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Evolution and Horizon as Revealed in Ceramic Analysis in Historical Archeology

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INTRODUCTION

In this paper we will examine the relationship between the manufacture period of ceramic types found on British American sites and the occupation period for the sites on which type fragments are found. We will present data indicating that on eighteenth century sites there is a high correlation between the ceramic manufacture dates and the site occupation period. We will also look at the effectiveness of ceramic analysis based on presence and absence as compared to quantification of fragments of ceramic types. The process of evolution and horizon as reflected in analysis of ceramics from historic sites will also be examined.

Terms

Attributes are those observable criteria by which a ceramic type has been defined, including shape, paste, hardness, design, decoration, color, glaze, etc. A type is a term used to refer to pottery defined by one or more key attributes. With historic ceramics a type is often distinguished on the basis of a single attribute.* Shape is used to refer to the physical form of an object, such as a teapot shape, or a teacup shape. Form is a generalized term which includes shape, as well as those other attributes from which types are defined. Thus the evolutionary process is seen in the change of form through time.

* See Clark 1968:134 for a discussion of attribute and artifact systems.

Quantification

In 1960 I urged historical archeologists to utilize quantification of historic pottery based on frequency distribution, and illustrated the validity of statistically dealing with ceramics from colonial American sites (South 1962:1; Appendix I, this paper). The point made at that time was that quantification of European ceramics from eighteenth century British American sites would allow the archeologist to date the occupation period of a ruin. An assumption was that a comparison of the percentage relationships from enough historically dated ruins would allow a prediction to be made as to the occupation period of ruins of unknown dates based on the frequency distribution of ceramic types.

The percentage relationships of ceramic types from various ruins in the mid-eighteenth century colonial English town of Brunswick, North Carolina were compared. The bar graphs of ceramic type frequencies were found to be similar when similar occupation periods for the ruins were involved (Appendix I). Ruins having a beginning historical date in the 1760's could be separated from those having a beginning date in the 1730's based on the frequency occurrence of creamware, a separation not possible when using presence-absence alone. Historical archeologists were urged to use frequency occurrence in ceramic studies to further test the possibilities of this approach with historic site data.

As can be seen from the historic site literature since that admonition there has been no general rush toward frequency analysis of historic ceramics. There even seems to be an attitude held by some that quantification of pottery

fragments on the historic site level will not reveal information of any significance beyond that gained from presence or absence of the ceramic types. In this paper we will present quantification data that tend to demonstrate that there are advantages to be gained through use of type fragment frequency in conjunction with certain analysis tools.

Type Manufacture Date and Deposition Date

In historical archeology the period during which artifacts were manufactured can be arrived at through documents, paintings, patent records, etc. The beginning date for the manufacture of a type may depend on the innovative action of one individual acting to introduce an additional attribute which is subsequently used to establish a type. The green glaze of the Whieldon-Wedgwood partnership developed in 1759, for instance, (Noël Hume 1970:124-25) which quickly went out of production, provides us with a known beginning manufacture date, and an end manufacture date probably no later than 1775. In many cases the end manufacture date cannot be fixed with the degree of accuracy of that of the beginning date. The point midway between the beginning and end manufacture dates would be the median manufacture date, an important date for the purpose of this study. As Noël Hume points out, "The trick is to be able to date the artifacts..." (1970:11). The knowledge of manufacture dates for artifacts is an invaluable aid in the determination of occupation dates for historic sites. This is not to say that the manufacture date and the occupation date are the same, but rather that there is a connection between the two in that the manufacture date provides a terminus post quem, "a date after which the object must have found its way into the

ground." (Noël Hume 1970:11). This is, as Noël Hume points out, "the cornerstone of all archaeological reasoning." However, there are those who believe there is such a slight connection between the date of manufacture and the date of deposition of ceramic type specimens on historic sites that they view as error any attempts to fix the occupation of sites by association of ceramics with the known date of manufacture (Dollar 1968:41-45). A major concern of this paper is to present data revolving around the artifact-manufacture-date and the artifact-deposition-date.

Evolution

Another major consideration here is the evolutionary concept of changing ceramic form through time as a dating tool as seen in fragments recovered from historic sites. Sixteen years ago this writer emphasized the necessarily intimate relationship between the process of archeology and evolutionary theory as a basic framework of archeology (South 1955). This paper also is anchored in the assumption that evolution of form is basic to the culture process, and is the foundation for the "cornerstone of all archaeological reasoning" of which Noël Hume speaks in his discussion of terminus post quem.

Horizon

Through the excavation of a variety of eighteenth century historic sites I have become increasingly convinced that groups of ceramic types from different ruins of the same time period are similar enough to allow them to be used as dating tools for determining site occupation periods. This seems to be so regardless of whether the site is a remote frontier fort, a Cherokee village, a congested port town house, or a mansion. This has resulted in the development of analytical tools for use in determining the occupation dates

for eighteenth century British American sites. These tools are useful and reliable when used on sites of varying functions over a broad area (Maryland, North Carolina, South Carolina). The explanation of this can be suggested in terms of the horizon concept (Willey and Phillips 1958:31-34), where the horizon is defined as:

> a primarily spatial continuity represented by cultural traits and assemblages whose nature and mode of occurrence permit the assumption of a broad and rapid spread. The archaeological units linked by a horizon are thus assumed to be approximately contemporaneous (Willey and Phillips 1958:31-34).

This concept of a broad and rapid spread of groups of contemporaneous ceramic types in the eighteenth century is examined through the tools described in this paper.

The Unimodal Curve

The ceramic types are seen to represent a unimodal curve that had an inception (beginning manufacture date), a rise to popularity, and a decrease in popularity to extinction (end manufacture date). This basic assumption is expressed by Dunnell based on concepts outlined by Rouse, Ford, Phillips and Griffin:

> The distribution of any historical or temporal class exhibits the form of a unimodal curve through time. The rationale for this assumption is that any idea or manifestation of an idea has an inception, a rise in popularity to a peak, and then a decrease in popularity to extinction (Dunnell 1970:309).

An example of this concept is seen in Mayer-Oakes' study of illumination methods used in Pennsylvania between 1850 and 1950 as cited by James A. Ford in A Quantitative Method for Deriving Cultural Chronology. Washington:1962, Figure 6.

THE PROBLEM

In the seventeenth century, British American settlements were relatively few and far between compared with those of the eighteenth century, and population density was considerably less. As a result there are fewer seventeenth century sites for archeologists to examine. This, plus fewer historical references to the manufacture dates of ceramics, combine to limit our knowledge of seventeenth century ceramics. We do know that the lower class seventeenth century household had a much greater dependence on pewter, leather and wooden trenchers and other vessel forms and less daily use of ceramics than did the gentry. From the ruins of the mansions of the seventeenth century we would therefore expect to find ceramics more abundantly represented than from ruins of the lower class homes (Noël Hume 1970: 24; personal communication on October 26, 1971). This status difference is <u>not</u> seen to be reflected in ceramics from archeological sites in the eighteenth century.

Also to be considered is the fact that the limits of our present knowledge of seventeenth century ceramic manufacture dates and the temporally significant attributes within certain wares, results in a broader manufacture time-span being assigned in comparison with the eighteenth century where short manufacture periods can be assigned to a number of marker types. As a result of this lack of refinement of our knowledge of seventeenth century ceramic types a comparison of manufacture dates with site occupation may well reveal less correlation than such a comparison made with data from eighteenth century sites. We might at first be inclined to interpret this as a time lag phenomenon, and indeed some time lag may well be involved in that with less use of ceramics in the lower class seventeenth century homes less breakage

would naturally be expected to occur, resulting perhaps in a greater percentage of older ceramic types finding their way into the midden deposits. In the upper class homes, however, we would expect more ceramics and a closer correlation between manufacture dates and site occupation dates due to more frequent use in the home. However, as far as the time it took barrels of ceramics to make the trip from Britain to America aboard a vessel, there would be no appreciable difference between the seventeen and the eighteenth century, in either case it was a relatively rapid process.

An hypothesis can also be constructed regarding a ceramic chronology model. Ceramic types found on colonial sites are well enough known from documents and kiln site excavations that an approximate beginning and end manufacture date can be assigned to ceramic types within certain limits of variability. Each of these ceramic types is seen to represent a unimodal curve through time as the type was introduced, reached a peak of popularity and then was discontinued. The median date for the ceramic types is the point mid-way through the duration of its period of manufacture. When the median date for a group of ceramic types is known, the types can be arranged so as to represent a chronology based on the median dates. Since such a chronology is based on documented duration periods of manufacture it is seen as an historical chronology, not a relative one such as those derived from stratigraphy and seriation on prehistoric sites. In constructing such a chronology, ceramic types such as locally made wares of unknown manufacture duration periods, or coarse English earthenwares of unknown periods of manufacture are not included for the obvious reason that they will contribute nothing to the chronology. If coarse earthenware and local wares of known periods of manufacture are present, they are most certainly to be used as

valuable additions to the chronology model. From these postulates we can state that British ceramic types can be arranged in an historical chronology on the basis of the median known manufacture date, and this chronology reflects the evolutionary development of the ceramic forms through time. colonial French and Spanish ceramics could also be arranged in a similar historical chronology provided the manufacture dates are known for the ceramic types. Once the approximate beginning and end manufacture dates of groups of historic artifact types such as wine bottles, wine glass, tobacco pipes, buttons, etc., are established, these too can be used to construct historical chronologies representing the evolution of form through time that in turn can be used to arrive at the duration of occupation of historic sites.

We can also state an hypothesis involving the horizon concept as defined by Willey and Phillips (1958:31-34). Eighteenth century English ceramics were manufactured in groups of several types at any one point in time, with some types having a shorter manufacture span than others. They were available in several types at the factories and groups of types were exported to British American ports. A limited number of these ceramic types were available on order through agents in Britain or through American outlets. Among those types available to the colonist was Chinese porcelain which took its place along with British ceramic types in the colonial American home. The purchasers of these ceramic types were no farther than a few days or weeks at the most from the remote frontier of the colonies, thus the possibility was present for the rapid distribution of ceramic types over a broad area (Noel Hume 1970:25). This broad and rapid spread of a limited number of ceramic types at any one point in time can be described as a horizon in which the cultural traits are approximately contemporaneous (Willey and Phillips 1958:31-34). Thus eighteenth

century historic site ceramics can be seen to represent a series of horizons in sequence.

Ceramic types of short manufacture duration are excellent temporal markers for determining the approximate brackets for the accumulation of the sample, allowing an interpretation to be made regarding the occupation period of the historic site. Such short-manufacture period types can be used effectively on a presence and absence basis as clues to sample accumulation. An important consideration here is that a ceramic type specimen cannot appear on a site prior to the beginning manufacture date for the type, thus creating a temporal relationship between the manufacture date and the occupation of the site by those who used and broke the ceramic objects.

Regarding broken ceramics we can state a final hypothesis based on several postulates. The cultural use-patterns of the eighteenth century were such that not long after ceramic types arrived in the home in a town or frontier fort, breakage began to occur. The broken ceramic types were discarded and older types broken along with the most recent acquisitions resulted in a number of types becoming associated in the midden deposits. Although a few heirloom pieces would be broken along with a few of the most recent acquisitions, the majority of the fragments would represent those most in use during the occupation of the site. Those few most recent acquisitions would provide the clue for placing the end date on the deposit using presence-absence. From these postulates we can state that an approximate mean date for the ceramic sample representing occupation of an eighteenth century British American site can be determined through the median manufacture dates for the ceramic types and the frequency of the types in the sample. With these problems in mind we will construct tools for use in ceramic analysis to examine the data.

THE TOOLS

The Chronological Model for Constructing the Analysis Tools

The first step in constructing ceramic analysis tools is to build a chronological model upon which the tools can be based. An excellent example of the potential of historic site data in this regard is the use of hole measurement of tobacco pipestems by Harrington (1954) for arriving at an approximate date of the accumulation of the sample, and the expression of this by Binford (1961) in terms of a regression line formula. The pipestem analysis tool as well as our ceramic analysis tools and other constructions built on a chronological framework are based on the evolution of form through time.

