle, Saturday, January 5, 1924, p. 6. An excerpt from this article states:

> Seven years ago Guy Daugherty bought the old J. B. Tipton pottery on the old Dallas road from Charles Moss. The plant had been idle for a number of years but after investing some $3,000 Daugherty started operations.

While the purchase date in the above article does not correlate with the deed records, this article indicates that J. B. Tipton operated a pottery in Denton at the turn of the century, which was under operation by Charles Moss when Ries (1908) visited the area in 1903-1904.

Guy Daugherty is identified as a potter residing with his wife and five children on Maple Street in the city directory for 1929 (Denton City Directory 1929). The Guy Daugherty Pottery is listed in the 1923, 1925, and 1929 directories (Denton City Directory 1923:25, 1925:27, 1929:28). In 1923, the pottery is identified as the Daugherty Pottery Works at 1321 Wilson Street. In 1925, it is called the Daugherty Art Pottery on Dallas Drive, while in 1929 it is named the Daugherty Pottery Plant at 903 S. Locust. Guy Daugherty is not listed in the directories for 1929, 1936, and 1945.

Robert Bradford and Monterville Griffith are listed as potters in Denton in the 1910 and 1920 population census schedules. Both probably worked at this pottery. Monterville Griffith's pottery (Roark-Griffith Pottery) on his property near Lloyd probably closed about 1908.

D. B. Daugherty (Boone Daugherty's son) is not listed in the 1913, 1916, 1923, or 1925 city directories. In 1929 and 1936, however, he is identified as a potter (Denton City Directory 1929, 1936) and probably worked at this pottery. L. E. Daugherty is identified as a potter in the city directory for 1936.

A 1924 article in the Denton Record-Chronicle, Saturday, January 5, 1924, p. 6, describes the Daugherty Art Pottery. The land for this pottery was purchased in 1920.

> The business grew and in the early part of 1923 a new factory was opened on the Dallas Drive at Mill Street. The initial investment at the new location was $5,000. Only the more delicate or "art pottery" is made at the new plant, where also is located the sales rooms ...
> The sales here during the last year amounted to about $7000 and would have been much larger but for the fact that operations were suspended the first part of the year while improvements were being made ...
> During 1924 Daugherty plans to erect another building near the new establishment. He also expects to build another kiln and install several sets of moulds [molds]. These contemplated improvements will cost about $5,000 and the plans then will give employment to about 15 men.

Kingdon Denton Pottery Works Pottery

Several advertisements for this pottery were found in historical newspapers from the turn of the century. The location of this pottery has not been verified and no stonewares have been found that are known to have been produced here. An ad in the Denton County News, Vol. 9, No. 22, September 27, 1900 reads:

DENTON POTTERY WORKS
H.H. Kingdon, Prop.
Manufacturer of Stoneware
Flower Pots and Drain Tile
Pottery on East McKinney Street

A second ad in the Record and Chronicle, Vol. 19, No. 38, April 25, 1901 reads:

FLOWER POTS
AT SPECIAL
PRICES.
Kingdon
Pottery Works.
East McKinney Street
Denton, Texas

It is unclear at this time if this pottery is located on the same property as the later Daugherty Pottery.

Unlocated Potteries

Two additional Denton potteries that operated near the turn of the century are poorly known and include the Denton Pottery Company and the J. Sublitz Pottery. The Denton Pottery Company was located in Denton, while the Sublitz property was several miles east of town.

The Denton Pottery Co. is mentioned in an advertisement in the 1890 Denton Business Review and Directory:

S. E. Andrews H. L. Kline H. M. Williams
Denton Pottery Co.,
Manufacturers of
STONEWARES, FLOWER POTS, ETC.
The Most Liberal Prices Guaranteed on Car Loads,
of which we make a Specialty
SAMPLES FURNISHED ON APPLICATION DENTON, TEXAS

No 1890 population census schedule is available for Denton County, and these individuals do not appear in other census years as potters. No deeds were found for these individuals. They probably were not potters, but were salesmen or proprietors.

The J. Sublitz Pottery is mentioned by Ries (1908:132) as one of several operating near Denton in 1903. I have found no other information about this possible pottery, and no deeds. J. Sublitz is not listed as a potter in the 1900 census, and he is not listed in the tax rolls for this period (Appendix C).

APPENDIX C

TAX ROLL DATA FOR THE DENTON COUNTY POTTERS AND LABORERS, 1850-1910

Tax roll data provide an invaluable source of information about the taxable property owned by potters and pottery laborers residing in Denton County. These data indicate that several potters owned considerable land and were large-scale farmers or ranchers, while other potters were land poor. The tax rolls provided considerable data on individual land holdings not found in the deed/title records and allowed short-term changes in ownership (often less than one or two years) to be more easily identified. These data are available for the years 1846 through 1910 on microfilm at the Willis Library at the University of North Texas, Denton.

The tax roll data in this appendix is organized alphabetically by potter or pottery laborer. These data were derived from the Tax Rolls for Denton County, Texas for the years 1850 through 1910. These tax rolls are organized by county, year, and taxpayer. The amount of land owned by each taxpayer, its value, and the original land survey on which it is located, the ownership of town lots, slaves, and farm animals, wagons, and miscellaneous property are enumerated. Slaves are reported for the 1850 to 1865 period. Farm animals are reported for all years, but the detail of the reporting is variable among years. Manufacturing tools, implements, equipment, and products are recorded for some years. Tax entries were not found for each year for all individuals although they owned land (e.g., John Cranston, 1857).

Elijah Bays

	Number/Acres	Value
1880		
R. Knight	80	$300.
Horses/Mules	1	$30.
Cattle	3	$15.
Hogs	15	$15.
Total		$360.
1882		
R. Knight	80	$400.
Wm. Merridith (McGlothlin survey)	2 1/2	$300.
Horses/Mules	1	$15.
Cattle	2	$15.
Hogs	11	$10.
Wagons	1	$10.
Total		$750.
1883		
R. Knight (A-702)	80	$400.

Cattle	2	$20.
Hogs	12	$15.
Wagons	1	$15.
Total		$450.

William Bays

1880		
N. Britton (A-51)	10	$75.
Horses/Mules	2	$40.
Cattle	4	$20.
Wagons	1	$10.
Total		$145.
1881		
N. Britton (A-51)	10	$150.
Horses/Mules	2	$50.
Cattle	4	$25.
Wagons	1	$10.
Total		$255.
1882		
No land		
Horses/Mules	2	$60.
Cattle	5	$50.
Hogs	8	$10.
Wagons	1	$30.
Miscellaneous		$100.
Total		$250.

R. H. Bradford

1893		
A. Hill (A-623)	8 1/2	$255.
Cattle	3	$25.
Total		$280.
1895		

A. Hill	8 1/2	$255.
Cattle	2	$15.
Total		$270.

William Bradford

<u>1863</u>		
J. C. Baker	100	$500.
Horses	6	$150.
Cattle	9	$40.
Miscellaneous		$30.
Total		$720.
<u>1867</u>		
No land		
Horses	6	$180.
Cattle	23	$142.
Miscellaneous		$93.
Total		$415.
<u>1868</u>		
No land		
Horses	8	$200.
Cattle	16	$80.
Miscellaneous		$140.
Total		$420.
<u>1869</u>		
No land		
Horses	9	$270.
Cattle	9	$40.
Miscellaneous		$105.
Total		$415.
<u>1870</u>		
J. C. Baker	150	$85.

Horses	10	$250.
Cattle	8	$40.
Miscellaneous		$85.
Total		$460.
1872		
J. C. Baker	160	$650.
Horses	7	$175.
Cattle	2	$10.
Miscellaneous		$140.
Total		$975.
1874		
J. C. Baker	100	$600.
Horses	6	$150.
Cattle	10	$50.
Miscellaneous		$170.
Total		$970.
1876		
J. C. Baker	100	$500.
Horses/Mules	4	$80.
Cattle	8	$50.
Miscellaneous		$60.
Total		$690.
1877		
J. C. Baker	100	$600.
Horses/Mules	6	$120.
Cattle	10	$60.
Hogs	12	$15.
Wagons	1	$70.
Miscellaneous		$60.
Total		$923.
1878		
E. Pritchett (A-1020)	40	$250.
S. Wofford (A-1368)	40	$250.
Horses/Mules	8	$160.

Cattle	12	$60.
Hogs	6	$10.
Wagons	1	$65.
Miscellaneous		$50.
Total		$845.

<u>1880</u>

B. Merchant (A-800)	80	$400.
E. Pritchett (A-1020)	40	$200.
S. Wofford (A-1372)	40	$200.
Horses/Mules	6	$180.
Cattle	20	$100.
Hogs	5	$10.
Wagons	1	$50.
Total		$1,140.

<u>1881</u>

B. Merchant (A-800)	80	$400.
E. Pritchett (A-1020)	40	$200.
S. Wofford (A-1372)	40	$200.
Horses/Mules	7	$175.
Cattle	15	$70.
Hogs	7	$5.
Wagons	1	$40.
Total		$1,090.

<u>1882</u>

J. S. Dickson (A-342)	3	$400.
B. Merchant (A-800)	80	$400.
E. Pritchett (A-1020)	40	$200.
S. Wofford (A-1372)	40	$200.
Horses/Mules	5	$125.
Cattle	7	$55.
Wagons	1	$25.
Total		$1,405.

<u>1883</u>

B. Merchant (A-800)	80	$400.
E. Pritchett (A-1020)	40	$200.
S. Wofford (A-1372)	40	$200.
Town Lot, Denton		$30.

Horses/Mules	1	$30.
Total		$860.

1884

E. Pritchett (A-1020)	40	$200.
S. Wofford (A-1372)	40	$200.
Total		$400.

George Cranston

1870

J. S. Dickson (A-342)	3	$500.
W. B. Hawes (A-557)	110	$110.
J. B. Teague (A-1258)	154	$154.
Horses	1	$25.
Total		$789.

1872

B.B.B. & C.R.R. Co. (A-185)	7	$3,000.
J. S. Dickson (A-342)	3	$500.
W. H. Gibson (A-454)	8	$8.
W. B. Hawes (A-557)	110	$110.
J. B. Teague (A-1258)	154	$154.
Horses	4	$200.
Total		$3,972.

1873

B.B.B. & C.R.R. Co. (A-185)	7	$4,000.
J. S. Dickson (A-342)	3	$500.
W. H. Gibson (A-454)	8	$10.
W. B. Hawes (A-557)	110	$110.
J. B. Teague (A-1258)	154	$150.
Horses	4	$200.
Miscellaneous		$130.
Total		$5,100.

1874

B.B.B. & C.R.R. Co. (A-185)	4	$800.
W. H. Gibson (A-454)	8	$20.
W. B. Hawes (A-557)	110	$220.
J. B. Teague (A-1258)	144	$510.
Horses	3	$100.
Cattle	4	$20.
Miscellaneous		$40.
Total		$1,710.
<u>1875</u>		
B.B.B. & C.R.R. Co. (A-185)	4	$500.
J. S. Dickson (A-342)	3	$500.
W. H. Gibson (A-454)	8	$20.
W. B. Hawes (A-557)	110	$220.
J. B. Teague (A-1258)	154	$310.
Horses/Mules	5	$150.
Cattle	6	$30.
Goats/Hogs	5	$70.
Manufacturing Tools & Equipment		$90.
Household & Kitchen Furniture		$190.
Miscellaneous		$10.
Total		$2,050.
<u>1876</u>		
B.B.B. & C.R.R. Co. (A-185)	40	$500.
W. H. Gibson (A-454)	8	$20.
W. B. Hawes (A-557)	110	$120.
J. Knight	80	$160.
J. Rogers	30	$120.
J. Withers (A-1343)	37 1/2	$140.
Town Lot 21, Blk 5, Denton		$350.
Horses/Mules	3	$100.
Cattle	9	$50.
Manufacturing Tools & Equipment		$30.
Jewelry, etc.		$20.
Total		$2,010.
<u>1877</u>		
B.B.B. & C.R.R. Co. (A-185)	4	$500.
W. H. Gibson (A-454)	8	$16.
W. B. Hawes (A-557)	110	$220.

J. Knight	80	$200.
J. B. Teague (A-1258)	152	$304.
Town Lot 2 W 1/2, Blk 5, Denton		$2,000.
Horses/Mules	6	$120.
Cattle	9	$45.
Hogs	20	$25.
Wagons	1	$5.
Miscellaneous		$20.
Total		$3,455.
1878		
B.B.B. & C.R.R. Co. (A-185)	4	$500.
W. H. Gibson (A-454)	8	$15.
W. B. Hawes (A-557)	110	$220.
R. Knight (A-702)	80	$320.
J. B. Teague (A-1258)	144	$300.
Town Lot 2 W 1/2, Blk 5, Denton		$2,000.
Horses/Mules	4	$100.
Cattle	8	$50.
Wagons	1	$50.
Miscellaneous		$15.
Total		$3,570.
1879		
B.B.B. & C.R.R. Co. (A-185)	4	$300.
W. H. Gibson (A-454)	8	$20.
W. B. Hawes (A-557)	110	$160.
H. Sisco (A-1184)	1	$150.
J. B. Teague (A-1258)	154	$240.
Town Lot 2 W 1/2, Blk 5, Denton		$2,000.
Horses/Mules	4	$100.
Cattle	10	$50.
Wagons	1	$25.
Miscellaneous		$15.
Total		$3,060.
1880		
B.B.B. & C.R.R. (A-185)	4	$250.
W. Gibson (A-454)	8	$15.
W. B. Hawes (A-557)	110	$220.
J. B. Teague (A-1258)	154	$300.

W. Loving (A-759)	7/8	$75.
H. Sisco (A-1184)	1	$200.
Town Lot 2 W 1/2, Blk 5, Denton		$800.
Mules/Horses	4	$75.
Wagons	1	$30.
Manufacturing Tools & Equipment		$1,200.
Miscellaneous		$15.
Total		$3,205.
<u>1881</u>		
B.B.B. & C.R.R. Co. (A-185)	4	$400.
W. H. Gibson (A-454)	8	$25.
W. B. Hawes (A-557)	110	$320.
W. Loving (A-759)	7/8	$100.
H. Sisco (A-1184)	1	$200.
J. B. Teague (a-1258)	150	$350.
Horses/Mules	4	$125.
Cattle	6	$50.
Wagons	1	$40.
Money on Hand		$1,300.
Miscellaneous		$15.
Total		$2,925.
<u>1882</u>		
B.B.B. & C.R.R. Co. (A-185)	4	$2,500.
H. Sisco (A-1184)	2	$350.
J. B. Teague (A-1258)	154	$300.
Horses/Mules	3	$110.
Cattle	2	$30.
Wagons	2	$60.
Manufacturing Materials & Articles		$400.
Total		$3,750.
<u>1883</u>		
B.B.B. & C.R.R. Co. (A-185)	4	$800.
H. Sisco (A-1184)	2	$300.
J. B. Teague (A-1258)	150	$375.
Horses/Mules	1	$25.
Cattle	2	$40.
Total		$1,540.

1884		
B.B.B. & C.R.R. Co. (A-185)	4	$800.
H. Sisco (A-1184)	2	$300.
J. B. Teague (A-1258)	150	$375.
Horses/Mules	1	$20.
Cattle	2	$75.
Total		$1,570.
1885		
B.B.B. & C.R.R. Co. (A-185)	4	$800.
H. Sisco (A-1184)	2	$300.
J. B. Teague (A-1258)	150	$375.
Wm. Neil (A-971)	3/4	$100.
Horses/Mules	1	$20.
Cattle	2	$75.
Total		$1,670.
1886		
B.B.B. & C.R.R. Co. (A-185)	4	$800.
H. Sisco (A-1184)	2	$300.
J. B. Teague (A-1258)	150	$375.
Wm. Neil (A-971)	3/4	$100.
Cattle	2	$75.
Wagons	1	$25.
Total		$1,670.
1887		
B.B.B. & C.R.R. Co. (A-185)	4	$800.
H. Sisco (A-1184)	2	$300.
J. B. Teague (A-1258)	150	$400.
W. Neil (A-971)	3/4	$100.
Cattle	1	$10.
Total		$1,610.

1888-1910
Not researched

John Cranston

<u>1855</u>		
N. Britton (A-51)	160	$160.
J. S. Dickson (A-342)	3	$400.
J. W. Simmons (A-1162)	320	$400.
(unknown)	110	$440.
Horses	2	$100.
Cattle	15	$120.
Wagons	1	$50.
Total		$1,670.
<u>1856</u>		
N. Britton (A-51)	160	$160.
J. S. Dickson (A-342)	3	$500.
J. W. Simmons (A-1162)	320	$400.
Horses	2	$125.
Total		$835.
<u>1858</u>		
N. Britton (A-51)	320	$320.
C. Chacon (A-298)	80	$100.
J. S. Dickson (A-342)	3	$500.
W. B. Hawes (A-567)	110	$400.
J. W. Simmons (A-1162)	320	$320.
Slaves	1	$500.
Horses	4	$235.
Cattle	10	$60.
Wagons	1	$30.
Total		$2,485.
<u>1859</u>		
N. Britton (A-51)	320	$640.
C. Chacon (A-298)	80	$160.
J. S. Dickson (A-342)	3	$500.
W. B. Hawes (A-567)	110	$220.
J. W. Simmons (A-1162)	320	$640.
Wm. Smith (A-1187?)	108	$216.
Slaves	2	$1,100.
Horses	3	$160.
Cattle	13	$235.
Wagons	1	$75.

Total		$3,946.
1860		
N. Britton (A-51)	308	$614.
C. Chacon (A-298)	80	$140.
J. S. Dickson (A-342)	8	$240.
G. Gray	40	$120.
W. B. Hawes (A-567)	108	$540.
W. B. Simmons (A-1162)	320	$640.
Wm. Smith (A-1187?)	108	$324.
J. B. Teague (A-1258)	154	$350.
Town Lot, Alton		$25.
Slaves	3	$2,100.
Horses	1	$50.
Cattle	8	$142.
Miscellaneous		$65.
Total		$5,634.
1861		
N. Britton (A-51)	308	$150.
J. A. Brown or I. M. Brown	108	$110.
A. E. Cannon (A-232)	~2	$5.
C. Chacon (A-298)	80	$40.
J. S. Dickson (A-342)	3	$400.
W. H. Gibson (A-253)	8	$20.
G. Gray (A-450?)	48	$40.
W. B. Hawes (A-567)	110	$275.
W. B. Simmons (A-1162)	320	$640.
J. B. Teague (A-1258)	154	$320.
Town Lot, Alton		$5.
Slaves	3	$1,800.
Horses	2	$120.
Cattle	12	$150.
Total		$3,915.
1862		
N. Britton (A-51)	160	$320.
N. Britton (A-51)	148	$296.
A. E. Cannon (A-232)	~2	$20.
C. Chacon (A-298)	80	$100.
J. S. Dickson (A-342)	3	$100.
W. H. Gibson (A-253)	8	$16.

G. Gray (A-450?)	48	$96.
W. B. Hawes (A-567)	110	$220.
W. B. Simmons (A-1162)	320	$640.
Wm. Smith (see J. A. Brown)	108	$216.
J. B. Teague (A-1258)	154	$300.
Slaves	3	$1,800.
Horses	2	$100.
Cattle	7	$42.
Money on Hand or Interest		$800.
Miscellaneous		$75.
Total		$5,141.

<u>1863</u>

N. Britton (A-51)	160	$320.
N. Britton (A-51)	148	$296.
A. E. Cannon (A-232)	1-2	$20.
C. Chacon (A-298)	80	$100.
J. S. Dickson (A-342)	3	$100.
W. H. Gibson (A-253)	8	$16.
G. Gray (A-450?)	48	$96.
W. B. Hawes (A-567)	110	$220.
J. Rogers	59	$177.
W. B. Simmons (A-1162)	320	$640.
Wm. Smith	108	$216.
J. B. Teague (A-1258)	154	$300.
Slaves/Farm Animals (not listed)		
Total		$4,812.

<u>1864</u>

N. Britton (A-51)	160	$320.
N. Britton (A-51)	148	$296.
I. M. Brown (see Smith)	108	$220.
A. E. Cannon (A-232)	2	$20.
C. Chacon (A-298)	80	$80.
J. S. Dickson (A-342)	3	$20.
W. H. Gibson (A-253)	8	$16.
G. Gray	40	$96.
W. B. Hawes (A-567)	110	$216.
J. Rogers	60	$178.
J. Rogers	40	$80.
W. B. Simmons (A-1162)	320	$640.
J. B. Teague (A-1258)	154	$300.

Slaves	2	$1,200.
Farm Animals (not listed)		$490.
Confederate Notes		$3,000.
Total		$7,272.

<u>1865</u>

N. Britton (A-51)	160	$210.
N. Britton (A-51)	140	$175.
I. M. Brown (see Smith)	108	$150.
A. E. Cannon (A-232)	2	$14.
C. Chacon (A-298)	80	$55.
J. S. Dickson (A-342)	3	$14.
W. H. Gibson (A-253)	8	$12.
G. Gray (A-450?)	40	$65.
W. B. Hawes (A-567)	110	$150.
J. Rogers	60	$125.
J. Rogers	40	$55.
W. B. Simmons (A-1162)	320	$410.
J. B. Teague (A-1258)	154	$200.
Horses	6	$225.
Cattle	40	$200.
Miscellaneous		$168.
Total		$2,228.

<u>1866</u>

N. Britton (A-51)	160	$210.
N. Britton (A-51)	149	$170.
A. E. Cannon (A-232)	2	$20.
C. Chacon (A-298)	80	$50.
J. S. Dickson (A-342)	3	$10.
W. H. Gibson (A-253)	8	$10.
G. Gray (A-450?)	40	$60.
W. B. Hawes (A-567)	110	$150.
J. Rogers	153	$230.
W. B. Simmons (A-1162)	320	$400.
Wm. Smith (see Brown)	108	$150.
J. B. Teague (A-1258)	154	$200.
Horses	5	$200.
Cattle	50	$250.
Miscellaneous		$100.
Total		$2,210.

1867

N. Britton (A-51)	308	$308.
A. E. Cannon (A-232)	2	$5.
C. Chacon (A-298)	80	$80.
J. S. Dickson (A-342)	3	$500.
W. H. Gibson (A-253)	8	$10.
G. Gray (A-450?)	40	$40.
W. B. Hawes (A-567)	110	$200.
J. Rogers	113	$113.
M. Rogers	40	$200.
J. W. Simmons	320	$320.
Wm. Smith	108	$108.
J. B. Teague (A-1258)	154	$234.
Horses	5	$200.
Cattle	46	$300.
Money on Hand or Interest		$300.
Miscellaneous		$205.
Total		$3,123.

1868 (deceased)
[see Nancy V. Cranston, widow]

Nancy V. Cranston

1868

N. Britton (A-51)	308	$310.
A. E. Cannon (A-232)	2	$10.
C. Chacon (A-298)	80	$80.
J. S. Dickson (A-342)	3	$500.
W. H. Gibson	8	$10.
W. B. Hawes (A-295 or 557 see George Cranston)	110	$200.
J. Rogers	113	$120.
M. Rogers	40	$20.
J. W. Simmons (A-591)	320	$320.
J. B. Teague	154	$230.
Horses	15	$320.
Cattle	22	$70.
Money on Hand or Interest		$600.
Miscellaneous		$330.

Total		$3,300.
1869		
N. Britton	160	$160.
N. Britton	148	$148.
A. E. Cannon	2	$2.
C. Chacon	80	$80.
J. S. Dickson	3	$30.
W. H. Gibson	8	$8.
W. B. Hawes	110	$110.
J. Rogers	60	$60.
J. Rogers	53	$50.
B. M. Rogers (or M. Rogers see above)	40	$40.
J. W. Simmons	320	$320.
J. B. Teague	154	$150.
Horses	6	$210.
Cattle	22	$100.
Money on Hand or Interest		$135.
Total		$1,576.
1870		
N. Britton	160	$160.
N. Britton	148	$149.
A. E. Cannon	2	$2.
C. Chacon	88	$88.
W. H. Gibson	8	$8.
B. M. Rogers	40	$40.
J. Rogers	60	$60.
J. Rogers	55	$55.
J. W. Simmons	320	$320.
Horses	7	$350.
Cattle	25	$125.
Miscellaneous		$40.
Total		$1,395.
1872		
N. Britton	308	$440.
C. Chacon	80	$80.
B. M. Rogers	40	$80.
J. Rogers	53	$80.
J. W. Simmons	320	$480.

Horses	4	$140.
Cattle	10	$50.
Total		$1,350.
1873		
N. Britton	160	$240.
N. Britton	148	$200.
C. Chacon	80	$80.
J. Rogers	53	$80.
J. Severe	100	$200.
J. W. Simmons	320	$480.
Horses	8	$150.
Cattle	10	$50.
Miscellaneous		$30.
Total		$1,510.
1874		
N. Britton (A-51)	308	$620.
B. M. Rogers (A-1101)	40	$80.
J. Rogers	53	$100.
J. Severe	100	$200.
J. W. Simmons	320	$640.
Horses	8	$150.
Cattle	10	$50.
Miscellaneous		$30.
Total		$1,870.
1875		
N. Britton (A-51)	308	$620.
B. M. Rogers (A-1101)	40	$80.
J. Rogers	53	$100.
J. Severe (A-1164)	100	$200.
Horses/Mules	8	$150.
Cattle	10	$50.
Miscellaneous		$30.
Total		$1,230.
1876		
N. Britton (A-51)	317	$1,500.
C. Chacon (A-298)	80	$100.
B. M. Rogers (A-1101)	72	$150.

J. Rogers	40	$80.
Horses/Mules	12	$180.
Cattle	8	$40.
Manufacturing Tools & Equipment		$20.
Miscellaneous		$40.
Total		$2,000.
<u>1877</u>		
N. Britton (A-51)	347	$1,000.
C. Chacon (A-298)	80	$160.
B. M. Rogers (A-1101)	72	$144.
Horses/Mules	5	$75.
Cattle	6	$60.
Hogs	8	$8.
Wagons	1	$20.
Total		$1,467.
<u>1878</u>		
N. Britton (A-51)	346	$1,000.
C. Chacon (A-298)	80	$160.
B. M. Rogers (A-1101)	72	$144.
Horses/Mules	5	$75.
Cattle	6	$60.
Hogs	8	$8.
Wagons	1	$20.
Total		$1,467.
<u>1879</u>		
N. Britton (A-51)	346	$1,000.
W. Neil (A-971)	3/4	$100.
B. M. Rogers (A-1101)	72	$125.
J. Rogers	40	$80.
Horses/Mules	4	$100.
Wagons	1	$30.
Total		$1,635.
<u>1880</u>		
N. Britton (A-51)	346	$1,000.
W. Neil (A-971)	3/4	$100.
B. M. Rogers (A-1101)	72	$125.

J. Rogers	40	$80.
J. Severe (A-1164)	100	$200.
Horses/Mules	4	$100.
Wagons	1	$30.
Total		$1,635.
<u>1881</u>		
N. Britton (A-51)	346	$1,000.
W. Neil (A-971)	3/4	$100.
B. M. Rogers (A-1101)	72	$200.
J. Rogers	40	$100.
Horses/Mules	4	$75.
Cattle	4	$25.
Wagons	1	$10.
Miscellaneous		$45.
Total		$1,555.
<u>1882</u>		
N. Britton (A-51)	346	$1,750.
W. Neil (A-971)	3/4	$100.
J. Rogers (A-1085)	58 2/3	$60.
M. Rogers (A-1080)	40	$200.
Horses/Mules	4	$100.
Cattle	5	$50.
Wagons	1	$20.
Miscellaneous		$40.
Total		$2,320.
<u>1883</u>		
N. Britton (A-51)	346	$1,400.
W. Neil (A-971)	3/4	$100.
J. Rogers (A-1085)	58 2/3	$60.
M. Rogers (A-1080)	40	$200.
Horses/Mules	4	$100.
Cattle	4	$40.
Total		$1,900.
<u>1884</u> (Estate)		
N. Britton (A-51)	346	$1,400.
W. Neil (A-971)	3/4	$100.

J. Rogers (A-1085)	58 2/3	$60.
M. Rogers (A-1080)	40	$200.
Horses/Mules	4	$190.
Cattle	3	$35.
Hogs	7	$15.
Wagons	1	$5.
Miscellaneous		$15.
Total		$2,020.

Boone Daugherty

<u>1869</u>
No land

Horses	8	$480.
Cattle	1	$5.
Miscellaneous		$130.
Total		$615.

<u>1870</u>

J. S. Dickson (A-342)	157	$1,200.
Horses	4	$200.
Cattle	4	$20.
Miscellaneous		$250.
Total		$1,670.

<u>1872</u>

J. S. Dickson (A-342)	157	$1,500.
Horses	2	$150.
Cattle	10	$50.
Miscellaneous		$40.
Total		$1,740.

<u>1873</u>

J. S. Dickson (A-342)	157	$1,800.
Horses	3	$220.
Cattle	13	$70.

Miscellaneous		$60.
Total		$2,150.
<u>1875</u>		
J. S. Dickson (A-342)	157	$1,500.
Horses/Mules	3	$120.
Cattle	20	$100.
Goats/Hogs	20	$40.
Manufacturing Tools, Equipment, Etc.		$80.
Kitchen Furniture		$160.
Miscellaneous		$20.
Total		$1,980.
<u>1876</u>		
J. S. Dickson (A-342)	157	$1,500.
R. D. Westcott (A-1338)		
Horses/Mules	3	$150.
Cattle	24	$120.
Goats/Hogs	30	$50.
Tools, Equipment, Etc.		$50.
Kitchen Furniture, Etc.		$150.
Miscellaneous		$10.
Total		$530.
<u>1877</u>		
J. S. Dickson (A-342)	157	$1500.
R. D. Westcott (A-1338)	200	$500.
Town Lot, 1/2 Lot 6, Blk 5, Denton		$1,250.
Horses/Mules	2	$60.
Cattle	45	$300.
Hogs	25	$100.
Wagons	1	$40.
Miscellaneous		$5.
Total		$3,755.
<u>1878</u>		
R. Beaumont (A-31)	21 1/4	$1,000.
R. D. Westcott (A-1334 or 1338)	200	$600.
Town Lot, 1/2 Lot 6, Blk 5, Denton		$585.
Horses/Mules	1	$40.

Cattle	36	$215.
Hogs	4	$25.
Wagons	1	$35.
Miscellaneous		$5.
Total		$2,505.
<u>1879</u>		
R. Beaumont (A-31)	21 1/4	$800.
Horses/Mules	3	$80.
Cattle	30	$150.
Hogs	2	$10.
Wagons	2	$100.
Miscellaneous		$5.
Total		$1,145.
<u>1880</u>		
R. Beaumont (A-31)	45	$1,000.
J. S. Dickson (A-342)	1	$5.
Horses/Mules	2	$100.
Cattle	4	$30.
Hogs	2	$15.
Wagons	1	$100.
Miscellaneous		$73.
Total		$1,323.
<u>1881</u>		
R. Beaumont (A-31)	42	$1,000.
J. S. Dickson (A-342)	1 3/4	$5.
Horses/Mules	4	$100.
Cattle	4	$40.
Hogs	3	$10.
Wagons	2	$70.
Miscellaneous		$5.
Total		$1,230.
<u>1882</u>		
R. Beaumont (A-31)	36 1/2	$1,000.
J. S. Dickson (A-342)	1 3/4	$5.
Horses/Mules	3	$100.
Cattle	40	$320.

Hogs	7	$25.
Wagons	2	$60.
Total		$1,510.
1883		
R. Beaumont (A-31)	36 1/2	$800.
J. S. Dickson (A-342)	1 3/4	$5.
Horses/Mules	5	$125.
Cattle	37	$370.
Hogs	5	$30.
Wagons	2	$50.
Total		$1,380.
1884		
R. Beaumont (A-31)	36 1/2	$800.
J. S. Dickson (A-342)	3	$15.
A. Hill (A-623)	22	$500.
Horses/Mules	2	$100.
Cattle	10	$100.
Hogs	2	$5.
Wagons	1	$50.
Total		$1,570.
1885		
R. Beaumont (A-31)	36 1/2	$800.
J. S. Dickson (A-342)	3	$15.
A. Hill (A-623)	23	$500.
Horses/Mules	2	$100.
Cattle	10	$100.
Hogs	2	$5.
Wagons	1	$50.
Total		$1,570.
1886		
J. S. Dickson (A-342)	157	$1,000.
A. Hill (A-623)	23	$500.
Horses/Mules	4	$150.
Cattle	15	$120.
Hogs	15	$20.
Wagons	1	$60.

Total		$1,850.
1887		
J. S. Dickson (A-342)	157	$1,000.
A. Hill (A-623)	23	$500.
Horses/Mules	6	$175.
Cattle	20	$145.
Wagons	1	$40.
Total		$1,860.
1888-1892		
Not Researched		
1893		
J. S. Dickson (A-342)	3	$10.
A. Hill (A-623)	10	$700.
H. Sisco (A-1184)	1/2	$60.
Horses	1	$40.
Cattle	4	$20.
Wagons	1	$50.
Manufacturing Tools, Equipment, Etc.		$10.
Manufacturing Goods, Wares, Merchandise		$70.
Total		$960.
1894		
J. S. Dickson (A-342)	3	$10.
A. Hill (A-623)	10	$700.
H. Sisco (A-1184)	1/2	$60.
Horses	4	$150.
Cattle	4	$30.
Wagons	1	$30.
Total		$980.
1895		
J. S. Dickson (A-342)	3	$10.
A. Hill (A-623)	15	$700.
H. Sisco (A-1184)	1/2	$60.
Horses	4	$75.
Cattle	2	$10.
Wagons	1	$20.

Manufacturing Goods, Wares, Merchandise		$25.
Total		$900.
1901		
J. S. Dickson	3	$10.
A. Hill	7	$500.
Horses/Mules	1	$20.
Total		$530.
1902		
J. S. Dickson	3	$10.
A. Hill	7	$500.
Horses/Mules	1	$10.
Total		$520.
1903		
J. S. Dickson (A-342)	3	$10.
A. Hill (A-110)	5	$500.
Horses/Mules	1	$15.
Cattle	1	$10.
Miscellaneous		$15.
Total		$550.
1904		
J. S. Dickson (A-342)	3	$10.
A. Hill (A-110)	5	$400.
Horses/Mules	1	$20.
Cattle	1	$10.
Hogs	2	$5.
Miscellaneous		$25.
Total		$470.
1905		
J. S. Dickson (A-342)	3	$10.
A. Hill (A-110)	5	$400.
A. N. B. Tompkins (A-1246)*	12	
E. Puchalski (A-996)*	11	$360.

* jointly owned with D. B. Daugherty/ total value $360.

Horses/Mules	1	$20.
Cattle	1	$10.
Miscellaneous		$25.
Total (excluding joint property)		$465.

1906

J. S. Dickson (A-342)	3	$10.
A. Hill (A-110)	5	$400.

* same joint property as 1905

Horses/Mules	1	$25.
Cattle	2	$15.
Hogs	3	$5.
Wagons	1	$20.
Miscellaneous		$50.
Total (excluding joint property)		$530.

