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# Clay Tobacco Pipes from the Tortugas Shipwreck, Florida (1622)

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Seven clay pipe stem fragments were recovered during the 1990-91 excavations of the 400m-deep Tortugas shipwreck in the Straits of Florida. One of the specimens is Euro-American and the other six are of Native American or Afro-Caribbean production. This report catalogues the pipe fragments and provides an historical overview of the early history of European exploration of the Americas and the concomitant development of the robust early New World tobacco industry.

The use of Native American or Afro-Caribbean pipes on the ship, identified as the 117-ton Spanish-operated *Buen Jesús y Nuestra Señora del Rosario* from the September 1622 Seville-bound fleet, contrasts with the dominance of Seville pottery among the wreck's tin-glazed wares, but corresponds with the cultural use of Afro-Caribbean colonowares for onboard cooking.



## 1. Introduction

Following the late 15th-century discovery – or rather rediscovery – of the New World, European entrepreneurs and explorers escalated probing and exploiting the vast continent, retrieving new-found assets for their benefactors. At the end of one of these forays, a storm off the Florida Keys sank around eight of the 28 vessels from the Spanish Tierra Firme fleet returning to Seville on 5 September 1622. The precious silver-laden *Atocha* is the best known of these sunken ships (Mathewson, 1986).

One of the seven less familiar vessels lost in the storm, the Tortugas shipwreck, is identified as the 117-ton *Buen Jesús y Nuestra Señora del Rosario* (Kingsley, 2013). The Tortugas shipwreck excavation of 1990-91 was the world's first comprehensive deep-sea excavation using exclusively a Remotely-Operated Vehicle (ROV), which resulted in the recovery and recording of 16,903 artifacts (Stemm *et al.*, 2013). The design and use of a Sediment Removal and Filtration System (SeRF) enabled recovery of very small items, including beads and seeds (Astley and Stemm, 2013: 11). Recovered artifacts included seven small artifacts, initially identified as broken clay beads, which were subsequently recognized as clay tobacco pipe stem fragments and are the subject of this report (Fig. 1).

## 2. Brief Overview of the Early Tobacco Industry in the New World

When Christopher Columbus arrived in the New World in 1492, he received gifts of tobacco leaves and his crew observed native peoples using tobacco (Fig. 2) in various ways, sometimes for its pleasurable effects, but often for treatment of various illnesses.[1] Some of Columbus' sailors observed the natives of Cuba and Haiti carrying a torch that contained tobacco and inhaling smoke from the burning leaves. It was later learned that the torch's purpose was to disinfect and ward off disease and fatigue (Charlton, 2004: 292). The first written account describing native tobacco use for smoking and as snuff, *De Insularium Ribitus,* appeared in Europe in 1497. Columbus landed in what is now Venezuela in 1498, which led to Spain colonizing Venezuela in 1522 with the first settlement at Cumana.

Tobacco use was recorded in Brazil in 1500, at which time the concept of tobacco as a panacea is believed to have become widely recognized. That same year the Portuguese explorer Pedro Alvarez Cabral reported its use there as "holy herb", which was deemed effective for treating ulcerated abscesses, sores and inveterate polyps, among

many other ailments (Charlton, 2004: 292). Numerous contemporary accounts of tobacco's medicinal uses by pre-Columbian Native Americans help explain why Europeans wished to take the plants and seeds back to Europe (Charlton, 2004: 293).

Cigarette smoking was documented in Yucatan in 1518, and a year later Cortés reported Aztecs smoking perfumed reed cigarettes. Tobacco samples arrived in Spain in 1518, where rolls of tobacco (the forerunner of cigars) were observed by 1530. The year 1530 also saw recognition of two distinct tobacco genera in Mexico: *Nicotiana tabacum* and *Nicotiana rustica*. Actual tobacco cultivation began in Santo Domingo in 1531, *Nicotiana tabacum* was planted in Cuba and Santo Domingo in 1534, and by 1548 the Portuguese exported cultivated tobacco from Brazil. The Breton sailor Jacques Cartier reported extensive cultivated native tobacco fields in Canada in 1535 during his second voyage to North America.

Tobacco was introduced commercially into France in 1556 by Jean Nicot, to Portugal in 1558, to Spain in 1559 and into England in 1565. The first published volume on tobacco, *De herbe panacea,* appeared in 1587, and the first English language book, *Tabacco,* was published in 1595, at which time tobacco smoking had exploded in popularity across England.

When first introduced, tobacco was prescribed by physicians and readily purchased from apothecaries (Pollard, 2004: 38). In 1571 Nicholas Monardes, the renowned physician of Seville, pronounced the "virtues" of the "holy herb" (Gilman and Xun, 2004: 10), listing 36 illnesses the tobacco plant was believed to cure, including bad breath, lockjaw, worms and cancer (Keoke and Porterfield, 2003: 266). Monardes further proclaimed that "this herb is so general a human need, not only for the sick but for the healthy" (Gilman and Zhou, 2004: 10). While the appeal of tobacco smoking drew upon its health benefits, it soon became an institution, integrated first into elite European culture and eventually adopted throughout society (Gilman and Zhou, 2004: 9; Pollard, 38: 2004).

Sir Francis Drake brought the milder *Nicotiana tabacum* to England in 1573, and European cultivation of tobacco in Cuba began in 1580. However, it was not until the 17th century that this colony began the harvesting and commercial production of tobacco, alongside sugar, in earnest. Tobacco was indigenous to South America and the Caribbean, where the native Tainos grew tobacco and smoked the dried leaves (Fig. 3). African slaves brought to the island were the first outsiders to take to tobacco with enthusiasm, growing, smoking and selling it to the crews of the treasure fleets at Havana (Gott, 2004: 36-7).

During the 17th-century's slaving activities, Africans were exposed to and embraced the use of tobacco (Handler, 2008: 1; 2009: 7). Paralleling its spread in West Africa, tobacco entered Central Africa's agricultural scene, where women assumed a prominent role in its development during the height of the early 17th-century Atlantic slave trade. Material life in Africa was transformed by tobacco, evidenced in the production of clay pipes, which relied largely

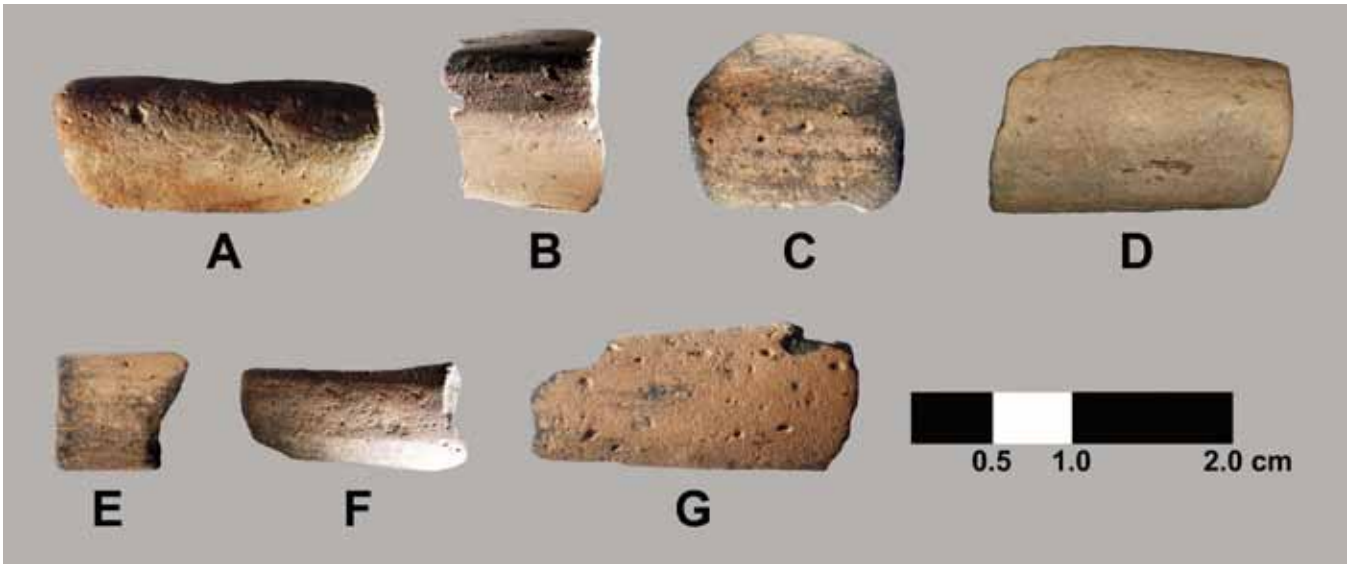


*Fig. 1. Clay tobacco pipe stem fragments recovered from the Tortugas shipwreck (exterior surface views). A. White clay pipe. B-G. Earthenware clay pipes. B, D, F & G: stem sections. C: stem section at bowl juncture. E: bit end of stem. A. TOR-90-01147-CR. B. TOR-90-01146-CR. C. TOR-90-01148-CR. D. TOR-90-01150-CR. E. TOR-90-01151-CR. F. TOR-90-01152-CR. G. TOR-90-01158-CS.*


*Fig. 2. Tobacco plant,* Tobacologia*, engraving of 1622, Photo: The Mariners' Museum Library, RM666.T6.N3.*

on African women's potting skills, drawing on their crafting traditions in producing ceramic cooking and eating bowls and other earthenware forms (Knight, 2010: 67). In the early years of colonial conquest the Spanish conquistadors disparagingly referred to tobacco as 'Negro stuff' until the 17th century, when they realized its commercial opportunities. At this time large-scale tobacco production began in the fertile lands between Havana and Trinidad and westward towards Pinar del Rio (Gott, 2004: 7).

