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The Cultural Origins of Technical Choice: Unraveling Algonquian and Iroquoian Ceramic Traditions in the Northeast

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In northeastern North America, the Late Woodland period (ca. A.D. 1000–1600) is defined and described largely on the basis of variation in ceramics. Archaeologists in the region have constructed fairly rigid stylistic typologies for ceramics in order to infer ethnicity and chronology (e.g., Engelbrecht 1978; MacNeish 1952; Rouse 1947; Smith 1947). While these typologies have been useful in some cases for the construction of culture histories, they have often become an end in themselves. Often these stylistic types are taken to be a direct reflection of group affiliation: for example, when a certain "type" of ceramic is found outside of its "homeland," it is interpreted as either stylistic copying, trade, or "female capture" (e.g., Brooks 1946; Byers and Rouse 1960; Engelbrecht 1972; Lavin 1988). While Northeast archaeologists have placed a premium on decoration for discerning such things as ethnicity (e.g., Engelbrecht 1978; Plog 1980a; *contra* Brumbach 1975; Goodby 1992), little attention has been paid to the wide variety of choices available to potters during ceramic production and use. Certainly the level at which we isolate aspects of material culture determines the patterns of behavior we are able to see (Lechtman 1977:12). Therefore, an overemphasis on decoration in Northeast ceramic studies has inhibited a deeper understanding of the technological and social contexts of ceramic manufacture and use.

The goal of the research presented here is to underscore and examine the complex relationships among technical choices, historical context, and society. These relationships are examined through an *attribute analysis of technical choices* for three Late Woodland archaeological sites in the Northeastern United States. Before I discuss the details of the archaeological context, I present a theoretical background for the notion of style in technology.

TOWARDS A THEORY OF CHOICE

As Dean Arnold rightfully points out "material culture is nowhere near as simple as it once seemed to be" (D. Arnold 1991:345). Thanks to the creative ethnographic work of archaeologists and other social scientists (e.g., Dietler and Herbich 1989; Hodder 1982, 1986; Lechtman 1977; Lemonnier 1989; Plog 1990; Sackett 1990), ceramic ecologists (D. Arnold 1985, 1993; P. Arnold 1991; Stark 1995c), and feminist archaeologists (Gero and Conkey 1991; Spector 1993), our understanding of the meaning of materials is much more complex, perhaps, than it was a decade ago. It is clear that we must move beyond a simplistic division between style and function if we are to gain any critical understanding of the social dimensions of material culture (Dietler and Herbich, this volume). If, for example, we accept Hill's (1985:374) definition of style—the "characteristic manner of expression, execution, construction or design"—we recognize style as permeating all aspects of variation in material culture. Indeed, style is a multilayered phenomenon, with different layers of style reflecting different cultural processes (Gosselain, this volume).

A focus on *how* things are made is somewhat of a departure from traditional anthropological archaeology. In fact, the study of techniques is often regarded as an area of inquiry outside anthropology (Mahias 1993:157). But the concept of "technological style" (Lechtman 1977) focuses on the relation between techniques and society—not on techniques in their own right (van der Leeuw 1993:240). According to Lemonnier (1992:3):

> In most cases, technological systems are summed up merely as static *constraints* without considering the social aspects of material culture. And in the few cases where the social aspects are explored, technological systems are reduced to statements about the shape of artifacts, or worse, their decoration . . . [emphasis in original].

Recent research shows that, in certain contexts, decorative style may be less indicative of social identities than are technological traditions (Childs 1991; Dietler and Herbich 1989; Gosselain 1992b; Lechtman 1977; Pfaffenberger 1992; Stark 1995c; Steinberg 1977:78; Sterner 1989). For example, Gosselain (1992b), in his ethnographic study of the Bafia and other Cameroonian groups, suggests that the vessel shaping *process* reflects ethnicity, more than does the end result. Likewise, Miller (1985) in his ethnographic study of pottery manufacture in central India, suggests that shaping *techniques*—not the shapes themselves—reflect social divisions of caste. Here the emphasis is on *choice*—rather than on the materials or tools—as critical in determining the final product (van der Leeuw 1993:241). The natural environment, rather than constraining choice, serves only as a backdrop or context for social relations (Dobres and Hoffman 1994:231; Lechtman 1977:14). Therefore, social agency is critical in "defining, determining, and articulating particular technologies and the operational sequences" (Dobres and Hoffman 1994:231).

The basic premise to theories of technological choice is that societies choose between a number of equally viable options; given a technical problem, choices transcend mere material efficacy or technical logic (Lemonnier 1989:156, 1993a:16; Mahias 1993:177). There are more subtle informational or symbolic aspects of technology that involve arbitrary choices about techniques and materials, and that are a part of a larger symbolic system (Lemonnier 1992:3). For example, when designing an airplane, an engineer is influenced by what she or he thinks an airplane "should be like" based on already existing designs, and her or his education and cultural experience (Lemonnier 1989:170).

A theory of technical choice does not simply replace an overemphasis on decoration with an overemphasis on technology or "function." The concept of technical choice is more comprehensive than other concepts of style (e.g., the social interaction [Deetz 1965; Engelbrecht 1978; Plog 1976] or information exchange theories [Plog 1980a; Wobst 1977]), because it requires as much attention to the sequence and context of manufacture and use as it does to what the finished product "looks like" or conveys. Thus, in this analysis "style" is viewed as the way an artifact is made, as much as, for example, the way it is decorated.

CERAMIC PRODUCTION IN NEW ENGLAND: OBJECTIVES

Since there is latitude for choice in virtually every technical aspect of human existence (Pfaffenberger 1992:499; see also Lechtman 1977:14 and Lemonnier 1986), in this study I emphasize the choices that are made by potters throughout the production sequence in order to move beyond a priori assumptions about the evolution of technology. I consider the entire sequence of decision-making involved in artifact production and interpret it in its specific sociocultural context. This approach is very much related to ceramic ecology, which emphasizes the interaction between ceramics and their natural and sociocultural context (e.g., D. Arnold 1985, 1993; Kramer 1985; Krause 1985; Longacre and Skibo 1994; Skibo 1992).

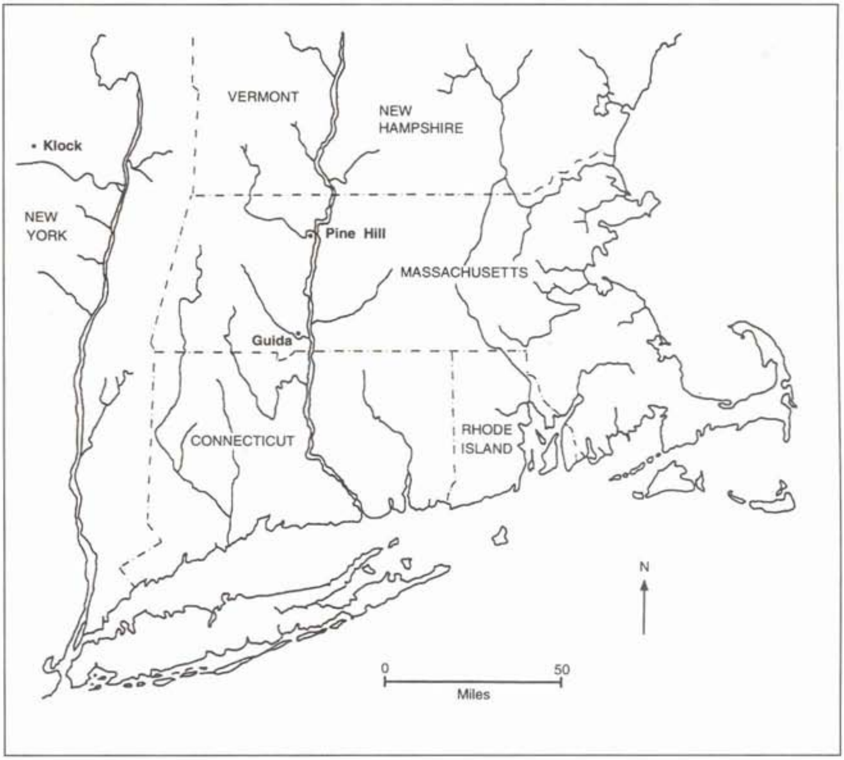

Figure 6.1. Southern New England and eastern New York, showing the location of key sites in this study.

The specific objectives of this research are to: (1) contribute to archaeological theory in the interpretation of material culture; (2) contribute to the refinement of archaeological method by exploiting alternatives to the typological approach—particularly by refining attribute analysis for archaeological ceramics; and (3) provide a more complete reading of New England prehistory—one that does not simply mimic the culture history of better-known groups, such as the Iroquois.

As a means to achieve these objectives, I examine ceramic variability at three Late Woodland sites in the Northeast (Fig. 6.1): two in the middle Connecticut River Valley in western Massachusetts (the Guida Farm site in Westfield and the Pine Hill site in Deerfield), and one in the Mohawk Valley in New York State (the Klock site in Ephratah, which lies approximately 80 km west of Albany). The two Massachusetts sites are thought to have been inhabited by Algonquian-speaking peoples of the Connecticut Valley (most likely the Pocumtucks at Pine Hill and the Woronocos at Guida Farm). The Klock site was most likely occupied by a

Mohawk community. All of the sites have components that date to the latter part of the Late Woodland period (A.D. 1300–1600). I chose these assemblages in order to evaluate the expectations that Algonquian and Iroquois ceramics differ with respect to: (1) the intended use of vessels; (2) the variables affecting decoration; (3) the scale of ceramic production; and (4) technical style.