1907

J. S. Dickson (A-342)	3	$10.
A. Hill (A-110)	7	$1,200.

Horses/Mules	1	$40.
Cattle	1	$20.
Hogs	5	$10.
Wagons	1	$20.
Miscellaneous		$20.
Total		$1,320.

1908

J. S. Dickson (A-342)	3	$15.
A. Hill (A-110)	7	$1,800.

Horses/Mules	1	$25.
Cattle	3	$50.
Money in Credit		$1,000.
Total		$2,500.

1909

J. S. Dickson (A-342)	3	$15.
A. Hill (A-110)	7	$900.

Horses/Mules	1	$20.
Cattle	6	$60.

Hogs	7	$15.
Miscellaneous		$20.
Total		$1,030.
1910		
A. Hill (A-110)	7	$900.
Cattle	2	$50.
Miscellaneous		$25.
Total		$975.

D. B. Daugherty

1901		
A. Hill (A-110)	2 1/2	$550.
Horses/Mules	1	$40.
Total		$590.
1902		
A. Hill (A-110)	2 1/2	$300.
Wagons	1	$5.
Total		$305.
1903		
A. Hill (A-110)	2 1/2	$300.
Wagons	1	$5.
Total		$305.
1904		
A. Hill (A-110)	2 1/2	$300.
Horses/Mules	1	$10.
Wagons	1	$5.
Total		$315.

A. T. Donaldson

<u>1855-57</u> [not listed]

<u>1858</u>

J. Severe	100	$200.
Horses	3	$150.
Miscellaneous		$120.
Total		$470.

<u>1859</u>

J. Severe	100	$200.
Horses	2	$150.
Miscellaneous		$50.
Total		$400.

<u>1860</u>

J. Severe	100	$200.
Horses	4	$200.
Miscellaneous		$60.
Total		$460.

<u>1861</u>

J. Severe	100	$200.
Horses	6	$300.
Miscellaneous		$50.
Total		$550.

<u>1862</u>

J. Severe	100	$200.
Horses	3	$200.
Miscellaneous		$30.
Total		$430.

<u>1863</u>

J. Severe	100	$300.
Total (other not described)		$600.

<u>1864</u>

J. Severe	100	$200.

Horses, Etc. (not listed)		$75.
Confederate Notes		$600.
Total		$875.
<u>1865</u>		
J. Severe	100	$150.
Miscellaneous		$40.
Total		$190.
<u>1866</u>		
J. Severe	100	$200.
Miscellaneous		$50.
Total		$250.
<u>1867</u>		
J. Severe (A-588)	100	$150.
Horses	1	$30.
Money on Interest		$25.
Miscellaneous		$120.
Total		$325.
<u>1868</u>		
J. Severe (A-588)	100	$100.
Horses	2	$50.
Miscellaneous		$80.
Total		$230.
<u>1869</u>		
J. Severe (A-588)	100	$100.
Horses	2	$60.
Miscellaneous		$70.
Total		$230.
<u>1870</u>		
J. Severe (A-588)	100	$200.
Horses	3	$80.
Miscellaneous		$70.
Total		$350.

<u>1872</u>		
J. Severe (A-588)	100	$100.
Horses	4	$80.
Total		$180.

<u>1873-74</u> [not listed]

<u>1875</u>		
No land listed (however, see 1877)		
Gold Watch, Jewelry		$10.
Total		$10.

<u>1877</u>		
J. Severe	100	$200.
Horses/Mules	3	$45.
Total		$245.

<u>1879</u>		
No land listed		
Horses/Mules	4	$40.
Total		$40.

<u>1880-2</u> [not listed]

<u>1883</u>		
No land		
Money on Hand		$300.
Total		$300.

<u>1884</u> [not listed]

J. W. Donaldson

<u>1870</u>		
No land		
Horses	3	$100.

Cattle	2	$20.
Miscellaneous		$85.
Total		$205.

<u>1872</u>

J. Rogers	60	$300.
Horses	3	$75.
Cattle	5	$25.
Miscellaneous		$30.
Total		$430.

<u>1873</u>

J. Rogers	60	$500.
Total		$500.

<u>1874-76</u> [not listed]

<u>1881</u>

No land

Horses	3	$60.
Wagons	1	$15.
Miscellaneous		$20.
Total		$95.

<u>1893</u> [not listed]

<u>1894</u>

A. Hill (A-623)	23	$120.
Total		$120.

<u>1895</u>

A. Hill (A-623)	23	$120.
Horses	2	$50.
Wagons	1	$30.
Total		$200.

T. J. Donaldson

<u>1872</u>		
A. E. Cannon (A-232)	7	$300.
Horses/Mules	2	$100.
Cattle	4	$20.
Miscellaneous		$40.
Total		$460.
<u>1876</u>		
A. E. Cannon (A-232)	7	$500.
__. Tannehill (in Tarrant Co.)	15	$60.
Horses/Mules	5	$100.
Cattle	10	$50.
Miscellaneous		$30.
Total		$740.
<u>1877</u>		
A. E. Cannon (A-232)	116 1/2	$1,000.
J. S. Dickson (A-342)	3	$30.
P. N. Sigler	15	$50.
Horses/Mules	3	$170.
Cattle	15	$75.
Hogs	20	$20.
Wagons	1	$35.
Miscellaneous		$680.
Total		$2,060.
<u>1878</u>		
A. E. Cannon (A-232)	116	$695.
L. Cohen (A-246)	15	$300.
J. S. Dickson (A-342)	3	$600.
Horses/Mules	4	$170.
Cattle	18	$100.
Hogs	15	$75.
Miscellaneous		$35.
Total		$1,990.
<u>1879</u>		
J. C. Baker	100	$500.
A. E. Cannon (A-232)	116	$550.
L. Cohen (A-246)	15	$50.

Horses/Mules	2	$100.
Cattle	19	$135.
Hogs	15	$15.
Wagons	1	$50.
Miscellaneous		$75.
Total		$1,475.

<u>1880</u>

J. C. Baker	100	$500.
A. E. Cannon (A-232)	116	$550.
L. Cohen (A-246)	15	$50.
J. S. Dickson (A-342)	3	$371.
Horses/Mules	4	$100.
Cattle	9	$54.
Hogs	5	$10.
Wagons	1	$50.
Manufacturing Goods, Wares, Merchandise		$140.
Miscellaneous		$388.
Total		$2,213.

<u>1881</u>

J. C. Baker	100	$500.
A. E. Cannon (A-232)	116	$800.
L. Cohen (A-246)	15	$50.
J. S. Dickson (A-342)	3	$500.
Horses/Mules	5	$150.
Cattle	11	$65.
Wagons	1	$50.
Miscellaneous		$15.
Total		$2,130.

<u>1882</u>

A. E. Cannon (A-232)	116	$700.
L. Cohen (A-246)	15	$40.
A. Hill (A-623)	13	$700.
Horses/Mules	2	$120.
Cattle	3	$25.
Wagons	1	$40.
Miscellaneous		$30.
Total		$1,655.

<u>1883</u>		
A. E. Cannon (A-232)	116	$600.
A. Hill (A-623)	11	$800.
Horses/Mules	2	$90.
Wagons	1	$30.
Miscellaneous		$25.
Total		$1,545.
<u>1884</u>		
A. E. Cannon (A-232)	116	$600.
A. Hill (A-623)	11	$800.
Horses/Mules	2	$100.
Cattle	2	$25.
Wagons	1	$10.
Miscellaneous		$525.
Total		$2,060.
<u>1885</u>		
A. Hill (A-623)	11	$800.
Total		$800.
<u>1886</u> [not listed]		
<u>1887-1902</u>		
Not Researched		
<u>1903</u>		
A. Hill (A-110)	23	$120.
Horses/Mules	2	$100.
Wagons	1	$30.
Total		$250.
<u>1904</u>		
A. Hill (A-110)	23	$250.
Horses/Mules	1	$50.
Wagons	1	$30.
Total		$330.

J. F. Griffith

1902		
R. J. Mosely (A-803)	115	$750.
Horses/Mules	3	$50.
Cattle	5	$35.
Hogs	6	$10.
Wagons	1	$20.
Total		$865.
1903		
R. J. Mosely (A-803)	115	$750.
Horses/Mules	2	$50.
Wagons	1	$20.
Total		$820.
1904		
R. J. Mosely (A-803)	115	$750.
Horses/Mules	3	$90.
Wagons	1	$20.
Total		$860.
1905		
R. J. Mosely (A-803)	115	$750.
Horses/Mules	1	$30.
Cattle	1	$10.
Total		$790.
1906		
R. J. Mosely (A-803)	115	$750.
Horses/Mules	1	$20.
Wagons	1	$15.
Total		$785.
1907		
R. J. Mosely (A-803)	115	$765.
Horses/Mules	2	$100.
Wagons	1	$15.

Total		$880.
<u>1908</u>		
R. J. Mosely (A-803)	115	$920.
Horses/Mules	1	$25.
Cattle	2	$30.
Wagons	1	$10.
Total		$985.
<u>1909</u>		
R. J. Mosely (A-803)	135	$1,220.
B. Eaves (A-338)	1	$10.
Horses/Mules	1	$20.
Wagons	2	$20.
Total		$1,270.
<u>1910</u>		
R. J. Mosely (A-803)	135	$1,250.
B. Eaves (A-388)	1	$10.
Cattle	1	$15.
Total		$1,275.

M. B. Griffith

<u>1881</u>		
No land		
<u>1884</u>		
R. J. Mosely (A-803)	20	$700.
Horses/Mules	2	$80.
Wagons	1	$20.
Total		$800.
<u>1893</u>		
R. J. Mosely (A-803)	21	$400.
Cattle	2	$10.
Hogs	2	$10.

Total		$420.
1894		
R. J. Mosely (A-803)	21	$400.
Cattle	3	$10.
Hogs	6	$10.
Total		420.
1895		
R. J. Mosely (A-803)	21	$400.
Horses	1	$25.
Cattle	5	$25.
Hogs	7	$10.
Total		$460.
1902		
R. J. Mosely (A-803)	20	$400.
B. Eaves (A-388)	1	$10.
Cattle	3	$25.
Wagons	1	$25.
Total		$460.
1903		
R. J. Mosely (A-803)	20	$400.
B. Eaves (A-388)	1	$10.
Horses/Mules	1	$25.
Cattle	5	$40.
Wagons	1	$25.
Total		$500.
1904		
R. J. Mosely (A-803)	20	$400.
B. Eaves (A-388)	1	$10.
Cattle	4	$30.
Wagons	1	$20.
Total		$460.
1905		
R. J. Mosely (A-803)	20	$400.

B. Eaves (A-388)	1	$10.
Cattle	2	$20.
Total		$430.
<u>1906</u>		
R. J. Mosely (A-803)	20	$400.
B. Eaves (A-388)	1	$10.
Horses/Mules	1	$30.
Cattle	1	$10.
Wagons	1	$25.
Total		$475.
<u>1907</u>		
R. J. Mosely (A-803)	20	$265.
B. Eaves (A-388)	1	$10.
Horses/Mules	1	$25.
Cattle	2	$15.
Wagons	1	$25.
Total		$340.
<u>1908</u>		
R. J. Mosely (A-803)	20	$300.
B. Eaves (A-388)	1	$10.
Horses/Mules	1	$25.
Cattle	2	$25.
Wagons	1	$15.
Total		$375.

<u>1909</u> [not listed]

M. B. Griffith and E. Bays

<u>1880</u>		
Wm. Merridith (same as McGlothlin)	67	$268.
Wagons	1	$10.
Total		$278.

J. E. Kimbrough

<u>pre-1885</u>
Not Researched

<u>1885</u>

No land		
Horses/Mules	1	$40.
Cattle	75	$600.
Total		$640.

<u>1886</u>
No land

<u>1887</u>
Not Found

<u>1888-1892</u>
Not Researched

<u>1893</u>

E. Puchalski (A-996)	1	$2,000.
Horses/Mules	1	$70.
Wagons	1	$70.
Total		$2,140.

<u>1894</u>

Town Lot, Pt 27, Denton		$400.
Town Lot, Pt 27, Denton		$400.
Horses/Mules	2	$80.
Wagons	1	$70.
Miscellaneous		$10.
Total		$960.

<u>1895</u>

Wm. Crenshaw (A-318)	5	$300.
Town Lot, Pt 27, Denton		$4,000.
Town Lot, Lot 2, Blk 22, Denton		$800.
Town Lot, Lot 16, 17, Blk 5, Denton		$200.

Horses/Mules	2	$100.
Cattle	1	$20.
Wagons	3	$100.
Miscellaneous		$200.
Total		$5,720.
<u>1896</u>		
Wm. Crenshaw (A-318)	5	$250.
Wm. Loving (A-759)	1	$50.
E. Puchalski (A-996)	5/8	$1,000.
Town Lot, Pt 27, Denton		$3,000.
Town Lot, Lot 2, Blk 22, Denton		$800.
Horses/Mules	3	$100.
Cattle	1	$20.
Wagons	1	$60.
Miscellaneous		$210.
Total		$5,490.
<u>1897</u>		
Wm. Loving (A-759)	1	$50.
E. Puchalski (A-996)	5/8	$1,000.
Town Lot, Pt 27, Denton		$3,000.
Town Lot, Lot 2, Blk 22, Denton		$800.
Town Lot, Lot 25, Denton		$200.
Horses/Mules	3	$50.
Cattle	1	$10.
Wagons	1	$40.
Miscellaneous		$100.
Total		$5,250.
<u>1898</u>		
Town Lot, Pt 27, Denton		$3,000.
Horses/Mules	1	$40.
Manufacturing Goods, Wares, Merchandise		$4,100.
Miscellaneous		$100.
Total		$7,140.
<u>1899</u>		
Town Lot, Pt 27, Denton		$2,500.
Horses/Mules	2	$125.

Wagons	2	$75.
Manufacturing Goods, Wares, Merchandise		$1,200.
Miscellaneous		$100.
Total		$4,000.

1900

Town Lot, Pt 27, Denton		$2,000.
Horses/Mules	3	$100.
Wagons	2	$100.
Manufacturing Goods, Wares, Merchandise		$1,500.
Miscellaneous		$100.
Total		$3,800.

1901

J. Brock (A-55)	20	$1,000.
Town Lot, 1 lot, Denton		$200.
Town Lot, Pt 27, Denton		$2,000.
Horses/Mules	3	$150.
Wagons	2	$50.
Miscellaneous		$100.
Total		$3,500.

1902

J. Brock (A-55)	20	$1,000.
Town Lot, 1 lot, Denton		$200.
Town Lot, Pt 27, Denton		$1,250.
Horses/Mules	3	$150.
Wagons	2	$50.
Miscellaneous		$100.
Total		$2,750.

1903

J. Brock (A-55)	18	$100.
Town Lot, 1 lot, Denton		$200.
Town Lot, Pt 27, Denton		$1,250.
Horses/Mules	2	$100.
Wagons	1	$25.
Total		$2,550.

1904 [not listed]

C. H. Moss (sometimes listed as J. H. Moss)

1902 [not listed]

1903

J. Brock (A-55)	1 1/2	$175.
Total		$175.

1904

J. Brock (A-55)	1 1/2	$175.
Horses/Mules	1	$30.
Total		$205.

1905 [not listed]

J. M. Roark

1874

R. J. Mosely (A-803)	6 1/2	$500.
Mules	1	$60.
Miscellaneous		$80.
Total		$640.

1875

R. J. Mosely (A-803)	108	$610.
Horses/Mules	2	$80.
Miscellaneous		$10.
Total		$700.

1876

R. J. Mosely (A-803)	114	$750.
Horses/Mules	5	$200.
Tools, Equipment, Etc.		$100.
Miscellaneous		$10.

Total		$1,060.
<u>1877</u>		
R. J. Mosely (A-803)	112	$500.
Horses/Mules	3	$150.
Wagons	2	$65.
Materials & Manufacturing Wares		$40.
Miscellaneous		$20.
Total		$775.
<u>1878</u>		
R. J. Mosely (A-803)	114	$750.
Horses/Mules	4	$200.
Wagons	2	$75.
Materials & Manufacturing Wares		$50.
Miscellaneous		$10.
Total		$1,085.
<u>1879</u>		
R. J. Mosely (A-803)	120	$1,000.
Horses/Mules	3	$120.
Cattle	6	$30.
Wagons	1	$50.
Total		$1,200.
<u>1880</u>		
R. J. Mosely (A-803)	120	$800.
Horses/Mules	4	$200.
Cattle	8	$40.
Wagons	2	$120.
Materials & Manufacturing Wares		$200.
Miscellaneous		$245.
Total		$1,605.
<u>1881</u>		
R. J. Mosely (A-803)	120	$800.
Horses/Mules	3	$150.
Cattle	8	$45.
Wagons	2	$110.

Materials & Manufacturing Wares		$20.
Miscellaneous		$5.
Total		$1,130.
1882		
R. J. Mosely (A-803)	120	$800.
Horses/Mules	3	$180.
Cattle	7	$50.
Hogs	9	$10.
Wagons	2	$100.
Miscellaneous		$55.
Total		$1,195.
1883		
R. J. Mosely (A-803)	120	$1,000.
Horses/Mules	4	$275.
Cattle	5	$50.
Hogs	5	$10.
Wagons	2	$160.
Miscellaneous		$70.
Total		$1,505.
1884		
R. J. Mosely (A-803)	408	$2,000.
Horses/Mules	3	$200.
Cattle	8	$95.
Hogs	6	$15.
Wagons	2	$60.
Miscellaneous		$5.
Total		$2,375.

J. M. Roark and J. A. Smith

1873		
R. J. Mosely (A-803)	8	$5,000.
Total		$5,000.

<u>1874</u>		
R. J. Mosely (A-803)	8	$8,500.
Cattle	2	$10.
Miscellaneous		$20.
Total		$8,530.
<u>1875</u>		
R. J. Mosely (A-803)	8	$3,000.
Horses/Mules	4	$20.
Manufacturing Tools, Equipment, Etc.		$10.
Total		$3,030.
<u>1876</u>		
R. J. Mosely (A-803)	8	$3,000.
Total		$3,000.
<u>1877</u>		
R. J. Mosely (A-803)	8	$200.
Cattle	6	$30.
Manufacturing Tools, Equipment, Etc.		$1,500.
Total		$1,700.
<u>1878</u>		
R. J. Mosely (A-803)	8	$240.
Cattle	8	$50.
Manufacturing Tools, Equipment, Etc.		$300.
Miscellaneous		$1,450.
Total		$2,050.

A. H. Serren

<u>1855</u>		
S. Kephart	40	$40.
A. H. Serren	320	$320.
Horses	7	$331.
Total		$691.

1856		
S. Kephart	40	$40.
A. H. Serren	320	$320.
Horses	10	$500.
Cattle	10	$146.
Miscellaneous		$115.
Total		$1,121.
1857		
S. Kephart	40	$40.
A. H. Serren	320	$320.
Unknown (unreadable)	100	$300.
Horses	11	$440.
Cattle	15	$222.
Wagons	2	$80.
Total		$1,102.
1858		
S. Kephart	40	$40.
A. H. Serren	320	$640.
Wm. Wilson	160	$160.
Horses	12	$600.
Cattle	34	$406.
Sheep	11	$183.
Total		$2,029.
1859		
S. Kephart	40	$80.
A. H. Serren	320	$640.
Wm. Wilson	160	$320.
Horses	14	$560.
Cattle	72	$695.
Sheep	14	
Sheep/Wagons (value combined)	1	$182.
Total		$3,607.
1860		
Wm. Gazaway	106	$213.
S. Kephart	40	$80.
A. H. Serren	320	$800.

Margaret Tucker	100	$200.
Wm. Wilson	160	$400.
Horses	14	$700.
Cattle	49	$595.
Sheep	18	$54.
Miscellaneous		$170.
Total		$3,291.
<u>1861</u>		
J. P. French	140	$280.
S. Kephart	40	$80.
A. H. Serren	320	$640.
M. Tucker	100	$200.
Wm. Wilson	160	$320.
Horses	21	$840.
Cattle	40	$240.
Sheep	19	$55.
Miscellaneous		$550.
Total		$3,205.
<u>1862</u>		
J. P. French	200	$400.
Wm. Gazaway	106	$150.
A. H. Serren	320	$640.
M. Tucker	160	$200.
Wm. Wilson	160	$320.
Horses	19	$760.
Cattle	60	$300.
Sheep	18	$54.
Miscellaneous		$430.
Total		$3,254.
<u>1863</u>		
J. Denson?	160	$320.
J. P. French	200	$600.
Wm. Gazaway	106	$212.
S. Kephart	40	$80.
A. H. Serren	320	$640.
M. Tucker	160	$320.
Wm. Wilson	160	$320.

Horses, etc. (not listed)		
Total		$4,567.
<u>1864</u>		
J. Denson?	160	$320.
J. P. French	200	$600.
S. Kephart	40	$80.
A. H. Serren	320	$640.
M. Tucker	160	$320.
Wm. Wilson	160	$320.
Horses, etc. (not listed)		
Total		$3,461.
<u>1865</u>		
J. Denson?	40	$40.
J. P. French	200	$200.
Wm. Gazaway	106	$110.
A H. Serren	320	$320.
M. Tucker	160	$160.
Mary Wright	80	$80.
Horses	19	$600.
Cattle	100	$500.
Miscellaneous		$160.
Total		$2,330.
<u>1866</u>		
J. P. French	200	$20.
Wm. Gazaway	106	$100.
S. Kephart	40	$40.
A. H. Serren	320	$320.
M. Tucker	160	$160.
Wm. Wilson	160	$160.
Mary Wright	80	$80.
Horses	19	$570.
Cattle	100	$500.
Total		$2,130.
<u>1867</u>		
J. P. French	200	$400.
Wm. Gazaway	106	$106.
S. Kephart	40	$40.

A. H. Serren	320	$605.
M. Tucker	160	$160.
Wm. Wilson	160	$320.
Mary Wright	80	$80.
Horses	19	$750.
Cattle	129	$920.
Money on Hand		$250.
Miscellaneous		$303.
Total		$3,934.
1868		
T. A. Cash	160	$160.
J. P. French	200	$200.
Wm. Gazaway	106	$100.
N. Hazleton	400	$400.
S. Kephart	40	$40.
J. B. Lafave	23	$20.
M. Lafave	23	$20.
N. Lafave	23	$20.
A. H. Serren	320	$640.
Wm. Wilson	160	$160.
Mary Wright	80	$80.
Horses	30	$960.
Cattle	35	$200.
Money on Hand		$300.
Miscellaneous		$730.
Total		$4,030.
1869		
J. P. French	200	$200.
Wm. Gazaway	106	$110.
W. Hazelton (A-302)	400	$400.
S. Kephart	40	$40.
J. B. Lafave	30	$30.
M. Lafave	30	$30.
N. Lafave	30	$30.
A. H. Serren	320	$500.
M. Tucker (A-947)	160	$160.
Wm. Wilson	160	$160.
Mary Wright (A-947)	80	$80.

1870

B.B.B. & C.R.R. Co.	640	$640.
J. P. French	200	$200.
J. P. French	80	$80.
Wm. Gazaway	106	$100.
W. Hazelton (A-302)	400	$400.
S. Kephart	40	$40.
Lafave (J. B., M., N.)	90	$90.
A. H. Serren	320	$800.
M. Tucker	160	$160.
Wm. Wilson	160	$300.
Mary Wright	80	$80.
Horses	40	$1,200.
Cattle	60	$300.
Sheep	20	$20.
Miscellaneous		$980.
Total		$5,390.
<u>1872</u>		
C. Bohman (A-57)	80	$160.
B.B.B. & C.R.R. Co.	640	$640.
A. E. Cannon	320	$1,000.
J. P. French	280	$420.
Wm. Gazaway	160	$240.
N. S. Hazelton	400	$700.
S. Kephart	40	$40.
B. Lafave	90	$90.
A. H. Serren	320	$960.
M. Tucker	160	$240.
Wm. Wilson	160	$480.
M. Wright	80	$120.
Horses	25	$500.
Cattle	40	$200.
Miscellaneous		$550.
Total		$6,340.
<u>1873</u>		
C. Bohman	50	$160.
B.B.B. & C.R.R. Co.	640	$640.
A. E. Cannon	320	$1,000.
J. P. French	250	$400.
S. Kephart	40	$40.
_. Lafave	91	$150.

C. Medlin (A-438)	130	$260.
A. H. Serren	320	$960.
Wm. Wilson	160	$500.
M. Wright	80	$160.
Horses	30	$750.
Cattle	40	$200.
Miscellaneous		$320.
Total		$6,090.
<u>1874</u>		
E. F. Autry	130	$300.
C. Bohannon (or Bohman)	80	$160.
B.B.B. & C.R.R. Co.	640	$1,000.
A. E. Cannon	320	$1,000.
J. P. French	200	$300.
N. S. Hazelton	400	$800.
S. Kephart	40	$80.
_. Lafave	91	$180.
E. Pritchitt	40	$80.
A. W. Robertson	168	$300.
A. H. Serren	320	$1,000.
M. Tucker	160	$240.
Wm. Wilson	160	$320.
Horses	35	$700.
Cattle	40	$200.
Mules	3	$150.
Miscellaneous		$280.
Total		$7,090.
<u>1875</u>		
C. Bohannon (Bohman or Bowman)	80	$160.
B.B.B. & C.R.R. Co.	640	$960.
_. Canady? (A-364)	130	$300.
A. E. Cannon	320	$640.
J. P. French	200	$400.
N. S. Hazelton	400	$800.
S. Kephart	40	$40.
_. Lafave	91	$180.
T. L. Ligon?	100	$200.
E. Pritchitt	40	$80.
A. W. Robertson (A-1040)	168	$330.
A. H. Serren	320	$640.

Wm. Wilson	160	$320.
Horses/Mules	30	$50.
Cattle	40	$200.
Goats/Hogs	27	$30.
Manufacturing Tools, Machinery, Etc.		$260.
Miscellaneous		$180.
Total		$6,220.
<u>1876</u>		
E. Autry	130	$300.
J. C. Baker	40	$100.
C. Bohannon	80	$160.
B.B.B. & C.R.R. Co.	640	$640.
A. E. Cannon	320	$700.
J. P. French	200	$300.
W. C. Garrison	160	$240.
N. S. Hazelton	400	$600.
S. Kephart	40	$40.
_. Lafave	91	$120.
A. W. Robertson	168	$300.
A. H. Serren	320	$600.
M. Tucker	160	$160.
Wm. Wilson	160	$320.
Horses/Mules	30	$50.
Cattle	40	$20.
Sheep	38	$60.
Goats/Hogs	24	$30.
Miscellaneous		$370.
Total		$5,840.
<u>1877</u>		
C. Bohannon	80	$160.
B.B.B. & C.R.R. Co.	640	$640.
A. E. Cannon	320	$700.
J. P. French	200	$300.
W. C. Garrison	160	$240.
N. S. Hazelton	400	$600.
S. Kephart	40	$40.
_. Lafave	91	$120.
T. D. Ligon	100	$200.
E. Pritchitt	40	$100.
A. W. Robertson	168	$300.

A. H. Serren	320	$600.
M. Tucker	160	$160.
Wm. Wilson	160	$320.
Horses/Mules	30	$500.
Cattle	30	$150.
Sheep	175	$350.
Goats	24	$25.
Hogs	12	$20.
Jacks & Jennets	5	$200.
Wagons	3	$100.
Manufacturing Tools, Equipment, Etc.		$100.
Miscellaneous		$80.
Total		$6,005.

<u>1878</u> (Estate)

C. Bohannon (A-86)	80	$240.
B.B.B. & C.R.R. Co.	640	$1,280.
A. E. Cannon (A-233)	320	$960.
J. P. French (A-426)	200	$400.
W. C. Garrison (A-511)	160	$480.
N. S. Hazelton (A-548)	400	$800.
S. Kephart (A-723)	40	$80.
_. Lafave	91	$180.
T. D. Ligon (A-749)	100	$200.
E. Pritchett (A-1017)	40	$80.
A. W. Robertson	168	$336.
A. H. Serren (A-1194)	320	$1,200.
M. Tucker (A-1249)	160	$320.
Wm. Wilson (A-1379)	160	$1,000.
Horses/Mules	44	$640.
Cattle	38	$295.
Sheep	81	$160.
Goats	9	$15.
Hogs	35	$35.
Wagons	4	$35.
Manufacturing Tools, Equipment, Etc.		$25.
Total		$8,800.

L. M. Tipton

1877		
B. Merchant	80	$320.
Horses/Mules	1	$50.
Cattle	2	$15.
Miscellaneous		$10.
Total		$395.
1878		
B. Merchant (A-799)	80	$500.
Horses/Mules	2	$100.
Cattle	6	$35.
Hogs	7	$5.
Wagons	1	$40.
Miscellaneous		$30.
Total		$710.
1879		
J. S. Dickson (A-342)	3	$625.
Total		$625.
1880-82 [not listed]		

William Wilson

1870		
A. E. Cannon (A-232)	5	$200.
G. W. McGlothlin	64	$300.
Horses	15	$440.
Cattle	15	$75.
Miscellaneous		$63.
Total		$1,078.
1879		
G. W. McGlothlin (also called Wm. Merridith)	67	$500.
Horses/Mules	5	$50.
Cattle	25	$110.

Hogs	5	$5.
Manufacturing Tools, Equipment, Etc.		$40.
Miscellaneous		$10.
Total		$715.

APPENDIX D

DEED/TITLE DATA FOR THE DENTON COUNTY FARMSTEADS, 1850-1910

The information obtained from the deed/title (land tract) records archived at the Carroll Courts Building in Denton are summarized in this appendix. These data include information on the individuals who owned and occupied the five farmsteads in this study during the 1850 to 1910 period. This information is discussed by farmstead in the following order: 41DN77, 41DN79, 41DN289, 41DN410, and 41DN466.

41DN77

This farmstead is situated on the Carmel Manchaca survey (A-790) and the earliest occupation of 41DN77 appears to date to 1877. In 1837, Carmel Manchaca granted J. A. Haynie power to select land for him. Haynie acquired on Manchaca's behalf one league and labor in Denton County (Carmel Manchaca survey A-79) (Denton County Deed Record H:138). In 1838, the Board of Land Commissioners of Bexar County, Texas granted Manchaca this land (Denton County Deed Record A2:135). Manchaca does not appear to have occupied the land and in 1875 a problem arose concerning ownership. The problem revolved around who had tried to transfer the land, purportedly unbeknownst to Carmel Manchaca (Denton County Deed Record O:244). In 1875, James A. Haynie and the heirs of A. C. Haynie (deceased) conveyed the property to David W. Heard and James L. Truehart of Bexar County. None of these individuals lived in Denton County. As part of this transaction, 750 acres of the west side of the league and labor survey were granted to James A. Haynie (Denton County Deed Record A2:136). This 750 acre tract is west of 41DN77.

In 1877, D. W. Heard and J. L. Truehart sold 182.39 acres (Tracts 7 and 8 within Division 3) of the east half of the survey to F. M. Ready and W. A. Ready (Denton County Deed Record Y:315). Site 41DN77 is located on this property. The Ready's occupied this property until they sold 91.5 acres (Tract 8) to J. Y. Stewart and his wife in 1886 (Denton County Deed Record 34:542). In turn, the Stewarts occupied the farm until they sold it to L. Elliott in 1899 for $2,000 (Denton County Deed Record 71:146). Two years later, the Elliotts sold the property to C. M. Wells also for $2,000 (Denton County Deed Record 84:12). The land was sold again in 1902 (Denton County Deed Record 82:110). Several absentee landowners held the property during the 1900-1930s period (see Denton County Deed Records 82:110; 185:227; 219:172; 259:53 for transactions during this period). According to Skinner and Baird (1985) the farm was occupied by tenant farmers in 1937. Based on the 1937 tax appraisal card, a dwelling and a barn were located on the property.

41DN79

William H. Downard acquired two surveys in 1855, including Minor Marsh survey A-880 and Minor Marsh survey A-881. Both surveys contain 320 acres and 41DN79 is located on the southern survey. Downard was a rancher, with cattle herds ranging in size between 350 and 1,000 heads a year (see Appendix E). William Downard promised this land to his son Washington Downard, but died before transferring it to him. Washington Downard acquired the property from his mother and first appears in the Denton County tax rolls associated with this property in 1877. No tax data were obtained for either William H. or Washington Downard for the years 1861 to 1877. It is unclear if the Downard family occupied this property, although they did use it for cattle grazing. In 1883, both William H. and Washington Downard are listed as residing in Cooke County.

J. R. Sullivan purchased the entire 640 acres and paid taxes on the property beginning in 1884. J. R. Sullivan owned several thousands of acres of land, his residence was not located at 41DN79. He raised cattle, and like the Downards, probably used much of this property for grazing or crops. J. R. Sullivan continued to own this property into the 1900s.

41DN289

Site 41DN289 is situated on the L. T. Higgins survey (A-534) of 580 acres acquired by Higgins in 1852. By 1858, he began acquiring additional property and by 1865, he began selling part of his survey. By 1869, he owned only 280 acres of the L. T. Higgins survey.

Although incomplete deed information was obtained for this property as some of the records were lost when the Denton County Courthouse burned in 1875, it appears that C. R. and William C. Portman acquired the property on which 41DN289 is situated in the late 1860s or early 1870s (see Denton County Deed Record A:290). Improvements (usually indicative of a dwelling and outbuildings) are mentioned in an 1872 deed for 50 acres sold by William M. Lester and Martha A. Lester to Victor Stinchcomb (Denton County Deed Record C:224). These improvements may refer to 41DN289.

The Portman's continued to own the property until 1884, the last year they paid taxes on the land. In 1885, the property was owned by G. L. Vardaman who continued to reside there until 1896. In 1896, he sold 35 acres to J. D. Vardaman along with 60 acres of the nearby S. Chowning survey (Denton County Deed Record 60:303). In 1897, J. D. Vardaman sold the L. T. Higgins survey property back to J. D. Vardaman (Denton County Deed Record 62:430). The same boundaries are described for this property in the 1897 deed, but the acreage is reported as 70 acres instead of 35. Vardaman continued to occupy the property until he sold it to A. Mayfield in 1900 (Denton County Deed Record 77:172). In 1904, Mayfield sold the property to A. Coker (Denton County Deed Record 90:289), who in turn sold the property in 1913 to R. E. Julian (Denton County Deed Record 117:509) who sold it to T. S. Hays (Denton County Deed Record 130:133). No evidence was found that any of these latter owners occupied 41DN289, the Coker's filed for a homestead in 1909 on an adjacent survey (Denton County Deed Record 115:350).

41DN410

41DN410 is situated on the W. Loving survey (A-747) of 320 acres. This survey was acquired by Peter Teel, assignee of William Loving, first paying taxes on it in 1852. Jacob and Melinda Cassady (also spelled Cassaday, Casady, Casaday, and Casidy) occupied this farmstead from 1873 until about 1910 (Appendix E).

Jacob Cassady acquired this property from R. L. Burke in 1876, including two tracts for $425 to be paid in cotton. The first tract was deeded by R. W. Scott and wife to J. Fleming in 1870. The second tract of ten acres was deeded by Peter Teel to J. Fleming in 1870. Cassady also owned 40 acres that he had previously purchased, probably from Fleming, providing a homestead of 93 acres. Improvements are also reported by 1876 (Denton County Deed Record F:360).