Any unique combination of attributes, constituting a type that becomes extinct, represents a time capsule having a median date that can be fixed as an approximate point in time, provided the beginning and ending dates can be reasonably determined. If a series of overlapping ceramic types with known median dates can be determined historically and refined archeologically, we have a temporal scale by which we can fix a collection of ceramic types in time. If this scale is established through occurrence or frequency seriation, as is the case with prehistoric artifact types and classes, the seriation can be viewed as a gross chronology, verifiable only through carefully controlled stratigraphic studies designed to accompany the seriation, or through radiocarbon dating (Dunnell 1970:315). However, if previously dated groups of attributes representing historical stylistic types are used, such as Deetz and Dethlefsen (1966) have done with dated New England gravestones, there is a positive historical chronology involved that provides a more direct rather than a gross framework with which to work. In their study Deetz and Dethlefsen demonstrated variation in time

and space because they were dealing with an artifact form that was a locally manufactured folk object. With the present ceramic study, however, a standardized factory product with a known manufacture period is involved, thus eliminating local variation. Therefore, with known historically based typologies such as those found in historical archeology, a specific chronology can be constructed in a manner not possible on the prehistoric level. Historical archeologists are only beginning to explore the possibilities offered by this unique quality of their historic site data toward the examination of cultural problems.

Historic site archeologists have constructed typologies of ceramics based on the references available to them and on their own observation, and these have been dealt with in temporal terms with varying degrees of success. Some have seen the numerous historic types and the accompanying documents as a confusing situation, and one not to be improved by attempts at typology and seriation of historic artifacts (Dollar 1968:14). Meanwhile, others have continued to define the diagnostic criteria for recognition of ceramic types in time and space with emphasis on those attributes of color, surface finish, design, decoration, form, etc., by means of which delineation of types can be accomplished. One of the leaders in the field of English ceramics has been Ivor Noël Hume, Chief Archeologist at Colonial Williamsburg. Before the publication of his book A Guide to Artifacts in Colonial America (1970) he and others were exposed to some criticism for what was seen as a lack of concern for artifact description based on specific criteria (Cleland and Fitting 1968). With the publication of this book, however, it is clear that Noël Hume is concerned with the determination of specific ceramic attributes that have significance in time and space. A book incorporating a definitive typology for English ceramics is still to be written. Meanwhile this book

along with basic ceramic references can be used by the archeologist to acquire an acquaintance with the ceramic types found on British American sites. Noël Hume does not use quantification based on ceramic fragments from archeological sites, but prefers to use vessel shape along with presence and absence in his analysis. Some of us, on the other hand, have utilized specific attributes of ceramic types as Noël Hume has done, but have added the ingredient of frequency occurrence of the fragments as well as presence and absence.

With the present availability of information regarding ceramic types, both descriptive and temporal, the historical archeologist should be able to explore the next step. For years to come we will continue to be concerned with description in historical archeology, as we should be, but we should not loose sight of the fact that this is not the goal, only the means toward attaining the goal. Lewis Binford has quoted Sherwood L. Washburn, a physical anthropologist, in regard to this point:

> The assumption seems to have been that description (whether morphological or metrical), if accurate enough and in sufficient quantity, could solve problems of process, pattern, and interpretation.... But all that can be done with the initial descriptive information is to gain a first understanding, a sense of problem, and a preliminary classification. To get further requires an elaboration of theory and method along different lines (Binford and Binford 1968:26; after Washburn 1953:714-15).

It is time we began to construct hypotheses and tools with which to deal with historic site data. Descriptive typology, temporally anchored in history is available for a number of classes of historic site artifacts. This descriptive base will be refined as more information becomes available. However, for illustrating the analytical tools in this paper we have confined ourselves to Noël Hume's criteria as seen in A Guide to Artifacts in Colonial America, and through personal communication with him and Audrey Noël Hume.

The procedure used to construct the model was to select seventy-eight ceramic types based on attributes of form, decoration, surface finish, hardness, etc., with the temporal dates assigned by Noël Hume for each type. These were given type numbers and classified according to the type of ware (Figure 1A), with page numbers following the types discussed in Noel Hume's book. Since Noël Hume has spent a lifetime attempting to define and delimit the attributes and temporal brackets for the manufacture of English ceramic types, his manufacture dates can be assumed to be based on the historical and archeological documents available to him at the time the book was written. These dates were recently updated in a conference with him. It should be emphasized that in arriving at the median manufacture date Noël Hume's generalized "1770's", was expressed as 1775 for the model, and that he frequently uses "about" and "around" and "c." to indicate that he is generalizing. The variation introduced by our conversion of these qualifying statements as definite dates is seen to be a relatively minor one when we consider the scale of the model we are building. In this study we are dealing with the ceramic types often seen on colonial sites in the English tradition, and comparable chronological models need to be constructed for sites reflecting French or Spanish tradition. This is illustrated by debased Rouen faience (type 21) which is found on French sites to date around 1755, whereas on English sites it dates some twenty years later (Noël Hume 1970:141), clearly demonstrating the need for separate models for different cultural traditions.

Type 49, decorated delftware, is seen to have a time span of two hundred years (Figure 1A). Because of this a median manufacture date of 1650 was assigned for use when the site is obviously of the seventeenth century, and

a date of 1750 for use when associated types are from the eighteenth century. This is the only deviation from the true median manufacture date that was used in this study, however, if other types having manufacture duration periods of from 140 to 160 years could be separated into more than one type having shorter temporal brackets the chronology would be considerably refined from that presently known for those types as presently defined. These types are "catch-all" in nature, such as types 26, 39, 49, and 65, and therefore reflect less sensitive temporal data.

The chronology might be extended through the nineteenth century by anyone interested in testing it during those decades, but our study only includes a few nineteenth century types. It should also be kept in mind that additional types can be added by the archeologist who knows the manufacture dates for such types, and it may well be found that some of the longer time span types can be eliminated from consideration until such time that diagnostic temporal attributes can be determined. Thus the degree of refinement of the model is dependent upon the degree of sophistication of the archeologist's ceramic knowledge. Because of this it might be argued that the more knowledgable archeologist may find he has little use for the analysis tools outlined in this paper. The extent of usefulness of the tools presented here is yet to be determined, but we have found them useful. The archeologist may well be able to distinguish white salt-glazed stoneware from creamware, pearlware, and "clouded" ware, but not be well acquainted with the manufacture brackets for the types. For such an archeologist the tools presented in this paper may well assist him in interpreting the occupation period of his historic sites.

The Tools - Visually Interpreting the Occupation Period of the Site From a Sample Using Manufacture Duration Dates and Presence and Absence

Once the unimodal curve representing the duration of manufacture for each ceramic type in a sample from a site is plotted on a time line as a bar, and the type bars are arranged one above the other in a graphic manner, it is possible to see at a glance the limits for the duration of manufacture for all ceramic types. For instance, on the chart (Figure 1D) we see that most of the bars for the Charles Towne Site (38CH1) include a time span from 1580 to 1725. Immediately we can see that this surely indicates a relationship between the manufacture date and the occupation of the site. To demonstrate otherwise would take some doing. However, we are interested in narrowing the temporal bracket, and a method used by us for a number of years involves placing a vertical bracket to the left and right on the ceramic bar graph, with the resulting time span between being the interpreted period inside of which the occupation of the site took place. The placing of the left bracket is determined by choosing the point at which at least half of the ceramic type bars are touching or intersecting the bracket. The right bracket is placed generally using the same rule, however it must be placed far enough to the right to at least touch the beginning of the latest type present. An exception to this are surface collections from sites revealing multiple occupation periods as revealed in a gap or discontinuity between the ceramic bars of the first occupation period and those of the later period. In such cases brackets for both occupations must be placed (see Gaudy's, GN3, and Fort Prince George, PN1, in Figure 1D). Using this method we can place the brackets for site 38CH1 at 1650 and 1700, which happens to include the known historic date of the site of from 1670 to 1680. This is a tool that has proved most useful through the years in

arriving at an interpreted occupation date for a site from ceramics from historic sites. It should be pointed out that this is entirely a presence-absence approach.

The time period can be further narrowed in some instances by consideration of the ceramic types conspicuously absent from the sample. For instance, the Gaudy's Trading Post cellar hole from site 38GN1-5 (Figure 1D) has a bracket date range from 1740 to 1775, which can be narrowed when we realize that absent from the sample are types manufactured during the 1750's and 1760's usually present on sites of the 1760's (types 27, 33-36, 41,42). If creamware (type 22) was present, we would have to leave the bracketed date at 1775. In the absence of it as well as other types of the 1760's, we can assign an occupation date from approximately 1740 to the early 1760's for the cellar hole. This matches well the historical information that the site was occupied in 1751 and was attacked by Cherokee Indians and most of the buildings burned in 1760. This bracketing from ceramics alone is seen to work well in arriving at an occupation period for historic sites with known dates of occupation, and since this is the case we have it in the same manner on sites of unknown historic dates, such as Cherokee Indian village sites. This is basically a terminus post quem approach also using marker type absence to interpret an end occupation date.

A point we should make clear here is that in a sealed archeological deposit the beginning manufacture date for the latest type present gives us a date after which the deposit was made. This is the traditional terminus post quem. The interpretive tools we are discussing here are designed to assist us in going beyond merely determining the date of the fill, and allowing us to make an interpretation as to the occupation period reflected

by the ceramics in the deposit. This information is not based solely on the latest ceramic type present, but is interpreted through the frequency of other ceramic types. We should keep in mind the nature of the deposit, which may have an important bearing on our interpreted occupation brackets. For instance, if the fill is an accumulation of midden thrown from a house over a long period of time we would expect a different result than if the cellar hole was filled at one moment in time using soil and refuse collected from other areas of the site. In the latter case the fill would have no bearing on the structure represented by that particular cellar hole. However, our interpreted occupation period in either case would be based on the ceramic fragments in hand, and whether they are from a single feature, a combination of features, a cellar hole, or are the sum of every sherd recovered from the ruin site (such as is the case with the Brunswick Town and Fort Prince George samples), an interpreted occupation period represented by the sample will emerge. The judgment of the archeologist is important here as to the significance of the interpreted occupation period. The validity of the interpreted occupation period would still depend on the nature of the archeological data on which it is based.

On sites such as Brunswick Town, Fort Prince George, Goudy's Trading Post, Fort Moore and Charles Towne there has been little occupation since the eighteenth century period use of these sites. In high density urban occupation areas there may well be continuous occupation to the present. Because of this it would be necessary to isolate features from high density sites and deal with these so as to reduce the effect of later ceramic types, whereas on sites such as Brunswick, Fort Moore, Fort Prince George, etc. every sherd from the site can be included in our sample and still allow an

interpreted occupation period relative to the eighteenth century. We should keep in mind the fact that in discussing occupation periods represented by ceramics we are dealing with cultural generalities and not historical specifics. For instance our occupation periods interpreted from ceramics as revealed on the chart in Figure 1 vary from fifteen years in duration to eighty years, but we should also notice that these brackets most often do include the known historic occupation period for the sites.

Similar versions of this interpretive tool have long been used by some historic site archeologists for arriving at an approximate occupation period for their sites. However, a drawback is that it does not take frequency into consideration, and a single sherd of creamware (type 22), for instance, has the same weight as five hundred sherds of white salt-glazed stoneware in determining the approximate temporal range for the sample. Consideration of frequency of occurrence would certainly place the relationship between the types in a more valid perspective than presence-absence alone. In order to consider both presence-absence and frequency in the determination of our approximate occupation period, we have devised a formula useful in arriving at a mean ceramic date for a group of ceramic types from an historic site. This date can then be used with the historical data, or with terminus post quem dates to arrive at an interpreted occupation period represented by the sample. This date can also be compared with mean pipestem dates, as well as with other artifact data to arrive at an interpretation of the site occupation period.

