STUDIES IN MATERIAL CULTURE RESEARCH

Edited by Karlis Karklins

Published by
THE SOCIETY FOR HISTORICAL ARCHAEOLOGY

Ronald L. Michael, editor

Anthropology Section
California University of Pennsylvania
California, Pennsylvania 15419

2000

ISBN 1-886818-06-1

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Smoking Pipes for the Archaeologist

Introduction

Tobacco consumption had become firmly entrenched in most Western industrial societies by the late 16th century. The popularity of the activity is evidenced by the abundance of smoking pipe remnants which frequent the artifact assemblages of most historical sites. The cheap, fragile, and expendable nature of clay pipes, the standard of the early pipe industry, coupled with the character of the smoking activity which generally deposited discarded pipes where they were consumed, have combined to produce an extensive record from which to draw valuable insight into the social lifeways and material consumption patterns of past cultures. Pipe attributes such as maker's marks, decorative elements, stem–bore diameter, and bowl size, style, and configuration, can help date the contexts from which the artifacts were recovered. Although a clay tobacco pipe can be considered a fragile commodity as a unit, pipe stems, once fragmented, provide an ideal, durable index for dating archaeological contexts prior to the 1760s. The quality and source of the pipes can also reflect the status of the user as well as current trade networks.

This work is not meant to be the definitive word on pipe manufacture, but is designed to provide a succinct and practical field guide for cataloguing and dating smoking pipes from archaeological contexts. It attempts to establish consistent terminology and a rudimentary, yet accurate, descriptive framework for recording the attributes of various types of pipes. The report also discusses the reworking of pipes, and use/wear marks on its various components, as well as such strategies as minimum object counts and bowl-to-stem ratios, and the significance of such analysis.

This study is a compilation of the contributions made by a number of material culture researchers who have worked on smoking pipe artifacts in the Parks Canada National Reference Collection over the past thirty years. Consequently, emphasis is on the European pipe tradition in Canada. Aboriginal pipes are beyond the scope of this paper.

Pipe Attributes and Characteristics

"Smoking pipe" is the general functional term employed when referring to this artifact class. Labels such as "tobacco pipe" are restrictive in that they represent specific smoking pipe types, and non-tobacco pipes have been encountered in the archaeological record (Figure 1). Furthermore, smoking pipes did not always consume tobacco, especially during times of scarcity; e.g., scraped willow root (Greenhous 1987:140).

Regarding orientation, a pipe should be described from the perspective of the smoker; the portion referred to as the bowl "back" is that section of the bowl that faces the smoker when the pipe is being smoked (Figure 2).

The terminology presented here applies to both clay and component pipes. These can be classified as single- or multiple-unit pipes. Single-unit pipes are of one-piece construction as exemplified by the common molded white clay pipe. Multiple-unit pipes, composed of two or more parts, can be further subdivided into two-unit (two parts) and multi-unit (three or more components) forms (Figure 3). A composite pipe

FIGURE 1. Pipes for substances other than tobacco: ***a***, reproduction of an opium pipe bowl recovered from an 1850s context, San Juan Islands, Washington. Note the Chinese characters on the side identifying the maker; ***b***, ceramic "toke stone" used in the consumption of marijuana, recovered from the sod layer during excavation of the Ottawa Lock Station, Ottawa, Ontario. (Photo by Rock Chan.)

Studies in Material Culture Research, 2000:104—133.

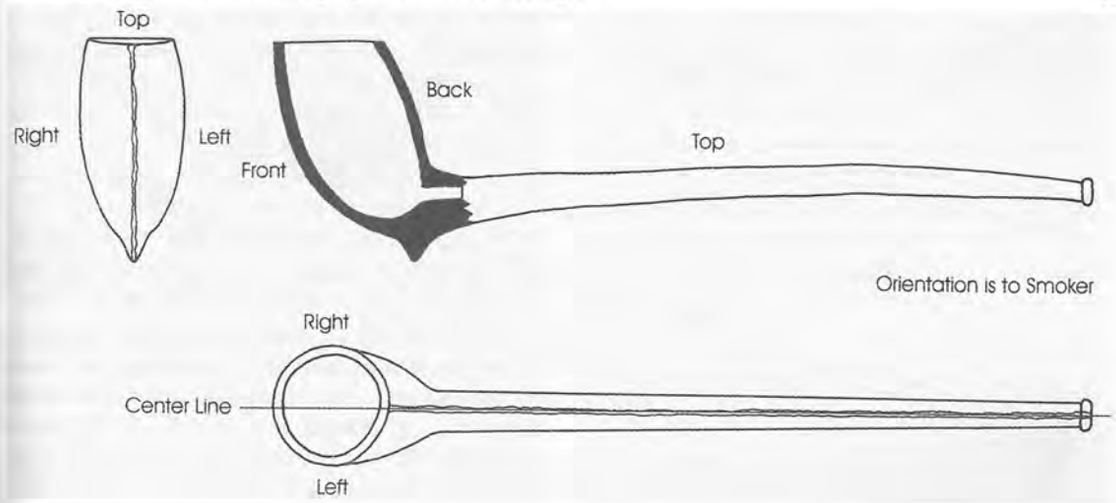

FIGURE 2. Pipe orientation. (Drawing by C. F. Richie.)

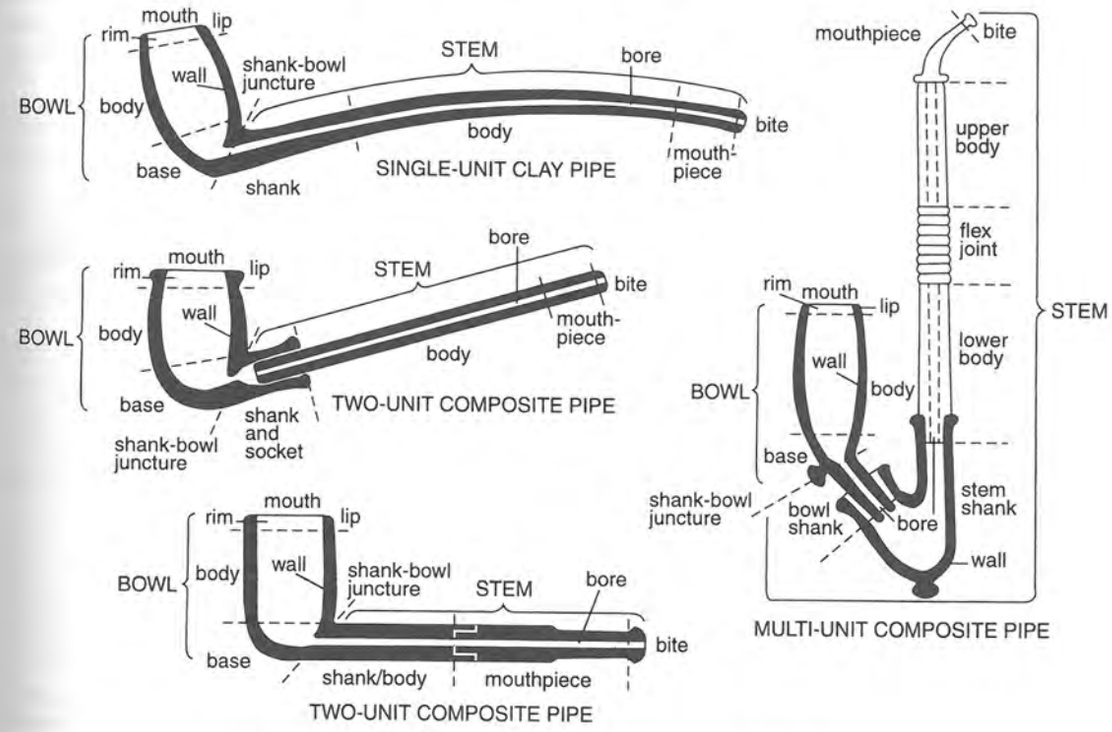

FIGURE 3. Smoking-pipe terminology. (Drawing by C. F. Richie.)

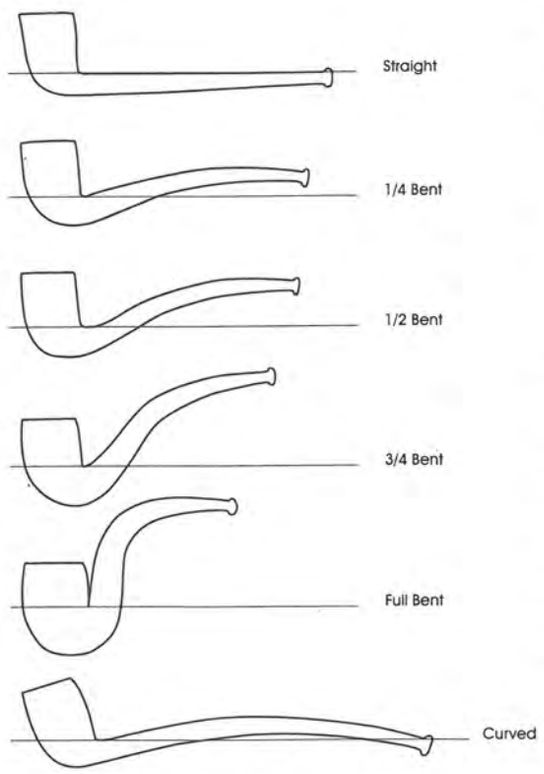

FIGURE 4. Stem configurations. (Drawing by C. F. Richie.)

reflecting a Central European tradition, which also became a prevalent form in the United States industry, incorporates a socket-shank that was designed to accept a separate stem of a different material.

A functional pipe consists of a bowl that holds the substance to be smoked, and a stem which transports the smoke to the mouth. The bowl is comprised of several parts which are identified in Figure 3. The point where the bowl and stem meet is the shank/bowl juncture. Feet and spurs are often found at the juncture of the shank and the base of the bowl. On clay pipes, maker's marks may appear on the shanks, bowls, spurs, and feet, while bowl decoration may also extend onto the shank and the stem of some models. The stem (or stem body), which generally tapers toward the bite on white clay pipes, connects the shank to the mouthpiece, the end of which is called a bite or bit. The hole running through the stem is called the bore.

Figure 4 illustrates the standard stem configurations of smoking pipes. Stems range from straight to curved, and include several degrees of bent forms. Although many of these stem styles are generally associated with composite pipes, molded clay imitations of fashionable composite designs were also manufactured. Fragmentary stems may not always conform to the standard. The specimen in Figure 5 is a section of a coiled pipe. Such smoking curios were fashionable novelties during the Victorian era and periodically appear in the archaeological record.

The condition of smoking pipe material can be an important factor in identifying the cause of deposition. For example, the presence of the relatively complete specimens in Figure 6 in latrine fill likely represents accidental loss. Condition encompasses the degree of completeness of the artifact by trait and attribute. Parts of a multi-component pipe should be considered as separate artifacts and described in degrees of completeness relative to the artifact and not to the pipe from which they came. A multi-component pipe is entered as a single artifact, and described as a whole prior to describing each component separately. A *complete* pipe is one with all elements intact as originally manufactured; a *functionally complete* pipe has been reworked to completeness or shows signs of use after breakage. Figures 7 and 8 illustrate the various levels of completeness that may be

FIGURE 5. Section of a coil pipe from a mid- to late-19th-century context at Fort Wellington, Prescott, Ontario. The presence of a bore indicates that this came from a functional pipe. (Photo by Rock Chan.)