41DN466

Site 41DN466 is situate on the J. J. Lytle survey (A-757) of 160 acres. The survey was patented to J. J. Lytle and in 1858 he conveyed the entire survey to G. W. Lytle (Denton County Deed Record G:92). In 1864, Dory Lytle, wife of George Lytle, sold 150 acres to Andrew McCarthy for $800. The remaining 10 acres was previously sold to a Sarah Payne (Denton County Deed Record G:93). Andrew McCarthy and his wife Sarah sold the 150-acre property the following year in 1865 to William Shannon for $700 (Denton County Deed Record G:93). Between 1865 and 1868, it is unclear what transactions occurred, but in 1868, A. H. Luttrell and Mary E. Luttrell and Celia A. Collins sold the same 150 acres back to William Shannon for $100 (Denton County Deed Record G:96). In turn, Shannon sold 130 acres back to the Luttrells in 1870 for $1 (Denton County Deed Record G:97). Following Mary Shannon's death, heir heirs sold the 130 acres to A. H. Luttrell (Denton County Deed Record G:98).

The next transaction I uncovered reveals that L. G. Harris acquired 105 acres of the J. J. Lytle survey, with evidence of him paying taxes on this land by 1890 (see Appendix E). The property apparently changed hands in the late 1890s or early 1900s, as W. J. McQueary and Nellie McQueary sold the 105 acres (now designated 100 acres) to J. J. Teacle for $3,500 in 1906 (Denton County Deed Record 99:79). The property changed hands number of times during the early 1900s (see Denton County Deed Record 104:411; 111:514; 129:381; 139:64; 156:534; 181:101; 273:255).

APPENDIX E

TAX ROLL DATA FOR THE DENTON COUNTY FARMSTEADS, 1850-1895

Tax roll data available for the years 1850 to 1910 provide an invaluable source of information about the taxable property of each farmstead owner, including those residing in Denton County and those residing in other counties and owning land in Denton County. These data indicate that several landowners had considerable landholdings and were large-scale farmers or ranchers, while others were land poor. The tax rolls provided considerable data on individual land holdings not found in the deed/title records and allowed short-term changes in ownership (often less than one or two years) to be more easily identified. Although tax rolls were available for each year, the names of some landowners were not found for some years suggesting that no taxes were paid those years.

The tax roll data in this appendix are organized by farmstead in the following order: 41DN77, 41DN79, 41DN289, 41DN410, and 41DN466. As a complete record of the tax roll data for each farmstead property from 1850 to 1910 was determined unnecessary as most of the farms were abandoned before or during the 1890s and little change was evident in property values on a year to year basis, only the years 1850 to 1895 are included in this appendix.

The tax rolls are organized by county, year, and taxpayer. The amount of land owned by each taxpayer, its value, the original land survey on which it is located, and the ownership of town lots, slaves, farm animals, wagons, and miscellaneous property are enumerated. Slaves are reported for the 1850 to 1865 period. Farm animals are reported for all years, but the detail of the reporting is variable among years. Manufacturing tools, implements, equipment, and products are recorded for some years. Tax entries were not found for each year for all individuals although they owned land. These tax roll records are on microfilm at the Willis Library at the University of North Texas, Denton. An asterisk (*) denotes the property the farmstead is located on.

41DN77

Owner	Number/Acres	Value
1850-1874 [no listing]		
C. Manchaca A-790		
1875 D. H. Heard		
C. Manchaca A-790*	1,476	$1,470.
1876-1883 [no data]		

<u>1884</u> W. A. Ready

C. Manchaca*	91 1/4	$450.
Horses/Mules	2	$100.
Cattle	9	$105.
Hogs	4	$10.
Wagons	1	$20.
Miscellaneous		$75.
Total		$760.

<u>1885</u> W. A. Ready

C. Manchaca A-790*	91 1/4	$450.
Horses/Mules	4	$100.
Cattle	9	$90.
Hogs	4	$5.
Wagons	1	$40.
Implements		$50.
Total		$735.

<u>1886</u> F. M. Ready

C. Manchaca A-790*	91 1/4	$700.
Horses/Mules	3	$100.
Cattle	3	$24.
Hogs	2	$5.
Wagons	1	$25.
Total		$850.

<u>1887</u> J. Y. Stewart

C. Manchaca A-790*	400	$1600.
Isaac Walters A-1329	20	$20.
Horses/Mules	4	$120.
Cattle	30	$200.
Wagons	1	$20.
Total		$1,960.

<u>1888</u> J. Y. Stewart

C. Manchaca A-790*	450	$1,800.
Horses/Mules	4	$120.
Cattle	50	$150.
Wagons	1	$30.
Total		$2,100.

1889 [Not found]

1890 J. Y. Stewart

C. Manchaca A-790*	450	$1800.
Horses/Mules	8	$320.
Cattle	35	$170.
Wagons	1	$10.
Implements		$20.
Total		$2,320.

1891 [J. Y. Stewart not found]

1892 J. Y. Stewart

C. Manchaca A-790*	450	$1,600.
W. Cox A-291	35	$50.
Pilot Point Lot #2 (1/2), Blk 9		$200.
Horses/Mules	6	$250.
Cattle	12	$60.
Jacks/Jennets	1	$200.
Goods, Wares, Merchandise		$500.
Total		$2,860.

1893 J. Y. Stewart

C. Manchaca A-790*	450	$2,030.
W. Cox A-291	35	$50.
E. Myers A-870	10	$100.
Horses/Mules	6	$240.
Cattle 6	$50.	
Wagons	1	$30.
Total	$2,500.	

1894 J. Y. Stewart

C. Manchaca A-790*	115	$600.
Horses/Mules	2	$40.
Cattle 2	$10.	
Wagons	1	$10.
Total	$740.	

1895 J. Y. Stewart

C. Manchaca A-790*	115	$600.
Horses/Mules	2	$60.
Wagons	1	$40.
Total	$700.	

41DN79

Owner	Number/Acres	Value

1850-1853 [not listed]

1854 William H. Downard

No land		
Total		$50.

1855 William H. Downard

Minor Marsh A-880	320	$640.
Minor Marsh A-881*	320	$640.
John Hunt	320	$480.
Horses/Mules	8	$510.
Cattle	350	$2450.
Wagons	2	$145.
Total		$4,865.

1856 William H. Downard

Minor Marsh A-880	320	$640.
Minor Marsh A-881*	320	$640.

John Hunt	320	$480.
Horses/Mules	10	$500.
Cattle	480	$3,360.
Wagons	2	$150.
Money at Interest		$315.
Total		$6,085.

1857 William H. Downard

Minor Marsh A-880	320	$640.
Minor Marsh A-881*	320	$640.
John Hunt	320	$640.
Horses/Mules	13	$630.
Cattle	415	$4,305.
Money at Interest		$505.
Miscellaneous		$282.
Total		$7,662.

1858 William H. Downard

Minor Marsh A-880	320	$800.
Minor Marsh A-881*	320	$800.
William Thompson	320	$800.
Horses/Mules	70	$2,010.
Cattle	770	$5,424.
Wagons (2)/ Sheep (43)	45	$249.
Total		$10,283.

1859 William H. Downard

Minor Marsh*	640	$3,200.
Horses	30	$1,095.
Cattle	1,000	$7,000.
Sheep/Hogs	62	$251.
Money at Interest		$310.
Total		$11,926.

1860 William H. Downard

Minor Marsh*	640	$3,000.

_. Thompson	320	$1,000.
Horses	27	$1,080.
Cattle	1,228	$8,595.
Sheep	90	$270.
Miscellaneous		$130.
Total		$14,076.

1861-1876 [W. H. Downard and Washington Downard not found]

1877 Washington Downard

Minor Marsh*	480	$1,440.
Horses/Mules	3	$150.
Cattle	11	$94.
Wagons	2	$80.
Money on Hand		$25.
Miscellaneous		$32.
Total		$1,821.

1883 William H. Downard (residing in Cooke County)

Minor Marsh*	160	$480.
H. M. Thompson A-1278	320	$960.
J. Matthews A-856	206	$620.

Washington Downard (residing in Cooke County)

Minor Marsh*	160	$640.
Minor Marsh*	85	$340.

1884 J. R. Sullivan

Minor Marsh A-880, A-881*	640	$2,200.
John Morton A-792	2,057	$7,180.
R. Beebe A-29	213	$750.
E. Rogers A-1100	144	$500.
D. Carter A-257	220	$720.
J. Matthews A-856	306 1/2	$1,000.
J. Wilson A-1409	101	$1,200.
A. Matthews A-839	80	$280.
Horses/Mules	14	$350.

Cattle	200	$2400.
Hogs	25	$40.
Wagons	3	$125.
Total		$16,745.

<u>1885</u> J. R. Sullivan

Minor Marsh A-880, A-881*	640	$3,200.
John Morton A-792	2,057	$6,170.
R. Beebe A-29	213	$640.
E. Rogers A-1100	144	$570.
D. Carter A-257	220	$880.
J. Matthews A-856	307	$920.
J. Wilson A-1409	102	$1,000.
A. Matthews A-839	80	$320.
Pilot Point Lot #1, Blk 24		$250.
Horses/Mules	12	$240.
Cattle	250	$2500.
Hogs	50	$50.
Wagons	3	$100.
Implements		$30.
Total		$16,870.

<u>1886</u> J. R. Sullivan

Minor Marsh A-880, A-881*	640	$2,200.
John Morton A-792	2,057	$7,180.
R. Beebe A-29	213	$750.
E. Rogers A-1100	144	$500.
D. Carter A-257	220	$720.
J. Matthews A-856	306 1/2	$1,000.
J. Wilson A-1409	101	$1,000.
A. Matthews A-839	80	$280.
Pilot Point Lot #1, Blk 24		$150.
Horses/Mules	15	$450.
Cattle	200	$1,600.
Hogs	20	$20.
Wagons	3	$80.
Implements		$20.
Total		$15,950.

<u>1887</u> J. R. Sullivan

Minor Marsh A-880, A-881*	640	$3,000.
John Morton A-792	2,057	$8,200.
R. Beebe A-29	213	$800.
E. Rogers A-1100	144	$570.
D. Carter A-257	220	$880.
J. Matthews A-856	306 1/2	$1,000.
J. Wilson A-1409	101	$1,000.
A. Matthews A-839	80	$400.
B. F. Lynch A-725	214	$850.
J. R. Sullivan	20	$20.
Pilot Point Lot #1, Blk 24		$150.
Horses/Mules	12	$450.
Cattle	200	$1,900.
Hogs	15	$10.
Wagons2	$50.	
Total		$14,330.

<u>1888</u> J. R. Sullivan

Minor Marsh A-880, A-881*	640	$3,200.
John Morton A-792	2,057	$8,200.
R. Beebe A-29	213	$850.
E. Rogers A-1100	144	$410.
D. Carter A-257	220	$880.
J. Matthews A-856	306 1/2	$1,000.
J. Wilson A-1409	101	$1,000.
A. Matthews A-839	80	$400.
B. F. Lynch A-725	213	$1,000.
J. R. Sullivan	20	$100.
Pilot Point Lot #1, Blk 24		$160.
Horses/Mules	18	$500.
Cattle	400	$2,500.
Hogs	9	$20.
Wagons	3	$100.
Total		$20,320.

<u>1889</u> J. R. Sullivan

Minor Marsh A-880, A-881*	640	$3,200.
John Morton A-792	2,057	$8,200.
R. Beebe A-29	213	$850.
E. Rogers A-1100	144	$570.

D. Carter A-257 [not listed]		
J. Matthews A-856	306 1/2	$1,000.
J. Wilson A-1409	101	$1,000.
A. Matthews A-839	80	$400.
B. F. Lynch A-725	213	$1,000.
J. R. Sullivan	20	$100.
Pilot Point Lot #1, Blk 24		$160.
Horses/Mules	20	$450.
Cattle	600	$4,750.
Hogs	8	$10.
Wagons	3	$100.
Implements		$50.
Miscellaneous		$40.
Total		$22,080.

<u>1890</u> J. R. Sullivan

Minor Marsh A-880, A-881*	640	$3,200.
John Morton A-792	2,057	$8,200.
R. Beebe A-29	213	$850.
E. Rogers A-1100	144	$570.
D. Carter A-257	220	$1,000.
J. Matthews A-856	306 1/2	$1,000.
J. Wilson A-1409	101	$1,000.
A. Matthews A-839	80	$400.
B. F. Lynch A-725	213	$1,000.
J. R. Sullivan	20	$100.
Pilot Point Lot #1, Blk 24		$200.
Sanger Lot		--.
Horses/Mules	20	$600.
Cattle	500	$4,000.
Hogs	10	$20.
Wagons	3	$100.
Implements		$50.
Miscellaneous		$30.
Total		$22,320.

<u>1891</u> J. R. Sullivan

Minor Marsh A-880, A-881*	640	$3,200.
John Morton A-792	2,057	$8,200.
R. Beebe A-29	213	$1,000.

E. Rogers A-1100	144	$550.
D. Carter A-257	220	$1,000.
J. Matthews A-856	306 1/2	$1,200.
J. Wilson A-1409	101	$1,000.
A. Matthews A-839	80	$400.
B. F. Lynch A-725	213	$,1000.
J. R. Sullivan	20	$100.
Pilot Point Lot #1, Blk 24		$200.
Sanger Lot		$500.
Horses/Mules	30	$900.
Cattle	500	$4,300.
Wagons	2	$100.
Miscellaneous		$50.
Total		$23,900.

<u>1892</u> J. R. Sullivan

Minor Marsh A-880, A-881*	640	$3,200.
John Morton A-792	2,057	$8,200.
R. Beebe A-29	213	$1,000.
R. Beebe A-29	32	$1,000.
E. Rogers A-1100	144	$550.
D. Carter A-257	220	$,1000.
J. Matthews A-856	306 1/2	$1,200.
J. Wilson A-1409	101	$1,000.
A. Matthews A-839	80	$400.
B. F. Lynch A-725	213	$1,000.
Pilot Point Lot #1, Blk 24		$200.
Sanger Lot		$800.
Horses/Mules	30	$800.
Cattle 400	$3,050.	
Wagons	2	$80.
Implements		$50.
Miscellaneous		$50.
Total		$23,580.

<u>1893</u> J. R. Sullivan

Minor Marsh A-880, A-881*	640	
John Morton A-792	2,057	
R. Beebe A-29	213	
E. Rogers A-1100	144	

D. Carter A-257	220	
J. Matthews A-856	306 1/2	
J. Wilson A-1409	101	
A. Matthews A-839	80	
B. F. Lynch A-725	213	
J. R. Sullivan	20	
Pilot Point Lot #1, Blk 24		

<u>1894</u> J. R. Sullivan

J. Morton A-792	1,220	$6,100.
R. Beebe A-29	213	$1,000.
E. Rogers A-1100	144 1/2	$550.
B. F. Lynch A-725	213	$1,000.
M. Marsh A-880, A-881*	640	$1,600.
J. Wilson A-1409	101	$1,000.
J. Matthews A-856	306 1/2	$1,200.
A. Matthews A-839	84	$400.
D. Carter A-257	220	$900.
R. Beebe A-29	48 1/2	$1,300.
D. R. McInturf A-862	100	$400.
Sanger	5	$600.
Sanger, 1 lot		$50.
Sanger, Lots 1-5, 7, Blk 2		$175.
Sanger, Lot 142, Blk 15		$500.
Sanger, 1/2 Blk 44		$150.
Horses/Mules	30	$600.
Cattle 350	$3,500.	
Hogs 40	$100.	
Wagons	3	$125.
Miscellaneous		$30.
Total	$22,880.	

<u>1894</u> J. R. Sullivan

J. Morton A-792	1,078	$5,390.
R. Beebe A-29	261 1/2	$2,300.
E. Rogers A-1100	44 1/2	$220.
B. F. Lynch A-725	213	$1,000.
M. Marsh A-880, A-881*	640	$3,200.
J. Wilson A-1409	101	$1,000.
J. Matthews A-856	306 1/2	$1,200.

A. Matthews A-839	84	$400.
D. Carter A-257	220	$900.
D. R. McInturf A-862	100	$400.
Sanger	5	$600.
Sanger, 1 lot		$50.
Sanger, Lots 1-7, Blk 2		$175.
Sanger, Lot 1, Blk 15		$50.
Sanger, Lot 3, Blk 3		$200.
Horses/Mules	30	$450.
Cattle 250	$2,450.	
Hogs 30	$30.	
Wagons	3	$125.
Miscellaneous		$30.
Total	$20,220.	

41DN289

Owner	Number/Acres	Value
1850 L. T. Higgins		
No land		
Horses	3	$115.
Total		$115.
1851 L. T. Higgins		
No land		
Horses	1	$70.
Total		$70.
1852 L. T. Higgins		
L. T. Higgins (A-534)*	580	$290.
V. R. Sutton	90	$65.
Cattle	14	$95.
Total		$430.
1853 L. T. Higgins		
L. T. Higgins (A-534)*	640	$480.

Horses	3	$155.
Total		$635.

<u>1854</u> [L. T. Higgins not found]

<u>1855</u> L. T. Higgins

L. T. Higgins (A-534)*	580	$870.
Cattle	15	$100.
Total		$970.

<u>1856</u> [L. T. Higgins not found]

<u>1857</u> L. T. Higgins

L. T. Higgins (A-534)*	580	$870.
Horses	6	$300.
Cattle	110	$660.
Total		$1,830.

<u>1858</u> L. T. Higgins

L. T. Higgins (A-534)*	580	$1,160.
Heirs E. Sutton	318	$640.
Horses	4	$300.
Cattle	60	$420.
Total		$2,520.

<u>1859</u> L. T. Higgins

L. T. Higgins (A-534)*	580	$1,740.
P. R. Higgins	160	$480.
P. R. Higgins	80	$240.
E. Sutton	318	$954.
Heirs E. Sutton	40	$120.
Horses	4	$300.
Cattle	40	$300.
Total		$4,154.

<u>1860</u> L. T. Higgins

L. T. Higgins (A-534)*	580	$1,885.
P. R. Higgins	80	$260.
P. R. Higgins	80	$260.
Heirs E. Sutton	35	$105.
Horses	7	$420.
Cattle	58	$510.
Miscellaneous		$125.
Total		$3,460.

<u>1861</u> L. T. Higgins

L. T. Higgins (A-534)*	580	$1,650.
P. R. Higgins	80	$320.
P. R. Higgins	80	$160.
P. R. Higgins	80	$160.
E. Sutton	50	$90.
S. Chowning	10	$20.
Horses	11	$825.
Cattle	50	$300.
Miscellaneous		$30.
Total		$3595.

<u>1862</u> L. T. Higgins

L. T. Higgins (A-534)*	580	$1,640.
P. R. Higgins	80	$160.
E. Sutton	30	$50.
Horses	14	$700.
Cattle	60	$360.
Total		$2,910.

<u>1863</u> [L. T. Higgins not found]

<u>1864</u> L. T. Higgins

L. T. Higgins (A-534)*	580	$1,640.
P. R. Higgins	80	$160.
E. Sutton	30	$50.
Total		$1,750.

1865 L. T. Higgins

L. T. Higgins (A-534)*	540	$820.
P. R. Higgins	80	$80.
E. Sutton	33	$30.
Horses	32	$880.
Cattle	70	$350.
Miscellaneous		$50.
Total		$2,210.

1866 L. T. Higgins

L. T. Higgins (A-534)*	540	$710.
P. R. Higgins	80	$80.
P. R. Higgins	310	$390.
E. Sutton	30	$30.
W. Wilson	80	$120.
Horses	25	$750.
Cattle	70	$350.
Miscellaneous		$120.
Total		$2,550.

1867 L. T. Higgins

L. T. Higgins (A-534)*	540	$660.
P. R. Higgins	80	$80.
P. R. Higgins	160	$160.
P. R. Higgins	150	$150.
E. Sutton	30	$30.
W. Wilson	80	$80.
Horses	24	$720.
Cattle	80	$480.
Sheep	12	$24.
Miscellaneous		$180.
Total		$2,564.

1868 L. T. Higgins

L. T. Higgins (A-534)*	420	$840.
P. R. Higgins	160	$160.
P. R. Higgins	160	$160.

P. R. Higgins	80	$80.
E. Sutton	33	$30.
W. Wilson	80	$120.
Horses	25	$650.
Cattle	64	$280.
Sheep	15	$20.
Miscellaneous		$260.
Total		$2,600.

<u>1869</u> L. T. Higgins

L. T. Higgins	280	$840.
P. R. Higgins	20	$20.
P. R. Higgins	150	$200.
P. R. Higgins	160	$160.
E. Sutton	33	$30.
W. Wilson	80	$80.
Total		$1,330.

<u>1870</u> [L. T. Higgins not found]

<u>1871</u> L. T. Higgins

L. T. Higgins	280	$1,500.
P. R. Higgins	20	$20.
P. R. Higgins	310	$310.
E. Sutton	36	$70.
W. Wilson	80	$80.
Horses	6	$200.
Total		$2,180.

<u>1872</u> L. T. Higgins and J. Sutton

L. T. Higgins	280	$1,500.
P. R. Higgins	20	$40.
E. Sutton	33	$100.
W. Wilson	80	$160.
Horses	11	$220.
Total		$2,020.

1873 L. T. Higgins

L. T. Higgins	280	$1400.
P. R. Higgins	20	$40.
E. Sutton	23	$70.
W. Wilson	80	$160.
Horses	4	$22.
Total		$1,890.

1873 V. Stinchcomb

L. T. Higgins (may include 41DN289)*	50	$300.
Horses	2	$50.
Cattle	2	$10.
Miscellaneous		$20.
Total		$380.

1874-75 [C. R. and W. C. Portman not found]

1876 C. R. and W. C. Portman

L. T. Higgins (A-534)*	70	$600.
Horses/Mules	4	$150.
Cattle	2	$10.
Goats/Hogs	14	$20.
Implements		$30.
Total		$810.

1877 J. P. Gillom and son

L. T. Higgins (adjacent to 41DN289)*	40	$300.
P. R. Higgins	80	$300.
C. Heath	160	$960.
W. Wilson	40	$80.
Horses/Mules	7	$140.
Cattle	50	$300.
Hogs	6	$5.
Wagons	1	$15.
Miscellaneous		$50.
Total		$2,090.

1877-83 [no data found]

1884 G. L. Vardaman (also Vardeman or Vardiman)

L. T. Higgins (A-534)*	35	$280.
Horses/Mules	3	$150.
Cattle	24	$300.
Miscellaneous		$20.
Total		$750.

1884 C. R. Portman

L. T. Higgins (A-534)*	35	$350.
Horses/Mules	1	$40.
Cattle	5	$60.
Hogs	7	$10.
Total		$460.

1885 G. L. Vardaman

L. T. Higgins (A-534)*	35	$280.
Horses/Mules	3	$100.
Cattle	15	$130.
Total		$510.

1886 G. L. Vardaman

L. T. Higgins (A-534)*	35	$350.
Horses/Mules	4	$300.
Cattle	12	$100.
Total		$750.

1887 G. L. Vardaman

L. T. Higgins (A-534)*	35	$300.
Horses/Mules	1	$200.
Cattle	12	$80.
Total		$680.

<u>1888</u> G. L. Vardaman

L. T. Higgins (A-534)*	70	$700.
Horses/Mules	6	$260.
Cattle	8	$40.
Total		$1,000.

<u>1889</u> G. L. Vardaman

L. T. Higgins	70	$700.
Horses/Mules	5	$200.
Cattle	18	$100.
Implements		$100.
Miscellaneous		$60.
Total		$1,160.

<u>1890</u> G. L. Vardaman

L. T. Higgins (A-534)*	70	$600.
S. Chowning	20	$30.
Horses/Mules	4	$170.
Cattle	18	$90.
Implements		$50.
Total		$940.

<u>1891</u> G. L. Vardaman

L. T. Higgins (A-534)*	70	$560.
S. Chowning	20	$40.
Horses/Mules	3	$140.
Cattle	20	$100.
Total		$840.

<u>1892</u> G. L. Vardaman

L. T. Higgins (A-534)*	70	$560.
S. Chowning	20	$40.
Horses/Mules	3	$180.
Cattle	20	$100.

Implements		$160.
Money on Hand		$100.
Total		$1,140.

<u>1893</u> G. L. Vardaman

L. T. Higgins (A-534)*	70	$560.
S. Chowning	20	$40.
Horses/Mules	2	$70.
Cattle 12	$60.	
Wagons	2	$50.
Miscellaneous		$40.
Total	$820.	

<u>1894</u> G. L. Vardaman

L. T. Higgins (A-534)*	70	$700.
S. Chowning	20	$200.
Horses/Mules	2	$100.
Cattle 10	$50.	
Hogs 12	$10.	
Wagons	1	$50.
Miscellaneous		$10.
Total	$1,120.	

<u>1895</u> G. L. Vardaman

L. T. Higgins (A-534)*	70	$700.
S. Chowning	20	$200.
Horses/Mules	3	$75.
Cattle 15	$75.	
Wagons	1	$60.
Miscellaneous		$10.
Total	$1,120.	

41DN410

<u>1850-1851</u> [not listed]

<u>1852</u> Peter Teel

J. Batch	320	$160.
C. Lewis	456	$228.
W. Powell	320	$160.
Horses	5	$325.
Cattle	35	$450.
Wagons	1	$214.
Total		$1,537.

<u>1853</u> Peter Teel

W. Loving*	320	$320.
C. Lewis	456	$228.
D. McCurley	986	$493.
W. Powell	320	$320.
Horses	6	$375.
Cattle	35	$450.
Sheep/Wagons	15/2	$160.
Money at Interest		$50.
Total		$2,396.

<u>1854</u> Peter Teel

W. Loving*	320	$320.
J. Balch	40	$40.
J. Balch	120	$120.
D. McCurley	984	$492.
W. Powell	320	$640.
Horses	4	$260.
Cattle	68	$650.
Wagons	2	$150.
Total		$2,662.

<u>1855</u> [Peter Teel not found]

<u>1856</u> Peter Teel

W. Loving A-747*	320	$640.
Other land [not readable]		$1,452.
Horses	4	$290.
Cattle	55	$500.

Wagons	2	$120.
Total		$3,002.

<u>1857</u> Peter Teel

W. Loving A-747	320	$960.
Other land [not legible]	?	$473.
Horses	4	$255.
Cattle	40	$280.
Total		$2,947.

<u>1858</u> Peter Teel

W. Loving A-747*	320	$960.
W. Powell	170	$1,000.
Horses	5	$250.
Cattle	50	$350.
Total		$2,560.

<u>1859</u> Peter Teel

W. Loving A-747*	320	$960.
W. Powell	170	$1,000.
Horses	6	$360.
Cattle	52	$410.
Sheep	31	$90.
Total		$2,820.

<u>1860</u> Peter Teel

W. Loving A-747*	320	$960.
W. Powell	170	$1,000.
Horses	7	$525.
Cattle	55	$385.
Sheep	25	$75.
Total		$2,840.

<u>1861</u> Peter Teel

W. Loving A-747*	320	$640.

W. Powell	170	$900.
J. Balch	40	$40.
Horses	9	$450.
Cattle	55	$330.
Sheep	40	$120.
Miscellaneous		$100.
Total		$2,540.

1862 Peter Teel

W. Loving A-747*	243	$480.
W. Powell	170	$850.
J. Balch	40	$40.
Horses	6	$450.
Cattle	50	$300.
Sheep	50	$150.
Miscellaneous		$50.
Total		$2,280.

1863 Peter Teel

W. Loving A-747*	243	$726.
W. Powell	170	$1,000.
Total [no breakdown given for personal property]		$2,160.

1864 Peter Teel

W. Loving A-747*	205	$615.
W. Loving A-747*[?]	1	$800.
W. Powell	170	$800.
W. McNeil A-815	1/2	$1500.
Confederate Notes		$110.
Total		$3,825.

1865 Peter Teel

W. Loving A-747*	300	$400.
W. Powell	170	$500.
E. A. Orr	40	$40.

Horses	13	$460.
Cattle	30	$150.
Total		$1,550.

<u>1866</u> Peter Teel

W. Loving A-747*	200	$400.
W. Powell	170	$680.
J. Balch	20	$40.
Horses	8	$320.
Cattle	40	$200.
Total		$1600.

<u>1867</u> Peter Teel

W. Loving A-747*	200	$400.
W. Powell	170	$850.
P. Ransom	40	$80.
W. B. Watkins (Collin Co.)	160	$400.
Horses	13	$640.
Cattle	63	$335.
Miscellaneous		$175.
Total		$2,480.

<u>1867</u> Jacob Casady (Freedman)

No land		
Cattle	8	$40.
Miscellaneous		$20.
Total		$60.

<u>1868</u> Peter Teel [not found]

<u>1869</u> Peter Teel

W. Loving A-747*	160	$400.
Total		$400.

<u>1870</u> Jacob Cassady (Freedman)

No land

Horses	4	$120.
Miscellaneous		$10.
Total		$130.

1871-2 Peter Teel [not found]

1872 J. Cassady (also Casady, Casiday, and Casidy)

No land		
Horses	9	$225.
Cattle	4	$20.
Total		$245.

1873 Jacob Cassady

W. Loving A-747*	40	$300.
Horses	2	$50.
Cattle	1	$10.
Miscellaneous		$10.
Total		$370.

1874 Jake Cassady

W. Loving A-747*	40	$250.
Horses	2	$40.
Cattle	8	$40.
Miscellaneous		$60.
Total		$390.

1875 [J. Casady not found]

1876 Jake Cassady

W. Loving A-747*	40	$200.
Horses/Mules	3	$60.
Cattle	6	$30.
Implements		$30.
Total		$420.

1877 Jake Cassady

W. Loving A-747*	30	$300.
W. Loving A-747*	49	$300.
Horses/Mules	3	$45.
Cattle	9	$45.
Hogs	11	$10.
Wagons	1	$10.
Miscellaneous		$65.
Total		$725.

1884 J. Cassady

W. Loving A-747* [Tracts #1 and 2]	93	$600.
Horses/Mules	5	$150.
Cattle	9	$110.
Hogs	8	$15.
Wagons	1	$15.
Miscellaneous		$10.
Total		$900.

1885 Jake Cassady

W. Loving A-747*	93	$600.
Horses/Mules	5	$155.
Cattle	10	$100.
Hogs	8	$20.
Wagons	1	$25.
Total		$900.

1886 Jacob Cassady

W. Loving A-747*	93	$600.
Horses/Mules	5	$150.
Cattle	10	$80.
Hogs	8	$15.
Wagons	1	$15.
Total		$860.

1887 Jacob Cassady

W. Loving A-747*	93	$600.
Horses/Mules	6	$240.
Cattle	9	$60.
Hogs	4	$5.
Wagons	1	$40.
Implements		$25.
Total		$970.

1888 Jacob Cassady

W. Loving A-747*	93	$600.
Horses/Mules	8	$240.
Cattle	9	$15.
Hogs	9	$45.
Wagons	1	$50.
Implements		$20.
Total		$1,020.

1889 [Not found]

1890 Jacob Cassady

W. Loving A-747*	93	$275.
Horses/Mules	8	$240.
Cattle	8	$40.
Hogs	9	$20.
Wagons	1	$25.
Implements		$40.
Total		$640.

1891 Jacob Cassady

W. Loving A-747*	93	$275.
Horses/Mules	8	$240.
Cattle	12	$65.
Hogs	14	$10.

Wagons	1	$40.
Implements		$90.
Total		$720.

1892 J. Cassady

W. Loving A-747*	93	$270.
Horses/Mules	8	$240.
Cattle	12	$60.
Wagons	1	$30.
Total		$600.

1893 J. Cassady

W. Loving A-747*	93	$300.
Horses/Mules	7	$220.
Cattle 14	$70.	
Hogs 7	$20.	
Wagons	1	$25.
Implements		$25.
Total	$660.	

1894 J. Cassady

W. Loving A-747*	93	$600.
Horses/Mules	7	$200.
Cattle 16	$80.	
Hogs 11	$10.	
Wagons	1	$20.
Implements		$50.
Total	$960.	

1895 J. Cassady

W. Loving A-747*	93	$600.
Horses/Mules	9	$250.
Cattle 14	$70.	
Hogs 12	$25.	
Wagons	1	$25.
Implements		$30.

Total	$1,000.	

41DN466

Owner	Number/Acres	Value
1850-1854 [J. J. Lytle not found]		
1856 J. J. Lytle		
J. J. Lytle A-757*	160	$160.
Total		$160.
1857 [J. J. Lytle not found]		
1858 G. W. Lytle		
J. J. Lytle A-757*	160	$320.
Horses	4	$300.
Cattle	60	$420.
Total		$2,520.
1859 George Lytle		
J. Lytle*	160	$480.
Horses	3	$150.
Wagons	2	$180.
Total		$810.
1860 George Lytle		
J. Lytle*	160	$400.
Horses	4	$150.
Miscellaneous		$100.
Total		$650.
1861 George Lytle		

J. Lytle*	160	$300.
Horses	3	$125.
Cattle	4	$25.
Miscellaneous		$75.
Total		$545.

1862 D. Lytle (wife of George Lytle)

J. Lytle*	160	$320.
J. Havens	5	$10.
Horses	1	$75.
Total		$405.

1863-1867 [D. Lytle and A. H. Luttrell not found]

1868 A. H. Luttrell

J. Lytle*	130	$260.
Horses	8	$190.
Sheep	10	$10.
Miscellaneous		$30.
Total		$491.

1869 W. G. Shannon

J. Lytle*	130	$300.
Horses	10	$300.
Cattle	20	$100.
Sheep	12	$10.
Miscellaneous		$80.
Total		$790.

1870- [not found; who owned?]

1890 L. G. Harris

J. J. Lytle A-757*	105	$700.
J. Brent A-106	310	$1,200.

Horses/Mules	4	$150.
Cattle	35	$170.
Wagons	1	$25.
Implements		$25.
Total		$2,260.

<u>1891</u> L. G. Harris

J. J. Lytle A-757*	100	$600.
J. Brent A-106	310	$1,240.
Horses/Mules	5	$250.
Cattle	25	$120.
Wagons	1	$30.
Total		$2,240.

<u>1892</u> L. G. Harris

J. J. Lytle A-757*	100	$800.
J. Brent A-106	172	$860.
Horses/Mules	4	$200.
Cattle	6	$30.
Wagons	1	$30.
Total		$1,920.

<u>1893</u> L. G. Harris

J. J. Lytle A-757*	100	$800.
J. Brent A-106	172	$860.
Horses/Mules	9	$225.
Cattle 6	$30.	
Hogs 7	$15.	
Wagons	1	$30.
Total	$2,060.	

<u>1894</u> L. G. Harris

J. J. Lytle A-757*	100	$800.
J. Brent A-106	173	$1,300.
Horses/Mules	7	$210.
Cattle 6	$60.	

Hogs 5	$10.	
Wagons	1	$20.
Implements		$20.
Total	$2,420.	