The white clay tobacco pipe manufacturing industry in England was established around 1580. Initially only available to aristocracy due to its high cost, tobacco became accessible to English commoners by *c*. 1586. In 1600 European cultivation began in Brazil, while 1601 marked the introduction of smoking into Turkey. Following *A Counterblaste to Tobacco* written in 1604, and recognizing the lucrative financial potential of tobacco, King James increased the tobacco import tax by 4,000%. In order to prevent competition in cultivation and commerce, King Phillip of Spain decreed in 1606 that the sale of tobacco seed to foreigners was a capital offense.

The Jamestown settlement was established in America in 1607 in what later became Colonial Virginia. The earliest known white clay long-stemmed pipe production in the Americas was begun in this settlement *c*. 1608 by Robert Cotton (Kelso, 2006: 183-84; Luccketti and Straube, 1998: 23-6; Luccketti and Straube, 1999: 14; Kelso and Straube, 2008).[2] The first tobacco plantation in the area of the USA was established in 1612, and 1614 saw the first sale of Virginia tobacco in England, when King James I immediately decreed a monopoly on tobacco importation.

Also in 1614 King Phillip III established Seville as the tobacco center of the Spanish world, requiring all Spanish shipments to be imported through this city. Rolled tobacco and later cigars were the major Spanish products, with cigarettes soon developed to market the cigar trimmings. The first tobacco processing plant was built in Seville in 1620. *Tabacalera*, the Spanish tobacco monopoly over production and sales, established in 1636, is the oldest tobacco company in the world.[3]

In 1619 King James I ordered that all tobacco imported to England should come through the Port of London, making it much easier to collect crown duties (Copeman, 1981: 26). That same year James granted a Charter of Incorporation of the Tobacco Pipemakers of Westminster, a document signed by 36 individuals representing more than half of the 62 pipemakers recorded in London at this date (Ayto, 2008: 13).[4]

This Charter, renewed by Charles II in 1663, attempted to monopolize control of the London area pipe making industry by protecting the interests of pipemakers by governing the laws of trading within the city, controlling the training of apprentices and regulating the supply of clay. Soon after its incorporation, the Company of Pipemakers

*Fig. 3. Harvesting wild tobacco,* Tobacologia*, engraving 1622. Photo: The Mariners' Museum Library, RM666.T6.N3.*

*Fig. 4. Tobacco field, Virginia, USA. Photo: courtesy of Jimmy Reese. 2003.*

assumed the right to enter dwellings to break up unlawful pipemaking – actions deemed necessary to prevent the sale of inferior products (Ayto, 2008: 13).

One side effect of this control was a migration of English pipe makers to other locations. Historical records show that many 17th-century pipemakers were poor and often traveled from one town to the next to avoid competition. Many are thought to have been Puritans seeking religious freedom and economic opportunities during the Reign of James I. By the middle of the century, London alone housed at least one thousand pipemakers, while others had spread to other parts of the British Isles, as well as to Holland (Ayto, 2008: 14; Klooster, 2010: 29). The number of English pipemakers in the Netherlands rivaled England by the third decade of the 17th century (Ayto, 2008: 14; De Roever, 1987: 51; Klooster, 2010: 29).

In 1619 the first Africans were delivered to Jamestown as indentured servants (Craven, 1971), and the establishment of the slave trade in North America was stimulated by the extremely labor-intensive tobacco cultivation process: it took one person to successfully cultivate each acre of tobacco (Fig. 4). In Virginia tobacco served as currency in 1619, used to buy goods and people. Successful in Virginia as a cash crop (Fig. 5), tobacco cultivation was attempted in other settlements along the North American east coast, including New York (Manhattan) in 1629, Maryland in 1631 and Connecticut in 1633 (tobacco was even commercially grown in Canada in 1800). Slavery was legalized in Virginia in 1661.

Tobacco was the first successful cash crop in the Americas, and its tax benefits continued to support governments and the funding of wars for centuries (for instance in 1776 tobacco was used by the Colonies as collateral on loans to France to help finance the Revolutionary War; the United States Congress passed the first Tobacco Tax in 1794; tobacco taxes helped finance the US Civil War in 1862; and use of the cigar box was legally mandated in 1863 to enable use of tax stamps).

The Emancipation Proclamation, an executive order by President Abraham Lincoln granting freedom to slaves in the southern States, went into effect on 1 January 1863. Slavery in the United States was legally terminated after the conclusion of the American Civil War with the passage of the 13th Amendment in December 1865, although the engrained social and cultural inequities continued for more than a century. In the 1954 Brown vs. Board of Education case, the US Supreme Court unanimously declared that segregation in public school education was unconstitutional. Passage of the Civil Rights Act of 1964, and the Voting Rights Act (1965) by President Lyndon Johnson, marked a major turning point that enabled Black Americans to begin to take their rightful place in American society.


*Fig. 5. Tobacco paper from 17th-century Virginia, issued at Barnstaple, England, showing a black man smoking a long-stemmed pipe. Photo: Abby Aldrich Rockefeller Folk Art Museum, Colonial Williamsburg Foundation, Virginia, no. C1980-866.*

*Fig. 6. Door lintel found at the Temple of the Cross, Palenque, Chiapas, Mexico, with the image of a god or priest smoking (cf. Robicsek, 2005: 340).*

## 3. Early Smoking & Clay Pipes

Tobacco likely originated in South America during the mid-Holocene. The earliest documented occurrence in Peru dates as early as 2500-1800 BC (Pearsall, 1992: 178). Tobacco smoking was widespread in North America prior to Columbus, but it is not known when the plant was introduced from South to North America; it is entirely possible that other botanicals were smoked prior to the availability of tobacco since stone and clay pipes were used across North America for millennia. The earliest smoking pipe recovered from North America may be an example from the archaic Eva Site in Tennessee dated to 2000 BC (Lewis and Lewis, 1961), whereas the earliest tobacco residue detected in a pipe dates to *c.* 300 BC at the Boucher Site in Vermont (Rafferty, 2006). More recently, three nicotine-related compounds were found in residue from a Mayan ceramic vessel dated no later than AD 800 (Zagorevski and Loughmiller-Newman, 2012).

The earliest illustration of smoking in the Americas, dating to *c.* AD 700, shows a priest or god smoking (Fig. 6). Later prehistoric images in a bark paper codex, recovered by Spanish explorers, similarly illustrate individuals smoking what is either a tube-shaped pipe or more likely rolled up tobacco leaves – effectively crude cigars (Fig. 7).[5]

The three basic indigenous pipe morphologies contemporary with the Tortugas shipwreck fragments of 1622 were the bi-conical style, such as a pipe recovered from the wreck of the *Atocha* that used a reed stem insert (Fig. 8), a cylindrical tube-shaped pipe (similar to the Maya images with rolled up tobacco leaves shown in Figs. 6-7), and a somewhat bent tubular pipe, such as one reported from Jamestown (Mallios and Straube, 2000: 41). This Jamestown example featured flattened sides (panels or facets).

An early major American historic archeological publication detailed the imported English pipes recovered from Jamestown (Cotter, 1958), and included a brief illustrated overview of 'Pipes as Time Markers' in the Jamestown collection (Jelks, 1958: 210-12). Subsequent discovery of the original Jamestown Fort yielded information about the earliest Euro-American white clay pipe production currently known in the New World. Pipe manufacturing, attributed to immigrant English pipemaker Robert Cotton, occurred at Jamestown beginning *c.* 1608 (Kelso, 2006: 183-84).