The Tools - The Mean Ceramic Date Formula Using Presence-Absence and Frequency

The mean manufacture date for the group of British ceramic types from an eighteenth century historic site taking into consideration the frequency of occurrence of fragments of the types, can be determined by a mean ceramic date-frequency formula as follows:

The mean ceramic date, Y, is expressed:

$$Y = \frac{\sum_{i=1}^{n} X_i \cdot f_i}{\sum_{i=1}^{n} f_i}$$

Where X_i = the median date for the manufacture of each ceramic type

f_i = the frequency of each ceramic type

n = the number of ceramic types in the sample

The median manufacture date for each ceramic type in the sample is determined from the documents, and in this study we have derived this from the book by Noël Hume (1970), and through personal communication with him. This information is seen in the list of ceramic types in Figure 1A. In order to use the formula the sherd count for each type is placed in a column beside the median date and these are multiplied, producing a third column, which is a product of the median date times the frequency of occurrence. The sum of the frequency column is divided into the sum of the product column, producing the mean ceramic date for the sample. Although this frequency-adjusted manufacture date might be assumed not to have anything to do with the occupation date for an historic site, we will see that there is a remarkable degree of similarity between the mean ceramic date derived from use of the formula and the historically known median occupation date of the eighteenth century historic sites on which it has been used.

APPLICATION OF THE TOOLS

Applicability

The beauty of the Binford (1961) and the Hanson (1971) formulas for dating tobacco pipestems is the fact that anyone can pick up a set of drills and proceed to measure a sample and arrive at a mean pipestem bore size from which a mean date for the accumulation of the sample can be determined. The mean ceramic date formula is not as easily applied since the user must know something about British ceramic types before he can determine a mean ceramic date from a group of types. If he has little understanding of the attributes for separating the seventy-eight types used in the model he will not get far in arriving at a meaningful mean ceramic date from the formula. For the formula to be used, therefore, a knowledge of ceramic types is necessary, which can be learned from the many references available. This reference work must be combined with a familiarity with the archeological specimens. A knowledge of the ceramic type attributes cannot be overemphasized for there are far too many meaningless descriptions appearing in the historic site literature now in spite of the availability of numerous excellent sources to act as guides for learning. It is totally meaningless to describe a ceramic type as being "Whieldonware or Rockingham ware" (Harris 1971:67), types with a source of origin separated by the Atlantic Ocean and one hundred years in time. Historical archeology is plagued by reports revealing no interpretation of any kind, historical, anthropological, cultural or archeological to justify a catalog type publication of objects. To use the mean ceramic date formula, therefore, there is no easy way out. The archeologist should have more than a passing knowledge of the ceramic types with which he deals. Some archeologists may prefer to deal primarily with a terminus post quem date for a deposit, and feel

they have no need for a median date such as the formula provides. Others may find it useful in the interpretation of site occupation periods.

The Sample

The size of the sample cannot always be controlled by the archeologist due to the fact that only seven sherds may be recovered from a feature from which he wishes to apply his ceramic analysis tools. He should remember, however, that a sample of that size would be somewhat less reliable than one of a much larger size. The nature of the sample would most certainly also have a bearing on the date that results from any interpretive analysis of the ceramics. For instance, a sloppily excavated cellar hole where poor contextual control was maintained by the archeologist might contain fragments of creamware or ironstone that fell into the hole during excavation from layers outside the actual contents of the cellar fill, or were carelessly thrown into the bag by an irresponsible worker. These fragments would require a much later date to be assigned to the feature than would have been the case had these one or two fragments not been allowed to intrude upon the sample from the context of the cellar. The importance of tight provenience control in the field cannot be overemphasized (unless the reasons for the control are not understood by the practitioner and an unnecessarily expensive and fruitless nit-picking approach is used to no effectual end, as is too frequently witnessed on historic sites). A large, tightly controlled sample is desirable, regardless of the length of time a site was occupied. In the absence of a large sample, however, the tools described here can still be used but the reliability might naturally be expected to be less.

Instead of the frequency occurrence based on individual sherds by ceramic type as we have done in this study, quantification by type and

shape could as well be used, and in some instances where shape is a sensitive attribute, a more refined temporal bracket may result. It is through an analysis of shape (teacups, saucers, plates, platters, mugs, etc.) that this writer feels that certain sensitive cultural differences may be reflected. Our present study is concerned, however, with ceramic type analysis as a reflector of the occupation period of historic sites.

Noël Hume has provided us with a frequency tabulation for the ceramic types from the Trebell Site Cellar (TS 807C) by object and by sherd count. With a cellar fill date of c.1810, and a construction date of c.1769, based on creamware, the median date should be around 1790. Using both sets of data with the formula we obtain a mean ceramic date of 1780.5 using the object count and 1788.9 using the sherd count. This would tend to point to a more accurate formula date using sherd count than when an object count is used.

The Technique of Application of the Visual Bracketing Tool to Historic Site Ceramic Samples

In Figure 1D eleven sites have been plotted with the following information graphically shown. The duration of manufacture of each ceramic type has been plotted as a bar against a time line. The known historic occupation period is plotted as a heavy horizontal bar with arrows indicating the approximate beginning and end dates as determined from the documents. The visual bracket for the interpretive occupation period of the site is plotted as two vertical lines that touch at least half of the ceramic type bars on both ends. The mean ceramic date for the site sample derived from the use of the ceramic date formula is plotted as a vertical line of large dots, with the pipestem date represented as a vertical line of small dots. The influence of absent ceramic types within a zone where they are usually found on historic sites is plotted as a shaded area of dots. This allows the interpreted occupation date to be narrowed in some cases.

The Technique of Application of the Mean Ceramic Date Formula to Historic Site Ceramic Samples

An example of this process is illustrated by unit S7 in the ruined town of Brunswick, North Carolina. This ruin was a stone-lined cellar located on lot 71 in Brunswick (South 1959). The records reveal that the structure was probably standing by 1734, and was burned in 1776. The collection of ceramic material from the entire ruin was used as the sample. The historic date would bracket the period from 1734 to 1776, with a median historic date of 1755.

Ceramic Type	Type Median (X_i)	Sherd Count (f_i)	Product
22	1791	483	43953
33	1767	25	1675
26	1730	62	1860
34	1760	32	1920
36	1755	55	3025
37	1733	40	1320
43	1758	327	18966
49	(1750)	583	29150
44	1738	40	1520
47	1748	28	1344
39	1730	241	7230
53,54	1733	52	1716
56	1733	286	9438
29	1760	9	540
		2263	123657 $= \sum_{i=1}^{n} X_i \cdot f_i$

The mean ceramic date formula

$$Y = \frac{\sum_{i=1}^{n} X_i \cdot f_i}{\sum_{i=1}^{n} f_i}$$

$$Y = \frac{123657}{2263} = 1754.6$$

It is interesting to note that the mean ceramic date derived from the formula is the same as the known median historic date for the ruin. As we will see, this appears to be more than a coincidence. The pipestem date for this ruin using the Binford formula (1961) is 1756, revealing an interesting correlation between historic, ceramic, and pipestem dates.

Ceramic Analysis of Samples from Historic Sites

Charles Towne (38CH1) The First English Fortification in South Carolina

Each of the eleven sites on the chart (Figure 1D) can be discussed to reveal various aspects seen in refining a temporal bracket for the occupation of a site through ceramics using the methods outlined here. Our discussion will follow the chronological chart from bottom to top (Figure 1D), beginning with the fortification ditch dug by the first Charles Towne settlers in South Carolina in 1670, and abandoned by 1680, provided a median historic date of 1675. The bracketing tool reveals a date from 1650 to 1700, which includes the historic occupation period. Attempting to narrow this date by means of the mean ceramic date formula produces a date of 1654.4 some twenty-one years prior to the known historic median date. This difference may well reflect our present knowledge of the ceramic types from which the mean date was derived. It may also reflect a time lag by the latest items not being present in the households at Charles Towne when the first settlers arrived in 1670. This gap may also relate to the fact that far more references are available to leather and wooden trenchers being in the town than ceramics, revealing, perhaps, less daily use of ceramic items, and thus less breakage (South 1971 MS). In this case the breakage that did occur would reveal a greater time lag than is seen on eighteenth century sites where ceramics came into more daily use, and breakage. This hypothesis needs to be checked by the use of the mean ceramic date formula on more seventeenth century sites of known occupation dates. This time lag may well be found to be a factor present on any seventeenth century site, in which case the formula can be altered to take this into consideration once enough data is at hand from seventeenth century sites. The pipestem date from this feature is also too

early, being 1667 (Hanson 1971:2), again possibly reflecting a true time-lag situation with artifacts in the seventeenth century. From this site we see an exception to the high reliability seen in the use of the mean ceramic date formula on sites of the eighteenth century. Noël Hume has pointed out that on seventeenth century sites of the wealthy class he has found many ceramic types represented, with little time-lag being evident, whereas on the ruins of the less affluent there are definitely fewer ceramic types present, thus revealing a socioeconomic distinction not seen to exist on sites of the eighteenth century (Noël Hume personal communication).

The First Fort Moore? (38AK4-15) An Eighteenth Century Frontier Fort and Trading Post

The second site is a cellar hole of a timber and clay structure with a clay chimney, located on the bank of the Savannah River at the historic site of Fort Moore, South Carolina. The first Fort Moore was built in 1716, and a second one was ordered built in 1747, with the site going into private hands in 1766. This site was excavated during the summer of 1971 by Richard Polhemus, Assistant Archeologist of the Institute of Archeology and Anthropology at the University of South Carolina. Using the bracketing method we can see that the site was likely occupied between 1700 and 1775. The mean ceramic date formula produces a date of 1726.1, not far from the historic median date for the first Fort Moore of 1732. The presence of creamware (type 22) (two sherds in the top layer of the cellar), but the absence of pearlware (type 17), does not allow us to narrow the date bracket using absence (shaded area of the graph). The Hanson pipestem formula produces a date of 1730.9. These early dates within the known historic range for the

occupation of the first Fort Moore allow us to interpret this cellar and this area of the site as likely that for the first Fort Moore. Even though creamware is present in the top layer of fill, providing us with a terminus post quem date for the final filling of the cellar, the frequency of types of the earlier period is such that a first Fort Moore period of occupation is interpreted as being represented by the ceramic sample.

Fort Moore (38AK5-A) An Eighteenth Century Frontier Fort and Trading Post

One hundred yards away from the cellar just discussed another cellar of the same type of construction was excavated some years ago, and the material from this cellar is stored at the Institute of Archeology and Anthropology at the University of South Carolina. The bottom two feet of this cellar fill was used in the ceramic analysis, which contained the large majority of the ceramics present. The bracketing bars reveal a likely date of 1700 to 1775 for the occupation of the site. However, the fact that there is an absence of types 22, 28, 33, 35, and 36, usually seen on sites of the 1760's and 70's, this range can be narrowed to include the period from 1700 to the early 1760's. The mean ceramic date formula produced a date of 1741.7 and the pipestem date was 1744.16. The mean ceramic date is virtually the same as the known median historic date of 1741 for the occupation of Fort Moore from 1716 to 1766.

From the use of the bracketing and mean ceramic date tools on the Fort Moore site it was possible to separate a ceramic sample from a cellar likely representing the entire occupation of Fort Moore, from a

cellar with a ceramic sample interpreted as representing the occupation period of the first Fort Moore. An interesting point here is that the cellar having the earliest mean ceramic date has creamware present in the fill, whereas the cellar without creamware has a later mean ceramic date, the reverse of what one might interpret from presence-absence alone. This illustrates the potential value of the mean ceramic date in such instances, particularly when supported by the same relationship between the pipestem dates as seen here. This does not mean we ignore the terminus post quem date indicated by creamware for the final fill of the cellar. It does mean that we are giving consideration to the mass of the ceramics rather than to the latest type on the sample (perhaps represented by a single sherd), when it comes to interpreting the major occupation period represented by the collection.

Brunswick Town, North Carolina (S7) A Colonial English Port Town

We have discussed this ruin previously and found the historic median to be 1755, the mean ceramic date to be 1754.6, and the mean pipestem date to be 1756. Other Brunswick Town ruins demonstrate the following comparison between the historic median and the ceramic formula mean:

S15	historic median date	1751.0
	ceramic formula date	1746.4
	pipestem date	1748.0
N1	historic median date	1754.0
	ceramic formula date	1750.1
S2	historic median date	1754.0
	ceramic formula date	1749.0
	pipestem date	1748.0

Large samples, such as those from Brunswick Town are particularly desirable for use with the mean ceramic date formula (see tables in Appendix).