FIGURE 6. Exploded view of two complete composite pipes. The specimen on the left is identified as a half-bent billiard with a military-style mouthpiece. The bowl is not briar but possibly of pearwood. The exterior surface was originally coated with black filler paint, typical of non-briar bowls or briars of inferior quality. The silver-plated brass shank ferrule was secured in grooves on the shank with an interior spring clip mechanism. The hard rubber mouthpiece and the metal tenon jacket were inserted into the ferrule spring clip which is forced over the end of the jacket, securing the mouthpiece to the ferrule. The case (a remnant of which is situated below the pipe) was black leather with a red felt lining and brass furniture. The pipe on the right is a traditional bent wooden style. The short, round briarwood bowl curves into a carved shank to accept the half-bent saddle style, hard-rubber mouthpiece. Elements of a nickel-plated brass ferrule were detected as were remnants of a spark cap. The threaded tenon was incorporated into the mouthpiece design. The mouthpiece is marked NRCo., identified as the mark of the Novelty Rubber Company, a firm that manufactured rubber products in New Brunswick, New Jersey, from 1855 to 1870 (Richie 1981:15). The recovery of these two pipes from 1870 to 1880 latrine fill at Fort Walsh, Saskatchewan, accounts for their relatively intact state. (Photo by Rock Chan.)

encountered within a pipe assemblage. The categories are:

1. Complete pipe: A complete bowl and stem, though the bowl may have portions of less than one major attribute missing.
2. Incomplete pipe: Specimens that do not meet the "complete pipe" criteria. This term should precede the categories listed below:
   a. Whole bowl: The complete bowl without any portion of the stem beyond the shank/bowl juncture. The bowl may have portions of less than one major attribute missing.
   b. Whole stem: The complete stem without any portion of the bowl beyond the stem/bowl juncture.
   c. Incomplete bowl: Any portion of a bowl less than a whole bowl as defined above.
   d. Incomplete stem: Any portion of a stem less than a whole stem as defined above.

Combinations of the whole and incomplete categories can be used except "whole bowl, whole stem" which should be subsumed under "complete pipe."

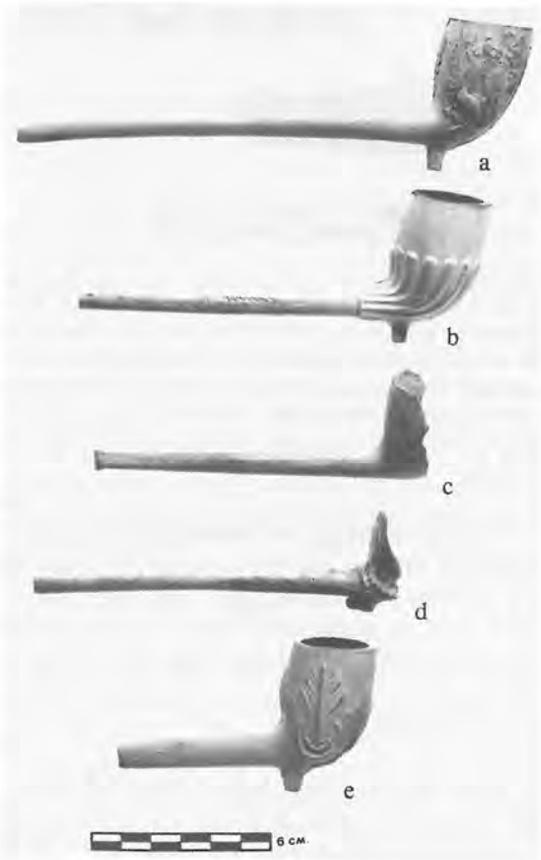

FIGURE 7. Levels of pipe condition: ***a***, complete pipe (20th century; Fort Wellington, Prescott, Ontario); ***b***, whole bowl/stem fragment (late 19th-early 20th century; Fort Wellington); ***c***, bowl fragment/whole stem (mid to late 19th century; Lower Fort Garry, Selkirk, Manitoba); ***d***, bowl fragment/whole stem (late 19th century; Fort Wellington, Prescott, Ontario); ***e***, functionally complete, incomplete pipe (late 19th-early 20th century; Red Bay, Labrador). (Photo by Rock Chan.)

FIGURE 8. Levels of pipe condition: ***a***, whole bowl; ***b***, whole bowl/stem fragment; ***c***, bowl fragment; ***d***, stem fragment; ***e***, bowl fragment/stem fragment, classified as a bowl fragment because the shank/bowl juncture is represented. The specimens are from late-19th-century contexts at Fort Wellington, Prescott, Ontario, except for ***d***, which dates to the 1840s-1850s. (Photo by Rock Chan.)

Properly recording the dimensions of a pipe is important as they can prove useful in determining the date of manufacture. Figures 9 and 10 show how to record bowl and stem dimensions as well as the angle of the bowl to the stem.

Clay Smoking Pipes

Most smoking pipes encountered on historical sites were made of clay. Its light, porous properties, coupled with its malleability prior to firing, made clay an ideal medium for pipe manufacture. Various clays were employed, the most common being a white ball clay, erroneously referred to as "kaolin" in the North American archaeological literature. A range of red to buff to orange clays, as well as occasional dark varieties, were also used. Although the majority of clay pipes were plain, they may also possess polished or glazed finishes.

Manufacturing Marks

A description of the complex process of clay pipe manufacture is beyond the scope of this report and has been well documented by a number of other researchers (Walker 1971b, 1977; Ayto 1994:19-24). In brief, the prepared clay was placed in a mold, the bowl was reamed with a plunging tool, and a wire was pushed through the stem to form the bore. The latter process usually left a small indentation or scar on the interior of the bowl opposite the bore.

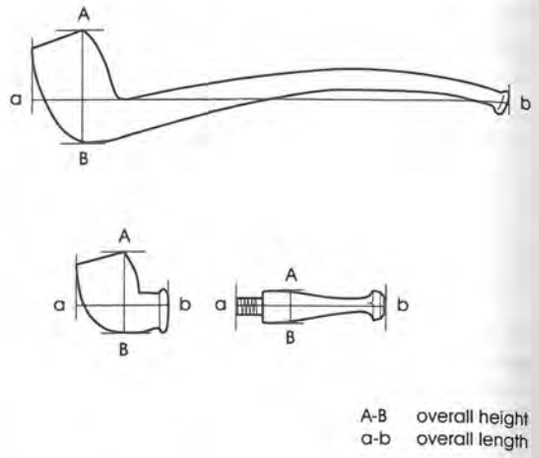

FIGURE 9. Measuring the overall dimensions of a smoking pipe: top, single-unit pipe; bottom, two-unit composite pipe bowl and stem. Debate exists over the merit of "the overall height" measurement as shown here. Some researchers feel that this should be measured perpendicular to the plane of the bowl rim, similar to bowl dimensions A-B in Figure 10. Either measurement is acceptable, but indicate which*ru are recording. (Drawing by C.F. Richie.)

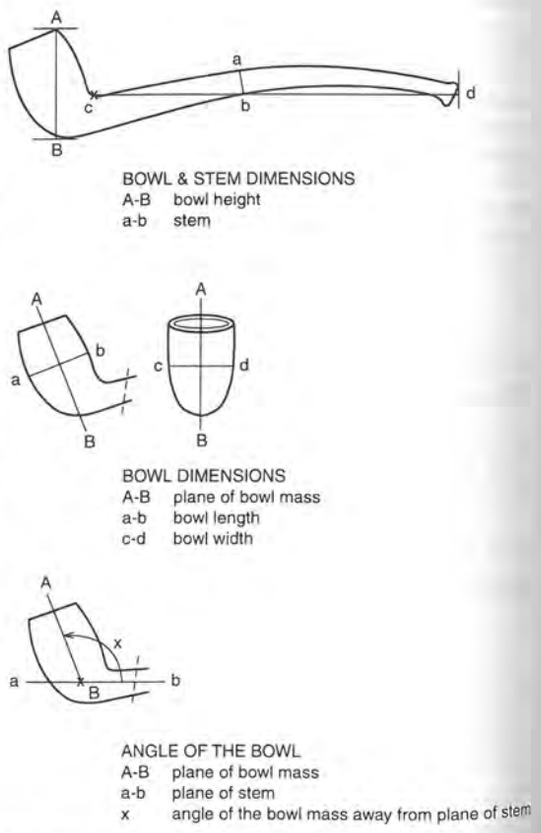

FIGURE 10. Proper orientations for recording bowl and stem dimensions, as well as the angle of the bowl to the stem. (Drawing by C. F. Richie.)

Most clay pipes encountered in archaeological collections were made in two-piece molds, with each piece forming a longitudinal half of the pipe. Seams extend along the top and bottom of the stem and up the front and back of the bowl. The marks were usually removed after the molding process and prior to firing. Trimming marks appear in the form of facets left by the trimming knife. The application of decorative floral sprigs or fronds along the seams was a popular method of masking the mold marks to reduce the labor required to produce a pipe.

Mold marks could also be obliterated by polishing, a burnishing process that applied a uniform, smooth, hard finish to the entire pipe. This step generally identifies better-quality pipes associated with continental, specifically Dutch, manufacture. Evidence of polishing consist of numerous thin striations that follow the contours of the pipe and the resultant dense, smooth surface (Figure 16).

Manufactured Bites

The identification of manufactured bites, also referred to as "bits" in the United States (Weber 1965:169), is important as these can help establish a minimum object count for the pipes in a collection. At least six bite configurations have been encountered at archaeological sites: flared lip, raised lip, plain flat lip, beveled lip, rounded, and rounded flat (Pfeiffer 1982:125). Two types of mouthpieces are generally encountered: in-mold and cut-made; a third type, termed salvaged, appears occasionally:

1. In-mold: Perhaps the most obvious bite style is that which consists of a raised lip around the end of the stem in imitation of the mouthpiece of a composite pipe. A second, more common type of in-mold bite consists of a bulbous or convex contour at the tip, often with a small cylindrical projection at the opening which was created while drawing out the bore wire during production.

2. Cut-made: A flush, cut-made mouthpiece may not be as readily detected. Performed prior to firing, this process involved cutting off the rough end of the stem, usually at an angle so that the very end is tapered. Careful examination of the bite may reveal the cut mark and often a very small projection caused by residual clay adhering to the pipe when the excess material is pulled away.

3. Salvaged: A third type of mouthpiece consists of a pipe stem with a broken end that has been glazed. Broken pipes were glazed and marketed in an attempt to salvage batches of damaged or substandard pipes. Since this was done by the manufacturer, such pipes constitute manufactured bites.

Glazing was one way of treating the bite to keep the smoker's lips from sticking to its surface. The pipe ends were simply dipped in a glaze prior to firing, producing a smooth finish over the porous clay surface. Evidence suggests that yellow/brown and green glazes were employed to a minor degree towards the end of the 1700s, rising dramatically in popularity during the 1800s (Noël Hume 1969:302). Mouthpieces treated with paint and sealing wax, which became popular during the last quarter of the 1800s, have also been recovered archaeologically (Figure 11).

Heels, Feet, and Spurs

Heels and feet were usually associated with early pipes, being replaced by spurs as the pipe form evolved. While the heels and feet on earlier styles enabled the pipe to stand upright on a flat surface, spurs allowed later pipes to be held comfortably while being smoked as the bowl would become very hot. Spike and peg-shaped spurs, located at the base of the bowl at the shank/bowl juncture, were the two principal styles. Some bowl styles did not possess these features.

Decoration and Design

The shape of a pipe bowl may sometimes be considered as decorative, as in the case of effigy pipes (Figure 12) and imitations of meerschaum, calabash, and woodstock styles (Figures 13-14). When describing decorative elements, the method by which they were imparted should be noted.

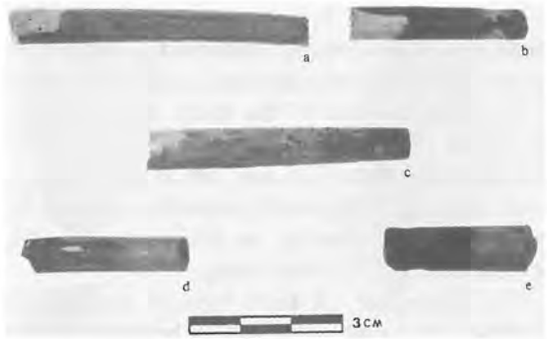

FIGURE 11. Pipe stem bites exhibiting various finishes designed to prevent the smoker's lips from sticking to the porous material: ***a***, glazed (Signal Hill, St. John's, Newfoundland); ***b***, glazed—note the wear marks where teeth have abraded the glaze (Fort Temiscamingue, Quebec); ***c***, red wax (Castle Hill, Placentia, Newfoundland); ***d***, red wax (Signal Hill, St. John's, Newfoundland); ***e***, black paint (1870s-1880s; Fort Walsh, Saskatchewan). (Photo by Rock Chan.)