THE DATA SET

The Guida Farm site is located just east of Westfield, Massachusetts. It was partially excavated by William Young in the early 1960s, and was also tested by numerous other professional and amateur archaeologists (see Byers and Rouse 1960). The two major excavations at the sites were conducted by Byers and Rouse (1960) in 1952 and William Young in 1958. Byers and Rouse excavated four trenches and three test pits (Byers and Rouse 1960:9). Apparently, none of the excavations uncovered evidence of settlement patterns or structures (see Byers and Rouse 1960:12). On the basis of the analysis of material culture, the major occupations of the site date to the Late Woodland and possibly early contact periods (ca. A.D. 1000–1700). It is a large site on a major river and likely represents a place on the landscape where people repeatedly returned. The site yielded large amounts of pottery from the Late Woodland period both on the surface and in association with features. It is unclear how much, if any, of the site still exists, due to farming, bulldozing and historic dumping (John Pretola, pers. comm. 1993).

I analyzed the ceramic assemblage from Guida that was excavated by William Young in 1964 (Young 1969). Young worked with the local Massachusetts Archaeological Society (MAS) for many years and excavated a portion of the site while working at the Springfield Museum (John Pretola, pers. comm. 1993). The collection contains about 1,000 sherds that were sufficiently complete to be used in this analysis.

Pine Hill was tested by the University of Massachusetts Archaeological Field School in the summers of 1989, 1991, 1993, and 1995; excavations were co-directed by the author and Arthur S. Keene in 1993 and 1995. No other documented collections are known to exist from the site, although there has been a great deal of looting. The site is located in an open deciduous forest on private land and is quite likely the best preserved Late Woodland site in western Massachusetts. The area is currently used as a wood lot, and the only plowing apparently took place in the early nineteenth century. Although the site analysis and interpretation is not yet complete, our current interpretation is that the site represents a seasonal encampment where small groups coalesced for hundreds, if not thousands, of years (Keene and Chilton 1995). However, the site's major occupation seems to have occurred during the Late Woodland period. Twenty possible storage or food processing features (11 of which contained Late Woodland ceramics) and 50 scattered postmolds have been identified since our excavations began in 1989. Two radiocarbon dates from pit feature lenses containing ceramics are: (1) cal A.D. 1230–1430; and (2) cal A.D. 1420–1520 (p=.67) or cal A.D. 1568–1627 (p=.33) (Chilton 1996). (Calibrated at 1 sigma with the program CALIB 3.0.3 [Stuiver and Pearson 1993].)

For the purpose of this study, I analyzed all of the ceramics collected from 1989 to 1993. Several hundred ceramic sherds were recovered from the Pine Hill site, 500 of which are sufficiently complete to be analyzed.

The Klock site is located in Ephratah, New York, 15 km north of the Mohawk River on Garoga Creek. The site was excavated under the direction of Robert Funk in the summers of 1969 and 1970, after preliminary testing by William Ritchie in 1950. Based on analysis of material culture by Kuhn and Funk (1994), the site is thought to date to the mid-sixteenth century. Two maize samples from a single pit feature at the site have been radiocarbon dated to cal A.D. 1483–1649 and cal A.D. 1326–1439 (calibrated using one sigma; Snow 1995). Klock is a stockaded village site with evidence of at least seven longhouses, and the site is thought to have been occupied for approximately ten years (Kuhn and Funk 1994). Over the two field seasons in the late 1960s, 157 features were encountered; 76 of these features were at least partially excavated.

The Klock assemblage contains more than 15,000 ceramic fragments. The Klock collection is much larger than those from the Connecticut Valley sites because: (1) on the basis of our knowledge of the large population size of the sixteenth-century Iroquois villages, the site was probably larger than contemporaneous Connecticut Valley sites; and (2) a much larger area was excavated. A random sample of enough sherds (n = 214) to comprise 100 vessel lots was chosen from the Klock assemblage for analysis (the means of establishing vessel lots is described below).

Before I discuss the details and results of the ceramic analysis of these three assemblages, I will provide some background for the Late Woodland period in the Northeast.

LATE WOODLAND CULTURAL DYNAMICS

Based on ethnohistoric and linguistic evidence, the Late Woodland communities of southern New England spoke dialects belonging to the Algonquian language family. The tribal groups in the Mohawk Valley, on the other hand, spoke dialects belonging to the Iroquoian language family. The Iroquois of the Late Woodland period resided predominantly in central and western New York and were surrounded by Algonquian-speaking groups. Current linguistic and archaeological evidence supports the theory that the Iroquois migrated into the region sometime between A.D. 900 and A.D. 1300 (Denny 1994; Parker 1916; Snow 1994; Swihart 1992; *contra* MacNeish 1952, 1976) and either intermingled with or wedged themselves between resident Algonquian groups in the Mohawk Valley. As I will discuss below, these linguistic differences between Algonquian and Iroquois groups were accompanied by a series of cultural distinctions.

In the greater Northeast, and especially for the Iroquois, the Late Woodland is perceived as a culturally dynamic period: agriculture became important for subsistence, communities became more sedentary, and population and the incidence of intergroup conflict increased (see Fenton 1978). However, the Late Woodland archaeology of the middle Connecticut Valley Algonquians is poorly known. In the middle Connecticut Valley, unlike areas to the south and west, no evidence exists for large, permanent, fortified settlements and intensive agriculture (see Thorbahn 1988).

Concerning the lack of evidence for large, Late Woodland villages in the region, archaeologists used to claim that they had not yet been found, or, as Ritchie claimed for the Hudson Valley, that they had been obliterated by the large-scale destruction of sites as a result of Euroamerican settlement and digging by amateurs (Ritchie 1958:7; see also Snow 1980:320). Certainly, the looting of sites has been, and continues to be, a serious problem (Jordan 1975). Also, due to the large, dynamic floodplain of the Connecticut Valley, some Late Woodland sites may have been buried or destroyed. Nevertheless, the seeming invisibility of Late Woodland villages in the eastern Algonquian area may reflect a high degree of mobility for the small groups resident in the valleys of the interior (Ritchie 1958:108).

Horticulture

While maize horticulture was present in the greater New England area by A.D. 1000, it was not practiced to the same degree across the region (George and Bendremer 1995:14; see also Cassedy et al. 1993 and Heckenberger et al. 1992). Certainly the timing and importance of maize horticulture in New England is controversial (see Ceci 1979, 1990; Demeritt 1991; Silver 1980). There is no evidence that maize was anything more than a dietary supplement in the New England interior, at least prior to European settlement (Dincauze 1991:30; McBride 1984:144; cf. George and Bendremer 1995; Snow 1980:333). Whether the Europeans were the direct cause or not, most New England archaeologists agree that *intensive* maize horticulture did not occur in New England until after the arrival of Europeans (see Ceci 1982; McBride and Dewar 1987; Thorbahn 1988).

Seventeenth-century accounts of the native New England diet belie claims of maize specialization. Wood (1977:86) in 1634, recorded for the Massachusetts Bay region: "In wintertime they have all manner of fowls of the water and of the land, and the beasts of the land and water, pond-fish, with catharres and other roots, Indian beans and clams. In the summer they have all manner of shellfish, with all sorts of berries." Josselyn (1988:93), reporting on his journey to the coast of Maine in 1674, echoes this diverse menu:

> Their Diet is Fish and Fowl, Bear, Wild-cat, Ratton and Deer; dryed Oysters, *Lobsters* rosted or dryed in the smoak, *Lampres* and dry'd *Moose*-tongues, which they esteem a dish for a *Sagamor*; hard egges . . . their *Indian* Corn and Kidney beans they boil . . . they feed likewise upon earth-nuts or ground-nuts, roots of water-Lillies, Ches-nuts, and divers sorts of Berries [original emphasis].

Based on his observations in 1643 of the Narragansett Bay region, Roger Williams stressed the importance of hunting and trapping of numerous animals and the collecting of acorns, chestnuts, walnuts, strawberries and cranberries (Williams 1963).

In contrast, the Iroquois of upstate New York were directly dependent on maize for subsistence. According to Parker (1968:9), maize was so important to the Iroquois "that they called it by a name meaning 'our life' or 'it sustains us.'" So important was maize to the Iroquois, that European invaders commonly burned Iroquois maize fields and maize stores as a warfare tactic (Parker 1968:17).

The type of horticulture practiced by the Iroquois was "shifting horticulture" (Niemczycki 1984:3; see also Morgan 1901). In order to prepare an area for horticulture, tracks of forest were cut and burned. The locations of the fields were shifted periodically to maintain the fertility of the soil. The type of maize cultivated by the Iroquois was Northern Flint or closely related varieties (Fenton 1978:325). This type of maize is unlike modern sweet corn, since it requires cooking for a long period of time over a hot fire. Overall, a great deal of time was devoted to the cultivation, harvest, storage and preparation of maize for consumption. Parker (1968) also indicates that there were many customs and rituals related to the cultivation and consumption of maize.

While maize was a dietary staple, other cultivated and wild plants were important for subsistence, such as beans, melons and squash, fungi and lichens, fruits, berries, nuts, roots, and bark foods (Parker 1968). Also, there is archaeological evidence that the Iroquois hunted deer, elk, bear, and turkey, and collected fresh water mussels (Funk 1976).