1895 L. G. Harris

J. J. Lytle A-757*	100	$700.
J. Brent A-106	173	$1,210.
Horses/Mules	9	$135.
Cattle 6	$30.	
Wagons	1	$15.
Implements		$10.
Total	$2,100.	

APPENDIX F

TRADITIONAL ATTRIBUTE DATA FOR THE CRANSTON-DONALDSON POTTERY

The raw attribute data presented in this appendix are discussed in Chapter 6 and were analyzed using SPSS. All attributes and attribute codes are listed below. A blank column occurs between each variable.

1. Specimen
2. Count
3. Interior glaze
4. Exterior glaze
5. Vessel form
6. Vessel part
7. Decoration
8. Makers' mark
9. Makers' mark location
10. Gallon number
11. Gallon number location
12. Base
13. Handle
14. Rim diameter (open vessels)
15. Gallon size
16. Jug rim diameter

FILE: CRNSTON DATA A1 UNIVERSITY OF NORTH TEXAS

```
//FA59SPSS JOB (FA59,:45,5),'LEBO',PASSWORD=(SUSAN)
/*ROUTE PUNCH UNTVM1.FC22
/*ROUTE PRINT UNTVM1.FC22
//  EXEC SPSSX
SET WIDTH 80
DATA LIST FIXED RECORDS=1
 /1 SPECIMEN 1-3 COUNT 5-7 IGLAZE 9 EGLAZE 11
   VFORM 13 PART 15 DEC 17 MMARK 19 MMLOC 21
   GAL# 23 GALLOC 25 BASE 27 HANDLE 29 RIMDIA 31-32
   GALSIZE 34 JUGRIM 36-39
VALUE LABELS
 IGLAZE 0 'UNID' 1 'NAT CLAY' 2 'SALT' 4 'TWO-TONE'
 /EGLAZE 0 'UNID' 1 'NAT CLAY' 2 'SALT' 4 'TWO-TONE'
 /VFORM 0 'UNID' 1 'MILKCROCK' 2 'MILKPAN' 3 'JAR/CHURN'
  4 'JAR/CROCK' 5 'CHURN' 6 'JUG'
 /PART 0 'UNID' 1 'RIM' 2 'BODY' 3 'BASE' 4 'RIM-BASE' 5 'HANDLE'
 /DEC 0 'NONE' 1 'COBALT BLUE' 2 'OTHER' 3 'UNID'
 /MMARK 0 'NONE' 1 'STAMPED' 2 'COBALT STENCIL'
 /MMLOC 0 'NONE' 1 'BODY' 2 'INSIDE HANDLE' 3 'ON RIM' 4 'ON BASE'
  5 'BODY NEAR BASE'
 /GAL# 0 'NONE' 1 'STAMPED' 2 'INCISED' 3 'COBALT BLUE'
  4 'INCISED & COBALT BLUE'
 /GALLOC 0 'NONE' 1 'BODY' 2 'INSIDE HANDLE' 3 'ON RIM' 4 'ON BASE'
  5 'BODY NEAR BASE'
 /BASE 0 'NONE' 1 'CIRC PATTERN' 2 'SMOOTH' 3 'STRAIGHT PAT'
  4 'MOLDED'
BEGIN DATA
107 001 1 2 0 2 1 0 0 3 1 0 0 00 3
108 001 1 2 0 2 1 0 0 3 1 0 0 00 4
126 001 1 2 0 2 0 0 0 3 2 0 4 00 6
128 001 1 2 0 2 1 0 0 3 1 0 0 00 4
121 001 1 2 0 2 1 0 0 3 1 0 0 00 4
110 001 1 2 0 2 0 0 0 3 1 0 0 00 3
114 001 1 2 0 2 1 0 0 3 1 0 0 00 5
113 001 1 2 0 2 0 0 0 3 1 0 0 00 5
112 001 1 2 0 2 0 0 0 3 1 0 0 00 2
115 001 1 2 0 2 1 0 0 3 1 0 0 00 2
111 001 1 2 0 2 0 0 0 3 1 0 0 00 2
119 001 1 2 0 2 1 0 0 3 1 0 0 00 2
118 001 1 2 0 2 1 0 0 3 1 0 0 00 4
116 001 1 2 0 2 1 0 0 3 1 0 0 00 2
125 001 1 2 0 2 0 0 0 3 1 0 0 00 2
123 001 1 2 0 2 1 0 0 3 1 0 0 00 2
124 001 1 2 0 2 1 0 0 3 1 0 0 00 5
109 001 1 2 0 2 0 0 0 3 3 0 0 00 0
120 001 1 2 0 2 0 0 0 3 3 0 0 00 0
099 001 1 2 4 1 0 1 1 0 0 0 0 00 0
079 001 1 2 4 1 0 1 1 1 1 0 0 10 2
096 002 1 2 4 1 0 1 1 0 0 0 0 07 0
077 001 1 2 2 1 0 1 1 0 0 0 0 11 0
082 001 1 2 4 1 0 1 1 0 0 0 0 11 0
078 001 1 2 4 1 0 1 1 1 1 0 0 10 3
081 001 1 2 4 1 0 1 1 1 1 0 0 10 3
1C1 001 1 2 4 1 0 1 1 1 1 0 0 09 7
100 001 1 2 4 1 0 1 1 0 0 0 0 08 0
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FILE: CRNSTON DATA A1 UNIVERSITY OF NORTH TEXAS

075	001	1	2	3	1	0	1	1	0	0	0	0	06	0
068	001	1	2	5	1	0	1	1	0	0	0	0	09	0
071	001	1	2	5	1	0	1	1	0	0	0	0	08	0
070	001	1	2	5	1	0	1	1	1	1	0	0	08	5
074	001	1	2	3	1	0	1	1	0	0	0	0	06	0
065	001	1	2	3	1	0	1	1	1	1	0	0	07	3
041	001	1	4	1	1	0	1	3	1	3	0	0	12	2
048	001	1	4	1	1	0	1	3	0	0	0	0	14	0
046	001	1	4	1	1	0	1	3	0	0	0	0	12	0
045	001	1	4	1	1	0	1	3	0	0	0	0	12	0
080	001	1	2	4	1	0	1	1	1	1	0	0	00	2
050	001	1	2	4	1	0	1	1	0	0	0	0	00	0
073	001	1	2	5	1	0	1	1	1	1	0	0	08	2
067	001	1	2	5	1	1	1	1	1	1	0	0	08	2
072	001	1	2	5	1	0	1	1	1	1	0	0	09	2
066	001	1	2	5	1	0	1	1	0	0	0	0	10	0
064	001	1	2	5	1	0	1	1	0	0	4	0	10	0
086	001	1	1	4	1	0	1	1	0	0	0	0	06	0
069	001	1	1	3	1	0	1	1	0	0	0	0	00	0
147	001	1	2	4	1	0	0	0	1	1	0	0	08	2
130	001	1	4	1	1	0	0	0	1	3	0	0	11	2
136	001	1	4	1	1	0	0	0	1	3	0	0	12	2
139	001	1	2	1	1	0	0	0	1	3	0	0	14	2
159	001	1	4	1	1	0	0	0	1	3	0	0	00	2
144	001	1	2	5	1	0	0	0	1	1	0	0	07	2
134	001	1	2	5	1	0	0	0	2	1	0	0	08	2
137	001	1	2	2	1	0	0	0	1	1	0	0	08	2
145	001	1	2	2	1	0	0	0	1	1	0	0	10	2
163	001	1	2	4	1	0	0	0	1	1	0	0	10	2
135	001	1	2	2	1	0	0	0	1	1	0	0	09	2
146	001	1	2	4	1	1	0	0	1	1	0	0	10	2
143	001	1	2	2	1	0	0	0	1	1	0	0	12	2
129	001	1	2	4	1	0	0	0	1	1	0	0	08	2
133	001	1	2	2	1	0	0	0	1	1	0	0	09	2
160	001	1	2	4	1	0	0	0	1	1	0	0	00	2
131	001	1	4	1	1	0	0	0	1	3	0	0	12	2
162	001	1	2	4	1	0	0	0	1	1	0	0	00	2
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152	001	1	2	5	1	0	0	0	1	1	0	0	00	2
148	001	1	2	2	1	0	0	0	1	1	0	0	12	2
150	001	1	2	4	1	0	0	0	1	1	0	0	10	2
157	001	1	2	4	1	0	0	0	1	1	0	0	08	2
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164	001	1	2	2	1	0	0	0	1	3	0	0	00	2
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172	001	1	2	5	1	0	0	0	1	1	0	0	08	3
177	001	1	2	5	1	0	0	0	1	1	0	0	09	3
183	001	1	2	3	1	0	0	0	1	1	0	0	07	3
176	001	1	2	3	1	0	0	0	1	1	0	0	07	3
185	001	1	2	5	1	0	0	0	1	1	0	0	09	3
173	001	1	2	5	1	0	0	0	1	2	0	4	10	3
169	001	1	2	5	1	0	0	0	1	1	0	0	08	3
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FILE: CRNSTON DATA A1 UNIVERSITY OF NORTH TEXAS

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165 001 1 1 5 1 0 0 0 2 2 0 4 08 3
200 001 1 1 5 1 0 0 0 2 2 0 4 09 4
193 001 1 2 5 1 0 0 0 1 2 0 4 09 4
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198 001 1 1 5 1 0 0 0 2 2 0 4 09 4
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215 001 1 2 5 1 0 0 0 1 2 0 4 00 6
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063 001 1 1 5 1 0 0 0 1 1 0 0 00 3
076 001 1 2 4 1 0 1 1 0 0 0 0 09 0
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047 001 1 2 0 3 0 1 5 0 0 2 0 00 0
044 001 1 2 0 3 0 1 5 1 5 2 0 00 2
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089 001 1 2 0 2 0 1 1 1 1 0 0 00 7
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088 001 1 2 0 2 0 1 1 0 0 0 0 00 0
098 001 1 2 0 2 0 1 1 0 0 0 0 00 0
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FILE: CRNSTON DATA A1 UNIVERSITY OF NORTH TEXAS

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175 001 1 2 0 2 0 0 0 1 1 0 0 00 3
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197 001 1 2 0 2 0 0 0 1 1 0 0 00 4
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223 001 1 2 0 2 0 0 0 1 1 0 0 00 8
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000 001 1 1 6 1 0 0 0 0 0 0 2 00 0 204
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FILE: CRNSTON DATA A1 UNIVERSITY OF NORTH TEXAS

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000	001	1	1	6	4	0	0	0	0	0	2	2	00	0	194
000	001	1	1	6	1	0	0	0	0	0	0	2	00	0	195
000	001	1	1	6	4	0	0	0	0	0	2	2	00	0	205
000	001	1	1	6	1	0	0	0	0	0	0	2	00	0	187
000	001	1	1	6	1	0	0	0	0	0	0	2	00	0	190
000	001	1	1	6	1	0	0	0	0	0	0	2	00	0	000
000	001	1	1	6	1	0	0	0	0	0	0	2	00	0	000
000	001	1	1	6	1	0	0	0	0	0	0	2	00	0	000
000	001	1	1	6	1	0	0	0	0	0	0	2	00	0	000

FILE: CRNSTON DATA A1 UNIVERSITY OF NORTH TEXAS

000	001	1	1	6	1	0	0	0	0	0	0	2	00	0	158
000	001	1	2	6	1	0	0	0	0	0	0	2	00	0	141
000	001	1	2	6	1	0	0	0	0	0	0	2	00	0	173
000	001	1	2	6	1	0	0	0	0	0	0	2	00	0	155
000	001	1	1	6	1	0	0	0	0	0	0	2	00	0	154
000	001	1	1	6	1	0	0	0	0	0	0	2	00	0	170
000	001	1	1	6	1	0	0	0	0	0	0	2	00	0	234
000	001	1	1	6	1	0	0	0	0	0	0	2	00	0	006
000	001	1	1	6	1	0	0	0	0	0	0	0	00	0	153
000	001	1	2	6	1	0	0	0	0	0	0	2	00	0	147
000	001	1	1	6	1	0	0	0	0	0	0	0	00	0	142
000	001	1	2	6	1	0	0	0	0	0	0	2	00	0	170
000	001	1	1	6	1	0	0	0	0	0	0	2	00	0	159
000	001	1	1	6	1	0	0	0	0	0	0	0	00	0	150
000	001	1	1	6	1	0	0	0	0	0	0	2	00	0	129
000	001	1	2	6	1	0	0	0	0	0	0	2	00	0	124
000	001	1	1	6	1	0	0	0	0	0	0	2	00	0	137
000	001	1	1	6	1	0	0	0	0	0	0	2	00	0	160
000	001	1	1	6	1	0	0	0	0	0	0	2	00	0	000
000	001	1	2	6	1	0	0	0	0	0	0	0	00	0	174
000	001	1	2	6	1	0	0	0	0	0	0	1	00	0	129
000	001	1	2	6	1	0	0	0	0	0	0	0	00	0	000
000	001	1	1	6	1	0	0	0	0	0	0	2	00	0	177
000	001	1	1	6	1	0	0	0	0	0	0	2	00	0	191
000	001	1	1	6	1	0	0	0	0	0	0	2	00	0	176
000	001	1	2	6	1	0	0	0	0	0	0	2	00	0	140
000	001	1	1	6	1	0	0	0	0	0	0	2	00	0	156
000	001	1	1	6	1	0	0	0	0	0	0	2	00	0	143
000	001	1	1	6	1	0	0	0	0	0	0	2	00	0	175
000	001	1	2	6	1	0	0	0	0	0	0	2	00	0	183
000	001	1	2	6	1	0	0	0	0	0	0	0	00	0	000
000	001	1	1	6	1	0	0	0	0	0	0	2	00	0	000
000	003	1	2	6	1	1	0	0	0	0	0	2	00	0	172
000	001	1	2	6	1	0	0	0	0	0	0	0	00	0	000
000	001	1	1	0	2	0	0	0	0	0	0	4	00	0	
000	001	1	2	0	2	0	0	0	0	0	0	4	00	0	
000	001	1	1	0	2	0	0	0	0	0	0	4	00	0	
000	017	1	2	0	2	0	0	0	0	0	0	4	00	0	
000	007	1	1	0	2	0	0	0	0	0	0	4	00	0	
000	002	1	2	0	5	0	0	0	0	0	0	4	00	0	
000	001	1	2	5	2	0	0	0	0	0	0	4	00	0	
000	001	1	2	5	2	0	0	0	0	0	0	4	00	0	
000	001	1	1	5	2	0	0	0	0	0	0	4	00	0	
000	153	1	2	0	2	0	0	0	0	0	0	0	00	0	
000	157	1	1	0	2	0	0	0	0	0	0	0	00	0	
000	187	1	2	0	2	0	0	0	0	0	0	0	00	0	
000	007	1	2	0	2	0	0	0	0	0	0	0	00	0	
000	023	1	1	0	2	0	0	0	0	0	0	0	00	0	
000	002	1	2	0	2	0	0	0	0	0	0	0	00	0	
000	001	1	2	6	2	0	0	0	0	0	0	0	00	0	000
000	001	1	2	6	2	0	0	0	0	0	0	0	00	0	000
000	008	1	2	0	2	0	0	0	0	0	0	0	00	0	
000	001	1	1	6	2	0	0	0	0	0	0	0	00	0	000
000	006	1	2	0	2	0	0	0	0	0	0	0	00	0	
000	003	1	1	0	2	0	0	0	0	0	0	0	00	0	

FILE: CRNSTON DATA A1 UNIVERSITY OF NORTH TEXAS

```
000 001 1 1 0 2 0 0 0 0 0 0 0 00 0
000 001 1 0 0 2 0 0 0 0 0 0 0 00 0
000 006 1 2 0 2 0 0 0 0 0 0 0 00 0
000 001 1 2 0 2 0 0 0 0 0 0 0 00 0
000 054 1 2 0 2 1 0 0 0 0 0 0 00 0
000 003 1 2 0 2 1 0 0 0 0 0 0 00 0
000 020 1 2 0 2 1 0 0 0 0 0 0 00 0
000 022 1 2 0 2 1 0 0 0 0 0 0 00 0
000 005 1 2 0 2 1 0 0 0 0 0 0 00 0
000 071 1 2 0 2 1 0 0 0 0 0 0 00 0
000 001 1 2 0 2 1 0 0 0 0 0 4 00 0
000 001 1 2 6 2 1 0 0 0 0 0 2 00 0 000
000 002 1 2 6 2 1 0 0 0 0 0 0 00 0 000
000 001 1 2 0 2 2 0 0 0 0 0 0 00 0
000 001 1 2 0 2 1 0 0 0 0 0 0 00 0
000 001 1 2 0 2 1 0 0 0 0 0 0 00 0
000 004 1 2 0 2 1 0 0 0 0 0 0 00 0
000 001 1 2 5 2 1 0 0 0 0 0 4 00 0
000 003 1 2 0 2 1 0 0 0 0 0 0 00 0
000 001 1 2 0 2 1 0 0 0 0 0 4 00 0
000 001 1 2 0 2 1 0 0 0 0 0 0 00 0
000 001 1 2 0 2 1 0 0 0 0 0 0 00 0
000 002 1 2 0 2 1 0 0 0 0 0 4 00 0
000 001 1 2 0 2 1 0 0 0 0 0 4 00 0
000 001 1 2 0 2 1 0 0 0 0 0 4 00 0
000 001 1 2 0 2 1 0 0 0 0 0 0 00 0
000 001 1 2 0 2 2 0 0 0 0 0 0 00 0
000 001 1 4 1 1 0 0 0 0 0 0 0 12 0
000 001 1 4 1 1 0 0 0 0 0 0 0 11 0
000 001 1 4 1 1 0 0 0 0 0 2 0 00 0
000 001 1 1 1 1 0 0 0 0 0 0 0 10 0
000 001 1 4 1 1 0 0 0 0 0 0 0 10 0
000 001 1 4 1 1 0 0 0 0 0 0 0 00 0
000 001 1 4 1 1 0 0 0 0 0 0 0 00 0
000 001 1 4 1 1 0 0 0 0 0 0 0 10 0
000 001 1 4 1 1 0 0 0 0 0 0 0 10 0
000 001 1 4 1 1 0 0 0 0 0 0 0 12 0
000 007 1 4 1 1 0 0 0 0 0 0 0 00 0
000 002 1 1 1 1 0 0 0 0 0 0 0 10 0
000 001 1 4 1 1 0 0 0 0 0 0 0 12 0
000 007 1 4 1 1 0 0 0 0 0 0 0 12 0
000 001 1 1 1 1 0 0 0 0 0 0 0 10 0
000 001 1 1 1 4 0 0 0 0 0 3 0 11 0
000 001 1 4 1 1 1 0 0 0 0 0 0 00 0
000 001 1 4 1 1 0 0 0 0 0 0 0 00 0
000 001 1 4 1 1 0 0 0 0 0 0 0 12 0
000 001 1 4 1 1 0 0 0 0 0 0 0 10 0
000 001 1 4 1 4 0 0 0 0 0 0 0 11 0
000 001 1 4 1 1 0 0 0 1 3 0 0 12 2
000 001 1 4 1 1 0 0 0 0 0 0 0 09 0
000 002 1 4 1 4 0 0 0 0 0 3 0 12 0
000 001 1 2 1 1 0 0 0 0 0 0 0 00 0
000 001 1 1 1 4 0 0 0 0 0 3 0 12 0
000 001 1 4 1 1 0 0 0 0 0 0 0 12 0
000 001 1 4 1 1 0 0 0 0 0 0 0 12 0
```

FILE: CRNSTON DATA A1 UNIVERSITY OF NORTH TEXAS

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000 001 1 4 1 1 0 0 0 0 0 0 0 00 0
000 001 1 4 1 1 0 0 0 1 3 0 0 12 0
000 001 1 4 1 1 0 0 0 0 0 0 0 12 0
000 001 1 4 1 1 0 0 0 0 0 0 0 09 0
000 001 1 4 1 1 0 0 0 0 0 0 0 12 0
000 001 1 1 1 4 0 0 0 0 0 1 0 10 0
000 001 1 4 1 4 0 0 0 0 0 2 0 12 0
000 001 1 4 1 4 0 0 0 0 0 2 0 10 0
000 001 1 4 1 4 0 0 0 0 0 1 0 10 0
000 001 1 4 1 1 0 0 0 0 0 0 0 10 0
000 001 1 4 1 1 0 0 0 0 0 0 0 12 0
000 001 1 4 1 4 0 0 0 0 0 2 0 12 0
000 001 1 1 1 4 0 0 0 0 0 2 0 12 0
000 001 1 4 1 4 0 0 0 0 0 2 0 12 0
000 001 1 4 1 1 0 0 0 0 0 0 0 12 0
000 005 1 4 1 1 0 0 0 0 0 0 0 12 0
000 002 1 4 1 4 0 0 0 0 0 2 0 10 0
000 001 1 4 1 4 0 0 0 0 0 2 0 00 0
000 001 1 4 1 4 0 0 0 0 0 2 0 10 0
000 001 1 4 1 4 0 0 0 0 0 2 0 00 0
000 003 1 4 1 4 0 0 0 0 0 2 0 12 0
000 001 1 4 1 4 0 0 0 0 0 2 0 10 0
000 001 1 4 1 4 0 0 0 0 0 3 0 00 0
000 002 1 4 1 1 0 0 0 0 0 0 0 12 0
000 001 1 2 1 1 0 0 0 0 0 0 0 00 0
000 010 1 1 0 3 0 0 0 0 0 2 0 00 0
000 008 1 2 0 3 0 0 0 0 0 2 0 00 0
000 002 1 2 0 3 0 0 0 0 0 3 0 00 0
000 003 1 1 0 3 0 0 0 0 0 3 0 00 0
000 001 1 4 0 3 0 0 0 0 0 2 0 00 0
000 007 1 2 0 3 0 0 0 0 0 2 0 00 0
000 007 1 1 0 3 0 0 0 0 0 2 0 00 0
000 003 1 0 0 3 0 0 0 0 0 3 0 00 0
000 001 1 0 0 3 0 0 0 0 0 2 0 00 0
000 001 1 4 1 3 0 0 0 0 0 2 0 00 0
000 015 1 2 0 3 0 0 0 0 0 2 0 00 0
000 019 1 1 0 3 0 0 0 0 0 2 0 00 0
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000 002 1 2 0 3 0 0 0 0 0 2 0 00 0
000 001 1 0 0 3 0 0 0 0 0 2 0 00 0
000 001 1 0 0 3 0 0 0 0 0 3 0 00 0
000 001 1 1 0 3 0 0 0 0 0 2 0 00 0
000 001 1 0 0 3 0 0 0 0 0 2 0 00 0
000 003 1 0 0 3 0 0 0 0 0 3 0 00 0
000 002 1 2 0 3 0 0 0 0 0 3 0 00 0
000 001 1 1 0 3 0 0 0 0 0 2 0 00 0
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000 001 1 1 0 3 0 0 0 0 0 3 0 00 0
000 001 1 1 0 3 0 0 0 0 0 2 0 00 0
000 002 1 2 0 3 0 0 0 0 0 2 0 00 0
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FILE: CRNSTON DATA A1 UNIVERSITY OF NORTH TEXAS

000	002	1	0	0	3	0	0	0	0	0	1	0	00	0
000	001	1	4	1	3	0	0	0	0	0	3	0	00	0
000	002	1	0	0	3	0	0	0	0	0	1	0	00	0
000	001	1	0	0	3	0	0	0	0	0	0	0	00	0
000	001	1	2	0	3	0	0	0	0	0	1	0	00	0
000	002	1	0	0	3	0	0	0	0	0	3	0	00	0
000	001	1	2	0	3	0	0	0	0	0	3	0	00	0
000	001	1	0	0	3	0	0	0	0	0	3	0	00	0
000	001	1	0	0	3	0	0	0	0	0	2	0	00	0
000	002	1	2	0	3	0	0	0	0	0	3	0	00	0
000	001	1	0	0	3	0	0	0	0	0	3	0	00	0
000	002	1	0	0	3	0	0	0	0	0	2	0	00	0
000	001	1	1	0	3	0	0	0	0	0	2	0	00	0
000	001	1	2	0	3	0	0	0	0	0	3	0	00	0
000	006	1	2	0	3	0	0	0	0	0	2	0	00	0
000	002	0	2	0	3	0	0	0	0	0	2	0	00	0
000	001	1	1	0	3	0	0	0	0	0	2	0	00	0
000	001	1	2	0	3	0	0	0	0	0	2	0	00	0
000	001	1	1	0	3	0	0	0	0	0	2	0	00	0
000	001	1	2	0	3	0	0	0	0	0	2	0	00	0
000	001	1	2	0	3	0	0	0	0	0	3	0	00	0
000	002	1	1	0	3	0	0	0	0	0	3	0	00	0
000	001	1	1	0	3	0	0	0	0	0	0	0	00	0
000	003	1	2	0	3	0	0	0	0	0	3	0	00	0
000	001	1	1	0	3	0	0	0	0	0	3	0	00	0
000	001	1	2	0	3	0	0	0	0	0	2	0	00	0
000	002	1	1	1	3	0	0	0	0	0	2	0	00	0
000	001	1	1	0	3	0	0	0	0	0	3	0	00	0
000	001	1	1	0	3	0	0	0	0	0	2	0	00	0
000	001	1	2	0	3	0	0	0	0	0	2	0	00	0
000	001	1	2	0	3	0	0	0	0	0	3	0	00	0
000	001	1	1	0	3	0	0	0	0	0	2	0	00	0
000	001	1	2	0	3	0	0	0	0	0	3	0	00	0
000	001	1	1	0	3	0	0	0	0	0	2	0	00	0
000	001	1	2	0	3	0	0	0	0	0	2	0	00	0
000	001	1	1	0	3	0	0	0	0	0	2	0	00	0
000	002	1	1	0	3	0	0	0	0	0	3	0	00	0
000	001	1	2	0	3	0	0	0	0	0	3	0	00	0
000	002	1	1	0	3	0	0	0	0	0	2	0	00	0
000	006	1	2	0	3	0	0	0	0	0	3	0	00	0
000	002	1	1	0	3	0	0	0	0	0	2	0	00	0
000	001	1	1	0	3	0	0	0	0	0	3	0	00	0
000	001	1	2	0	3	0	0	0	0	0	2	0	00	0
000	002	1	1	0	3	0	0	0	0	0	2	0	00	0
000	003	1	2	0	3	1	0	0	0	0	3	0	00	0
000	002	1	2	0	3	0	0	0	0	0	0	0	00	0
000	001	1	2	0	3	1	0	0	0	0	2	0	00	0
000	001	1	2	0	2	1	0	0	0	0	0	0	00	0
000	001	1	2	0	3	0	0	0	0	0	0	0	00	0
000	001	1	1	0	3	0	0	0	0	0	0	0	00	0
000	003	1	2	0	2	1	0	0	0	0	0	0	00	0
000	002	1	2	0	3	1	0	0	0	0	3	0	00	0
000	001	1	2	0	3	1	0	0	0	0	2	0	00	0
000	001	1	2	0	3	1	0	0	0	0	1	0	00	0
000	007	1	1	0	3	0	0	0	0	0	2	0	00	0

FILE: CRNSTON DATA A1 UNIVERSITY OF NORTH TEXAS

223	001	1	2	5	1	0	0	0	0	0	0	0	09	0
224	001	1	2	5	1	0	0	0	0	0	0	0	08	0
225	001	1	1	5	1	0	0	0	0	0	0	0	08	0
226	001	1	1	5	1	0	0	0	0	0	0	0	10	0
227	001	1	2	5	1	0	0	0	0	0	0	0	00	0
228	001	1	2	5	1	0	0	0	0	0	0	0	09	0
229	001	1	2	5	1	0	0	0	0	0	0	0	09	0
230	001	1	2	5	1	0	0	0	0	0	0	4	09	0
231	001	1	2	5	1	0	0	0	0	0	0	0	09	0
232	001	1	2	5	1	0	0	0	0	0	0	4	10	0
233	001	1	1	5	1	0	0	0	0	0	0	4	09	0
234	001	1	1	5	1	0	0	0	0	0	0	0	09	0
235	001	1	2	5	1	0	0	0	0	0	0	0	09	0
236	001	1	1	5	1	0	0	0	0	0	0	4	10	0
237	001	1	2	5	1	0	0	0	0	0	0	0	10	0
238	001	1	1	5	1	0	0	0	0	0	0	0	10	0
239	001	1	2	3	1	0	0	0	0	0	0	0	05	0
240	001	1	2	3	1	0	0	0	0	0	0	0	05	0
241	001	1	2	5	1	0	0	0	0	0	0	0	09	0
242	001	1	2	5	1	0	0	0	0	0	0	0	10	0
243	001	1	2	5	1	0	0	0	0	0	0	0	00	0
244	001	1	2	5	1	0	0	0	0	0	0	4	10	0
245	001	1	1	5	1	0	0	0	0	0	0	0	10	0
246	001	1	2	3	1	0	0	0	0	0	0	0	05	0
247	001	1	2	5	1	0	0	0	0	0	0	0	10	0
248	001	1	2	5	1	0	0	0	0	0	0	0	09	0
249	001	1	2	5	1	0	0	0	0	0	0	4	10	0
250	001	1	2	5	1	0	0	0	0	0	0	4	09	0
251	001	1	2	5	1	0	0	0	0	0	0	4	10	0
252	001	1	2	5	1	0	0	0	0	0	0	0	09	0
253	001	1	1	5	1	0	0	0	0	0	0	4	09	0
254	001	1	2	5	1	0	0	0	0	0	0	0	10	0
255	001	1	2	5	1	0	0	0	0	0	0	0	09	0
256	001	1	2	5	1	0	0	0	0	0	0	4	10	0
257	001	1	2	3	1	0	0	0	0	0	0	0	07	0
258	001	1	1	5	1	0	0	0	0	0	0	0	08	0
259	001	1	2	5	1	0	0	0	0	0	0	4	10	0
260	001	1	2	5	1	0	0	0	0	0	0	0	08	0
261	001	1	2	5	1	0	0	0	0	0	0	4	09	0
262	001	1	2	5	1	0	0	0	0	0	0	0	08	0
263	001	1	2	5	1	0	0	0	0	0	0	0	09	0
264	001	1	1	5	1	0	0	0	0	0	0	4	08	0
265	001	1	2	5	1	0	0	0	0	0	0	4	09	0
266	001	1	1	5	1	0	0	0	0	0	0	4	11	0
267	001	1	2	5	1	0	0	0	0	0	0	4	10	0
268	001	1	2	5	1	0	0	0	0	0	0	0	08	0
269	001	1	2	5	1	0	0	0	0	0	0	0	10	0
270	001	1	2	5	1	0	0	0	0	0	0	4	10	0
271	001	1	2	5	1	0	0	0	0	0	0	0	08	0
272	001	1	2	5	1	0	0	0	0	0	0	4	09	0
273	001	1	2	5	1	0	0	0	0	0	0	4	10	0
274	001	1	2	5	1	0	0	0	0	0	0	4	11	0
275	001	1	1	5	1	0	0	0	0	0	0	4	10	0
276	001	1	2	5	1	0	0	0	0	0	0	4	10	0
277	001	1	2	3	1	0	0	0	0	0	0	0	06	0

FILE: CRNSTON DATA A1 UNIVERSITY OF NORTH TEXAS

278	001	1	2	5	1	0	0	0	0	0	0	0	08	0
279	001	1	2	3	1	0	0	0	0	0	0	4	07	0
280	001	1	2	5	1	0	0	0	0	0	0	0	10	0
281	001	1	2	5	1	0	0	0	0	0	0	4	09	0
282	001	1	1	5	1	0	0	0	0	0	0	0	00	0
283	001	1	1	5	1	0	0	0	0	0	0	0	09	0
284	001	1	2	5	1	0	0	0	0	0	0	0	08	0
285	001	1	2	5	1	0	0	0	0	0	0	4	09	0
286	001	1	2	5	1	0	0	0	0	0	0	0	09	0
287	001	1	2	5	1	0	0	0	0	0	0	4	10	0
288	001	1	1	5	1	0	0	0	0	0	0	0	00	0
289	001	1	2	5	1	0	0	0	0	0	0	4	08	0
290	001	1	2	5	1	0	0	0	0	0	0	0	10	0
291	001	1	1	5	1	0	0	0	0	0	0	0	09	0
292	001	1	2	3	1	0	0	0	0	0	0	0	06	0
293	001	1	1	5	1	0	0	0	0	0	0	0	09	0
294	001	1	2	5	1	0	0	0	0	0	0	0	08	0
295	001	1	2	5	1	0	0	0	0	0	0	0	09	0
296	001	1	2	5	1	0	0	0	0	0	0	0	10	0
297	001	1	2	5	1	0	0	0	0	0	0	0	09	0
298	001	1	2	5	1	0	0	0	0	0	0	0	00	0
299	001	1	2	5	1	0	0	0	0	0	0	0	10	0
300	001	1	2	5	1	0	0	0	0	0	0	0	10	0
301	001	1	2	5	1	0	0	0	0	0	0	4	08	0
302	001	1	2	5	1	0	0	0	0	0	0	0	00	0
303	001	1	1	5	1	0	0	0	0	0	0	4	09	0
304	001	1	2	5	1	0	0	0	0	0	0	4	10	0
305	001	1	2	5	1	0	0	0	0	0	0	0	08	0
306	001	1	2	5	1	0	0	0	0	0	0	0	09	0
307	001	1	2	5	1	0	0	0	0	0	0	0	09	0
308	001	1	2	5	1	0	0	0	0	0	0	0	08	0
309	001	1	2	5	1	0	0	0	0	0	0	4	09	0
310	001	1	2	5	1	0	0	0	0	0	0	0	11	0
311	001	1	1	5	1	0	0	0	0	0	0	0	08	0
312	001	1	2	5	1	0	0	0	0	0	0	4	10	0
313	001	1	1	5	1	0	0	0	0	0	0	0	09	0
314	001	1	2	5	1	0	0	0	0	0	0	0	00	0
315	001	1	2	5	1	0	0	0	0	0	0	0	08	0
316	001	1	2	5	1	0	0	0	0	0	0	0	09	0
317	001	1	2	5	1	0	0	0	0	0	0	0	09	0
318	001	1	2	3	1	0	0	0	0	0	0	0	07	0
319	001	1	2	3	1	0	0	0	0	0	0	0	07	0
320	001	1	2	5	1	0	0	0	0	0	0	0	10	0
321	001	1	2	5	1	0	0	0	0	0	0	4	09	0
322	001	1	2	5	1	0	0	0	0	0	0	4	10	0
323	001	1	2	5	1	0	0	0	0	0	0	4	10	0
324	001	1	2	5	1	0	0	0	0	0	0	4	10	0
325	001	1	2	5	1	1	0	0	0	0	0	0	10	0
326	001	1	2	5	1	1	0	0	0	0	0	4	10	0
327	001	1	2	5	1	2	0	0	0	0	0	0	08	0
328	001	1	2	5	1	1	0	0	0	0	0	4	10	0
329	001	1	2	5	1	1	0	1	3	1	0	0	09	4
330	001	1	2	5	1	1	0	0	3	1	0	0	08	2
331	001	1	2	5	1	1	0	0	0	0	0	0	09	0
332	001	1	2	5	1	1	0	0	0	0	0	0	10	0

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333	001	1	2	5	1	0	0	0	0	0	0	0	10	0
334	001	1	2	5	1	0	0	0	0	0	0	0	09	0
335	001	1	2	5	1	1	0	3	1	0	0	0	09	3
336	001	1	2	5	1	1	0	0	0	0	0	4	10	0
337	001	1	2	5	1	2	0	0	0	0	0	0	09	0
338	001	1	2	5	1	0	0	3	1	0	0	0	09	4
339	002	1	2	5	1	1	0	3	1	0	0	0	08	2
340	001	1	2	3	1	1	0	3	1	0	0	0	06	2
341	001	1	2	5	1	0	0	3	1	0	0	0	09	2
342	001	1	2	5	1	1	0	0	0	0	0	4	08	0
343	001	1	2	5	1	1	0	0	0	0	0	0	00	0
344	001	1	2	5	1	0	0	3	1	0	0	0	08	3
345	001	1	2	5	1	1	0	0	0	0	0	4	09	0
346	001	1	2	5	1	0	0	0	0	0	0	0	00	0
347	001	1	2	5	1	0	0	3	1	0	0	0	09	4
348	001	1	2	5	1	1	0	0	0	0	0	4	09	0
349	001	1	2	5	1	1	0	3	1	0	0	4	09	3
350	001	1	2	5	1	1	0	0	0	0	0	4	11	0
351	001	1	2	5	1	1	0	3	1	0	0	0	09	4
352	001	1	2	5	1	1	0	0	0	0	0	4	10	0
353	001	1	2	5	1	1	0	0	0	0	0	4	10	0
354	001	1	2	5	1	1	0	0	0	0	0	0	10	0
355	001	1	2	5	1	0	0	3	1	0	0	0	08	2
356	001	1	2	5	1	1	0	0	0	0	0	4	10	0
357	001	1	2	5	1	1	0	3	1	0	0	4	10	4
358	001	1	2	5	1	1	0	0	0	0	0	4	10	0
359	001	1	2	5	1	1	0	0	0	0	0	0	09	0
360	002	1	2	5	1	1	0	3	1	0	0	0	09	2
360	001	1	2	5	1	0	0	0	0	0	0	0	09	0
360	001	1	2	0	0	0	0	0	0	0	0	0	00	0
361	001	1	2	5	1	2	0	0	0	0	0	0	00	0
362	001	1	2	5	1	0	0	0	0	0	0	0	00	0
363	001	1	2	5	1	0	0	0	0	0	0	0	08	0
364	001	1	1	5	1	0	0	0	0	0	0	4	08	0
365	001	1	1	5	1	0	0	0	0	0	0	0	09	0
366	001	1	2	5	1	0	0	0	0	0	0	0	09	0
367	001	1	2	5	1	0	0	0	0	0	0	4	10	0
368	001	1	1	5	1	0	0	0	0	0	0	4	08	0
369	001	1	1	5	1	0	0	0	0	0	0	4	09	0
370	001	1	2	5	1	0	0	0	0	0	0	0	07	0
371	001	1	2	5	1	0	0	0	0	0	0	0	10	0
372	001	1	1	5	1	0	0	0	0	0	0	0	09	0
373	001	1	2	5	1	0	0	0	0	0	0	0	08	0
374	001	1	2	5	1	0	0	0	0	0	0	0	10	0
375	001	1	2	5	1	0	0	0	0	0	0	0	00	0
376	001	1	2	5	1	0	0	0	0	0	0	0	09	0
377	001	1	2	5	1	0	0	0	0	0	0	4	10	0
378	001	1	2	5	1	0	0	0	0	0	0	0	11	0
379	001	1	1	5	1	0	0	0	0	0	0	0	09	0
380	001	1	2	3	1	0	0	0	0	0	0	0	07	0
381	001	1	2	5	1	0	0	0	0	0	0	0	10	0
382	001	1	1	5	1	0	0	0	0	0	0	0	08	0
383	001	1	2	5	1	0	0	0	0	0	0	0	09	0
384	001	1	2	3	1	0	0	0	0	0	0	0	07	0
385	001	1	2	5	1	0	0	0	0	0	0	4	10	0

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386	001	1	1	5	1	0	0	0	0	0	0	4	08	0
387	001	1	2	5	1	0	0	0	0	0	0	0	09	0
388	001	1	1	5	1	0	0	0	0	0	0	0	09	0
389	001	1	2	5	1	0	0	0	0	0	0	0	00	0
390	001	1	2	5	1	0	0	0	0	0	0	0	09	0
391	001	1	2	5	1	0	0	0	0	0	0	0	11	0
392	001	1	2	5	1	0	0	0	0	0	0	4	00	0
393	001	1	2	5	1	2	0	0	0	0	0	0	00	0
394	001	1	2	5	1	0	0	0	0	0	0	0	08	0
395	001	1	2	5	1	0	0	0	0	0	0	0	09	0
396	001	1	2	3	1	0	0	0	0	0	0	0	06	0
397	001	1	2	5	1	0	0	0	0	0	0	0	07	0
398	001	1	1	3	1	0	0	0	0	0	0	0	07	0
399	001	1	1	5	1	0	0	0	0	0	0	0	10	0
400	001	1	1	5	1	0	0	0	0	0	0	4	09	0
401	001	1	2	5	1	0	0	0	0	0	0	4	08	0
402	001	1	1	5	1	0	0	0	0	0	0	4	09	0
403	001	1	2	5	1	0	0	0	0	0	0	0	09	0
404	001	1	2	5	1	0	0	0	0	0	0	0	08	0
405	001	1	2	5	1	0	0	0	0	0	0	0	09	0
406	001	1	2	5	3	1	0	0	0	0	0	0	07	0
407	001	1	2	5	1	0	0	0	0	0	0	4	00	0
408	001	1	1	5	1	0	0	0	0	0	0	4	10	0
409	001	1	2	5	1	0	0	0	0	0	0	0	00	0
410	001	1	2	5	1	0	0	0	0	0	0	0	00	0
411	001	1	2	5	1	0	0	0	0	0	0	0	08	0
412	001	1	2	5	1	0	0	0	0	0	0	4	09	0
413	001	1	2	5	1	0	0	0	0	0	0	4	10	0
414	001	1	2	5	1	0	0	0	0	0	0	0	10	0
415	001	1	2	5	1	0	0	0	0	0	0	0	08	0
122	001	1	2	4	1	1	0	3	1	0	0	0	10	2
127	001	1	2	4	1	0	0	3	1	0	0	0	09	2
117	001	1	2	4	1	0	0	3	1	0	0	0	00	2
437	002	1	1	4	1	0	0	0	0	0	0	4	10	0
436	001	1	2	4	1	1	0	0	0	0	0	4	10	0
438	001	1	2	4	1	0	0	0	0	0	0	4	12	0
439	001	1	2	4	1	0	0	0	0	0	0	4	11	0
440	001	1	2	4	1	0	0	0	0	0	0	4	12	0
441	002	1	1	4	1	0	0	0	0	0	0	0	09	0
441	002	1	1	0	3	0	0	0	0	0	2	0	09	0
442	001	1	1	4	1	0	0	0	0	0	0	0	09	0
443	001	1	2	4	1	0	0	0	0	0	0	0	11	0
444	001	1	2	4	1	0	0	0	0	0	0	0	00	0
445	001	1	1	4	1	0	0	0	0	0	0	0	08	0
446	001	1	2	4	1	0	0	0	0	0	0	0	08	0
447	001	1	2	4	1	0	0	0	0	0	0	0	09	0
448	001	1	1	4	1	0	0	0	0	0	0	0	08	0
449	001	1	2	4	1	0	0	0	0	0	0	0	00	0
450	001	1	2	4	1	0	0	0	0	0	0	0	09	0
451	001	1	1	4	1	0	0	0	0	0	0	0	08	0
452	001	1	1	4	1	0	0	0	0	0	0	0	08	0
453	001	1	1	4	1	0	0	0	0	0	0	0	00	0
454	001	1	2	4	1	0	0	0	0	0	0	0	09	0
455	001	1	2	4	1	0	0	0	0	0	0	0	00	0
456	001	1	1	4	1	0	0	0	0	0	0	0	07	0

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457	001	1	1	4	1	0	0	0	0	0	0	0	07	0	
458	001	1	2	4	1	2	0	0	0	0	0		11	0	
459	001	1	1	4	1	0	0	0	0	0	0	0	00	0	
460	001	1	1	4	1	0	0	0	0	0	0	0	00	0	
461	001	1	1	4	1	0	0	0	0	0	0	0	11	0	
462	001	1	2	4	1	2	0	0	0	0	0	0	09	0	
463	001	1	1	4	1	0	0	0	0	0	2	0	08	0	
464	001	1	2	4	1	0	0	0	0	0	0	0	08	0	
465	001	1	2	4	1	0	0	0	0	0	0	0	06	0	
466	001	1	2	4	1	0	0	0	0	0	0	0	06	0	
467	001	1	2	4	1	0	0	0	0	0	0	0	06	0	
468	001	1	2	2	1	0	0	0	0	0	0	0	10	0	
469	001	1	2	2	1	0	0	0	0	0	0	0	10	0	
470	001	1	2	2	1	0	0	0	0	0	0	0	00	0	
471	001	1	2	2	1	0	0	0	0	0	0	0	09	0	
472	001	1	2	2	1	0	0	0	0	0	0	0	11	0	
473	001	1	2	2	1	0	0	0	0	0	0	0	10	0	
474	001	1	2	2	1	0	0	0	0	0	0	0	10	0	
475	001	1	2	2	1	0	0	0	0	0	0	0	09	0	
476	001	1	2	2	1	0	0	0	0	0	2	0	09	0	
477	001	1	2	2	1	0	0	0	0	0	0	0	09	0	
478	001	1	2	2	1	0	0	0	0	0	2	0	12	0	
479	001	1	2	4	1	0	0	0	0	0	0	0	09	0	
480	001	1	2	2	1	0	0	0	0	0	0	0	09	0	
481	001	1	2	2	1	0	0	0	0	0	0	0	09	0	
482	001	1	2	2	1	0	0	0	0	0	0	0	10	0	
483	001	1	2	2	1	0	0	0	0	0	0	0	10	0	
484	001	1	2	4	1	0	0	0	0	0	0	0	09	0	
485	001	1	2	2	1	0	0	0	0	0	0	0	10	0	
486	001	1	2	2	1	0	0	0	0	0	0	0	10	0	
487	001	1	2	2	1	0	0	0	0	0	0	0	10	0	
488	001	1	2	4	1	0	0	0	0	0	0	0	07	0	
489	001	1	2	4	1	0	0	0	0	0	0	0	00	0	
490	001	1	2	2	1	0	0	0	0	0	0	0	00	0	
491	001	1	2	3	1	0	0	0	0	0	0	0	00	0	
492	001	1	2	4	1	0	0	0	0	0	0	0	07	0	
493	001	1	2	2	1	0	0	0	0	0	0	0	09	0	
494	001	1	2	2	1	0	0	0	0	0	0	0	10	0	
495	001	1	2	2	1	0	0	0	0	0	0	0	11	0	
496	001	1	2	4	1	0	0	0	0	0	0	0	09	0	
497	001	1	2	2	1	0	0	0	0	0	0	0	10	0	
498	001	1	2	2	1	0	0	0	0	0	0	0	00	0	
000	001	1	1	6	2	0	0	0	0	0	0	3	00	0	000
000	001	1	1	6	2	0	0	0	0	0	0	3	00	0	000
000	001	1	1	6	2	0	0	0	0	0	0	2	00	0	000
000	001	1	1	6	2	0	0	0	0	0	0	1	00	0	000
000	001	1	1	6	5	0	0	0	0	0	0	3	00	0	000
000	005	1	1	6	5	0	0	0	0	0	0	3	00	0	000
000	001	1	1	6	2	0	0	0	0	0	0	3	00	0	000
000	001	1	1	6	2	0	0	0	0	0	0	3	00	0	000
000	001	1	1	6	5	0	0	0	0	0	0	2	00	0	000
000	005	1	1	6	5	0	0	0	0	0	0	2	00	0	000
000	002	1	1	6	2	0	0	0	0	0	0	3	00	0	000
000	001	1	1	6	2	0	0	0	0	0	0	3	00	0	000
000	002	1	1	6	5	0	0	0	0	0	0	3	00	0	000

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```
000 003 1 2 6 5 0 0 0 0 0 0 3 00 0 000
000 003 1 2 6 5 0 0 0 0 0 0 2 00 0 000
END DATA
```

