

CONSUMERISM IN THE LATE EIGHTEENTH CENTURY: THE TREATMENT OF
DISPOSED TOBACCO PIPES FROM THE MOUNT PLEASANT SITE (46JF215)
JEFFERSON COUNTY, WEST VIRGINIA

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ABSTRACT

Excavations at historic sites often result in the recovery of an abundance of white clay tobacco pipe fragments. There are several theories that explain why large quantities of stem fragments are recovered from sites, however, no systematic studies have been done to evaluate these theories. The 1999 cultural resources field investigation in Jefferson County, West Virginia uncovered a rural homestead, the Mount Pleasant Site (46JF215), as well as an artifact assemblage that includes 171 pipe bowl fragments and 396 stem fragments. To determine if there are patterns that explain how pipe stems were broken, the stem fragments from the site were measured, then compiled in Microsoft Excel®, and statistically analyzed. Pipe stem breakage experiments were conducted on historic reproduction clay pipes to compare to the data of the site. The stem fragments from the experiments were then measured, compiled in Microsoft Access®, and statistically analyzed. The results of the statistical analysis from the Mount Pleasant pipes and the experimental pipes conclude that while pipe stems are liable to accidental breaking, the intentional breaking of stem fragments can be identified by lip and corresponding lip scar breakage patterns which are present in the Mount Pleasant pipe assemblage.

INTRODUCTION

The pipe is not just an instrument used for smoking; it is a form of art and a symbol of solace in the commonplace. It is unknown who is responsible for making the first clay tobacco pipe, but after tobacco was first introduced to England in the mid-sixteenth century, the smoking-pipe industry rapidly developed by the early seventeenth century. Pipes of white clay became a fashionable item in high demand to satisfy men, women and children in the art and pleasure of “tobacco drinking” as it was called then (Ayto 1994, Fairholt 1968). White clay pipes were in fact so common, that archaeological sites in both England and the United States have produced these fragments by the thousands (Deetz 1977).

Early historical archaeologists contended that the reason for the recovery of so many stem fragments from sites is because it was custom for smokers to share pipes. Each smoker would break a piece off the stem after it was smoked in order to mitigate the unhygienic effects of the practice, and to provide a clean smoke for the next smoker. These theories have been discredited by some archaeologists who have made the argument that breaking off stem fragments would defeat the purpose of pipes with tapered mouthpieces, or that smoking from a fractured, jagged-end would not have been preferable (Hume 1969). Theorists argue that the prevalence of stem fragments on colonial sites is then due to the pipes’ long-stemmed and fragile manufacture; so when dropped or knocked, then broke into several pieces. These interpretations may provide logical insight as to how smokers in the late eighteenth and early nineteenth centuries might have practiced their smoking habits, but without direct historical accounts of these smoking practices, these hypotheses need to be supported by archaeological evidence and scientific study.

The chronological dating of pipes recovered from archaeological sites have been the focus of attention in order to date sites. Adrian Oswald (1975) conducted the first study in 1951 in which he dated pipes by the basis of bowl shape and identified makers' marks. The outcome was that he developed the theory that bowl typology was dependent on the individual molds that pipemakers used in manufacture. More recent attention has been paid to the dating of pipe stems, such as J.C. Harrington's study in 1954 in which he discovered a system of dating by measuring the diameter of the bore hole of the stem. This system is the basis of his theory that the older the pipe, the larger the bore diameter of the stem. However, this is valid only until the end of the eighteenth century (Omwake 1965, Oswald 1967). Lewis Binford (1962) furthered Harrington's dating system by creating a formula to obtain an average date of site occupation by the size of the stems' bore holes. While it is helpful to date sites and pipes by pipe bowl typology, makers' marks, and stem bore analysis, these studies do not test how the pipes were broken.

This research paper aims to understand how stem fragments are broken by identifying if there are certain breakage patterns that correlate with specific behaviors of pipe disposal and what those patterns may be. More specifically, by testing if the occupants at the Mount Pleasant Site were intentionally breaking stem fragments off of the pipes or if the pipes broke accidentally, there will be different: 1) Lengths of stem fragments; 2) Quantities of stem fragments; and, 3) Observable patterns of stem breakage. The statistical data of stem fragments from the Mount Pleasant Site were first statistically compiled and then compared to the systematic breaking of 61 historic reproduction pipes in two experiments. The results of this study will provide a model for pipe disposal patterns and will offer insight to the proposals of the smoking practices that consumed late eighteenth century society.

PROJECT HISTORY/BACKGROUND INFORMATION

Mount Pleasant Site Background Information

The 1999 field investigation for the Route 9 Highway Project uncovered a rural homestead, the Mount Pleasant Site, in Jefferson County, West Virginia (Figure 1). The federal undertaking for the building of a highway from Martinsburg to Charlestown involved a Phase I archaeological survey in compliance with Section 106 of the National Historic Preservation Act. First identified in a Phase I survey by shovel test probes, a Phase II recovery was recommended to further expose the Mount Pleasant Site. The site is located in an upland setting on a low rise surrounded by grasslands and slightly rolling hills (McAndrews et al. 2003). The Mount Pleasant Site is within ten miles of historic Shepherdstown, Harpers Ferry and Charles Town on the Eastern Panhandle of West Virginia.



Figure 1. Location of the Mount Pleasant Site in Jefferson County

The rich farmland of the region between the Shenandoah and Potomac River Valleys provided for the gentleman farming tradition that developed among the rural homesteads in the late eighteenth and early nineteenth centuries (McAndrews et al. 2003). The archaeological site is 200 meters southeast of a stone house that dates to the early nineteenth century and still stands on the property today. While the Mount Pleasant Site has a long line of ownership history, the individuals who could have occupied the site can be identified: Moses Tullis and his family

who occupied and farmed the estate from 1762 until his death in 1777, Mary Elizabeth Tullis who continued to occupy the site until 1796 with her children and new husband, and Benjamin Wiltshire and his family who served as an overseer for the property's owner Charles Yates sometime after 1787 until about 1816.

The excavation at the site included 172 test units, each measuring 1 x 1m (3.3 x 3.3ft). The historic artifact assemblage recovered from the Phase I and expanded Phase II excavations includes over 35,000 domestic artifacts that date between the 1770s and 1830s (McAndrews et al. 2003). Over 567 English clay pipe fragments made out of ball clay, a variety of kaolinite that is light to white in color with a fine finish, and is high in plasticity (Industrial Minerals Association-North America 2008), were also recovered. Relief-molded designs on the pipe fragments include embossed and incised patterns on the bowls and stems including banded, floral, geometric, stars, dots or combinations of these patterns (McAndrews et al. 2003).

Tobacco, Smoking and Pipes: Native American Origins to British Colonial Garbage Pits

Origins of Tobacco, Smoking and Pipes

- Early Smoking

In all of its various forms and involving many different groups of people throughout the distant past, smoking, chewing, and snuffing of tobacco has always been practiced by the natives of the Western Hemisphere for many centuries. Tobacco was not always the substance used in smoking either; those in Europe, Asia and Africa used what was available to them such as the dried leaves of herbs, plants, or trees (Dunhill 1961). The ancient Egyptians, Babylonians, Hindus, Greeks and Romans practiced the earliest forms of smoking which involved burning incense as offerings to their deities (Dunhill 1961). Other examples include

the Roman Catholic Church that burned incense at each High Mass, or the ancient Chinese whom would burn *moxa* to cast away demons (Gilman and Xun 2004). Another major practice involving smoke was held in the Near East, Eastern Europe, in Central America and Mexico where the fumes of plants were inhaled for two reasons: for its narcotic and medicinal effects. Concerning its narcotic effects is the most popular example of the priestesses at the Oracle at Delphi whom would make prophecies after becoming intoxicated. The Ancient Greek historian Herodotus may have been the first to write about this practice in his account of the Scythians who would inhale the fumes and become intoxicated after hemp seed were thrown upon a fire (Dunhill 1961, Ehwa 1974, Gilman and Xun 2004, Goldring 1973).

- Tobacco and the First Pipes

The tobacco plant was first used in religious ceremonies by priests in North, Central and South America before it was even cultivated, beginning between 5,000 and 3,000 BCE (Dunhill 1961, Gilman and Xun 2004). The oldest known evidence of tobacco-smoking is a stone-carved relief of a Mayan priest smoking a tube pipe in a temple at Palenque in modern-day Chiapas, Mexico. The tradition of blowing tobacco smoke as a healing ritual, to drive out evil spirits, to become intoxicated and to make offerings to the gods were practiced by the Mayans, Toltecs, Aztecs and Caribs (Fisher 1939, Dunhill 1961, Gilman and Xun 2004). Throughout the West Indies, Mexico, and Central America, tobacco had always been smoked in the form of a reed or tube. The Mayas, through their line of descendents to the Aztecs, used reeds or pipes. Natives of the West Indies smoked rolled tobacco leaves, otherwise known as cigars today (Fisher 1939). One of the oldest smoking practices by means of digging a pit and driving a hollowed stick into the pit horizontally has been known in Africa, West and Central Asia. Known as “earth-smoking,” the smoker would have to lie flat on the ground in an

uncomfortable position but was successful as a makeshift pipe (Dunhill 1961, Goldring 1973).

In North America, archaeologists have recovered pipes made of wood, stone and clay in the burial mounds of the areas surrounding the Mississippi River basin. Smoking in North America may go back at least 3,000 years before the Europeans began colonizing.

- From North America to Europe

Native Americans were the first to grow and utilize tobacco for medicinal, ceremonial and leisure purposes. They found that the perennial plant was a powerful narcotic disguised by its glossy blue-green leaves and unique flowers that can grow between three and fifteen feet high (Dunhill 1961, Fairholt 1968, Fisher 1939). It is important to note that the first Europeans in North America did not actually “discover” smoking, but were the first Europeans to see tobacco and to remember smoking in different forms. People were no longer inhaling the toxic fumes that filled rooms, they were inhaling by means of cigars and pipes, taking snuff, and even chewed the leaves (Gilman and Xun 2004). One of the first Europeans to encounter tobacco and its uses by the native Indians of North America was the French mariner Jacques Cartier. Exploring the country by way of the St. Lawrence River, he wrote that wherever he went he found that the Native Indians would keep large stores of tobacco, carried a certain quantity on them around their necks, and gave the first clear description of a pipe (Corti 1931). Second to witness tobacco and its uses was Columbus. On his first voyage to the West Indies on the island of San Salvador on October 12, 1492, Columbus sent two Spaniards, Luis de Torres and Rodrigo de Jerez inland to explore the island further. According to the Bishop Bartolomé de Las Casas who edited in 1514 the journals of Columbus’ travels that they “...met with great multitudes of people, men and women, with lighted firebrands in their hands and puffed smoke from their mouths and noses” (Corti 1931,

Fairholt 1968, Fisher 1939, Gilman and Xun 2004). None of the explorers understood the value of the tobacco leaves as they would discard their gifts of “dried leaves as worthless” (Corti 1931:37). Nor did they understand the smoking habit to which the natives of the island indulged in, and there is no evidence to suggest that they are the first European smokers. In fact, some of the earliest written accounts of smoking were not portrayed as appealing. In the *Historia General y Natural de las Indias* the Spanish historian Gonzalo Fernández de Oviedo y Valdéz wrote between 1526 and 1535:

Among other evil practices the Indians have one that is especially harmful, the inhaling of a certain kind of smoke...in order to produce a state of stupor...The *caciques* employed a hollow tube, shaped like a Y, inserting the forked ends in their nostrils, and the other end of the tube applied to the burning leaves of the herb and would inhale the smoke until they became unconscious and lay sprawling on the earth like men in a drunken slumber [Corti 1931, Dunhill 1961, Fairholt 1968, Fisher 1939, Goldring 1973].

Oviedo went on to write that when forked tubes could not be implemented, straight reeds or hollow tubes were used that the Native Americans called “tabaco” (Corti 1931, Fairholt 1968, Fisher 1939). Columbus’ crew on his second voyage in 1494 witnessed other forms in which tobacco was taken. A friar on the expedition, Romano Pane, noted that after a cane was inserted in the nose in one end, the powder was then drawn up from the other end (Corti 1931, Fairholt 1968). This is the earliest account of snuff-taking. Both de Las Casas and Pane also wrote about their accounts of the practice of chewing tobacco and the first cigars (Corti 1931, Dunhill 1961). Both writers noticed that the Natives also puffed tobacco that had been rolled into a tube in which dried leaves were placed into the rolled leaf and the smoke was then inhaled after it was lighted (Corti 1931, Fairholt 1968). As a result of the interaction with the Native Indians, smoking in its various forms began to be practiced among the Spaniards who sailed between America and Spain. The earliest date the Spaniards are known to have

introduced the plant to Spain in 1518, where it was first cultivated as an ornamental plant for its beauty and medicinal qualities (Corti 1931, West 1934). From Spain, tobacco was then introduced to Portugal in 1555 and then to France in 1556. In 1559, Jean Nicot served as French Ambassador to the Portuguese Court at Lisbon. After purchasing tobacco seeds and successfully cultivating his own tobacco garden, he discovered that it was an antiseptic and universal remedy to many ailments (Corti 1931, Dunhill 1961, Ehwa 1974, Fairholt 1968, West 1934). After his return to France in 1561, Nicot presented some of his plants to Queen Catherine de' Medici to use as a medicine to cure her headache. The plant gained favor in the French Court after she claimed the plant had remedial effects. Medici designated it as *Nicotiana* in honor of the ambassador and it was soon grown in the gardens of France as a medicinal herb (Fairholt 1968, Fisher 1939). It was not until later in the sixteenth century that smoking began.

The Uses of Tobacco

Jean Nicot may have promoted the healing properties of tobacco but never mentioned its smoking qualities (Corti 1931). It was not until sailors and sea captains popularized it such as Sir John Hawkins, Sir Francis Drake, Captain Philip Amadas, Captain Arthur Barlowe and Sir Walter Raleigh whom after returning from their voyages from North America in the 1560s and 1570s, brought the practice back with them (Dunhill 1961, Ehwa 1974, Fairholt 1968, Fisher 1939, Spence 1941). These men were more concerned with the pleasures of tobacco than its medicinal qualities. The first British colonists in North America noticed that the native Indians did not take snuff nor smoke cigars, but rather, they used pipes. The first English smokers were colonists, who along with Ralph Lane, established the first colonies in Virginia and learned to use tobacco and smoke it by means of a pipe from the Native

Americans (Fisher 1939). They found the native Indians of North America cultivated and smoked because tobacco was a gift from the Great Spirit (Corti 1931, Ehwa 1974, Fairholt 1968, West 1934). The colonists also noticed that they supplemented their diet and cured illnesses and injuries with smoking tobacco from a pipe. But furthermore, in deciding war, concluding peace, under religious circumstances whether public or private, these deliberations took place through the passage of the “pipe of peace” (Fairholt 1939, Fisher 1939, Dunhill 1961, West 1934). These ceremonies involved the transfer of the sacred pipe from one individual to another. Ornamented with eagle’s feathers these pipes were only allowed to be used for these special occasions. Each individual would then draw a breath of smoke thereby sanctifying the ceremony. The act and the pipe itself was regarded as the “traditional sign of friendship, hospitality, and peace” (Dunhill 1961:5). Under ordinary circumstances, a Native would always keep their own personal pipe on them as a “constant companion through life.” Through it, he would “pledge his friends and find meditative comforts” (Fairholt 1939:42).

The more the English sailors and colonists experienced these smoking practices among the Native Americans, the more they came to regard the act of smoking as a pleasurable experience, and the tobacco plant, a substitute for food and drink (Fisher 1939). Some of the earliest colonists and sailors were eager to learn the smoking practice. And as some colonists such as those in Ralph Lane’s company, were driven out of Virginia and returned to England around 1586 (West 1934), they would indulge in their smoke sailing back. Upon their return to England, the colonists and sailors would then teach the pleasurable smoking habit they had learned from the native Indians (Corti 1931).

Back in the “New World,” British colonists began raising the native tobacco plant *Nicotiana rustica* that had been taught to them to make small profits on the tobacco trade with

England. But after John Rolfe and the original settlers of Jamestown introduced *Nicotiana tabacum* from the West Indies in 1612, it was an instant success and soon smoking became a commodity, and tobacco, a form of currency (Ehwa 1974). In fact, when the colonists asked for women to be sent to them from London, their passage, however expensive, was paid in full with tobacco (Dunhill 1961, Fisher 1939). By 1614, seven thousand shops in London were selling colonial tobacco; within ten years of its introduction to Virginia, the colonies were exporting 500,000 pounds of tobacco annually, and by the end of the sixteenth century, tobacco use spread throughout all of Europe and British America (Ehwa 1974).

The Spread of Pipes

The English copied not only the habit of smoking but the means of smoking from a device “formed like a little ladell” (Spence 1941:45). Many of the Indian pipes that the English came into contact with were the large elaborate pipes of the ceremonies different Native American groups held for religious and peace-making purposes. But not all of the pipes were ceremonial, in fact, large quantities of pipes have been found in burial mounds of all sizes and materials; from stone or pottery, and of the simple tube, elbow, monitor, platform, or effigy pipes. Of all the pipes, the English showed particular interest in the small personal pipes for ordinary use that would require smaller amounts of tobacco that proved to be an expensive luxury in England. Made out of stone or pottery, and anywhere from two to six inches long (Fisher 1939), the colonists and sailors would take back to England their small pipes given to them by the Indians which served as the prototype for the first English clays that were manufactured as early as 1570 (Hume 1969). Throughout the seventeenth century, the leading exporters of clay pipes included the English, French and Dutch.