Settlement Patterns

Based on both ethnohistoric and archaeological accounts, we know that the traditional dwelling throughout New England was the wigwam (Fig. 6.2). The size of wigwams was apparently small; Williams (1963:121) describes a dwelling for two families as "a little round house of some fourteen or fifteen foot over." Likewise, Higgeson (1629:123) states: "Their houses are verie little and homely, being made

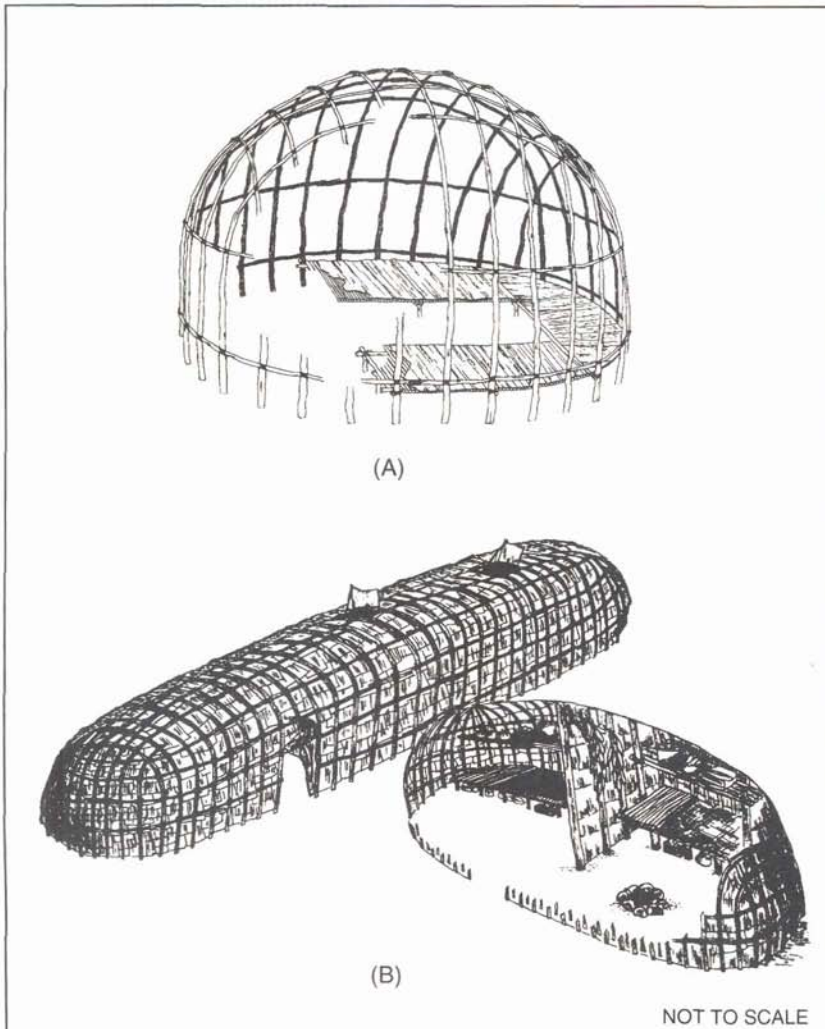

Figure 6.2. Reconstructions of indigenous architectural forms: (a) cut-away of a wigwam (after Sturtevant 1975, fig. 2c); (b) longhouse (after Kraft 1975:83).

with small poles pricked into the ground." Each house was likely shared by one or two related families (Morgan 1965:124; Williams 1963:61). For the Hudson Valley, Johan de Laet (1625–1640 [Jameson 1909:57]) says of the Algonquians living there that "some of them lead a wandering life in the open aire without settled habitation. . . . Others have fixed places of abode." Thus, it is clear that there was diversity in settlement practices even within a particular valley. For some groups, the size and shape of dwellings would change, depending on population density (e.g., small wigwams in the summer, multifamily longhouses in the winter; Cronon 1983:38).

Williams (1963:135) also comments on the Algonquians' seasonal movements and the flexibility of their habitations:

> In the middle of summer . . . they will flie and remove on a sudden from one part of their field to a fresh place . . . Sometimes they remove to a hunting house in the end of the year . . . but their great remove is from their Summer fields to warme and thicke woodie bottoms where they winter: They are quicke; in a halfe a day, yea, sometimes a few houres warning to be gone and the house up elsewhere.

Similarly, Josselyn (1988:91) notes the impermanence of New England communities: "Towns they have none, being always removing from one place to another for conveniency of food. . . . I have seen half a hundred of their Wigwams together in a piece of ground and they shew prettily, within a day or two, or a week they have all been dispersed."

In terms of archaeological evidence, while McBride (1984:322) claims that "(m)ost New England archaeologists report an increase in artifact . . . and site density as well as a trend toward fewer, larger sites after A.D. 1000," this is apparently true only in the lower Connecticut Valley (see George and Bendremer 1995). In fact, Ceci (1979) reports that there is *no* evidence of village-based settlement patterns on Long Island. McBride's claim of increasing site density and size is, likewise, *not* evident in the New England interior (see Thorbahn 1988).

In contrast to the small and impermanent settlements of the New England Indians, the Iroquois resided in villages of 30 to 150 ft, multiroomed longhouses (Fenton 1978:306; Fig. 6.2). These villages were inhabited for 25–50 years at a time (Tuck 1978:326). Morgan states that these longhouses accommodated up to twenty families (Morgan 1965:64). Each household was comprised of a group of kin related through the female line (Morgan 1965:64). Many of the Iroquois villages of the Late Woodland period were palisaded for defense, which is likely a reflection of the intercommunity conflict that arose as a result of sedentism and intensive horticulture (Hasenstab 1990:1; see also Morgan 1901:306).

Political Differences

The five and, later, six nations of the Iroquois shared a cultural base and "a well-developed tribal level sociopolitical organization which distinguished them from their Algonquian neighbors" (Niemczycki 1984:3). Population size apparently grew and settlements became more nucleated during the Late Woodland period, as the importance of agriculture and the availability of surplus food increased. As a result of increasing population growth and density, the size, power and rigidity of matrilocal-matrilineal groups increased as a means of controlling intergroup relations (Whallon 1968:242–243).

This sociopolitical organization differed greatly from the "loosely organized" Algonquians of New England (Fenton 1940:162). Here, no political unit was larger than the village, and there was no central authority to force political conformity (Thomas 1979:400). Since groups were fissioning and fusing seasonally, patterns of residence and the reckoning of kin needed to be more flexible. As E. Johnson (1993) proposes, mobility may have been a political strategy of resistance to authority—that is, the authority of certain native political leaders, and, later, the English. By maintaining flexibility and mobility in their settlement practices, the Algonquians of the interior could literally "vote with their feet," which may explain the infrequent occurrence of warfare prior to European contact.

Algonquian-Iroquois Interactions

Thus far I have presented differences between the Algonquians of the Connecticut Valley and the Iroquois of the Mohawk Valley as dichotomous. However, there is increasing evidence of interaction between the Mohawk and the Connecticut Valley groups, at least in the early historic periods (Haefeli and Sweeney 1993; Salisbury 1993). Trade networks associated with the immigration of Europeans may have served to augment or even reduce earlier ties between Algonquians and the Iroquois, but these ties were likely forged in the prehistoric period. There is also archaeological evidence for contact and trade prior to the arrival of Europeans. For example, New York chert tools and debitage are commonly found on archaeological sites in New England. While these "exotic" materials are more numerous in certain periods (such as the Late Archaic, about 6,000–3,000 years before present), they are present to some degree for most of the prehistoric period. Also, despite the differences between Algonquian and Iroquoian subsistence, settlement, and ceramics, the differences are mostly in *degree* and not in kind. For example, the two groups shared numerous cultigens: maize, beans, squash, and tobacco. Also, certain design motifs reoccur across the Northeast, such as the "ladder motif" (see MacNeish 1952:159) and geometrically designed, zoned collars. These similarities are the main reason why New England archaeologists have attempted to import New York typologies whole stock. While, in some cases the similarities may be the result of direct trade, stylistic similarities are often the result of social interaction and the occasional movement of people. There may, indeed, have been a symbiotic relationship between the Iroquois as settled horticulturalists and the Algonquian mobile farmers.

Ethnohistoric Accounts of Northeast Ceramics

There are few references to ceramic manufacture in the ethnohistoric literature for New England, and in the scant material available there is contradiction. For example, while Williams (1963:179) recorded that the "women make all their earthen vessels," according to Gookin (1792:151), men made pottery.

For the Iroquois there is more of a consensus that women produced pottery vessels (Morgan 1901:280; Whallon 1968:230). According to Sagard (1968:109), in his seventeenth-century account of his travels among the Huron, it was women who were firing pots "in their hearths" (*en leur foyer,* incorrectly translated as "ovens" in this English translation). There is little to no archaeological evidence for ceramic firing features in the northeast. Therefore, it is likely that most native peoples of the Northeast fired their pottery in multipurpose hearths. Thus, direct evidence for ceramic production and firing is absent.

According to Engelbrecht (1978:141), groups of related Iroquois women cooperated to make pottery. Since the Iroquois resided in semipermanent villages, the context and timing of ceramic manufacture would have been fairly consistent and predictable. On the other hand, for the Algonquians of the New England interior, small groups were likely fissioning and fusing throughout the year, and the smallest ceramic production unit was likely the nuclear family. Ceramics would have been produced in variable environments and in cooperation with various personnel. While there are no ethnohistoric references to the quantity of ceramic vessels produced, it is clear from the archaeological record that Iroquois ceramic production was conducted at a much larger scale than that of the Connecticut Valley Algonquians. These different contexts and scales of ceramic manufacture have implications for ceramic homogeneity and heterogeneity, which I discuss below.