FIGURE 12. Examples of effigy bowls: ***a***, sometimes referred to as a hussar effigy, there are several varieties of this decorative style ranging from very military-like to an obscure to civilian likeness. Variations are sometimes referred to as a sultan effigy. In the hussar style, a military cap forms the rim and mouth of the bowl. Close inspection may reveal a chin strap indicating the base of a helmet or possible pillbox cap with a puggaree and badge at the front. A high military style of collar can be detected at the junction of the bowl and stem (Fort Coteau du Lac, Coteau du Lac, Quebec); ***b-d***, standard variations of a male effigy from post-1840s contexts (Le Vieille Maison des Jesuites, Sillery, Quebec; Fort Wellington, Prescott, Ontario; Signal Hill, St. John's, Newfoundland); ***e***, fragmented bowl decorated with a lady's effigy. The fine craftsmanship coupled with remnants of painted detail indicate a pipe of probable French manufacture. The clothing style is suggestive of the latter half of the 1800s (Colonel By House, Ottawa, Ontario); ***f***, knight with mailed hood, ca. 1870s. This specimen is unusual in that the effigy faces the smoker (Fort Wellington, Prescott, Ontario); ***g***, lady effigy in a socket-stemmed style of probable U.S. manufacture (probably mid 1800s; non-archaeological specimen). (Photo by Rock Chan.)

FIGURE 13. Meerschaum pipe designed and finished to imitate a calabash (late 19th-early 20th century; Fort George, Niagara-on-the-Lake, Ontario). Calabashes, consisting of clay or meerschaum bowls inserted into specially prepared gourds, originated in South Africa and became fashionable in Europe and North America toward the end of the 1800s. (Photo by Rock Chan.)

FIGURE 14. Clay imitations of wooden pipe bowl styles: ***a***, red clay panel style with a raised ring around the stem simulating the junction of the wood shank and the straight stem (late 19th-early 20th century; Fort Wellington, Prescott, Ontario); ***b***, white clay billiard style (Signal Hill, St. John's, Newfoundland); ***c***, white clay pipe with a half-bent stem, imitating a popular wooden style (Signal Hill); ***d***, white clay bite fragment designed to resemble an articulated bite from a multi-component pipe (1870-1884; Lower Fort Garry, Selkirk, Manitoba). (Photo by Rock Chan.)

FIGURE 15. Some decorative elements on bowls dating from the mid to late 19th century: ***a***, crossed lacrosse sticks and ball (Rideau Canal, Ottawa, Ontario); ***b***, bowl fragment finished with an egg and claw motif (1870-1884; Lower Fort Garry, Selkirk, Manitoba); ***c***, acorn bowl, 1857-1877; Lower Fort Garry); ***d***, terra cotta urn bowl with a glazed finish of probable U.S. manufacture (ca. 1860; Fort George, Niagara-on-the-Lake, Ontario); ***e***, knob-decorated bowl, sometimes referred to as an imitation corncob style; corncobs were softwood pipes that were developed initially for local consumption in the central United States (Fort George Military Reserve, Niagara-on-the-Lake, Ontario); ***f***, thorn-decorated stem (1857-1877; Lower Fort Garry); ***g***, scalloped bowl (Signal Hill, St. John's, Newfoundland). (Photo by Rock Chan.)

Furthermore, decoration applied during the manufacturing process should be distinguished from that applied afterwards by the purchaser. Such alteration should be identified as *reworking*.

DECORATIVE CATEGORIES

Seventeenth-century pipes were generally plain, with decoration being restricted to rouletted lines or grape patterns (Figures 22-23) and a Tudor rose design (Figure 22*e*) on the bowl. Bowl decoration became more common during the 18th century, and by the mid-19th century, pipe manufacturers were able to provide innumerable decorative themes to accommodate the great diversification in taste as far as pipe decoration is concerned. The diversity of designs can prove challenging in cataloguing pipe collections (Figures 15-16). The various designs can be documented and classified according to the principal subject of the decoration. Specimens may be assigned to categories based on broad themes. The perceived themes may change as recording progresses, the researcher finding that what looked like a main decorative theme on a small bowl fragment is actually only a minor theme when seen on a more complete example. Most decorative themes fall into the following five categories:

1. Naturalistic: A realistic, or attempted realistic, representation of an object or scene.
2. Stylistic: A conventionalized representation of an object or scene. This includes abstract and geometric renderings of natural phenomena.

FIGURE 16. Decorative motifs on finer-quality 19th-century pipe bowls of probable continental manufacture (note the fine polishing marks on all of the examples that clearly follow the lines of the pipe): ***a***, painted cherub erupting from the bowl front (late 19th century; Fort Wellington, Prescott, Ontario); ***b***, plain bowl showing distinct striations as a result of burnishing/polishing (late 19th-early 20th century; Rideau Canal, Ottawa, Ontario); ***c***, lotus leaf extending along the front of the bowl axis (early 20th century; Rideau Canal, Ottawa, Ontario); ***d***, beaver effigy on the underside of the bowl (1870s-1880s; Fort Walsh, Saskatchewan). (Photo by Rock Chan.)

3. Free-form: The design elements are not representative of natural phenomena and are characterized by non-geometric free forms.

4. Geometric: The design elements do not represent natural phenomena and are characterized by straight lines, circles, triangles, and similar forms (Figure 17).

5. Symbolic: The design elements (including letters, numbers, emblems, etc.) have, or are suspected of having, a meaning derived from their integrated whole. Some examples are:

a. Ethnic/Patriotic: This category (Figure 18) became a popular form of decoration as pipe manufacturers began to cater to ethnic and national sentiments, which was particularly fashionable throughout the 19th century.

b. T.D.: The initials "TD" situated on the back of the bowl (Figure 19) comprise one of the most common decorative categories on clay pipes. There are numerous variations, with the letters raised or impressed on a plain bowl, or within ovals and rounded cartouches, rope wreaths, shields, sunbursts, circles of stars, etc. The significance of the lettering is uncertain. The letters are believed to have appeared in the mid to late 1700s, and are thought to have been the initials of a maker of quality pipes. Through widespread plagiarism, they evolved into a popular symbolic decorative element. By the early 20th century, the firm of Duncan McDougall of Glasgow, Scotland, possessed 22 mold variations of the TD design (Walker 1977:88).

c. Masonic: Modern Freemasonry was established in England in 1717, and the society had become popular in the United States by the 1730s. The movement was firmly entrenched in the British military by the early 1800s. The decoration on Masonic pipes can be quite abstract as it often consists of a number of obscure symbols of fraternity and other devices relevant to the organization (Figure 20). One of the more common is the letter "G" set within dividers and a square.

FIGURE 17. Typical geometric decoration encountered on 19th-century pipes: ***a***, raised, wide vertical ribbing encircling the bowl, beginning at the halfway point of the bowl body and continuing down the base and curving towards the stem (late 19th century; Fort Wellington, Prescott, Ontario); ***b***, a series of raised vertical ridges within a U-shaped border which covers the bowl sides from the rim to the base (late 19th-early 20th century; Fort Wellington); ***c***, raised, beaded paisley decoration around the base of the bowl (1870s-1890s; Fort Wellington); ***d***, a series of raised, wide, vertical rectangles encircling the upper portion of the bowl, combined with raised crosshatching on the base (post-1850s; Lower Fort Garry, Selkirk, Manitoba); ***e***, pattern of raised panels following the contour of the pipe bowl from the base and extending approximately $\frac{3}{4}$ of the way up the sides; the panels are crosshatched and alternate with raised ridges (post-1865; Fort Wellington, Prescott, Ontario); ***f***, fine raised ribbing which covers the entire bowl and follows its contours (Fort St. Joseph, Ontario); ***g***, a series of raised, vertical ridges and facets which alternate around the bowl and follow its contours (Fort Wellington). (Photo by Rock Chan.)

FIGURE 18. Clay pipes decorated with ethnic and patriotic motifs: ***a***, flag of Scotland/thistle on bowl sides (late 19th-early 20th century; Fort Wellington, Prescott, Ontario); ***b***, crossed flags–Red Ensign and Stars and Stripes–on bowl sides (late 19th-early 20th century; Fort Wellington); ***c***, crossed flags, British Flag of the Union and Stars and Stripes, on bowl sides (late 19th-early 20th century; Ottawa Lock station, Rideau Canal, Ottawa); ***d***, fleur-de-lis/thistle on bowl sides (1870s-1890s; Fort Wellington, Prescott, Ontario); ***e***, Scottish thistle/ Irish effigy harp on bowl sides (1870s-1890s; Fort Wellington, Prescott, Ontario); ***f***, maple leaf on bowl sides (late 19th-early 20th century; Ottawa Lock station, Rideau Canal, Ottawa); ***g***, Irish effigy harp on the bowl front (post-1840s; Signal Hill, St. John's, Newfoundland); ***h***, Wolfe Tone and Irish effigy harp on the bowl sides (late 19th-early 20th century; Fort Wellington, Prescott, Ontario). (Photo by Rock Chan.)

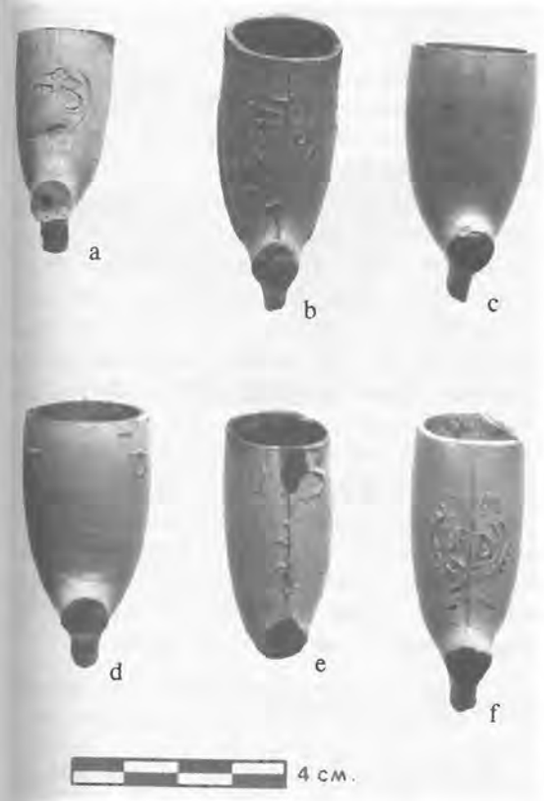

FIGURE 19. A selection of white clay "TD" bowls: ***a***, impressed TD within a circular cartouche (ca. 1810; Fort George, Niagara-on-the-Lake, Ontario); ***b***, raised TD within a shield with sprigs (ca. 1820s; Fort George); ***c***, impressed TD (ca. 1870s; Fort Wellington, Prescott, Ontario); ***d***, raised TD (1870s-1890s; Fort Wellington); ***e***, raised TD on bowl rim (Fort George); ***f***, raised TD within a sunburst (Fort Coteau-du-lac, Quebec). (Photo by Rock Chan.)

TYPES OF DECORATION

Decorative elements fall into four principal categories, depending on how they were applied to the pipe:

1. Raised: Applied by molding, the design elements appear in relief.

2. Impressed: Also applied by molding, the design elements are sunk into the pipe. An effigy pipe bowl is an example of impressed decoration.

3. Incised or Abraded: The design elements are abraded or cut into the pipe with an instrument during the manufacturing process. As mentioned above, this does not include designs added after the pipe has been fired.