Some of Cotton's pipes were also paneled or faceted and are impressed with designs and even names (Luccketti and Straube, 1998: 23-26).[6] Later in the 17th century, an extensive diffuse pipe-producing industry developed in the Chesapeake Bay area of modern Virginia and Maryland, producing long stem pipes of various clay colors (white, red and even marbled). These pipes have variously been attributed to three different cultural groups, settlers, Native Americans and African slaves, although the intertwined cultural origins are still being unraveled (cf. Henry, 1979; Mitchell, 1983; Pogue, 1991; Emerson, 1994; Luckenbach and Cox, 2002; Luckenbach *et al.*, 2002; Luckenbach, 2004; Luckenbach and Kiser, 2006). European pipes were continuously exported to the New World through the first half of the 20th century, and were constantly supplemented with

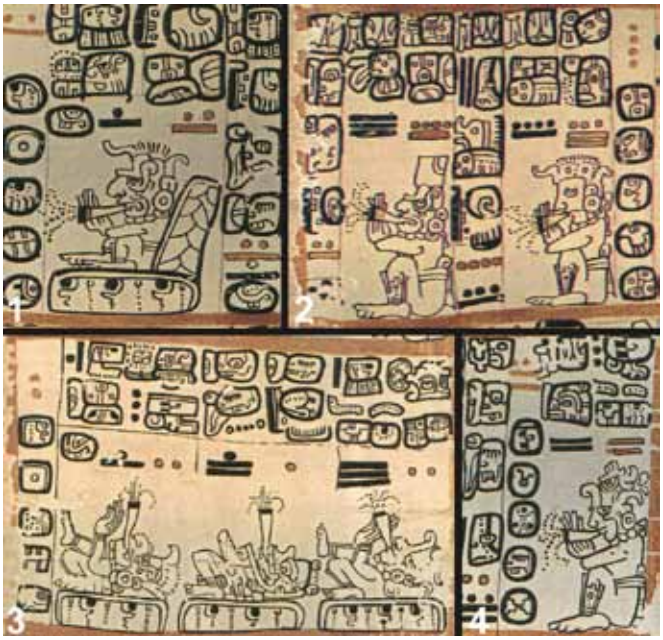


*Fig. 7. Four images depicting smoking in the Mayan 'Madrid Codex', thought to predate the Spanish conquest, including an enthroned king (1).*[5]

indigenous manufacture, as well as production by individuals of African origin or descent, as in the case of the pipes recovered from 17th-century Port Royal, Jamaica (Heidtke, 1992). Development of the clay tobacco pipe manufacturing industry in the United States of America is chronicled elsewhere (Sudbury, 1979; Sudbury and Jung, 2011).

Although post-dating the Tortugas clay pipe assemblage, pipes from 17th-century Colonial Barbados and Jamaica, as well as early Colonial Virginia, provide a vision of the socio-economic and material cultural values associated with tobacco, clay pipes and pipe production among Afro-American and Afro-Caribbean communities. As in the case of beads, tobacco and clay pipe commodities were used by Europeans to acquire and reward slaves. African slaves brought to the New World valued tobacco as well as the clay pipes themselves. This is well evidenced on the Caribbean island of Barbados, where in the late 17th century thousands of slaves of African birth or descent were employed on sugar plantations. Most of the tobacco the slaves consumed was distributed by plantation managers as an incentive for good behavior. Similarly, clay smoking pipes (typically long-stemmed white clay examples of English manufacture) were acquired in this manner (Handler, 1983: 245; 2008: 1, 3; 2009: 7-8). European pipes, which were generally preferred over African ones, were integral to the slave trade, as reflected in a late 17th-century document citing 20 gross of pipes needed to provision 450 slaves, allowing for seven or eight pipes per slave (Gallegher 1987: 233).

Slaves also acquired pipes from a variety of other sources, including broken long-stemmed pipes discarded by their owners, as well as through theft, purchase or barter in the island's internal marketing system in which the slaves actively participated (Handler, 1983: 245). Documentary evidence suggests that Barbadian slaves sometimes smoked short-stemmed or 'elbow' pipes, a fact confirmed by excavations of burial sites at a Barbadian slave cemetery, where clay pipes were interred as grave goods in plantation mortuary practices. One burial yielded a short-stemmed example believed to be of West African (Ghanian) origin (Handler, 1983: 245-6, 249), where similar 'elbow' pipes dating from the early 17th century have been discovered on a variety of archaeological sites (Handler, 2009: 8). While this one 'elbow' pipe (Handler, 1983: 249), as well as many long-stemmed white clay examples recovered from other burials in the slave cemetery, do not conform to the Tortugas pipe specimens, their presence provides insight into the enslaved Afro-Caribbean smoking culture derived from European contact and introduced directly into Central and West Africa by the early 17th century (Handler, 2009: 7).

Red-colored clay pipes of New World production have been found on many colonial sites in the Americas, as well as the Caribbean. Until recently, these pipes have received far less attention than the mass-produced European white clay pipes (Heidtke, 1992: 2). Jamaica's 17th-century red clay pipes are an especially relevant assemblage because they reflect the interaction between European, African and Native American people, who together shaped the historical

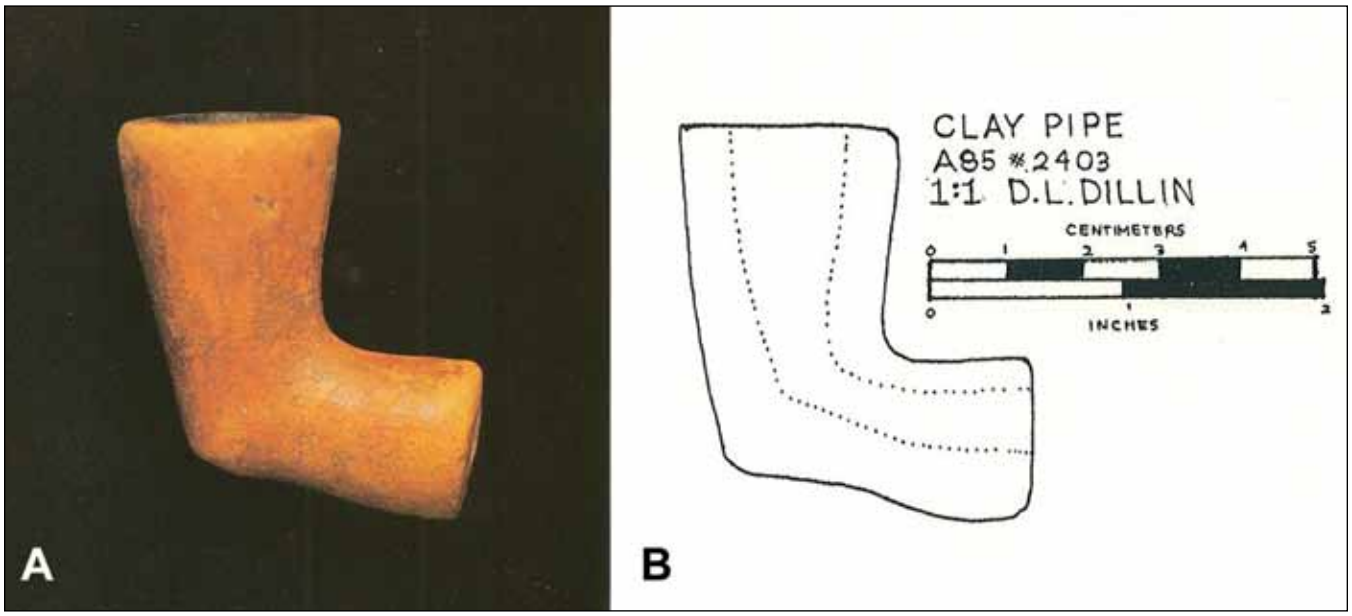


*Fig. 8. The only clay tobacco pipe (L. 6.5cm) recovered from the 1622* Atocha *shipwreck (Christie's, 1988: 48-9). Historical research revealed that the* Atocha *was carrying about 25 tons of tobacco back to Spain. Photos: A. reproduced from Christie's, 1988: 49. B. Mel Fisher Artifact Research Database, A85.2403.*

| Specimen & Inv. Nos. | Weight | Length | Width | Wall Th. | Section Tapered | ~ Min. Bore Diam. (inch) |
|---|---|---|---|---|---|---|
| A. TOR-90-01147-CR | 0.9 | 21.48 | 8.93 | 2.56-3.42 | | |
| B. TOR-90-01146-CR | 0.7 | 10.77 | 12.3 | 3.66-4.77 | Yes | 13/64 |
| C. TOR-90-01148-CR | 0.8 | 13.95 | 11.66 | 3.26-4.21 | Yes | 10/64 |
| D. TOR-90-01150-CR | 1.0 | 19.36 | 11.38 | 2.52-4.05 | Yes | 11/64 |
| E. TOR-90-01151-CR | 0.2 | 8.69 | 7.82 | 1.94-2.20 | No | 12/64 |
| F. TOR-90-01152-CR | 0.3 | 14.75 | 7.28 | 2.69-3.33 | ? | 11/64 |
| G. TOR-90-01158-CS | 0.8 | 21.48 | 9.53 | 2.26-3.43 | Yes | 9/64 |