Goudy's Trading Post at Fort Ninety Six, South Carolina (38GN1-3 and 38GN1-5)

Goudy's Trading Post at Ninety Six, South Carolina, was begun in 1751 and was attacked and burned in 1760. Preliminary excavation revealed a small cellar hole with some eighteenth century objects in the top surface of the fill. The cellar is yet to be excavated. Only four ceramic types and a total of seven sherds were recovered, but these were used to attempt to date the deposit using the tools under discussion here. The median historic date is 1756, with a mean ceramic date of 1754.6, an impressive match using only seven sherds. However, without the known historic date we can establish a duration using our bracketing tool of from around 1740 to 1775. In the absence of types 27, 33-36, 41, 42 (representing the types likely to be present if the sample dated from the 1760's), and also using the mean ceramic formula date of 1754.6, we could say that the deposit represents an approximate date range of from around 1744 to the early 1760's, impressively close to our 1751 to 1760 historic data. We have arrived at this date using the ceramic analysis tools here under discussion, and not our historic data.

The surface layer and plowed soil zone of Goudy's Trading Post site revealed creamware, which was absent from the cellar hole sample. This sample was designated 38GN1-3, and has an historic occupation date of unknown length after the first occupation of 1751 and the fire of 1760. From the mean ceramic date formula we determine a date of 1769.3,

and with this and our known beginning date of 1751 as half of our date range, we can conjecture a date from 1751 to around 1787 for the period represented by the sample, since if we know the mean date and one end we can interpret the approximate position of the opposite bracket. It should be noted that one sherd of whiteware was found on the site in the plowed soil (type 2), and because of the absence of pearlwares, this clearly reveals a disconformity between it and the other ceramic types, reflecting a post 1820 occupation and not a continuous one.

Fort Prince George, South Carolina (38PN1) A British Military Post on the Cherokee Frontier

Fort Prince George was built by Governor Glen of South Carolina in 1753, and the last reference to it is in 1768 when it was abandoned. The median historic date is 1761. The site was dug by John Combes, Assistant Director of the Institute of Archeology and Anthropology, University of South Carolina. The ceramic sample includes all sherds recovered from the entire site. From the bracketing technique of the ceramic type bars we arrive at a date of around 1745 to 1775 for the site. The mean ceramic date formula reveals a mean date of 1763.0, and the pipestem date is 1750.14 (Hanson 1971:2). In this case the mean ceramic formula date is much closer to the median date for the site than is the pipestem date. Without the known historic date we might take our interpreted end date of 1775 and the mean ceramic formula date of 1763, and conjecture a date bracket of from 1751 to 1775, again not far removed from the known occupation of 1753 to 1768.

The Paca House, Annapolis, Maryland (19J,27B) A Town House Mansion

The Paca House was built in 1763 by William Paca, signer of the Declaration of Independence, and is still standing and in the process of being restored. Archeological work was carried out there in 1967 by this writer (through a contract with Contract Archeology, Inc.) and two eighteenth century midden deposits were discovered still relatively undisturbed (South 1967 MS). These were combined for this analysis. The median historic date for the sample is not known, but the context in which the midden was found indicates that it was among the earliest midden thrown from the house after it was constructed in 1763. The presence of creamware and one piece of pearlware, however, indicate that the midden received material at least as late as the 1780's. The mean ceramic formula date for the deposit is 1763.1. The left and right bracketing lines fall at 1720 and 1780, and using the mean ceramic date of 1763, we can narrow our interpreted date range to 1748 to 1780.

The Dump at Brunswick Town (S10)

Nath Moore's Front in Brunswick Town (ruin S10) was burned in 1776 (South 1958) and the interior of the stone foundation wall for the cellar was used as a garbage dump for some years afterward, in fact, judging from the whiteware present it was used into the 1830's. The last reference to anyone living in Brunswick was in the early 1830's. The median historic date for the dump would be 1803. Using the vertical brackets we arrive at a date of from 1740 to 1820. The mean ceramic date is found to be 1794.0, not too far from the historic median date of 1803. An interesting feature of this ceramic profile is the continuation of the overlapping ceramic type-bars throughout

the period of the Revolution into the early decades of the nineteenth century.

The Nipper Creek Site (38RD18)

No historical information is available on this pit, which was located in a bulldozed area of an Archaic Indian site. The brackets point to a short time span from 1795 to 1815, with a mean ceramic formula date of 1801.3. The absence of types of the 1815-35 period indicate that this ceramic sample can be interpreted as representing an occupation period from around 1795 to about 1810.

Tallassee A Nineteenth Century Cherokee Indian? House Site in Tennessee

The historic information available on this site indicates that it was transferred from Indian to White hands in the early nineteenth century. Other than this no information is available, except that a quantity of Cherokee ceramic types were found associated with the house ruin, suggesting possible Indian occupants.

The mean ceramic formula date was found to be 1818.1. In the absence of type 2 we would interpret a date bracket of from 1800 to 1820 as the likely range for the occupation represented by the sample.

Additional Cherokee Indian Village Sites Not Shown in Figure 1

The Rock Turtle Site (38PN4) An Eighteenth Century Indian Village Site

One hundred yards from the site of Fort Prince George a Cherokee Indian village site (38PN4) was tested, and revealed ceramic types producing a mean ceramic formula date of 1749.7, and a Hanson pipestem date of 1756.36. There is no historic data associated with the site other than its close association with Fort Prince George and the

eighteenth century Cherokee Town site of Keowee.

Toxaway (38OC3) An Eighteenth Century Cherokee Indian Village Site

Excavation on the eighteenth century Cherokee Town site of Toxaway was carried out some years ago by the Institute of Archeology and Anthropology at the University of South Carolina, and from the five ceramic types present a mean ceramic formula date of 1761.0 is determined.

A Discussion of the Reliability of the Ceramic Analysis Tools

The measure of the reliability of the temporal bracketing and mean ceramic formula analysis tools is the degree of correlation between the interpreted dates and the known historic dates for the particular site. Prehistorians do not have such a readily available check on their chronologies and seriations. As we have seen with the individual samples from various historic sites the bracketing and mean ceramic tools, along with presence-absence consideration, allows a relatively high percentage of correlation between the interpreted and the historically known dates. The table (Figure 2) illustrates the comparison between the historical bracket and median date, and the visual bracketing tool and the mean ceramic formula date for those sites in this study, with a detailed tabulation in the Appendix. The correlation between the historical median date for a site and the mean ceramic formula date is seen to be quite high in most instances, with an average correlation for all eighteenth century sites for which historical data was available being 93%. What is needed now is more application of the tools to determine the limits of reliability on a broader time and space frame of reference.

Site	Historical Date Range	Bar Graph Date Range	Historical Median Date	Mean Ceramic Formula Date	Years Away From Historical Median With Quantification	Pipestem Date	Formula Date Without Quantification	Years Away From Historical Median Without Quantification	Site Name
38CH1	1670-1680	1650-1685	1675	1654	(21)	1667	1661	(14)	Charles Towne
38AK4-15	1716-1747	1725-1775	1732	1726	(6)	1731	1736	(4)	1st Ft.Moore
38AK5-A	1716-1766	1725-1775	1741	1742	(1)	1744	1738	(3)	Ft. Moore
S7	1734-1776	1740-1775	1755	1755	(0)	1756	1749	(6)	Brunswick
38GN1-5	1751-1760	1745-1775	1756	1755	(1)	-	1752	(4)	Goudy's Post
38GN1-3	1751- ?	1740-1775	-	1769		-			Goudy's Post
38PN1	1753-1768	1740-1775	1761	1763	(2)	1750	1755	(6)	Ft. Prince (George)
Paca (19J,28B)	1763- ?	1750-1780	-	1763		1753			Paca House
S10	1776-1830	1740-1820	1803	1794	(9)	-	1773	(30)	Bruns. Dump
38RD18	?	1795-1805	?	1801		-			Nipper Creek
Tallassee	c.1800-?	1800-1815	?	1818		-			Tallassee
S18	1763-1776	1740-1775	1770	1776	(6)	1751	1753	(17)	Brunswick
S15	1726?-1776	1740-1775	1751?	1746	(5)	1748	1755	(4)	Brunswick
N1	1731-1776	1740-1775	1754	1750	(4)	-	1746	(8)	Brunswick
S2	1731-1776	1740-1775	1754	1749	(5)	1748	1757	(3)	Brunswick
38PN4	18th Cent.	1750-1775	?	1750		1756			Rock Turtle
38OC3	18th Cent.	1725-1780	?	1736		-			Toxaway
					(39)			(85)	

Average Years From Historical Median With Quantification (4)

Average Years From Historical Median Without Quantification (8)

COMPARATIVE TABLE OF CERAMIC ANALYSIS DATA
FIGURE 2

Site	Historical Date Range	Bar Graph Date Range	Historical Median Date	Mean Ceramic Formula Date	Years Away From Historical Median With Quantification	Pipestem Date	Percentage of Correlation With Quantification	Formula Date Without Quantification	Years Away From Historical Median Without Quantification	Percentage of Correlation Without Quantification	Site Name
8CH1	1670-1680	1650-1685	1675	1654	(21)	1667	72%	1661	(14)	81%	Charles Towne
8AK4-15	1716-1747	1725-1775	1732	1726	(6)	1731	81%	1736	(4)	89%	1st Ft.Moore
8AK5-A	1716-1766	1725-1775	1741	1742	(1)	1744	98%	1738	(3)	90%	Ft. Moore
7	1734-1776	1740-1775	1755	1755	(0)	1756	100%	1749	(6)	89%	Brunswick
8GN1-5	1751-1760	1745-1775	1756	1755	(1)	-	98%	1752	(4)	93%	Goudy's Post
8GN1-3	1751- ?	1740-1775	-	1769		-	-			-	Goudy's Post
8PN1	1753-1768	1740-1775	1761	1763	(2)	1750	97%	1755	(6)	90%	Ft. Prince (George)
aca (19J,28B)	1763- ?	1750-1780	-	1763		1753	-				Paca House
10	1776-1830	1740-1820	1803	1794	(9)	-	91%	1773	(30)	71%	Bruns. Dump
8RD18	?	1795-1805	?	1801		-	-			-	Nipper Creek
allassee	c.1800-?	1800-1815	?	1818		-	-			-	Tallassee
18	1763-1776	1740-1775	1770	1776	(6)	1751	92%	1753	(17)	79%	Brunswick
15	1726?-1776	1740-1775	1751?	1746	(5)	1748	90%	1755	(4)	93%	Brunswick
1	1731-1776	1740-1775	1754	1750	(4)	-	93%	1746	(8)	85%	Brunswick
2	1731-1776	1740-1775	1754	1749	(5)	1748	91%	1757	(3)	95%	Brunswick
8PN4	18th Cent.	1750-1775	?	1750		1756	-			-	Rock Turtle
8OC3	18th Cent.	1725-1780	?	1736		-	-			-	Toxaway
verage Percentage of Correlation for the Eighteenth Century Sites					(39)		93%		(85)	87%	
verage Years From Historical Median With Quantification					(4)	Average Years From Historical Median Without Quantification			(8)		

COMPARATIVE TABLE OF CERAMIC ANALYSIS DATA
FIGURE 2

To judge the role of quantification in the mean ceramic date formula between the known historical median date and the formula date, we substituted the frequency of one for each of the ceramic types and thereby nullified the effect of quantification on the date derived from the formula. This reduced the formula to a presence-absence tool, and by comparing the date thus determined with the ceramic formula date, we can see which is closer to the historical median. This comparison can be seen on the chart in Figure 2. From this we can see that the average correlation for the ten eighteenth century sites without using frequency is 87%, whereas using frequency of fragments by ceramic type there is a correlation of 93% between the mean ceramic formula date and the historic median date. This indicates a slight advantage in reliability when using quantification as opposed to presence-absence alone. This advantage can perhaps be seen in more proper perspective by comparing the number of years away from the historical median are the formula dates <u>with</u> frequency and <u>without</u> frequency being considered. Using frequency only one date is as much as nine years from the known historical median for the occupation of the site, whereas without considering frequency two of the ten sites are seventeen and thirty years distant from the known historical median. The average deviation from the historical median date using frequency is only four years, whereas the average deviation without consideration of frequency is eight years, or twice that when frequency is considered. Our conclusion from this is that frequency consideration appears to have a refinement advantage over presence-absence when used with the mean ceramic date formula.