Clay Pipe Manufacture

The first manufactured pipes in England were made out of silver and iron (Spence 1941), but the preferred material by the late sixteenth century was a white, plastic-clay known as *ball clay*. It was locally acquired in the United Kingdom from Purbeck in Dorsetshire, Staffordshire, Cornwall, Dorset, or Shropshire in Devon (Ayto 1994, Dunhill 1961, Fairholt 1968, Oswald 1975). Pipes were made either by hand or in molds which involved considerable handwork, and finishing. After the acquisition of the clay, it was then pounded with a wooden rammer, soaked, and then mixed with water. To acquire a consistency to that of putty (Goldring 1973), the mix was then wedged or passed through a *pugmill* (Dunhill 1961). Another in the process would then pull, twist, roll, thumb, knead out, and divide the clay by hand into portions large enough for a pipe of the required various size and shape (Dunhill 1961, Fairholt 1968). He would shape the clay into a long-tailed lump. The next artisan, the molder would fit the lump into a mold that may have had decorations. They would then take a steel-wire and push it down the center of the clay through the length of the pipe (Fairholt 1968). When the stem was short, a fairly large hole could be made by using a thick wire, but when the stems became longer and the wire had further to travel, a thinner wire was needed. This is the theory, though it is possible to find wires of differing thickness in use in the same period by the same maker (Hume 1969). An iron hand-stopper to shape the bowl was then inserted into the mold (Ayto 1994, Dunhill 1961). After the bore hole had been made, the mold was placed in a press where two iron plates would squeeze out the excess clay. The mold was then opened and the partly-dried pipe was passed on to the trimmer. Using a sharp steel instrument, excess clay was cut-away from the junction of the mold, the mouthpiece, and the rest of the pipe, including at the bowl after which was then neatly shaped.

At this point, sometimes the trade stamp was impressed (Dunhill 1961, Fairholt 1968). After, they would blow down the stem to make sure the stem hole was unobstructed; the pipe was then laid on a frame or a *sagger*, which is an earthenware firing pot where it was laid to dry before it was fired in a pipe kiln for about 20 hours (Ayto 1994, Dunhill 1961, Liebaert and Maya 1994). If there had been a high demand for them, some pipemakers would tightly pack the pipes on the sagers before firing. Some pipemakers could turn out “as many pipes as 200 to 500 gross of pipes a day” (Dunhill 1961:92). Finally after the pipes had cooled, sometimes a wax was applied to the tip. Furthermore, there were hundreds, if not thousands, of pipemakers, each with his own deviations in size and shape from the other (Alexander 1967). Although the clay tobacco pipe may have been manufactured within a day, pipes were generally imported, smoked, and thrown away all within a matter of a year or two (Hume 1969).

Smoking Behavior and Smoking Accessory Consumerism

- *Prohibition of Tobacco*

The rise of smoking did not actually begin until about 10 years after the tobacco plant’s initial introduction and cultivation in European countries. While it is only logical that no farmer would raise a crop of tobacco until he felt that there was a high demand for his product (Fisher 1939:9), it is also true that the first edict banning the use of tobacco for social smoking purposes did not occur until the custom became widespread and popular enough to make any ruler or monarch concerned about the “vicious habit” that consumed his subjects (Fisher 1939:9). Smoking in its earliest years in England faced widespread opposition because some insisted that it was a barbarous, dirty, social habit that caused diseases (Dunhill 1961). Despite the medicinal virtues the tobacco plant may have had, King James I was one like

many other pamphleteers, whom wrote ardently about how he viewed his kingdom was being corrupted by tobacco: "...a custome lothsome to the eye, hatefull to the Nose, harmefull to the braine, daungerous to the Lungs, and in the blacke stinking fume thereof," (1604). After he wrote *Counterblaste to Tobacco*, he strictly prohibited the cultivation of the plant in England in the Edict of 1621 and also became the first to impose a tax on it. Before the edict and taxes were established, the price of tobacco had been affordable to all economic levels of European society. Whether rich or poor, the people sought out apothecaries' shops, grocers' shops, chandlers' shops, taverns, wine, ale-houses and anywhere tobacco was vendible (Fairholt 1968). But after these events, mostly only the upper strata of society could afford to smoke. The increased cost of tobacco still did not prevent the rising popularity of smoking. The prohibition became so hard to enforce that tobacco was still being cultivated in England in 12 counties by 1639 (Dunhill 1961:14). In addition, the King's officers and officials could not keep up with tobacco smugglers, illegal traders, bands and "armed ruffians" that continued to find ways to smuggle tobacco into the country (Dunhill 1961:19).

- *Smoking and Clay Pipes as Art*

Sir Walter Raleigh is known to be the first devoted adherent of smoking in England and brought it into fashion by the late sixteenth century (Fairholt 1968). The early seventeenth century was when the popularity of the practice was in full swing and by the commencement of the seventeenth century, smoking was at its golden age. Smoking had become art as the common folk smoked plain clay pipes and the elites puffed away at their elaborately carved and decorated clays. Sailors always kept themselves supplied with it on their voyages; soldiers liked it as they kept guard all day and night; scholars, writers, farmers, porters and all laboring men desired a smoke because not only did they say it "refreshed" them, but that they

were so addicted to it that they would rather part with food than to part with their tobacco (Fairholt 1968). Even the poorest man could not part with his tobacco and were perfectly content with their makeshift walnut shell and straw stem pipe (Dunhill 1961, Spence 1941). Smoking had been termed “drinking tobacco” or the “dry drink” during this period, and as it became an important activity for every gentlemen to accomplish along with “dancing, riding, hunting and card-playing,” a gentlemen had to smoke with a certain grace (Dunhill 1961, Fairholt 1968, Fisher 1939, Goldring 1973). For those who could afford it, men would pay a tobacco tutor to teach them. Men would spend hours practicing the art of smoking, indulging in “the contemplative man’s recreation,” and acquiring the “gentlemen-like smell” (Fairholt 1968, Gilman and Xun 2004, Goldring 1973). This allowed for new modes of interaction to take place such as in coffee houses, taverns and clubs or wherever tobacco was sold (Fisher 1939).

- *Smoking Behaviors*

Most public houses would keep a tobacco-box on the table and if the smoker paid the innkeeper, he could fill his pipe (Fairholt 1968, Fisher 1939). Iron holders were kept near the hearth to clean the smokers’ pipes from the heat of the fire, as well as a tinder box containing materials to light a fire were kept on the shelves of public houses until about the mid-nineteenth century (Dunhill 1961). No matter where a smoker was, at home, on the street, or at the theater, a smoker would practice the proper technique to exhale the smoke through their nostrils, blow rings and invent new smokers’ tricks like: *The Ring*, *The Whiffe*, *The Gulp*, *The Retention* (Dunhill 1961:10), *The Cuban Ebolution*, *The Euripus*, or *Receit Reciprocall* (Ehwa 1974). At all times of day a ‘tobacconist’ would carry a complete smokers’ kit—a wooden, ivory, or metal tobacco-box that contained up to a pound of tobacco, a pair of silver or ember

tongs for lighting his pipe, a knife to shred the tobacco, a small scoop, and a tobacco stopper or rammer for pressing the dried leaves firmly into his pipe bowl (Dunhill 1961, Fisher 1939, Goldring 1973). It was normal for Englishmen to greet one another by asking “will you take a pipe of tobacco?” (Fairholt 1968:90). After a time, women also became proficient smokers indulging in a pipe in a “lady-like” manner (Fairholt 1968:69). Some households would have the table set with half a dozen pipes and tobacco after dinner was finished. It was customary for children in England and France to be sent off to school with a small pouch of tobacco, their books, and their very own smokers’ kit in their satchels. Mothers would take care filling their tobacco pouches every morning as this was their breakfast (Liebaert and Maya 1994, Mann and Rafferty 2004). Teachers at school would then “make sure at the accustomed time to instruct their smoking pupils the proper techniques of the habit and maintenance of the pipe” (Ehwa 1974, Fairholt 1968). Some smokers would fall asleep at night with pipes in their mouths and others would “awake during the night to light their pipe” (Fairholt 1968:117).

- *The Importance and Popularity of Smoking and Clay Pipes*

In short, smoking and therefore, pipes, were meaningful to the Europeans: first, they found tobacco and smoking absolutely necessary to maintain their health. For example, during the Great Plaque in London of 1665, tobacco was the recommended preventative treatment. Secondly, they found smoking to be a means of religious and leisurely meditation as it helped to one to relax. Third, they found the pipe to be aesthetically pleasing, and lastly, it became the fashionable thing to do (Fairholt 1968:118). Despite opposition and the prohibition of the practice, Virginian tobacco was a major import to European countries (Dunhill 1961). By 1640, over a million and a quarter pounds of tobacco were being exported from Jamestown, Virginia every year (Fox 2002).

By the end of the seventeenth century, William III came to power who condoned smoking, and as a result, the practice became acceptable. As he traveled England in 1697, he noticed that the use of tobacco actually made the men and women of his country “thoughtful” and “melancholy” (Fairholt 1968:125). Alfred Forrester wrote of this quality men take on when they smoke a pipe of tobacco as “the man who smokes is considered equal to any man who smokes, and the proud Hidalgo, still preserving all his dignity promptly proffers the tip of his best” (1947:60). It was not until after the shift in attitude about the character of those who smoked, that the price of Colonial tobacco gradually decreased and the number of smokers grew (Fisher 1939). Pipes then became a popular commodity as a result of how inexpensive they were, around two shillings a gross in 1709 (Hume 1969). Studies show that by the mid-seventeenth century, changing prices, the more availability of affordable goods, and increased earnings from multiple jobs made early consumerism of tobacco paraphernalia possible (Fox 2002). According to Ivor Noël Hume (1969), this made pipes available to all economic levels of society. Those in the lower classes could now take part in the luxury consumption that for the most part had been a privilege for those in the upper classes. Finally, the English and British colonists of both sexes, all ages and classes could be smokers (Fisher 1939:73).

The Evolution of Clay Tobacco Pipes

The earliest clays made as early as 1570 that were popular up until the middle of the nineteenth century, had plain barrel-shaped bowls that leaned forward, had a flat heel, and were anywhere from four to six inches in the length of the stem. These short pipes were known as a *cutty* or *nose warmer* (Goldring 1973:69). Depending on the locality of where they were found, these cutties were of the *fairy*, *Celtic*, *Cromwellian*, *Elizabethan*, *elfin* or

tavern pipe varieties (Ayto 1994:4). With the introduction of new goods and an overwhelming interest in the practice, new refinements to the pipes were made by the beginning of the eighteenth century. Pipes were lengthened from about 10 to 14 inches although advertisements of the time referred to both short and long-stem pipes (Ayto 1994, Hume 1969). After 1640, spurs replaced the heel for three possible reasons: so that pipe-makers could place their initials at the spur or side of the bowl, that with the new social interaction in public houses, spurs prevented the hot bowl from touching the table, or could have acted as a small handle as the bowl could heat to high temperatures (Ayto 1994, Dunhill 1961, Goldring 1976). Then when the Dutch King William II ascended the throne in 1689, he introduced the longer-stemmed and larger-bowled *aldermen*. The Dutch became unsatisfied with the small bowls the English were producing (Fairholt 1968, Fisher 1939), therefore, bowls became larger for a greater tobacco capacity, up to three-quarters of an inch. The stems of these pipes also tended to curve and were tipped with a wax glaze to prevent the porous clay from adhering to the smokers' lips (Ayto 1994, Fisher 1939, Hume 1969). Beginning in the early eighteenth century, spurs became flat-bottomed, called *pedestal spurs*, and other pipes were produced with no spurs at all. Pipe bowls and stems also began to be molded with designs of low relief on the sides at this time (Atkinson and Oswald 1969, Spence 1941). The stem drastically lengthened again in the mid-eighteenth century from 18 to 24 inches (Ayto 1994:6). Pipes produced throughout the eighteenth century, Hume suggests, were manufactured and advertised in a variety of shapes and sizes that differed among pipemakers. In Boston, newspapers advertised "Long London tobacco pipes" in 1716 and 1742, "Boxes of short pipes" in 1761, "Long and short pipes" the next year, and "long and middling pipes" in 1763 (1969). Furthermore, Hume found an advertisement in the Boston Gazette on May 28,

1764, from a pipemaker that made “Glaz’d 18 inch London Pipes per Box” (1969). After 1815, the longer *churchwardens*, as they were coined, were made between 24 and 36 inches (Ayto 1994, Dunhill 1961, Fisher 1939). Still, others reverted to the earlier, shorter and more manageable-sized clay pipes that were around nine inches, and always remained popular up until the end of the clay pipe era in the mid-nineteenth century (Hume 1969, Liebaert and Maya 1994, Oswald 1967). One of the more important results of the refinement to the pipes was that beginning in the mid-eighteenth century, gentlemen used their pipes as conversation pieces. The extra-long pipe stems promoted socialization and were cheap to buy. By the end of the eighteenth century, the “best” clay pipes could cost eleven pence for three dozen, or a gross of Dutch clays for two shillings, also making them popular because they were easily disposable and replaceable when they broke (Dunhill 1961, Hume 1969).

Early eighteenth century was the peak of pipe smoking, but by the end of the eighteenth century, the popularity of it began to change. Because everyone, including children, clergy, merchants, and the common laborer had been puffing away at their pipes, the upper crust of society began to put away their smoking accessories and opted for their elaborate snuff-boxes. The consumption of cigars also increased by the end of the eighteenth century for two reasons: “it was daintier than a pipe, and it was sufficiently expensive so that it remained for some time a rich man’s luxury” (Fisher 1939:76). Clay pipes were finally driven out of consumption by 1850 and clay pipe manufacture came to an end in 1914 (Ayto 1994). For years it was known that clay, porcelain, and meerschaum were too fragile a material, and that wood was ideal for pipes. After a French pipe-maker experimented with the root from a dwarf-oak growing in the Black Forest of Germany, the *bruyère* or *briar* as it has come to be known has become the pipe of preference even in the present-day (Fisher 1939:79)

History of Dating Clay Tobacco Pipes

Prior to studying the hole diameters of stems, the dating of tobacco pipes had relied on the evolution of the bowl form, and for pipes between the seventeenth and eighteenth centuries, this is still the most reliable guide. The first to study the evolution of the bowl in 1951 was Adrian Oswald. He discovered that as time progresses, the size of the bowl is inclined to get larger until the end of the eighteenth century, at which they get smaller, but not as small as those of the late sixteenth to mid-seventeenth centuries (Alexander 1967). The shapes of the bowl depended on the number of different molds each pipe maker possessed. The first clay tobacco pipes were made in the 1570s, so after that date, hundreds if not thousands of pipe makers were in the pipe-industry, each manufacturing different styles and sizes of pipes (Alexander 1967). However, finding bowl fragments and whole pipes prove to be more scarce than finding stem fragments on an archaeological site (Deetz 1977).

J.C. Harrington became the first to date pipes by their stem hole diameters in 1954. Edward Lenik discusses how bore diameters are measured in his article *The Step Gauge: A New Tool for Measuring Pipestem Bore Diameters*: First, a set of drill bits that contain drills in sixty-fourths increments must be obtained. Then, after a selection of a stem fragment, a drill is inserted into the bore hole. It might be necessary to try different sized drills into the hole until a snug fit into the hole is found. When the right drill has been found, the size of the drill, in sixty-fourths, is then recorded (Lenik 1971). Harrington discovered that there was a general trend where the bore hole diameters gradually decreased in size as time progresses from 1620 to 1800 (Binford 1962, Deetz 1977, Omwake 1965). The earliest pipes, dating to about 1600, had stems with bores of 9/64-inch diameter. By 1800 this diameter had decreased to 4/64-inch (Deetz 1977). Harrington noted that this change in diameter probably was due to

the fact that pipe stems became longer during this period, requiring a narrower bore diameter. This transformation in turn might ultimately relate to the greater availability of tobacco, which led to larger pipe bowls and potentially longer and hotter smokes. As a result, the lengthening of the stem would have removed the hot bowl farther from the mouth, and reducing the bore hole diameter would cut down on the amount of matter transmitted through the stem to the smoker's mouth.

However, in another study that was done by Lewis Binford in 1961, he found that Harrington's method was illogical because Harrington devised the occurrence of various hole diameters by forty year time periods in a series of percentages when no archaeological sample is going to correspond to forty year time periods. From Harrington's percentages, Binford found a formula where he could substitute values from any archaeological sample into the formula, and determine the average date for the period of the sample (Binford 1962). Binford's formula is used in the latter of this paper. As a result of this formula, James Deetz (Table 1) lists the time periods that correlate to the average bore diameters in a table (1977):

Table 1. Table of Bore Diameters and Correlative Temporal Period

<u>Diameter</u>	<u>Dates</u>
9/64	1590-1620
8/64	1620-1650
7/64	1650-1680
6/64	1680-1720
5/64	1720-1750
4/64	1750-1800

In addition, Binford found that if there is a bore diameter that dominates the site, but stems with other diameters are also present, the few stems in the larger and smaller categories reflect either normal variation in bore diameter or a slightly longer time of occupation on either end of the period indicated by the majority of the stems (Deetz 1977). However, studies have been

done on the methods of stem hole dating and have proved that this form of dating is unreliable. First, another result of Binford's work was that he found out that his formula breaks down towards the end of the eighteenth century and is distorted when applied to nineteenth century stems (Omwake 1965), and second, Audrey Noel Hume published her findings in 1963 that there needs to be a sample of 900 or 1000 stem fragments in order to obtain an accurate date (Alexander 1983).