*Table 1. Tortugas clay pipe stems (metrics). Dimensions are in mm and weight in gms.*

| Specimen & Inv. Nos. | Ext. Surface | Within Wall | Int. Surface |
|---|---|---|---|
| A. TOR-90-01147-CR | Off White | Off White | Off White |
| B. TOR-90-01146-CR | Orange | Light Grey/Orange | Orange |
| C. TOR-90-01148-CR | Orange | Grey | Grey |
| D. TOR-90-01150-CR | Tan | Grey | Grey |
| E. TOR-90-01151-CR | Orange | Grey | Tan |
| F. TOR-90-01152-CR | Tan/Pale Orange | Grey | Tan/Pale Orange |
| G. TOR-90-01158-CS | Orange | Grey | Grey |

*Table 2. Tortugas clay pipe stems (colors).*

context of the colonial period. Made in imitation of European clay tobacco pipes that had evolved from their Native American antecedent, the pipe craftsmen of Jamaica appear to have been predominantly of African origin or descent and likely incorporated elements of their own ceramic tradition (Heidtke, 1992: 117).

Redware pipes from North America's Chesapeake Bay Area, also dating to the 17th-century, similarly appear to have been made by both European colonists, the indigenous inhabitants and enslaved Africans (Heidtke, 1992: 114; Straube and Luccketti, 1995: 27). The redware Chesapeake pipes found on sites dating as early as 1620, yet more commonly ranging from 1650-1700, appear to have been produced as a result of shortages in European-made clay pipes and subsequent price increases attributable partly to economic, political and social conditions, paralleling what is believed to have been the impetus for the production of the Jamaican red clay pipes (Heidtke, 1992: 111-12, 114-15).

Jamaica's red clay pipes appear to have been made continuously from around 1660-1720, the users representing members of a mixed African and European community. The Englishman John Taylor, who visited Port Royal in the late 1680s, offered a descriptive account of life in this major port city prior to the earthquake of 1692 and some insights into the smoking population, writing that "The common people here goe generally arrayed in good linnen, but many of them barefooted, without shoo and stockins,… with a Strawn hatt, & red tobacco pipe in their mouths…". Taylor also noted that the pipes were made by "negroes" from "red claie' found in the Liguanea plain and around the Spanish town (Heidtke, 1992: 82, 113, 117).

The ethnic origins of the Tortugas clay pipe makers remain elusive. However, the Jamaican red-clay pipe assemblage, produced by an Afro-Caribbean population influenced by ethnically diverse ceramic traditions (as was the case for the Afro-Caribbean colonoware recovered from the Tortugas wreck: Gerth and Kingsley, 2014), opens up the possibility that the Tortugas pipe assemblage could similarly have been the product of interacting cultures.

# 4. The Tortugas Shipwreck Pipes

Seven heavily weathered small clay pipe stem fragments comprise the sample recovered from the Tortugas shipwreck (Figs. 1, 9-13, while the metrics and apparent color information are recorded in Tables 1-2). Additional observations and comments about the individual specimens are presented below.

### *A. White Clay Pipe Stem Specimen A (TOR-90-01147-CR)*

Superficially, this specimen is easily mistaken for bone (Fig. 1A). The color of this heavily iron-stained clay pipe stem fragment was originally unclear, but it appears to be made of white clay. This is the only stem section in the sample that has a parallel-sided normal bore typical of European white clay pipes. The few faint striations present on the bore wall are all extremely narrow, straight and

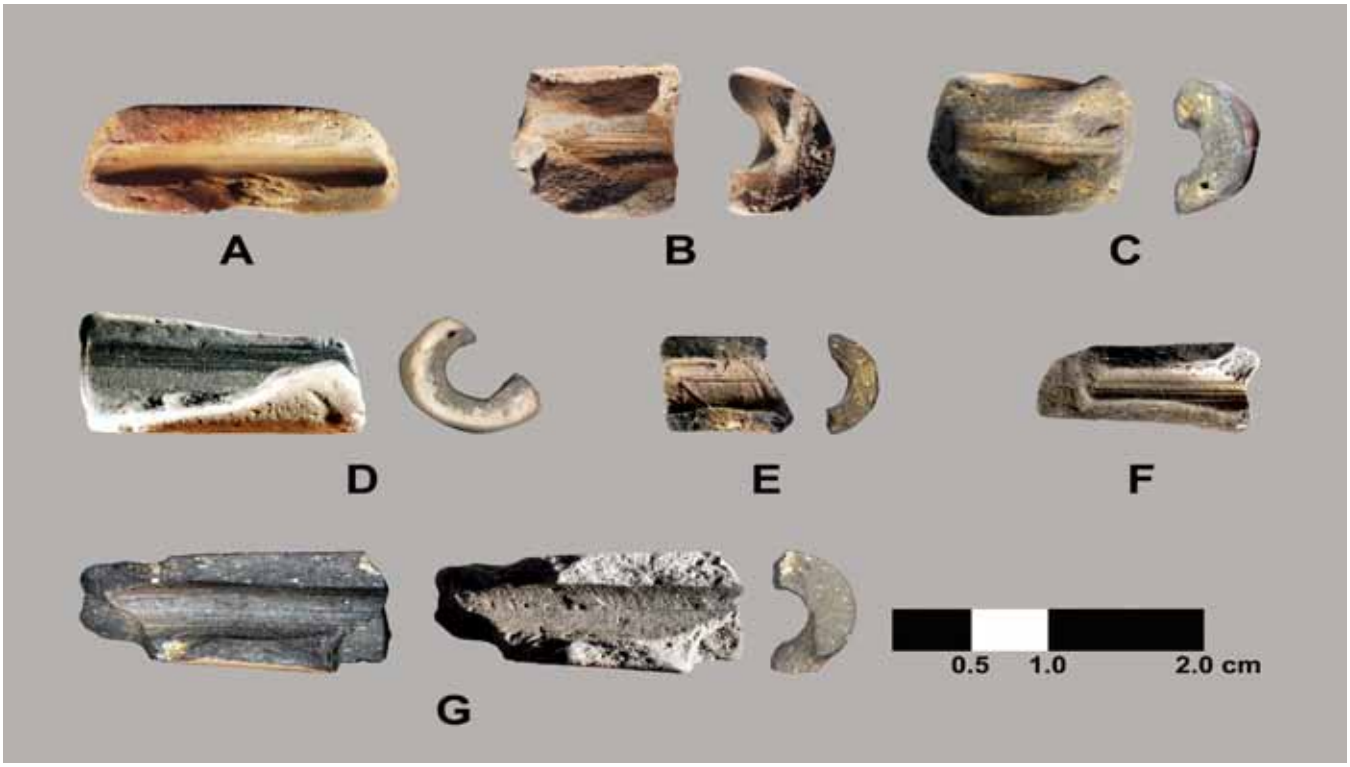


*Fig. 9. Tortugas shipwreck pipe stem fragments; interior surfaces and end views. The multiple interior views for specimen G show different surface features (uniform ring light illumination was used for the photograph at left; side lighting was used for the interior image at right. All other interior views were produced via side lighting). A. TOR-90-01147-CR. B. TOR-90-01146-CR. C. TOR-90-01148-CR. D. TOR-90-01150-CR. E. TOR-90-01151-CR. F. TOR-90-01152-CR. G. TOR-90-01158-CS.*

uniform (Fig. 9A). Coupled with the parallel-sided bore, this suggests an Anglo-European manufacturing technique. Unfortunately, a mold seam is not visible on this small and heavily weathered fragmentary specimen.

Perhaps the most unusual feature about this pipe stem is the rather large sand grains present in the paste (Fig. 10). Coarse sand grains do not regularly occur in ball clay pipes of English and Dutch manufacture dated to *c*. 1620 examined. Thus, it is uncertain whether this pipe was made in the Americas or in Europe. The pipe product that is characteristic of this era from both Spain and Portugal remains unknown – if any were even being produced. In the recent pipes and pipe manufacturing world overview survey organized by country, the pipe industry production history is detailed and illustrated for 19 countries, but Spanish, Portuguese and Venezuelan-made pipes were not addressed (Higgins, 2010). Early in the 17th century, rolled tobacco leaves and later cigars became very popular in Spain, although no mention is made of pipes. There is no direct evidence that this white clay form of pipe from the Tortugas shipwreck originated in Spain. However, unusual early 17th-century pipes, seemingly marked Pedro di Vargas, have been found in Plymouth, England (Higgins, 1995: 48-9), indicative of otherwise unknown early continental production. The name is suggestive of an Iberian origin, but archaeologists currently claim that white pipes were not used there, even though a Bristol advertisement mentions the Spanish market.