4. Color contrast: The design elements are defined by color.

Dating Clay Pipes

Pipes are seldom marked with absolute dates. Specimens do occasionally depict commemorative themes which imply absolute dates and enable the determination of at least a *terminus post quem* for the pipe (Figure 21). Such instances are relatively rare, however, and dates and ascriptions generally need to be determined on the basis of a pipe's attributes. Examination of stem bore diameter, stem thickness, and bowl size and shape should supply a gross assessment of a pipe fragment's chronological position.

FIGURE 20. Examples of Masonic motifs on pipe bowls: ***a***, standard Masonic symbol/bird decorative motif with elk head on the bowl back (Signal Hill, St. John's, Newfoundland); ***b***, Masonic symbol consisting of the letter G within a cartouche formed by dividers and a set square. This appears on the bowl side opposite the bird shown in a. The bowl back exhibits the Prince of Wales plumes (early 1840s to early 1850s; Fort Wellington, Prescott, Ontario); ***c***, another Masonic pipe style marked W. White, Glasgow. This pipe illustrates a variety of symbols associated with the Order. The design on the bowl back is a sunburst within a Masonic cartouche (late 19th century; Fort Wellington, Prescott, Ontario). (Photo by Rock Chan.)

FIGURE 21. Pipes commemorating events (dating by association): ***a***, pipe commemorating Daniel O'Connell, leader and organizer of the Irish Catholic emancipation movement. His election to British Parliament in 1828 led to the passing of the Emancipation Bill of 1829 (Signal Hill, St. John's, Newfoundland); ***b***, white clay pipe bowl exhibiting the two sides of a five-franc coin of the Second Republic of France, dated 1849 (Fort Wellington, Prescott, Ontario); ***c,*** reproduction of a Franklin Pierce presidential campaign pipe. Pierce, elected 14th president in 1852, was in office from 1853-1857 (San Juan Islands, Washington); ***d***, temperance motif commemorating the work of Reverend Theobald Mathew, a leader in the British Temperance Movement (Signal Hill); ***e,*** white clay pipe bowl commemorating Queen Victoria's 75 years on the throne in 1897 (Ottawa Lock Station, Ottawa, Ontario); ***f,*** presidential campaign pipe bearing the effigy of Zachary Taylor, elected 12th president of the United States in the 1848 presidential election (non-archaeological specimen); ***g,*** coronation pipe marking the accession of Edward VII, and dating to the beginning of the 20th century (Fort Wellington). (Photo by Rock Chan.)

Other attributes such as finish, maker's marks, and decoration, if any, are also helpful for this purpose. Comparing the data recovered from pipe analysis with that derived from other material in an archaeological assemblage will generally also prove useful in dating pipe material.

THE EVOLUTION OF ATTRIBUTES

Clay smoking pipes of British manufacture underwent numerous changes from the 16th to the 20th century. The following sections highlight the more prominent changes apparent in the evolutionary progression.

17TH-CENTURY PIPES

Figures 22 and 23 illustrate examples of early bowl shapes from the 17th century. The bowls, bulbous or barrel-shaped, are squat and very small at the beginning of the century but increase in size as the century progresses. The plane of the lip of the bowl slopes away from the smoker and is at a very acute angle to the stem. Many styles possess flat feet or heels at the base of the bowl which are often large enough for the pipe to rest on in an upright position. Spurs are rarely present during this period. Decoration is also rare and generally consists of a rouletted line encircling the rim of the bowl. A maker's mark, if present, usually consists of a symbol, initials, or a full name, sometimes within a cartouche, impressed in the foot or heel. Toward the end of the century, marks also appear on the side or back of the bowl, as well as on top of the shank.

18TH-CENTURY PIPES

Typical bowl shapes of the 18th century are shown in Figure 24. The plane of the lip of the bowl is parallel to the stem. The rouletted line encircling the rim has disappeared by this time. The standard of manufacture has improved. Spurs become fashionable, and many makers begin applying their raised, mold-imparted initials to the sides of these projections. During the second half of the century, the angle of the axis of the bowl to the stem tends to become less obtuse (more nearly a right angle). Toward the end of the 18th century, the baroque, heavy style of decoration which would come to dominate the Victorian period begins to appear; fluting and leaves belong either to the end of this century or the beginning of the next.

19TH-CENTURY PIPES

The mass production of clay pipes carried out in many countries–such as England, Scotland, France, Canada, and the United States–resulted in innumerable types and styles (Figure 25). Pipes from this period are heavily decorated, for the most part. The popularity of meerschaums and briars led to imitations in clay. Clay bowl shapes, bites, and stem configurations, imitating those of meerschaums or briars, date from the

FIGURE 22. Pipe bowl shapes, ca. 1640s-ca. 1690s: ***a,*** ca. 1650-1680 (Fort Anne, Annapolis Royal, Nova Scotia); ***b,*** ca. 1640-1660 (H.M.S. *Sapphire*, Bay Bulls, Newfoundland); ***c,*** ca. 1640-1700 (*Sapphire*); ***d,*** ca. 1670-1690 (*Sapphire*); ***e,*** ca. 1670-1690; this bowl also has a raised Tudor-style rose on both sides of the bowl base (*Sapphire*). (Photo by Rock Chan.)

second half of the 19th century. Effigy pipes had become popular by the beginning of the century. They are certainly represented on sites dating to the first half of the 1800s, as are heavily decorated bowls and stems. Mold-imparted names and ascription on the sides of the shank are also typical of the period. Peg and spike-style spurs are still encountered, many

FIGURE 23. Pipe bowl shapes, ca. 1680s-ca. 1740s: ***a,*** ca. 1680-1710; "mulberry" or "grape" decoration (Castle Hill, Placentia, Newfoundland); ***b,*** ca. 1680-1710; single rouletted band around bowl back rim (this and the following specimens are all from the 1696 wreck of the H.M.S. *Sapphire*, Bay Bulls, Newfoundland); ***c,*** ca. 1680-1710; ***d,*** ca. 1680-1730; ***e,*** ca. 1680-1730; ***f,*** ca. 1680-1720; ***g,*** ca. 1690-1720, with an ambiguous impressed linear decoration extending along the back rim of the bowl (Castle Hill, Placentia, Newfoundland). (Photo by Rock Chan.)

FIGURE 24. Bowl shapes typical of the mid to late 1700s: ***a,*** ca. 1760 (H.M.S. *Sapphire*, Bay Bulls, Newfoundland); ***b,*** ca. 1720-1780 (Riviere Richelieu underwater survey to, St-Jean Cantic, Quebec); ***c,*** a style typical of the North American export trade, a pipe by R. Tippet of Bristol, ca. 1720-1760 (wreck of *Le Machault*, Chaleur Bay, Quebec). (Photo by Rock Chan.)

with marks as before. Old features reappear, such as the plane of the bowl lip once again becoming moderately slanted away from the smoker. On machine-made pipes, the finish of the bowl may be careless (mold lines may not be smoothed off), even though the clay may be

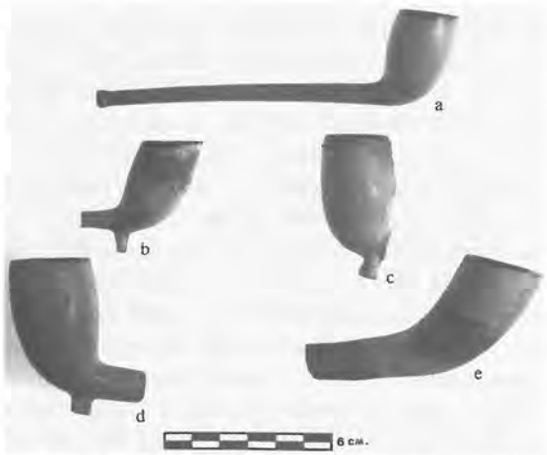

FIGURE 25. Pipe bowl shapes typical of the 1800s. The complete pipe is a short cutty style that became popular during the 1800s. The whole bowl and stem fragment in the lower right is a "woodstock" style which became popular during the latter half of the 19th century. Provenience: ***a,*** mid to late 19th century (Fort George, Niagara-on-the-Lake, Ontario); ***b,*** late 19th-early 20th century (Fort Wellington, Prescott, Ontario); ***c,*** post-1840 (St. Andrew's Blockhouse, St. Andrew's, New Brunswick); ***d-e***, mid to late 19th century (Signal Hill, St. John's, Newfoundland). (Photo by Rock Chan.)

smoother and purer than in earlier pipes. Borestem diameter is not helpful for dating during this period.

Bowl Shapes

The size and shape of the bowl of a clay pipe and its relationship to the stem can also provide reliable dating clues as these attributes experienced numerous recognizable changes throughout the historic period. The best source for distinguishing English bowl types is Oswald (1961; 1975). A simplified version of his bowl-shape chronology, which is more applicable to North American researchers as it is based on pipes recovered from American sites, appears in Noël Hume (1969:303). It should be noted that as with most typologies, allowances must be made for variations in bowl shape. Departures from the norm will be encountered and should, therefore, be expected throughout any period. The presence, style, and location of the foot or spur may also provide a relative date since spurs begin to appear on the bowl around the early 1700s.

The Dutch clay-pipe industry was initiated around 1600, largely by immigrant English pipemakers, thus, basic similarities in style between English and Dutch pipes are present throughout the 17th century. By the end of the century, bowl shape had changed to one where the mouth became as wide as or wider than the middle of the bowl. This conical shape, referred to as conoidal by Walker (1966a:4), continued until the end of the 19th century in the Netherlands, the size of the bowl and the obtuseness of its angle to the stem tending to increase with time, while the cross section of the bowl changed from circular to oval. Dutch pipes usually exhibit a much finer finish than English ones, frequently having a glossy, well-polished surface and milling along the rim of the bowl (Walker 1971a:90). Dutch bowls often appear to be smaller than English ones. An excellent study of early Dutch pipes in North America is by McCashion (1979). Atkinson and Oswald (1972) and Duco (1976) present more information concerning the identification and dating of Dutch clay pipes.

MAKER'S MARKS

Identifiable maker's marks provide the most dependable means to date clay pipes. These include all marks (such as symbols, names, initials, and numbers) put on a pipe to identify the maker and the place of manufacture, as well as the style and mold number of the pipe. It should be noted that there was a degree of plagiarism within the industry, in that the marks of firms associated with better-quality products were copied by others. These include Peter Dorni pipes, as well as certain Dutch marks synonymous with finer pipes. The ubiquitous "TD" mark, perhaps the most common decorative element on clay pipes, is thought to have originally represented a British maker who manufactured quality pipes (Walker 1966b). There are three types of marks:

1. Raised: The mark appears in relief.
2. Impressed: The mark is sunk into the surface.
3. Incised or abraded: The mark is cut or ground into the pipe with an instrument during the manufacturing process (before firing in the case of clay pipes).

Early pipe marks (dating from the first half of the 1600s) appeared on the base of the foot, the top of the shank or around it, or on the back or sides of the bowl. The marks consisted of initials, a full name, or a combination of the two. Symbols were also employed. With the advent of spurs in the early 18th century, English pipemakers began placing their initials on these features. It was customary to put the initial of the maker's first name on the left side of the spur and the initial of the last name on the right side. It should be pointed out that in these marks, the letter "I" also represents "J" in some cases. Who the initials represent can frequently be determined by consulting Oswald (1975). Cartouches enclosing maker's marks on the sides and backs of bowls persisted throughout this period. One of the more prominent firms to employ this form of identification was the Ford pipemakers of the Stepney area of London. The Fords were principal suppliers to the Hudson's Bay Company and pipes bearing their names within oval cartouches on the bowl back have been excavated at numerous fur trade sites in Canada and the United States. Walker (1983:65) illustrates some typical marks associated with these prominent London makers. Mold-imparted maker's names, usually accompanied by the name of the city where the factory was located, generally began appearing on pipes of British manufacture during the early 1800s, and continued into the 20th century.