Archaeological Ceramics

In general, native ceramics from the Late Woodland period are more elaborate than earlier ceramics in the Northeastern United States in both decoration and form (e.g., globular bodies, applied collars, castellated rims, and constricted necks [Goodby 1992:4]). There has been little research on native ceramic traditions in Massachusetts; thus, archaeologists in the state often rely on ceramic sequences developed for southern and coastal New England and New York (see Luedtke 1986:113; MacNeish 1952:98; Ritchie and MacNeish 1949; Lenig 1965). In southern New England, ceramic classifications are largely based on the work of Smith (1944,

TABLE 6.1
Late Woodland Ceramic Traditions in Southern New England and New York

	Windsor	East River	Shantok	Guida	Owasco	Mohawk
General description	Red-orange or tan color; roughened surface (brushed and stamped); later collared and incised; vessels are "thick" and "coarse"	Gray to brown color; smooth interiors, roughened exterior; shell impressed or incised decoration; mostly grit temper	Mostly shell-tempered, incised, collared and incised, commonly with appliqués or modeled nodes	Gray to black color; fine, micaceous temper; surface is "flaky" or "silky"	Cord-impressed decoration and surface treatment collars rare at first, later with castellations; grit temper	Incised, smooth surface treatment, castellated collars, fine grit temper
Geographical placement	Coastal New England and eastern Long Island, Connecticut River to Westfield, Massachussetts	Southeastern NewYork and western Long Island	Southeastern Connecticut and eastern Long Island	Western and central Connecticut and Massachussetts	Most of New York	Eastern New York
Type names	Clearview, Sebonac, and Niantic types	Bowmans Brook and Clasons point types		Guida Incised, Guida Cord-marked, Plain, Stamped, Misc.	Numerous Castle Creek and Owasco types	Numerous incised and notched types, differentiated by motif
Time period	A.D. 1000–1700	A.D. 1100–1700	A.D. 1400–1700	A.D. 1500–1700	A.D. 1000–1400	A.D. 1400–1700

Sources: Byers and Rouse (1960), Lavin (1980, 1988), Lavin and Kra (1994), Lenig (1965), MacNeish (1952), McBride (1984), Ritchie (1980), Rouse (1947), Smith (1947), and Snow (1994).

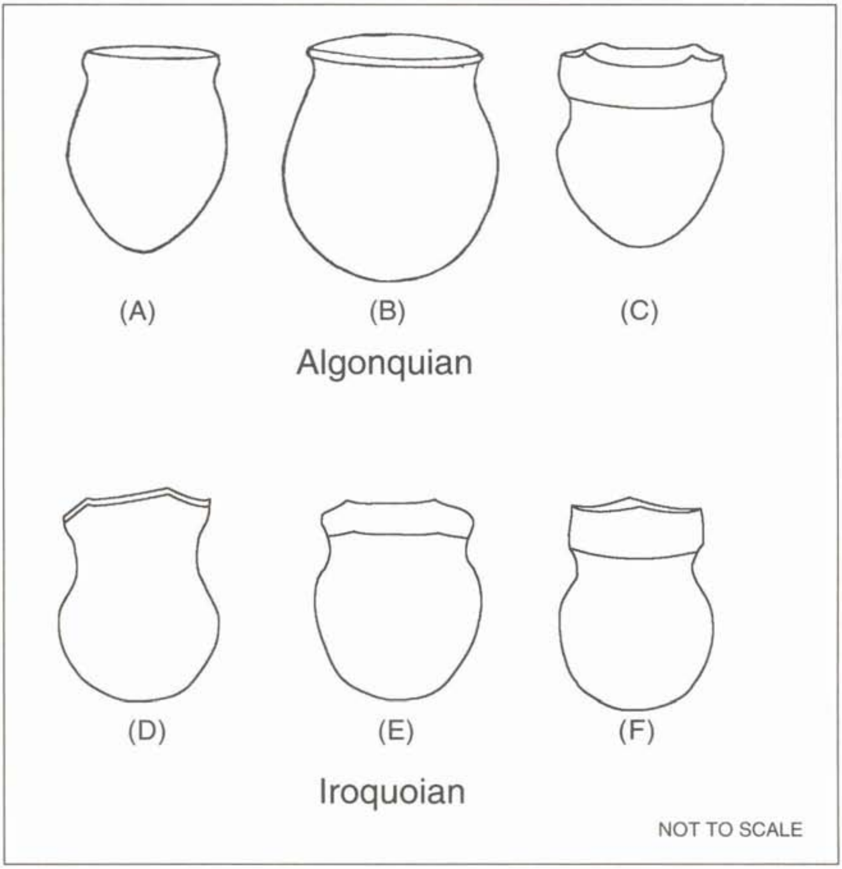

Figure 6.3. Vessel shapes of the Late Woodland period: (a) East River tradition (after Smith 1947, fig. 2); (b) Niantic vessel of the Windsor tradition (after Smith 1947, fig. 2); (c) Narragansett Bay area (after Fowler 1966, fig. 18); (d) Oakfield phase of western New York; (e) Oak Hill Corded type from eastern New York; (f) Late prehistoric Iroquoian vessel from central New York (d–f after Ritchie 1980, plates 104, 105, 11).

1947, 1950), Rouse (1945, 1947), and Lavin (1986, 1988) (see also Fowler 1945 and Pope 1953). Ritchie's extensive work in New York (e.g., Ritchie 1944) on the development of classification schemes was probably the impetus behind the development of similar schemes for coastal New York and Connecticut (McBride 1984:4; e.g., Smith 1947, 1950; Rouse 1947). Smith and Rouse defined three broad ceramic traditions (Windsor, East River, and Shantok) based on certain "diagnostic features" or attributes such as inclusion type, thickness, color, surface treatment, and decoration. Types have been defined within these broader traditions (Table 6.1 and Fig. 6.3). Lavin has continued to build on the typological work of Smith and

Rouse, often adding to or expanding the existing type names (see Lavin 1986 and Lavin and Miroff 1992). While attribute analysis and typological analysis have sometimes been presented as mutually exclusive forms of analysis (e.g., Petersen 1985), attribute analysis is often employed in southern New England as a *means* to assign sherds to previously known or new types. For example, Lavin (1986:3) views attribute analysis and typology as "complementary stages in the ordering of . . . data." Others, however, have turned to attribute and technological analyses as means to move *beyond* the typologies that have constrained archaeological interpretation in the region (e.g., Chilton 1991; Dincauze 1975; Dincauze and Gramly 1973; Finlayson 1977; Goodby 1992; Kenyon 1979; Kristmanson and Deal 1993; Lizee 1994; Luedtke 1986; McGahan 1989; Pendergast 1973; Petersen 1985; Ramsden 1977; Stothers 1977).

CERAMIC ATTRIBUTE ANALYSIS

Attribute analysis involves the descriptive comparison of specific artifact features (Lavin 1986:3), such as temper or clay type, surface treatment, color, and decoration. Thus, two pots can share some attributes, but not others. In the method of analysis used here, *an attribute analysis of technical choice,* the goal is to look for variation *and* covariation across objects—not between groups of objects. An important component to this attribute analysis is that vessels, rather than individual sherds, are the units of analysis. Historically, the use of rim or sherd frequencies to describe ceramic assemblages has been a common practice in Northeast archaeology (Petersen 1985:10). However, researchers in the Northeast have increasingly employed vessels as units of analysis (Petersen 1985:10; see Dincauze 1975, 1976; Dincauze and Gramly 1973; Luedtke 1980; Petersen 1980; Wright 1980). The use of vessels as units of analysis is very important in the interpretation of human behavior because vessels were likely the most common units of meaning in prehistoric societies (Carr 1993; Skibo et al. 1989a).

In this analysis, I define an attribute as *one aspect or variable of a ceramic vessel,* such as surface treatment, color, inclusion type, or rim shape. Thus, each attribute has an infinite number of possible values. This definition of attribute differs from that used by Cowgill (1982), Rouse (1960, 1964), and Petersen and Sanger (1991), who define an attribute as the specific state of a variable—not the variable itself. Using my definition, an attribute represents a technical choice, such as vessel shape, inclusion size, or color. Therefore, the emphasis is placed on the *criteria* for selecting between various technical options—not the specific choices themselves.

Using this method, in order to establish a vessel lot—that is, a group of potsherds determined to be *minimally* from the same vessel—at least nine attributes are recorded for each sherd: modal thickness, inclusion material (e.g., temper),