In addition to the evidence of stem holes and bowl shapes, pipes may also be dated through the correct identification of makers' marks. The first studies of pipemakers and their associated makers' marks in the 1960s have been done by authors David Atkinson and Adrian Oswald (1969), whom found that the makers' mark or initial would have been molded on one side of the bowl or on the spur.

Theories of the Social Behaviors Associated with Clay Pipes

Historical archaeology as a branch of archaeology that employs the use of various forms of written accounts and documentation. This historical research then supplements archaeological information that is recovered. However, written documentation is not always available to supplement the archaeology recovered from sites. The practice of smoking clay pipes is one such case. Hundreds, up to thousands of fragments can be recovered from archaeological sites and the question remains, "why are so many pipe fragments recovered from one site?" This section of the paper will be a discussion from a logical standpoint the main suggestions historians and archaeologists have made.

It has been argued for and against for many years that pipes were shared; passed from one smoker to the next after they took in their fill of smoke, but before passing it to the next

smoker, a fragment was broken off. But before a discussion can be made on why fragments would have intentionally been broken off, a discussion of the context on why they would have shared pipes must be made.

Sharing pipes would have occurred under two circumstances: first, in a group of smokers that sat together and would have lighted a single pipe, each breaking a fragment off the stem after their smoke; or second, after a smoker finished his smoke with a pipe, would have then broken off the fragment, and laid it on the stand or rack to cool where soon after, another smoker would pick up the same pipe, light it, and smoke to their pleasure. The sharing of pipes is mentioned in many sources, but none go in depth on the reasons for it. In one such account, Barnaby Rich mentions the passing of the pipe custom in his article, *The Irish Hubbub*, that “one pipe of tobacco will suffice three or four men at once” (1618:41). F.W. Fairholt also wrote a number of accounts describing the sharing of pipes among a group of smokers (1968). Fairholt shares that in another book by Barnaby Rich called *Honestie of this Age* (1614), Rich wrote that a smoker is “(almost) never without company, that from morning till night are still taking of tobacco.” In another account from a man by the name of Aubrey, he wrote in 1680 that “I have heard my grandfather say that one pipe was handed from man to man round the table” (1968:170). In the last account, as written in *Smoke: A Global History of Smoking*, a man by the name of Horatio Busion visited London in 1618. He was fascinated by the smoking ritual the city practiced: “Amongst themselves, they are in the habit of circulating toasts, passing the pipe from one to the other with much grace” (Gilman and Xun 2004). Other authors such as Corti, Dunhill and Fisher have also mentioned the sharing of pipes in their writing.

It is important to recognize that the first Europeans to have seen this practice of sharing pipes were the British colonists and sailors who joined in on or witnessed the Native Americans pass around the pipe of peace in their ritual ceremonies. However, the context of the pipes being passed around in the native Indians' ceremonies would have been religious, which differs from that of the proposed context of the Europeans. As the Europeans used the pipe for secular and personal reasons, the only logical motives they would have had in sharing pipes would include, that first, sharing pipes would have been a matter of greeting one another. For example, Fairholt quotes Richard Brathwait's book entitled *The Smoking Age*, that English gentlemen "whose first salutation to their acquaintance is, 'Will you take a pipe of tobacco?' Or to a lady was, 'Dear Lady, please you take a pipe of tobacco'" (1968:66). Second, sharing pipes would have been a bonding experience among friends or even strangers to enjoy each others' company. King James I could not even deny that the importance of tobacco was no longer as a cure, but as a means of "good fellowship," and "he that will refuse to take a pipe of Tobacco among his fellowes is accounted (as) no good company" (James I 1604). Alfred Dunhill is another notable author that mentions in *The Gentle Art of Smoking* how "clay pipes were passed from hand to hand in the so-called 'tabagies'—meeting places resembling ordinary taverns." Dunhill includes an account of a London coffee-house in 1714 from a man by the name of "Addison:"

I was yesterday in a coffee-house not far from the Royal Exchange, where I observed three persons in close conference over a pipe of tobacco; upon which, having filled one for my own use, I lighted it at the little wax candle that stood before them; and after having thrown in two or three whiffs amongst them, sat down and made one of the company. I need not tell my reader that lighting a man's pipe at the same candle is looked upon among brother-smokers as an overture to conversation and friendship [Dunhill 1961:17].

A third reason that smokers would have shared pipes is because they took their tobacco seriously and would have wanted their acquaintances to indulge in the “best tobacco.” Such a narrative was written by a man in London named “Piscator Cotton” of his own account when he asked a man named “Viator” if he was “for the diet” of a pipe of tobacco. Viator answered that Cotton’s pipe must have been good because of the smell. Cotton offered his own pipe to Viator and replied, “If a man does smoke, let him smoke good tobacco, that no extra and unnecessary offence be given to the ‘weaker brethren’” (Fairholt 1968:119). The last and most logical reason smokers would have wanted to share pipes is that it would have been in their best interest to conserve pipes; whether among a group of smokers or for a number of smokers to share a single pipe that is smoked at different times. It wasn’t until the mid-seventeenth century when tobacco and pipes were available to smokers of all ages and classes; so whether pipes were smoked at home or public houses, smokers would have looked for ways to still get their daily intake of tobacco smoke, but not spend more than they could afford on purchasing the necessary smoking paraphernalia. It also became a business practice for taverns to keep a supply of pipes and tobacco whether free (Spence 1941), or for their guests to purchase and could “check out” again on later visits (Jay 1935:4). And as long as the pipes as a whole remained unbroken, tavern keepers would have allowed their customers to re-use them to keep from consuming their pipe supplies too fast (Hume 1969).

Furthermore, while pipes may have seemingly been shared for cultural and economic reasons, the causes for the quantities of stem fragments recovered from archaeological sites needs to be addressed. The main theory is that pipes were shared among smokers and that in between each individuals’ smoke, a part of the stem was broken off. An example of this “breaking-off-fragments-from-the-stem” phenomenon is in David Jay’s *Tobacco Smoke and*

Taverns. He explains that “when a tavern-keeper learned that one of his guests had finally gone to sleep,” he would take the pipe from the sleeping smoker, “break off part of the stem, and restore the broken pipe to its customary place” (1935:5), either on a wall-rack or vertical cooling stand (Spence 1941).

One reason suggested by George Cooper Spence for breaking off fragments of the stem was that it was done to mitigate any unhygienic affects a smoker could contract from the previous smoker (Spence 1941). But it is highly unlikely people during the eighteenth century were concerned about contracting germs and diseases from smoking. Germs and their correspondence to disease were not discovered by Louis Pasteur until the 1860s. The second suggested reason was that stem fragments were broken off from the stems in order for the next smoker to have a clean smoke. Alfred Dunhill contends that the purity and taste of smoke deteriorates with every use so required daily maintenance and cleaning (1961). However, Ivor Noel Hume (1969) disagrees. Hume argues that breaking a piece off the stem to “give himself an unsullied mouthpiece,” is “nonsense” for three reasons:

1. Pipes were carefully tapered at the mouthpiece to fit the lips, so the removal of more than two or three inches would have defeated that purpose.
2. It is extremely unlikely that a smoker would have been satisfied to smoke from a pipe with a jagged-end. And if fragments were broken off the stem, smokers would have then wanted to carefully file or ground down the end to shape a new comfortable mouthpiece.
3. The clear explanation then for the prevalence of stem fragments on colonial sites is that pipes were made with fragile material and had long stems which made it easy to accidentally drop or knock into numerous pieces (Ehwa 1974, Hume 1969).

Two more suggested reasons for the prevalence of stem fragments on archaeological sites may also include that pipes broke due to being the objects of entertainment and are further broken down by post-depositional processes.

Clay tobacco pipes may have amused the smokers and the non-smokers as well, and as a result of this entertainment, numerous pipes were broken. Fairholt describes an account of a tavern-keeper who kept his guests entertained by taking clean tobacco pipes and after lining the mouthpieces off the edge of a table, he would blow into them, each pipe making a different pitch and creating a tune. The keeper confessed that even though he could make musical pipes, “he broke such quantities of pipes that he almost broke himself” (1968:174). Fairholt also wrote about Mahommed Caratha who performed in the 1740s a pipe-balancing act where on a slack rope, he would “fire pistols from each hand” and balance at the “same time seven tobacco pipes on a ring held in his mouth” (1968:174). A popular pastime up until 1930, was for children to blow bubbles in clay pipes which also could have resulted in the accidental breaking of pipes (Ayto 1994).

After all this, it still must be recognized that whether the pipes were broken intentionally or accidentally, or for whatever the reason, the pipe fragments will be affected by the numerous processes that occur in the ground after the fragments were deposited. In recounting these processes, it begins after the fragments were thrown-away in garbage pits outside the back of the home or public house; those pits would have eventually been compacted and backfilled firmly almost to a point where there would have been no evidence of a garbage midden. They wouldn’t have wanted to risk the injury of falling into a gapping pit in the ground when walking outside. Compacting and backfilling alone may further break the fragments down. Then, after the pits were backfilled, transformational processes began

after the pipe fragments were disposed. These processes include all the conditions and events that affected the pipe fragments from the time they were deposited to the time the Mount Pleasant Site was excavated. Such processes can include: further soil deposition on top of the pits, disturbances from animal activity such as burrowing, or human activity such as plowing, as well as tree roots, erosion, extreme temperature variations and water seepage in the soil can all effect the physical characteristics of the pipe fragments.

Theories describing possible reasons why people may have desired to intentionally break stem fragments off of pipes bring to light new insights about the smoking behaviors during the clay pipe era. However, if ethnographic accounts do not exist of explanations to these smoking practices to support these theories, pursuing the question why pipe stems were broken is seemingly endless. Instead, my research approaches this problem from a *how* they broke standpoint. By investigating how the fragments could have broken and if there are characteristics about stem fragments that can be identified that determine how they were broken, this can lay the foundation to the right kind of research necessary to answer why there is an abundance of stem fragments on numerous archaeological sites.

METHODOLOGY

Mount Pleasant Site Statistical Data

During the inventory of the Mount Pleasant pipe assemblage, the presence of the large quantity of pipe fragments was observed. The process of discovering how the pipes from the Mount Pleasant Site were broken, began with collecting statistical data of the pipe assemblage. This information included: the fragment length and exterior diameters (the two ends and midpoint of the stem fragment) were measured using calipers (Appendix A-1), the

bore diameters of the stem fragments were measured using drill bits in 64ths of an inch (Appendix A-1), the quantification of bowl fragments (Appendix A-2), bowl typology, the quantity of stem and bowl juncture fragments to determine the approximate *Minimum Number of Individual* (MNI) pipes within the assemblage (Appendix A-3), as well as a stem breakage typology list of observable characteristics of the fractured ends. The statistical data gathered from the Mount Pleasant Site was then compiled into Microsoft Excel®, and then compared to the statistical data gathered from two experiments that tested intentional breaking and accidental dropping.

Experiments

Experiment 1: Intentional Breaking

In the first experiment 49 pipes were intentionally broken in which 24 participants received a six inch pipe, and 25 participants received a 16 inch pipe. They were then instructed to break fragments off from only the ends of the pipe stems multiple times. Each broken fragment was numbered starting with number one at the mouthpiece to allow for easier assemblage of the pipe during analysis. To investigate if the direction of breakage would result in different stem patterns, each participant broke off the stem fragments in one of four directions and only with that same direction for the entire stem shaft. For each of the four directions, six long and short pipes were broken: 1) from a *top-down* motion pushing down from the top of the stem, 2) *bottom-up* motion pushing up from the bottom of the stem, 3) *right to left* motion (when the front of the bowl is facing you) (Figure 2), 4) *left to right* motion (when the front of the bowl is facing you).

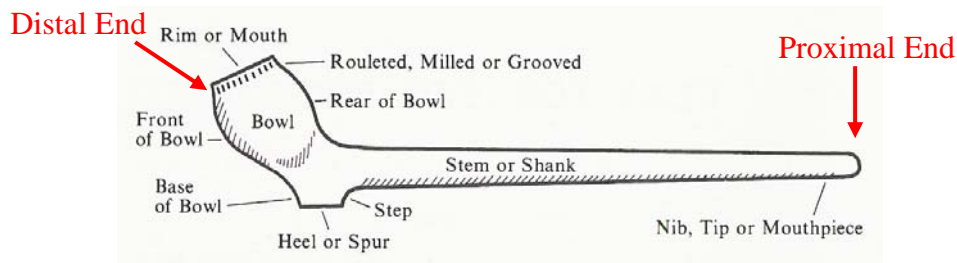


Figure 2. Labeled diagram of the parts of a clay tobacco pipe (Ayto 1994:2).

After each fragment was broken off and numbered, participants were asked to make notes on their catalog sheet including: the way in which their pipe was held, if there was a change in their holding method, the proximity of their hands and if any of the breaks were accidental (Appendix B-2). All fragments were counted, recorded, and placed in a catalog bag. During the analysis of the intentionally broken fragments, all the fragments were assembled back together using the numbers on the fragments as a guide. The fragment ends were then labeled as either *proximal* or *distal* in order to distinguish the stem ends for recording. The *proximal* end refers to the end closest to the mouthpiece, and *distal* end being the end closest to the bowl (Figure 2). Further notes on the identification of the stem fragments are discussed in Appendix B-3. The statistical data was then collected from each of the experimental pipes, and then recorded in Microsoft® Access (Appendix B-1).

Experiment 2: Accidental Dropping

In the second experiment, a participant dropped 12 pipes (six, six inch and six, 16 inch pipes) on a wood floor from the heights of three feet (table height) and five feet (bar height). To determine if how the pipe was drop would affect the stem breakage pattern, the pipes were dropped from the bowl, middle of the stem, and from the mouthpiece (Appendix C-2). After all the pipes were dropped, all the fragments were counted, recorded and placed in a catalog bag. During the analysis, each of the fragments were numbered, and the stem ends were either

labeled as proximal or distal. Statistical data such as the quantity, lengths, and observable breakage patterns of the experimental pipes were then compiled in Microsoft® Access (Appendix C-1).

RESULTS

Analysis of the Mount Pleasant Site Data

• *Total Pipe Assemblage*

The results from the inventory of the Mount Pleasant Site pipe assemblage consists of 567 total pipe fragments, and about 70 percent of those fragments are made up of stem fragments (Table 2, Figures 3 and 4). The remaining 30 percent of the assemblage is comprised of pipe bowls, and one fragment that could not be identified.

Table 2. Total Counts of Mount Pleasant Site Pipe Assemblage

	Total	Percentage
Bowls	171	30.2%
Stems	395	69.7%
Unidentified Fragment	1	0.2%
Total Fragments	567	100.0%

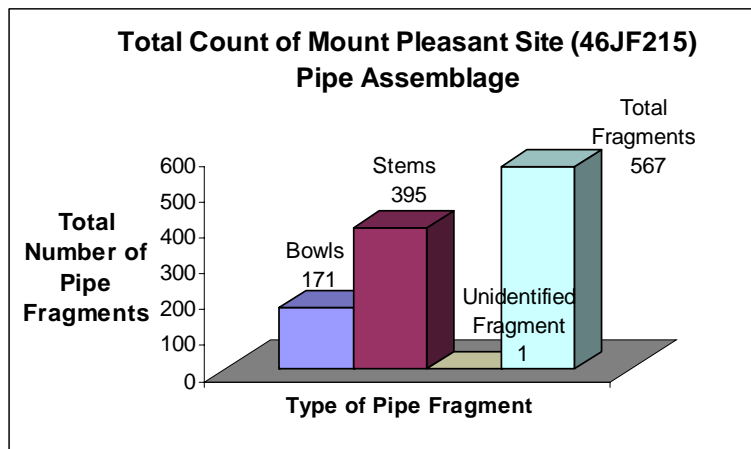


Figure 3. Total Counts of Mount Pleasant Site Pipe Assemblage

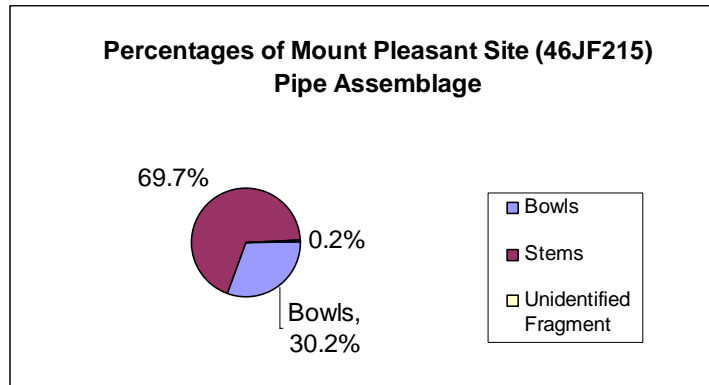


Figure 4. Percentages of Mount Pleasant Site Pipe Assemblage

- *Approximate Number of Pipes in the Mount Pleasant Site Assemblage*

A unique element to all pipes was counted to provide an estimation of the minimum number of individual pipes in the Mount Pleasant Site pipe collection (Plate 1). Twenty-eight stem and bowl juncture fragments were counted, which suggest that the minimum possible number of pipes that had been disposed at the site were 28 pipes (Appendix A-3).