The paste illustrations of this Tortugas tobacco pipe with sand inclusions are included in this study in the hope that future researchers will be able to identify the clay source and production center of this specimen (Fig. 10). Deagan (1995: 130) states that white clay "tobacco pipes do not occur in the sixteenth century at Puerto Real [Haiti], or for that matter at sixteenth-century Spanish sites in general." European white clay pipes were commonplace in Port Royal, Jamaica, by the mid-17th century (Fox, 1999), whereas red pipes were abundant in Jamaica largely from the latter 17th century and were used until *c*. 1720. A Charleston, Virginia, site associated with a sea captain, and dating from 1638 to 1660, has yielded a red clay pipe bowl believed to be Jamaican (Heidtke, 1992: 116), a find hinting at even earlier Jamaican red clay pipe production.

White clay pipes were being produced in Jamestown, Virginia, by *c*. 1608-16. However, the Jamestown speci-

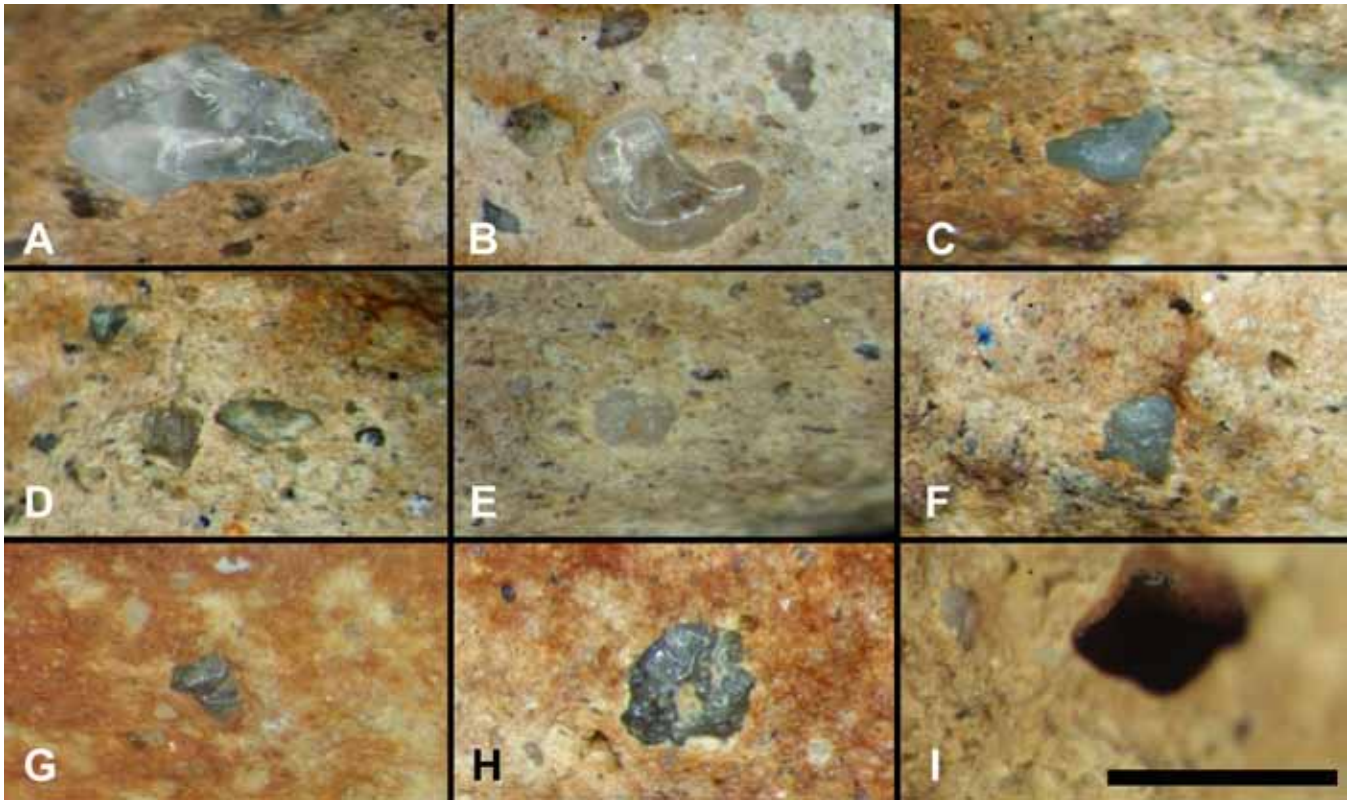


*Fig. 10. Images of white clay pipe stem specimen A (TOR-90-01147-CR). A-H: various sizes of large, heavily weathered sand grains exposed on the stem surface. Some areas have iron staining (strongest in G and H; see also Figs. 1A and 9A). I: hole or perforation in the pipe body. Scale bar in I is 1mm long. Photos taken via a stereomicroscope at 45x.*

mens appear to have thicker stems, and there is currently no indication of a direct Jamestown interaction with the Spanish merchant fleet traveling to or from Venezuela, Cartagena, Havana and Seville. Thus, this enigmatic white clay pipe stem fragment may be a poor quality European product, or represent a previously unrecognized pipe production source from within the broad area of commerce. Assuming this pipe was the personal possession of a crew member, it could have been manufactured at any one of a number of locations depending on the travel itinerary and the seaman's contacts.

It should be noted that the early pipes made in Jamestown did contain coarser sand (Luccketti *et al.*, 1994: 28). This comment is not an implication of a Jamestown origin for this fragment. Rather, this similarity indicates that while establishing a fledgling industry, immigrants struggling for survival in a new environment with limited knowledge of local resources utilized whatever materials were accessible, even if they were not optimal quality.

### *B. Earthenware Pipe Stem Fragments*

The Tortugas pipe assemblage comprises six earthenware stem fragments whose production may be derived from indigenous pipemakers or, as in the case of later Port Royal, Jamaica, possibly potters of African origin or descent who were imitating European forms while incorporating elements of their own ceramic traditions (Heidtke, 1992: 117) (Figs. 1B-1G and 9B-9G). Based on their small inner bore diameters, these specimens are felt to represent stem sections rather than pipe bowl fragments; the stem/bowl juncture is present on one specimen (Fig. 1C: TOR-90-01148-CR). Due to their fragmentary nature, the original pipe morphology of the other specimens is unknown. They tend to have tapered bores, most have abrasion or tool marks made on the bore walls before firing, and most of the stem exteriors are tapered. Four specimens are smooth-walled and appear round in external cross section (Figs. 1C, D, E, G), whereas two have evidence of faint flat (faceted) exterior panels (Figs. 1B, 1F). Flat paneled TOR-90-01152-CR (Fig. 1F) is too fragmentary to determine if it was actually tapered or not; thus it was excluded from this category for purposes of discussion.

All of the specimens show trace evidence of exterior striations; it is uncertain if this is a by-product of manufacturing or conservation activity. A brief description of each specimen follows (see Tables 1-2 for surface color and metrics).

*Specimen B: TOR-90-01146-CR (Figs. 1B, 9B, 12)*
Tapered pipe stem section; some striations are visible on exterior surface; possibly heated after being broken (Fig. 12); at least one flat panel is present; thick-walled, fairly uniform light orange coloration throughout (with a trace of grey within the wall); internal striations visible from the manufacturing process (Fig. 9B).

