**Back to the Bowl: Using English Tobacco Pipebowls to Calculate Mean Site-Occupation Dates**

**ABSTRACT**

The form of English white ball-clay pipebowls can be used to determine accurate mean dates for historical contexts. Using previously established bowl seriations and typologies on the well-dated material assemblage uncovered at the site of the 1607 James Fort at Jamestown Island, Virginia, a newly developed calculation proves to be a reliable technique of assessing chronology. Determining the pipebowl mean date involves identifying the shape of each bowl, counting the number of examples of each morphological type, and then completing a series of simple arithmetic calculations. The pipebowl-dating device correlates well with other archaeological lines of evidence. On average, pipebowl mean dates are within seven years of mean dates established by other factors. This method regularly outperforms established pipestem-based mean-date measures.

**Introduction**

English white ball-clay pipebowls can be used to determine reliable mean dates for historical features. Analyses of recent material discoveries at the site of the original 1607 James Fort indicate that English pipebowls offer mean dates for 17th-century archaeological contexts that are corroborated by other factors. Continuing excavations by the Jamestown Rediscovery team on the Association for the Preservation of Virginia Antiquities’ (APVA) Jamestown Island property from 1994 to 2000 produced multiple narrowly dated features that are used to test previously established and newly created pipe-dating methods. These include temporal measures developed in the past by Lewis Binford (1962), Lee Hanson (1969), and Robert Heighton and Kathleen Deagan (1971). Based on bowl typologies established using seriation by David Atkinson and Adrian Oswald (1969) and Oswald (1951, 1975), the calculation for pipebowl mean dates presented here proves to be a reliable technique for determining chronology. On average, it provides occupation midpoints within seven years of mean dates established by other archaeological and historical lines of evidence. The bowl-based method consistently outperforms commonly used stem-based mean-date measures. When used on material uncovered at 44JC802, an off-island 17th-century site in Jamestown’s historical hinterland, the pipebowl mean date confirms the likely identity of the site’s landowner during its occupation. These preliminary results encourage additional use and testing of the dating technique at other historical sites.

Beginning with a review of pipe-based chronologies developed over the last 50 years, which, with few exceptions (Oswald 1951), focused more on pipestems than bowls (Harrington 1954; Binford 1962; Hanson 1969; Heighton and Deagan 1971; Deetz 1987), the following analysis also offers a brief overview of the history and archaeology of the first permanent English settlement in America as background. The four steps involved in determining a pipebowl mean date are then detailed. This temporal tool produces more accurate results than various stem-based measures on the Jamestown assemblage. Subsequent use of the dating device on neighboring sites further demonstrates its relative accuracy and utility. Throughout the article, the objects of study are English white ball-clay pipes—often called kaolin—and do not include terra-cotta “Chesapeake” or “Colono” pipes (Walker 1972:161). On the basis of maker’s marks and motifs present on the bowls and stems, the overwhelming majority of the white ball-clay pipes considered in this analysis are identified as English and not Dutch. Ultimately, even with small assemblages containing only 6 to 15 bowls, this chronological method proves to be a reliable material line of evidence with which to examine archaeological patterns.

**Background**

**Pipe-Dating Methods**

Before J. C. Harrington’s landmark discovery regarding the correspondence between time and
Pipestem-bore diameter, archaeologists depended largely on pipebowl shape for pipe chronology. Oswald (1951) established a form-based typology with reliable date ranges for English ball-clay tobacco pipebowls. His seriation demonstrated subtle yet distinct changes in bowl shape over time, pinpointing specific alterations in bowl form between regular and often exclusive 20- to 30-year intervals. Oswald noted that bowls varied regionally, but they nevertheless followed a general evolutionary pattern. Although this analytical tool aided archaeologists in their dating of many sites, scholars lamented that few excavations produced a wealth of pipebowls (Noël Hume 1969:302). Relatively small sample size—it was thought—prevented Oswald’s typology from quantitative manipulation.

Archaeologists also attempted to devise pipe chronologies on the basis of an individual pipe’s total stem length (Noël Hume 1969:296). Temporal designations corresponded with the general pattern of early-17th-century pipes averaging 6 to 8 inches long, pipes produced during the 1700s being twice that length, and 19th-century pipes returning to the original short-stemmed form (Noël Hume 1969:297). Stem-length characteristics proved problematic though, as long-stemmed “Tavern” or “Churchwarden” pipes were manufactured and used continuously after their introduction (Michael A. Pfeiffer 2001, pers. comm.). Furthermore, complete stems were even more of a rarity on historical sites than measurable bowls. Likewise, established production date and use date ranges for pipemaker’s marks provided important insights for archaeologists during this time, but the majority of historical sites did not turn up these stamped or incised pipes in statistically significant quantities.