Plate 1. Stem and Bowl Juncture Fragments

- *Length of All Stem Fragments*

The lengths of all 395 stem fragments were recorded using digital calipers in millimeters (Appendix A-1). Figure 5 illustrates that the lengths of all the stem fragments are

consistent. There is a strong pattern that a majority of the stem fragments fall between the lengths of 20 and 30 mm and any length above or below that range are outliers. The results of Figure 5 also illustrate that the average length of all the fragments was 25 mm, the maximum length was 91 mm and the minimum was five millimeters (Plate 2).

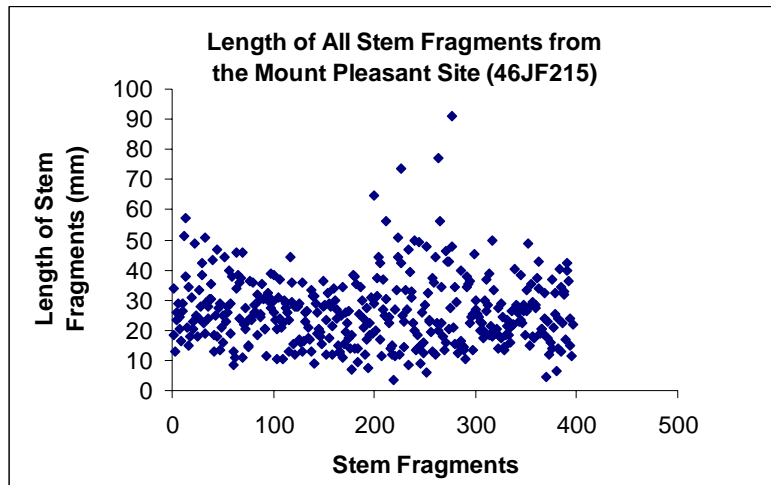


Figure 5. Length of All Stem Fragments from the Mount Pleasant Site



Plate 2. Average Length of Mount Pleasant Site Stem Fragments

The first histogram (Figure 6) shows the frequency of stem fragments by 10 mm intervals. The graph illustrates that over half of stem fragments in the Mount Pleasant pipe assemblage, or 346 fragments are between the lengths of 10 and 40 mm. The range of length that had the highest stem fragment frequency was between 20 to 30 mm at 155 fragments. The

second highest range with 116 fragments was between 10 and 20 mm, and the third highest at 75 fragments was between 30 and 40 mm. Only 10 fragments were of lengths over 50 mm.

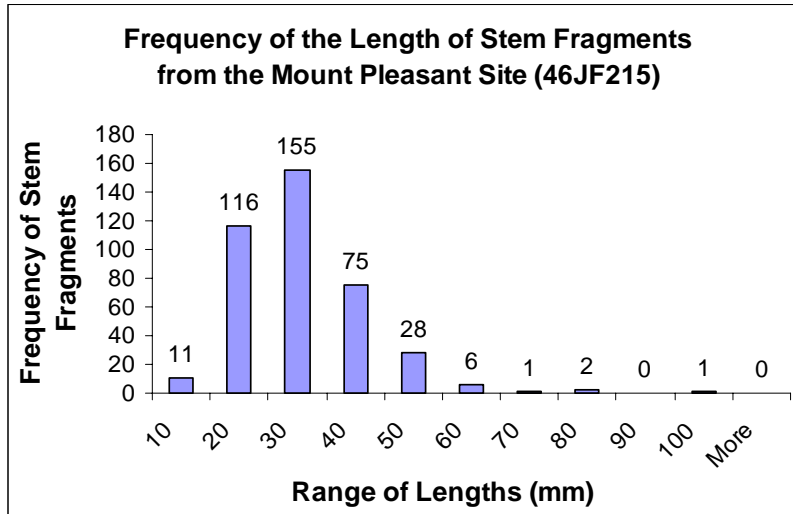


Figure 6. Histogram of Frequency of Stem Fragments at 10 mm Intervals

The second histogram (Figure 7) further breaks down the frequencies of stem fragments and ranges of lengths to five millimeter intervals. The highest frequency at 78 fragments falls between the 25 and 30 mm range, and the second highest frequency at 77 fragments were between 20 and 25 mm.

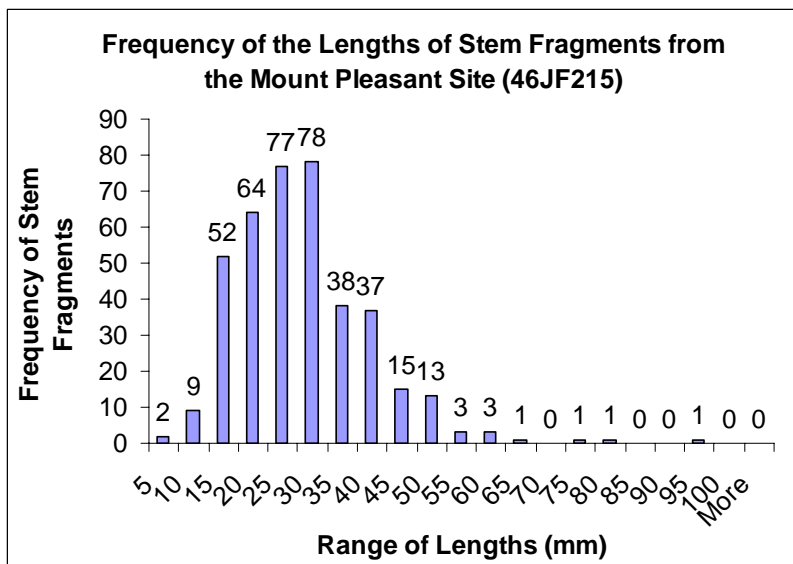


Figure 7. Histogram of Frequency of Stem Fragments at Five Millimeter Intervals

- *Stem Bore Analysis*

Edward Lenik’s methodology was applied in using drill bits that measured 64ths of an inch to measure the bore diameters of all the stem fragments. The Mount Pleasant Site pipe assemblage is comprised of pipes with stems that measure 4/64, 5/64, and 6/64 of an inch. Pipe stems that measured 5/64 of an inch had the highest total of bore measurements at 237. The 4/64 bore diameter was the second highest at 74 fragments, and 6/64 bore diameter had the lowest at 37 stem fragments. There were 50 stem fragments that did not yield stem holes, therefore those stems could not be accounted for in this analysis (Figures 8-9 and Table 3). With over half of the stem fragments measuring at 5/64, pipes manufactured with this diameter date from 1720 to 1750 (Deetz 1977). Pipes with the smaller diameter of 4/64 date from 1750 to 1800 and those pipes of the 6/64 diameter date from 1680 to 1720 (Deetz 1977). The stems with larger and smaller bore diameters can indicate that older pipes could still be acquired as well as new pipe imports could be bought, and that the occupation at the Mount Pleasant Site extended to 1800.

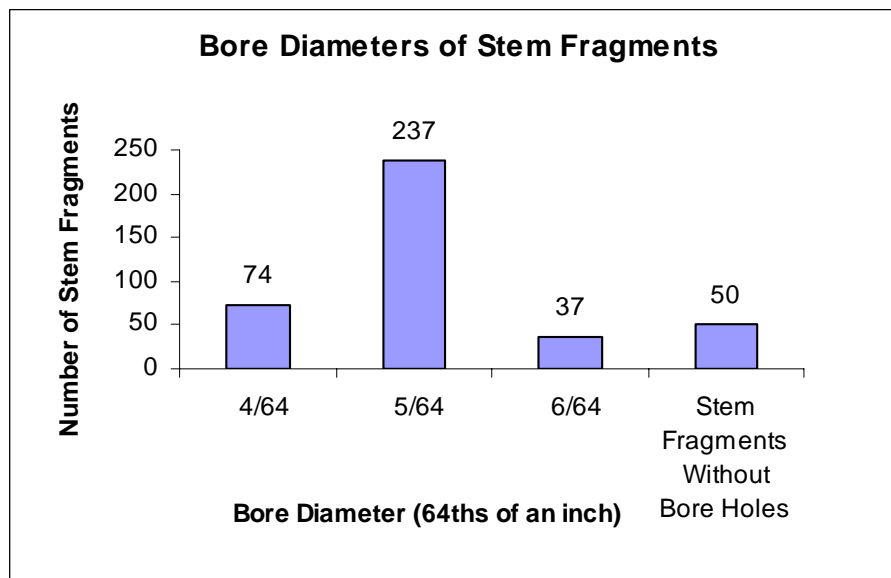


Figure 8. Bore Diameters of Stem Fragments

Table 3. Statistics of the Stem Fragment Bore Diameters

	4/64	5/64	6/64	Stem Fragments Without Bore Holes
Count	74	237	37	50
Average Length (mm)	26	28.19	26.69	
Average Length (in)	1.02	1.11	1.05	
Average Stem End Diameters (mm)	7.67	7.63	7.5	
Average Stem Fragment Midpoint Diameter (mm)	7.57	7.34	7.43	

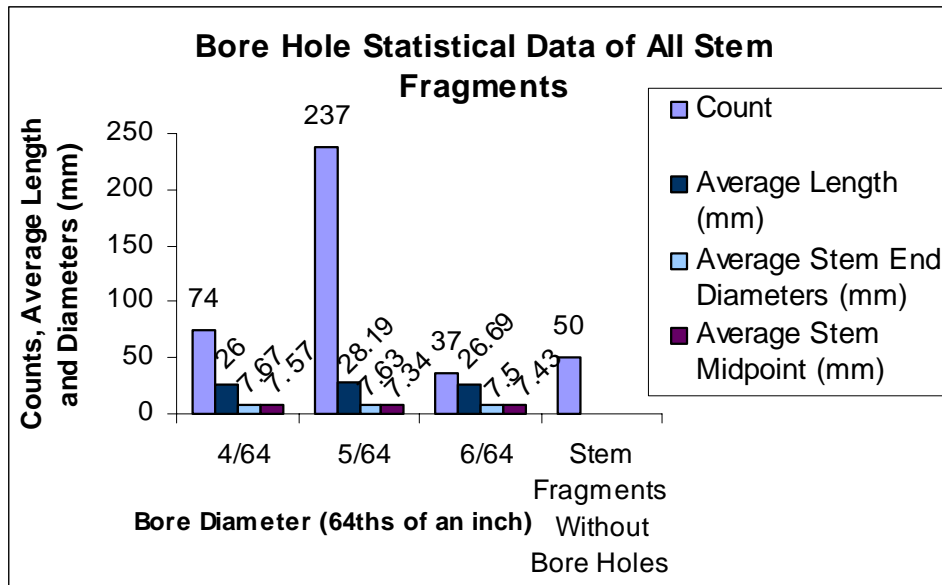


Figure 9. Statistics of the Stem Fragment Bore Diameters

Another way that the pipes can be dated is by using Lewis Binford's stem bore statistical formula that was refined in 1961 from J.C. Harrington's method. The formula expressing the relationship between the date and stem bore diameter is as follows:

$$Y = 1931.85 - 38.26 X$$

Where Y stands for the date of the deposit and X is the average stem bore diameter expressed in 64ths of an inch. Applying the formula to the Mount Pleasant stem fragments the following results were obtained:

<u>Diameter of Bore</u>	<u>Number of Stem Fragments</u>
4/64 in.	74
5/64 in.	237
6/64 in.	37
<u>Total</u>	<u>348</u>

$$\text{Average bore diameter, } X = \frac{(4 \times 74) + (5 \times 237) + (6 \times 37)}{348}$$

$$X = 4.89$$

$$Y = 1931.85 - (38.26 \times 4.89) = \mathbf{1744.7586}$$

Lewis Binford's (1962) stem bore formula gives a result of the average date of occupation at the Mount Pleasant site to be 1744. However, the first occupants of the site the Tullis family did not acquire the land until 1762, so the formula date in this case has proven to be inaccurate. Explanations include that both Binford and Harrington did specify that these calculations diminish in accuracy towards the late eighteenth century, beginning around 1760, and the formula being total unreliable in the nineteenth century (Oswald 1975). Historical archaeologist Audrey Noël Hume further argues that for any date of occupation to be accurate using Binford's formula, the sample needs to include at least 900 fragments (Oswald 1975). Other possible explanations includes that pipemakers used various sized wires during different periods as this can also affect dating of the stem on the basis of too small a sample or on specifying a certain date from a single stem bore, or that the occupants at the Mount Pleasant Site were simply keeping older pipes and were using them later.

Although dating the pipes by the stem bore have proven to be unreliable for this pipe assemblage, it may be possible to find a date of occupation by the general stem typology. The general conclusion from Harrington's study that the larger the diameter of the bore and stem, the older the pipe may be applied. The stems present in the pipe assemblage range from medium thick to small, and narrow in thickness which can date from 1700 to 1840 (Oswald 1975).

- *Bowl Typology*

None of the bowl or stem fragments exhibited makers' marks. As a result, the best way to date the pipes is by their general bowl typology (Plates 3-5). There are only two complete pipe bowls in the assemblage which are similar in typology. The overall small shape of the bowls, and the bowls' thin walls suggest that those date from 1780 to 1850 according to Lynford Alexander (1967). A reversion to smaller bowls began in the late eighteenth century, as well a less projecting, or straightening to the front of the bowl briefly took place during this time. Pipes of this same general size and shape persisted into the middle of the nineteenth century (Alexander 1967). The spurs of the bowls are also a temporal indicator. Other stem and bowl juncture fragments present in the Mount Pleasant assemblage also have smaller, thin, flat spurs, perpendicular to the bowl which approximate in date from 1780-1840 (Oswald 1975). The date of occupation according to David Atkinson and Adrian Oswald's bowl description of "thin brittle bowl, flat based spur," is 1780-1820 ((1969) Plates 4 and 5). Other partial bowl fragments in the Mount Pleasant assemblage are different in typology. A stem and bowl juncture present in the assemblage is much smaller and the bowl is more bulbous as compared to the previously mentioned bowls (Plate 5). The stem is also slightly thicker and the spur projects forward. Although the spur is small, thin, and flat which is distinctive of the

late eighteenth century, the spur is not perpendicular to the bowl. According to a study done on the *Clay Pipes from Chester*, by Peter Davey and Jane Rutter, this stem and bowl juncture dates from 1640-1680 (1980). More numerous in the Mount Pleasant assemblage are fragments of upright narrow bowls with medium to thick walls and thick stems (Plates 3 and 5). These bowls generally do not have spurs and date from 1730-1760 (Oswald 1975).



Plates 3-5. Bowl Typology

- *Stem Breakage Typology*

In order to compare the observable characteristics of stem breakage for the two experiments, a list of the patterns of stem breakage were compiled from observations during the analysis of the Mount Pleasant Site pipe stems (Table 4). The list of visible stem end breakage patterns from the Mount Pleasant Site pipe assemblage is as follows:

Table 4. Typology List of Break Patterns from the Mount Pleasant Pipe Assemblage

<u>Edge Patterns</u>	<u>Core Patterns</u>
Rounded, even edges	Swirl pattern
Rounded, jagged edges	Layered, ridged pattern
Sharp, even edges	Smooth pattern
Sharp, jagged edges	Rough pattern
<u>Whole Fragment</u>	<u>Angle of Fracture</u>
Whole fragment	Slanted
Portion(s) of stem missing	Vertical

Analysis of the Experimental Data

Experiment 1: Intentional Breaking

In the first experiment, 49 pipes were intentionally broken which resulted in 435 stem fragments. Participants commented that it was harder to break the six inch pipe than the 16-inch pipe and that the fragments were easier to break in the beginning of the stem than closer to the bowl. The rest of this section breaks down the results from *Experiment 1* by the results of testing for the hypotheses.

- *Length of All Stem Fragments*

The length of the stem fragments from intentional breaking resulted in consistent lengths. Figure 10 illustrates that the major cluster of lengths from the intentionally broken fragments is similar to the cluster of lengths of fragments from the Mount Pleasant Site although the pattern is not as strong as there is slightly more length variation. The histogram in Figure 11 further explains this similarity between the lengths of fragments from the Mount Pleasant Site and *Experiment 1*. Although more stem fragments had varied lengths than the fragments from the Mount Pleasant Site, 41 percent of all the stem fragments from *Experiment 1*, or 179 fragments fell between the same length range of 20 and 30 mm.