APPENDIX G

TRADITIONAL ATTRIBUTE DATA FOR THE ROARK-GRIFFITH POTTERY

The raw attribute data presented in this appendix are discussed in Chapter 6 and were analyzed using SPSS. All attributes and attribute codes are listed below. A blank column occurs between each variable.

1. Specimen
2. Count
3. Interior glaze
4. Exterior glaze
5. Vessel form
6. Vessel part
7. Decoration
8. Makers' mark
9. Makers' mark location
10. Gallon number
11. Gallon number location
12. Base
13. Handle
14. Rim diameter (open vessels)
15. Gallon size
16. Jug rim diameter

```
FILE: ROARK37  DATA     A1  UNIVERSITY OF NORTH TEXAS

//FA59SPSS JOB (FA59,:45,5),'LEBO',PASSWORD=(SUSAN)
/*ROUTE PUNCH UNTVM1.FC22
/*ROUTE PRINT UNTVM1.FC22
//  EXEC SPSSX
SET WIDTH 80
DATA LIST FIXED RECORDS=1
 /1 SPECIMEN 1-3 COUNT 5-7 IGLAZE 9 EGLAZE 11
    VFORM 13 PART 15 DEC 17 MMARK 19 MMLOC 21
    GAL# 23 GALLOC 25 BASE 27 HANDLE 29 RIMDIA 31-32
    GALSIZE 34 JUGRIM 36-38 (2) UNIT 40 LEVEL 42
VALUE LABELS
 IGLAZE 0 'UNID' 1 'NAT CLAY' 2 'SALT' 4 'TWO-TONE'
 /EGLAZE 0 'UNID' 1 'NAT CLAY' 2 'SALT' 4 'TWO-TONE'
 /VFORM 0 'UNID' 1 'MILKCROCK' 2 'MILKPAN' 3 'JAR/CHURN'
  4 'JAR/CROCK' 5 'CHURN' 6 'JUG' 7 'PRESERVE JAR'
 /PART 0 'UNID' 1 'RIM' 2 'BODY' 3 'BASE' 4 'RIM-BASE' 5 'HANDLE'
 /DEC 0 'NONE' 1 'COBALT BLUE' 2 'OTHER' 3 'UNID'
 /MMARK 0 'NONE' 1 'STAMPED' 2 'OTHER'
 /MMLOC 0 'NONE' 1 'BODY' 2 'INSIDE HANDLE' 3 'ON RIM' 4 'ON BASE'
  5 'BODY NEAR BASE'
 /GAL# 0 'NONE' 2 'STAMPED' 3 'INCISED' 4 'INCISED & CBLUE'
 /GALLOC 0 'NONE' 1 'BODY' 2 'INSIDE HANDLE' 3 'ON RIM' 4 'ON BASE'
  5 'BODY NEAR BASE'
 /BASE 0 'NONE' 1 'CIRC PATTERN' 2 'SMOOTH' 3 'STRAIGHT PAT'
  4 'MOLDED'
BEGIN DATA
031 001 1 1 7 1 0 0 0 0 0 0 0 04 0 000 3 3
032 001 1 2 5 1 0 0 0 0 0 0 0 00 0 000 3 3
033 001 1 1 7 1 0 0 0 0 0 0 0 04 0 000 3 3
034 001 1 2 6 1 0 0 0 0 0 0 0 00 0 175 3 3
035 001 1 2 4 1 0 0 0 0 0 0 0 08 0 000 3 3
036 001 1 2 4 1 0 0 0 0 0 0 0 00 0 000 3 3
037 001 1 2 4 1 0 0 0 0 0 0 0 00 0 000 3 3
038 001 1 2 5 1 0 0 0 0 0 0 4 09 0 000 3 3
039 001 1 2 4 1 0 0 0 0 0 0 0 00 0 000 3 3
040 001 1 1 5 1 0 0 0 0 0 0 0 08 0 000 3 3
041 002 1 1 4 1 0 0 0 0 0 0 0 00 0 000 3 3
042 001 1 2 4 1 0 0 0 0 0 0 0 00 0 000 3 3
043 001 1 2 5 1 0 0 0 0 0 0 0 00 0 000 3 3
044 001 1 2 4 1 0 0 0 0 0 0 0 00 0 000 3 3
045 001 1 1 6 1 0 0 0 0 0 0 0 00 0 000 3 3
046 001 1 1 6 1 0 0 0 0 0 0 2 00 0 176 3 1
047 001 1 1 6 1 0 0 0 0 0 0 0 00 0 000 3 1
048 001 1 2 4 1 0 0 0 0 0 0 0 10 0 000 3 1
049 001 1 2 5 1 0 0 0 0 0 0 0 08 0 000 3 1
050 001 1 2 4 1 0 0 0 0 0 0 0 10 0 000 3 1
051 001 1 2 4 1 0 0 0 0 0 0 0 10 0 000 3 1
052 001 1 2 4 1 0 0 0 0 0 0 0 08 0 000 3 1
053 001 1 2 4 1 0 0 0 0 0 0 0 10 0 000 3 1
054 001 1 2 5 1 0 0 0 0 0 0 0 10 0 000 3 1
055 001 1 2 4 1 0 0 0 0 0 0 0 00 0 000 3 1
056 001 1 1 7 1 0 0 0 0 0 0 0 04 0 000 3 1
057 001 1 2 4 1 0 0 0 0 0 0 0 00 0 000 3 1
058 001 1 2 4 1 0 0 0 0 0 0 0 10 0 000 3 1
059 001 1 1 4 1 0 0 0 0 0 0 0 00 0 000 3 1
```

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060	001	1	2	5	1	0	0	0	0	0	0	0	09	0	000	3	1
061	001	1	2	4	1	0	0	0	0	0	0	0	08	0	000	3	1
062	001	1	2	4	1	0	0	0	0	0	0	0	00	0	000	3	1
063	001	1	2	0	1	0	0	0	0	0	0	0	00	0	000	3	1
064	001	1	2	4	1	0	0	0	0	0	0	0	00	0	000	3	1
065	001	1	4	1	1	0	0	0	0	0	0	0	00	0	000	3	1
066	001	1	2	4	1	0	0	0	0	0	0	0	00	0	000	3	1
067	001	1	2	5	1	0	0	0	0	0	0	0	08	0	000	3	1
068	001	1	2	5	1	0	0	0	0	0	0	0	08	0	000	3	1
069	001	1	2	5	1	0	0	0	0	0	0	0	09	0	000	3	1
070	001	1	2	4	1	0	0	0	0	0	0	0	10	0	000	3	1
076	001	1	1	6	1	0	0	0	0	0	0	0	00	0	170	3	1
077	001	1	2	4	1	0	0	0	0	0	0	0	12	0	000	3	2
078	001	1	2	5	1	0	0	0	0	0	0	0	00	0	000	3	2
079	001	1	1	4	1	0	0	0	0	0	0	0	06	0	000	3	2
080	001	1	2	4	1	0	0	0	0	0	0	0	00	0	000	3	2
081	001	1	2	4	1	0	0	0	0	0	0	0	00	0	000	3	2
082	001	1	2	5	1	0	0	0	0	0	0	0	09	0	000	3	2
083	001	1	2	5	1	0	0	0	0	0	0	0	10	0	000	3	2
084	001	1	2	4	1	0	0	0	0	0	0	0	10	0	000	3	2
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090	001	1	2	4	1	0	0	0	0	0	0	0	08	0	000	3	2
091	001	1	2	4	1	0	0	0	0	0	0	0	10	0	000	3	2
092	001	1	4	1	0	0	0	0	0	0	0	0	00	0	000	3	2
093	001	1	2	4	1	0	0	0	0	0	0	0	08	0	000	3	2
094	001	1	1	6	1	0	0	0	0	0	0	0	00	0	000	3	1
095	001	1	2	5	1	0	0	0	0	0	0	0	00	0	000	3	1
096	001	1	2	4	1	0	0	0	0	0	0	0	00	0	000	3	1
097	001	1	2	5	1	0	0	0	0	0	0	4	09	0	000	3	1
098	001	1	2	6	1	0	0	0	0	0	0	2	00	0	000	3	1
099	001	1	2	2	1	0	0	0	0	0	0	0	12	0	000	3	4
100	001	1	2	2	1	0	1	1	0	0	0	0	12	0	000	3	4
101	001	1	2	4	1	0	0	0	0	0	0	0	00	0	000	3	4
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106	001	1	2	4	1	0	0	0	0	0	0	0	10	0	000	3	4
107	001	1	2	3	1	0	0	0	0	0	0	0	05	0	000	3	4
108	001	1	2	4	1	0	0	0	0	0	0	0	09	0	000	3	4
109	001	1	2	5	1	0	0	0	0	0	0	0	00	0	000	3	4
110	001	1	2	3	1	0	0	0	0	0	0	0	05	0	000	3	4
111	001	1	2	5	1	0	0	0	0	0	0	0	09	0	000	3	4
112	001	1	2	4	1	0	0	0	0	0	0	0	00	0	000	3	4
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114	001	1	2	2	1	0	0	0	0	0	0	0	00	0	000	3	4
115	001	1	2	4	1	0	0	0	0	0	0	0	11	0	000	3	4
116	001	1	2	2	1	0	0	0	0	0	0	0	11	0	000	3	4
117	001	1	2	2	1	0	0	0	0	0	0	0	00	0	000	3	4
118	001	1	2	4	1	0	0	0	0	0	0	0	10	0	000	3	4
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FILE: ROARK37 DATA A1 UNIVERSITY OF NORTH TEXAS

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000 001 1 1 0 3 0 0 0 0 0 1 0 00 0 000 3 3
000 001 1 2 0 3 0 0 0 0 0 1 0 00 0 000 3 3
000 003 1 1 0 3 0 0 0 0 0 3 0 00 0 000 3 3
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000 008 1 2 0 3 0 0 0 0 0 2 0 00 0 000 3 3
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000 001 1 1 0 3 0 0 0 0 0 2 0 00 0 000 3 2
000 001 1 2 0 3 0 0 0 0 0 2 0 00 0 000 3 2
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000 001 1 2 0 3 0 0 0 0 0 2 0 00 0 000 3 2
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000 048 1 0 0 3 0 0 0 0 0 2 0 00 0 000 3 2
000 002 1 2 0 3 0 0 0 0 0 2 0 00 0 000 3 2
000 001 1 2 0 3 0 0 0 0 0 1 0 00 0 000 3 2
000 001 1 1 0 3 0 0 0 0 0 2 0 00 0 000 3 2
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FILE: ROARK37 DATA A1 UNIVERSITY OF NORTH TEXAS

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000 001 1 2 0 3 0 0 0 0 0 2 0 00 0 000 3 4
000 001 1 1 0 3 0 0 0 0 0 2 0 00 0 000 3 4
000 001 1 1 0 3 0 0 0 0 0 2 0 00 0 000 3 4
000 036 1 0 0 3 0 0 0 0 0 2 0 00 0 000 3 4
000 004 1 2 0 3 0 0 0 0 0 1 0 00 0 000 3 4
000 002 1 0 0 3 0 0 0 0 0 1 0 00 0 000 3 4
000 001 1 2 0 3 0 0 0 0 0 3 0 00 0 000 3 4
000 024 1 2 0 3 0 0 0 0 0 2 0 00 0 000 3 4
000 016 1 1 0 3 0 0 0 0 0 2 0 00 0 000 3 4
071 001 1 2 5 2 0 0 0 0 0 0 0 00 0 000 3 1
072 001 1 2 5 2 0 0 0 0 0 0 0 00 0 000 3 1
073 001 1 1 4 2 0 0 0 0 0 0 0 00 0 000 3 1
074 001 1 2 5 2 0 0 0 0 0 0 0 00 0 000 3 1
075 001 1 2 0 2 0 1 1 0 0 0 0 00 0 000 3 1
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000 001 1 2 0 2 0 0 0 0 0 0 4 00 0 000 3 1
000 001 1 1 0 2 0 0 0 0 0 0 3 00 0 000 3 3
000 001 1 2 6 2 0 0 0 0 0 0 0 00 0 000 3 2
000 001 1 2 5 2 0 0 0 0 0 0 0 00 0 000 3 2
000 001 1 2 0 2 0 0 0 0 0 0 4 00 0 000 3 2
000 001 1 2 0 2 0 0 0 0 0 0 4 00 0 000 3 2
000 001 1 2 5 2 0 0 0 0 0 0 0 00 0 000 3 2
000 001 1 1 3 2 0 0 0 0 0 0 0 00 0 000 3 2
000 001 1 2 5 2 0 0 0 0 0 0 4 00 0 000 3 2
000 003 1 2 5 2 0 0 0 0 0 0 0 00 0 000 3 4
000 001 1 1 6 2 0 0 0 0 0 0 0 00 0 000 3 4
238 001 1 2 0 2 0 1 1 1 5 0 0 00 6 000 3 4
239 001 1 2 0 2 0 1 1 1 1 0 0 00 6 000 3 1
000 002 1 2 0 2 0 0 0 0 0 0 0 00 0 000 3 4
000 005 1 1 6 5 0 0 0 0 0 0 3 00 0 000 3 2
000 001 1 2 6 5 0 0 0 0 0 0 3 00 0 000 3 2
000 001 0 2 6 5 0 0 0 0 0 0 3 00 0 000 3 2
153 001 1 2 3 1 0 1 1 0 0 0 0 05 0 000 7 6
139 001 1 2 5 1 0 1 1 0 0 0 0 08 0 000 7 4
140 001 1 2 4 1 0 1 1 0 0 0 0 09 0 000 7 4
134 001 1 2 2 1 1 1 1 1 1 0 0 13 2 000 7 3
121 001 1 2 2 1 0 0 0 1 1 0 0 11 2 000 7 3
204 001 1 2 4 1 0 0 0 0 0 0 0 07 0 000 7 6
203 001 1 2 2 1 0 0 0 0 0 0 0 13 0 000 7 6
202 001 1 2 2 1 0 0 0 0 0 0 0 09 0 000 7 6
207 001 1 2 2 1 0 0 0 0 0 0 0 11 0 000 7 6
206 001 1 2 4 1 0 0 0 0 0 0 0 07 0 000 7 6
205 001 1 2 4 1 0 0 0 0 0 0 0 08 0 000 7 6
201 001 1 2 2 1 0 0 0 0 0 0 0 11 0 000 7 6
200 001 1 2 3 1 1 0 0 0 0 0 0 07 0 000 7 6
152 001 1 2 5 1 0 0 0 0 0 0 0 09 0 000 7 6
150 001 1 2 5 1 0 0 0 0 0 0 0 08 0 000 7 6
149 001 1 2 5 1 0 0 0 0 0 0 0 07 0 000 7 6
199 001 1 2 4 1 0 0 0 0 0 0 0 05 0 000 7 6
197 001 1 2 5 1 0 0 0 0 0 0 0 08 0 000 7 6
196 001 1 2 4 1 0 0 0 0 0 0 0 06 0 000 7 6
198 001 1 2 5 1 0 0 0 0 0 0 0 00 0 000 7 6
157 001 1 2 5 1 0 0 0 0 0 0 0 08 0 000 7 6
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146	001	1	2	4	1	0	0	0	0	0	0	0	06	0	000	7	6
156	001	1	2	2	1	0	0	0	0	0	0	0	10	0	000	7	6
145	001	1	2	2	1	0	0	0	0	0	0	0	10	0	000	7	6
158	001	1	2	2	1	0	0	0	0	0	0	0	11	0	000	7	6
154	001	1	2	4	1	0	0	0	0	0	0	0	09	0	000	7	6
147	001	1	2	2	1	0	0	0	0	0	0	0	11	0	000	7	6
148	001	1	2	4	1	0	0	0	0	0	0	0	06	0	000	7	6
144	001	1	2	2	1	0	0	0	0	0	0	0	11	0	000	7	6
233	001	1	2	2	1	0	0	0	0	0	0	0	12	0	000	7	3
234	001	1	2	2	1	0	0	0	0	0	0	0	08	0	000	7	3
235	001	1	2	2	1	0	0	0	0	0	0	0	00	0	000	7	3
236	001	1	2	3	1	0	0	0	0	0	0	0	07	0	000	7	3
151	001	1	2	6	1	0	0	0	0	0	0	0	00	0	045	7	6
155	001	1	2	6	1	0	0	0	0	0	0	0	00	0	051	7	6
159	001	1	2	6	1	0	0	0	0	0	0	0	00	0	056	7	6
166	001	1	2	6	1	0	0	0	0	0	0	0	00	0	057	7	4
167	001	1	2	6	1	0	0	0	0	0	0	0	00	0	068	7	4
168	001	1	2	6	1	0	0	0	0	0	0	0	00	0	062	7	4
169	001	1	2	6	1	0	0	0	0	0	0	0	00	0	057	7	4
170	001	1	2	6	1	0	0	0	0	0	0	0	00	0	043	7	5
174	001	1	2	6	1	0	0	0	0	0	0	0	00	0	053	7	5
175	001	1	2	6	1	0	0	0	0	0	0	0	00	0	062	7	5
176	001	1	2	6	1	0	0	0	0	0	0	0	00	0	000	7	5
177	001	1	2	6	1	0	0	0	0	0	0	0	00	0	051	7	5
178	001	1	2	6	1	0	0	0	0	0	0	0	00	0	000	7	5
179	001	1	2	6	1	0	0	0	0	0	0	0	00	0	050	7	5
180	002	1	2	6	1	0	0	0	0	0	0	0	00	0	000	7	5
182	001	1	2	6	1	0	0	0	0	0	0	0	00	0	055	7	5
188	001	1	2	6	1	0	0	0	0	0	0	0	00	0	062	7	5
208	001	1	2	6	1	0	0	0	0	0	0	0	00	0	062	7	5
237	001	1	2	6	1	0	0	0	0	0	0	0	00	0	065	7	3
164	001	1	2	2	1	0	0	0	0	0	0	0	00	0	000	7	4
163	001	1	2	2	1	0	0	0	0	0	0	0	11	0	000	7	4
162	001	1	2	0	1	0	0	0	0	0	0	0	00	0	000	7	4
161	001	1	2	5	1	1	0	0	0	0	0	0	09	0	000	7	4
160	001	1	2	5	1	0	0	0	0	0	0	0	08	0	000	7	4
165	001	1	2	0	1	0	0	0	0	0	0	0	00	0	000	7	4
141	001	1	2	2	1	0	0	0	0	0	0	0	00	0	000	7	2
142	001	1	2	2	1	0	0	0	0	0	0	0	00	0	000	7	2
143	001	1	2	3	1	0	0	0	0	0	0	0	07	0	000	7	2
133	001	1	2	5	1	0	0	0	0	0	0	0	09	0	000	7	1
132	001	1	2	5	1	0	0	0	0	0	0	0	00	0	000	7	1
131	001	1	2	5	1	0	0	0	0	0	0	0	08	0	000	7	1
130	001	1	2	3	1	0	0	0	0	0	0	0	06	0	000	7	1
129	001	1	2	4	1	1	0	0	0	0	0	0	11	0	000	7	1
128	001	1	2	2	1	0	0	0	0	0	0	0	11	0	000	7	1
124	001	1	2	5	1	0	0	0	0	0	0	0	00	0	000	7	1
195	001	1	2	4	1	0	0	0	0	0	0	0	08	0	000	7	5
191	001	1	2	4	1	0	0	0	0	0	0	0	12	0	000	7	5
173	001	1	2	2	1	0	0	0	0	0	0	0	00	0	000	7	5
184	001	1	2	2	1	0	0	0	0	0	0	0	10	0	000	7	5
190	001	1	2	4	1	0	0	0	0	0	0	0	00	0	000	7	5
183	001	1	2	2	1	0	0	0	0	0	0	0	09	0	000	7	5
185	001	1	2	4	1	0	0	0	0	0	0	0	07	0	000	7	5
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194	001	1	2	5	1	0	0	0	0	0	0	0	09	0	000	7	5
186	001	1	2	2	1	0	0	0	0	0	0	0	10	0	000	7	5
192	001	1	2	5	1	0	0	0	0	0	0	0	08	0	000	7	5
171	001	1	2	5	1	0	0	0	0	0	0	0	00	0	000	7	5
172	001	1	2	5	1	0	0	0	0	0	0	0	09	0	000	7	5
193	001	1	2	5	1	0	0	0	0	0	0	0	00	0	000	7	5
189	001	1	2	4	1	0	0	0	0	0	0	0	07	0	000	7	5
208	001	1	2	2	1	0	0	0	0	0	0	0	11	0	000	7	3
209	001	1	2	2	1	0	0	0	0	0	0	0	00	0	000	7	3
210	001	1	2	4	1	0	0	0	0	0	0	0	00	0	000	7	3
211	001	1	2	4	1	0	0	0	0	0	0	0	07	0	000	7	3
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214	001	1	2	2	1	0	0	0	0	0	0	0	00	0	000	7	3
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215	001	1	2	2	1	0	0	0	0	0	0	0	11	0	000	7	3
216	001	1	2	2	4	0	0	0	0	0	2	0	12	0	000	7	3
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000	020	1	2	0	2	0	0	0	0	0	0	0	00	0	000	7	3
000	039	1	2	0	2	0	0	0	0	0	0	0	00	0	000	7	3
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000	040	1	2	0	2	0	0	0	0	0	0	0	00	0	000	7	5
000	064	1	2	0	2	0	0	0	0	0	0	0	00	0	000	7	5
000	009	1	2	0	2	0	0	0	0	0	0	0	00	0	000	7	5
000	022	1	2	0	2	0	0	0	0	0	0	0	00	0	000	7	5
000	054	1	2	0	2	0	0	0	0	0	0	0	00	0	000	7	5
000	001	1	1	0	2	0	0	0	0	0	0	0	00	0	000	7	5
000	009	1	2	0	2	0	0	0	0	0	0	0	00	0	000	7	5
000	020	1	2	0	2	0	0	0	0	0	0	0	00	0	000	7	6
000	057	1	2	0	2	0	0	0	0	0	0	0	00	0	000	7	6
000	070	1	2	0	2	0	0	0	0	0	0	0	00	0	000	7	6
000	003	1	2	0	2	0	0	0	0	0	0	0	00	0	000	7	6
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000	038	1	2	0	2	0	0	0	0	0	0	0	00	0	000	7	6
000	078	1	2	0	2	0	0	0	0	0	0	0	00	0	000	7	1
000	022	1	1	0	2	0	0	0	0	0	0	0	00	0	000	7	1
000	554	0	0	0	2	0	0	0	0	0	0	0	00	0	000	7	6
000	026	0	0	0	2	0	0	0	0	0	0	0	00	0	000	7	5
000	029	0	0	0	2	0	0	0	0	0	0	0	00	0	000	7	5
000	037	0	0	0	2	0	0	0	0	0	0	0	00	0	000	7	3
000	004	0	0	0	2	0	0	0	0	0	0	0	00	0	000	7	3
000	072	0	0	0	2	0	0	0	0	0	0	0	00	0	000	7	5
000	057	0	0	0	2	0	0	0	0	0	0	0	00	0	000	7	1
000	028	0	0	0	2	0	0	0	0	0	0	0	00	0	000	7	4
000	051	1	2	0	2	0	0	0	0	0	0	0	00	0	000	7	4
000	058	1	2	0	2	0	0	0	0	0	0	0	00	0	000	7	4

```
FILE: ROARK37  DATA     A1  UNIVERSITY OF NORTH TEXAS

000 001 1 2 0 2 0 0 0 0 0 0 3 00 0 000 7 4
000 001 1 2 0 2 0 0 0 0 0 0 3 00 0 000 7 4
000 042 1 2 0 2 0 0 0 0 0 0 0 00 0 000 7 4
000 001 1 1 0 2 0 0 0 0 0 0 0 00 0 000 7 2
000 017 0 0 0 2 0 0 0 0 0 0 0 00 0 000 7 2
000 095 0 0 0 2 0 0 0 0 0 0 0 00 0 000 7 6
000 002 1 1 0 2 0 0 0 0 0 0 0 00 0 000 7 6
000 100 1 2 0 2 0 0 0 0 0 0 0 00 0 000 7 6
000 073 1 2 0 2 0 0 0 0 0 0 0 00 0 000 7 6
000 001 1 1 0 2 0 0 0 0 0 0 0 00 0 000 7 6
000 002 1 2 0 2 0 0 0 0 0 0 3 00 0 000 7 6
000 014 1 2 0 2 1 0 0 0 0 0 0 00 0 000 7 1
000 007 1 2 0 2 1 0 0 0 0 0 0 00 0 000 7 2
000 006 1 2 0 2 1 0 0 0 0 0 0 00 0 000 7 6
000 002 1 2 0 2 1 0 0 0 0 0 0 00 0 000 7 6
000 005 1 2 0 2 1 0 0 0 0 0 0 00 0 000 7 4
000 009 1 2 0 2 1 0 0 0 0 0 0 00 0 000 7 5
000 008 1 2 0 2 1 0 0 0 0 0 0 00 0 000 7 3
000 002 1 2 0 2 1 0 0 0 0 2 0 00 0 000 7 3
000 002 1 2 6 2 0 0 0 0 0 0 0 00 0 000 7 4
000 001 1 2 6 2 0 0 0 0 0 0 0 00 0 000 7 4
000 003 1 2 5 2 0 0 0 0 0 0 0 00 0 000 7 6
000 007 1 2 6 2 0 0 0 0 0 0 0 00 0 000 7 5
000 001 1 2 6 2 0 0 0 0 0 0 0 00 0 000 7 1
000 001 1 2 5 2 0 0 0 0 0 0 0 00 0 000 7 1
000 001 1 2 0 1 0 0 0 0 0 0 0 00 0 000 7 1
000 001 1 2 5 2 0 0 0 0 0 0 0 00 0 000 7 6
000 001 1 2 5 2 0 0 0 0 0 0 0 00 0 000 7 5
000 001 0 0 6 1 0 0 0 0 0 0 0 00 0 000 7 3
122 001 1 2 0 2 0 1 1 0 0 0 0 00 0 000 7 5
135 001 1 2 5 2 0 1 1 0 0 0 0 00 0 000 7 5
127 001 1 2 0 2 0 1 1 0 0 0 0 00 0 000 7 5
123 001 1 2 0 2 0 1 1 0 0 0 0 00 0 000 7 5
126 001 1 2 0 2 0 1 1 0 0 0 0 00 0 000 7 6
125 001 1 2 0 2 0 1 1 0 0 0 0 00 0 000 7 3
136 001 1 2 0 2 0 1 1 1 1 0 0 00 4 000 7 6
137 001 1 2 0 2 0 1 1 0 0 0 0 00 0 000 7 6
138 001 1 2 0 2 0 1 1 1 1 0 0 00 2 000 7 4
000 001 1 2 0 2 0 0 0 0 0 0 4 00 0 000 7 5
000 001 1 2 0 2 0 0 0 0 0 0 0 00 0 000 7 5
000 005 1 2 6 5 0 0 0 0 0 0 1 00 0 000 7 5
000 008 0 2 0 5 0 0 0 0 0 0 3 00 0 000 7 5
000 001 0 2 0 5 0 0 0 0 0 0 3 00 0 000 7 6
000 003 0 2 0 5 0 0 0 0 0 0 3 00 0 000 7 6
000 001 0 2 0 5 0 0 0 0 0 0 3 00 0 000 7 4
000 003 1 2 0 3 0 0 0 0 0 1 0 00 0 000 7 3
000 005 1 2 0 3 0 0 0 0 0 3 0 00 0 000 7 3
000 018 1 2 0 3 0 0 0 0 0 2 0 00 0 000 7 3
000 002 1 0 0 3 0 0 0 0 0 2 0 00 0 000 7 3
000 005 1 2 0 3 0 0 0 0 0 2 0 00 0 000 7 3
000 001 1 2 0 3 0 0 0 0 0 3 0 00 0 000 7 3
000 001 1 0 0 3 0 0 0 0 0 2 0 00 0 000 7 3
000 003 1 2 0 3 0 0 0 0 0 1 0 00 0 000 7 5
000 026 1 2 0 3 0 0 0 0 0 1 0 00 0 000 7 5
000 001 1 2 0 3 0 0 0 0 0 1 0 00 0 000 7 5
000 003 1 2 0 3 0 0 0 0 0 2 0 00 0 000 7 5
000 002 1 2 0 3 0 0 0 0 0 3 0 00 0 000 7 5
000 009 1 2 0 3 0 0 0 0 0 1 0 00 0 000 7 6
000 010 1 2 0 3 0 0 0 0 0 2 0 00 0 000 7 6
000 004 1 2 0 3 0 0 0 0 0 3 0 00 0 000 7 4
000 001 1 2 0 3 0 0 0 0 0 2 0 00 0 000 7 4
000 006 1 2 0 3 0 0 0 0 0 1 0 00 0 000 7 4
000 004 1 2 0 3 0 0 0 0 0 2 0 00 0 000 7 2
000 001 1 2 0 3 0 0 0 0 0 1 0 00 0 000 7 2
000 020 1 2 0 3 0 0 0 0 0 2 0 00 0 000 7 1
000 005 1 2 0 3 0 0 0 0 0 1 0 00 0 000 7 1
000 001 1 0 0 3 0 0 0 0 0 2 0 00 0 000 7 1
000 001 1 1 0 3 0 0 0 0 0 1 0 00 0 000 7 6
000 022 1 2 0 3 0 0 0 0 0 1 0 00 0 000 7 6
000 009 1 2 0 3 0 0 0 0 0 2 0 00 0 000 7 6
000 003 1 0 0 3 0 0 0 0 0 1 0 00 0 000 7 6
000 004 1 2 0 3 0 0 0 0 0 3 0 00 0 000 7 6
119 001 1 2 0 3 1 1 1 1 1 2 0 00 2 000 7 3
120 001 1 2 0 3 0 1 5 1 5 3 0 00 2 000 7 3
END DATA
```