From this average four year variation from the known historic median occupation for the ten eighteenth century sites in this study we can make an additional refinement of our mean ceramic date. We can now state that when frequency is considered, the mean ceramic date derived can be followed by an average deviation of plus or minus four years on sites of the eighteenth century. As the ceramic collection from a larger number of sites are examined with this formula, this plus or minus factor can be refined as the data indicates. Without using frequency by type, thus utilizing the formula strictly on a presence-absence basis, a plus or minus eight years should be added to the mean ceramic date thus derived. The number of plus or minus years may well be found to vary by area as groups of sites are tested using this formula. Such variation may be found to reflect areal cultural variation within the broader cultural horizon.

We will now look at the one seventeenth century site represented in this study, the Charles Towne fortification ditch (38CH1). The deviation here between the known median date of 1675 and the ceramic formula dates with and without frequency considered is 21 and 14 years respectively. This reveals only a 72% and 81% of correlation to the known historical median date with and without frequency (Figure 2). This is a dramatic contrast to the ten eighteenth century sites for which the median historical manufacture dates are known. At present this gap seems to be a result of possibly two factors, lack of knowledge of seventeenth century ceramic types and manufacture dates, and a possible status factor. Noël Hume has found seventeenth century upper class mansions have more ceramics represented than do the lower

class homes of that period, but has not found this to be so in the eighteenth century (Noël Hume 1970:25; and personal communication). This writer thinks that the lower class seventeenth century homes may well have had a greater time-lag represented in ceramics than there was in the mansions. This is not seen, however, as a lag resulting from less "broad and rapid spread" of ceramic types but from the greater non-functional, status role played by ceramics within the lower class seventeenth century household. The rapid distribution of ceramics from factory to British American ports, and the subsequent journey to the frontier is seen to result in the horizon phenomenon in both the seventeenth and eighteenth century periods. This will probably best be demonstrated through analysis of ceramics from the more affluent seventeenth century homes, but such a status difference is yet to be demonstrated through ceramics from eighteenth century British American sites. On the eighteenth century sites included in this study the high percentage of correlation between the mean ceramic manufacture date derived from the formula and the historic median date for the occupation of the site is seen as a clear demonstration of the horizon phenomenon.

In instances where we might have wanted more precision in our tool we can sometimes see a possible explanation in terms of a small sample. The Paca House midden for example had only 46 sherds, and a probable historical range for the deposit of from 1763 to around 1780 when the house was sold to a new owner, producing a median date of around 1771, some eight years later than the formula date of 1763 plus or minus four years. However, if no historical data were available

our slightly "too early" mean ceramic date would still be only eight years away from the actual date.

It is hoped that more such formulas will be forthcoming with which to deal with historic site data, with buttons, beads, wine bottles and glasses all contributing their individual chronologies and mean artifact dates suitable for comparison with the mean ceramic date and brackets, pipestems, and coins, but this only as introduction to the examination of questions of broader scope.

The apparent success of the tools discussed here is thought to be due to the fact that with colonial artifacts we are dealing with a historical chronology reflecting cultural process, just as we would be doing with a study of motifs from a collection of dated coins from the same cultural tradition. The coins are indicators of the historical as well as the cultural process as well as reflecting the temporal occupation span for a site just as we have seen ceramics to be. For instance, at Brunswick Town the documented duration of the site was from 1725 until it was burned in 1776. The coins from the ruins of houses burned at that time date from 1696 to 1775. The coins from all ruins including those occupied after the Revolution into the 1830's date to 1820. Thus coins are used along with ceramics to help fix dates for historic site occupation. However, they are not often found in quantity sufficient for them to be a major tool. They can provide auxillary data as historically fixed documents, just as we have seen ceramics utilized in this study.

INTERPRETIVE SUMMARY

In this study we have concentrated on the similarity between groups of eighteenth century ceramic types as found on colonial English historic sites over a wide area and of varying functions. We have suggested that this can be done due to the horizon nature of the ceramic groups in the eighteenth century, and the fact that the ceramic types reflect culture change through time. We have not dealt with the important differences between ceramic forms as reflectors of functional or socioeconomic factors at work within the culture. The potential of such a study has been pointed out by Stone (1970) and others regarding porcelain as an index of status. Miller and Stone (1970) have also indicated that ceramic analysis offers great potential in studies of sociocultural change, status and social level and functional interpretations. The study of ceramic types as we have done in this paper as indicators of site occupation periods reflecting the cultural horizon concept does not negate the study of ceramic shapes as more sensitive indicators of status and function within the culture. Although ceramic analysis by type can be demonstrated to vary but relatively little from a port town such as Brunswick and the frontier forts of the same period, thus providing us with a valuable temporal tool for use on eighteenth century sites, an analysis of the same ceramic fragments using shape might well reflect status or cultural pattern of a different sort. Garry Stone at the 1970 meeting of the Society for Historical Archaeology presented a paper illustrating the use of a number of ceramic shapes dealing with the tea ceremony at the frontier outpost of Fort Dobbs, North Carolina. In the present study, of the nineteen ceramic types present at the frontier site of Fort Prince George, ten were represented by the presence of teapots,

teacups or saucers, tending to support the observations made by Stone in North Carolina regarding the extension of the tea ceremony to the far corners of the colonial frontier (see Roth 1961). The emphasis on shape as opposed to type, reflecting perhaps an emphasis on function as compared to time can be seen in the manner in which archeologists approach their data. Noël Hume, for instance, classifies and catalogs his ceramics by quantification of the shape of various types present, whereas this archeologist has always used quantification by fragments of ceramic types present. Analysis by shape would seem to be a more sensitive indicator of function and possible socioeconomic level, whereas that by type is useful for discovering the kind of cultural information dealt with in this present study. Thus the manner in which we classify our data has a bearing on our interpretations.

Other points dealing with this subject should be mentioned. Ceramic analysis should consider such factors as absence, which may well correlate with documents, such as the period from about 1640 to 1680 when the English were barred from Chinese ports, thus having a definite effect on the import of Chinese porcelain during this period (Noël Hume 1970:257). The absence of porcelain in the collection from the Charles Towne deposits of 1670-1680 is therefore no surprise. Another point is that from the first Fort Moore of the early eighteenth century fewer ceramic shapes were present dealing with the tea ceremony than were found on the later frontier forts in the area. This difference in ceramic shape between these eighteenth century forts may reflect the greater popularity of the tea ceremony from the mid-eighteenth century on as opposed to its popularity in the early part of the century (Roth 1961).

Although Stone (1970) found an association between porcelain and the more affluent in the inventories he studied we surely need more data before we can say that this is reflected in archeological collections. Miller and Stone (1970:100) have also suggested that archeologists "should be able to establish the relative socioeconomic level of a population and define any major status differences which existed at a site by means of the distributional analyses of ceramics." Archeologists often give lip service to this view, but we have yet to see the demonstration of this milking process archeologically demonstrated. Comparison of French with English ceramics at Michilimackinac was done by Miller and Stone with interesting differences observed, but whether status or socioeconomic differences can be witnessed within the context of an eighteenth century British American site is yet to be demonstrated. Cleland (1970:122) has mentioned differences in ceramics from two row houses being interpreted as reflecting social status of the occupants, and suggests that this interpretation can validly be made in the absence of specific historical data for the row houses themselves. I suggest that this is only one of the possibilities, but one yet to be validly demonstrated. I do not think interpretations based on a single comparison can be considered to be valid. We need several such ceramic differences in comparisons made between a number of archeologically examined historic ruins. I would suggest that we need a pattern of such differences before we could archeologically demonstrate that a status situation is indeed responsible. Another approach to this problem could come through the excavation of ruins of homes of historically known

affluent people at one particular point in time, and comparison of the ceramics recovered from ruins of historically known non-affluent individuals at the same period in time. This would provide a control against which the archeological data could be examined. At such a time we might begin to be able to make statements regarding status as reflected by the ceramics from the sites we excavate. Meanwhile status appears to be a goal we all think we should somehow milk from our ceramics, but as yet we have not discovered the proper grip for producing this stream of cultural knowledge from our archeological data from eighteenth century British American sites.

Functional interpretations from historic site ruins are also often frustratingly unproductive. With kiln sites, furnaces, and other specialized structures the interpretation becomes obvious as the data is revealed. However, with the town ruins of Bethabara, North Carolina, for instance, maps of 1760 and 1766 revealed the functional use for each structure at that time, the tailor shop, kitchen, pottery shop, business manager's house, the doctor's laboratory, the apothecary shop, the blacksmith shop, the millwright's house, the gunsmith shop, and the tavern, but when excavation was complete not a single structure could be interpreted from the archeological data as to its correct function except the pottery shop of Gottfried Aust, identifiable from the clay wedging floor and the kiln waster dump. We should be cautious, therefore, and anchor our research goals in something more productive than a consideration of the function of the structure we are examining. Fortunately, there are other questions that can be asked about historic site data, such as those examined in this paper.

In this study we have seen that eighteenth century British American sites of varied functions, from port town ruins, to town house mansions to frontier forts and Indian villages have similar groups of ceramic types present at similar periods of time. This has been interpreted in terms of the horizon concept (Willey and Phillips 1958:31-34). The time required for the spread of the cultural material representing the horizon is a factor to be considered, as Willey and Phillips point out. Therefore, an approximate contemporaneity is involved. With our historic ceramics used in this study we are dealing with a class of objects that originated, for the most part, in England, and were brought into America aboard vessels to ports such as Charleston, Savannah, Boston, New York, and Philadelphia, and from these centers were distributed to inland sites. This distribution was often quite rapid, being only as long as it took a man on horseback to ride the distance from the port town where the limited collection of ceramic types was available, to his frontier destination at Fort Prince George, Goudy's Trading Post or Fort Moore. A few months at the most might have been involved, so that within a few weeks after a ship arrived in a port town, teacups, teapots and saucers of white salt glazed stoneware or "clouded" polychrome painted cream-colored ware could easily have been used by an Indian to pour a cup of the "black drink" at the Cherokee town of Keowee opposite Fort Prince George. Such ceramic types and forms are found in Cherokee midden deposits, and whether they reached the Cherokee nation by way of Philadelphia or Charleston is immaterial when we consider that in either case the journey would take but a few weeks at the most. Thus the argument that considerable time lag must have been involved for English ceramic types to reach the various remote corners of the colonial frontier is a more difficult position to support than that dispersal of goods was a relatively rapid process. If this was so then we can understand why a great deal of

uniformity would exist among ceramic types from sites of the same time period, regardless of the fort, port, or Indian village function of the site on which the ceramics were used.

Documents from port records may well reveal that certain colonial ports received ceramic goods from different English ports, thus theoretically introducing another variable into the picture. However, as Cleland has said (1970:122), "These are historic facts that are really irrelevant to the interpretation of the archaeological data." For example, if the historical documents were to reveal that Charleston did not receive any Oriental porcelain in the eighteenth century this would not alter the percentage relationships of this type from the sites in this study, or the applicability of the mean ceramic date formula, or the interpretation of the data in terms of the horizon concept. It would point to questions centering around transportation and supply routes relative to the sites in this study merely as additional historical information.

From this examination of our hypotheses we can see that the bracketing and mean ceramic date formula tools have proved of value in producing a time bracket for eighteenth century sites that correlates well with the historically known occupation periods. From this correlation the validity of our hypotheses has tended to be demonstrated to the limits of our present data. More use of these and similar tools on a broader scope should now be undertaken by historic site archeologists in similar studies if we are to interpret the most from our historic site data.

The construction of tools such as pipestem and ceramic analysis formulas, however, is only a first step toward discovering answers to the larger questions of culture process. This paper has attempted to address itself to some of these questions. Historical archeology data particularly lends itself

to analysis in a controlled and specific manner not possible on the prehistoric level. For this reason it offers an ideal arena for the examination of cultural concepts long explored on prehistoric sites. Historical archeology has now matured to the point where we should begin to explore this potential rather than continuing to crowd our bookshelves with descriptive catalogs of our systematized relic collecting devoid of any redeeming analytical or interpretive value. Historical archeologists have a challenge and a responsibility to abstract order through analysis and meaning through interpretation of their data. "From the pages of the earth, the historical archeologist gathers bits and pieces representing past human activity and relates these to the shreds and patches surviving as the worn documents and faded words of history. From this collection of essentially meaningless, unique fragments of the past, he abstracts the order, and strives to press a meaning" (South 1969). Too often we stop with description of the bits and pieces and the relation of these to the documentary shreds and patches without attempting to abstract the order and discover the meaning. We historical archeologists should more frequently take that next step from data to theory, a step so clearly stated by Hempel (1966:15):

> The transition from data to theory requires creative imagination. Scientific hypotheses and theories are not <u>derived</u> from observed facts, but <u>invented</u> in order to account for them. They constitute guesses at the connections that might obtain between the phenomena under study, at uniformities and patterns that might underlie their occurrence.