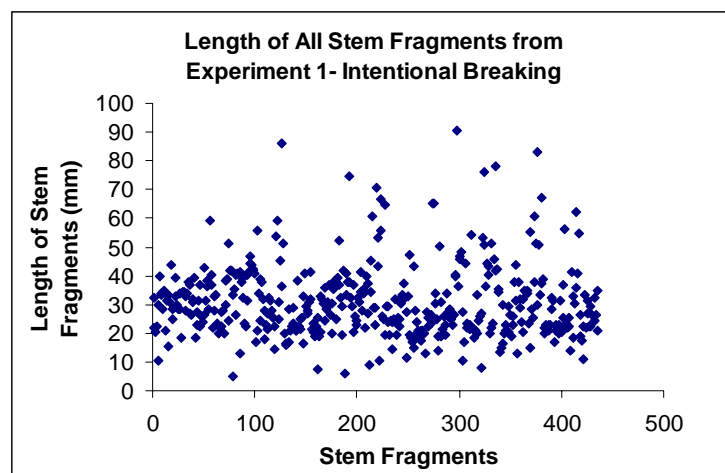


Figure 10. Length of All Stem Fragments from Experiment 1

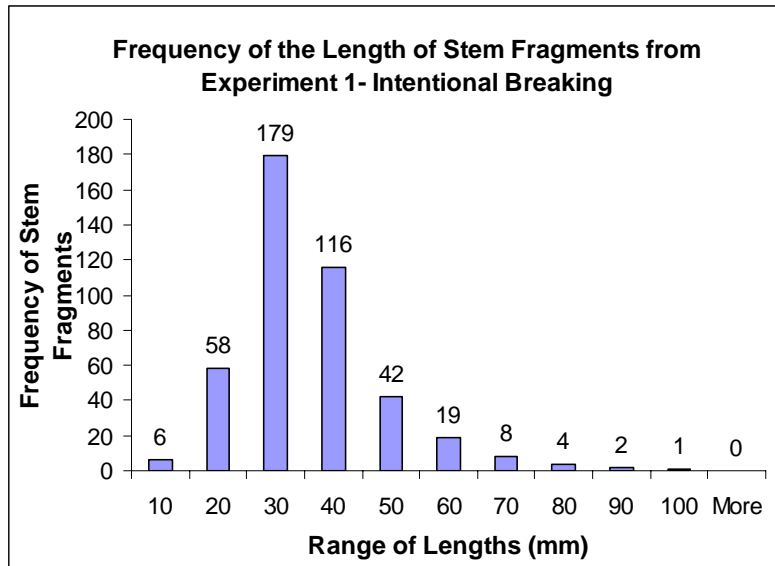


Figure 11. Histogram of the Frequency of Lengths of Stem Fragments from Experiment 1

Both the six inch pipes and the 16 inch pipes produced fragments that averaged in length to about 30 mm, however, the 16 inch pipes yielded a larger amount of shorter fragments overall. Generally, participants commented they could intentionally break shorter or longer fragments although a number of participants also commented that breaking shorter fragments took a lot more strength and pressure to do than to break longer fragments. The resulting length of the fragment appears to be associated with four variables: 1) How the pipe was held, 2) The amount of pressure the participant applied, 3) Where the pressure was applied, and 4) The proximity of their hands.

1. How the Pipe was Held

Based on the first experiment, ten different methods of breakage were identified (For a descriptive list of the breakage methods see Appendix B-3). Of the 10 breakage methods, four methods made up 303, or almost 70 percent of the 435 total stem fragments (Table 5). One method, the *thumb to thumb* which involves both hands wrapped around the stem with thumbs

on top and parallel to the stem, resulted in 154 breaks and the average stem length was 29 mm. The second highest frequency of stem breaks is associated with the *thumb on top, parallel to stem* method in which the thumb of the breaking hand that is breaking off the end of the fragment, is placed parallel to the stem (For a description of hand designations see Appendix B-3). This method had an average length of 40 mm. The four commonly used methods that were used to break the most stem fragments are highlighted in Table 5. The average length of stem fragments from the four methods is 31 mm. It is apparent, based on Table 5, that the way in which the pipe was held did have an effect on the length of the resulting stem fragment.

Table 5. The Effects of Breakage Method on Fragment Count and Average Length (mm)

Count of Fragments	Breakage Method	Fragment Length (mm)
1	Other	23.35
30	Distal Phalange of Index Finger	24.24
36	Single Hand with Thumb	29.09
55	Thumb on Top Perpendicular to Stem	29.13
154	Thumb to thumb	29.26
12	Hands Overlap	31.57
1	Index Fingers Touching	37.98
15	Thumbs on Opposite Sides of the Stem	39.44
58	Thumb on Top Parallel to Stem	40.13
8	Fist to Fist	40.26
16	One Fist	41.89

As previously mentioned, for some participants it was harder to break the stem fragments than it was for others, therefore, those that had a harder time repositioned their hands or fingers until they found a more comfortable grip where they could either break consistent lengths or found the most leverage. Some participants were forced to change their breakage method as the stem became harder to break starting between 24 and 26 cm on the 16 inch pipes. More than half of the participants changed their breakage method at least once. Those participants that found a suitable method or didn't have any problems whichever

method they used, they could plan for a certain length and obtain it. However, those participants that had a harder time breaking fragments varied their breakage methods more, which also resulted in unexpected, varied lengths.

2. The Amount of Pressure Applied

Generally, the participants commented that more pressure needed to be applied to produce shorter fragments. More strength and force was also needed as they progressed towards the distal end or bowl of the pipe. The breaking off of a stem fragment proved to be the most difficult to break at the stem and bowl juncture. A majority of participants found this fragment the most difficult and did not attempt to break it. For those that did, the extent to which it took to break it involved immense strength and force; one participant even had to use the table.

3. The Location of Applied Pressure

The fragments always broke the length of the stem up until where the most pressure was applied. Longer fragments generally occurred when participants left longer portions of the stem above their breaking hand or if an accidental break in their bracing hand occurred. In the accidental break, the participant did not expect the pressure from holding the stem would break a fragment from the stem. Of the 435 fragments, only 12 fragments were broken accidentally, all of which came from the 16 inch pipes. The average length of the accidentally broken fragments was 60 mm or about the width of the participants' hand.

4. Proximity of Hands

The fourth variable that affected the length of the fragment was the distance between the breaking and bracing hands. Figure 12 illustrates the results of the total fragments and the average length of fragments for the proximity of hands. It appears that the participants

preferred a closer proximity of hands as 143 more breaks occurred when the hands were closer together than further apart. The graph also suggests that the closer together the hands were placed, the shorter the stem fragment that would result.

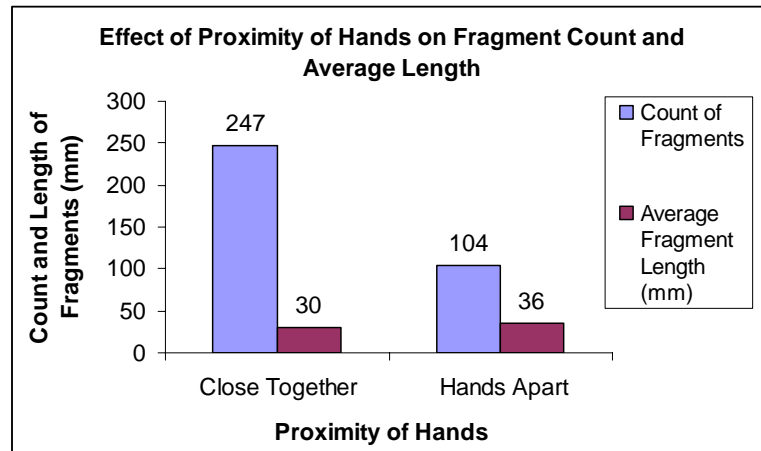


Figure 12. Effect of Proximity of Hands on Fragment Count and Average Length

Two general trends were identified: the further the hands were apart, the less control the participant had in the location the fragment was going to break, therefore there was a factor of unpredictability in the length of the resulting fragment. In contrast, the closer the hands were together, the more control the participant had in the location the stem fragment was going to break and could make a reasonable prediction in the resulting length of the stem fragment. This can be supported in that the highest frequency of fragments, 154 fragments, resulted in the average length of 29 mm, by the thumb to thumb method in which the thumbs were touching or were in close proximity (Table 5).

- *Quantity of Stem Fragments*

The first experiment resulted in 435 fragments, 331 of those from the 16 inch pipes, and 104 fragments from the six inch pipes. Figure 13 represents the average number of fragments that were broken for the six and 16 inch pipes. It suggests that similar to the total

count of fragments in which 227 more fragments were broken from the 16 inch pipes than the six inch pipes, the average number of fragments broken from the 16 inch pipes was also significantly greater. An average of 13 fragments were broken from the 16 inch pipes in contrast to the average of four fragments broken from the six inch pipes. One 16 inch pipe was accidentally broken and resulted in seven fragments.

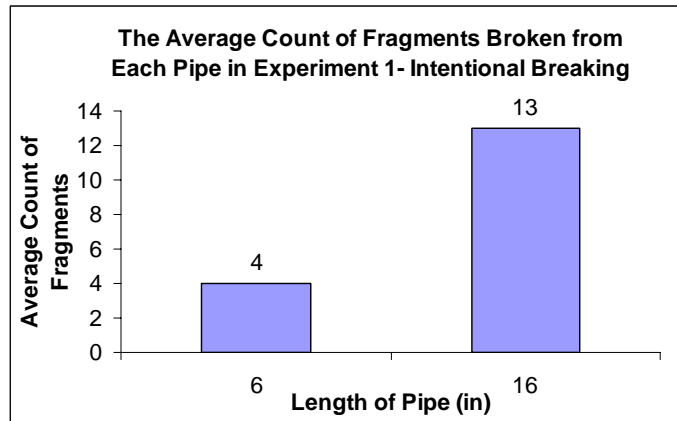


Figure 13. Average Count of Fragments from Each Pipe in Experiment 1

- *Observable Stem Breakage Patterns*

Six characteristics of intentionally broken stem fragments were identified as a result of the first experiment: 1) Lip, 2) Lip scar, 3) Even edges, 4) Even core, 5) Divets of excess or an absence of clay near the bore hole, and 6) Flaking. Of the 435 intentionally broken fragments, 244 of those fragments resulted in a lip on the proximal end of the stem fragment, and a lip scar on the distal end (Plate 6). These patterns appear when pressure is applied in one location and is supported on the opposite side of the stem; this acts as the pivot point or fulcrum where the lip, and lip scar occur.

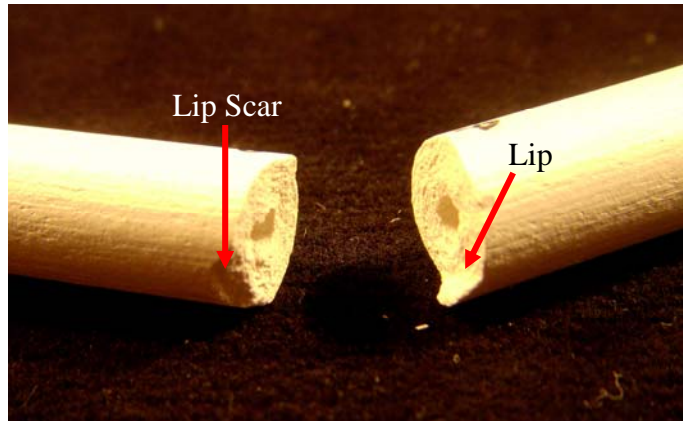


Plate 6. Lip and Lip Scar

1. Lip

A lip is a single place on the edge of a stem fragment that looks like a small, thin peak. There is a smooth, steep slope going from the core up the lip (Plate 6). The lip occurs during the break on the side of the stem that was being held where the most pressure to break the fragment was applied. A lip results in that part of the stem that absorbed all the shock from the break at the pivot point.

2. Lip Scar

A lip scar is a single place on the end of a stem fragment where shallow and gradual flaking took place from the exterior edge of the fragment going inwards on the exterior of the fragment (Plate 6). The lip scar occurs during the break on the side of the stem that is broken away from the lip at the pivot point.

The lip and lip scars are the main characteristics that define an intentional break. However, there are other attributes that are typical of intentional breaking, including even edges, an even core, divets and flaking.

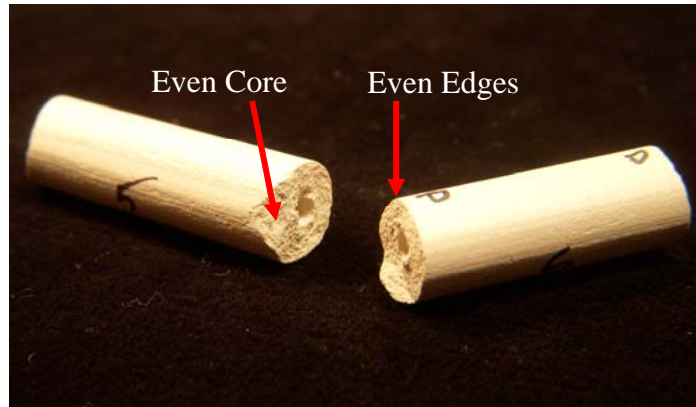


Plate 7. Even Edges and Core

3. Even Edges

With the exception of the lip and lip scar, the edge along the circumference of the stem generally has even edges (Plate 7).

4. Even Core

During the analysis of the Mount Pleasant pipes, a breakage typology was outlined including: 1) Edge pattern, 2) Whole fragment, 3) Core pattern, and 4) Angle of fracture. However, the core patterns of all the intentionally broken fragments were the same exhibiting a rough-textured core, most likely due to the clay material the historic reproduction pipes were made out of. In addition to the lip, lip scars, and even edges, all the fragments exhibited even core, in which no portions of the core were protruding (Plate 7). And concerning whole fragments, all the fragments, whether broken intentionally or accidentally, were broken in complete fragments, meaning no portions of the stem were broken off of any of the fragments; only flaking occurred.

5. Divets

Divets occur in the core next to the bore hole and are either characterized as a protruding small portion of excess of clay, an *outward divet* (Plate 8), or as an absence of a small portion of clay, an *inward divet* (Plate 9). Sometimes both types of divets occurred

on a break as a result of a crack in the bore hole from manufacture. These consist of a protrusion of excess clay on one side of the bore hole while the on the other side of the bore hole a portion of the clay is withdrawn (Plate 10). The same pattern appears on the end of the other corresponding stem fragment from the break, only the inward and outward divets occur on opposite sides.

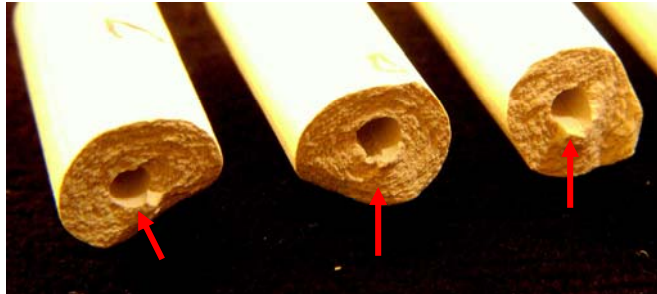


Plate 8. Outward Divets

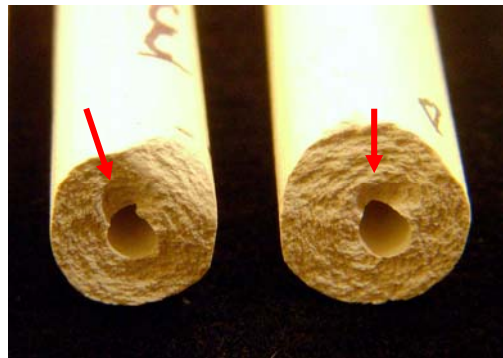


Plate 9. Inward Divets

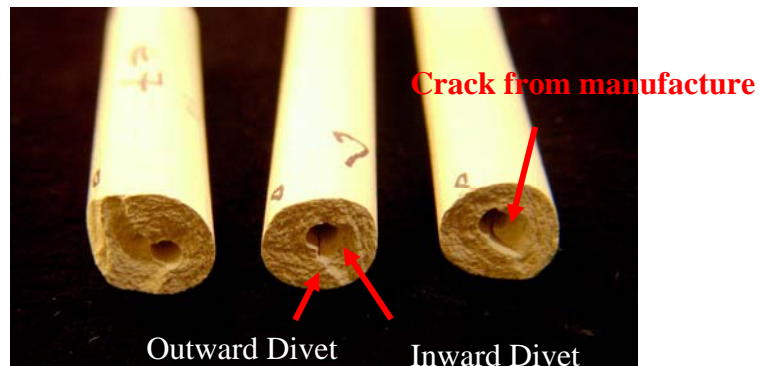


Plate 10. Both Divets

Furthermore, of all the proximal ends of stem fragments, 250 of those had divets, and of all the distal ends of stem fragments, 261 of those had divets. This statistic suggests that divets occurred from intentional breaking just as often as lip and lip scars occurred, in which, as previously stated, lip and lip scars occurred 244 times. Figure 14 further demonstrates that while outward divets occurred more often on proximal ends and inward divets on distal ends.