TABLE 6.2

Sample Data from the Attribute Analysis of the Pine Hill Assemblage

VESSELLOT	CATNUM	# SHERDS	TESTUNIT	STRATUM	LEVEL	FEATURE	THICKNESS (mm.)	TEMPER1	TEMPER2	GRITCOMP	GRITCOMP2	GRITCOMP3	T1MIN	T1MAX	T2MIN	T2MAX	T1DENSITY (%)	T2DENSITY (%)	INTCOLOR	EXTCOLOR	SFTREAT	SFTREAT2	PORTION	RIMFORM	LIPFORM	ORIFICE	COLLARWDTH (mm.)	RESIDUES
6	93.1617	2	N498E524NE	201			8	QT	FE	NA	NA	NA	C	P	VF	C	25	2	10YR52	10YR53	WI	SM	B	NA	NA	0	0	N
6	93.1626	1	N498E524NE	202			6	QT	FE	NA	NA	NA	C	P	VF	C	30	2	10YR52	10YR52	SM		B	NA	NA	0	0	N
6	93.1762	1	N498E524NW	202			6	QT	FE	NA	NA	NA	C	P	VF	C	25	2	10YR52	10YR42	WI	SC	B	NA	NA	0	0	N
6	93.1765	1	N498E524NE	202			10	QT	FE	NA	NA	NA	C	P	VF	C	25	2	10YR52	10YR63	WI	SC	B	NA	NA	0	0	N
6	93.1765	1	N498E524NE	202			8	QT	FE	NA	NA	NA	C	P	VF	C	25	2	10YR52	10YR53	WI	SM	B	NA	NA	0	0	N
6	93.2017	1	N487E510SW	202			7	QT	FE	NA	NA	NA	C	P	VF	C	25	2	10YR52	10YR53	WI	SC	N	NA	NA	0	0	N
6	93.2114	1	N498E528SE	202			6	QT	FE	NA	NA	NA	C	P	VF	C	25	2	10YR52	10YR53	WI	SM	B	NA	NA	0	0	N
6	93.2222	1	N498E530	202			8	QT	FE	NA	NA	NA	C	P	VF	C	25	2	10YR53	10YR53	WI		B	NA	NA	0	0	N
7	91.939	1	N500E524	1	1		6	QT	FE	NA	NA	NA	C	P	VF	C	30	2	10YR52	10YR53	SM	NO	R	EV	FL	7	0	N
7	93.11	1	N496E528SE	201			7	QT	FE	NA	NA	NA	C	P	VF	C	30	2	10YR54	10YR53	SM		B	NA	NA	0	0	N
7	93.1193	1	N498E530SW	201			8	QT	FE	NA	NA	NA	C	P	VF	C	30	2	10YR53	10YR54	SM		N	NA	NA	0	0	N
7	93.1252	1	N498E530SW	202	2		7	QT	FE	NA	NA	NA	C	P	VF	C	30	2	10YR54	10YR53	SM		B	NA	NA	0	0	N
7	93.1451	1	N494E530SW	202			7	QT	FE	NA	NA	NA	C	P	VF	C	30	2	10YR54	10YR53	SM		B	NA	NA	0	0	N
7	93.1472	1	N498E522NW	220			8	QT	FE	NA	NA	NA	C	P	VF	C	30	2	10YR54	10YR53	SM		B	NA	NA	0	0	N
7	93.1626	1	N498E524NE	202			6	QT	FE	NA	NA	NA	C	P	VF	C	30	2	10YR54	10YR53	SM		N	NA	NA	0	0	N
8	91.31	1	N500E512	1	1		4	GR	NA	FE	MI	QT	VF	C			20	0	10YR31	10YR53	SM		N	NA	NA	0	0	Y
8	91.314	1	N500E512	2	1		4	GR	NA	FE	MI	QT	VF	C			20	0	10YR21	10YR53	IN	SM	C	NA	NA	0	0	Y
8	91.321	1	N500E512	3	1		4	GR	NA	FE	MI	QT	VF	C			20	0	10YR41	10YR52	SM	WI	B	NA	NA	0	0	N
8	91.33	1	N500E512	2	3		4	GR	NA	FE	MI	QT	VF	C			20	0	10YR53	10YR53	IN	SM	R	ST	IN	7	0	Y
8	91.331	1	N500E512			22	3	GR	NA	FE	MI	QT	VF	C			20	0	10YR41	10YR53	SM		B	NA	NA	0	0	N
8	91.335	1	N500E512	2	3		3	GR	NA	FE	MI	QT	VF	C			20	0	10YR41	10YR53	SM		B	NA	NA	0	0	N
8	91.343	1	N500E512	2	3		4	GR	NA	FE	MI	QT	VF	C			20	0	10YR53	10YR53	SM	WI	N	NA	NA	0	0	N
8	91.347	1	N500E512	2	4		4	GR	NA	FE	MI	QT	VF	C			20	0	10YR31	10YR41	IN	SM	R	ST	IN	7	0	Y
8	91.551	1	N499.5E510	2	2		4	GR	NA	FE	MI	QT	VF	C			20	0	10YR53	10YR53	IN	SM	C	NA	NA	0	0	Y
8	91.674	1	N500E516	2	1		3	GR	NA	FE	MI	QT	VF	C			20	0	10YR53	10YR53	SM		B	NA	NA	0	0	N
8	91.68	2	N500E516	2	2		3	GR	NA	FE	MI	QT	VF	C			20	0	10YR53	10YR53	SM		B	NA	NA	0	0	N
8	91.683	1	N500E516	2	3		3	GR	NA	FE	MI	QT	VF	C			20	0	10YR53	10YR53	SM		B	NA	NA	0	0	N
8	91.771	1	N500E516	3			4	GR	NA	FE	MI	QT	VF	C			20	0	10YR53	10YR53	IN	SM	C	NA	NA	0	0	Y
8	93.1279	1	N496E528NE	202	2		2	GR	NA	FE	MI	QT	VF	C			20	0	10YR42	10YR53	SM		B	NA	NA	0	0	N
8	93.1361	1	N498E522SE	202			2	GR	NA	FE	MI	QT	VF	C			20	0	10YR42	10YR53	SM		B	NA	NA	0	0	N

Temper (TEMPER1, TEMPER2, GRITCOMP, GRITCOMP2, and GRITCOMP3):
FE = Feldspar GR = Grit
MI = Muscovite NA = Not available
QT = Quartz

Size (T1MIN, T1MAX, T2MIN, and T2MAX):
VF = Very fine (1/16–1/8 mm)
C = Coarse (1/2–1 mm)
P = Pebble (4–6 mm)

Surface Treatment (SFTREAT, SFTREAT2, and SFTREAT3):
NO = Notched SC = Scraped
SM = Smooth WI = Wiped
IN = Incised

Portion (PORTION):
B = Body C = Collar
N = Neck R = Rim

Rim Form (RIMFORM):
CL = Collared EV = Everted
IN = Inverted NA = Not available
ST = Straight

Lip Form (LIPFORM):
FL = Flat IN = Inverted
NA = Not available

size, and density, exterior and interior color and surface treatment, and location of the sherd on the vessel (Table 6.2). Inclusions were identified using 10× magnification. Since it is extremely difficult to identify rock minerals in fired ceramic pastes, my inclusion designations were consistent, if not exact. Inclusion density was estimated using comparative charts (Terry and Chilingar 1955:229–234); be-

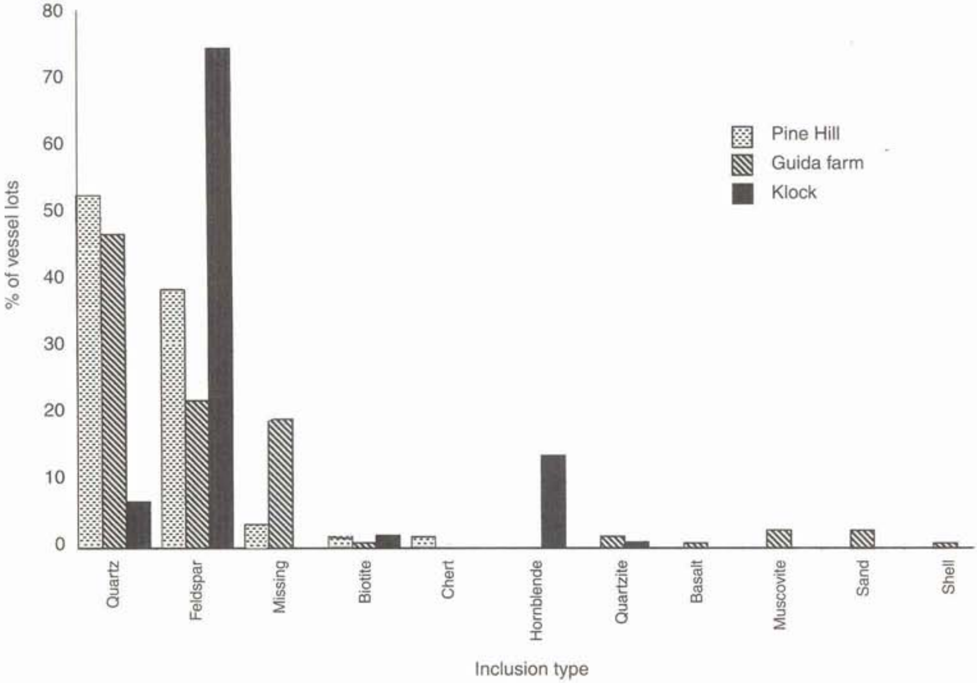

Figure 6.4. Primary inclusion type by site.

cause the amount of inclusion varies a great deal within ceramic pastes of hand-built pots, estimates of inclusion density are sufficient. The final vessel lot determination is based on overall similarity in the attributes analyzed. As a result of this analysis, 56 vessel lots were identified from the Pine Hill assemblage, 108 from the Guida Farm assemblage, and 100 from the Klock site sample.

RESULTS

In this vessel lot analysis there are striking differences between the ceramics from the Algonquian sites and the ceramics from the Iroquoian Klock site. These differences fall into two broad categories: technical and decorative.

Technical Differences

In this section I will discuss only a few of the more important technical attributes. Other attributes analyzed included construction techniques, rim and lip form, collar size, and interior and exterior color (see Chilton 1996).

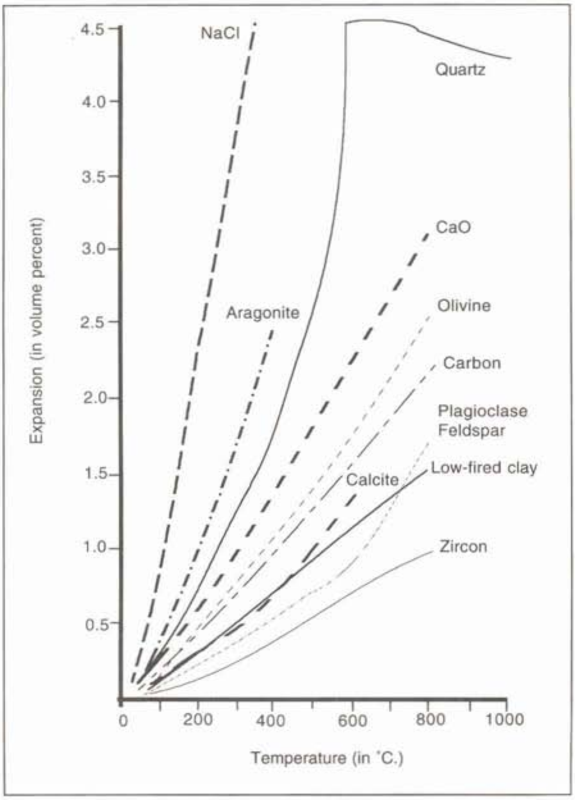

Figure 6.5. Thermal expansion curve (after Rice 1987, fig. 7.11; and Rye 1976, fig. 3).