In his classic 1954 publication, Harrington documented the relationship between pipestem bore diameters and time. Every 30 to 50 years from 1620 to 1800, pipemakers regularly reduced by 1/64th of an inch the size of the wire they used to push through the unfired clay pipe during production. As a result, the boreholes of pipestems from different time periods demonstrated a standardized reduction over time. Measurable stems outnumbered measurable bowls at most excavations by more than 12 to 1 (Noël Hume 1969:302; Mallios and Fesler 1999:48–54; Mallios 2000:69). Thus, Harrington’s dating technique for pipestems successfully determined and refined chronologies for smaller site assemblages where others could not. Oswald’s established bowl typology and date ranges provided Harrington with evidence to corroborate his findings (Deetz 1996:27). Bowls with attached measurable stems offered the ultimate test for pipestem dating: Did a chronology based on the diameter of the stem bore correspond with the bowl date range? Harrington found the answer more often than not was “yes,” and his 39-cent drill bits transformed the ubiquitous pipestem from an artifact of vague temporality into one of the more successful dating tools for sites from the historical period.

Harrington explained the merits of his new pipe-dating device and lamented its shortcomings in the same article. He noticed a wide range of variation within each defined time period and, thus, was uncomfortable with results based on small sample sizes. Harrington (1954:13) used histograms (Figure 1) to spotlight the “very marked modal distribution for each time period” and acknowledged that extending the dating technique to a single pipestem “would be unwise” and “statistically unthinkable.” He, therefore, encouraged others to limit use of his

![Figure 1](image_url)
technique to large samples of pipes. Harrington (1954:10) believed that a sample of 66 was sufficient—having measured a total of 330 pipe-stems for the five time periods tested—and that his results “would not be altered through use of a much larger sampling.” Similar quantitative techniques, such as histograms, were rarely extended to pipebowls because of Harrington’s concerns about having adequately large sample sizes. Archaeologists worried that they did not have enough measurable pipestems in their sample to date their sites even with Harrington’s method. Thus, they had little chance of finding enough measurable bowls.

Dissatisfied with what he deemed Harrington’s “clumsy ... method of data presentation,” Binford (1962:19) calculated a straight-line regression formula based on chronology and mean bore-diameter size. His criticism concerned the broad 30- to 50-year intervals that Harrington’s histograms identified. Binford (1962) asserted that the dates of archaeological samples rarely corresponded with these specific increments. As a result, Binford found temporal comparisons between sites difficult. The formula he used to determine the mean date of a particular deposit was the following:

\[ Y = 1931.85 - 38.26X \]

\( Y \) represented time in years, and \( X \) signified the pipe assemblage’s average bore-diameter measurement. Binford expressed five limitations for his formula, each of which concerned the sample. The sample needed to be (1) sufficiently large, (2) accumulated before 1780, (3) random, (4) representative, and (5) deposited over time at an even rate (Binford 1962:21).

During the 1960s, archaeologists began to notice significant problems with the accuracy and, thus, the reliability of Binford’s formula on their pipe assemblages. Stanley South employed Binford’s calculations on later Brunswick Town deposits and observed that the results strayed far from mean dates based on other historical and archaeological lines of evidence (South 1962: 23). Audrey Noël Hume (1963:24) noted that Binford’s formula worked poorly on contexts filled before 1670 or after 1760. Substantive discrepancies led to the development of modifications in the dating tool. Hanson (1969) posited a nonlinear relationship between time and bore diameter, and he proposed the following set of formulas for different date ranges:

\[ Y = 1891.64 - 39.09X, \text{ for } 1620-1680 \]

\[ Y = 1880.92 - 30.70X, \text{ for } 1620-1710 \]

\[ Y = 1869.31 - 28.88X, \text{ for } 1650-1710 \]

\[ Y = 1887.99 - 31.66X, \text{ for } 1620-1750 \]

\[ Y = 1888.06 - 31.67X, \text{ for } 1650-1750 \]

\[ Y = 1894.88 - 32.98X, \text{ for } 1680-1750 \]

\[ Y = 1919.10 - 36.06X, \text{ for } 1620-1800 \]

\[ Y = 1930.24 - 38.23X, \text{ for } 1650-1800 \]

\[ Y = 1959.66 - 44.32X, \text{ for } 1680-1800 \]

\[ Y = 2026.12 - 58.97X, \text{ for } 1710-1800 \]