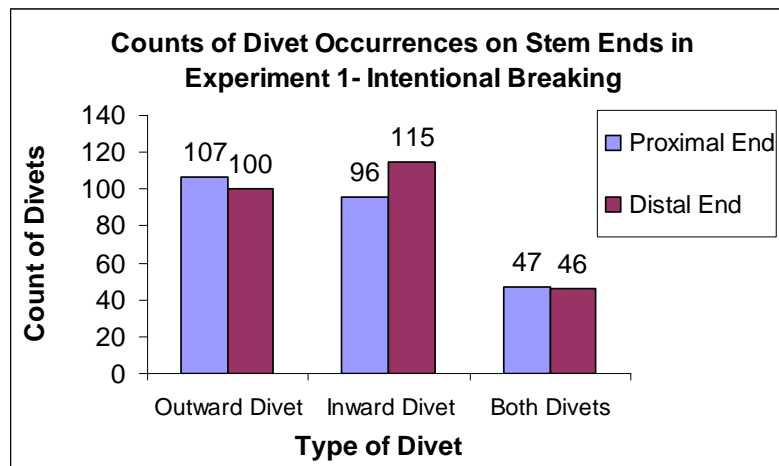


Figure 14. Count of Divet Occurrences on Stem Ends in Experiment 1

It is also important to recognize that while outward divets occurred more often on proximal ends, lips also appeared as well. It can also be suggested that while inward divets tended to occur on distal ends, lip scars were also characteristic of distal ends. It is inferred from these patterns, then, that another defining characteristic of intentional breaking are proximal ends with lips and outward divets, and distal ends with lip scars and inward divets.

6. Flaking

Flaking occurs between a lip and lip scar, above a lip scar, or a place on the edge of the stem end from a break (Plate 11). Where portions of clay are missing, intentional flaking can be identified by its shallow depth below the exterior of the fragment.

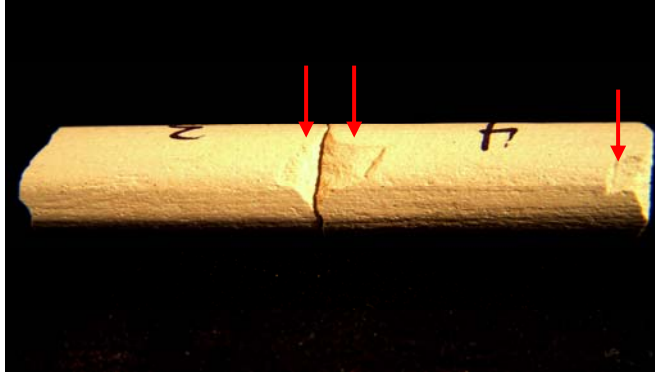


Plate 11. Flaking

- *The Direction Fragments were Broken*

Another hypothesis that was tested was if the direction of breakage affected the breakage pattern. During the analysis of the Mount Pleasant Site pipe fragments, a sample of stems exhibited ends with pronounced and subtle rounded-edges. These rounded edges were examined under a microscope, but no evidence of intentional filing or scrape patterns was observed. As a result from the first experiment, it was determined that no matter which direction fragments were broken, no rounded-edge stems occurred. However, one participant took a fragment and ground the edge of the fragment on a wooden table; in only a few seconds, the subtle rounded-edge did in fact result. The fragment in the middle of Plate 12 illustrates the intentionally broken fragment with the grounded edge. This edge is similar to the subtle rounded edges of the two fragments from the Mount Pleasant Site on either side of the intentional fragment. The edges of the fragments in Plate 13 appear to be more receded than both the intentionally rounded fragment and the Mount Pleasant Site fragments with subtle rounded-edges.



Plate 12. Middle: Intentionally rounded fragment. On either side: Mount Pleasant Site fragments.



Plate 13. Exceedingly Withdrawn Rounded-Edges on Mount Pleasant Site Fragments

Experiment 2- Accidental Dropping

In the second experiment, 12 pipes were dropped onto a wooden floor from either three or five feet which resulted in 71 fragments. This section also discusses the results of the second experiment according to the hypotheses that were tested.

- *Length of All Stem Fragments*

The lengths of the stem fragments were not as consistent in length as compared to the intentionally broken stem fragments in the first experiment. The scatter plot in Figure 15

shows that there was more variation in the lengths of stem fragments as the range of length from the accidentally broken fragments were as short as 9 mm or as long as 363 mm (about 14 inches). Within this wider variation of stem lengths, the highest concentration of fragments ranged from below 10 mm to 40 mm, but fragments were evenly distributed above 50 mm (Figure 16). This indicates that the accidentally broken pipes, first, resulted in a majority of stem fragments below 40 mm but were varied in length, second, that some of those fragments were as short as 10 mm, and third, numerous fragments were 50 mm and longer.

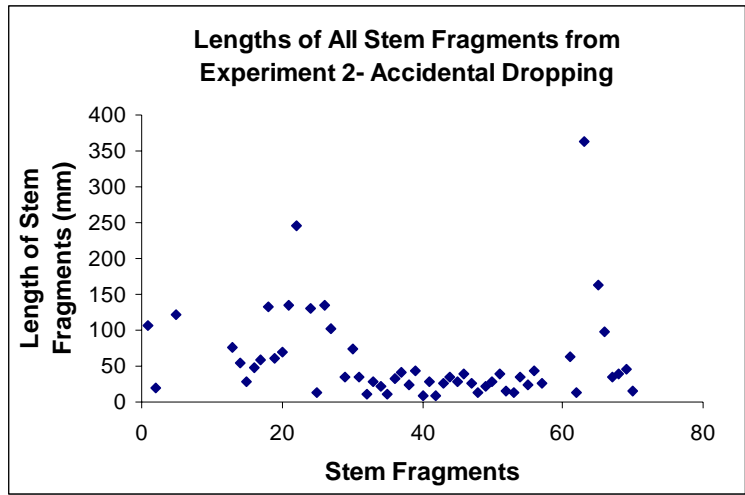


Figure 15. Lengths of All Stem Fragments from Experiment 2

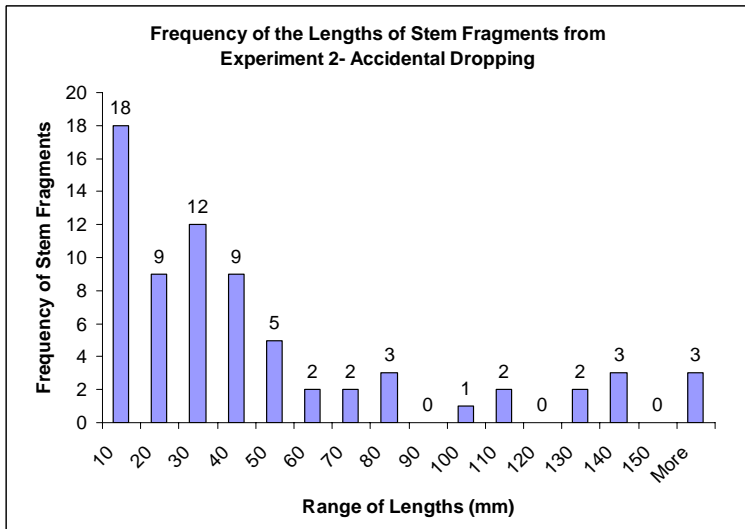


Figure 16. Frequency of the Lengths of Stem Fragments

In contrast to the wide variation in length and distribution of fragments, the length of the intentionally broken fragments was narrower in variation, ranging in length from 5 mm to 91 mm, with no stem lengths above 91 mm, and the distribution more concentrated between 20 to 30 mm. Furthermore, while the fragments broken from both the six and 16 inch pipes in the intentional experiment averaged in length to 30 mm, the lengths of the accidentally broken fragments are considerably longer. The average length of the six inch pipes were 38 mm while the fragments from the 16 inch pipes averaged in length at 47 mm.

Based on the histograms and the average lengths of the intentionally and accidentally broken fragments it can be inferred that intentionally broken fragments will generally average from 20 to 30 mm in length and that accidentally broken stem fragments, although vary in length and can also average in length from 20 to 30 mm, they tend to be 10 mm or shorter and 50 mm or longer. Although 37 more pipes were broken in *Experiment 1* than in *Experiment 2*, based on all three scatter plots of the lengths of stem fragments, the scatter plot of the intentionally broken fragments more closely resembles the scatter plot from the Mount Pleasant Site stem fragments.

- *Quantity of Stem Fragments*

As a result of the second experiment in which accidentally dropping the pipes was tested, 71 fragments were broken. However, because 37 more pipes were broken in *Experiment 1* than *Experiment 2*, the total quantities of fragment that resulted cannot be compared to make a sound conclusion if quantities of fragments can be identified as either intentional or accidental. Under these circumstances, evaluating the average counts of broken fragments from the pipes broken in both experiments might prove to be more useful.

In the first experiment the average count of the intentionally broken pipes was four fragments for the six inch pipes, and 13 fragments for the 16 inch pipes (Figure 13). In contrast, Figure 17 illustrates that significantly less fragments were broken in the accidental experiment between the two pipe lengths. As the average number of fragments from the six-inch pipes was two fragments and the 16 inch pipes averaged to about nine fragments, this data supports that accidentally dropped pipes will result in fewer quantities of stem fragments because of the higher frequency of stem fragments with longer lengths. In addition to this, intentionally dropped pipes will result in a higher frequency of stem fragments with shorter lengths.

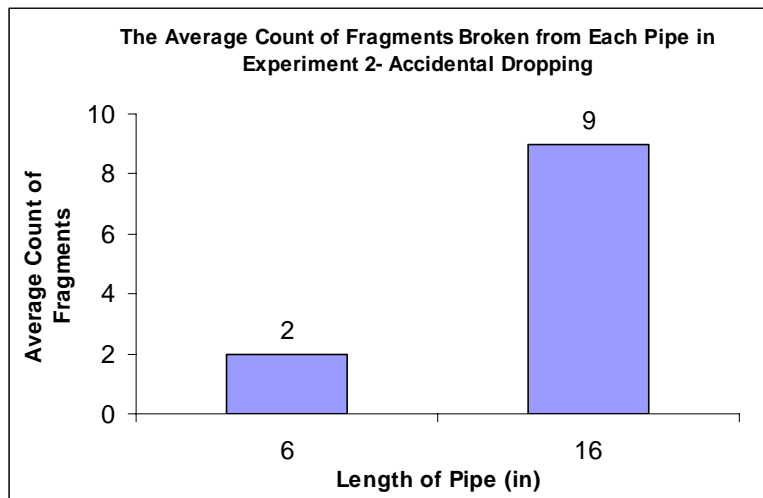


Figure 17. Average Count of Fragments from Each Pipe in Experiment 2

- *Observable Stem Breakage Patterns*

The pipes that were accidentally dropped in the second experiment also resulted in lip and lip scars, however, the fragments had different defining characteristics of an accidental break as compared to the intentionally broken fragments. The six key accidental break patterns include: thicker, wider or longer lips, or *excessive lips*, deep lip scars sometimes with ridges, uneven edges, an uneven core, excessive flaking and bowl fragments.

1. Excessive Lips

In comparing to the intentional lips, the accidental lips were more excessive in length, width or thickness with a longer slope (Plate 14). The width of the extreme lips generally spanned the diameter of the fragment, whereas the lips of the intentional fragments only spanned a portion of the diameter. The two fragment ends on the far right in Plate 14 also show that some excessive lips were found to have ridges.

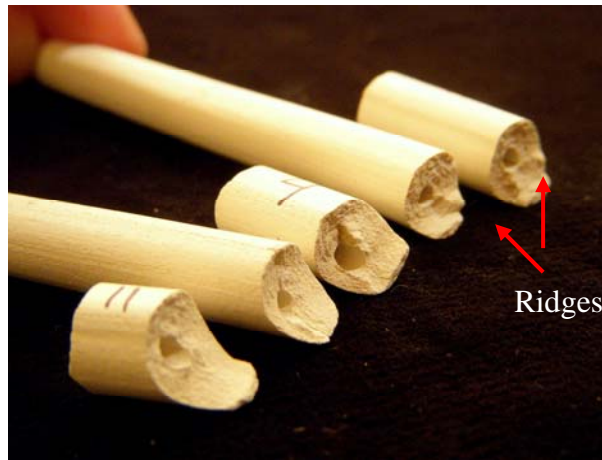


Plate 14. Excessive Lips and Excessive Lips with Ridges

2. Deep Lip Scars

Lip Scars also resulted in the second experiment, but unlike the intentional lip scars were not shallow and did not have a gradual fading effect away from the edge; accidental lip scars occurred deeper in the core and stopped abruptly at a certain point (Plate 15). Some of the lip scars also included ridges in the core which was not a characteristic of the intentional lip scars (Plate 16).

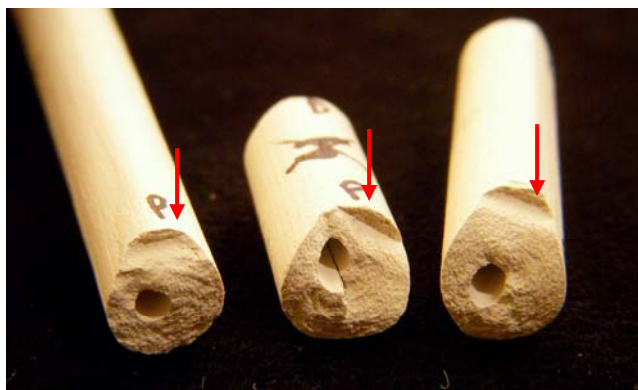


Plate 15. Deep Lip Scars

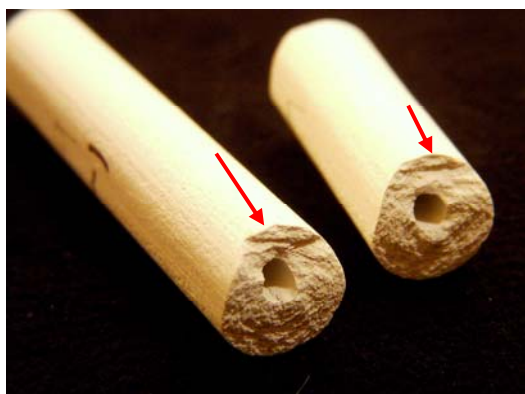


Plate 16. Lip Scars with Ridges

3. Uneven Edges

Including the lip and lip scars, some stems had jagged edges or an uneven appearance along the circumference of the stem, but most of the stem ends also tended to be even excluding the lip and lip scars.

4. Uneven Core

The cores tended to include protruding portions of clay, ridges or grooves that gave the cross-section of the core an uneven appearance (Plate 17). No divets or small projections or withdrawn portions of clay occurred. Similar to the intentional fragments, all the accidentally broken fragments were broken in complete fragments,

meaning no portions of the stem were broken off of any of the fragments; only flaking occurred.



Plate 17. Uneven Core

5. Excessive Flaking

Flaking on the accidental fragments occurred deeper within the core, wider across the diameter of the stem end, and longer from the edge of the end and inwards on the exterior of the fragment (Plate 18). In addition, another common pattern to accidental breaking is that numerous fragments included ends with what appears on one edge of the fragment, as a sharp ridge or lip that spans almost the width of the fragment and a lip scar above it (Plate 19).



Plate 18. Excessive Flaking



Plate 19. Common Flaking Pattern to the Accidentally Broken Fragments

6. Bowl Fragments

One result that did not occur in the intentional breaking experiment was the occurrence of bowl fragments (Plate 20). Four pipes out of the 12 pipes total that were dropped resulted in bowl fragments with an average of one or two bowl fragments from those bowls. Two six-inch pipes that were dropped from holding the mouthpiece resulted in bowls that shattered in half.



Plate 20. Bowl Fragments

- How the Pipe is Dropped

A fourth hypothesis that was tested was if holding the pipe in a certain location would affect the breakage pattern outcome. The participant in the second experiment dropped the pipes from holding the stem, middle of the shaft and by the bowl (Appendix C-2). As

previously mentioned, two six inch pipes that were dropped from holding the mouthpiece resulted in bowls that shattered. In contrast, there was one six inch pipe that was dropped from three feet by its bowl two times and both times the dropping resulted in no fragments or the whole pipe. Furthermore, of the four pipes that were dropped by holding the middle of the stem shaft, only one pipe resulted in a single bowl fragment in which it came from a 16 inch pipe. These results may indicate that the number of bowl fragments that result will depend on the amount of surface area and density of the pipe at its point of impact when it hits the floor. For example, in the case of the two pipes that resulted in shattered bowl fragments, they were dropped by their mouthpieces. This resulted in the bowl hitting the floor first, in which, not only does the bowl have a larger surface area but the bowl is hollow which means the bowl could not support the force of the impact when it hit the floor. In the case of dropping the pipe by the bowl, the mouthpiece is the location on the pipe that hits the floor first, but because the mouthpiece is densely compact, the force of impact does not affect the pipe as in the case of the six inch pipe that resulted in no fragments.

- Dropped from Three and Five Feet

The final hypothesis that was tested was if the difference in height would affect the resulting breakage patterns. *Experiment 2* tested the average table height of dropping a pipe at three feet and an average bar height of five feet. Figure 18 shows that significantly more fragments, or 17 more fragments were dropped from the height of five feet than from three feet.