Around the middle of the 1800s, a number of British manufacturers began putting marks on the bowls, shanks, or in some cases, the spurs of their pipes. These codes are believed to have identified specific mold patterns or decorations, and could be used to order the desired pipe pattern.

Most Dutch bowls exhibit maker's marks. Unlike the English who tended to use their initials as marks, Dutch makers employed various devices. Their marks were extremely well defined and consisted of very small numbers and letters, often surmounted by crowns, as well as various heraldic and symbolic devices such as windmills, mermaids, milkmaids, etc. These marks were usually located on the base of the foot or heel, and later on the peg-style spur. Dutch pipemakers continued to put their marks in these locations until the end of the 1800s. In the case of a pipe with no spur, the mark was placed on the base of the bowl where the spur would have been or, occasionally, on the back of the bowl. Research on pipe marks registered in the city of Gouda, the major center of the Dutch clay-pipe industry, has resulted in an illustrated catalogue (Helbers 1942). More recently, Don Duco (1976) has conducted extensive research into the identification of Dutch clay pipes and their marks. Although Dutch marks are superbly made with meticulous detail, their use to identify makers and date pipes can be problematic. As these marks could be bought, sold, or inherited, they can be difficult to associate with an individual maker or firm. Nevertheless, the presence of the coat of arms of the city of Gouda on pipes is indicative of manufacture after 1739/1740, when authorization to use this device was granted. The letter "S" for the Dutch word *slegte*, which denotes lesser-quality pipes, was placed above the city's arms shortly thereafter (Walker 1971a:62).

PROMINENT PIPE MANUFACTURERS

CANADA

The Canadian pipemaking industry began in earnest in the 1840s, and lasted into the 20th century. The pipes were produced in the British tradition. Consequently, the maker's name and city of manufacture appeared on the left and right shank sides, respectively, in keeping with the trend in Britain during this period. A list of Montreal pipemakers has been compiled by Robin Smith who is currently researching the clay pipe industry in that city. This listing, "Montreal Clay Tobacco Pipe Makers, 1846-1902," is accessible through the Internet (Smith 1998).

Maker	Location	Date
R. Bannerman	Montreal	1858-1888
Bannerman	Montreal	1888-1907
T. Doherty	Montreal	1850-1857
W. H. Dixon & Co.	Montreal	1876-1894
D. Ford	Montreal	1857-1873
Henderson	Montreal	1847-1876
Henderson's	Montreal	1849-1876
Murphy	Montreal	1859-1886
W&D Bell	Quebec City	1862-1881

SCOTLAND

Five Scottish pipe manufacturers–Alexander Coghill, William Murray, William White, Duncan McDougall, and T. Davidson–monopolized pipe exports during the 19th century.

Maker	Location	Date
Alex. Coghill	Glasgow	1826-1904
Davidson, T & Co.	Glasgow	1861-1910
Duncan McDougall & Co.	Glasgow	1847-1967
Wm. Murray & Co.	Glasgow	1830-1861
John Nimmo	Glasgow	1834-1846
W. White	Glasgow	1805-1955
Thos. White & Co.	Edinburgh	1823-1876
Thos. Whyte	Edinburgh	1832-1864

ENGLAND

As pipe smoking was practiced in England as early as the 1570s (Oswald 1975:4), Great Britain has a long tradition of clay pipe manufacture with thousands of individuals having been associated with the industry. An exhaustive listing was compiled by Adrian Oswald (1975:128-207) which covers pipemakers from the various parts of England as well as Scotland, Ireland, and Wales. When combined with temporal data provided by a pipe's attributes, these lists can be most helpful in identifying the

maker of a pipe and its probable date.

Maker	Location	Date
Ford	London (Stepney)	1805-1865
Michael Martin	London (Woolwich)	1847
Posener	London	1866-1899
Swinyard	London	1836-1853
John Williams	London	1828-1842
William Williams	London	1823-1864
Ring	Bristol	1803-1883
Robert Tippet	Bristol	1660-ca.1720
T. Pascall	Dartford	1839-1851
J. Braithwaite	Liverpool	1816-1864
R. Morgan	Liverpool	1790-1845
W. Morgan	Liverpool	1767-1796, 1803
Edward Higgins	Salisbury	ca.1680-1710
C. Carter	Southampton	1720-1750
Reuen Sidney	Southampton	1687-1748

FRANCE

Although this industry has a long history, French pipes only came into their own between the 1850s, and the beginning of the 20th century. French pipes were generally of superior quality, with many of the bowls displaying finely molded effigies and designs. Many of the effigies possessed painted features, such as eyes, hair, hats, scarves, etc., and the clay used for some pipes was dyed red or black, attributes that may help to identify French pipes in a collection (Pfeiffer 1985:117, 1999:personal communication). French pipes were usually marked with the name and place of manufacture on the top of the shank. Two references which illustrate the styles of pipes produced by French pipemakers are Jean-Léo (1971) and Augustin (1980-1981).

Maker	Location	Date
Peter Dorni	St. Omer	ca.1850-ca.1880
Dumeril	St. Omer	1844-ca.1885
L. Fiolet	St. Omer	1746-1920
Nihoul	Nimy	1766-1914
Gambier	Paris	1780-1926
Gisclon	Paris (Lille)	ca.1820-ca.1880

NETHERLANDS

In North America, Dutch pipes appear on sites associated with Dutch and French settlement. One of the principal manufacturers was J. & G. Prince, Gouda (1773-1898).

UNITED STATES

Although Euroamerican smoking pipes have been manufactured in the United States since the 1600s, their production generally constituted a minor portion of a potter's trade and pipes were generally manufactured to fulfill local demand (Sudbury 1979:215). Consequently, few American pipes possess any identifiable maker's marks. The first pipes were crude copies of European designs made in a variety of colored clays, apparently in Virginia and New England (Noël Hume 1969:308). A style of pipe produced in the United States since at least the mid-1700s was the socket-shanked pipe, a two-unit pipe in which the clay portion, consisting of a bowl and shank, was designed to accept a separate stem. Considered the most dominant pipe form manufactured in the United States from the 1840s into the early 1900s, these pipes became synonymous with the later American clay pipe industry (Pfeiffer 1981b:109). This pipe style is believed to reflect a central European tradition (Walker 1971c:30, 1983:40).

Many American pipes were made of terra cotta, a red to orange clay. As with the Aust pipe illustrated in Figure 26, the investigation of pottery and kiln waster sites in the United States is slowly providing information concerning the products of specific pipemakers (South 1964, 1967). Consequently, it is important to record the finish on terra cotta pipes, whether plain or glazed (numerous glazes were used, the most common being salt, or fly ash glaze) and, if glazed, whether the glaze covers only the exterior or both the interior and exterior of the bowl. Sudbury (1979, 1980, 1983, 1986) provides an essential starting point to the very complex problem of identifying American pipemakers. Industrialization within the American pipe industry by the middle of the 19th century prompted large-scale production in areas such as Point Pleasant, Ohio and Pamplin, Virginia.

THE U.S. MCKINLEY TARIFF ACT

The McKinley Tariff Act of 1891 stipulated that all goods imported into the United States henceforth had to bear the name of the country of origin. Often used in dating ceramics, this act also applied to the pipe industry as foreign pipemakers had to comply if they were to compete in the lucrative U.S. market.

STEM-BORE-DIAMETER DATING

Some years ago, North American archaeologists concentrated their efforts on determining the utility of stem-bore diameters to date clay smoking pipes in archaeological assemblages. They concluded that the bores of pipes, measured in increments of 1/64 of an inch, progressively decreased in size until about 1770. Harrington (1954, 1990) gives specifics. The reduction was gradual with the result that three different diameters were often manufactured simultaneously during any given period. Consequently, the mean of the bore diameters derived for a collection of pipe stems provides the probable date for the assemblage, except in the case of the last (1750-1800) period defined by Harrington. The erratic results for samples from sites of this period reveal that the trend towards smaller bores no longer prevailed and demonstrates the futility of using stem-bore-diameter dating on material postdating the 1750s or 1770s.

As more data were collected, a number of regression formulae were devised in an attempt to date archaeological assemblages. Although it is beyond the scope of this work to describe their mechanics (Harrington 1954, 1990; Binford 1962; Heighton and Deagan 1971) or to assess the accepted dating techniques (Omwake 1956; Noël Hume 1963, 1979:5-7; Walker 1965, 1967; Pfeiffer 1978), some considerations should be raised. The application of the formulae should be restricted to pipes manufactured in England, specifically London and Bristol. Assemblages with a heterogeneous composition tend to provide erratic dates, as do assemblages that predate the 1680s and postdate the 1760s (Noël Hume 1969:300). Therefore, the formulae are not applicable to sites dating from the latter half of the 18th century where a variety of pipes from a number of countries may be present.

A statistically significant sample is needed to obtain good results in stem-bore-diameter dating. Harrington, as the principal proponent of stem-

FIGURE 26. A stylized, anthropomorphic effigy pipe attributed to the Moravian Potter Gottfried Aust of Bethabara, North Carolina. Once considered a post-18th-century phenomena, it is now known that such pipes were in production prior to 1800. The pipe is a bent-elbow socket-stemmed style with a half-bent shank. The bowl is cylindrical and flared at the top; it portrays the face of a mustached man wearing a flared, visored shako. Raised floral rococo scrollwork decorates the cap. Recovered from the 1760 wreck of the French privateer *Le Machault*. (Photo by Rock Chan.)

bore-dating, recognized this and the potential for misuse: "I had hoped that no one would be uncritical enough or so literal-minded, that they would attempt to date a single pipe stem fragment, or even a limited number from my chart" (Harrington 1955:12). The formulae also require an even temporal distribution of pipe material. This may not be the case at some sites as samples may be skewed by intermittent occupation. The greatest misuse of the regression formulae, however, has occurred as a result of a researcher's inherent tendency to assign a mathematically derived, absolute date to a pipe sample. Caution must be taken when employing bore diameters to calculate dates for an archaeological assemblage. Considering the non-regulated nature of the pipe industry, coupled with the extremely gradual evolution of the bore-reduction phenomenon, considerable variation may be expected in stem-bore diameters throughout any given period. The finding of two distinct stem-bore diameters in a wrecked ship's cargo reveals that different-size bore tools were being used simultaneously by a single manufacturer (Higgins 1997:131). Nevertheless, a nominal date for a pipe assemblage can be established in some cases through analysis of the bore diameters of the recovered pipe stems, especially when combined with data derived from other attributes such as bowl configuration and maker's marks.

There is a correlation between time and bore-stem diameter, thus measuring the bore diameters of clay pipe fragments should be a standard cataloguing procedure even though there may be no immediate practical application. As both Pfeiffer (1981a) and Cranmer (1990:73) noted, attributes such as the shape and diameter of stem bores, as well as their frequency in deposits, may prove more useful than for simply determining a mean date. Analysis of these characteristics may provide critical insight into the spatial distribution of a specific site, as well as its occupational phases and their intensity.

Drill bits are ideal for measuring stem-bore diameters. Bits ranging from 4/64 in. to 9/64 in. can be embedded in a rubber stopper, thus forming a handy little measuring device. Another popular tool for measuring bore diameters is the step gauge which incorporates all the required measurements into one implement (Lenik 1971:100-101).

Metal Pipes

Occasional fragments of metal pipes have been recovered from North American sites (Noël Hume 1969:308). One- and two-piece pipes were manufactured from various metals, including silver, iron, brass, and copper. Even some pewter examples are known from Jamestown (Noël Hume 1969:308) and Sainte-Marie among the Hurons (Jeanie Tummon 1990:personal communication). Believed to have been most popular towards the end of the 1700s, these pipes were employed during more robust activities, such as traveling and hunting, where fragile clay pipes might not survive. The forms of the metal pipes mirrored those of contemporary clay pipes. Iron pipes covered with brightly colored enamel are also known, and smokers in remote areas sometimes fashioned pipes from such objects as tin cans (Figure 27).