Heighton and Deagan (1971) attempted to confirm Hanson’s theory, developing a general logarithmic equation that fit the natural curve of the pipestem data from a variety of historical period sites in North America. Their calculations contained two parts:

\[ (1) \quad X = (-\log Y + 1.04435)/0.05234 \]

\[ (2) \quad \text{mean date} = 1600 + 22X \]

In this case, \( Y \) signified the pipe assemblage’s average bore diameter in 1/64ths of an inch, and \( X \) represented the necessary logarithmic conversion determined in the first computation.

Whereas the aforementioned scholars pointed to specific inaccuracies in Binford’s formula, others found shortcomings in his overall approach. James Deetz (1987) used Harrington’s pipe-dating device to identify three distinct historical site groupings at Flowerdew Hundred plantation. Deetz emphasized that, in addition to providing general dates, histograms revealed occupation length and intensity. Deetz (1987:66) asserted that, on the contrary, Binford mean dates failed to appreciate these “qualitative” aspects of archaeological data. Binford (1962:21) had attempted to take some of these nuances into account, claiming that “by calculating the standard deviations of the means of the samples, you have a rough estimate of the length of time over which the sample was accumulating.” These date ranges, however, were less precise and accurate than those established by Harrington histograms. Deetz (1987:66) also dismissed the significance of mean dates on sites with bimodal occupations because they act as medians that counterproductively
pinpoint the time in between the site’s periods of use. Overall, he expressed frustration with the growing practice in historical archaeology of scholars using Binford mean dates instead of Harrington histograms. Deetz (1987:67) cautioned the archaeological community about exclusively employing “narrowly focused techniques” and insisted that archaeologists embrace multiple lines of evidence to deepen insight into the past.

Jamestown History and Archaeology

Although groups of prehistoric natives had occupied Jamestown Island for thousands of years before the English landed in May 1607, the colonists noted no Algonquian settlements on the island upon their arrival (Figure 2). In fact, the Paspahgegs, geographically the nearest of the 31 indigenous Chesapeake tribes that made up the Powhatan chiefdom in the early-17th century, offered Jamestown Island as a gift to the English colonists during the settlers’ first week in the region (Mallios 1998:202–292).

Many of the fabled events in early Anglo-American history—Pocahontas “saving” John Smith, the “birth” of American democracy at the 1619 General Assembly, the devastatingly coordinated 1622 Algonquian Uprising, and others—began on this small swampy island that the natives no longer inhabited and immediately transferred to the foreign settlers. A wealth of contemporaneous primary documents detailed the fledgling English New World colony as it grew from frontier outpost to burgeoning town to Virginia capital during the 17th century (Barbour 1969, 1986; McIlwaine 1979).

Extensive archaeological excavations at Jamestown Island during the late-19th and 20th centuries produced thousands of significant finds but no evidence of early-17th-century fortifications. As a result, popular belief held that the material remains of the 1607 James Fort had eroded away into the James River. In 1996, however, Jamestown Rediscovery archaeologists announced that they had uncovered undeniable evidence of the first permanent English settlement in America. Many of the more than 500 features exposed during ongoing excavations corresponded with fort descriptions and dimensions recorded by Council President John Smith, Colony Secretary William Strachey, and Spanish Ambassador to England Don Pedro de Zúñiga. The faint soil stain imprints of long-since-vanished palisaded fort walls, circular bastions, demilune earthworks, and fortified extensions corresponded with many of the details in the historical narratives (Kelso et al. 2001). Furthermore, a majority of the more than 350,000 artifacts recovered to this point were unquestionably used and discarded during the 1607–1623 Fort period (Mallios and Straube 2000).

Methods

Of the many structures, ditches, pits, and middens excavated at the site of James Fort from 1994 to 2000, 8 contained at least 5 pipebowls whose overall shape could be determined, and 9 included more than 100 measurable pipestems in their fill. Complementary analytical lines of evidence—those based, for example, on stratigraphy, a *terminus post quem* or a *terminus ante quem*, dated items, historical...
analogs, parallel findings from other sites, and the intersection of artifact production- and usedate ranges—established explicit date ranges for these sealed contexts. The analysis presented here first tested pipebowl mean dates against the known date-range midpoint for each feature. It then performed a similar comparison among Binford, Hanson (1620–1680), and Heighton-Deagan pipestem mean dates and the feature-specific assemblages.