PRIMARY INCLUSION TYPE The primary inclusion type at Pine Hill and Guida was crushed quartz, followed by feldspar (Fig. 6.4). In contrast, the most common inclusion types at the Mohawk Valley Klock site were feldspar (mostly plagioclase) and hornblende, which are both present in the granitic and anorthositic rocks of the nearby Adirondack Mountains. It is important to note here that the optimal inclusion types for cooking vessels have thermal expansion coefficients similar to or less than that of clay (Rice 1987:229; Fig. 6.5), such as grog, calcite, crushed burned shell, feldspar, and hornblende. Quartz, on the other hand, is not an optimal inclusion type for cooking pots; it expands much more quickly than clay and can lead to crack initiation. Therefore, on the basis of inclusion materials used, the Connecticut Valley ceramics were not ideal cooking pots, on the whole. They may have been sporadically used for cooking, but they were not designed to cook maize over long, hot fires.

Not only do the assemblages from the Connecticut Valley have different kinds of inclusions, but they also show a higher diversity of inclusion materials used. I

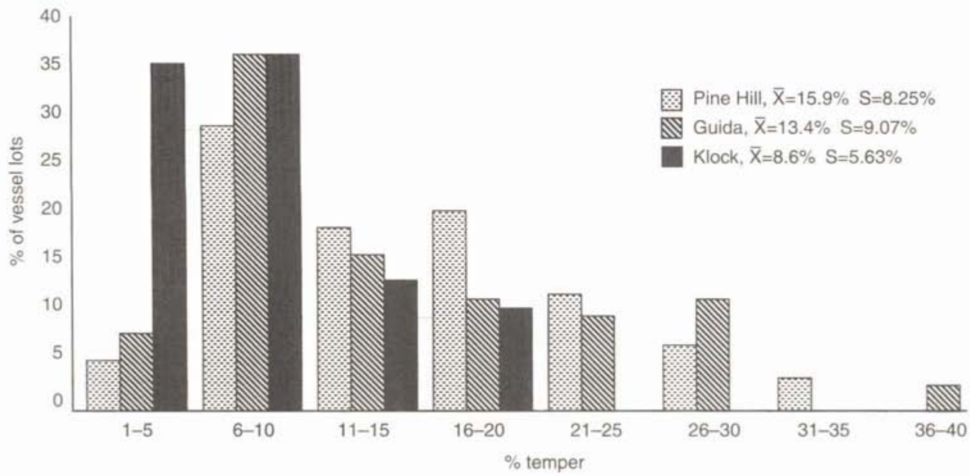

Figure 6.6. Temper density by site.

suggest that a higher diversity in inclusion type for the Connecticut Valley vessels is due to one or more of the following factors: (1) potters were living in a highly dispersed settlement pattern and were mobile throughout the year; therefore, they were using diverse sources of inclusions (see D. Arnold 1993:236); (2) potters did not select for specific kinds of inclusions (i.e., inclusion type was not considered to be an important attribute); (3) different inclusion types were used for vessels with different intended functions; and (4) few pots were made from the same batch of clay. Conversely, less diversity in inclusion type for Iroquois vessels may indicate that: (1) potters were relatively sedentary and, therefore, had access to a smaller range of inclusion types (or had consistent access to preferred materials); (2) potters selected for certain inclusion types because of their use properties (such as low thermal expansion); and (3) more pots were manufactured with the same batch of clay.

INCLUSION DENSITY Inclusion density follows a similar, yet much more striking, pattern. The mean inclusion densities for vessel lots from Pine Hill and Guida are similar: 15.6 percent and 15.5 percent, respectively, with standard deviations of 7.7 percent and 8.9 percent (Fig. 6.6). The mean inclusion density for the Klock site is much lower at 8.6 percent—nearly half that of Pine Hill and Guida. The standard deviation for Klock is much lower at 5.1 percent, indicating less absolute variation from the mean.

A densely tempered paste is usually stronger. However, the more temper in a paste, the more potential problems as a result of thermal expansion—especially if the temper is quartz (see Braun 1983, 1987). Therefore, the Connecticut Valley ves-

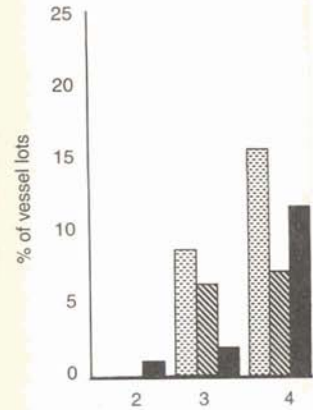

Figure 6.7. Vessel wall t

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(Aronson et al. 1994)

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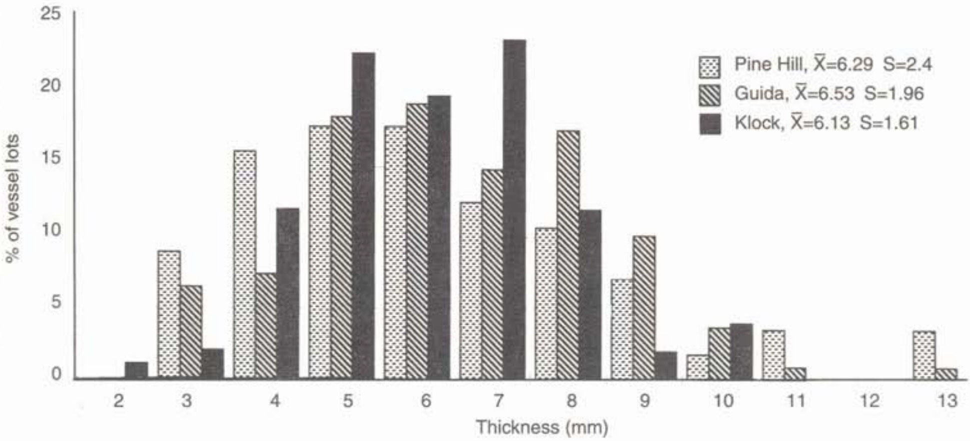


Figure 6.7. Vessel wall thickness.

sels would have been less resistant to thermal shock than the Klock site vessels, but more resistant to mechanic shock. Another advantage to dense inclusions, aside from increasing resistance to mechanical stress, is that it reduces drying time prior to firing; thus, ceramic could have been produced in a wider range of environments, even in colder seasons (D. Arnold 1985:97). One disadvantage to a densely tempered paste is that it may lose its plasticity and, therefore, its workability (Aronson et al. 1994).

WALL THICKNESS AND VESSEL SIZE Means and standard deviations for vessel wall thickness are both slightly lower for the Klock site, as compared to the Connecticut Valley sites (the mean is 6.13 mm for Klock, and 6.29 mm and 6.53 mm for Pine Hill and Guida, respectively; Fig. 6.7), but the difference is not statistically significant. However, on the basis of body sherd curvature, the Klock vessels are, on average, 70 percent larger than those of Pine Hill and Guida (29 cm vs. 17 cm mean diameter; Fig. 6.8). Because larger vessels are expected to have relatively thicker walls in order to support the additional weight, the vessel wall thickness of the Klock assemblage *is* significantly thinner in proportion to vessel size. Morgan (1901:9) indicates that the Iroquois pots were "usually of sufficient capacity to contain from 2 to 6 quarts." Larger vessels may also reflect "communal dining" (Snow 1994:13) by the relatively large residential kin groups that existed among the Iroquois in the Late Woodland period (Tuck 1971; Whallon 1968).

Vessel wall thickness directly affects resistance to thermal shock: vessels with thinner walls are less apt to crack when used for cooking. Therefore, since the Klock pots had significantly thinner walls (relative to overall size), potters were ap-

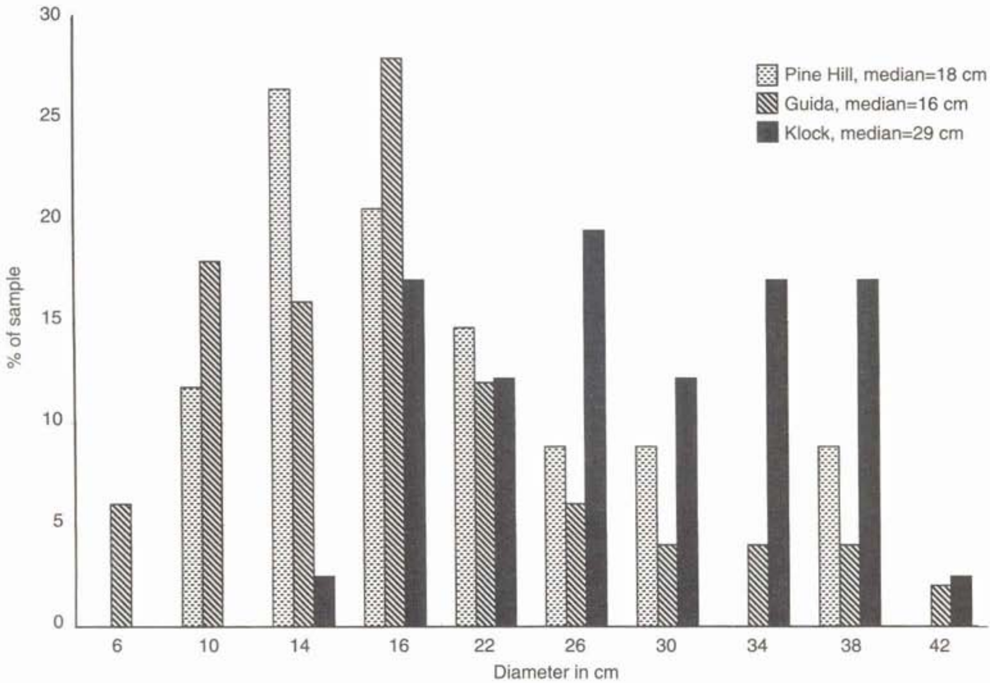


Figure 6.8. Body sherd curvature.

parently constructing pots with walls thin enough to withstand the thermal stresses of cooking maize over long, hot fires. Since susceptibility to thermal shock increases with vessel size (see Kingery 1955 and Searle and Grimshaw 1959), other attributes were used to compensate, such as wall thickness and inclusion kind, size, and amount.