FIGURE 27. Smoking pipe fashioned from a tin can by a member of Franklin's 1845-1848 Arctic Expedition (Eden Point, Devon Island). (Photo by Rock Chan.)

Composite Pipes

Composite smoking pipes possess several components which are frequently composed of different materials such as porcelain, stone, and wood. In addition, composite pipes can also be composed of several clay components, or consist of reworked clay pipes fitted with homemade elements, such as whittled wooden stems. Ehwa (1974) gives a description of various types of composite pipes and their manufacture.

Porcelain

Although documented in the 1700s, porcelain pipes came into fashion around the 1850s (Figures 28-29). Many excavated examples can be identified as the "coffee house" style which consists of a porcelain bowl, usually with a metal spark cap, a porcelain reservoir which connects the bowl to a straight cherry-wood stem of varying length, and a horn, bone, or possibly amber mouthpiece (Figure 30). These pipes were designed for a sedentary, relaxed setting.

Stone

Most European stone pipes are composed of meerschaum, a German term meaning "sea surf" as it was originally thought to be petrified sea foam. The material is, in reality, a metamorphic rock composed of a hydrous magnesium

FIGURE 28. Glazed and painted porcelain pipe bowls: ***a,*** lion effigy of possible German manufacture (1830-1860; Fort George, Niagara-on-the-Lake, Ontario); ***b,*** two-tone decorated bowl (late 19th-early 20th century, Rideau Canal, Ottawa, Ontario). (Photo by Rock Chan.)

FIGURE 29. Artist's reconstruction of the porcelain lion effigy pipe bowl shown in Figure 28***a.*** The spark cap representing the animal's head is based on a similar animal effigy pipe illustrated by Fairholt (1859:201). (Drawing by Dorothea Larsen.)

silicate (Weber 1965:76). The best meerschaum came from Asia Minor, specifically Turkey. It has been carved into pipe bowls since the early 1700s, and such pipes were very much in fashion with the very rich by the 1750s. The discovery of new deposits of meerschaum made this form more affordable and, by the 1850s, meerschaum pipes were a popular smoking medium of the middle classes. Fragile and expensive, meerschaum pipes are occasionally encountered in archaeological contexts.

Meerschaum pipes are composite or multi-component pipes in that the bowl was attached to an amber or horn mouthpiece by a bone tenon and ferrule, or the pipe had a socket style of shank with a tapered hole which accommodated a cork or leather-tipped stem, usually of cherry wood. The bite was generally composed of amber or horn. Pipe bowls of carved meerschaum can be plain or highly decorated (Figure 31). A peculiar quality of meerschaum is that its color changes from chalk white or

FIGURE 30. Porcelain pipe bowl fragments from ca. 1860s-1880s archaeological contexts in relation to an intact coffee house specimen. (Photo by Rock Chan.)

creamy yellow to a rich amber or golden brown as the tars and oils from the tobacco interact with the waxed surface of the bowl.

Fashioned from siltstone, steatite, and catlinite, fragments of stone pipes similar in form to clay pipes have also been encountered on archaeological sites. These generally represent an indigenous pipe industry and probably reflect a Euroamerican pipe tradition (Figure 32).

Wood

Briar pipes, fashioned from the burl of the white heather tree, became popular around the 1850s. As a result, a number of briar-bowl styles came into being during the latter part of the 19th century. Figure 33 illustrates some of the more common forms; billiard, panel, and apple are three of the earlier styles that may be encountered in archaeological collections. Pipe bowls were also made of apple, cherry, and pear wood. Mouthpieces were also occasionally fashioned from wood (Figure 36*c*).

Other Materials

Composite pipes frequently have components fashioned from such materials as metal, bone and ivory, amber, horn, and synthetic substances.

1. Metal: Metal pipe components were generally in the form of spark caps, ferrules, and filters. *Spark caps*, usually made of copper alloy with a nickel finish, were found on some models of porcelain and wooden pipe bowls (Figure 34).

Ferrules, metal bands or sleeves that covered the join between the pipe shank and mouthpiece, occasionally provide very useful information concerning the origin and date of a pipe. Many better-quality British briar and composite pipes of the 19th century had hallmarked sterling-silver

FIGURE 31. Meerschaum pipes and a white clay meerschaum imitation (late 19th-early 20th century): ***a,*** plain meerschaum bowl fragment. The light color suggests that the pipe was not heavily smoked, despite attempts to prolong the life of the piece by reaming out the broken shank to accept a makeshift stem (Fort Walsh, Saskatchewan); ***b,*** complete composite meerschaum pipe. The color of the plain bowl indicates that the piece was well-smoked. The pipe possesses a straight-stemmed amber mouthpiece. Note the hallmarks on the silver pipe stem ferrule (non-archaeological specimen); ***c,*** four fragments of a white clay pipe manufactured by Fiolet of France, and finished with a baked varnish finish to imitate a well-smoked meerschaum. Note the uniform color on the stem, the same amber-colored hue as a meerschaum, and the darker color of the rim and base of the bowl fragment in imitation of the well-smoked pipe in the center. The detailed figure on the bowl back is typical of the style encountered on meerschaums (Fort Wellington, Prescott, Ontario). (Photo by Rock Chan.)

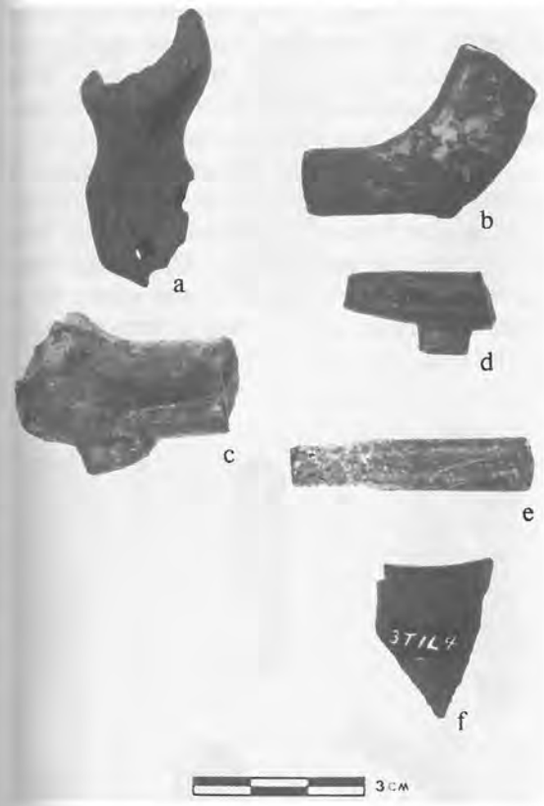

FIGURE 32. Fragmentary stone pipes: ***a,*** traditional indigenous style (Fort Amherst, Prince Edward Island); ***b,*** unfinished siltstone whole bowl/stem fragment (Fort St. James, British Columbia). This and the remaining fragments reflect Euroamerican pipe manufacture; ***c,*** siltstone bowl fragment/stem fragment (Yuquot, Nootka Island, British Columbia); ***d,*** steatite bowl fragment/stem fragment which includes the stem/bowl juncture as well as a rectangular spur (Fort St. James); ***e,*** steatite stem fragment, note the teeth marks (Fort St. James); ***f,*** bowl fragment, unidentified stone (Fort St. James). (Photo by Rock Chan.)

ferrules. The marks consisted of a maker's mark, a mark indicating the guild/city, and, most importantly, a date mark. By comparing these marks to references on the subject (Bradbury 1927), it is possible to determine the year of manufacture. Less expensive pipes with plated copper-alloy ferrules often had the maker's initials stamped within a number of cartouches that were reminiscent of hallmarks (Figure 35).

Filters, small metal fittings found within some stems, served to remove tars, oils, and other substances from the smoke. As the volatized material encountered the filters, it was trapped on the fittings which absorbed the heat, causing the substances to condense on the metal.

FIGURE 33. Wooden bowl styles: ***a,*** billiard bowl (probably 20th century; Fort Wellington, Prescott, Ontario); ***b,*** undesignated squat, panel, or faceted bowl style (Lower Fort Garry, Selkirk, Manitoba); ***c,*** bulldog bowl (Fort Anne, Annapolis Royal, Nova Scotia); ***d,*** panel bowl (1870s-1880s; Fort Walsh, Saskatchewan); ***e,*** small "prince" bowl (ca. 1848-1911; Lower Fort Garry, Selkirk, Manitoba). (Photo by Rock Chan.)

2. Bone and Ivory: These materials usually appear in composite pipes in the form of mouthpieces or tenon inserts in pipe shanks (Figure 36*a-b*, *e*; 38*a-b*).

3. Amber: Mouthpieces were also made from amber (Figures 36*f*, 37), and it was also periodically employed as a decorative element.

4. Horn: This substance was usually used for mouthpieces.

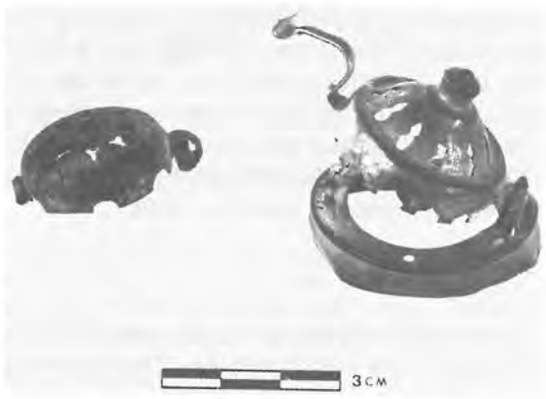

FIGURE 34. Metal spark caps, also known as wind caps or pipe-bowl covers, from component pipes. Note the hinge which allows the cap to swivel and the curved metal clips which secure it in the closed position. Both specimens appear to be nickel-plated brass and date to the 1870s-1880s (***left***, Lower Fort Garry, Selkirk, Manitoba; ***right***, Fort Walsh, Saskatchewan). (Photo by Rock Chan.)

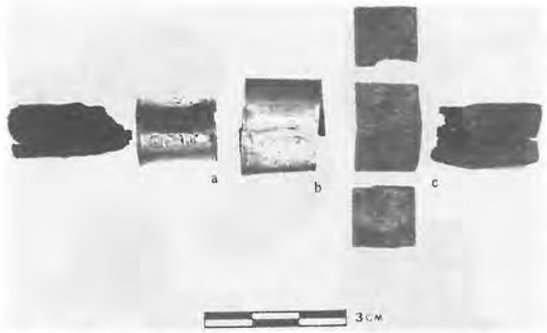

FIGURE 35. Marked metal pipe ferrules from the Fort Wellington latrine, Prescott, Ontario: ***a,*** cylindrical silver ferrule with a remnant of a briar shank. The marks include the maker's initials "HF," the mark designating Birmingham, and the date code for 1903; ***b,*** cylindrical silver ferrule with marks including the maker's initials "HM," the mark for Chester, and the date code for 1903; ***c,*** fragmented diamond-faceted ferrule with remnants of an associated wooden shank (late 19th-early 20th century). Maker's marks appear within a series of cartouches in imitation of hallmarks on a better-quality pipe. "EP" within the diamond-shaped cartouche indicates a silver, electro-plated finish on copper alloy. (Photo by Rock Chan.)

5. Synthetics: Vulcanite, a form of hard sulfurized rubber, was made into mouthpieces for briar and several other component pipes (Figures 36*d*, 38). Although Walker (1983:39-40) stated that Vulcanite mouthpieces came into use around 1878, a small number of pipe stems recovered from the 1865 wreck of the steamboat *Bertrand* possessed poorly molded, hard-rubber mouthpieces (Pfeiffer 1986:86), indicating that they were in use at least thirteen years prior to that date. Pfeiffer (1986) goes on to say that the use of Vulcanite mouthpieces on a variety of composite pipes had been firmly established by 1875. Plastic has also been used to manufacture mouthpieces since at least the 1950s.