In this paper we have made guesses at some of the connections and uniformities we have observed from historic site ceramics. If our guesses prove valid we have sharpened our theoretical tools (Deetz 1968:130), and revealed the cultural "treasure from earthen vessels", a goal of archeology.

I would like to thank John and Joan Combes, George Teague, Robert L. Stephenson, and Audrey and Ivor Noël Hume for discussing this paper with me and helping to clarify some of the concepts.

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APPENDIX I

Percentage Relationship of Certain Ceramic Types
from Several Structures at Brunswick Town, N.C.

from a paper delivered at the first
Conference on Historic Site Archaeology in 1960

by Stanley South

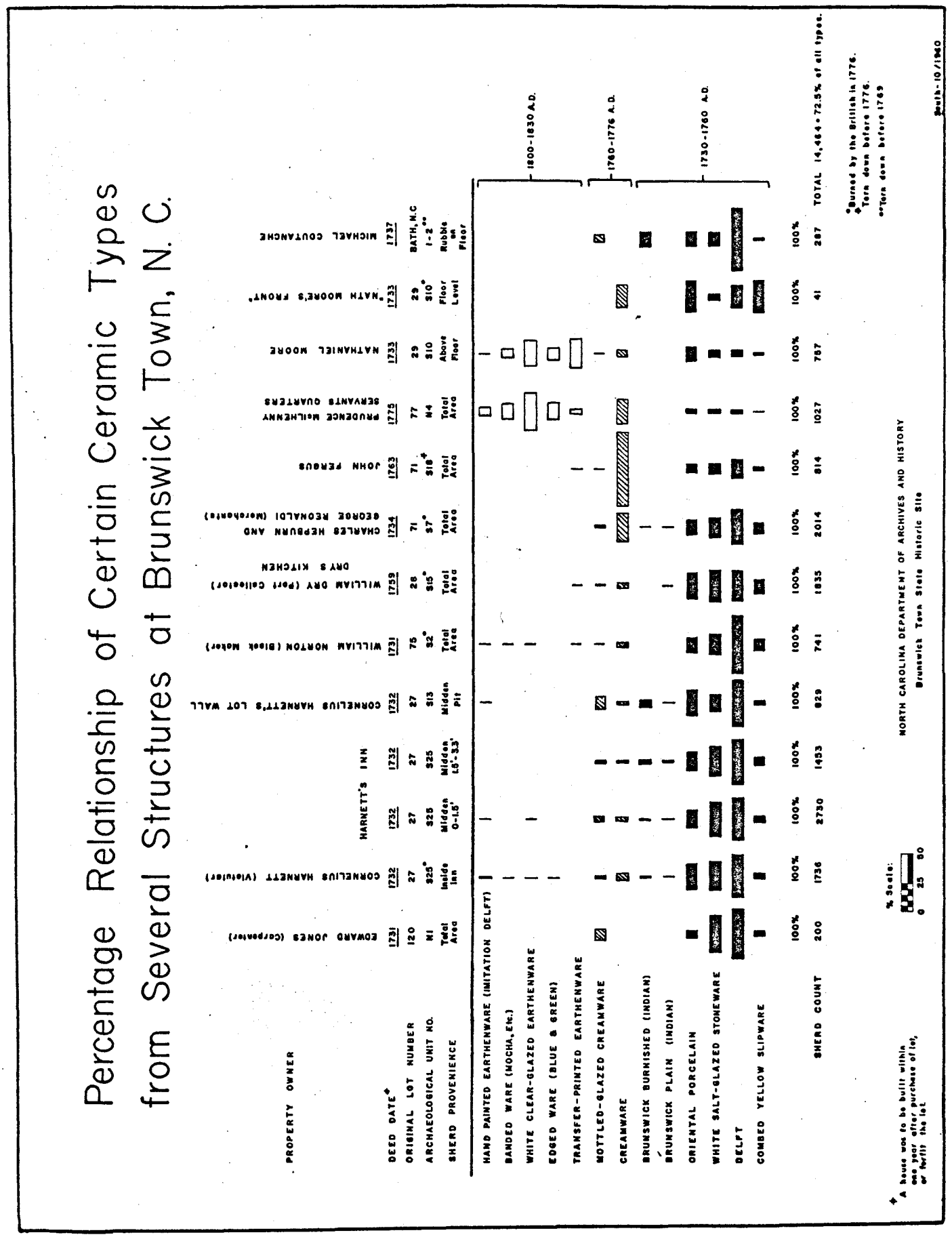
entitled

"The Ceramic Types at Brunswick Town,
North Carolina"

Published in

Southeastern Archaeological Conference Newsletter
Vol. 9, No. 1 (1962)

This chart demonstrated the similarity of percentage relationships between several ruins of similar documented time periods, providing data of value in determining the occupation period of ruins of unknown time periods from a percentage relationship comparison of the ceramic types.


Percentage Relationship of Certain Ceramic Types from Several Structures at Brunswick Town, N. C.
PROPERTY OWNER
DEED DATE♦
ORIGINAL LOT NUMBER
ARCHAEOLOGICAL UNIT NO.
SHERD PROVENIENCE
EDWARD JONES (Carpenter)
CORNELIUS HARNETT (Violuter)
HARNETT'S INN
CORNELIUS HARNETT'S LOT WALL
WILLIAM NORTON (Block Maker)
WILLIAM ORR (Port Collector)
ORR'S KITCHEN
CHARLES HEPBURN AND GEORGE REONALDI (Merchants)
JOHN FERRUS
PRUDENCE MAILHENNY SERVANTS QUARTERS
NATHANIEL MOORE
"NATH MOORE'S FRONT"
MICHAEL COUTANCHE
HAND PAINTED EARTHENWARE (IMITATION DELFT)
BANDED WARE (MOCHA, Etc.)
WHITE CLEAR-GLAZED EARTHENWARE
EDGED WARE (BLUE & GREEN)
TRANSFER-PRINTED EARTHENWARE
MOTTLED-GLAZED CREAMWARE
CREAMWARE
BRUNSWICK BURNISHED (INDIAN)
BRUNSWICK PLAIN (INDIAN)
ORIENTAL PORCELAIN
WHITE SALT-GLAZED STONEWARE
DELFT
COMBED YELLOW SLIPWARE
SHERD COUNT
1800-1830 A.D.
1760-1776 A.D.
1730-1760 A.D.
TOTAL 14,464 • 72.5% of all types.
♦A house was to be built within one year after purchase of lot, or forfit the lot.
% Scale:
0 25 50
NORTH CAROLINA DEPARTMENT OF ARCHIVES AND HISTORY
Brunswick Town State Historic Site
Drafts-10/1960
♦Burned by the British in 1776.
Torn down before 1776.
♦♦Torn down before 1769

APPENDIX II

THE MEAN CERAMIC DATE FORMULA USING PRESENCE-ABSENCE AND FREQUENCY

The mean manufacture date for the group of Colonial British ceramic types from an historic site taking into consideration the frequency of occurrence of fragments of the types, can be determined by a mean ceramic date-frequency formula as follows:

Where the mean ceramic date, Y, is expressed:

$$Y = \frac{\sum_{i=1}^{n} X_i \cdot f_i}{\sum_{i=1}^{n} f_i}$$

Where X_i = the median date for the manufacture of each ceramic type

f_i = the frequency of each ceramic type

n = the number of ceramic types in the sample

APPENDIX III

Application of the Mean Ceramic Date Formula to Samples from Historic Sites

Presented here are the types and frequency data for the sites discussed in this paper as used with the mean ceramic date formula from which the mean ceramic dates used in Figure 1 were taken.

APPENDIX III

APPLICATION OF THE MEAN CERAMIC DATE FORMULA TO SAMPLES FROM HISTORIC SITES

Charles Towne (38CH1) The First English Fortification in South Carolina

Ceramic Type	Type Median	Sherd Count	Product
64	1665	4	6660
62	1670	13	21710
65	1720	10	17200
66	1660	60	99600
70	1635	62	101370
58	1668	1	1668
72	1610	1	1610
		151	249818 ÷ 151 = 1654.4

Historic dates 1670-1680

Historic median date 1675

Mean ceramic date 1654.4

Pipestem date 1667

The First Fort Moore? (38AK4-15) An Eighteenth Century Frontier Fort and Trading Post

22	1791	2	3582
26	1730	1	1730
37	1733	1	1733
29	1760	1	1760
43	1758	35	61530
49	(1750)	64	112000
48	1745	1	1745
39	1730	38	65740
54	1733	4	6932
56	1733	18	31194
61	1713	42	71946
66	1660	39	64740
		246	424632 ÷ 246 = 1726.1

Historic dates 1716-1747

Historic median date 1732

Mean ceramic date 1726.1

Pipestem date 1730.9

Fort Moore (38AK5-A)

Ceramic Type	Type Median	Sherd Count	Product
62	1730	1	30
37	1733	2	66
43	1758	13	754
49	(1750)	17	850
44	1738	4	152
39	1730	18	540
53	1733	3	99
54	1733	4	132
56	1733	4	132
		66	2755 ÷ 66 (+ 1700) = 1741.7

Historic dates 1716-1766

Historic median date 1741

Mean ceramic date 1741.7

Pipestem date 1744.16

Goudy's Trading Post at Fort Ninety Six, South Carolina (38GN1-3) (Plowed Zone)

22	1791	7	637
21	1788	1	88
43	1758	2	116
49	1750	6	300
44	1738	1	38
		17	1179 ÷ 17 (+ 1700) = 1769.3

Historic dates 1751-?

Mean ceramic date 1769.3

Goudy's Trading Post at Fort Ninety Six, South Carolina (38GN1-5) (Cellar)

29	1760	2	120
43	1758	3	174
49	1750	1	50
44	1738	1	38
		7	382 ÷ 7 (+ 1700) = 1754.6

Historic dates 1751-1760?