*Specimen C: TOR-90-01148-CR (Figs. 1C, 9C)*
Some striations are visible on exterior surface; also internal striations (from reed or stick to initially form the pipe stem or to clean out bore before firing?); exterior surface apparently rounded; tapered stem section; weathered surface with variable surface color. Some smoothing strokes appear to be visible on the exterior surface. This specimen retains a

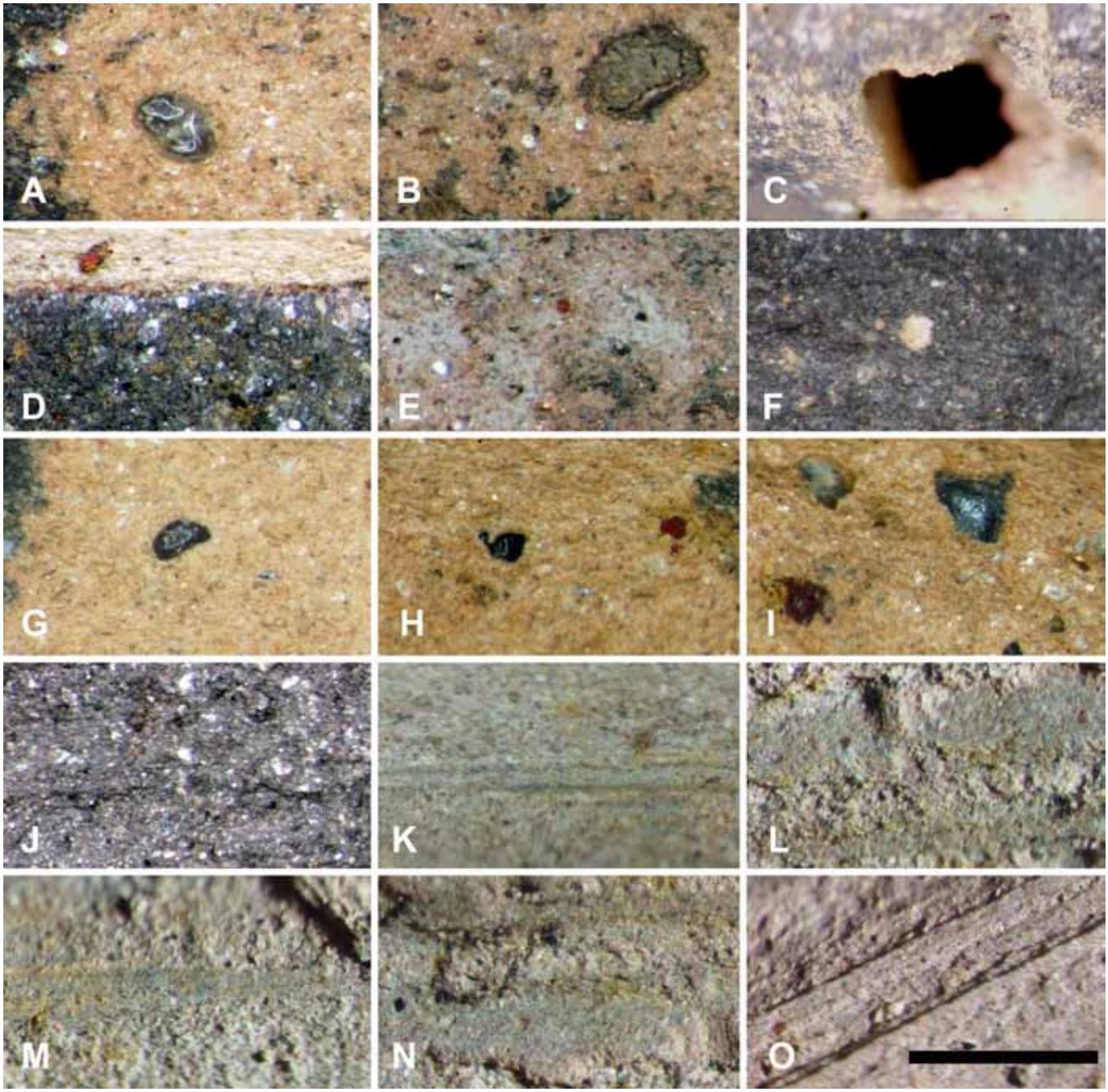


*Fig. 11. Internal and external surface features of earthenware pipe stem fragments B-G. A-C: specimen C. D: specimen E. E: specimen F. F-I: specimen G. Representative tool marks on stem bore walls. J: specimen D. K-N: specimen E. O: specimen F. Scale bar in O is 1mm long.*

trace of the bowl juncture (Fig. 9C: left image, upper right corner), so this stem fragment definitely does not derive from a tube pipe. The paste and surface treatment of C and E are similar enough that they may be from the same pipe.

*Specimen D: TOR-90-01150-CR (Figs. 1D, 9D)*
There are a few faint striations on the exterior surface; the exterior color extends nearly half way through the specimen (Figs. 9D, 13D), suggesting the surface color change may have been due to firing rather than application of a slip. In cross-section the bore shows a prominent corner or angle (Fig. 9D, 5 o'clock position); this may indicate that the pipe stem was formed around a reed or stick or that the bore was created by inserting a stick; this specimen exhibits a rounded exterior surface. Some circular or spiral striations visible on the bore wall (Fig. 13D).

*Specimen E: TOR-90-01151-CR (Figs. 1E, 9E)*
Significantly thinner-walled than all the other pipe stem fragments, this fragment is from the bit end of the stem (in profile the lip is rounded); some internal and external striations are visible; not visibly tapered (i.e. is parallel-sided); round in cross-section. The paste and surface treatment of specimens C and E are similar enough that they may be from the same pipe.

*Specimen F: TOR-90-01152-CR (Figs. 1F, 9F)*
Some faintly visible external striations; more distinct striations are visible internally in bore; faint trace of possible fingerprint observed in clay (unable to photograph or confirm; see Sudbury, 2009: 125-26 for the reporting of pipes with very clear fingerprints molded into stems); variable wall thickness; probably paneled exterior wall. The specimen is too fragmentary to determine if the stem was tapered.

*Specimen G: TOR-90-01158-CS (Figs. 1G, 9G)*
Faint smoothing visible on external surface; distinct striations are visible internally in bore, including some suggestive of a twisting motion while the clay was moist; tapered sides with a thicker distal wall (contracting diameter); definitely round exterior; hardest (densest) paste of the specimens recovered. The two interior views show the linear and twisting striations when viewed via different illumination methods (Fig. 9G; see also Fig. 13G). Pieces of clay dislodged during manufacture that were redeposited over striations in the bore and fired in place were observed, giving some indication of manufacturing technique (Fig. 13G).

### *C. Earthenware Pipes: Discussion*

All six earthenware pipe stem specimens from the Tortugas shipwreck have grey wall cores, although B is significantly


*Fig. 12. Two end views of specimen B, which originally seemingly had a gray core, but may have been overheated, oxidizing iron in the paste, resulting in a color change.*

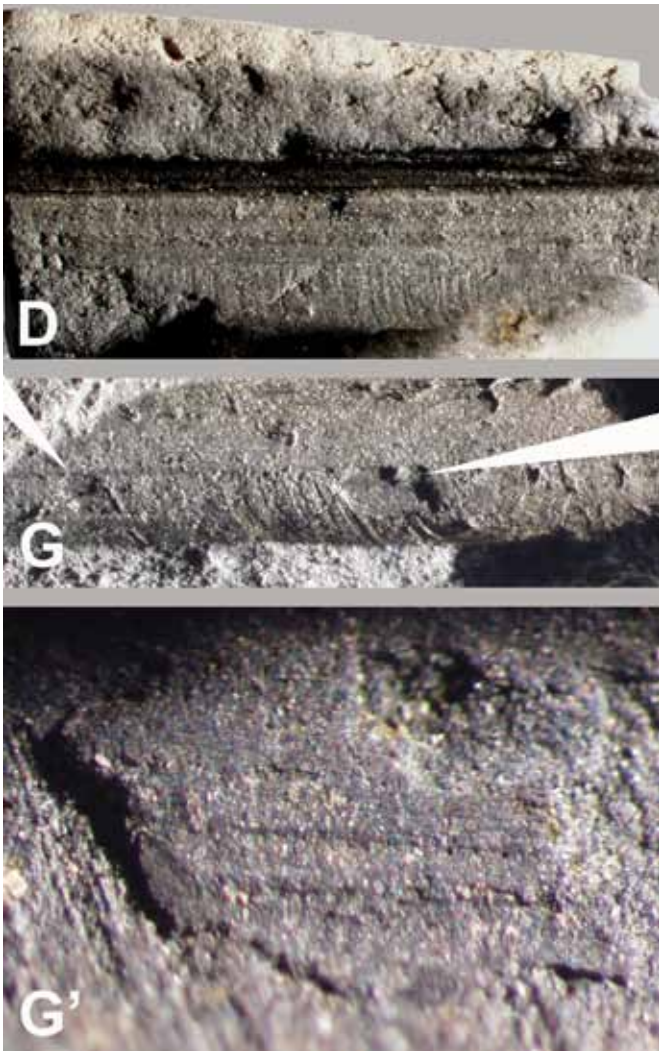


*Fig. 13. Detail of circular or spiral marks in the bores of specimens D and G, and two pieces of plastic clay superimposed over the striation marks during manufacture (denoted by two arrows in G). The right arrow location in G, enlarged in G' below, shows the clay covering the bore striations and additional striations on top of the piece of clay. Linear striations parallel to the long axis of the pipes are also visible.*

lighter in color (and actually near orange) than the other specimens (Figs. 9B, 12). The exterior surfaces of these six specimens have a somewhat similar orange to tan color, although the thickness of the exterior colored zone varies considerably, with specimen D having by far the thickest distinct exterior layer (Figs. 9D, 13D).