The Connecticut Valley vessels, on the other hand, had thicker vessel walls relative to overall size. Pots with thick walls are less fragile (more resistant to mechanical shock) but are more likely to crack when exposed to heat. Therefore, I suggest that the Connecticut Valley potters were producing vessels that were intended to withstand mechanical stresses, which would be important for nonsedentary groups (cf. D. Arnold 1985:110). The overall small size of the vessels would have made them easier to transport; many of these small vessels could easily have served as portable containers for water or food.

Decorative Differences

Surface treatment consists of impressions, or evidence of scraping or smoothing on the exterior and interior surfaces of the fired clay. Examples of surface treat-

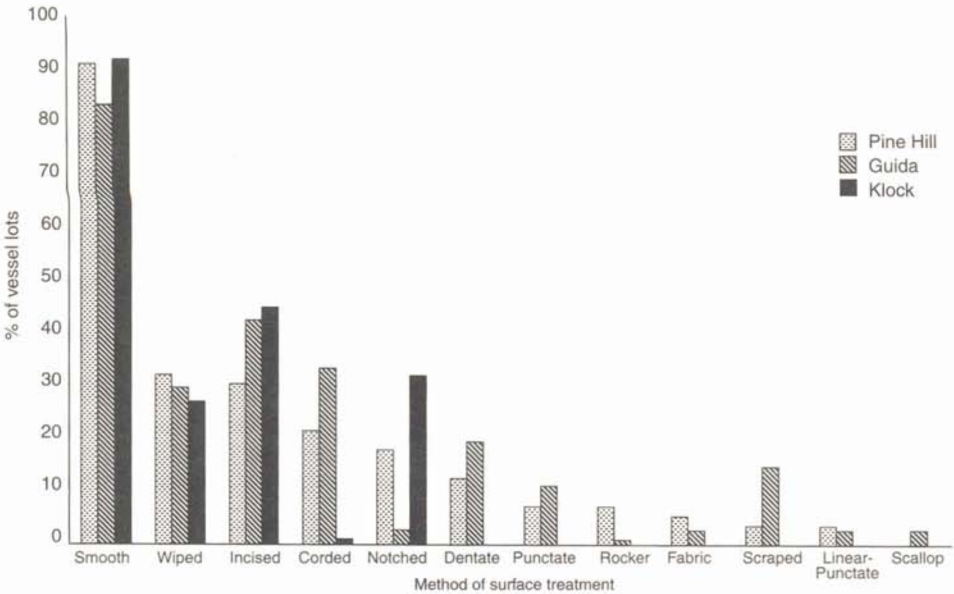


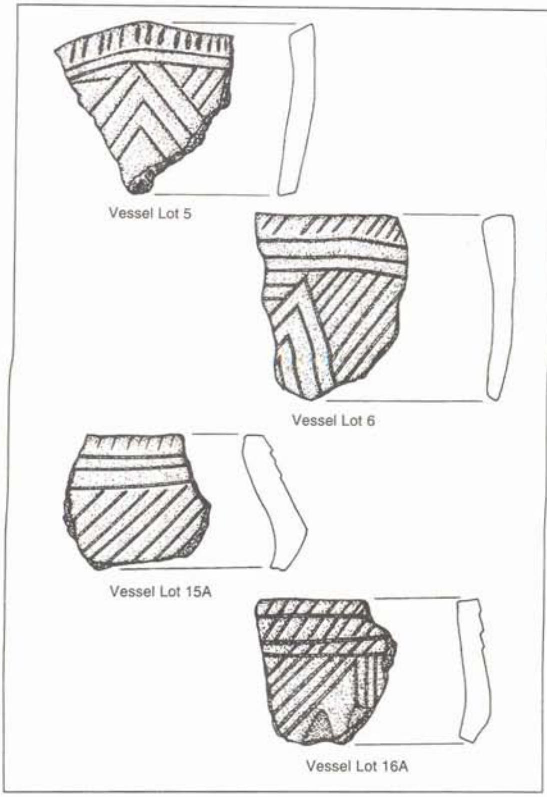
Figure 6.9. Surface treatment by site.

ment include smoothing, wiping, incising, and cord-marking (Table 6.2). Surface treatment can be an artifact of manufacturing technique, or purposeful "finishing" for either technical or decorative purposes.

There are striking differences in surface treatment between the sites analyzed. Surface treatments from the Klock site are exclusively smoothed, wiped, incised, and notched (Figs. 6.9, 6.10); body sherds are mostly smooth and wiped, and collared rims are exclusively incised and notched. The Pine Hill and Guida assemblages show much more diversity in terms of surface treatment. Surface treatments for these sites include: cord-marked, dentate-stamped, punctated, rocker-stamped, fabric-impressed, scraped, linear punctated, scallop shell-impressed, as well as smoothed, wiped, incised, and notched (Figs. 6.9, 6.11, and 6.12).

On the basis of conventional assumptions that dentate-stamping and fabric-impressing date to the Middle Woodland period (A.D. 0–1000) and therefore predate incising, the assemblages from Pine Hill and Guida might appear to have Middle Woodland components. However, there is evidence that dentate stamping may also be a Late Woodland and even a Contact period trait, at least in New England. For example, at Pine Hill one sherd exhibits both incising and dentate stamping (vessel lot 33), and two vessel lots from Guida have dentate-stamped collars (vessel lots 7 and 29); collars are thought to be an exclusively Late Woodland trait. It is clear from these examples that in the Connecticut Valley unilinear evolutionary changes in surface treatment cannot be assumed.

Figure 6.10. Vessel lots from the Klock site. (Illustration by Maureen Manning-Bernatsky.)



Surface treatments can profoundly affect vessel performance (see Schiffer et al. 1994). For example, a roughened surface, such as those produced by cord-marking, fabric-impressing, or scraping, can increase thermal shock resistance and reduce thermal spalling (Schiffer et al. 1994). A rough surface also provides a more secure grip (Rice 1987:232), and may increase heat absorption and the evaporation of liquids (Charlton 1969; Herron 1986). Therefore, surface treatments are not chosen automatically; a potter makes choices and compromises along numerous axes according to various personal, social, and technological criteria. It is possible, therefore, that the Connecticut Valley pots were more often given roughened surfaces to compensate for the fact that other attributes, such as vessel wall thickness, may have reduced the ability of vessels to transfer heat. Therefore, for the occasions when pots *were* used for cooking, a corrugated surface would have been advantageous. As previously mentioned, a roughened surface would also make the vessel less slippery, and, therefore, easier to transport.

How else can we account for the greater diversity in surface treatment at the Connecticut Valley sites? Since Algonquian groups were quite mobile, and had rel-

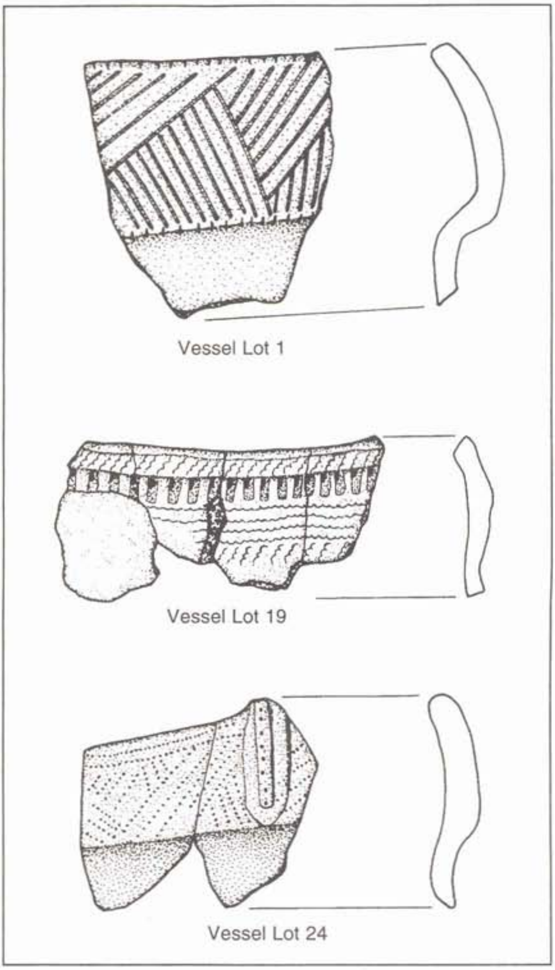


Figure 6.11. Vessel lots from the Guida Farm site. (Illustration by Maureen Manning-Bernatsky.)

atively fluid social boundaries, the social and environmental contexts of ceramic manufacture and use would have been quite variable. It should come as no surprise, then, that the Late Woodland ceramics of the Connecticut Valley show great variability in surface treatments, as well as other technical choices. For the Iroquois, who were living in more permanent, structured communities, pots would have been made in similar social and ecological contexts each time, under more predictable circumstances; there was both stability and continuity in ceramic traditions. Accordingly, in the present study the Iroquois ceramics show much more internal homogeneity in terms of decorative and technological attributes. The ceramics from the Klock site have a limited range of decorative types and motifs. All of the rimsherds from the site fit neatly into the established stylistic typologies for