The calculation of pipebowl mean dates consisted of the following four steps:

1. Identify and note each pipebowl form within the given bowl typology (Figures 3–5). The typology is from the work of Atkinson and Oswald (1969).
2. Count the number of bowls represented by each form.
3. Multiply the number of bowls in each type by the midpoint year of each typological date range.
4. Sum these midpoints and divide by the total number of measurable bowls in the sample.

The answer is the pipebowl mean date.

For example, Jamestown Rediscovery’s Ditch 1 contained 30 measurable pipebowls: 2 Type 4’s, 2 Type 5’s, 1 Type 6, 2 Type 8’s, 12 Type 10’s, 3 Type 12’s, and 8 Type 13’s. The resultant calculation

\[
\{(2 \times 1625) + (2 \times 1625) + (1 \times 1625) + (2 \times 1625) + (12 \times 1650) + (3 \times 1655) + (8 \times 1670)\}/30
\]

produced an answer of 1650. Dozens of other archaeological factors had previously determined Ditch 1’s actual mean date to be 1645 (Mallios and Straube 2000:23).

Results

Jamestown

Pipebowl mean dates, even from those features with a pipebowl count as low as 6, were reliable markers of chronology (Figure 6). They were, on average, fewer than 6.5 years off of a feature’s actual temporal midpoint (Tables 1 and 2). Furthermore, pipebowl dates pinpointed a year within the feature’s combined occupational/depositional date range 87.5% of the time (seven out of eight). They also provided a relatively accurate temporal estimation for a feature in a pre-1620 context, a known limitation of pipestem-based calculations (Noël Hume 1963). For example, English settlers filled Pit 3, likely a secondary expense magazine in James Fort, sometime between 1607 and 1620. Excavators found eight measurable pipebowls in the fill of this feature. The pipebowl mean date (1613.75) was less than a year off of

<table>
<thead>
<tr>
<th>Master Context</th>
<th>No. of Datable Bowls Using 1969 Atkinson/Oswald Typology</th>
<th>Types 1</th>
<th>Types 3</th>
<th>Types 4</th>
<th>Types 8</th>
<th>Types 9</th>
<th>Types 10</th>
<th>Types 11</th>
<th>Types 12</th>
<th>Types 13</th>
<th>Types 15</th>
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<tr>
<td>Pit 3</td>
<td>8</td>
<td>3</td>
<td>5</td>
<td>0</td>
<td>0</td>
<td>0</td>
<td>0</td>
<td>0</td>
<td>0</td>
<td>0</td>
<td>0</td>
</tr>
<tr>
<td>Townwork Trench</td>
<td>13</td>
<td>1</td>
<td>7</td>
<td>5</td>
<td>0</td>
<td>0</td>
<td>0</td>
<td>0</td>
<td>0</td>
<td>0</td>
<td>0</td>
</tr>
<tr>
<td>Ditch 7</td>
<td>18</td>
<td>3</td>
<td>8</td>
<td>5</td>
<td>0</td>
<td>0</td>
<td>2</td>
<td>0</td>
<td>2</td>
<td>0</td>
<td>2</td>
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<td>Ditch 1</td>
<td>30</td>
<td>0</td>
<td>7</td>
<td>12</td>
<td>3</td>
<td>8</td>
<td>8</td>
<td>8</td>
<td>8</td>
<td>8</td>
<td>8</td>
</tr>
<tr>
<td>Pit 2</td>
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<td>3</td>
<td>3</td>
<td>1</td>
<td>5</td>
<td>1</td>
<td>5</td>
<td>5</td>
<td>5</td>
<td>5</td>
</tr>
<tr>
<td>Ditch 3</td>
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<td>2</td>
<td>2</td>
<td>0</td>
<td>2</td>
<td>2</td>
<td>2</td>
<td>2</td>
<td>2</td>
<td>2</td>
</tr>
<tr>
<td>Midden 1</td>
<td>26</td>
<td>0</td>
<td>2</td>
<td>12</td>
<td>2</td>
<td>10</td>
<td>10</td>
<td>10</td>
<td>10</td>
<td>10</td>
<td>10</td>
</tr>
<tr>
<td>Ditch 6</td>
<td>15</td>
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<td>5</td>
<td>6</td>
<td>4</td>
<td>0</td>
<td>0</td>
<td>0</td>
<td>0</td>
<td>0</td>
<td>0</td>
</tr>
</tbody>
</table>

TABLE 1
JAMESTOWN REDISCOVERY PIPEBOWL DATA
the mean date determined from complementary lines of evidence (1613.50).