This variability in thickness, and the near-uniform color of specimen B visible in cross section (Fig. 12), may indicate that in at least some cases the exterior coloration is a by-product of firing in an oxidizing atmosphere. A clay slip may have been applied to some specimens (for instance D with the sharp profile boundary layer visible in Fig. 13D), but the weathering during nearly four centuries of saltwater immersion, lack of suitable comparative reference material, and reluctance to section the specimen makes assessment difficult.

Although specimens C and E do not join together, their physical attributes are similar enough that they may be from the same pipe – likely an integral stemmed pipe with a bowl. One feature in common noted between specimens C, E, F and G is that all contain particles of a red (iron-based?) mineral in their paste (Figs. 11D, 11E, 11H). One of the more striking features noted was the similarity between the square hole in the white clay pipe specimen A (Fig. 10I) and that noted in C (Fig. 11C). These are not holes from which sand particles were dislodged; they are deeper than perforations that would be caused by sand particles. This hole, as well as the large weathered sand grains in the white clay pipe (Figs. 10A-10I), led to consideration that the white clay pipe could possibly be of New World manufacture. The two similar size holes may indicate that the perforations occurred from a tool during clay preparation. Larger than normal sand grains also occur on the exterior surface of specimens C and G (Fig. 11A, 11G-11I).

The linear striations in the earthenware pipe bores may indicate that a reed or stick was either used to form the stem hole by insertion, or as a core around which to manually form the clay stem, leaving a bore when the stem was withdrawn. The visible interior angle in the cross-section of one specimen (Fig. 9D) also supports this theory. The spiral marks may indicate that the stem bore was cleaned out or finished with a circular or sweeping motion after formation (Figs. 9, 13). The superimposed clay particles over the striations confirm that the interior markings occurred during the manufacturing process rather than during later laboratory processing (Fig. 13).

# 5. Conclusion

In light of their low frequency and fragmentary nature, the pipes recovered from the Tortugas shipwreck were likely the personal effects of the crew and/or passengers, rather than cargo. The possibility of native travelers or blacks on board sailing to Spain cannot be positively excluded, a seemingly logical theory supported by the discovery on the Tortugas shipwreck of a Native American greenstone labret and two whetstones, as well as Afro-Caribbean colonowares typically associated with food preparation and cooking (Stemm *et al*., 2013: 104). This evidence led to speculation that African slaves worked in food preparation on the *Buen Jesús* (Gerth and Kingsley, 2014).

The earlier Spanish St. John's shipwreck off the Bahamas, dated to *c*. 1554-75, produced four white clay pipe fragments (Malcom, 1996). However, based on the illustration, those pipes clearly appear to be of European manufacture, so are not directly relevant to the origins of the Tortugas pipes. An English origin has also been proposed for the 17 pipe fragments from the mid-17th century Spanish Stonewall wreck off Bermuda (Dethlefsen *et al*., 1977: 325-26, fig. 14). Excavations of the 17th-century Monte Cristi 'Pipe Wreck' in the Dominican Republic yielded an enormous cargo of clay tobacco smoking pipes of Dutch manufacture intended for both the colonial and tribal trades (Hall, 1996: 199; 2006: 20-21). These European-produced pipes also do not appear to conform to the Tortugas assemblage. Although white clay pipes contemporaneous with the Tortugas wreck were also produced in America in the early 17th century, the illustrated Jamestown specimen stems are far larger than the Tortugas white clay specimen. Thus, the manufacturing origin of the Tortugas white clay pipe remains unknown.

Although one tends to initially assume a European origin, the crude manufacture (very coarse sands in the paste) and the possible commonality in production methods suggested by the square hole in the white pipe stem (Fig. 10I), compared to the hole in the earthenware specimen (Fig. 11C), raised enough doubt to prevent arbitrarily assigning the white clay pipe to a European manufacturing source such as England or Holland. The Tortugas wreck's white stem specimen's paste is crude and of lower quality compared to contemporaneous English and Dutch pipes. Likewise nothing is known about early white clay pipe production (if any occurred) in Spain or Portugal, so numerous questions remain about this specimen's origin. To date, early indigenous 17th-century white clay pipe manufacture using European production techniques has not been reported in South America.

The six earthenware specimens are attributed to New World, non-European manufacture. Multiple clay sources appear to be represented, although the production locations remain unknown. If the pipes were carried by indigenous American or black slaves aboard the Tortugas ship,

they very possibly derived from their native villages and thus represent their owners' local clay and product. However, if the pipes were acquisitions made by crewmembers for personal use, they more likely originated from the ship's ports of call, where they were either purchased in the market place or appropriated from the inhabitants. Cuba and Venezuela represent the two most likely sources for the earthenware specimens, the latter country being journey's end for the *Buen Jesús*, although the actual production sources remain unidentified.

## Notes

1. This historical overview is based on Sudbury, J.B., 'Historic Clay Tobacco Pipes in the United States' (PowerPoint Presentation at Fort Union Trading Post National Historic Site, Williston, North Dakota, 31 July 2003).
2. See also, Neely, P., '400-Year-Old Personalized Pipes Found at Jamestown', *National Geographic,* November 2010: http://news.nationalgeographic.com/news/2010/11/101129-jamestown-personalized-pipes-virginia-history-colonial-america.
3. Tabacalera merged with SEITA to become Altadis in 1999, which was acquired by Imperial Tobacco in 2008.
4. See, Pearce, J., 'Clay Tobacco Pipes and Smoking in London': http://www.locatinglondon.org/static/MolaArchaeology.html.
5. These panels were taken from the Madrid Rosary posted on line at http://www.famsi.org/mayawriting/codices/marhenke.html (accessed 7 March 2014). The specific codex page for each image is: A. Plate XXV, B. Plate XXVI, C. Plate XXXIV, and D. Plate XXVII.
6. *Ibid* Note 2.

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## Bibliography

Astley, J. and Stemm, G., 'The Deep-Sea Tortugas Shipwreck, Florida: Technology'. In G. Stemm and S. Kingsley (eds.), *Oceans Odyssey 3. The Deep-Sea Tortugas Shipwreck, Straits of Florida: A Merchant Vessel from Spain's 1622 Tierra Firme Fleet* (Oxford, 2013), 1-16.

Ayto, E.G., *Clay Tobacco Pipes* (Haverfordwest, 2008).

Charlton, A., 'Medicinal Uses of Tobacco in History', *Journal of the Royal Society of Medicine*, 97.6 (2004), 292-96.

Christie's, *Gold and Silver of the Atocha and Santa Margarita* (Christie's New York, 14-15 June, 1988).

Copeman, S., 'Pipe Makers Arise', *Tobacco* (May 1981), 26-28.

Cotter, J.L., *Archeological Excavations at Jamestown Colonial National Historical Park and Jamestown National Historic Site, Virginia* (Archeological Research Series 4, National Park Services, US Department of the Interior, Washington, 1958).

Craven, W.F., 'Twenty Negroes to Jamestown in 1619?', *Virginia Quarterly Review* 47 (1971), 416-20.

De Roever, M., 'The Fort Orange 'EB' Pipe Bowls: An Investigation of the Origins of American Objects in Dutch Seventeenth-Century Documents'. In R.H. Blackburn and N.A. Kelly (eds.), *New World Dutch Studies. Dutch Arts and Culture in Colonial America, 1609-1776* (Albany Institute of History and Art, 1987), 51-62.

Deagan, K. (ed.), *Puerto Real. The Archaeology of a Sixteenth-Century Spanish Town in Hispaniola* (University Press of Florida, Gainesville, 1995).

Dethlefsen, E.S., Davison, E. and Buchman, D.L., 'The Stonewall Wreck. Interim Report on a 17th Century Spanish Vessel Wrecked off Bermuda'. *International Journal of Nautical Archaeology* 6.4 (1977), 315-29.

Emerson, M.C., 'Decorated Clay Tobacco pipes from the Chesapeake. An African Connection'. In P.A. Shackel and B.J. Little (eds.), *Historical Archaeology of the Chesapeake* (Washington, 1994), 35-49.

Fox, G.L., *The Archaeology of the Clay Tobacco Pipe. XV The Kaolin Clay Tobacco Pipe Collection from Port Royal, Jamaica* (BAR Int. S809, Oxford, 1999).

Gallagher, D.B., 'Clay Pipes for the Company for Scotland: Documentary Evidence'. In P. Davey (ed.), *The Archaeology of the Clay Tobacco Pipe X* (BAR No. 178, Oxford, 1987), 233-38.

Gerth, E. and Kingsley, S., *The Deep-Sea Tortugas Shipwreck, Florida: Afro-Caribbean Colonoware & Maritime Slavery* (OME Papers 39, Tampa, 2014).

Gilman, S.L. and Xun, Z., 'Introduction'. In S.L. Gilman and Zhou Xun (eds.), *Smoke. A Global History of Smoking* (London, 2004), 9-28.