Historic median date 1756

Mean ceramic date 1754.6

Fort Prince George, South Carolina 38PN1 A British Military Post on the Cherokee Frontier

Ceramic Type	Type Median	Sherd Count	Product
28	1769	2	138
22	1791	255	23205
33	1767	1	67
31	1770	78	5460
21	1788	12	1056
26	1730	25	750
34	1760	2	120
36	1755	6	330
40	1763	4	252
29	1760	12	720
43	1758	127	7366
49	(1750)	123	6150
44	1738	15	570
47	1748	2	96
45	1750	72	3600
39	1730	68	2040
46	1755	10	550
54	1733	16	528
56	1733	21	693
		851	53691 ÷ 851 (+ 1700) = 1763.0

Historic dates 1753-1768

Historic median date 1761

Mean ceramic date 1763.0

Pipestem date 1750.14

The Rock Turtle Site (38PN4) An Eighteenth Century Indian Village Site

22	1791	2	182
33	1767	4	268
26	1730	1	30
34	1760	1	60
36	1755	2	110
40	1763	1	63
37	1733	1	33
41	1758	1	58
43	1758	23	1334
49	(1750)	54	2700
44	1738	5	190
39	1730	9	270
54	1733	3	99
56	1733	5	165
		112	5562 ÷ 112 (+ 1700) = 1749.7

Mean ceramic date 1749.7

Pipestem date 1756.36

Brunswick Town, North Carolina (Ruin S15)

Ceramic Type	Type Median	Sherd Count	Product
11	1818	1	1818
22	1791	96	171936
33	1767	37	65379
26	1730	54	93420
35	1780	2	3560
42	1758	2	3516
37	1733	23	39859
29	1760	63	110880
43	1758	532	935256
49	(1750)	485	848750
44	1738	68	118184
47	1748	52	90896
39	1730	418	723140
46	1755	3	5265
53,54	1733	79	136907
56	1733	330	571890
		2245	3920656 ÷ 2245 = 1746.4

Historic dates 1726-1759-1776

Historic median date 1751

Mean ceramic date 1746.4

Pipestem date 1748

Brunswick Town, North Carolina (Ruin N1)

33	1767	3	201
26	1730	1	30
34	1760	8	480
29	1760	7	420
43	1758	64	3712
49	(1750)	89	4450
44	1738	6	228
47	1748	2	96
39	1730	17	510
53,54	1733	1	33
56	1733	14	462
		212	10631 ÷ 212 (+ 1700) = 1750.1

Historic dates 1731-1776

Historic median date 1754

Mean ceramic date 1750.1

Brunswick Town, North Carolina (S2)

Ceramic Type	Type Median	Sherd Count	Product
11	1818	1	1818
13	1805	3	5415
22	1791	41	73431
33	1767	4	7068
26	1730	14	24220
34	1760	4	7040
36	1755	3	5265
37	1733	5	8665
29	1760	12	21120
43	1758	136	239088
49	(1750)	373	652750
44	1738	45	78210
47	1748	112	195776
39	1730	103	178190
53,54	1733	31	53723
56	1733	91	57703
		978	1709482 ÷ 978 = 1749.0

Historic dates 1731-1776

Historic median date 1754

Mean ceramic date 1749.0

Pipestem date 1748

Brunswick Town, North Carolina (S18)

11	1818	1	1818
22	1791	558	999378
33	1767	6	10602
26	1730	8	13840
34	1760	11	19360
36	1755	8	14040
37	1733	3	5199
43	1758	73	128334
49	(1750)	137	239750
44	1738	7	12165
47	1748	4	6992
39	1730	28	48440
53,54	1733	10	17330
56	1733	15	25995
		869	1543244 ÷ 869 = 1776.2

Mean ceramic date 1776.2

The Paca House, Annapolis, Maryland 19J,27B A Town House Mansion

Ceramic Type	Type Median	Sherd Count	Product
44	1738	4	6952
22	1791	14	25074
26	1730	2	3460
43	1758	9	15822
47	1748	3	5244
37	1733	1	1733
49	(1750)	5	8750
39	1730	2	3460
36	1755	1	1755
17	1800	1	1800
31	1770	2	3540
46	1755	1	1755
34	1760	1	1760
		46	81105 ÷ 46 (+ 1700) = 1763.1

Historic dates 1763-80?

Mean ceramic date 1763.1

The S10 Dump at Brunswick Town A Post Revolutionary War Dump

2	1860	45	83700
12	1805	44	79420
11	1818	136	247248
13	1805	32	57760
17	1800	1	1800
22	1791	17	30447
33	1767	10	17670
19	1805	47	84835
26	1730	13	22490
43	1758	21	36918
49	(1750)	16	28000
44	1738	12	20856
47	1748	2	3496
39	1730	37	64010
53,54	1733	15	25995
56	1733	15	25995
		463	830640 ÷ 463 = 1794.0

Historic dates 1776-1830

Historic median date 1803

Mean ceramic date 1794.0

Tallassee, A Nineteenth Century Cherokee Indian? House Site in Tennessee

Ceramic Type	Type Median	Sherd Count	Product
4	1830	28	51240
11	1818	10	18180
9	1810	6	10860
15	1798	5	8990
17	1800	10	18000
		59	107270 ÷ 59 = 1818.1

Mean ceramic date 1818.1

Toxaway (38OC3) An Eighteenth Century Cherokee Indian Village Site

1	1860	11	20460
19	1805	1	1805
48	1745	11	19195
39	1730	2	3460
56	1733	32	55456
		57	100376 ÷ 57 = 1761.0

Mean ceramic date 1761.0

The Nipper Creek Site (38RD18)

12	1805	29	52345
14	1798	2	3596
15	1798	30	53940
19	1805	1	1805
		62	111686 ÷ 62 (+1800) = 1801.3

Mean ceramic date 1801.3

FIGURE 1

CERAMIC ANALYSIS TOOLS FOR EIGHTEENTH CENTURY
COLONIAL ENGLISH SITES

CERAMIC ANALYSIS TOOLS

FOR THE INTERPRETATION

of Eighteenth Century British American Sites

Stanley Sout
Institute of Archeol
University of Sc

To Accompany a Paper on "Evolution and Horizon as Revealed in Ceramic Analysis in Historical Archeology"

(A) The Ceramic Types Used to the Analysis Tools

from

A Guide to Artifacts of Colonial Ame

by

Ivor Noël Hume

(Updated in a Conference with Noël Hume, O

TYPE NUMBER	DATE RANGE	MEDIAN DATE	CERAMIC TYPE NAME AND PAGE REFERENCE
			Porcelain
5.	c.1800-1830	1815	CANTON PORCELAIN (262).
7.	c.1790-1825	1808	OVERGLAZE ENAMELLED CHINA TRADE PORCELAIN (258 and 261).
26.	c.1660-1800	1730	OVERGLAZE ENAMELLED CHINESE EXPORT PORCELAIN (261).
31.	c.1745-1795	1770	ENGLISH PORCELAIN (137).
39.	c.1660-1800	1730	UNDERGLAZE BLUE CHINESE PORCELAIN (257).
41.	c.1750-1765	1758	"LITTLER'S BLUE" (119-23) (ON WHITE SALT-GLAZED STONEWARE, PORCELAIN, AND CREAMWARE).
69.	c.1574-1644	1609	CHINESE PORCELAIN, UNDERGLAZE BLUE, LATE MING (257 and 264).
			Stoneware
BROWN			
1.	c.1820-1900+	1860	BROWN STONEWARE BOTTLES FOR INK, BEER, ETC. (78-79).
46.	c.1700-1810	1755	NOTTINGHAM STONEWARE (LUSTERED) (114).
52.	c.1700-1775	1738	BURSLEM "CROUCH" PALE BROWN STONEWARE MUGS.
53.	c.1690-1775	1733	BROWN SALT-GLAZED MUGS (FULHAM) (111-13).
54.	c.1690-1775	1733	BRITISH BROWN STONEWARE (EXCLUDING 1, 52, 53) (112-14).
66.	c.1620-1700	1660	DETERIORATED BELLARMINE FACE BOTTLES (ONE DATED EXAMPLE TO THE 1760's) (56-57).
74.	c.1550-1625	1588	BELLARMINE, BROWN SALT-GLAZED STONEWARE, WELL MOLDED HUMAN FACE (55-57).
75.	c.1540-1600	1570	RHENISH BROWN-GLAZED SPRIGGED, MOULD-DECORATED, COLOGNE TYPE STONEWARE (277-79).
BLUE, GRAY			
44.	c.1700-1775	1738	WESTERWALD, STAMPED BLUE FLORAL DEVICES, GEOMETRIC DESIGNS (284-85).
58.	c.1650-1725	1668	SPRIG MOLDING, COMBED LINES, BLUE AND MANGANESE DECORATED RHENISH STONEWARE (280-81).
59.	c.1690-1710	1700	EMBELLISHED HOHR GRAY RHENISH STONEWARE (284).
77.	c.1700-1775	1738	WESTERWALD CHAMBER POTS (148,281).
WHITE			
16.	c.1740-1765	1753	MOULDED WHITE SALT-GLAZED STONEWARE (115).
24.	c.1765-1795	1780	DEBASED "SCRATCH BLUE" WHITE SALT-GLAZED STONEWARE (118).
30.	c.1755-1765	1760	TRANSFER PRINTED WHITE-SALTGLAZED STONEWARE (128).
34.	c.1744-1775	1760	"SCRATCH BLUE" WHITE SALT-GLAZED STONEWARE (117).
40.	c.1720-1805	1763	WHITE SALT-GLAZED STONEWARE (EXCLUDING PLATES AND MOULDED) (115-17).
41.	c.1750-1765	1758	"LITTLER'S BLUE" (119-23) (ON WHITE SALT-GLAZED STONEWARE, PORCELAIN, AND CREAMWARE).
43.	c.1740-1775	1758	WHITE SALT-GLAZED STONEWARE PLATES (115-17).
48.	c.1715-1775	1745	SLIP-DIPPED WHITE SALT-GLAZED STONEWARE (114-15).
55.	c.1720-1730	1725	"SCRATCH BROWN OR TRAILED" WHITE SALT-GLAZED STONEWARE (117).
OTHER			
3.	c.1813-1900	1857	IRONSTONE AND GRANITE CHINA (131).
27.	c.1750-1820	1785	"BLACK BASALTES" STONEWARE (121-22).
28.	c.1763-1775	1769	ENGINE-TURNED UNGLAZED RED STONEWARE (121).
37.	c.1690-1775	1733	REFINED RED STONEWARE, UNGLAZED, SPRIGGED (120-21).
50.	c.1732-1750	1741	RALPH SHAW, BROWN, SLIPPED STONEWARE (118-19).
			Earthenware
SLIPWARE			
56.	c.1670-1795	1733	LEAD GLAZED SLIPWARE (COMBED YELLOW) (107,134-36).
63.	c.1650-1710	1680	NORTH DEVON SGRAFFITO SLIPWARE (104-05).
67.	c.1612-1700	1656	WROTHAM SLIPWARE (103-04).
68.	c.1630-1660	1645	"METROPOLITAN" SLIPWARE (103).
70.	c.1610-1660	1635	RED MARBELIZED SLIPWARE (NORTH ITALIAN) (77).
73.	c.1580-1625	1603	WANFRIED SLIPWARE (139).

Earthenware (Continued)

REFINED			
2.	c.1820-1900+	1860	WHITEWARE (130-31).
6.	c.1795-1890	1843	MOCHA (131).
29.	c.1740-1780	1760	"JACKFIELD" WARE (123).
33.	c.1759-1775	1767	GREEN GLAZED CREAM-BODIED WARE (124-25).
36.	c.1740-1770	1755	"CLOUDED" WARES, TORTOISESHELL, MOTTLED GLAZED CREAM-COLORED WARE (123).
42.	c.1740-1775	1758	REFINED AGATE WARE (132).
51.	c.1725-1750	1738	"ASTBURY" WARE, WHITE SPRIGGED AND TRAILED (123).
78.	c.1790-1840	1815	LUSTER DECORATED WARES.
COARSE			
35.	c.1750-1810	1780	COARSE AGATE WARE (EXCLUDING DOORKNOBS) (132).
38.	c.1745-1780	1763	IBERIAN STORAGE JARS (143).
47.	c.1720-1775	1748	BUCKLEY WARE (132-33, 135).
61.	c.1650-1775	1713	NORTH DEVON GRAVEL TEMPERED WARE (133).
TIN-ENAMELLED			
21.	c.1775-1800	1788	DEBASED ROUEN FAIENCE (141-42) (c.1755 ON FRENCH SITES).
32.	c.1730-1830	1780	PEDESTAL-FOOTED TYPE DELFT OINTMENT POT (204-05).
45.	c.1700-1800	1750	EVERTED RIM, PLAIN DELFT OINTMENT POT (204-05).
49.	c.1600-1802	(1650) (17TH CENT.) (1750) (18TH CENT.)	DECORATED DELFTWARE (105-11).
57.	c.1750-1800	1775	PLAIN DELFT WASH BASINS.
60.	c.1710-1740	1725	MIMOSA PATTERN DELFT (108-11).
62.	c.1620-1720	1670	ENGLISH DELFTWARE (BLUE DASH CHARGERS) (108-09).
64.	c.1630-1700	1665	CYLINDRICAL DELFT OINTMENT POTS (109, 203-10).
65.	c.1640-1800	1720	PLAIN WHITE DELFTWARE (109).
71.	c.1620-1775	1698	DELFT APOTHECARY JARS (MONOCHROME).
72.	c.1580-1640	1610	DELFT APOTHECARY JARS AND POTS (POLYCHROME) (203).
76.	c.1660-1800	1730	DELFT CHAMBER POTS (146-47).
CREAMWARE			
8.	c.1790-1820	1805	"FINGER-PAINTED" WARES (POLYCHROME SLIP ON CREAMWARE OR PEARLWARE (132).
14.	c.1780-1815	1798	"ANNULAR WARES" CREAMWARE (131).
15.	c.1775-1820	1798	LIGHTER YELLOW CREAMWARE (126-28).
18.	c.1765-1810	1788	OVERGLAZE ENAMELLED HAND PAINTED CREAMWARE.
22.	c.1762-1820	1791	CREAMWARE (125-26).
23.	c.1765-1815	1790	TRANSFER PRINTED CREAMWARE (126-28).
25.	c.1762-1780	1771	DEEPER YELLOW CREAMWARE (126-28).
41.	c.1750-1765	1758	"LITTLER'S BLUE" (119-23) (ON WHITE SALT-GLAZED STONEWARE, PORCELAIN, AND CREAMWARE).