Comparisons of pipestem mean dates based on the different formulas discussed earlier offered insights into the individual effectiveness of each dating method (Figure 7). Hanson’s linear regression for 1620–1680 contexts provided dates, on average, within seven years of each feature’s actual chronological midpoint (Tables 3 and 4). Binford mean dates were off by
FIGURE 4. English pipebowl typology for pipe types 14–25 with associated date ranges and midpoints (after Atkinson and Oswald 1969:figures 1 and 2). Pipes are drawn to scale.
FIGURE 5. English pipebowl typology for pipe types 26–32 with associated date ranges and midpoints (after Atkinson and Oswald 1969:figure 2). Pipes are drawn to scale.
TABLE 2
JAMESTOWN REDISCOVERY MEAN DATES AND PIPEBOWL MEAN DATES

<table>
<thead>
<tr>
<th>Master Context</th>
<th>Date Range</th>
<th>Mean Date</th>
<th>Pipebowl Mean Date</th>
<th>Difference between Mean Date and Pipebowl Mean Date</th>
<th>Pipebowl Mean within Date Range?</th>
</tr>
</thead>
<tbody>
<tr>
<td>Pit 3</td>
<td>1607–1620</td>
<td>1613.50</td>
<td>1613.75</td>
<td>0.25</td>
<td>yes</td>
</tr>
<tr>
<td>Bulwark Trench</td>
<td>1607–1630</td>
<td>1618.50</td>
<td>1632.31</td>
<td>13.81</td>
<td>no</td>
</tr>
<tr>
<td>Ditch 7</td>
<td>1630–1650</td>
<td>1640.00</td>
<td>1631.94</td>
<td>8.06</td>
<td>yes</td>
</tr>
<tr>
<td>Ditch 1</td>
<td>1630–1660</td>
<td>1645.00</td>
<td>1650.00</td>
<td>5.00</td>
<td>yes</td>
</tr>
<tr>
<td>Pit 2</td>
<td>1630–1660</td>
<td>1645.00</td>
<td>1652.50</td>
<td>7.50</td>
<td>yes</td>
</tr>
<tr>
<td>Ditch 3</td>
<td>1640–1660</td>
<td>1650.00</td>
<td>1648.33</td>
<td>1.67</td>
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</tr>
<tr>
<td>Midden 1</td>
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<td>1647.50</td>
<td>1656.15</td>
<td>8.65</td>
<td>yes</td>
</tr>
<tr>
<td>Ditch 6</td>
<td>1640–1660</td>
<td>1650.00</td>
<td>1643.00</td>
<td>7.00</td>
<td>yes</td>
</tr>
</tbody>
</table>

an average of 12 years, and the Heighton-Deagan estimations regularly missed the mark by 21 years. For 87.5% of the features, Hanson’s calculation supplied a date within the established chronological range. Binford and Heighton-Deagan dates were within each feature’s date range 37.5% and 12.5% of the time, respectively. These tests also confirmed the previously established ineffectiveness of pipestem mean dates in pre-1620 contexts. For example, Structure 165, a Fort period earthfast post building and L-shaped cellar that

![Figure 6](image.png)

FIGURE 6. A comparison of pipebowl mean dates and date ranges for Jamestown Rediscovery features.
Beyond Jamestown Island

The George Sandys Site

Analysis of material from the original 1607 fort site at Jamestown Island revealed the utility of the pipebowl mean-date technique. The
The method was then used on other archaeological sites in an effort to test the efficacy of this new dating tool. In a subsequent study, the pipebowl mean date played an important role in supporting a link between the material assemblages from an archaeological site and the identification of its likely historical owner and occupants. The pipebowl mean date was not calculated in place of any other analytical techniques but in addition to them. The results demonstrated how pipebowl mean dates can be helpful in defining ownership of a single-occupation site that had been repeatedly transferred within a brief period of time (Walker 1965:62).