APPENDIX H

ELEMENTAL COMPOSITIONAL DATA FOR THE DENTON COUNTY POTTERIES AND CLAY SOURCES

The compositional data presented in this appendix are organized into three files that contain the scanning electron microscope analyses on the six sherd/clay samples discussed in Chapter 5. These samples include:

1. 70 sherds comprised of 10 rim sherds from each of 7 pottery kiln sites; prepared in epoxy resin
2. 35 sherds selected from sample 1; prepared with carbon tape
3. 134 sherds comprised of 1 sherd from each vessel at the 5 farmstead sites; prepared in epoxy resin
4. 31 clay samples; prepared twice, once with epoxy resin and once with carbon tape
5. 43 marked sherds from the Cranston-Donaldson and Roark-Griffith potteries; prepared with carbon tape
6. 44 unmarked sherds from the Cranston-Donaldson pottery prepared with carbon tape

File 1

File 1 contains data from samples 2, 4, and 5 that were used to examine the relations among five sherds from each of the minor potteries (Daugherty, Donaldson, Lambert, Serren, and Wilson), 15 sherds marked CRANSTON, 15 sherds marked DONALDSON, and 13 sherds marked ROARK, and the clay specimens. All of these sherds and clay specimens were prepared with carbon tape.

File 2

File 2 contains data from samples 4 and 5 that were used to examine the relations among marked sherds from the Cranston-Donaldson and Roark-Griffith potteries and the clay specimens.

File 3

File 3 contains data from samples 5 and 6 that were used to examine the relations among marked and unmarked sherds from the Cranston-Donaldson pottery with specific macroattributes.

Compositional Data

The elemental compositional data presented on the following pages are arranged for each file in the order presented below. Each variable is separated by a blank column.

1. Na
2. Mg
3. Al
4. Si
5. S
6. Cl
7. K
8. Ca
9. Ti
10. Fe
11. Cu
12. Zn
13. Specimen Number
14. Site

Site Codes:

Pottery-Kiln Sites

dn16	Cranston-Donaldson
dn16c	Cranston only
dn16d	Donaldson only
dn18r	Roark-Griffith
dn19w	Wilson (Wilson-Donaldson)
dn74L	Lambert
dn75s	Serren
daugh	Daugherty
Cann	Donaldson on Cannon survey

Clay Sources

ccan	Clay pit on Cannon survey
cran	Clay pit on Cranston Pottery property (disturbed)
dagh	Clay outcrop at Daugherty Pottery
acm1	Acme pit 1
acm2	Acme pit 2
acm3	Acme pit 3
acm4	Acme pit 4 (N. Britton survey pit owned by Cranston)
lamb	Acme pit formerly owned by Lambert Pottery
a380	Acme pit on Hwy 380 situated near the Roark-Griffith Pottery

<u>Farmstead Sites</u>
dn77
dn79
dn289
dn410
dn466

```
FILE: SEM6     DATA     A1  UNIVERSITY OF NORTH TEXAS

SET WIDTH=132
//FA59SPSS JOB (FA59,:45,5),'LEBO',PASSWORD=(SUSAN)
/*ROUTE PUNCH UNTVM1.FC22
/*ROUTE PRINT UNTVM1.FC22
//  EXEC SPSSX
DATA LIST FIXED RECORDS=1
 /1 Na 1-4 (2) Mg 6-9 (2) Al 11-14 (2) Si 16-19 (2) S 21-24 (2)
   Cl 26-29 (2) K 32-34 (2) Ca 36-39 (2) Ti 41-44 (2) Fe 46-49 (2)
   Cu 51-54 (2) Zn 56-59 (2) Specimen 61-69 (a) Site 71-72
BEGIN DATA
0000 0000 1283 4434 0011 0037 0203 0134 0326 0737 1263 1572 078 dn16c 01
0000 0000 1507 5723 0004 0017 0204 0127 0242 0528 0734 0914 070 dn16c 01
0000 0000 1174 3765 0016 0045 0224 0154 0388 0940 1469 1825 074 dn16c 01
0000 0000 1492 4480 0014 0040 0217 0138 0309 0677 1176 1456 089 dn16c 01
0000 0000 1288 4491 0014 0038 0217 0133 0331 0746 1210 1533 101 dn16c 01
0000 0000 1753 4847 0000 0012 0225 0102 0243 0657 0965 1196 047 dn16c 01
0000 0000 1331 4023 0016 0042 0214 0147 0330 1141 1226 1529 042 dn16c 01
0000 0000 1366 4627 0013 0033 0224 0128 0314 0715 1139 1441 095 dn16c 01
0000 0000 1321 4402 0017 0045 0239 0146 0339 0768 1189 1534 100 dn16c 01
0000 0000 1601 5045 0000 0011 0262 0131 0277 0706 0862 1105 093 dn16c 01
0000 0000 1266 4027 0012 0044 0246 0158 0381 0849 1333 1684 065 dn16c 01
0000 0000 1493 5254 0002 0015 0179 0098 0192 1654 0512 0590 082 dn16c 01
0000 0000 1663 6344 0000 0000 0215 0050 0215 0568 0448 0496 094 dn16c 01
0218 0386 2190 6274 0000 0001 0238 0039 0119 0432 0068 0035 077 dn16c 01
0000 0000 1567 7133 0018 0026 0291 0091 0235 0512 0127 0000 091 dn16c 01
0093 0290 1942 6561 0008 0001 0283 0080 0141 0593 0007 0000 066 dn16d 02
0099 0314 2011 6475 0000 0005 0263 0037 0164 0599 0033 0000 067 dn16d 02
0158 0335 1949 6637 0009 0000 0295 0057 0183 0335 0000 0040 059 dn16d 02
0103 0336 2006 6437 0008 0000 0331 0065 0178 0495 0030 0011 080 dn16d 02
0000 0000 1450 7604 0000 0000 0289 0065 0193 0353 0033 0013 085 dn16d 02
0000 0000 1411 7449 0000 0007 0377 0044 0233 0408 0071 0000 053 dn16d 02
0000 0000 1653 5356 0000 0014 0269 0095 0275 0583 0785 0970 084 dn16d 02
0269 0483 1939 6585 0033 0001 0207 0072 0111 0218 0081 0000 041 dn16d 02
0242 0436 1701 6591 0000 0001 0236 0044 0164 0478 0106 0000 098 dn16d 02
0226 0417 1844 6423 0000 0007 0293 0064 0192 0419 0093 0022 040 dn16d 02
0233 0383 1932 6419 0009 0006 0284 0055 0171 0412 0095 0000 072 dn16d 02
0206 0347 1708 6806 0010 0000 0241 0051 0162 0367 0103 0000 052 dn16d 02
0199 0354 1952 6585 0010 0009 0257 0065 0186 0321 0050 0009 049 dn16d 02
0160 0355 1825 6669 0005 0011 0278 0046 0175 0345 0100 0030 092 dn16d 02
0000 0000 2186 6888 0020 0053 0208 0175 0000 0106 0248 0115 054 dn16d 02
0000 0176 1832 6924 0000 0000 0181 0190 0222 0416 0059 0000 135 dn18r 03
0000 0220 1951 6605 0000 0012 0204 0141 0263 0562 0042 0000 120 dn18r 03
0000 0191 2161 6256 0000 0000 0174 0140 0118 0731 0151 0079 136 dn18r 03
0000 0116 1994 6599 0000 0000 0228 0157 0248 0442 0216 0000 134 dn18r 03
0000 0154 1675 6814 0009 0006 0180 0191 0283 0502 0175 0011 138 dn18r 03
0000 0127 1991 6690 0000 0000 0136 0092 0184 0650 0130 0000 137 dn18r 03
0000 0139 1731 6749 0000 0000 0202 0203 0273 0492 0190 0020 127 dn18r 03
0000 0118 1693 6564 0007 0044 0185 0198 0250 0578 0219 0145 122 dn18r 03
0000 0120 1767 7070 0000 0000 0200 0138 0190 0499 0000 0015 119 dn18r 03
0000 0173 1858 6901 0000 0000 0175 0118 0208 0428 0070 0068 121 dn18r 03
0000 0093 1728 6946 0000 0000 0126 0290 0128 0447 0179 0063 123 dn18r 03
0000 0136 1936 6827 0000 0000 0159 0139 0209 0417 0102 0077 125 dn18r 03
0074 0222 1815 6600 0007 0000 0202 0263 0267 0551 0000 0000 100 dn18r 03
0000 0000 1981 6693 0000 0039 0351 0235 0175 0359 0167 0000 001 dn19w 04
0000 0000 1760 7100 0000 0000 0396 0071 0210 0437 0020 0007 002 dn19w 04
```

```
FILE: SEM6      DATA      A1  UNIVERSITY OF NORTH TEXAS

0000 0000 1935 7006 0000 0003 0190 0061 0241 0488 0076 0000 003 dn19w 04
0000 0000 2103 6392 0000 0000 0221 0372 0226 0673 0013 0000 004 dn19w 04
0000 0000 1681 6923 0000 0000 0314 0118 0219 0699 0046 0000 005 dn19w 04
0000 0000 1855 6560 0002 0016 0332 0113 0220 0900 0000 0000 001 dn74L 05
0000 0000 1651 6486 0000 0000 0212 0141 0096 1196 0128 0090 002 dn74L 05
0000 0000 1716 6763 0007 0000 0287 0057 0190 0914 0066 0000 003 dn74L 05
0000 0000 1759 6670 0026 0002 0243 0206 0223 0639 0100 0130 004 dn74L 05
0000 0000 1706 6380 0015 0009 0404 0190 0217 1040 0021 0017 005 dn74L 05
0000 0000 1663 7203 0000 0000 0397 0052 0201 0407 0077 0000 001 dn75s 04
0000 0000 1749 7265 0012 0000 0325 0061 0183 0324 0082 0000 002 dn75s 04
0000 0000 1800 7062 0000 0000 0372 0059 0181 0467 0015 0043 003 dn75s 04
0000 0000 1850 6989 0000 0000 0373 0049 0166 0574 0000 0000 004 dn75s 04
0000 0000 1637 7109 0000 0000 0376 0060 0222 0489 0055 0052 005 dn75s 04
0000 0056 1726 6921 0000 0004 0245 0095 0195 0618 0140 0000 001 daugh 07
0000 0056 1614 7062 0006 0000 0294 0072 0242 0434 0149 0072 002 daugh 07
0000 0105 1946 6568 0000 0021 0288 0073 0238 0492 0204 0064 003 daugh 07
0000 0054 2214 6077 0000 0000 0195 0165 0163 1040 0055 0036 004 daugh 07
0000 0071 1657 7157 0000 0000 0266 0086 0172 0510 0055 0026 006 daugh 07
0000 0156 2211 5255 0091 0000 0395 0550 0233 1013 0095 0000 001 cann  08
0000 0121 2026 5836 0048 0033 0369 0234 0198 0823 0302 0010 002 cann  08
0000 0088 1701 5259 0102 0063 0330 0447 0229 1176 0276 0329 003 cann  08
0000 0139 2012 5426 0062 0092 0324 0221 0166 1439 0119 0000 004 cann  08
0000 0159 2205 5873 0000 0009 0209 0074 0242 0779 0263 0187 005 ccan  09
0000 0043 2354 6170 0000 0000 0386 0078 0168 0607 0134 0062 003 acm2  13
0000 0000 1376 4378 0000 0000 0185 2736 0000 1008 0221 0097 001 cran  11
0000 0000 1079 3967 0000 0000 0243 3037 0000 1091 0397 0185 002 cran  11
0000 0000 2745 6353 0000 0000 0374 0000 0001 0314 0150 0063 007 lamb  12
0000 0072 2367 6644 0000 0000 0088 0087 0179 0441 0081 0041 001 acm1  13
0000 0086 1982 5327 0000 0000 0236 0139 0239 1841 0150 0000 002 a380  14
0000 0022 1653 3784 0396 0009 0274 2836 0066 0662 0236 0063 002 ccan  09
0000 0093 1867 5438 0000 0000 0259 0288 0282 1703 0060 0010 001 acm4  15
0000 0045 2495 6000 0000 0000 0158 0062 0186 0563 0284 0207 001 acm2  13
0000 0095 2218 6585 0002 0000 0079 0099 0235 0491 0141 0056 002 acm3  13
0000 0115 2493 5557 0064 0006 0541 0460 0197 0567 0000 0000 002 acm2  13
0102 0144 2745 5265 0000 0000 0258 0003 0082 1400 0000 0000 003 lamb  12
0000 0000 1659 3765 0664 0000 0227 3060 0019 0410 0135 0061 001 ccan  09
0000 0082 2759 5316 0000 0000 0331 0152 0166 0861 0275 0057 001 acm3  13
0000 0027 2133 6523 0000 0000 0240 0094 0180 0454 0260 0089 003 acm1  13
0000 0006 2282 6432 0000 0000 0379 0038 0208 0446 0136 0073 002 acm4  15
0000 0005 2668 6078 0000 0000 0460 0015 0118 0362 0220 0074 002 lamb  12
0000 0082 2457 5241 0000 0000 0204 0343 0011 0453 0943 0264 004 acm1  13
0000 0046 2036 5733 0000 0000 0229 0019 0187 1518 0191 0041 004 lamb  12
0000 0051 1691 6209 0000 0000 0237 0217 0178 1222 0147 0048 001 a380  14
0000 0043 1958 5953 0000 0000 0319 0073 0211 1147 0242 0055 003 a380  14
0000 0000 2249 6593 0000 0000 0346 0055 0114 0397 0186 0059 004 a380  14
0000 0000 1756 7298 0000 0000 0165 0089 0186 0277 0181 0047 003 acm3  13
0000 0034 1954 5885 0000 0000 0190 0080 0113 1575 0131 0039 005 lamb  12
0000 0024 2624 5934 0000 0000 0350 0097 0158 0585 0114 0114 002 dagh  13
0000 0009 1887 6580 0000 0000 0265 0011 0166 0920 0100 0062 004 acm2  13
0000 0067 2401 6272 0000 0000 0181 0053 0099 0570 0253 0103 001 dagh  13
0000 0042 2497 6090 0000 0000 0376 0035 0243 0494 0198 0025 001 lamb  12
0000 0011 2541 5648 0000 0000 0422 0015 0116 1103 0117 0027 006 lamb  12
END DATA
```

APPENDIX I

ELEMENTAL COMPOSITIONAL DATA FOR THE DENTON COUNTY FARMSTEADS

The compositional data presented in this appendix are organized by farmstead and are discussed in Chapter 5.

Compositional Data

The elemental compositional data presented on the following pages are arranged for each file in the order presented below. Each variable is separated by a blank column.

1. Na
2. Mg
3. Al
4. Si
5. S
6. Cl
7. K
8. Ca
9. Ti
10. Fe
11. Cu
12. Zn
13. Specimen Number
14. Site

Site Codes:

Pottery-Kiln Sites

dn16	Cranston-Donaldson
dn16c	Cranston only
dn16d	Donaldson only
dn18r	Roark-Griffith
dn19w	Wilson (Wilson-Donaldson)
dn74L	Lambert
dn75s	Serren
daugh	Daugherty
Cann	Donaldson on Cannon survey

Clay Sources

ccan	Clay pit on Cannon survey
cran	Clay pit on Cranston Pottery property (disturbed)
dagh	Clay outcrop at Daugherty Pottery
acm1	Acme pit 1
acm2	Acme pit 2
acm3	Acme pit 3
acm4	Acme pit 4 (N. Britton survey pit owned by Cranston)
lamb	Acme pit formerly owned by Lambert Pottery
a380	Acme pit on Hwy 380 situated near the Roark-Griffith Pottery

Farmstead Sites

dn77
dn79
dn289
dn410
dn466

41DN77

```
FILE: DN77BR   DATA     A1  UNIVERSITY OF NORTH TEXAS

SET WIDTH=132
//FA59SPSS JOB (FA59,:45,5),'LEBO',PASSWORD=(SUSAN)
/*ROUTE PUNCH UNTVM1.FC22
/*ROUTE PRINT UNTVM1.FC22
//  EXEC SPSSX
SET WIDTH 80
DATA LIST FIXED RECORDS=1
 /1 Na 1-4 (2) Mg 6-9 (2) Al 11-14 (2) Si 16-19 (2) S 21-24 (2)
   Cl 26-29 (2) K 32-34 (2) Ca 36-39 (2) Ti 41-44 (2) Fe 46-49 (2)
   Cu 51-54 (2) Zn 56-59 (2) Specimen 61-68 (a) Pottery 70
   Kilncly 72-73
BEGIN DATA
0000 0000 1913 7035 0000 0000 0225 0085 0184 0521 0036 0000 01 DAUGH 2 01
0000 0000 1782 7598 0000 0000 0258 0111 0053 0170 0028 0000 02 DAUGH 2 01
0000 0000 1937 7474 0000 0000 0155 0131 0032 0113 0158 0000 03 DAUGH 2 01
0000 0000 2030 7776 0000 0000 0150 0000 0000 0044 0000 0000 04 DAUGH 2 01
0000 0000 2241 7578 0000 0000 0090 0000 0000 0090 0000 0000 05 DAUGH 2 01
0000 0000 1857 8054 0000 0000 0011 0000 0000 0000 0079 0000 06 DAUGH 2 01
0000 0000 1530 7515 0000 0000 0174 0043 0180 0472 0086 0000 08 DAUGH 2 01
0000 0000 1850 7381 0000 0000 0243 0018 0120 0350 0037 0000 09 DAUGH 2 01
0000 0000 1774 7802 0000 0000 0234 0024 0044 0150 0000 0000 01 DN16  5 02
0000 0000 1789 7517 0000 0000 0228 0029 0071 0351 0003 0013 02 DN16  5 02
0000 0000 1786 8132 0000 0000 0031 0000 0000 0031 0020 0000 03 DN16  5 02
0000 0000 1801 7509 0000 0000 0239 0010 0065 0258 0076 0042 04 DN16  5 02
0000 0000 1450 8038 0000 0000 0194 0000 0046 0142 0102 0028 05 DN16  5 02
0000 0000 1808 8102 0000 0051 0000 0000 0000 0000 0039 0000 06 DN16  5 02
0000 0000 1399 7883 0000 0000 0248 0043 0099 0282 0019 0026 07 DN16  5 02
0000 0000 1853 7656 0000 0000 0253 0041 0049 0149 0000 0000 08 DN16  5 02
0000 0000 1599 8195 0000 0000 0168 0000 0000 0038 0000 0000 09 DN16  5 02
0000 0000 1487 7962 0000 0000 0219 0048 0062 0222 0000 0000 10 DN16  5 02
0000 0000 2233 7094 0000 0000 0213 0053 0008 0312 0086 0000 01 DN74  5 03
0000 0000 2370 7343 0000 0000 0110 0011 0000 0069 0097 0000 02 DN74  5 03
0000 0000 2079 7168 0000 0000 0153 0000 0026 0501 0073 0000 03 DN74  5 03
0000 0000 2336 7600 0000 0000 0064 0000 0000 0000 0000 0000 04 DN74  5 03
0000 0000 2145 7066 0000 0000 0190 0000 0000 0553 0046 0000 05 DN74  5 03
0000 0000 1634 7616 0000 0000 0098 0000 0072 0559 0020 0000 06 DN74  5 03
0000 0000 2027 7708 0000 0000 0165 0000 0000 0000 0099 0000 07 DN74  5 03
0000 0000 2208 7691 0000 0000 0085 0000 0000 0016 0000 0000 08 DN74  5 03
0000 0000 2284 7288 0000 0000 0140 0000 0000 0198 0090 0000 09 DN74  5 03
0000 0000 1862 7543 0000 0000 0071 0009 0012 0443 0060 0000 10 DN74  5 03
0000 0000 1904 7894 0000 0000 0202 0000 0000 0000 0000 0000 01 DN75  3 04
0000 0011 1937 7708 0000 0000 0208 0008 0023 0071 0028 0006 02 DN75  3 04
0000 0000 1914 7709 0000 0000 0235 0006 0026 0079 0032 0000 03 DN75  3 04
0000 0000 1976 7793 0000 0000 0147 0000 0000 0000 0061 0023 04 DN75  3 04
0000 0000 1818 7868 0000 0000 0219 0000 0019 0071 0006 0000 05 DN75  3 04
0000 0000 1824 7560 0000 0000 0266 0009 0094 0232 0012 0002 06 DN75  3 04
0000 0000 1830 7287 0000 0000 0316 0027 0116 0388 0021 0015 07 DN75  3 04
0000 0000 1639 7607 0000 0000 0252 0145 0092 0215 0023 0027 08 DN75  3 04
0000 0000 1782 7822 0000 0000 0226 0000 0049 0081 0031 0009 09 DN75  3 04
0000 0000 1957 7853 0000 0000 0190 0000 0000 0000 0000 0000 10 DN75  3 04
0000 0000 2113 7512 0000 0000 0158 0000 0000 0000 0194 0023 01 DN19  3 05
0000 0000 1794 7402 0000 0000 0306 0053 0102 0243 0094 0006 02 DN19  3 05
0000 0000 2267 7723 0000 0000 0010 0000 0000 0000 0000 0000 03 DN19  3 05
0000 0000 1805 6148 0008 0030 0202 1647 0000 0060 0100 0000 04 DN19  3 05
0000 0000 2107 7843 0000 0000 0000 0000 0000 0000 0051 0000 05 DN19  3 05
```

```
FILE: DN77BR   DATA     A1  UNIVERSITY OF NORTH TEXAS

0000 0000 1879 7492 0000 0000 0134 0014 0098 0299 0083 0000 06 DN19   3 05
0000 0000 1467 8309 0000 0000 0149 0000 0000 0000 0076 0000 07 DN19   3 05
0000 0000 1672 7707 0000 0000 0264 0004 0077 0177 0090 0008 08 DN19   3 05
0000 0000 1889 7529 0000 0000 0228 0014 0051 0138 0134 0015 09 DN19   3 05
0000 0000 1286 8423 0000 0000 0069 0000 0036 0088 0073 0026 10 DN19   3 05
0000 0000 1580 7461 0000 0000 0257 0026 0159 0464 0053 0000 01 DN18   5 06
0000 0000 1757 7077 0000 0000 0308 0028 0166 0614 0050 0003 02 DN18   5 06
0000 0000 1834 7265 0000 0000 0123 0161 0195 0417 0004 0000 03 DN18   5 06
0000 0000 2027 7250 0000 0000 0072 0067 0139 0354 0089 0003 04 DN18   5 06
0000 0000 1974 7510 0000 0000 0116 0065 0080 0220 0035 0000 05 DN18   5 06
0000 0000 1516 7928 0000 0000 0211 0040 0110 0167 0000 0029 06 DN18   5 06
0000 0000 1971 7815 0000 0000 0214 0000 0000 0000 0000 0000 07 DN18   5 06
0000 0000 1525 7650 0000 0000 0272 0108 0180 0262 0002 0000 08 DN18   5 06
0000 0000 1860 7483 0000 0000 0152 0065 0111 0328 0000 0000 09 DN18   5 06
0000 0000 1862 7516 0000 0000 0142 0063 0115 0301 0000 0000 10 DN18   5 06
0000 0086 2627 6462 0060 0062 0248 0081 0071 0305 0000 0000 01 CANNP 5 07
0000 0000 2581 7246 0000 0006 0159 0008 0000 0000 0000 0000 02 CANNP 5 07
0000 0095 2196 6789 0000 0000 0212 0069 0121 0491 0004 0023 03 CANNP 5 07
0000 0120 2380 6381 0000 0005 0266 0061 0101 0686 0000 0000 04 CANNP 5 07
0000 0000 2258 7253 0000 0000 0190 0040 0059 0200 0000 0000 05 CANNP 5 07
0000 0121 2412 6642 0000 0025 0099 0192 0140 0309 0032 0029 06 CANNP 5 07
0000 0106 2275 6478 0000 0005 0182 0160 0364 0417 0000 0013 07 CANNP 5 07
0000 0177 2794 6213 0000 0000 0210 0059 0093 0443 0007 0003 08 CANNP 5 07
0000 0000 2486 6750 0335 0000 0137 0288 0000 0004 0000 0000 09 CANNP 5 07
0000 0133 2145 6746 0000 0000 0218 0067 0112 0579 0000 0000 10 CANNP 5 07
0000 0055 2206 7448 0000 0000 0124 0056 0033 0062 0000 0015 01 DN77   1 21
0000 0000 0189 6114 0000 0401 0000 0000 0000 0000 2296 1000 02 DN77   1 21
0000 0000 1922 7642 0017 0029 0219 0117 0029 0024 0000 0000 03 DN77   1 21
0000 0115 2048 7509 0003 0000 0105 0042 0072 0105 0000 0002 04 DN77   1 21
0000 0070 1874 7251 0000 0000 0303 0047 0153 0281 0017 0006 05 DN77   1 21
0000 0000 1959 7320 0000 0000 0080 0106 0134 0303 0033 0064 06 DN77   1 21
0000 0000 1867 7846 0000 0005 0104 0118 0000 0060 0000 0000 07 DN77   1 21
0000 0000 1997 7390 0000 0000 0488 0011 0029 0070 0013 0003 08 DN77   1 21
0000 0000 2082 7335 0000 0000 0181 0036 0077 0289 0000 0000 09 DN77   1 21
0000 0000 2018 7341 0000 0000 0291 0003 0051 0146 0054 0096 10 DN77   1 21
0000 0000 1923 7512 0000 0000 0083 0070 0137 0274 0000 0000 11 DN77   1 21
0000 0046 1931 7638 0000 0000 0153 0026 0064 0143 0000 0000 14 DN77   1 21
0000 0079 2026 7326 0000 0000 0056 0096 0137 0280 0000 0000 15 DN77   1 21
0000 0015 1725 6887 0000 0014 0725 0101 0114 0399 0020 0000 18 DN77   1 21
0000 0128 2056 7032 0000 0003 0127 0091 0153 0360 0037 0014 19 DN77   1 21
0000 0000 1998 7023 0000 0000 0265 0016 0017 0606 0000 0076 20 DN77   1 21
0000 0117 2189 6964 0000 0003 0146 0128 0132 0321 0000 0000 21 DN77   1 21
0000 0000 0344 5982 0121 1572 0220 1142 0000 0000 0000 0618 23 DN77   1 21
0000 0177 2252 6671 0003 0000 0592 0036 0072 0160 0017 0020 24 DN77   1 21
0000 0000 1740 7069 0000 0024 0232 0182 0143 0505 0030 0075 25 DN77   1 21
0000 0095 2197 7378 0000 0026 0055 0057 0073 0108 0000 0012 26 DN77   1 21
0000 0003 1597 7214 0016 0043 0256 0092 0158 0524 0066 0030 28 DN77   1 21
0000 0000 1958 7333 0023 0021 0100 0218 0075 0204 0051 0017 29 DN77   1 21
0000 0005 1779 6887 0031 0050 0710 0083 0099 0278 0043 0036 30 DN77   1 21
0000 0011 1860 6948 0001 0024 0311 0096 0157 0591 0000 0000 32 DN77   1 21
0000 0089 2330 6636 0012 0018 0285 0076 0142 0308 0066 0037 33 DN77   1 21
0000 0000 1684 7909 0000 0000 0401 0006 0000 0000 0000 0000 34 DN77   1 21
0000 0075 1816 7017 0012 0005 0280 0123 0206 0433 0029 0003 35 DN77   1 21
END DATA
```