Tenon Styles

The tenon united the shank with the stem component of a composite pipe. There are three principal types:

1. Threaded Tenon: This consists of a carved insert, generally of bone, that threads into the stem/mouthpiece and the shank body. It can also be molded into the mouthpiece as in the case of Vulcanite, or carved as in the case of some wooden examples.

2. Push Tenon: These generally consist of a smooth tube projecting from the mouthpiece which slips into the wooden shank and is held in place by a combination of friction and expansion caused by the heat generated during smoking.

3. Military Tenon: Sometimes termed a military stag tenon, the military tenon consists of a tapered form of push tenon, and was held in place by the same forces. The style's name derives from the fact that it was easier for a soldier to repair it rather than a threaded tenon in the field.

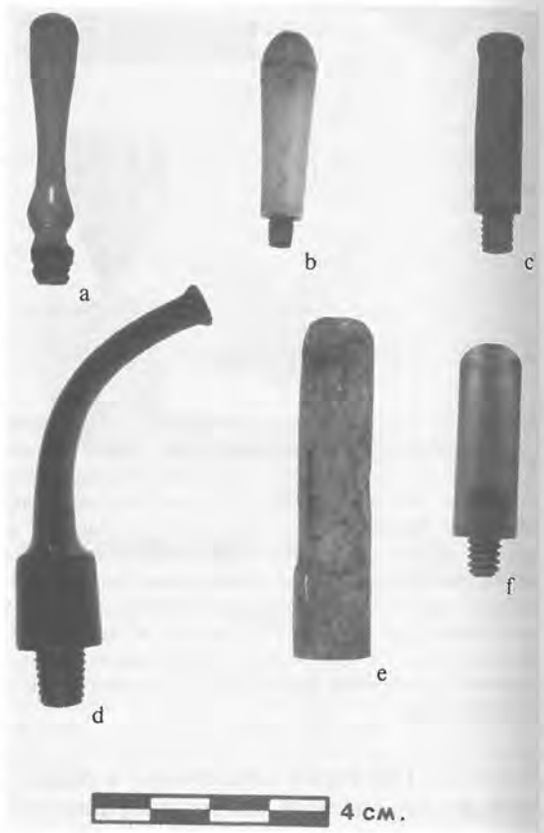

FIGURE 36. Mouthpieces from composite pipes: ***a,*** bone mouthpiece held in place by a crimped copper-alloy ferrule. It was probably for a multi-unit coffee-house style pipe (1870-1884; Lower Fort Garry, Selkirk, Manitoba); ***b,*** ivory example with a carved tenon extension (1870-1884; Lower Fort Garry); ***c,*** wooden mouthpiece with an integral carved tenon; ***d,*** Vulcanite, half-bent saddle-style mouthpiece with integral threaded tenon (1870s-1880s; Fort Walsh, Saskatchewan); ***e,*** ivory saddle-style mouthpiece (1870s-1880s; Fort Walsh); ***f,*** amber mouthpiece with threaded bone tenon insert (Fort St. James, British Columbia). (Photo by Rock Chan.)

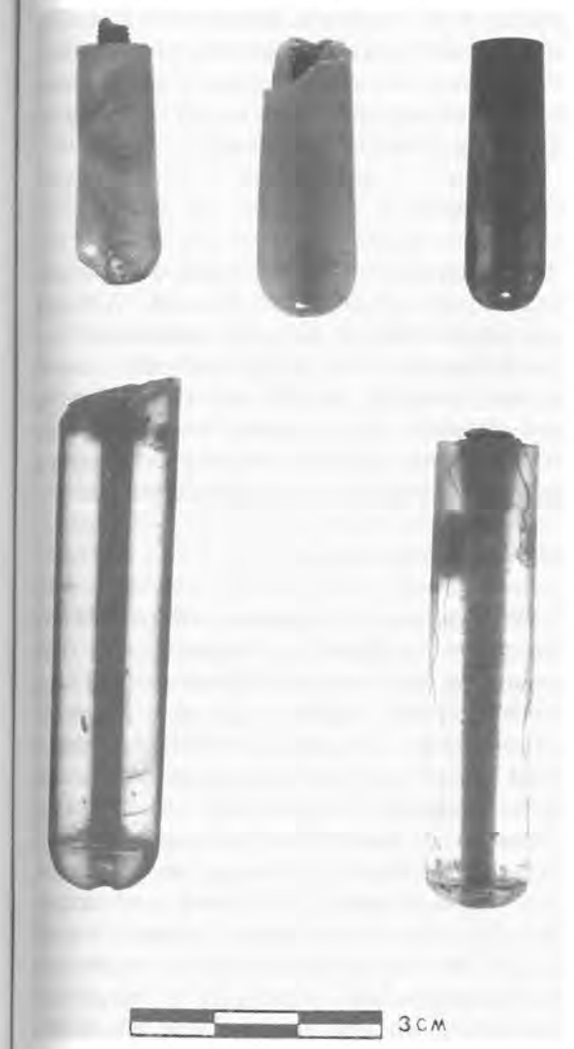

FIGURE 37. Flush-style amber mouthpieces (late 19th-early 20th century). The color varies from red to gold to yellow and from translucent to opaque. The hand carved nature of the bites accounts for the subtle differences in form. (Photo by Rock Chan.)

Composite-Pipe Bites

The weight of composite pipes necessitated a change from the traditional round clay-pipe style mouthpiece to a wider and flatter one which enabled the smoker to better clench, balance, and support the heavier pipe in his teeth (Walker 1983:39). The two most common mouthpieces used with composite pipes are known as "flush," where the mouthpiece is flush with the adjoining shank, gradually tapering to the bite, and the "saddle" or "cut back" style where the pipe is symmetrically reduced on both the upper and lower planes, giving a popular streamlined look.

Cigar/Cigarette Holders

These are included here as they have the form of tobacco pipes (Figure 39), but are smaller in size and were intended to have a cigar or cigarette inserted into the bowl, rather than shredded tobacco.

British soldiers were first exposed to cigars during the Peninsular campaign of the Napoleonic Wars. The fashion did not become affordable to any but the upper classes before the 1840s (Dunhill 1954:25), and probably did not

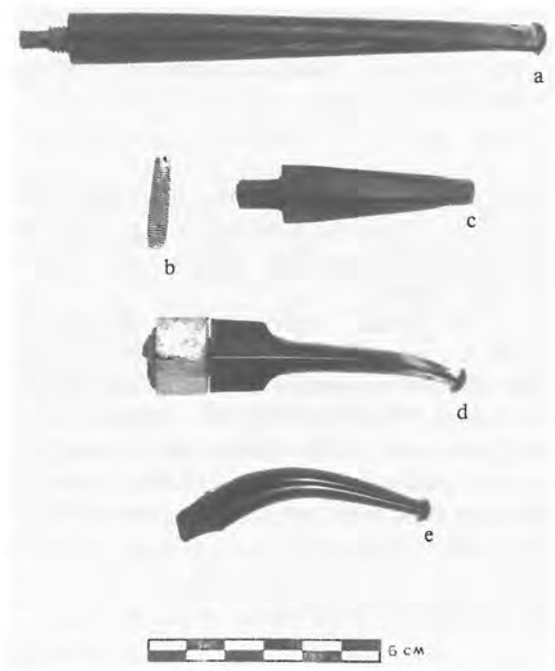

FIGURE 38. Hard rubber mouthpiece styles: ***a,*** straight-tapered flush stem with a threaded bone tenon insert (late 19th-early 20th century; Fort Wellington, Prescott, Ontario); ***b,*** threaded bone tenon from a composite mouthpiece (late 19th-early 20th century; Rideau Canal, Ottawa, Ontario); ***c,*** diamond-sectioned straight stem with a push-style tenon. Note the pattern of teeth marks (1870s-1880s; Fort Walsh, Saskatchewan); ***d,*** bent saddle-style mouthpiece. The threaded tenon is integral with the mouthpiece. Note the electro-plated ferrule with imitation hallmarks (late 19th-early 20th century; Fort Wellington); ***e,*** tapered, half-bent, military-style mouthpiece pared down to fit snugly into a pipe shank (late 19th-early 20th century; Rideau Canal, Ottawa). (Photo by Rock Chan.)

FIGURE 39. Typical forms of cigar/cigarette holders, latter half of the 19th century: ***a,*** glass cigar holder (1870s-1880s; Fort Walsh, Saskatchewan); ***b,*** small grenadier effigy white clay cigarette pipe. The cigarette was inserted in the bowl and smoked in a vertical position (late 19th-early 20th century; Fort Wellington, Prescott, Ontario); ***c,*** fragmented meerschaum cigarette pipe in the form of a woman's head. Worn features on the example indicate that the pipe was subjected to heavy handling (non-archaeological specimen); ***d,*** fragmented cigarette pipe with a more horizontal orientation of the bowl, indicating the direction of evolution (non-archaeological specimen). (Photo by Rock Chan.)

achieve a degree of popularity until the 1860s or 1870s. Cigarette smoking, a legacy of the Crimean campaign, also became very popular in Great Britain.

As in Britain, cigars became popular in North America during the early 1800s (Pfeiffer 1983:43), and cigarettes came into fashion around mid-century (Pfeiffer 1985:114). Certainly, both practices were well-established by the late 19th century, and cigar/cigarette holders co-existed with the many types of smoking pipes available during this period.

Analyzing Pipe Material

Examination of such physical attributes as bowl shape, maker's marks, decoration, and stem-bore diameter should reveal information concerning a site's overall temporal placement. The second phase of analysis is to examine the pipe material collectively in order to place the assemblage within the cultural context of the site, identifying the nature of the occupation as well as activity areas, thereby shedding light on the lifeways of the occupants.

Once the recovered pipe material has been sorted by material (clay, stone, porcelain, etc.), the fragments should be sorted and counted by provenience. The number of bowl fragments, stem fragments, shank/bowl junctures, and manufactured bites should also be tallied. The amount and nature of use/wear exhibited by the fragments, as well as any evidence of reworking, should also be noted.

Crossmends

To determine distribution and discard patterns, crossmends should be recorded. Although straight mending of any pipe assemblage may prove labor-intensive and provide only minimal returns, mending is still useful to determine maker's marks and decorative motifs represented within a collection, and possibly associating a specific maker with a particular decoration.

Minimum Object Count

When counting fragments, the number of shank/bowl junctures and manufactured bites should be recorded in addition to the total number of bowl fragments and stem fragments. Since conventional pipes have only one shank/bowl juncture and one manufactured bite, a tally of these attributes will provide a minimum object count for an assemblage, the highest number of either attribute determining the population. Any fragment containing the shank/bowl juncture should be considered a bowl fragment, regardless of the amount of stem that is present, as the integral portion of the pipe is represented. Conversely, any portion of the stem which does not include the shank/bowl juncture should be classified as a stem fragment.

Bowl-to-Stem Ratio

Determining the bowl-to-stem ratio of a clay-pipe assemblage may provide insight into the nature of pipe use on site, indicating where smoking took place, and possibly identifying disposal patterns (Richie 1978:136). The ratio is based on the premise that a pipe can still be functional even after the stem has been broken. A pipe's stem can be reduced through breakage several times during its life, resulting in a higher recovery of stem fragments than bowl fragments at most sites. Theoretically, the longest clay pipe style of the first half of the 18th century had a 12-inch stem which will produce a ratio of one bowl fragment to four stem fragments

(Richie 1978:135). The bowl to stem ratio for pipes manufactured after 1780, which had shorter stems, should not be less than 1 bowl fragment to 1.5-2 stem fragments for a typical distribution. This reduced ratio is based on the regulated and relatively short "Virginia" pipe style which was exported to North America in an attempt to alleviate the high rate of stem breakage in transit (Jackson and Price 1974:83, 85).

Pipe assemblages from sites with highly transient populations and no nearby source of pipes should have a low number of bowls in proportion to stems because functional bowls were removed from the site in spite of attrition in the form of stem breakage. Conversely, a site with a population close to its source of pipes should exhibit a higher proportion of bowl fragments as the probability of bowls being discarded would be higher. For example, statistics approaching a 1:1 ratio of bowls to stems indicate a somewhat restricted smoking population close to its source of pipes, a typical distribution expected in, for example, military garrisons.