Located 8 miles east of Jamestown Island along the north shore of the James River, site 44JC802 contained more than 40,000 artifacts and consisted of 25 features, including three post-in-ground structures, a well, a daub pit, and a storage pit (Figure 8). Information gleaned from the material assemblages and associated archaeological contexts of this single-occupation farmstead offered insights into the operation of one of Virginia’s earliest attempts at settling Jamestown’s hinterland. Site 44JC80—dug from 1992 to 1998 by members of the APVA’s Jamestown Rediscovery staff—was named after the area’s first documented landowner, George Sandys, who served as Jamestown’s initial resident treasurer from 1621 to 1625. The property passed through the hands of multiple individuals during the second quarter of the 17th century—Sandys (1624–1626), Edward Grendon (1626–1628), Thomas Grendon (1628–ca. 1630), John Wareham (ca. 1630–1638), John Browning (1638–1646), and William Browning (1646–1660).

Multiple lines of evidence indicated that colonists inhabited the Sandys site during the second quarter of the 17th century. The material assemblage produced a majority (68%) of stems with bores 8/64 of an inch in diameter, dated by Harrington to 1620–1650. The assemblage also included ceramics attributed to potters at Jamestown (1630–1645) and Martin’s Hundred (1620–1640). It was also significant that there was an absence of wine-bottle glass (terminus ante quem 1650). Although the Sandys site pipe sample produced more than 100 measurable English pipebowls, a bowl-based histogram provided little additional qualitative information (Figure 9). In fact, it suggested a broad 1610–1660 occupation that other, more precisely dated artifact types refined and shortened. Overall, a conservative interpretation of the multiple lines of archaeological evidence placed colonists at 44JC802 from 1620 to 1650 with a median date of 1635 (Figure 10). This chronology eliminated from consideration only William Browning from the inventory of probable owners of the land during the site’s occupation.

Various archaeological factors suggested that only one group of settlers had inhabited the Sandys site and that this occupation was brief.
First, none of the three buildings had repair posts; second, there were abundant inter- and intrafeature ceramic crossmends, and no spatial or temporal gradients existed between them; third, none of the subsurface pits contained wash or silt layers; and, fourth, none of the features cut into another. With this in mind, attention turned toward an attempt at determining which individual might have owned the property during its probable lone occupation period. Mean dates helped to narrow the list further. The pipebowl mean date of 1637 pinpointed the ownership period of John Wareham (ca. 1630–1638). A Binford pipestem mean date of 1633 also suggested that the site was inhabited during Wareham’s tenure.

The copper quotient, another dating tool developed at Jamestown Island, corroborated this temporal attribution. The link between time and copper is so strong at Jamestown and its historical hinterland that the date of an early colonial deposit can be reliably estimated on the basis of how much copper is in it. Statistical measures indicate that over four-fifths of the variation in the amount of copper in a feature at the James Fort site is related to the time at which it was filled. The coefficient of multiple determination (or analogous $r^2$ value) was 80.78. The exact copper/time relationship fits a mathematical curve that is generated by determining the “copper quotient”—the number of copper alloy items in a feature divided by the feature’s total artifacts. It suggested that the middle year of occupation at the Sandys site was 1636 (Mallios 2000; Mallios and Straube 2000).

A more liberal interpretation of the archaeological evidence, attributable in part to the pipebowl mean date and its proven reliability at Jamestown Island, linked 44JC802 with John Wareham. Other historical factors also supported this theory. For example, a nearby waterway to the Sandys site, now called Grove Creek, was repeatedly referred to in 17th-century documents as “Wareham’s Creek” and “Wareham’s
River” (Mallios 2000:19). Wareham was also a burgess from the immediate area, known as “Mount’s Bay” in 1632 and 1633. In addition, a tentative link could be made between the function of an archaeologically established storehouse at 44JC802 and the multiple court records that listed John Wareham’s occupation as “Merchant.”