41DN79

```
FILE: DN79BR   DATA     A1  UNIVERSITY OF NORTH TEXAS

SET WIDTH=132
//FA59SPSS JOB (FA59.:45.5).'LEBO'.PASSWORD=(SUSAN)
/*ROUTE PUNCH UNTVM1.FC22
/*ROUTE PRINT UNTVM1.FC22
//  EXEC SPSSX
SET WIDTH 80
DATA LIST FIXED RECORDS=1
 /1 Na 1-4 (2) Mg 6-9 (2) Al 11-14 (2) Si 16-19 (2) S 21-24 (2)
   Cl 26-29 (2) K 32-34 (2) Ca 36-39 (2) Ti 41-44 (2) Fe 46-49 (2)
   Cu 51-54 (2) Zn 56-59 (2) Specimen 61-68 (a) Pottery 70
   Kilncly 72-73
BEGIN DATA
0000 0000 1913 7035 0000 0000 0225 0085 0184 0521 0036 0000 01 DAUGH 2 01
0000 0000 1782 7598 0000 0000 0258 0111 0053 0170 0028 0000 02 DAUGH 2 01
0000 0000 1937 7474 0000 0000 0155 0131 0032 0113 0158 0000 03 DAUGH 2 01
0000 0000 2030 7776 0000 0000 0150 0000 0000 0044 0000 0000 04 DAUGH 2 01
0000 0000 2241 7578 0000 0000 0090 0000 0000 0090 0000 0000 05 DAUGH 2 01
0000 0000 1857 8054 0000 0000 0011 0000 0000 0000 0079 0000 06 DAUGH 2 01
0000 0000 1530 7515 0000 0000 0174 0043 0180 0472 0086 0000 08 DAUGH 2 01
0000 0000 1850 7381 0000 0000 0243 0018 0120 0350 0037 0000 09 DAUGH 2 01
0000 0000 1774 7802 0000 0000 0234 0024 0044 0150 0000 0000 01 DN16  5 02
0000 0000 1789 7517 0000 0000 0228 0029 0071 0351 0003 0013 02 DN16  5 02
0000 0000 1786 8132 0000 0000 0031 0000 0000 0031 0020 0000 03 DN16  5 02
0000 0000 1801 7509 0000 0000 0239 0010 0065 0258 0076 0042 04 DN16  5 02
0000 0000 1450 8038 0000 0000 0194 0000 0046 0142 0102 0028 05 DN16  5 02
0000 0000 1808 8102 0000 0051 0000 0000 0000 0000 0039 0000 06 DN16  5 02
0000 0000 1399 7883 0000 0000 0248 0043 0099 0282 0019 0025 07 DN16  5 02
0000 0000 1853 7656 0000 0000 0253 0041 0049 0149 0000 0000 08 DN16  5 02
0000 0000 1599 8195 0000 0000 0168 0000 0000 0038 0000 0000 09 DN16  5 02
0000 0000 1487 7962 0000 0000 0219 0048 0062 0222 0000 0000 10 DN16  5 02
0000 0000 2233 7094 0000 0000 0213 0053 0008 0312 0086 0000 01 DN74  5 03
0000 0000 2370 7343 0000 0000 0110 0011 0000 0069 0097 0000 02 DN74  5 03
0000 0000 2079 7168 0000 0000 0153 0000 0026 0501 0073 0000 03 DN74  5 03
0000 0000 2336 7600 0000 0000 0064 0000 0000 0000 0000 0000 04 DN74  5 03
0000 0000 2145 7066 0000 0000 0190 0000 0000 0553 0046 0000 05 DN74  5 03
0000 0000 1634 7616 0000 0000 0098 0000 0072 0559 0020 0000 06 DN74  5 03
0000 0000 2027 7708 0000 0000 0165 0000 0000 0000 0099 0000 07 DN74  5 03
0000 0000 2208 7691 0000 0000 0085 0000 0000 0016 0000 0000 08 DN74  5 03
0000 0000 2284 7288 0000 0000 0140 0000 0000 0198 0090 0000 09 DN74  5 03
0000 0000 1862 7543 0000 0000 0071 0009 0012 0443 0060 0000 10 DN74  5 03
0000 0000 1904 7894 0000 0000 0202 0000 0000 0000 0000 0000 01 DN75  3 04
0000 0011 1937 7708 0000 0000 0208 0008 0023 0071 0028 0006 02 DN75  3 04
0000 0000 1914 7709 0000 0000 0235 0006 0026 0079 0032 0000 03 DN75  3 04
0000 0000 1976 7793 0000 0000 0147 0000 0000 0000 0061 0023 04 DN75  3 04
0000 0000 1818 7868 0000 0000 0219 0000 0019 0071 0006 0000 05 DN75  3 04
0000 0000 1824 7560 0000 0000 0266 0009 0094 0232 0012 0002 06 DN75  3 04
0000 0000 1830 7287 0000 0000 0316 0027 0116 0388 0021 0015 07 DN75  3 04
0000 0000 1639 7607 0000 0000 0252 0145 0092 0215 0023 0027 08 DN75  3 04
0000 0000 1782 7822 0000 0000 0226 0000 0049 0081 0031 0009 09 DN75  3 04
0000 0000 1957 7853 0000 0000 0190 0000 0000 0000 0000 0000 10 DN75  3 04
0000 0000 2113 7512 0000 0000 0158 0000 0000 0000 0194 0023 01 DN19  3 05
0000 0000 1794 7402 0000 0000 0306 0053 0102 0243 0094 0006 02 DN19  3 05
0000 0000 2267 7723 0000 0000 0010 0000 0000 0000 0000 0000 03 DN19  3 05
0000 0000 1805 6148 0008 0030 0202 1647 0000 0060 0100 0000 04 DN19  3 05
0000 0000 2107 7843 0000 0000 0000 0000 0000 0000 0051 0000 05 DN19  3 05
```

```
FILE: DN79BR   DATA     A1  UNIVERSITY OF NORTH TEXAS

0000 0000 1879 7492 0000 0000 0134 0014 0099 0299 0083 0000 06 DN19   3 05
0000 0000 1467 8309 0000 0000 0149 0000 0000 0000 0076 0000 07 DN19   3 05
0000 0000 1672 7707 0000 0000 0264 0004 0077 0177 0090 0008 08 DN19   3 05
0000 0000 1889 7529 0000 0000 0228 0014 0051 0138 0134 0015 09 DN19   3 05
0000 0000 1286 8423 0000 0000 0069 0000 0036 0088 0073 0026 10 DN19   3 05
0000 0000 1580 7461 0000 0000 0257 0026 0159 0464 0053 0000 01 DN18   5 06
0000 0000 1757 7077 0000 0000 0306 0028 0166 0614 0050 0003 02 DN18   5 06
0000 0000 1834 7265 0000 0000 0123 0161 0195 0417 0004 0000 03 DN18   5 06
0000 0000 2027 7250 0000 0000 0072 0067 0139 0354 0089 0003 04 DN18   5 06
0000 0000 1974 7510 0000 0000 0116 0065 0080 0220 0035 0000 05 DN18   5 06
0000 0000 1516 7928 0000 0000 0211 0040 0110 0167 0000 0029 06 DN18   5 06
0000 0000 1971 7815 0000 0000 0214 0000 0000 0000 0000 0000 07 DN18   5 06
0000 0000 1525 7650 0000 0000 0272 0108 0180 0262 0002 0000 08 DN18   5 06
0000 0000 1860 7483 0000 0000 0152 0065 0111 0328 0000 0000 09 DN18   5 06
0000 0000 1862 7516 0000 0000 0142 0063 0115 0301 0000 0000 10 DN18   5 06
0000 0000 2058 7855 0000 0000 0043 0000 0000 0000 0045 0000 02 DN79   1 18
0000 0000 2082 7412 0000 0000 0182 0000 0039 0283 0000 0001 05 DN79   1 18
0000 0000 1963 7983 0000 0000 0055 0000 0000 0000 0000 0000 07 DN79   1 18
0000 0000 1805 7354 0000 0000 0181 0011 0072 0557 0020 0000 08 DN79   1 18
0000 0111 1504 6106 0000 0000 0527 0880 0051 0821 0000 0000 09 DN79   1 18
0000 0000 1857 7197 0000 0000 0233 0036 0111 0555 0011 0000 10 DN79   1 18
0000 0000 1639 7489 0000 0000 0566 0032 0004 0157 0064 0049 11 DN79   1 18
0000 0000 1954 7141 0000 0000 0243 0032 0082 0497 0022 0030 12 DN79   1 18
0000 0000 2018 7212 0000 0000 0473 0000 0000 0288 0003 0000 13 DN79   1 18
0000 0000 2029 7748 0000 0000 0184 0000 0000 0039 0000 0000 14 DN79   1 18
0000 0086 2627 6462 0060 0062 0246 0081 0071 0305 0000 0000 01 CANNP 5 07
0000 0000 2581 7246 0000 0006 0159 0008 0000 0000 0000 0000 02 CANNP 5 07
0000 0095 2196 6789 0000 0000 0212 0069 0121 0491 0004 0023 03 CANNP 5 07
0000 0120 2380 6381 0000 0005 0266 0061 0101 0686 0000 0000 04 CANNP 5 07
0000 0000 2258 7253 0000 0000 0190 0040 0059 0200 0000 0000 05 CANNP 5 07
0000 0121 2412 6642 0000 0025 0099 0192 0140 0309 0032 0029 06 CANNP 5 07
0000 0106 2275 6478 0000 0005 0182 0160 0364 0417 0000 0013 07 CANNP 5 07
0000 0177 2794 6213 0000 0000 0210 0059 0093 0443 0007 0003 08 CANNP 5 07
0000 0000 2486 6750 0335 0000 0137 0288 0000 0004 0000 0000 09 CANNP 5 07
0000 0133 2145 6746 0000 0000 0218 0067 0112 0579 0000 0000 10 CANNP 5 07
END DATA
```

41DN289

```
FILE: DN289    DATA     A1  UNIVERSITY OF NORTH TEXAS

SET WIDTH=132
//FA59SPSS JOB (FA59,:45,5),'LEBO',PASSWORD=(SUSAN)
/*ROUTE PUNCH UNTVM1.FC22
/*ROUTE PRINT UNTVM1.FC22
//  EXEC SPSSX
SET WIDTH 80
DATA LIST FIXED RECORDS=1
 /1 Na 1-4 (2) Mg 6-9 (2) Al 11-14 (2) Si 16-19 (2) S 21-24 (2)
   Cl 26-29 (2) K 32-34 (2) Ca 36-39 (2) Ti 41-44 (2) Fe 46-49 (2)
   Cu 51-54 (2) Zn 56-59 (2) Specimen 61-68 (a) Pottery 70
   Kilncly 72-73
BEGIN DATA
0000 0000 1913 7035 0000 0000 0225 0085 0184 0521 0036 0000 01 DAUGH 2 01
0000 0000 1782 7598 0000 0000 0258 0111 0053 0170 0028 0000 02 DAUGH 2 01
0000 0000 1937 7474 0000 0000 0155 0131 0032 0113 0158 0000 03 DAUGH 2 01
0000 0000 2030 7776 0000 0000 0150 0000 0000 0044 0000 0000 04 DAUGH 2 01
0000 0000 2241 7578 0000 0000 0090 0000 0000 0090 0000 0000 05 DAUGH 2 01
0000 0000 1857 8054 0000 0000 0011 0000 0000 0000 0079 0000 06 DAUGH 2 01
0000 0000 1530 7515 0000 0000 0174 0043 0180 0472 0086 0000 08 DAUGH 2 01
0000 0000 1850 7381 0000 0000 0243 0018 0120 0350 0037 0000 09 DAUGH 2 01
0000 0000 1774 7802 0000 0000 0234 0024 0044 0150 0000 0000 01 DN16  5 02
0000 0000 1789 7517 0000 0000 0228 0029 0071 0351 0003 0013 02 DN16  5 02
0000 0000 1786 8132 0000 0000 0031 0000 0000 0031 0020 0000 03 DN16  5 02
0000 0000 1801 7509 0000 0000 0239 0010 0065 0258 0076 0042 04 DN16  5 02
0000 0000 1450 8038 0000 0000 0194 0000 0046 0142 0102 0028 05 DN16  5 02
0000 0000 1808 8102 0000 0051 0000 0000 0000 0000 0039 0000 06 DN16  5 02
0000 0000 1399 7883 0000 0000 0248 0043 0099 0282 0019 0026 07 DN16  5 02
0000 0000 1853 7656 0000 0000 0253 0041 0049 0149 0000 0000 08 DN16  5 02
0000 0000 1599 8195 0000 0000 0168 0000 0000 0038 0000 0000 09 DN16  5 02
0000 0000 1487 7962 0000 0000 0219 0048 0062 0222 0000 0000 10 DN16  5 02
0000 0000 2233 7094 0000 0000 0213 0053 0008 0312 0086 0000 01 DN74  5 03
0000 0000 2370 7343 0000 0000 0110 0011 0000 0069 0097 0000 02 DN74  5 03
0000 0000 2079 7168 0000 0000 0153 0000 0026 0501 0073 0000 03 DN74  5 03
0000 0000 2336 7600 0000 0000 0064 0000 0000 0000 0000 0000 04 DN74  5 03
0000 0000 2145 7066 0000 0000 0190 0000 0000 0553 0046 0000 05 DN74  5 03
0000 0000 1634 7616 0000 0000 0098 0000 0072 0559 0020 0000 06 DN74  5 03
0000 0000 2027 7708 0000 0000 0165 0000 0000 0000 0099 0000 07 DN74  5 03
0000 0000 2208 7691 0000 0000 0085 0000 0000 0016 0000 0000 08 DN74  5 03
0000 0000 2284 7288 0000 0000 0140 0000 0000 0198 0090 0000 09 DN74  5 03
0000 0000 1862 7543 0000 0000 0071 0009 0012 0443 0060 0000 10 DN74  5 03
0000 0000 1904 7894 0000 0000 0202 0000 0000 0000 0000 0000 01 DN75  3 04
0000 0011 1937 7708 0000 0000 0208 0008 0023 0071 0028 0006 02 DN75  3 04
0000 0000 1914 7709 0000 0000 0235 0006 0026 0079 0032 0000 03 DN75  3 04
0000 0000 1976 7793 0000 0000 0147 0000 0000 0000 0061 0023 04 DN75  3 04
0000 0000 1818 7868 0000 0000 0219 0000 0019 0071 0006 0000 05 DN75  3 04
0000 0000 1824 7560 0000 0000 0266 0009 0094 0232 0012 0002 06 DN75  3 04
0000 0000 1830 7287 0000 0000 0316 0027 0116 0388 0021 0015 07 DN75  3 04
0000 0000 1639 7607 0000 0000 0252 0145 0092 0215 0023 0027 08 DN75  3 04
0000 0000 1782 7822 0000 0000 0226 0000 0049 0081 0031 0009 09 DN75  3 04
0000 0000 1957 7853 0000 0000 0190 0000 0000 0000 0000 0000 10 DN75  3 04
0000 0000 2113 7512 0000 0000 0158 0000 0000 0000 0194 0023 01 DN19  3 05
0000 0000 1794 7402 0000 0000 0306 0053 0102 0243 0094 0006 02 DN19  3 05
0000 0000 2267 7723 0000 0000 0010 0000 0000 0000 0000 0000 03 DN19  3 05
0000 0000 1805 6148 0008 0030 0202 1647 0000 0060 0100 0000 04 DN19  3 05
0000 0000 2107 7843 0000 0000 0000 0000 0000 0000 0051 0000 05 DN19  3 05
```

```
FILE: DN289    DATA     A1  UNIVERSITY OF NORTH TEXAS

0000 0000 1879 7492 0000 0000 0134 0014 0099 0299 0083 0000 06 DN19  3 05
0000 0000 1467 8309 0000 0000 0149 0000 0000 0000 0076 0000 07 DN19  3 05
0000 0000 1672 7707 0000 0000 0264 0004 0077 0177 0090 0008 08 DN19  3 05
0000 0000 1889 7529 0000 0000 0228 0014 0051 0138 0134 0015 09 DN19  3 05
0000 0000 1286 8423 0000 0000 0069 0000 0036 0088 0073 0026 10 DN19  3 05
0000 0000 1580 7461 0000 0000 0257 0026 0159 0464 0053 0000 01 DN18  5 06
0000 0000 1757 7077 0000 0000 0306 0028 0168 0614 0050 0003 02 DN18  5 06
0000 0000 1834 7265 0000 0000 0123 0161 0195 0417 0004 0000 03 DN18  5 06
0000 0000 2027 7250 0000 0000 0072 0067 0139 0354 0089 0003 04 DN18  5 06
0000 0000 1974 7510 0000 0000 0116 0065 0080 0220 0035 0000 05 DN18  5 06
0000 0000 1516 7928 0000 0000 0211 0040 0110 0167 0000 0029 06 DN18  5 06
0000 0000 1971 7815 0000 0000 0214 0000 0000 0000 0000 0000 07 DN18  5 06
0000 0000 1525 7650 0000 0000 0272 0108 0180 0262 0002 0000 08 DN18  5 06
0000 0000 1860 7483 0000 0000 0152 0065 0111 0328 0000 0000 09 DN18  5 06
0000 0000 1862 7516 0000 0000 0142 0063 0115 0301 0000 0000 10 DN18  5 06
0000 0000 2129 7640 0000 0000 0111 0000 0005 0115 0000 0000 01 DN289 1 17
0000 0000 1900 7340 0000 0000 0054 0080 0103 0524 0000 0000 02 DN289 1 17
0000 0000 2258 7742 0000 0000 0000 0000 0000 0000 0000 0000 03 DN289 1 17
0000 0000 1813 7503 0000 0000 0093 0042 0097 0436 0016 0000 04 DN289 1 17
0000 0000 1646 7370 0000 0000 0231 0058 0129 0507 0038 0014 05 DN289 1 17
0000 0000 2233 7339 0000 0000 0114 0000 0001 0313 0000 0000 06 DN289 1 17
0000 0000 1513 7652 0000 0000 0226 0064 0148 0380 0016 0001 07 DN289 1 17
0000 0000 1850 8150 0000 0000 1850 8150 0000 0000 0000 0000 08 DN289 1 17
0000 0000 2123 7719 0000 0000 0000 0000 0000 0000 0137 0022 09 DN289 1 17
0000 0000 1882 7652 0000 0000 0151 0017 0030 0233 0028 0007 10 DN289 1 17
0000 0044 1849 7303 0000 0000 0103 0077 0063 0549 0012 0000 11 DN289 1 17
0000 0000 2158 7637 0000 0000 0100 0000 0000 0100 0005 0000 12 DN289 1 17
0000 0000 1847 8073 0000 0000 0045 0000 0000 0035 0000 0000 13 DN289 1 17
0000 0000 2131 7426 0000 0000 0112 0073 0026 0142 0072 0019 14 DN289 1 17
0000 0000 1936 7151 0000 0000 0249 0106 0117 0433 0008 0000 15 DN289 1 17
0000 0000 1800 7733 0000 0000 0340 0044 0000 0082 0000 0000 16 DN289 1 17
0000 0000 1951 6031 0000 0012 0191 0149 0104 1516 0023 0023 17 DN289 1 17
0000 0000 2324 7676 0000 0000 0000 0000 0000 0000 0000 0000 18 DN289 1 17
0000 0000 2282 7718 0000 0000 0000 0000 0000 0000 0000 0000 19 DN289 1 17
0000 0000 1884 7482 0000 0000 0172 0036 0063 0295 0069 0000 20 DN289 1 17
0000 0086 2627 6462 0060 0062 0246 0081 0071 0305 0000 0000 01 CANNP 5 07
0000 0000 2581 7246 0000 0006 0159 0008 0000 0000 0000 0000 02 CANNP 5 07
0000 0095 2196 6789 0000 0000 0212 0069 0121 0491 0004 0023 03 CANNP 5 07
0000 0120 2380 6381 0000 0005 0266 0061 0101 0686 0000 0000 04 CANNP 5 07
0000 0000 2258 7253 0000 0000 0190 0040 0059 0200 0000 0000 05 CANNP 5 07
0000 0121 2412 6642 0000 0025 0099 0192 0140 0309 0032 0029 06 CANNP 5 07
0000 0106 2275 6478 0000 0005 0182 0160 0364 0417 0000 0013 07 CANNP 5 07
0000 0177 2794 6213 0000 0000 0210 0059 0093 0443 0007 0003 08 CANNP 5 07
0000 0000 2486 6750 0335 0000 0137 0288 0000 0004 0000 0000 09 CANNP 5 07
0000 0133 2145 6746 0000 0000 0218 0067 0112 0579 0000 0000 10 CANNP 5 07
END DATA
```

41DN410

```
FILE: DN410     DATA     A1  UNIVERSITY OF NORTH TEXAS

SET WIDTH=132
//FA59SPSS JOB (FA59,:45,5),'LEBO',PASSWORD=(SUSAN)
/*ROUTE PUNCH UNTVM1.FC22
/*ROUTE PRINT UNTVM1.FC22
//  EXEC SPSSX
SET WIDTH 80
DATA LIST FIXED RECORDS=1
 /1 Na 1-4 (2) Mg 6-9 (2) Al 11-14 (2) Si 16-19 (2) S 21-24 (2)
   Cl 26-29 (2) K 32-34 (2) Ca 36-39 (2) Ti 41-44 (2) Fe 46-49 (2)
   Cu 51-54 (2) Zn 56-59 (2) Specimen 61-68 (a) Pottery 70
   Kilncly 72-73
BEGIN DATA
0000 0000 1913 7035 0000 0000 0225 0085 0184 0521 0036 0000 01 DAUGH 2 01
0000 0000 1782 7598 0000 0000 0258 0111 0053 0170 0028 0000 02 DAUGH 2 01
0000 0000 1937 7474 0000 0000 0155 0131 0032 0113 0158 0000 03 DAUGH 2 01
0000 0000 2030 7776 0000 0000 0150 0000 0000 0044 0000 0000 04 DAUGH 2 01
0000 0000 2241 7578 0000 0000 0090 0000 0000 0090 0000 0000 05 DAUGH 2 01
0000 0000 1857 8054 0000 0000 0011 0000 0000 0000 0079 0000 06 DAUGH 2 01
0000 0000 1530 7515 0000 0000 0174 0043 0180 0472 0086 0000 08 DAUGH 2 01
0000 0000 1850 7381 0000 0000 0243 0018 0120 0350 0037 0000 09 DAUGH 2 01
0000 0000 1774 7802 0000 0000 0234 0024 0044 0150 0000 0000 01 DN16  5 02
0000 0000 1789 7517 0000 0000 0228 0029 0071 0351 0003 0013 02 DN16  5 02
0000 0000 1786 8132 0000 0000 0031 0000 0000 0031 0020 0000 03 DN16  5 02
0000 0000 1801 7509 0000 0000 0239 0010 0065 0258 0076 0042 04 DN16  5 02
0000 0000 1450 8038 0000 0000 0194 0000 0046 0142 0102 0028 05 DN16  5 02
0000 0000 1808 8102 0000 0051 0000 0000 0000 0000 0039 0000 06 DN16  5 02
0000 0000 1399 7883 0000 0000 0248 0043 0099 0282 0019 0026 07 DN16  5 02
0000 0000 1853 7956 0000 0000 0253 0041 0049 0149 0000 0000 08 DN16  5 02
0000 0000 1599 8195 0000 0000 0168 0000 0000 0038 0000 0000 09 DN16  5 02
0000 0000 1487 7962 0000 0000 0219 0048 0062 0222 0000 0000 10 DN16  5 02
0000 0000 2233 7094 0000 0000 0213 0053 0008 0312 0086 0000 01 DN74  5 03
0000 0000 2370 7343 0000 0000 0110 0011 0000 0069 0097 0000 02 DN74  5 03
0000 0000 2079 7168 0000 0000 0153 0000 0026 0501 0073 0000 03 DN74  5 03
0000 0000 2336 7600 0000 0000 0064 0000 0000 0000 0000 0000 04 DN74  5 03
0000 0000 2145 7066 0000 0000 0190 0000 0000 0553 0046 0000 05 DN74  5 03
0000 0000 1634 7616 0000 0000 0098 0000 0072 0559 0020 0000 06 DN74  5 03
0000 0000 2027 7708 0000 0000 0165 0000 0000 0000 0099 0000 07 DN74  5 03
0000 0000 2208 7691 0000 0000 0085 0000 0000 0016 0000 0000 08 DN74  5 03
0000 0000 2284 7288 0000 0000 0140 0000 0000 0198 0090 0000 09 DN74  5 03
0000 0000 1862 7543 0000 0000 0071 0009 0012 0443 0060 0000 10 DN74  5 03
0000 0000 1904 7894 0000 0000 0202 0000 0000 0000 0000 0000 01 DN75  3 04
0000 0011 1937 7708 0000 0000 0208 0008 0023 0071 0028 0006 02 DN75  3 04
0000 0000 1914 7709 0000 0000 0235 0006 0026 0079 0032 0000 03 DN75  3 04
0000 0000 1976 7793 0000 0000 0147 0000 0000 0000 0061 0023 04 DN75  3 04
0000 0000 1818 7868 0000 0000 0219 0000 0019 0071 0006 0000 05 DN75  3 04
0000 0000 1824 7560 0000 0000 0266 0009 0094 0232 0012 0002 06 DN75  3 04
0000 0000 1830 7287 0000 0000 0316 0027 0116 0388 0021 0015 07 DN75  3 04
0000 0000 1639 7607 0000 0000 0252 0145 0092 0215 0023 0027 08 DN75  3 04
0000 0000 1782 7822 0000 0000 0226 0000 0049 0081 0031 0009 09 DN75  3 04
0000 0000 1957 7853 0000 0000 0190 0000 0000 0000 0000 0000 10 DN75  3 04
0000 0000 2113 7512 0000 0000 0158 0000 0000 0000 0194 0023 01 DN19  3 05
0000 0000 1794 7402 0000 0000 0306 0053 0102 0243 0094 0006 02 DN19  3 05
0000 0000 2267 7723 0000 0000 0010 0000 0000 0000 0000 0000 03 DN19  3 05
0000 0000 1805 6148 0008 0030 0202 1647 0000 0060 0100 0000 04 DN19  3 05
0000 0000 2107 7843 0000 0000 0000 0000 0000 0000 0051 0000 05 DN19  3 05
```

FILE: DN410 DATA A1 UNIVERSITY OF NORTH TEXAS

0000	0000	1879	7492	0000	0000	0134	0014	0099	0299	0083	0000	06	DN19	3	05
0000	0000	1467	8309	0000	0000	0149	0000	0000	0000	0076	0000	07	DN19	3	05
0000	0000	1672	7707	0000	0000	0264	0004	0077	0177	0090	0008	08	DN19	3	05
0000	0000	1889	7529	0000	0000	0228	0014	0051	0138	0134	0015	09	DN19	3	05
0000	0000	1286	8423	0000	0000	0069	0000	0036	0088	0073	0026	10	DN19	3	05
0000	0000	1580	7461	0000	0000	0257	0026	0159	0464	0053	0000	01	DN18	5	06
0000	0000	1757	7077	0000	0000	0306	0028	0166	0614	0050	0003	02	DN18	5	06
0000	0000	1834	7265	0000	0000	0123	0161	0195	0417	0004	0000	03	DN18	5	06
0000	0000	2027	7250	0000	0000	0072	0067	0139	0354	0069	0003	04	DN18	5	06
0000	0000	1974	7510	0000	0000	0116	0065	0080	0220	0035	0000	05	DN18	5	06
0000	0000	1516	7928	0000	0000	0211	0040	0110	0167	0000	0029	06	DN18	5	06
0000	0000	1971	7815	0000	0000	0214	0000	0000	0000	0000	0000	07	DN18	5	06
0000	0000	1525	7650	0000	0000	0272	0108	0180	0262	0002	0000	08	DN18	5	06
0000	0000	1860	7483	0000	0000	0152	0065	0111	0328	0000	0000	09	DN18	5	06
0000	0000	1862	7516	0000	0000	0142	0063	0115	0301	0000	0000	10	DN18	5	06
0000	0000	1812	7205	0000	0000	0219	0160	0130	0393	0073	0008	01	DN410	1	20
0000	0000	2347	7541	0000	0000	0059	0053	0000	0000	0000	0000	02	DN410	1	20
0000	0000	2044	7211	0000	0000	0140	0218	0023	0364	0000	0000	03	DN410	1	20
0000	0000	1948	7788	0000	0000	0055	0096	0020	0071	0021	0000	04	DN410	1	20
0000	0000	2369	7437	0000	0000	0130	0045	0000	0019	0000	0000	05	DN410	1	20
0000	0000	2453	7130	0000	0000	0212	0101	0053	0051	0000	0000	06	DN410	1	20
0000	0000	1867	7717	0000	0000	0133	0084	0000	0163	0036	0000	07	DN410	1	20
0000	0000	2234	6862	0000	0000	0236	0112	0080	0440	0035	0000	08	DN410	1	20
0000	0000	2122	7418	0000	0000	0089	0064	0043	0264	0001	0000	09	DN410	1	20
0000	0000	2186	7691	0000	0000	0070	0049	0000	0003	0000	0000	10	DN410	1	20
0000	0000	2004	7861	0000	0000	0094	0002	0000	0040	0000	0000	11	DN410	1	20
0000	0000	1783	6930	0000	0000	0186	0218	0106	0768	0008	0000	12	DN410	1	20
0000	0000	1833	7806	0000	0000	0082	0043	0000	0218	0017	0000	13	DN410	1	20
0000	0000	1780	7058	0000	0000	0188	0201	0100	0673	0000	0000	14	DN410	1	20
0000	0086	2627	6462	0060	0062	0246	0081	0071	0305	0000	0000	01	CANNP	5	07
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APPENDIX J

SELECTED ILLUSTRATIONS OF VESSEL SHERDS FROM THE CRANSTON-DONALDSON AND ROARK-GRIFFITH POTTERIES

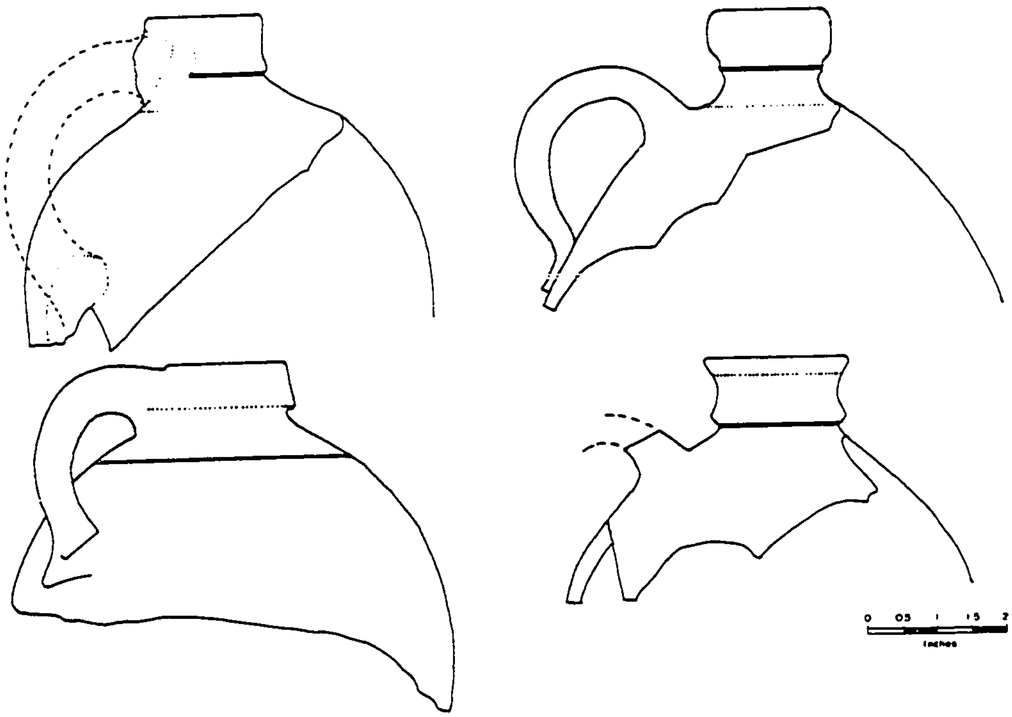

Figure J.1 Four jug sherds from the Cranston-Donaldson Pottery. Note the different rim and handle attachment styles (drawn by Carin E. Horn).

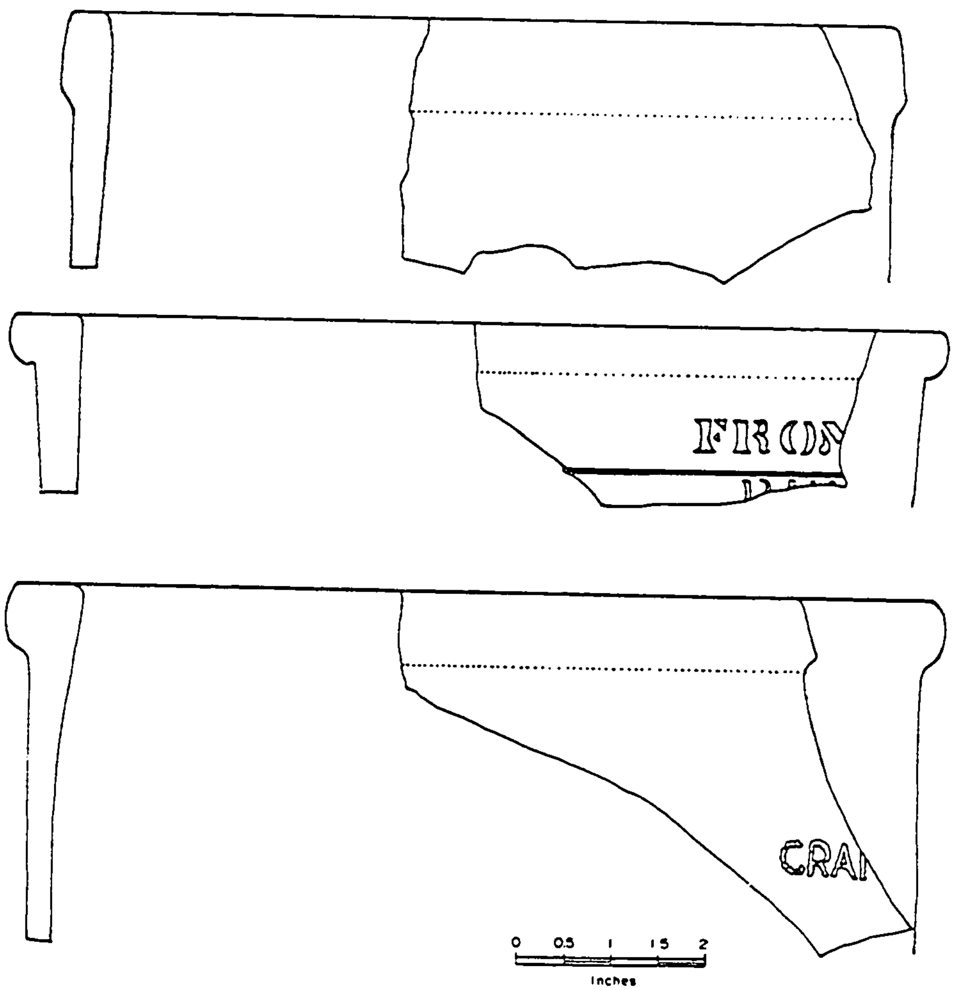

Figure J.2 Crock or wide-mouth jars from the Cranston-Donaldson Pottery. The middle vessel is marked FROM DONALDSON and the bottom vessel is marked CRANSTON (drawn by Carin E. Horn).