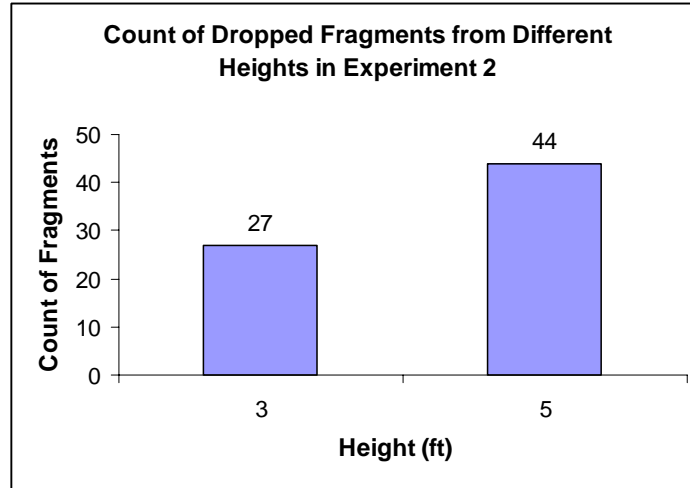


Figure 18. Count of Dropped Fragments from Different Heights in Experiment 2

By further breaking down the count of dropped fragments by pipe length, Figure 19 shows that the six inch pipes resulted in eight more fragments and the 16 inch pipes resulted in nine more fragments when dropped five feet than from three feet. From this graph it is apparent whether the pipe is six or 16 inches, more fragments will always result when a pipe is dropped from a higher height.

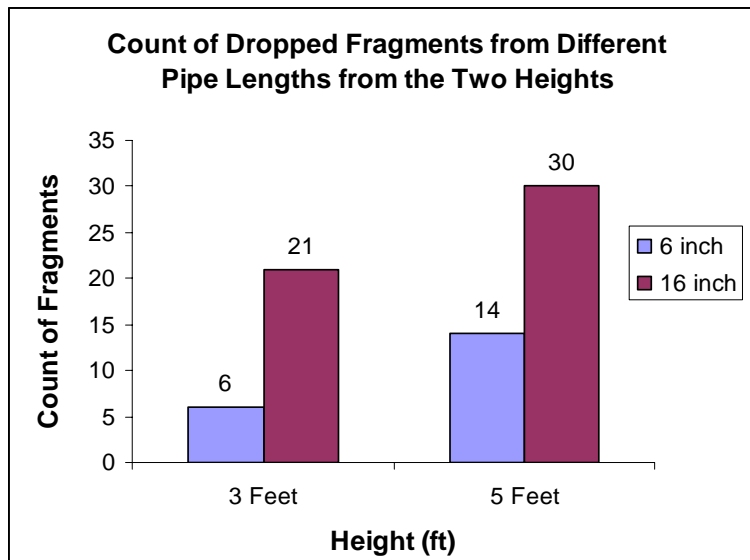


Figure 19. Count of Dropped Fragments from Different Pipe Lengths from the Two Heights

Comparison of the Experimental Data to the Mount Pleasant Site Data

After the results of the first two experiments were compiled and compared, they were then compared to the Mount Pleasant Site pipe stem assemblage. A 25 percent sample of the Mount Pleasant Site pipe stems were randomly selected by an electronic random number generator for the analysis. As a result, 99 stem fragments were chosen among the 395 total stem fragments to compare the lengths, quantities, and observable stem breakage patterns of the Mount Pleasant Site stem fragments to the experimental stem fragments. Each of the 99 fragments were then analyzed and compiled into Microsoft Access®. The results include that a total of 19 fragments out of the 99 were identified as intentionally broken, 35 fragments as accidentally broken, and 45 could not be identified. The full results of the analysis are discussed according to the hypotheses that were tested.

- *Length*

It was determined in the analysis of the stem fragments in *Experiment 1* that intentionally broken fragments will range between 20 to 30 mm (Figure 11). In the initial statistical analysis of the entire Mount Pleasant Site stem fragment assemblage it was also determined that the average length of all the stems was 25 mm, or ranged between 20 to 30 mm (Figure 6). This also proves to be the case for the sample of 99 stem fragments as the highest frequency range was 20 to 30 mm. (Figure 20). Because of the high concentrations of the lengths of stems between 20 to 30 mm, both the histograms of the sample and the complete stem assemblage show that the Mount Pleasant Site stem fragments correlate most strongly with having been broken intentionally.

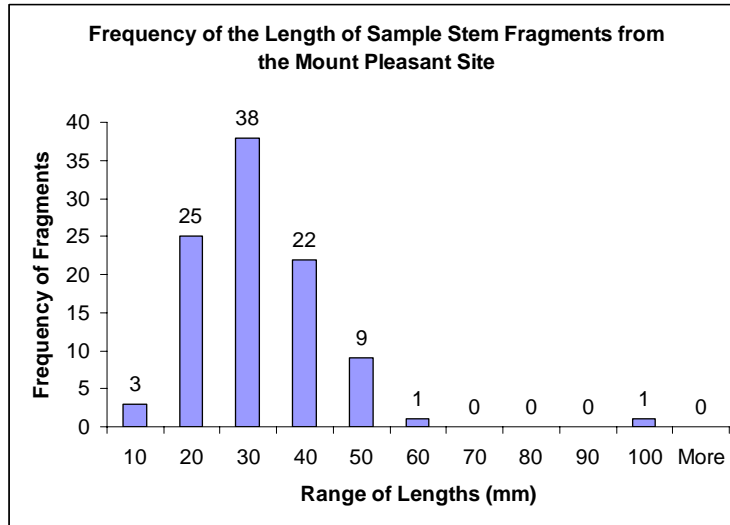


Figure 20. Histogram of Frequency of the Sample of Mount Pleasant Site Stem Fragments at 10 mm Intervals

- *Quantity*

Although the experiments testing for intentionally and accidentally breaking stems demonstrated that intentional breaking will result in more fragments per pipe than accidental breaking, a pipe to stem fragment ratio cannot be used for the Mount Pleasant Site pipe assemblage to determine whether the intentional breaking of pipes occurred at the site or not. Although the MNI or approximate number of pipes at the site was determined to be 28 pipes, it is unknown what the exact number of pipes was, therefore a valid pipe to stem fragment ratio cannot be established.

- *Observable Stem Breakage Patterns*

The analysis of the 99 Mount Pleasant Site stem fragments consisted of identifying the characteristics of intentional breaks, which includes small, thin, steep-sloped lips or shallow lip scars with divets, even edges and an even core, or, the distinctive accidental patterns of long or wide, thick, long-sloped lips or deep lip scars with jagged edges and an uneven core.

The results of the analysis are illustrated in Figure 21 in which the percentages of the stem fragment identification are illustrated. Overall, almost half of the 99 stem fragments could not be identified. This was in large part due to six characteristics not present in either of the experiments which proved the identification of those 45 stem fragments to be difficult, and as a result, were designated as *unknown* (For further identification notes from comparing the three datasets see Appendix D-2).

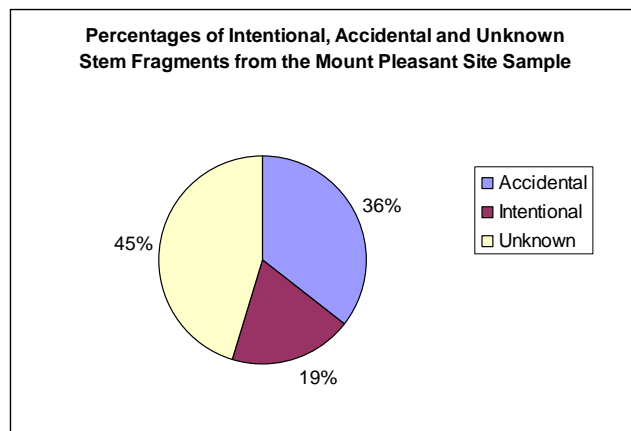


Figure 21. Percentages of Intentional, Accidental and Unknown Stem Fragments

Those *unknown* characteristics include: missing portions of cross-sections (Plate 21) and large portions of the stem (Plate 22), only halves of stem fragments (Plate 23), as well as large scrape marks (Plate 24) and rounded edges that were either subtle or exceedingly withdrawn (Plates 25-27). The following photos depict these characteristics:



Plate 21. Missing Portions of Cross-Sections



Plate 22. Large Portions of Stem Fragment Missing



Plate 23. Halves of Stem Fragments



Plate 24. Large Scrape Marks



Plate 25. Subtle Rounded-edges



Plates 26 and 27. Exceedingly Withdrawn Rounded-edges

However, for the 54 Mount Pleasant Site stem fragments that could be identified, 19 stem fragments appeared to have intentional characteristics and 35 fragments were identified as accidental.

Of the 99 fragments identified, the accidentally broken stem fragments were the easiest to distinguish. The most distinctive accidental characteristics were: excessive lips in length and width (Plate 28), jagged edges and uneven cores (Plate 29), deep lip scars (Plate 30) and the common flaking pattern that is similar to the accidentally broken stem fragments, as illustrated in Plate 19, of a sharp ridge or lip with a lip scar above it (Plates 31 and 32).



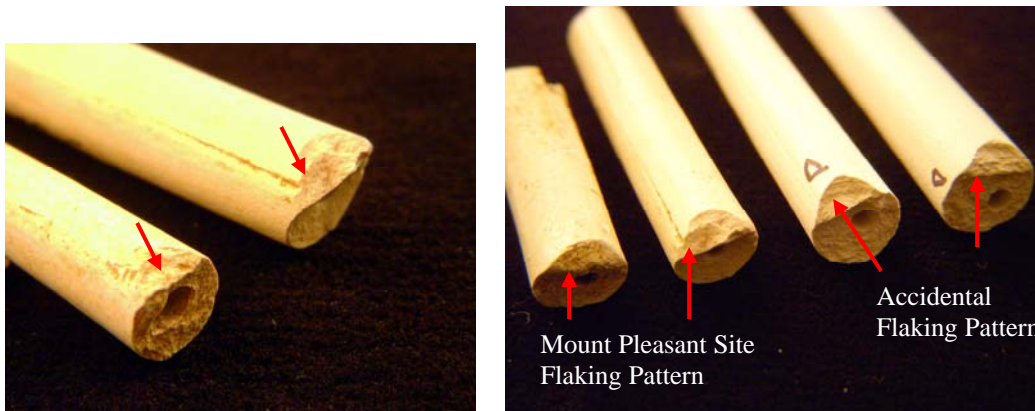
Plate 28. Excessive Lips in Length and Width



Plate 29. Jagged Edges and Uneven Cores



Plate 30. Deep Lip Scars



Plates 31 and 32. Common Flaking Pattern Among Accidentally Broken Stem Fragments

Although 19 intentionally broken stem fragments were identified in the Mount Pleasant Site sample, they proved to be harder to identify than the accidentally broken stem fragments. This was large in part due to the fragments that had portions of the stem missing, or where only one-half of the fragment was present, or to the fragments with rounded edges. Some ends appeared like they may have been intentional because of the presence of an identifiable intentional characteristic, but because a segment of the stem end was missing, a valid classification could not be made. As Figure 22 illustrates, 25 percent or almost 50 ends out of the 198 stem ends could not be identified.

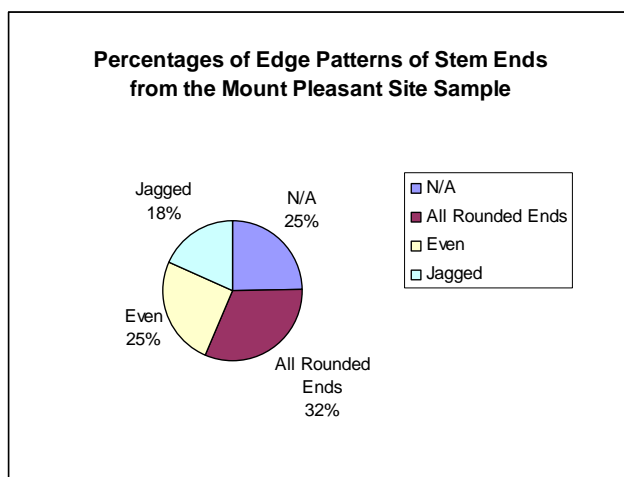


Figure 22. Percentages of Edge Patterns of Stem Ends from the Mount Pleasant Site Sample

The same was true for those stem ends with rounded edges. If a stem end was intentionally broken before it was thrown away, that behavior could not be detected on the stem ends that had exceedingly receded. Out of the 99 fragments, Figure 22 shows that 32 percent of all the stem ends were rounded. As a whole, more than half, or 57 percent of all stem ends could not be identified because of ends with missing stem portions or rounded edges.

However, for the few stem fragments that were identified as intentionally broken, the smooth, thin-sloping lip, even core and edges, were recognized for 31 stem ends, three of those being on distal ends of mouthpieces, and shallow lip scars were identified for 29 stem ends (Plates 37 and 38). Plates 33 to 36 (clockwise) show a slanted lip, a subtle lip and two stem fragments with prominent lips.



Plate 33. Intentional Slanted Lip



Plate 34. Intentional Subtle Lip



Plate 35. Intentional Prominent Lip



Plate 36. Intentional Prominent Lip



Plates 37 and 38. Intentional Lip Scars

In addition to the intentional characteristics of lip and lip scars found among the sample of 99 Mount Pleasant Site stem fragments, two fragments show evidence of possible modification (Plate 39). The modified fragment on the right in Plate 39 appears to have been gnawed on and the texture is present around the circumference of the stem. The fragment on the left however, does not show evidence of gnawing but the diameter of the stem gradually, but significantly decreases about the midpoint of the fragment. This decrease in diameter and smooth texture of that portion of the stem is present around the stem's circumference.

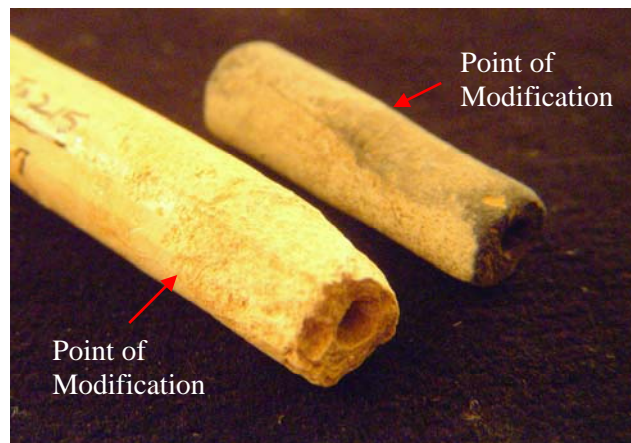


Plate 39. Possible Modified Stem Fragments

DISCUSSION

Based on the sample of the 99 Mount Pleasant Site Fragments it is evident that although the stem fragments from the site averaged in length to be the same as those fragments from the experiment that tested for intentional breaking, the breakage patterns of the stem ends indicate that the accidental breaking of pipe stems occurred more than the intentional breaking of pipe stems. From this conclusion, new ideas and possible explanations should be discussed.

It was first recognized in *Experiment 1- Intentional Breaking*, the fragility of the clay pipes. One participant had been tapping the open bowl on the palm of her hand when all of a sudden, the 16 inch pipe broke and fell onto the floor. Although only 99 stem fragments from the site were analyzed, the quantity of accidentally broken fragments compared to the intentionally broken fragments may be a good representation of the ease with which the clay pipes broke. It is probable that the pipes accidentally broke almost on a day to day basis. It should also be recognized that it was discovered in *Experiment 2- Accidental Dropping*, more stem fragments always broke from the longer pipes. So if the occupants of the Mount Pleasant Site were using pipes of lengths between 12 and 24 inches that were popular during the eighteenth century and were accidentally dropping those, that could account for the large quantity of accidental fragments found at the site.

In regards to the small quantity of intentional fragments compared to the quantity of accidental fragments, the context of the site must be considered. The Mount Pleasant Site was not a place of social merriment for all the nearby locals; it was a homestead. Although historic records show two possible families may have inhabited the site, no matter the family, smoking would have been a personal, private pastime for those who smoked at home.

Therefore, intentionally breaking fragments may have occurred more often in a tavern-setting than at a homestead. At home, there wouldn't have been a need to break off fragments to conserve, share pipes, or to reduce the spread of germs such as in taverns, because at home, smokers would have taken the time to maintain their pipes, enjoy them for the peace of mind they brought or to hold as small art pieces, even though the accidental breaking of pipes did happen. The designs on numerous bowl and stem fragments in the assemblage may also indicate that the occupants at the site may not have necessarily purchased them to use constantly, but to use sparingly, or only to indulge in once in a while. Based on these suggestions, a variety of sites need to be studied to determine in what contexts more or less intentional or accidental breaking occurs.

However small a quantity intentional fragments were identified, the occupants at the Mount Pleasant Site were practicing this behavior. And as it is evident by the numerous accidental fragments that pipes frequently broke due to their fragility and length, no matter the type of site, the constant occurrence of broken pipes would have provided an incentive for any smoker to re-use and conserve the pipes that didn't break. This would have meant doing the proper maintenance on the pipe in between smokes—emptying the bowl of the ash, letting the pipe cool before re-use, the rotation of pipes in between each use and cleaning the bore hole with a pipe cleaner. Since pipes were manufactured in long lengths during the eighteenth century to remove the lighted hot bowl away from the face and to allow for the extended use of a single pipe, an intentional short break of the mouthpiece would not have been a bad idea to shorten the overall length of the pipe. Not only would this allow for the pipe to last longer but would have made sense to prevent from accidentally breaking the pipe stem so easily. For other smokers, conserving pipes may have meant breaking off the mouthpiece or small

fragments of the stem to alleviate the bitter taste that increased with each smoke, instead of throwing away the entire pipe. For whatever the reason a smoker would try to use a pipe for as long as possible, the common, everyday smoker would not have wanted to pay more than what they could afford for something that although may have been considered a personal luxury, was also a social norm and broke very easily.