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(B) An Application of the Mean Ceramic Date Formula

THE MEAN CERAMIC DATE FORMULA USING PRESENCE-ABSENCE AND FREQUENCY

THE MEAN MANUFACTURE DATE FOR THE GROUP OF COLONIAL ENGLISH CERAMIC TYPES FROM AN HISTORIC SITE TAKING INTO CONSIDERATION THE FREQUENCY OF OCCURRENCE OF FRAGMENTS OF THE TYPES, CAN BE DETERMINED BY A MEAN CERAMIC DATE-FREQUENCY FORMULA AS FOLLOWS:

WHERE THE MEAN CERAMIC DATE, Y, IS EXPRESSED:

$$Y = \frac{\sum_{i=1}^{n} X_i \cdot f_i}{\sum_{i=1}^{n} f_i}$$

WHERE X_i = THE MEDIAN DATE FOR THE MANUFACTURE OF EACH CERAMIC TYPE

f_i = THE FREQUENCY OF EACH CERAMIC TYPE

n = THE NUMBER OF CERAMIC TYPES IN THE SAMPLE

BRUNSWICK TOWN, NORTH CAROLINA RUIN S7

CERAMIC TYPE	TYPE MEDIAN (X_i)	SHERD COUNT (f_i)	PRODUCT ($X_i \cdot f_i$)
22	1791	483	43953
33	1767	25	1675
26	1730	62	1860
34	1760	32	1920
36	1755	55	3025
37	1733	40	1320
43	1758	327	18966
49	(1750)	583	29150
44	1738	40	1520
47	1748	28	1344
39	1730	241	7230
53,54	1733	52	1716
56	1733	286	9438
29	1760	9	540
		2263	T23657 ÷ 2263 (+ 1700) = 1754.6

HISTORIC DATES 1734-1776

HISTORIC MEDIAN DATE 1755

MEAN CERAMIC DATE 1754.6

PIPESTEM DATE 1756

(D) Application of th

The Ceramic Analysis [

Using Interpretive Occu

Presence and Absence,

Date Formula Compare

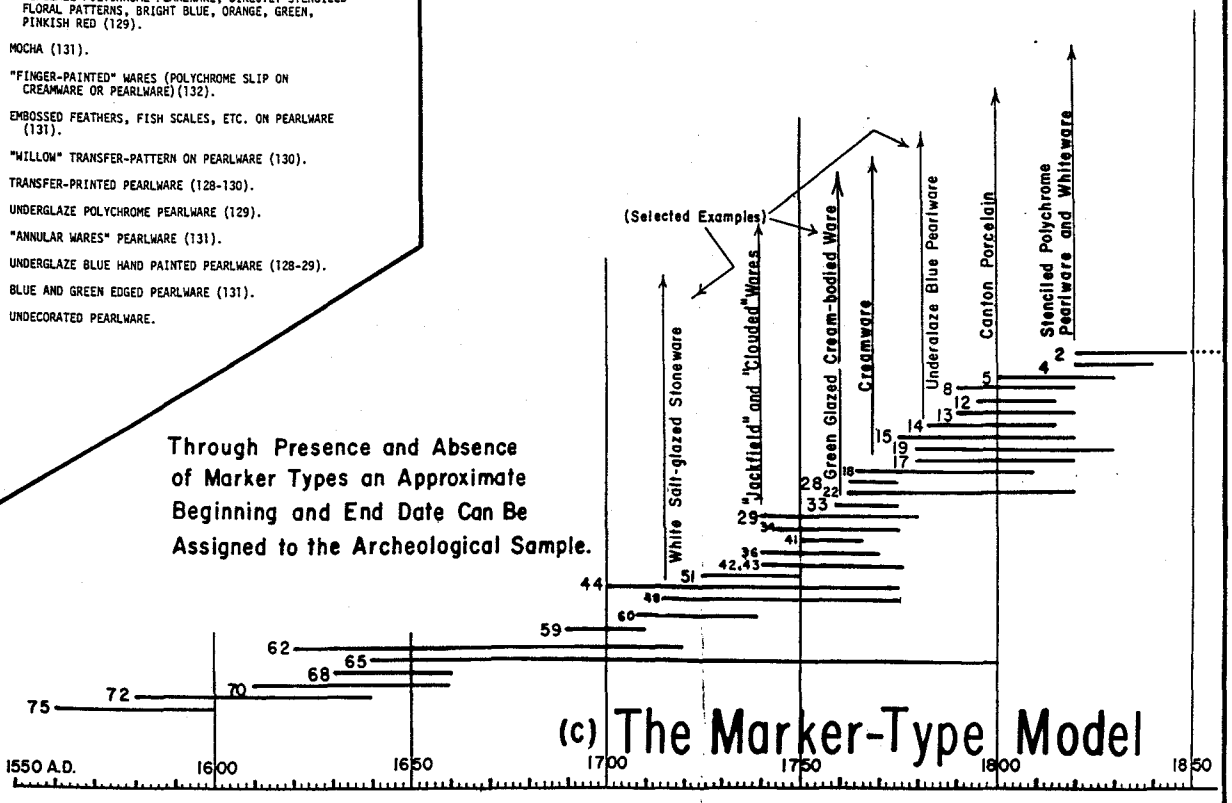
Site Occupation Period

Earthenware(Continued)

PEARLWARE

4.	c.1820-1840	1830	UNDERGLAZE POLYCHROME PEARLWARE, DIRECTLY STENCILED FLORAL PATTERNS, BRIGHT BLUE, ORANGE, GREEN, PINKISH RED (129).
6.	c.1795-1890	1843	MOCHA (131).
8.	c.1790-1820	1805	"FINGER-PAINTED" WARES (POLYCHROME SLIP ON CREAMWARE OR PEARLWARE)(132).
9.	c.1800-1820	1810	EMBOSSED FEATHERS, FISH SCALES, ETC. ON PEARLWARE (131).
10.	c.1795-1840	1818	"WILLOW" TRANSFER-PATTERN ON PEARLWARE (130).
11.	c.1795-1840	1818	TRANSFER-PRINTED PEARLWARE (128-130).
12.	c.1795-1815	1805	UNDERGLAZE POLYCHROME PEARLWARE (129).
13.	c.1790-1820	1805	"ANNULAR WARES" PEARLWARE (131).
17.	c.1780-1820	1800	UNDERGLAZE BLUE HAND PAINTED PEARLWARE (128-29).
19.	c.1780-1830	1805	BLUE AND GREEN EDGED PEARLWARE (131).
20.	c.1780-1830	1805	UNDECORATED PEARLWARE.

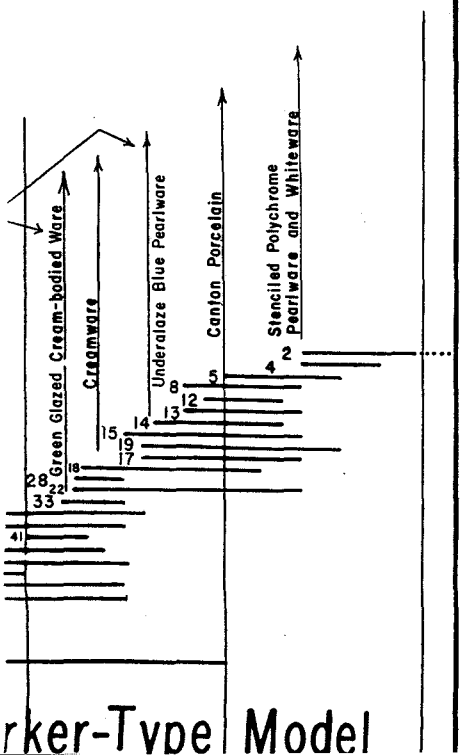
Through Presence and Absence of Marker Types an Approximate Beginning and End Date Can Be Assigned to the Archeological Sample.



(C) The Marker-Type Model

(D) Application of the Analysis Tools

The Ceramic Analysis Data from Eleven Sites Using Interpretive Occupation Brackets, Presence and Absence, and the Mean Ceramic Date Formula Compared to the Documented Site Occupation Period.



rker-Type Model

Legend

9 — Ceramic Type 9 Manufacture Period

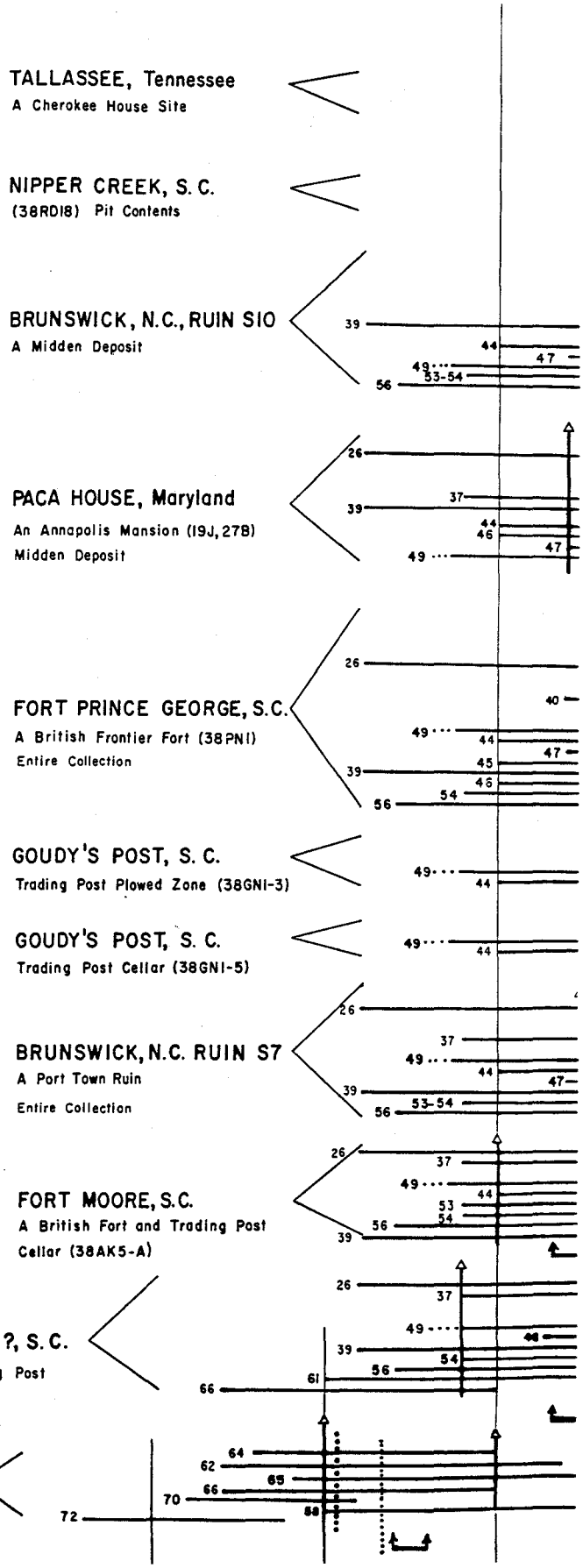
Visually Interpreted Occupation Period Brackets

Mean Ceramic Formula Date

Pipestem Date

Area of Absent Types for Interpreting an Occupation End Date

Documented Occupation Period for the Site



nalysis Tools

m Eleven Sites
Brackets,
: Mean Ceramic
Documented

Legend

— Ceramic Type 9 Manufacture Period

Visually Interpreted Occupation Period Brackets

Mean Ceramic Formula Date

Pipestem Date

Area of Absent Types for Interpreting an Occupation End Date

Documented Occupation Period for the Site