As with stem-bore diameters, caution should be exercised in determining bowl-to-stem ratios. The presence of pipe stems may not necessarily represent smoking activity. Some fragments may represent merchandise damaged in transit, or possibly some form of reuse. Since the ratios are based on postulated stem length, adjustments need to be made to the formula because stems shortened over time. Also, variations in stem length will be encountered throughout any given period. Only an approximate size can be reflected in archaeological material. An ideal assemblage for such analysis would be English pipes, especially those made in Bristol, representing isolated events or limited occupations during the latter half of the 18th century.

Use/Wear Marks

Clay pipe fragments should also be examined for use/wear marks and evidence of reworking as such information will help to determine the nature of the material and consumption patterns. For example, a lack of teeth marks and smoking stains on broken pipes may be indicative of damaged cargo, rather than personal possessions, and extensively repaired and reworked pipes might suggest that pipes were not readily available.

Teeth marks on pipe stems are caused by clenching them between the teeth, an activity that gradually abrades the surface of the stem. Classic patterns consist of an upper bite which is a little further forward than the lower bite. Evidence of idiosyncratic behavior can also be defined on occasion, such as chewing or twirling the pipe while in the mouth. Finding a relatively intact pipe which exhibits the reverse of the classic pattern indicates that the owner either smoked or held the pipe upside down. Teeth marks on the end of a clay stem fragment indicate that the owner either intentionally shortened the stem of his pipe to suit his needs, or continued to smoke a pipe after its stem broke accidentally (Figure 40). Such stems often exhibit score marks or rings which helped to snap the stem at the desired location (Figure 41).

Smoking stains found within the bowl and, in some cases, radiating out from the bore of the stem are clear evidence that a pipe was used. The degree of staining can reveal how much a pipe was smoked. The stains can range from a light gray color to blue to black, depending on how much the pipe was smoked. This dark discoloration is caused by the oils and tars being absorbed by the clay. On extremely heavily smoked specimens, the outer rim of the pipe–especially the area around the back of the rim–can become quite black from use. The staining substances are water soluble so care must be taken not to remove them when washing pipe material after excavation. It should also be noted that some types of soil and exposure to sunlight can eradicate smoking stains, as can burning.

Other use/wear marks noted primarily on clay pipes include:

1. Charring/burning: Exposure to high heat, as in a house or trash fire, can cause clay pipes to become semi-vitrified, approaching a near-porcelain-like state. This can also cause slag/cinders to adhere to the fragments (Figure 42).
2. Chipping: Found on the bowl interior and resulting from ash extraction.
3. Spalling: Pock marks caused by exposure to fire, salt, or freeze/thaw (Figure 43).
4. Abrasion: Marks imparted to a pipe fragment after being discarded, as gouged surfaces caused by grinding underfoot.

FIGURE 40. Classic teeth-mark patterns on the stems of mostly 19th-century smoking pipes. The lower examples reflect idiosyncratic habits. The patterns on the lower-most stem fragments, in particular, indicate habitual chewing and twirling of the pipe while in the mouth. The other examples demonstrate the range of wear, from slight abrasion to pronounced teeth marks indicative of hard use. (Photo by Rock Chan.)

5. Trowel marks.

When recording such evidence, the main objective should be to determine whether the artifact was deposited as the result of loss or discard and, in the case of the latter, whether primary or secondary deposition is involved.

Reworking

Reworking marks found on pipe fragments indicate purposeful alteration after the manufacturing process. This was done for three reasons: (1) to customize an individual pipe; (2)

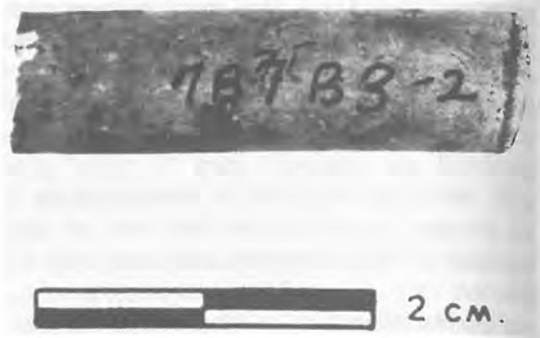

FIGURE 41. Pipe stem scored to facilitate snapping at the desired point (1750-early 1800s; Beaubassin, New Brunswick). (Photo by Rock Chan.)

to prolong the life of a pipe; and (3) to adapt the pipe or pipe fragment for alternative uses. Instances of reworking tend to be higher on sites where the populace has limited mobility or is some distance from a source of pipe supply, such as remote military and fur trade posts. With the advent of more-expensive composite pipes, instances of reworking components to prolong the life of a pipe would be expected to be higher. Some of the most common examples of reworking include: (1) stems fashioned into bites (Figure 44); (2) stems and bowls altered to accommodate reed or wooden stems (Figure 45); (3) repairs to such components as ferrules (Figure 46); (4) initials and/or designs applied by the owner (Figure 47); and (5) pipe stem fragments reworked into such objects as beads

FIGURE 42. Evidence of charring and exposure to extreme heat on smoking pipe fragments: ***a,*** charred bowl; ***b,*** charred stem; ***c-f,*** burned bowl and stem fragments. (Photo by Rock Chan.)

FIGURE 43. White clay bowl/stem fragment exhibiting classic evidence of frost spalling (mid-1800s; Mount Beaufort, Devon Island, Northwest Territories). (Photo by Rock Chan.)

and hairpipes (Figure 48) (Walker 1976:124-127; Sudbury 1978:105-107).

Conclusion

Smoking became so rapidly entrenched after its mid-16th-century introduction into European

FIGURE 44. Examples of bites fashioned on clay pipe stems. The two uppermost specimens have definite carved bites. The other examples have been altered into mouthpieces by abrasion. The one in the lower right was carved prior to abrasion and could also represent alteration to accommodate a makeshift stem. (Photo by Rock Chan.)

FIGURE 45. Broken pipes reworked by abrasion in an attempt to extend their life. Although the majority of these appear to have been altered to friction-fit in a wooden or reed stem, the bowl fragment in the top right has been reamed out to accept a stem insert. (Photo by Rock Chan.)

society that few other artifacts are as indicative of occupation by Northern Europeans. Consequently, fragmented smoking pipes invariably occur on most historical sites in North America. Large-scale industrialization in the pipemaking industry in both Europe and North America, coupled with recognition of pipes as a medium of decorative expression, resulted in the production of an innumerable variety of styles and designs, many of which can help to date and interpret their archaeological contexts.

Although smoking could be described as a highly social activity, it is also very personal, as evidenced by variations in use, the idiosyncrasies of wear, ingenuity in repair, and acts of personalization detected on many pipe fragments. An apt statement in the frontispiece of Iain Walker's monumental work on the Bristol pipemaking industry was an observation made by Sir Arthur Conan Doyle's fictional detective, Sherlock Holmes: "Pipes are occasionally of extraordinary interest–nothing has more individuality save, perhaps, watches and bootlaces" (Walker 1977:iii). The researcher should document any details of use and wear in pipe assemblages as they may prove helpful in expanding a record of past lifeways.

The advent of composite-pipe styles during the latter half of the 19th century fostered a radical change in smoking habits as smoking

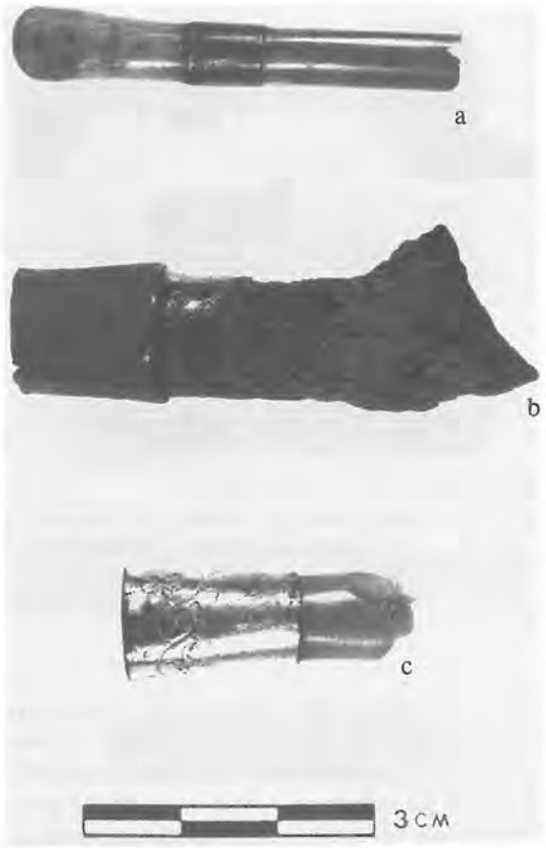

FIGURE 46. Reworked pipe stem fragments illustrating the range of makeshift ferrules: ***a,*** this homemade stem and mouthpiece represents a lot of effort to repair a pipe. The stem body was fashioned from a hollow bird bone, while the mouthpiece was carved from more dense bone. The two components are joined by a silver ferrule crimped around the juncture. The success of this repair is revealed by the dense pattern of teeth marks on the mouthpiece (1870s-1890s; Fort Wellington, Prescott, Ontario); ***b,*** shank of a wooden pipe with an improvised ferrule fashioned from the base of a .410-gauge shotgun shell (1870s-1880s; Fort Walsh, Saskatchewan); ***c,*** remnant of an amber mouthpiece with a decorated white-metal ferrule crimped around one end (1870s-1880s; Fort Walsh). (Photo by Rock Chan.)

FIGURE 47. Typical examples of post-production markings and decoration on smoking pipes: ***a,*** scored line around the stem (Fort St. Joseph, Ontario); ***b,*** crosses incised on the bowl (1840-1850s; Fort Wellington, Prescott, Ontario); ***c,*** the letter "A" incised on the socket shank (Fort Walsh, Saskatchewan); ***d,*** painted decoration on the bowl (Fort St. Joseph, Ontario); ***e,*** series of intermittent incised lines encircling the pipe shank (Fort St. Joseph, Ontario). (Photo by Rock Chan.)

unit pipe elements that are recovered archaeologically often exhibit evidence of reworking, showing that the owner attempted to prolong the life of his pipe.

Other forms of tobacco consumption during the latter half of the 19th century must also be considered by the researcher. Cigars, cigarettes, and chewing tobacco represent expressly expendable tobacco products which have left only a very subtle trace in the archaeological record.

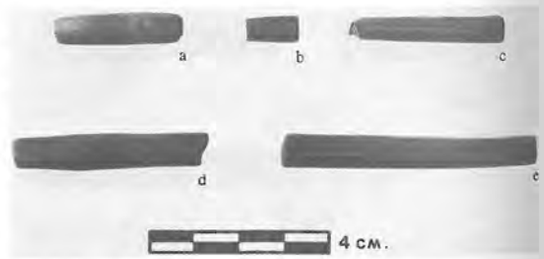

FIGURE 48. White clay pipe stem fragments reworked into beads: ***a,*** definite bead, tapered at both ends; ***b,*** possible wampum-style bead; ***c,*** possible bead preform consisting of the manufactured bite and a scored and snapped opposite end; ***d-e,*** long beads or possible hairpipes. All specimens are from H.B.C. Nottingham House, Lake Athabasca, Alberta (1802-1806). (Photo by Rock Chan.)

pipes were no longer considered a cheap and expendable commodity. The increasing popularity of composite forms should be reflected in late 19th-century disposal patterns, as the more-durable and expensive composite pipes were kept for longer periods than were traditional clay forms, often lasting throughout the occupation of a site and leaving very little trace. Those multi-

Although much has been learned about smoking-pipe assemblages, the potential to learn more is incredible as archaeologists have really only just begun to appreciate the potential of this artifact class.

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