**Utopia Quarter Site**

Less than a mile to the west of the Sandys site, archaeologists uncovered the Utopia Quarter site, 44JC32 and 44JC787 (Figure 8). Likely home to generations of enslaved Africans from 1660 to 1780, the Utopia Quarter consisted of four distinct periods of occupation: Period 1 from 1660 to 1700, Period 2 from 1700 to 1725, Period 3 from 1725 to 1750, and Period 4 from 1750 to 1780. Historically documented changes in ownership (Thomas Pettus, Jr., James Bray II, James Bray III, Lewis Burwell IV, and Lewis Burwell V) corresponded temporally with artifacts from the sites’ occupation areas (Fesler 2000:2). Period 1 features included a dwelling with a brick-lined cellar, an outbuilding, a well, and assorted ditches and pits. Three earthfast structures, each with multiple root cellars, and other assorted pits made up Period 2. The third period consisted of two dwellings with root cellars, an outbuilding, and various large trash pits. Period 4 included a dwelling with many root cellars and a few associated pits.

The pipebowl mean date was only marginally successful with the Utopia assemblage. Although it provided relatively reliable chronologies for the site’s late-17th- and early-18th-century components—on average less than nine years off of the area’s actual mean—the Period IV calculation missed the mark by 43 years. The longer date ranges of late-18th-century pipebowl types undermined the point-specific goal of the mean-dating technique. Whereas none of the 17th-century bowl types maintained a date range longer than 30 years, 18th-century bowl type 25 was in use for at least 70 years. Pipebowl forms during the 1600s and early 1700s changed more rapidly than bowls from the late-18th century. As a result, the pipebowl mean-dating technique, like most bore-diameter dating methods, was less useful on later assemblages.

**Limitations**

The limitations of the English ball-clay mean-date technique correspond with established archaeological dimensions of time, form, and space (Spaulding 1960). As the above analysis demonstrates, the dating device is less effective in middle- to late-18th-century contexts. The American Revolution significantly impacted the distribution of English pipes in the New World. Following the war, many ball-clay tobacco pipes came from countries other than England. In addition, Oswald based his 1969 typology on English pipebowls, which differ enough from Dutch pipebowls to prevent their inclusion in this study. Consequently, Dutch pipes represent a formal restriction of the new dating device proposed here. Pipebowl production locales might have also resulted in regional variation in the American colonies. Differential colonial settlement patterns, socio-economic practices, and intercultural relations often influenced production practices (Monroe and Mallios 2004). As a result, archaeologists might be less successful in using this technique on areas to the north that were more heavily influenced by Dutch exports.
Conclusions and Ramifications

English white ball-clay pipebowl mean dates on 17th-century assemblages are reliable and easy to calculate. As a result, archaeologists are encouraged to add this chronological instrument to their continually expanding analytical tool belt. J. O. Brew (1946:64) warned years ago against the “dogma and defeat” that results from limiting oneself to a lone typology or classificatory system. Likewise, it is affirmed here that historical archaeology needs “more rather than fewer” techniques because, “even in simple things no single analysis will bring out ... all of the evidence our material holds” (Brew 1946:64). On a more specific level of insight, the preliminary findings suggest that the sample size for this technique need not be large. That sample sizes of 6, 8, 12, 13, and 15, respectively, produce relatively accurate mean dates for some of the Jamestown features implies that within the given 20- to 30-year time period, pipebowls vary only marginally in shape. Scholars have found anomalous bore diameters to be commonplace in stem analyses. A significant percentage of pipestems have at least a 1/64th of an inch difference between the ends of a single specimen. Deviations in 17th-century bowl shapes are far more rare. Because pipebowls make up in quality what they lack in quantity at colonial sites from the 1600s, the analysis presented here asks archaeologists to turn back to the bowl as an effective dating device.

FIGURE 10. Artifact ranges, intersections, and mean dates from 44 JC80.
In testing old and new techniques on a well-defined material assemblage, this study demonstrates how scholars working on sites with rich collections can help themselves and their peers who work on sites with fewer artifacts. It is hoped that archaeologists will test these methods on other collections, enabling meaningful site comparisons that ground historical archaeology in much-needed relative regional and global contexts. In evaluating whether quantitative pipe analyses are still important contributions to the field or outdated techniques of the pro cessual past, it must be remembered that the development of increasingly reliable material dating tools sharpens archaeological resolution. These techniques clarify specific patterns that form the basis for many significant interpretive insights. Some archaeologists may feel that they have moved beyond these sorts of basic calculations. They may see quantitative pipe analyses as the out-of-place, grown-up teen idols of today’s historical archaeology. In response, one is reminded that only by spending a day both literally and analytically as one of Galileo Galilei’s (1638:65) “less worthy workmen who procure from the quarry the marble out of which, later, the gifted sculptor produces ... masterpieces,” can we collectively produce more quality work as a field.

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