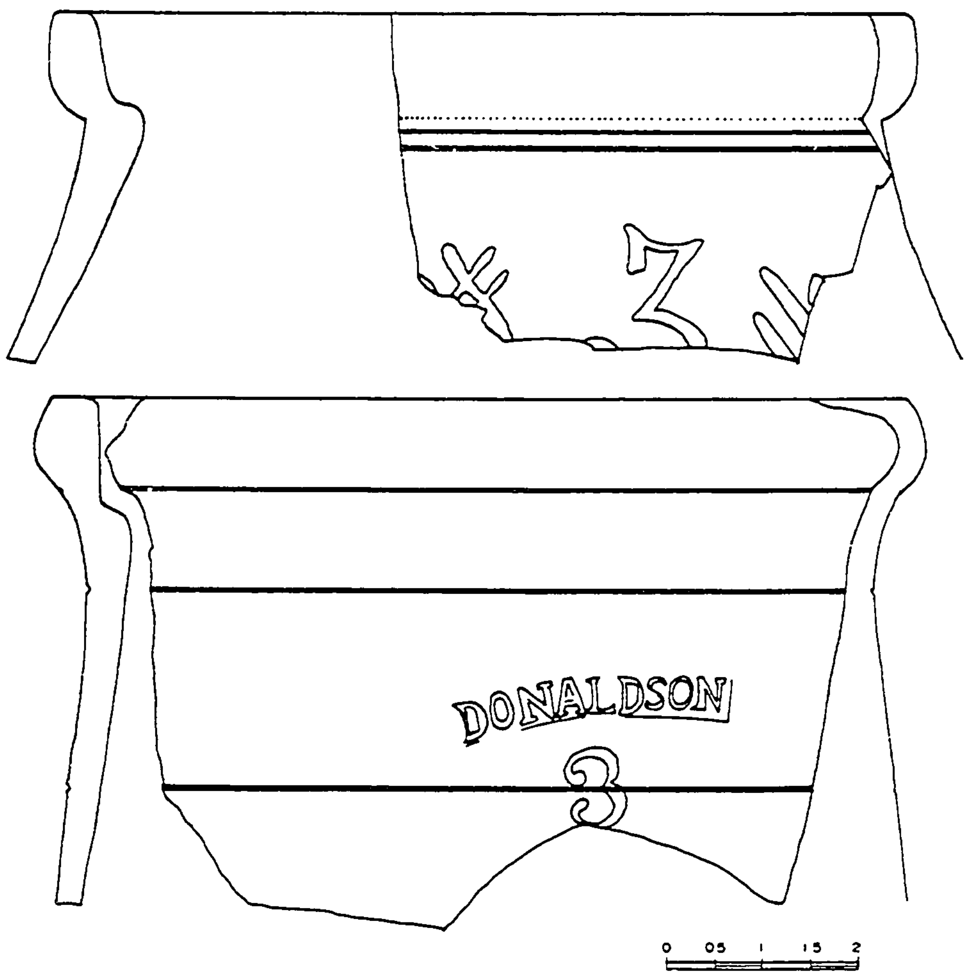

Figure J.3 Two churns from the Cranston-Donaldson Pottery. The bottom vessel is marked DONALDSON and based on the cobalt-blue decoration and gallon number on the upper vessel, this vessel was also probably made by Donaldson (drawn by Carin E. Horn).

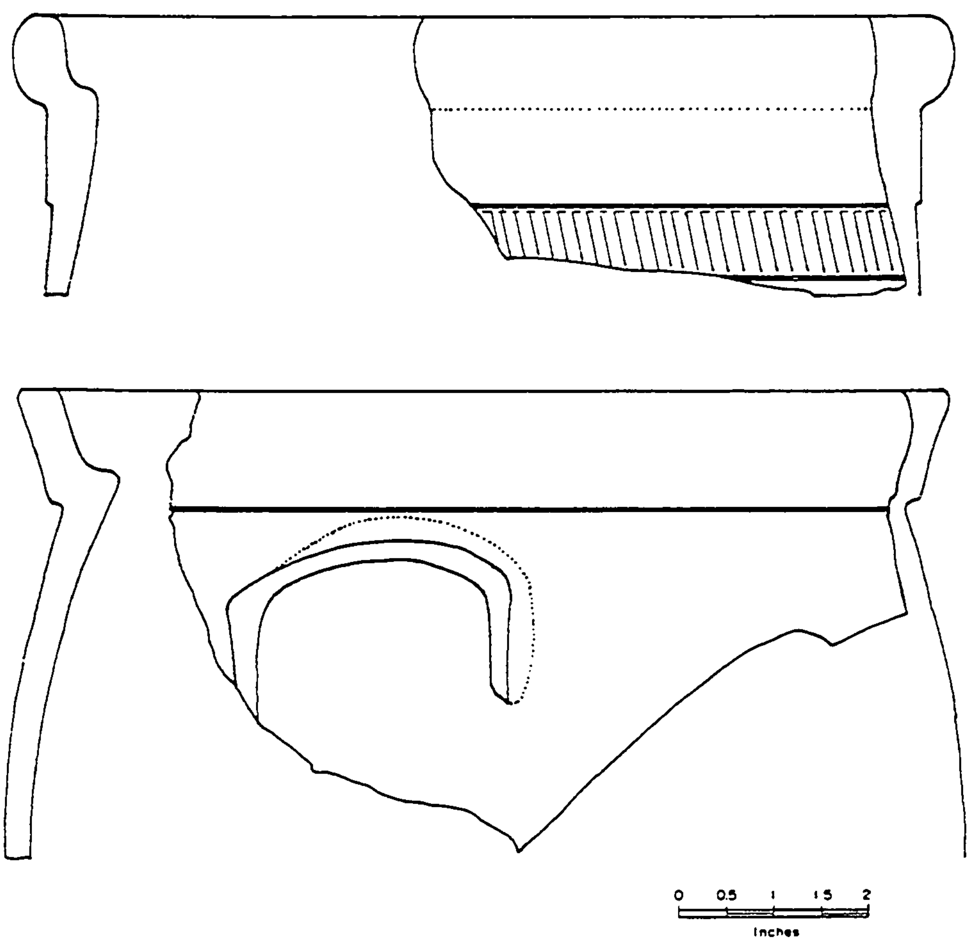

Figure J.4 Two churns from the Cranston-Donaldson Pottery. The upper vessel is one of two vessels found at the pottery with a ribbed design (drawn by Carin E. Horn).

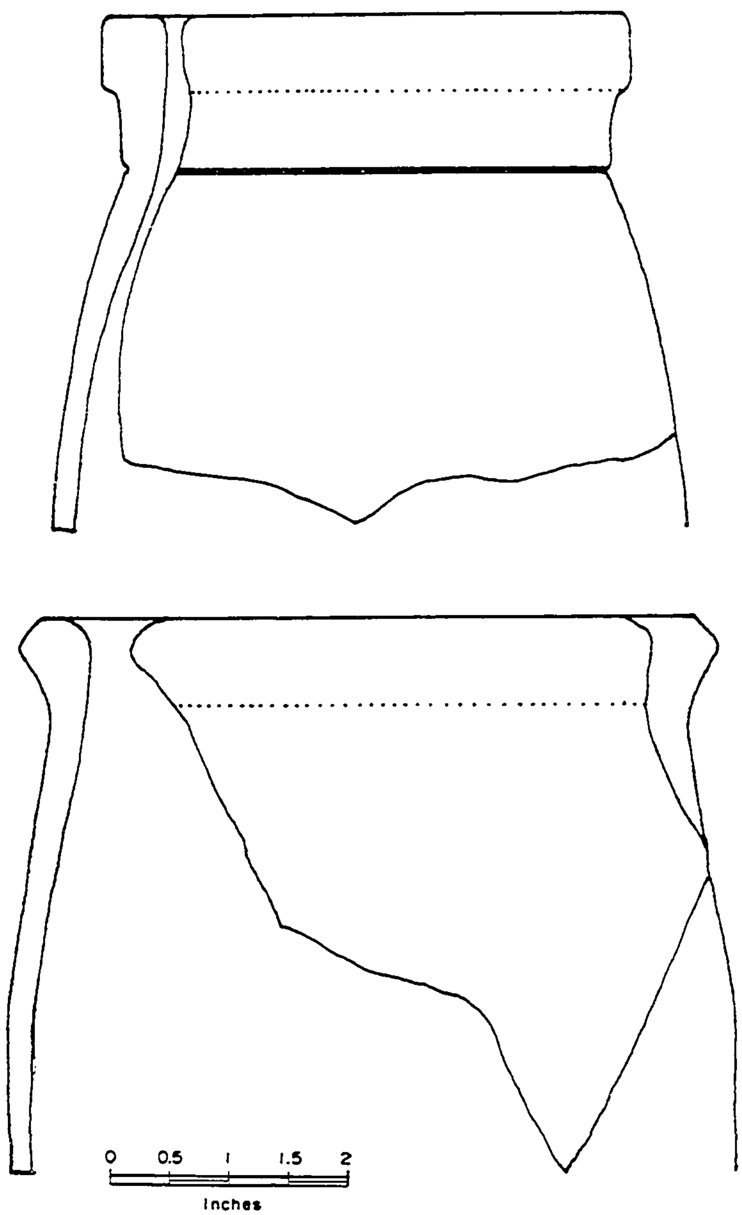

Figure J.5 Narrow-mouth (upper) and a wide-mouth (lower) jars from the Cranston-Donaldson Pottery (drawn by Carin E. Horn).

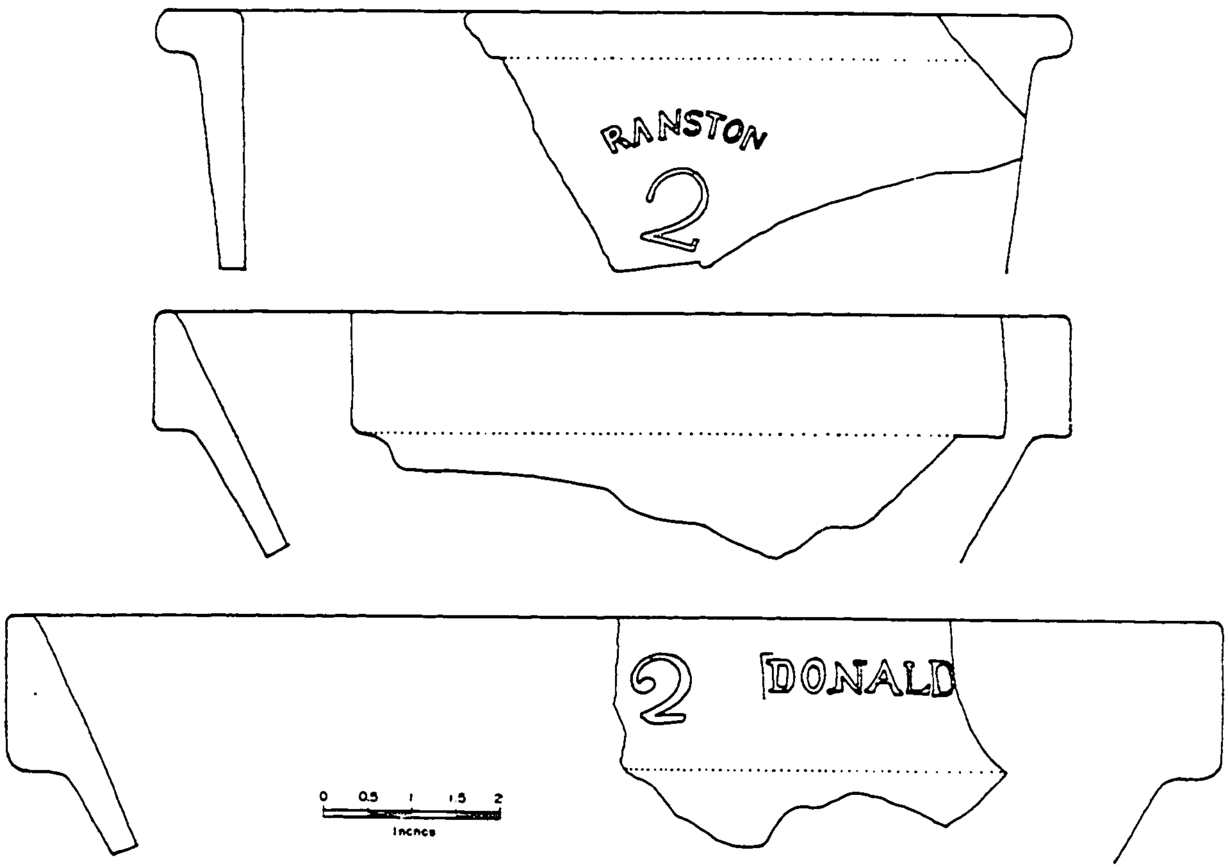

Figure J.6 Milkpan (top) and two milkbowl vessels from the Cranston-Donaldson Pottery (drawn by Carin E. Horn).

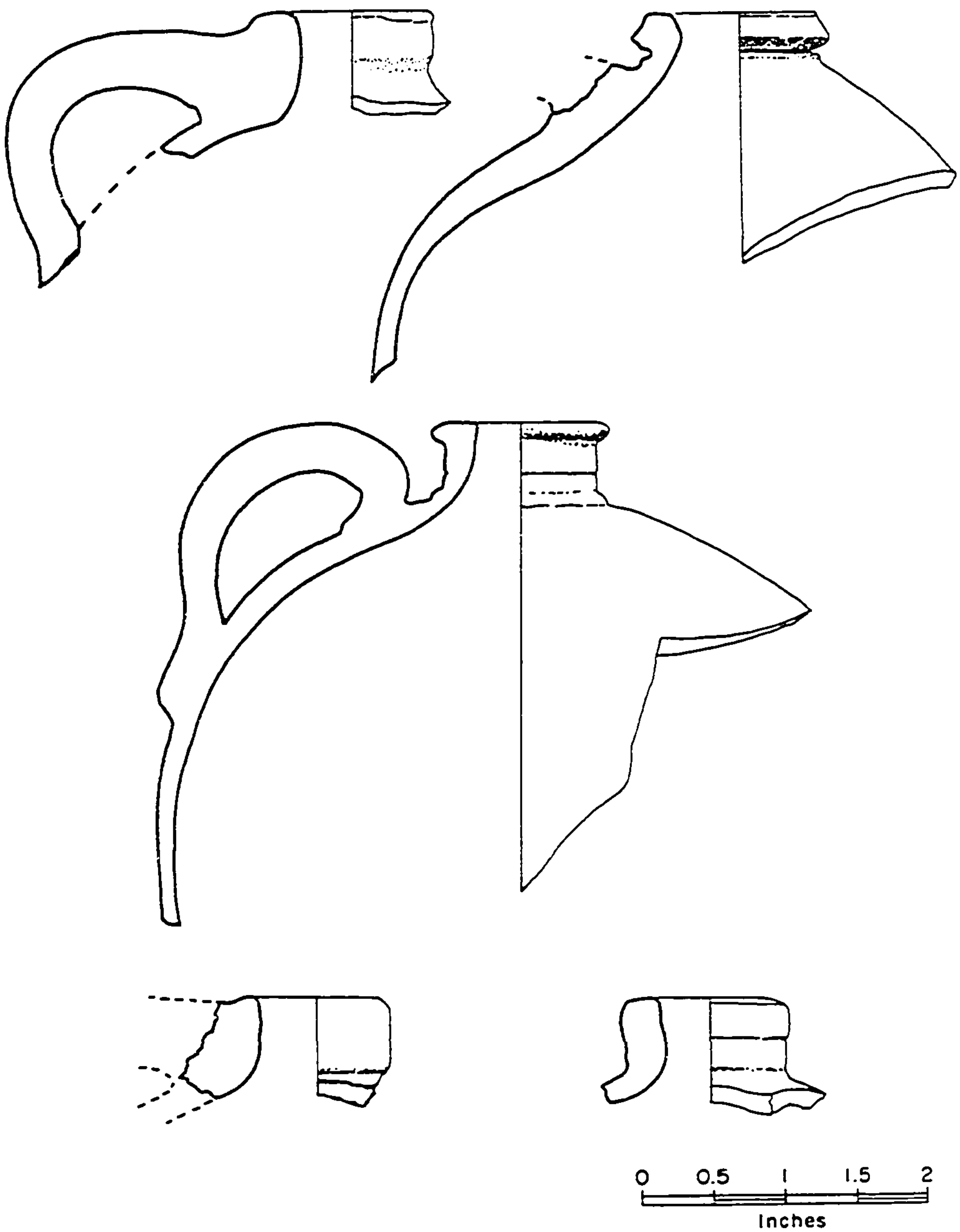

Figure J.7 Five jugs from the Roark-Griffith Pottery, each exhibiting a different rim style (drawn by Karim Sadr).

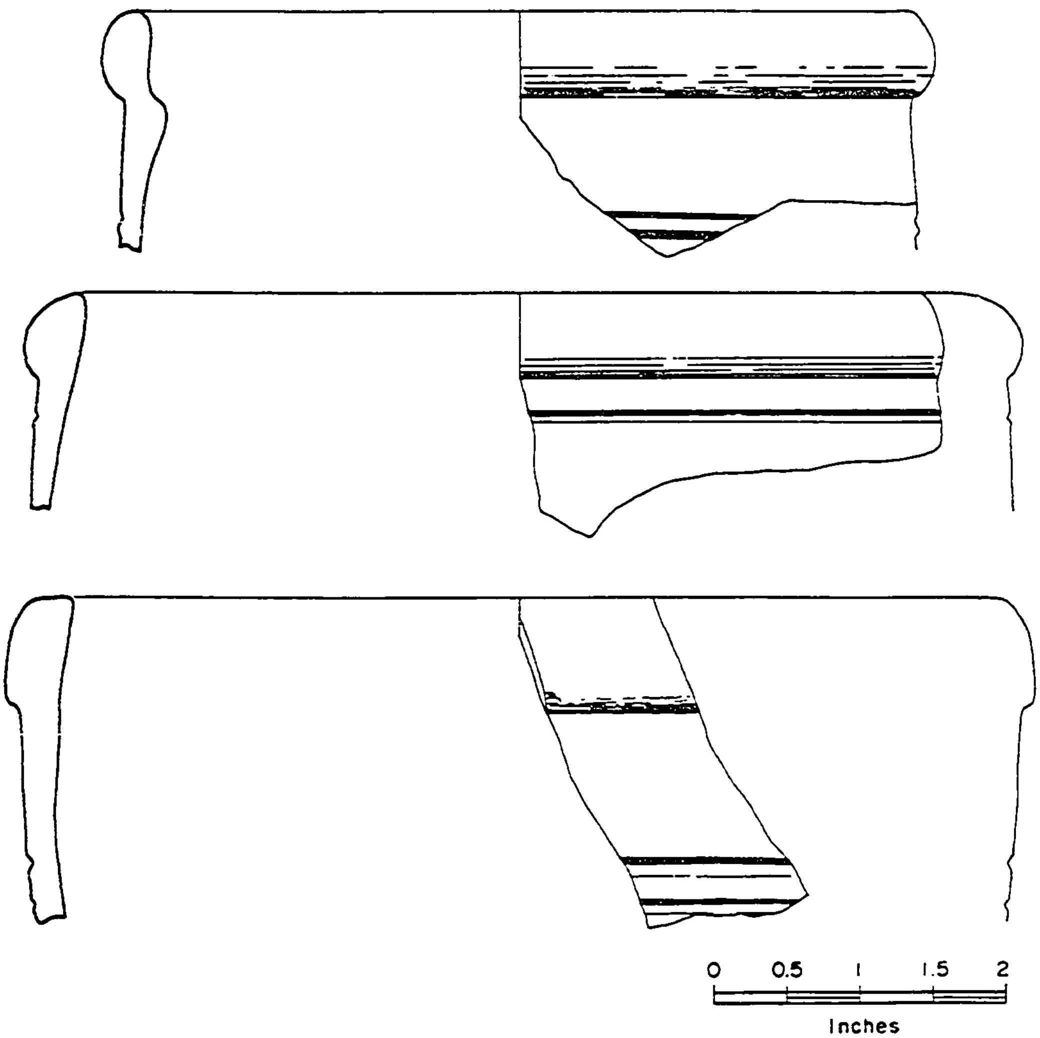

Figure J.8 Churn (top) and two crocks from the Roark-Griffith Pottery (drawn by Karim Sadr).

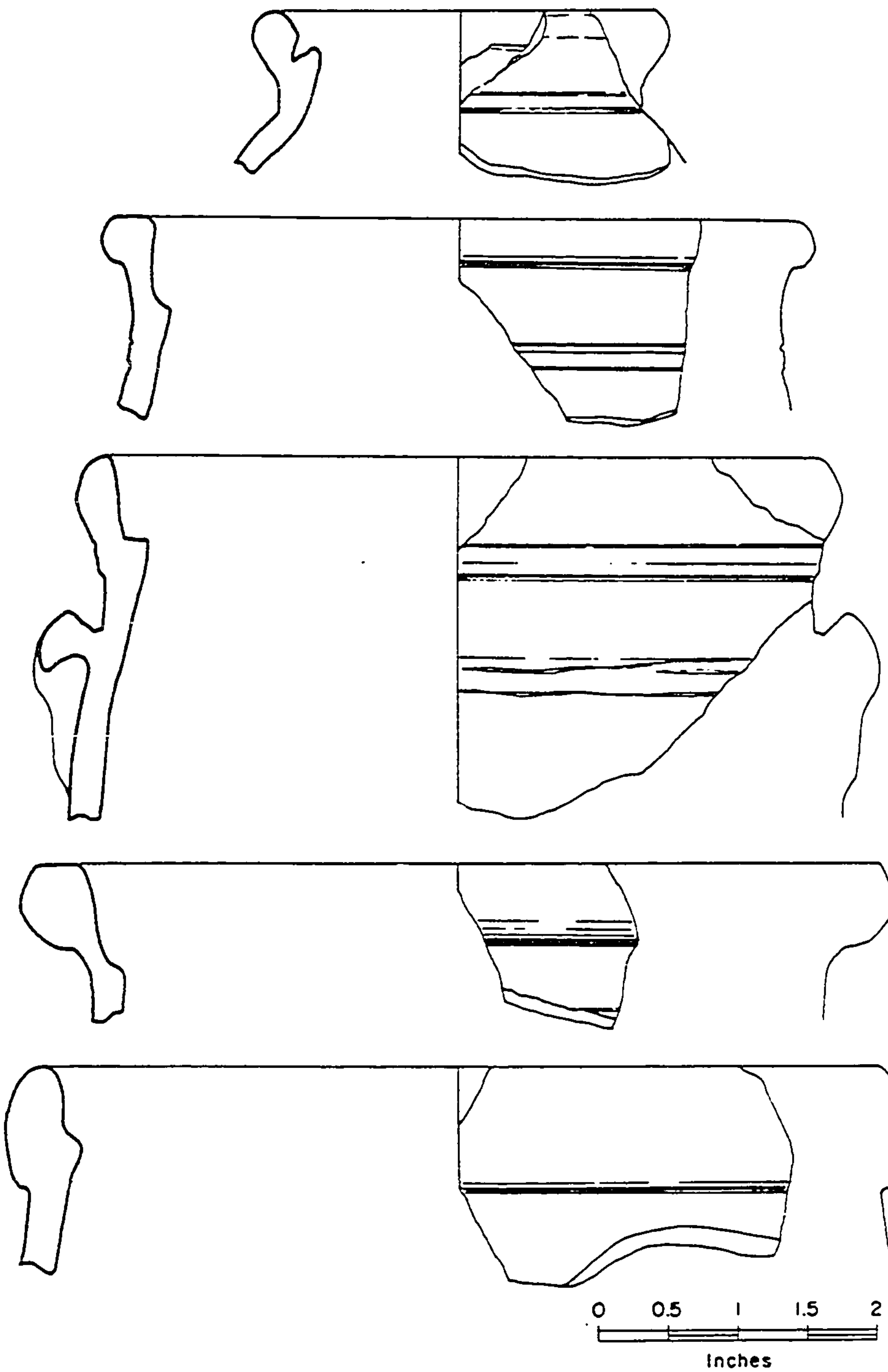

Figure J.9 Preserve jar (top) and four churns from the Roark-Griffith Pottery. The middle vessel has opposing lug handles (drawn by Karim Sadr).

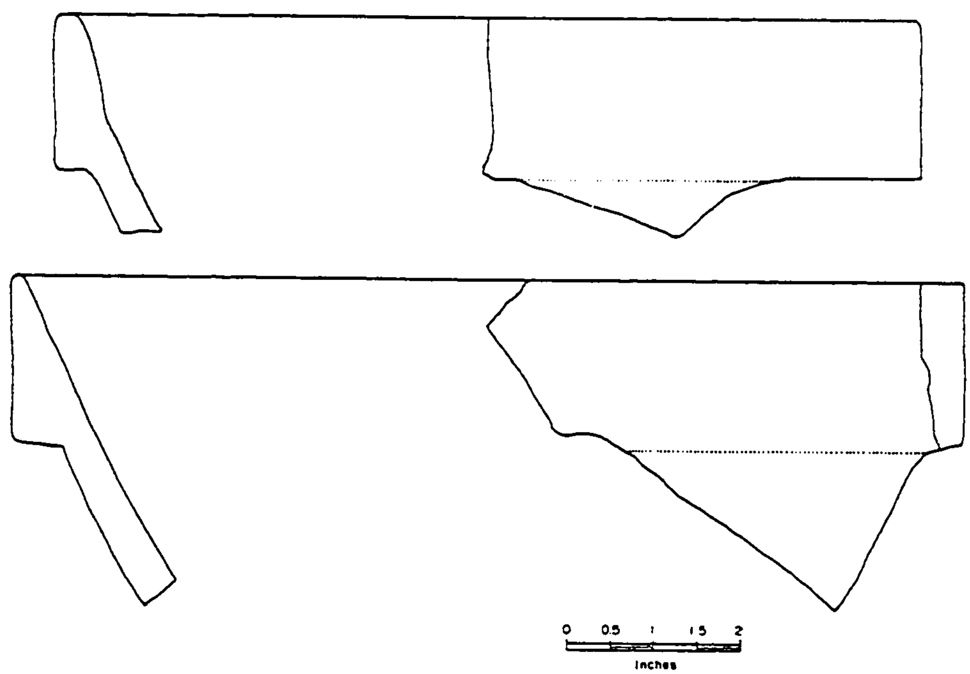

Figure J.10 Two milkbowls from the Roark-Griffith Pottery (drawn by Carin E. Horn).

VITA

SUSAN ANNE LEBO

Most Recent Positions

Historical Archaeologist, Consultant, Geo-Marine, Inc., Plano, Texas (August-November 1992).

Program Production Assistant, Latin American Studies Association, XVII International Conference, Dr. John Booth, Political Science Department, University of North Texas (March-September 1992).

Education

1992 Ph.D., Anthropology, University of Washington, Seattle
Dissertation Title: Specialization: Stoneware Pottery Production in Texas, 1850-1910

1981 M.A., Anthropology, University of Washington, Seattle

1979 B.A., Anthropology, University of Washington, Seattle

Grants, Awards, Honors

Anthropology Department Travel Grant (1988-1989)
Graduate School Research Assistantship (1980)
Phi Beta Kappa (1978)
Departmental Honors (1978)
Provost List, Deans List (1973-1978)

Professional Societies

Dallas Archeological Society
Society for Historical Archaeology

Academic Positions

1990-1991 Adjunct Faculty, Physical Geology Lab 1610, Department of Geography, University of North Texas, Denton, Texas (August 1990-December 1991; 3 semesters).

1980 Research Assistant, Department of Anthropology, University of Washington, Seattle, Washington (September-December 1980).

1980 Research Assistant, Office of Public Archaeology, University of Washington, Seattle, Washington (September-December 1980).

1979 Research Assistant, Office of Public Archaeology and the Department of Anthropology, University of Washington, in the field at Nespelem, Washington, on the Coville Indian Reservation (September-December 1979).

Professional Experience (13 years)

1986-1992 Historic Project Director for three reservoir projects (Ray Roberts Lake, Lewisville Lake, Jones Farm), Center for Quaternary Archaeology & Geology, Institute of Applied Sciences, University of North Texas, Denton (October 1986-February 1992).

1991 Historical Consultant for Weldon Nash and Associates, Historical Restoration of Five Log Structures from the Ray Roberts Lake area at Farmers Branch Historical Park, Farmers Branch, Texas (Spring 1991).

1988 Project Archivist, Dry Branch Archaeological Project, University of North Texas, Denton (November 1988).

1986-1987 Historic Project Director, Tucker and Sinclair Cemeteries Project, Center for Quaternary Archaeology & Geology, Institute of Applied Sciences, University of North Texas, Denton (September 1986-February 1987).

1986 Consulting Archaeologist, Archaeological Investigations at the Ferris Cemetery, Dallas, Texas (March 1986).

1985-1986 Historic Field Director, Assistant Project Archaeologist, Joe Pool Lake Archaeological Project, Archaeology Research Program, Southern Methodist University, Dallas, Texas (January 1985-September 1986).

1983-1984 Prehistoric and Historic Laboratory Director, Assistant Project Archaeologist, Richland/Chambers Creek Archaeological Project, Archaeology Research Program, Southern Methodist University, Dallas, Texas (January 1983-December 1984).

1982 Computer Analyst and Historical Laboratory Assistant, Richland/Chambers Creek Archaeological Project, Archaeology Research Program, Southern Methodist University, Dallas, Texas (September-December 1982).

1982	Historic Site Supervisor, Richland/Chambers Creek Archaeological Project, Archaeology Research Program, Southern Methodist University, Dallas, Texas (June-September 1982).
1982	Historic Project Archaeologist, Bainbridge Naval Training Center Project, Maryland Historical Trust, Annapolis, Maryland (April-June 1982).
1981-1982	Laboratory Director and Archival Researcher, Soil Systems, Inc., Cultural Resource Management Branch, Alexandria, Virginia (November 1981-April 1982).
1981	Archaeological Records Manager, Tombigbee Historic Townsites Project, Michigan State University, on location in West Point, Mississippi (August-October 1981).
1981	Field Director, Tombigbee Historic Townsites Project, Michigan State University, on location in West Point, Mississippi (May-July 1981).
1981	Data Base Computer Entry, Forest Resources Title II-C Project, University of Washington, Seattle, Washington (April-May 1981).
1980	Assistant Laboratory Director, Earlington-Black River Archaeological Project, Office of Public Archaeology, Seattle, Washington. Laboratory Analyst, Robards Farm Archaeological Project, Dunklin County, Missouri at the University of Washington (September-December 1980).
1980	Field Assistant, Excavation, Resistivity and Magnetometer Survey, Geology and Anthropology Departments, Ball State University, Mounds State Park, Muncie, Indiana (June-August 1980).
1980	Laboratory Map Analyst, Moses Lake-Soap Lake Recreation Area, eastern Washington, Office of Public Archaeology, Seattle, Washington (January-March 1980).
1979	Assistant Laboratory Director, Records Management, Chief Joseph Dam Cultural Resources Project, University of Washington, on location in Nespelem, Washington, on the Coville Indian Reservation (May-December 1979).
1978-1979	Laboratory Assistant, Records Management, Steens Mountain Archaeological Project, Department of Anthropology, University of Washington, Seattle, Washington (August 1978-March 1979).

1978 Field School Student, Steens Mountain Archaeological Field School, University of Washington, on location in the Great Basin (June-August 1978).

Professional Publications

Lebo, Susan A., and Maynard B. Cliff
n.d. Pottery Industry in Texas. Handbook of Texas. Accepted October 1992.

Lebo, Susan A.
1992 Book Review of Recent Developments in Ceramic Petrology, edited by Andrew Middleton and Ian Freestone. Geoarchaeology 7(3):277-280.

Lebo, Susan A., Melissa M. Green, and David C. Crass
1988 Nineteenth Century Stoneware Industry in North Central Texas: Preliminary Test Excavations at the Roark Pottery, Denton County, Texas. In The Record, 50th Anniversary Edition, pp. 134-153. Dallas Archeological Society, Kissel Printing Co., Inc., Dallas.

Perttula, T. K., and Susan A. Lebo
1987 Current Research: North Texas State University. Southeastern Archaeological Conference Newsletter 29(2): 36-37.

Contract and Technical Publications

1992a Lebo, Susan A. (author and editor)
Historic Archaeology of the Jones (41DN250) and Johnson (41DN248) Farmsteads in the Ray Roberts Lake Area: 1850-1950. Draft popular report submitted to the U.S. Army Corps of Engineers, Fort Worth District, Fort Worth, Texas. Institute of Applied Sciences, University of North Texas, Denton.

1992b Lebo, Susan A. (author and editor)
Historic Archaeology of the Jones (41DN250) and Johnson (41DN248) Farmsteads in the Ray Roberts Lake Area: 1850-1950. Draft technical report submitted to the U.S. Army Corps of Engineers, Fort Worth District, Fort Worth, Texas. Institute of Applied Sciences, University of North Texas, Denton.

1992c Lebo, Susan A., and Stephen P. Austin
The Evansville Mines: Twentieth Century Lignite Mining in East Central Texas. Miscellaneous Report of Investigations Number 41. Report submitted to Northwestern Resources Co, Jewett, Texas. Geo-Marine, Inc., Plano, Texas.

1991a Brown, Kenneth Lynn, and Susan A. Lebo
Archaeological Testing of the Lake Lewisville Shoreline, Denton County, Texas. Institute of Applied Sciences, University of North Texas, Denton.

1991b Lebo, Susan A. (author and editor)
Archaeology and History of the Ray Roberts Lake Area of Northcentral Texas, 1850-1950. Final draft report submitted to the U.S. Army Corps of Engineers, Fort Worth District, Fort Worth, Texas. Institute of Applied Sciences, University of North Texas, Denton.

1991c Lebo, Susan A. (author and editor)
Archaeology of Nineteenth and Early Twentieth Centuries Lifeways in the Lewisville Lake Area, Denton County, Texas. Final draft report submitted to the U.S. Army Corps of Engineers, Fort Worth District, Fort Worth, Texas. Institute of Applied Sciences, University of North Texas, Denton.

1990 Lebo, Susan A., and Kenneth Lynn Brown
Archaeological Survey of the Lewisville Lake Shoreline, Denton County, Texas. Institute of Applied Sciences, University of North Texas, Denton.

1989 Ferring, C. Reid, and Susan A. Lebo
An Archaeological Survey of Portions of Dry Branch Creek, Dallas County, Texas. Institute of Applied Sciences, University of North Texas, Denton. Report submitted to the U.S. Army Corps of Engineers, Fort Worth District, Fort Worth, Texas.

1988a Lebo, Susan A. (author and editor)
The Tucker (41DN104) and Sinclair (41DT105) Cemeteries of Delta County, Texas: An Archaeological and Bio-archaeological Perspective. Institute of Applied Sciences, University of North Texas, Denton. Report submitted to the U.S. Army Corps of Engineers, Fort Worth District, Fort Worth, Texas.

1988b Jurney, David H., Susan A. Lebo, and Melissa M. Green (authors and compilers)
Historic Farming on the Hogwallow Prairies: Ethnoarchaeological Investigations of the Mountain Creek Area, North Central Texas. Joe Pool Lake Archaeological Project, Volume II. Archaeology Research Program, Institute for the Study of Earth and Man, Southern Methodist University, Dallas, Texas.

1988c Lebo, Susan A. (author)
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