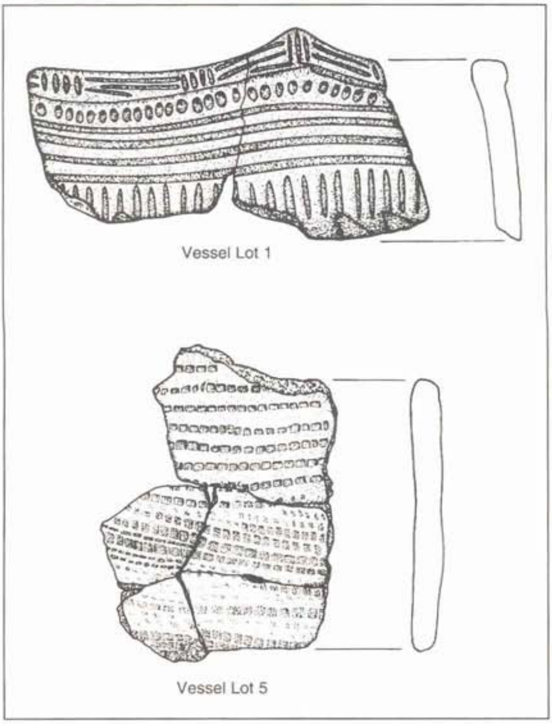


Figure 6.12. Vessel lots from the Pine Hill site. (Illustration by Maureen Manning-Bernatsky.)

Iroquois ceramics: 84 percent of the collared rim sherds from the site have been typed by Kuhn and Funk (1994) as "Garoga Incised," and 7 percent have been typed as Wagoner Incised. The remaining 9 percent were typed as Chance Incised, Deowongo Incised, Martin Horizontal, Cromwell Incised, and Thurston Horizontal (Kuhn and Funk 1994:9).

There is certainly merit in applying the information exchange model in this case, in terms of technological style *and* decorative motifs. First, as Wobst (1977: 323) points out, "only simple invariate and recurrent messages will normally be transmitted stylistically." Mohawk ceramic designs *are* simple, fairly invariant, and recurrent. They are also restricted in time and space, which is why they "work" so well as chronological and geographical markers (Kuhn and Bamann 1987:41). With their fairly rigid social organization, Iroquois pottery iconography may have been used to signal group identity.

In contrast, very few vessels from Pine Hill and Guida fit neatly into the established typologies. While many of the vessel lots from Guida resemble traditions defined for southern New England, particularly the Windsor and East River traditions, there is so much overlap in the New England traditions as they are defined (Table 6.3), that much of the collection cannot be assigned to known types. The

Algonquian pattern (or lack thereof) may indicate individual expression, fluid social boundaries, and a flexible social organization.

Production Scale and Diversity

Algonquian and Iroquoian ceramics apparently differ not only in their intended uses, social milieu and production contexts, but also in production scale. More specifically, Algonquian ceramic production is most aptly described as "household production" (van der Leeuw 1984:722). Household production is carried out exclusively by members of the household for household consumption (D. Arnold 1985:225). Household potters need to devote little time to ceramic manufacture (P. Arnold 1991:92). For New England Algonquians, variability may have been maintained within household production because of: (1) the infrequency of the activity; (2) the low number of producers involved; and (3) the lack of controls over access to resources and information (Rice 1991:273).

Iroquois ceramic production, on the other hand, is closer to what is termed "household industry" (van der Leeuw 1984:722; *contra* Allen 1992). Household industry is characterized by part-time production for group use. In household industry more people are involved in the production sequence (D. Arnold 1985); for the Iroquois, production would have been carried out by groups of related women (see Engelbrecht 1978:141). The major differences between household production and household industry are that in household industry: (1) production is conducted more frequently; (2) there in an increase in the amount of production, and, therefore; (3) there is an additional investment in labor (P. Arnold 1991:92). Production becomes more regularized, and, archaeologically, increased output leads to greater ceramic densities (P. Arnold 1991:93). Household industry is often correlated with population increase, when there may be may an increase in demand for ceramics (D. Arnold 1985:226). The archaeological evidence for the Iroquois supports a population increase (or, at least, clustering), increased pottery production (see Tuck 1978), and a certain amount of pottery specialization during the Late Woodland period. This "household industry" does not refer to production for market. Iroquois society is characterized by a high degree of communal living. Therefore, items such as pots were produced and shared within and between lineages and clans. It is likely that a certain amount of standardization was achieved simply through repetition and routinization of the production of large amounts of pottery (see Rice 1991:268).

Certainly, as Allen (1992:154) points out, there is "no evidence to support the presence of a higher level of organization for ceramic production [among the Iroquois] than the household level." Indeed, I suggest that production was happening at the household level, but it was happening on a larger scale, and with more

TABLE 6.3

Common Ceramic Types for Southern New England and New York, A.D. 1000–1700

Traditions	Windsor	East River	Guida	Mohawk
Common Ceramic A.D. 1100–1400	Sebonac (A.D. 1100–1400): simple conical vessels, shell temper, interior and exterior surface brushing, stamping and dragging decorations (Smith 1947).	Bowmans Brook (A.D. 1100–1200): smooth interior, cord-marked exterior; rims decorated with horizontal rows of cord-wrapped stick impressions; incising not common (Smith 1947).		
A.D. 1400–1700	Niantic (A.D. 1400–1700); thin walled, shell-tempered, globular pots, with constricted necks, collars and complex stamped scallop shell designs; sometimes smooth interior surface (Lavin and Kra 1994; McBride 1984:127; Rouse 1947). Niantic Incised: smooth, constricted necks, collared rims, incised decoration (Keener 1965). Lavin (1988:15) suggests that these are "strongly reminiscent of Hudson and Mohawk Valley types." Other names: Niantic Stamped, Niantic Linear Dentate, Niantic Punctate, etc.	Clasons Point (A.D. 1200–1700): collared rims, globular bodies, stamping decreases as incising increases; plain surface treatment common; grit temper frequent, but shell tempering increases throughout; at the end of the period vessels "approximate forms of the eastern Iroquois" (Smith 1947).	Guida Incised (A.D. 1500–1700): gray to black; fine, micaceous temper; surface "flake" or "silky." Designs of finely incised lines, very close together on narrow collars; Byers and Rouse (1960:17) suggest that the motifs are "Iroquoian." Other Guida types: Guida Cord Marked, Guida Fabric Marked, Guida Plain, Guida Stamped, and Guids "Miscellaneous" (Byers and Rouse 1960).	Chance Phase (A.D. 1400–1500): incising replaces cord-impressing for collar and neck designs; fine grit temper, semiglobular shape; check-stamped and cord-marked replaced by smooth surfaces. Gavoga Phase (A.D. 1500–1700): large, globular vessels, incised linear patterns on castellated collars, notches at base of collar (MacNeish 1952; Ritchie 1980).

stability and continuity, than in New England communities. In this sense, I view ceramic specialization and production not as a series of stepped categories, but as a continuum of choice.

CONCLUSIONS: THE ROLE OF CHOICE

In this analysis I have tried to underscore both social and technological-mechanical factors that are likely to have influenced the paste composition and vessel morphology of the ceramic assemblages discussed. If Algonquian and Iroquoian people were interacting and sharing information, then the Connecticut Valley Algonquians had access to the knowledge and technology necessary to: (1) become sedentary farmers; and (2) make large, thin-walled, globular, smooth-bodied pots. However, they did not do either of these things. I argue that they were capable of implementing theses changes, had they chosen to do so. Instead of assuming that for some strictly ecological or evolutionary reason they had not reached the same evolutionary stage as the Iroquois, I suggest that we view them as active agents of their own social change. As such, they made choices concerning subsistence, settlement and social structure. In terms of house form (Prezzano 1992), settlement patterns, subsistence, politics, and ceramics, they made choices within the "spectrum of . . . equally viable options" (Sackett 1990:33). As potters, they made choices in ceramic production that both reflected and affected these decisions (see Miller 1985:205 and Wobst 1978:307).

As demonstrated in this study, variation in ceramics occurs at two levels. First, variation exists in what Sackett calls *instrumental form* (Sackett 1990:33) which, in this case, includes choice of temper, temper density, vessel wall thickness, and vessel size. This type of style is "built in, rather than added on, to the pots" (Sackett 1990:33). The second kind of variation, *adjunct form*, refers to variation that is added on to the pot, such as decoration or surface treatment (Sackett 1990:33). It is the analysis of both aspects of variation at the same time—the "functional" and the "aesthetic"—that provides the view of material culture as part of the wider system of meaning (Lemonnier 1992:99).

I would like to end with a word of caution: Algonquian and Iroquoian ceramic traditions are only one component of a much broader technical system. As discussed previously, there is archaeological and ethnohistoric evidence for interaction between Algonquian communities in New England and the Iroquois; therefore, the two groups had access to similar kinds of technological information.

It is also important to acknowledge that we cannot assume the same "meaning" of technical choices in different societies. For example, some societies may be more prone to "technological routine" than others (Lemonnier 1992:22). It is, therefore, possible that a certain *Algonquian conservatism* played a role in the choices made—or *not* made, in the case of the routinization of ceramic production, sedentism, and social hierarchy. In this paper I have focused on "logical" reasons for choices in ceramic production. Nevertheless, I would like to underscore the fact that there is a certain amount of arbitrariness involved in both technical and nontechnical or adjunct choices (see Lemonnier 1993a:16). There may not be "logical" or obvious social or technical advantages to specific choices, at least not from within a strictly ecological or evolutionary framework. Therefore, archaeologists must also turn to historical explanations of meaning in material culture in order to understand the complexity of technical choice.

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