Gott, R., *Cuba. A New History* (Yale University Press, 2005).

Hall, J.L., *A Seventeenth-Century Northern European Merchant Shipwreck in Monte Cristi Bay, Dominican Republic* (PhD. Thesis, Texas A&M University, 1996).

Hall, J.L., 'The Monte Cristi 'Pipe Wreck'. In R. Grenier, D. Nutley and I. Cochran (eds.), *Underwater Cultural Heritage at Risk. Managing Natural and Human Impacts* (ICOMOS, Paris, 2006), 20-22.

Handler, J.S., 'An African Pipe from a Slave Cemetery in Barbados, West Indies'. In P. Davey (ed.), *The Archae-*

*ology of the Clay Tobacco Pipe VIII. America* (BAR Int. S175, Oxford, 1983), 245-54.

Handler, J.S., 'Aspects of the Atlantic Slave Trade: Smoking Pipes, Tobacco, and the Middle Passage', *African Diaspora Newsletter* (June 2008), 1-12.

Handler, J.S. 'The Middle Passage and Material Culture of Captive Africans', *Slavery & Abolition* 30.1 (2009), 1-26.

Heidtke, K.P., *Jamaican Red Clay Tobacco Pipes* (MA Thesis, Texas A&M University, 1992).

Henry, S.L., 'Terra-cotta Pipes in Seventeenth Century Maryland and Virginia: A Preliminary Study', *Historical Archaeology* 13 (1979), 14-37.

Higgins, D.A., 'Clay Tobacco Pipes: A Valuable Commodity', *International Journal of Nautical Archaeology* 24.1 (1995), 47-52.

Higgins, D.A. (ed.), 'National Clay Pipe Summaries', *Journal of the Academie Internationale de la Pipe* 2 (2010).

Jelks, E.B., 'Appendix A: Ceramics from Jamestown'. In J.L. Cotter, *Archeological Excavations at Jamestown Colonial National Historical Park and Jamestown National Historic Site* (Archeological Research Series 4, National Park Services, US Department of the Interior, Washington, 1958), 201-12.

Kelso, W.M., *Jamestown, the Buried Truth* (University of Virginia Press, Charlottesville, 2006).

Kelso, W.M. and Straube, B. (eds.), *2000-2006 Interim Report on the APVA Excavations at Jamestown, Virginia* (Association for the Preservation of Virginia Antiquities, Richmond, VA, 2008).

Keoke, E.D. and Porterfield, K.M., *Encyclopedia of American Indian Contributions to the World. 15,000 Years of Inventions and Innovations* (New York, 2003).

Kingsley, S., 'The Identity and Maritime History of the Deep-Sea Tortugas Shipwreck'. In G. Stemm and S. Kingsley (eds.), *Oceans Odyssey 3. The Deep-Sea Tortugas Shipwreck, Straits of Florida: A Merchant Vessel from Spain's 1622 Tierra Firme Fleet* (Oxford, 2013), 123-50.

Klooster, K. 'The Tobacco Nation: English Tobacco Dealers and Pipe-Makers in Rotterdam, 1620-1650'. In L. Cruz and J. Mokyr (eds.), *The Birth of Modern Europe. Culture and Economy, 1400-1800. Essays in Honor of Jan de Vries* (Leiden, 2010), 17-34.

Knight, F.C., *Working the Diaspora. The Impact of African Labor on the Anglo-American World 1650-1850* (New York University Press, 2010).

Lewis, T.M. and Lewis, M.K., *Eva, an Archaic Site* (University of Tennessee Press, Knoxville, 1961).

Luccketti, N., Kelso, W.M. and Straube, B., *APVA Jamestown Rediscovery Field Report* (Association for the Preservation of Virginia Antiquities, Richmond, VA, 1994).

Luccketti, N. and Straube, B., *1997 Interim Report on the APVA Excavations at Jamestown, Virginia* (Association for the Preservation of Virginia Antiquities, Richmond, VA, 1998).

Luccketti, N. and Straube, B., *Interim Report on the APVA Excavations at Jamestown, Virginia* (Association for the Preservation of Virginia Antiquities, Richmond, VA, 1999).

Luckenbach, A., 'The Swan Cove Kiln: Chesapeake Tobacco Pipe Production, Circa 1650-1669'. In R. Hunter, (ed.), *Ceramics in America 2004* (The Chipstone Foundation, Wisconsin, 2004), 1-14.

Luckenbach, A. and Cox, C.J., 'Tobacco-Pipe Manufacturing in Early Maryland: The Swan Cove Site (ca. 1660-1669)'. In A. Luckenbach, C.J. Cox and J. Kille (eds.), *The Clay Tobacco-Pipe in Anne Arundel County, Maryland (1650-1730)* (Anne Arundel County's Lost Towns Project, Annapolis, 2002), 56-58.

Luckenbach, A., Cox, C.J. and Kille, J. (eds.), *The Clay Tobacco-Pipe in Anne Arundel County, Maryland (1650-1730)* (Anne Arundel County's Lost Towns Project, Annapolis, 2002).

Luckenbach A. and Kiser, T., 'Seventeenth-Century Tobacco Pipe Manufacturing in the Chesapeake Region; a Preliminary Delineation of Makers and their Styles'. In R. Hunter (ed.), *Ceramics in America 2006* (The Chipstone Foundation, Wisconsin, 2006), 160-77.

Malcom, C,. *St. John's Bahamas Shipwreck Project. Interim Report I: the Excavation and Artifacts 1991-1995* (Mel Fisher Maritime Heritage Society, Key West, 1996).

Mallios, S. and Straube, B., *1999 Interim Report on the APVA Excavations at Jamestown, Virginia* (Association for the Preservation of Virginia Antiquities, Richmond, VA, 2000).

Mathewson, R.D., *Treasure of the Atocha* (New York, 1986).

Mitchell, V., 'The History of Nominy Plantation with Emphasis on the Clay Tobacco Pipes', *Historic Clay Tobacco Pipe Studies* 2 (1983), 1-38.

Pearsall, D.M., 'The Origins of Plant Cultivation in South America'. In C.W. Cowan and P.J. Watson (eds.), *The Origins of Agriculture. An International Perspective* (Washington, 1992), 173-205.

Pollard, T., 'The Pleasures and Perils of Smoking in Modern England'. In S.L. Gilman and Zhou Xun (eds.), *Smoke. A Global History of Smoking* (London, 2004), 18-45.

Pogue, D.J., 'Clay Tobacco Pipes from Four Seventeenth Century Domestic Sites in the Lower Patuxent River Valley of Maryland'. In P. Davey (ed.), *The Archaeology*

 

*of the Clay Tobacco Pipe Chesapeake Bay XII* (BAR Int. S566, Oxford, 1991), 3-26.

Rafferty, S.M., 'Evidence of Early Tobacco in Northeastern North America?', *Journal of Archaeological Science* 33 (2006), 453-58.

Robicsek, F., 'Mayas'. In J. Goodman (ed.), *Tobacco in History and Culture. An Encyclopedia* (New York, 2005), 339-43.

Stemm, G., Gerth, E., Flow, J., Guerra-Librero, C.L. and Kingsley, S., 'The Deep-Sea Tortugas Shipwreck, Florida: A Spanish-Operated *Navio* of the 1622 Tierra Firme Fleet. Part 2: the Artifacts'. In G. Stemm and S. Kingsley (eds.), *Oceans Odyssey 3. The Deep-Sea Tortugas Shipwreck, Straits of Florida: A Merchant Vessel from Spain's 1622 Tierra Firme Fleet* (Oxford, 2013), 55-122.

Straube, B. and Luccketti, N., *APVA Jamestown Rediscovery Interim Report* (Association for the Preservation of Virginia Antiquities, Richmond, VA, 1995).

Sudbury, B., 'Historic Clay Tobacco Pipemakers in the United States of America'. In P. Davey (ed.), *The Archaeology of the Clay Tobacco Pipe II* (BAR Int. S60, Oxford, 1979), 151-341.

Sudbury, J.B., *Politics of the Fur Trade: Clay Tobacco Pipes at Fort Union Trading Post NHS (32WI17). Summary Report* (Clay Pipes Press, Ponca City, OK 2009).

Sudbury, J.B. and Jung, S.P. Jr., 'Clay Pipe Summary for the United States of America', *Journal of the Academie Internationale de la Pipe* 2 (2011), 137-48.

Zagorevski, D.V. and Loughmiller-Newman, J.A., 'The Detection of Nicotine in a Late Mayan Period Flask by Gas Chromatography and Liquid Chromatography Mass Spectrometry Methods', *Rapid Communications in Mass Spectrometry* 26.4 (2012), 403-11.