Furthermore, in order to make better distinctions as to how pipe breaks, further studies would need to be made to determine how the unknown patterns such as the deep scrapes, the missing portions of cross-sections, halves of stem fragments and rounded-edges of stems occur. As none of these patterns resulted in either experiment but made up the largest portion of fragments in the analysis of the Mount Pleasant Site sample, the effects of post-depositional processes must be studied. During the analysis of the sample, it was found that even if there were signs that intentional or accidental patterns of breakage had been present on a fragment at one point, that distinction could not be made because the fragments had been affected by post-depositional processes that mitigated those patterns. The earliest the pipe fragments could have been deposited on the site was 1762 when the property had first been inhabited. And until those pipe fragments had been recovered in 1999, they were subject to around 237 years of post-deposition. Both experiments have shown the fragility of the clay used in the production of pipes, so any amount or intensity of processes that occurred in the ground surrounding the fragments could have greatly affected them making the identification of breakage patterns difficult. Therefore, studies need to be conducted on the post-depositional processes that can affect the length, quantity, and observable characteristics of the stem fragments and how those processes can be identified on the pipe fragments. Examples can include investigations on how different types of soils and how water seepage

can effect the preservation of clay. And as in the case with the stems with subtle rounded edges from the Mount Pleasant Site that look similar to the stem end in which a participant ground the edge on the table (Plate 12), or the two possible modified stem fragments in Plate 39, it cannot be known for sure if those fragments really were intentionally modified until more studies have been done.

In considering all these future research suggestions, it should be mentioned that it is important to recognize that the research presented in this paper is preliminary. Going back to Audrey Noël Hume's argument that a large sample of stems is necessary in order to date them by their bore holes, or even with any study on morphology and typology, even larger quantities of stems must be studied and more experiments need to be conducted than what was completed for this research paper in order to provide better support for my conclusions. More pipes, and especially, of different clays need to be intentionally broken and accidentally dropped as different clay materials may result in different patterns under certain circumstances; clay pipes need to be thrown in the grass or on soil and stepped on; they should be thrown in a pit, backfilled and compacted; and most importantly, they should be smoked, and the same experiments should then be conducted.

Although many more studies need to be conducted to generate more insight on the “numerous-clay-pipe-fragments-on-archaeological-sites” phenomenon, the results of this research can provide a preliminary model to interpret the behavior that result in pipe disposal patterns. If after selecting a stem fragment from a clay pipe assemblage you identify on a stem end: a small, thin, steep-sloped lip, a shallow lip scar, divets, even edges, an even core, you may have a fragment that was intentionally broken. This could especially be true if those patterns occurred on the distal end of a mouthpiece, the proximal end of a fragment that was

within the stem shaft and if the fragment is between 20 to 30 mm. On the other hand, if you identify on a stem end: a long or wide, thick, long-sloped lip, or a deep lip scar with jagged edges and an uneven core, that may be a fragment that was accidentally broken. In addition, if these patterns occur on the distal end of a fragment where the proximal end looks intentionally broken, and the length of the fragment is 10 mm or shorter, or 50 mm and longer, you have better support for the fragment having been broken accidentally. Although intentionally and accidentally broken fragments can break longer or shorter according to the previously mentioned length ranges, the key to identification is to look at the breakage patterns.

CONCLUSIONS

Historic clay tobacco pipe stem fragments are often recovered from archaeological sites and the goal of this research was to understand the meaning the fragments convey. Instead of focusing the attention on why the pipe stems were broken, the research I presented in this paper seeks to understand how the stem fragments were broken through the identification of certain breakage patterns that correlate with specific behaviors of pipe disposal. The proposal that was tested were that the fragments from the Mount Pleasant Site were either broken intentionally or accidentally, and the hypotheses used to guide the investigation, were that, depending on how the stems were broken, there will be differences in the lengths and quantities of stem fragments as well as different stem end breakage patterns. The statistical data of stem fragments from the Mount Pleasant Site were first statistically compiled and then compared to the systematic breaking of 61 historic reproduction pipes in two experiments. The results of this study indicate that while there is overwhelming evidence

for the accidental breaking of pipes at the Mount Pleasant Site, the intentional breaking of the pipe stems also did occur as can be identified by the breakage patterns on stems that identify these pipe disposal behaviors.

APPENDICES

Appendix A: Mount Pleasant Site Statistical Data

Appendix B: Experiment 1—Intentional Breaking Data

Appendix C: Experiment 2—Accidental Dropping Data

Appendix D: Comparing the Experimental Data to the Mount Pleasant Site Data

Appendix A-1: Mount Pleasant Site Pipe Stem Data

ID#	Cat #	Qty	Frag #	North	East	STP/Unit/ Fea	Depth Low (cm)	Depth High (cm)	Mea (mm)	Mea (in)	Design?	Description	Notes	Max Diam end #1 (mm)	Max Mdpt Diam (mm)	Max Diam end #2 (mm)	Max Diam Bore hole end #1	Max Diam Bore hole end #2	Mthpc
1	6	1	1	215	170	STP	0	25	18.38	0.723	no	portions of core are white and light gray		7.68	7.8	7.96	4/64	4/64	no
2	10	1	1	230	180	STP	0	22	33.85	1.332	no	gray core on one end of stem		8.5	9	9.11	5/64	5/64	no
3	22	7	1	335	145	STP	0	80	13.05	0.513	no		cat# 22 supposed to have 7 stem frag, 2 bowl frag; but one frag is not a stem frag, it is a bowl frag	9.34	9.45	9.84	5/64	5/64	no
4	22		2						23.42	0.922	no			6.88	6.76	6.80	5/64	5/64	no
5	22		3						25.86	1.018	no			8.71	8.50	8.34	5/64	5/64	no
6	22		4						28.62	1.126	no			7.69	7.56	7.60	5/64	5/64	no
7	22		5						20.49	0.807	no			7.72	7.58	7.36	5/64	5/64	no
8	22		6						24.53	0.965	no			5.46	5.71	5.83	5/64	5/64	no
9	22		7						16.18	0.636	no	junction of stem and front of bowl		11.61			6/64	6/64	no
10	31	1	1	340	150	STP	0	39	28.75	1.132	no			8.12	7.79	7.58	4/64	4/64	no
11	40	1	1	345	150	STP	0	12	26.23	1.033	no	stem is rectangular at one end in cross-section		5.30	6.14	7.24	5/64	5/64	no
12	64	1	1	326	144	Unit	36	46	51.29	2.019	no			7.79	8.19	8.85	5/64	5/64	no
13	67	2	1	331	145	Unit	27	35	57.05	2.246	no			7.06	7.21	7.09	5/64	5/64	no
14	67		2						37.79	1.488	no			6.86	6.95	6.77	5/64	5/64	no
15	69	1	1	334	145	Unit	43	53	20.96	0.825	no			8.02	7.90	7.76	6/64	6/64	no
16	75	2	1	335	145	Unit	41	52	34.53	1.359	no	1 deep cut on exterior-not decoration		6.80	7.53	7.86	4/64	4/64	no
17	75		2						15.09	0.594	no			5.64	5.49	5.36	5/64	5/64	no
18	77	2	1	336	150	Unit	30	40	17.84	0.702	no			7.07	7.14	7.32	5/64	5/64	no
19	77		2						31.06	1.223	no			7.31	7.87	8.06	4/64	4/64	no
20	81	1	1	335	145	Fea 9 (Unit .50x.50m)	101	106	22.94	0.903	no			6.87	7.24	7.30	5/64	5/64	no
21	85	1	1	335	145	Fea 9 (Unit .50x.50m)	66	71	20.48	0.806	no			8.69	8.13	7.42	5/64	5/64	no
22	92	2	1	335	146	Unit	27	37	48.57	1.912	no	black residue on the core and exterior of one end		9.15	8.42	8.09	4/64	4/64	no
23	92		2						23.82	0.938	no	portion of the stem has broken off along the shaft		7.07	7.15	7.32	4/64	4/64	no
24	97	4	1	336	145	Unit	45	48	24.66	0.971	no	junction of stem and bowl		10.49	9.22	9.34	5/64	5/64	no
25	97		2						17.96	0.707	no			7.99	8.08	8.13	5/64	5/64	no
26	97		3						33.27	1.309	no			7.18	6.80	6.55	4/64	4/64	no

Appendix A-1: Mount Pleasant Site Pipe Stem Data

ID#	Cat #	Qty	Frag #	North	East	STP/Unit/ Fea	Depth Low (cm)	Depth High (cm)	Mea (mm)	Mea (in)	Design?	Description	Notes	Max Diam end #1 (mm)	Max Mdpt Diam (mm)	Max Diam end #2 (mm)	Max Diam Bore hole end #1	Max Diam Bore hole end #2	Mthpc
27	97		4						23.79	0.936	no			6.20	6.14	6.46	5/64	5/64	no
28	102	1	1	337	145	Unit	17	27	27.77	1.093	no			7.60	7.32	7.28	5/64	5/64	no
29	103	3	1	337	145	Unit	27	37	42.13	1.659	no	mouthpiece is a ball includes a portion of the bowl at one end of the stem		6.75	5.76	6.01	6/64	6/64	yes
30	103		2						38.27	1.506	no			10.05	8.92	8.40	5/64	5/64	no
31	103		3						22.39	0.881	no			6.36	6.48	6.63	4/64	4/64	no
32	104	2	1	337	146	Unit	26	36	50.61	1.992	no	fragment is small in diameter		6.63	6.08	5.67	4/64	4/64	yes
33	104		2						18.76	0.738	no			6.80	6.95	7.06	6/64	6/64	no
34	105	1	1	337	146	Unit	36	46	29.35	1.155	no			7.05	7.21	7.25	4/64	4/64	no
35	106	1	1	338	145	Unit	25	36	27.99	1.102	no			8.81	8.10	8.12	4/64	4/64	no
36	107	3	1	338	145	Unit	36	46	23.81	0.937	no			8.06	7.89	7.86	6/64	6/64	no
37	107		2						30.15	1.187	no			6.45	6.36	6.27	5/64	5/64	no
38	107		3						35.27	1.388	no			6.53	6.53	6.37	6/64	6/64	no
39	108	1	1	341	145	Unit	21	31	30.51	1.201	no			10.01	8.96	8.77	6/64	6/64	no
40	109	1	1	341	145	Unit	31	41	43.42	1.708	no			7.07	7.30	7.56	5/64	5/64	no
41	110	1	1	341	145	Unit	41	48	18.62	0.732	no			5.80	6.00	6.29	6/64	5/64	yes
42	112	1	1	341	150	Unit	29	39	12.97	0.51	no			6.75	6.67	6.73	5/64	5/64	no
43	113	1	1	341	155	Unit	18	28	25.02	0.985	no			7.58	7.54	7.45	5/64	5/64	no
44	114	1	1	341	155	Unit	28	38	17.95	0.706	no			7.20	7.28	7.30	5/64	5/64	no
45	126	3	1	326	150	Unit	30	40	46.97	1.849	no			8.61	7.90	7.56	5/64	5/64	no
46	126		2						27.55	1.084	no			6.03	6.19	6.26	4/64	4/64	yes
47	126		3						13.24	0.521	no	heat treated small fragment; light green exterior, core and bore hole							
48	129	1	1	326	155	Unit	10	12	28.78	1.133	no			7.96	8.49	9.42	5/64	5/64	no
49	131	1	1	331	150	Unit	29	37	20.86	0.821	no	black residue on the core and exterior of both ends		8.35	8.49	9.95	5/64	5/64	no
50	133	2	1	331	155	Unit	31	39	24.88	0.979	no			7.25	6.94	6.90	5/64	5/64	yes
51	133		2						15.69	0.618	no			6.57	6.73	7.13	4/64	4/64	no
52	135	2	1	336	151	Unit	34	43	44.26	1.742	no			7.33	7.37	7.76	5/64	5/64	no
53	135		2						23.09	0.909	no			6.49	6.45	6.30	4/64	4/64	no
54	136	2	1	336	155	Unit 1x1	22	31	27.65	1.088	no			8.94	9.27	9.90	4/64	4/64	no
55	136		2						26.01	1.024	no			7.55	7.57	7.62	5/64	5/64	no
56	137	2	1	336	155	Unit	31	40	39.62	1.56	no			7.92	8.01	8.03	5/64	5/64	no
57	137		2						28.62	1.126	no			7.52	7.40	7.13	5/64	5/64	no
58	138	1	1	338	150	Unit	25	33	18.91	0.743	no	mouthpiece is rectangular in cross- section		8.47	8.57	8.88	5/64	5/64	yes
59	139	1	1	338	150	Unit	33	34	37.59	1.479	no			8.32	8.09	7.72	5/64	5/64	no
60	140	1	1	344	150	Unit	21	33	12.98	0.511	no	small fragment							
61	142	1	1	335	146.5	Unit	18	26	8.51	0.335	no	small fragment							
62	146	1	1	337	146.5	Unit	29	36	10.93	0.43	no			7.96	7.90	8.05	4/64	4/64	no
63	149	2	1	337	150	Unit	31	41	45.77	1.802	no			7.76	7.43	7.00	5/64	5/64	no
64	149		2						33.86	1.333	no			7.74	7.52	6.92	6/64	6/64	yes
65	154	1	1	332	150	Unit	27	37	38.54	1.517	no			7.26	7.42	7.46	4/64	4/64	no

Appendix A-1: Mount Pleasant Site Pipe Stem Data

ID#	Cat #	Qty	Frag #	North	East	STP/Unit/ Fea	Depth Low (cm)	Depth High (cm)	Mea (mm)	Mea (in)	Design?	Description	Notes	Max Diam end #1 (mm)	Max Mdpt Diam (mm)	Max Diam end #2 (mm)	Max Diam Bore hole end #1	Max Diam Bore hole end #2	Mthpc
66	155	2	1	332	150	Unit	37	40	23.66	0.931	yes	motif is with 2 circles with single dots in center and 2 dots vertical to one side of circles		6.76	6.45	6.33	5/64	5/64	yes
67	155		2						35.63	1.301	no	black residue on the core and exterior of both ends		8.41	8.23	7.95	5/64	5/64	no
68	160	2	1	334	149	Unit	7	17	37.46	1.474	no	white/gray exterior with some black residue; gray core near bore hole		8.39	8.70	8.96	5/64	5/64	no
69	160		2						10.72	0.422	no			8.76	8.94	9.41	5/64	5/64	no
70	164	2	1	334	150	Unit	22	26	45.53	1.792	no			7.98	7.48	7.43	5/64	5/64	yes
71	164		2						21.73	0.855	no			7.57	7.74	7.83	5/64	5/64	yes
72	169	2	1	334	152	Unit	17	25	27.25	1.073	no	black residue on exterior of one end		9.33	9.10	8.93	5/64	5/64	no
73	169		2						20.39	0.802	no	half a stem fragment; fractured vertically along shaft		7.59	7.49	7.30			
74	170	1	1	334	152	Unit	25	35	23.03	0.906	no			9.45	9.96	10.26	5/64	5/64	yes
75	173	2	1	335	149	Unit	13	23	14.64	0.576	yes	junction of stem and bowl; includes a flattened spur; design is parallel rib lines around stem		8.68	9.04		5/64	5/64	no
76	173		2						15.11	0.595	no			6.33	6.26	6.18	5/64	5/64	no
77	175	3	1	335	150	Unit	26	31	36.3	1.44	no			7.80	7.90	8.35	5/64	5/64	no
78	175		2						23.39	0.92	no			6.92	6.90	7.06	4/64	4/64	yes
79	175		3						24.44	0.961	no			6.30	6.53	6.98	4/64	4/64	no
80	178	2	1	335	151	Unit	29	39	35.91	1.412	no			9.37	9.17	8.86	5/64	5/64	no
81	178		2						28.51	1.122	no	junction of the stem and bowl		8.24	8.57	14.96	5/64	5/64	no
82	179	2	1	335	151	Unit	39	40	26.1	1.027	no			6.52	6.76	7.01	5/64	5/64	no
83	179		2						25.94	1.02	yes	junction of the stem and bowl; geometric, horizontal, parallel lines on stem leading up to bowl		8.56	8.98	12.60	4/64	4/64	no
84	181	1	1	335	152	Unit	2	9	18.44	0.725	yes	motif with 5 dots in "x" pattern divided by a single line; "x" pattern appears 5 times		7.49	7.26	7.15	6/64	6/64	yes
85	182	3	1	335	152	Unit	9	19	31.82	1.252	no			9.02	8.47	8.05	5/64	5/64	yes
86	182		2						29.77	1.171	no			7.58	7.66	8.14	5/64	5/64	no
87	182		3						25.29	0.995	no	one-third of fragment; fractured vertically along shaft		7.25	7.30	7.26	4/64	4/64	yes
88	185	1	1	335	153	Unit	3	11	24.27	0.995	no			7.64	7.70	8.03	6/64	6/64	no
89	186	5	1	335	153	Unit	11	21	35.35	1.392	no			7.25	7.17	6.96	5/64	5/64	yes

Appendix A-1: Mount Pleasant Site Pipe Stem Data

ID#	Cat #	Qty	Frag #	North	East	STP/Unit/ Fea	Depth Low (cm)	Depth High (cm)	Mea (mm)	Mea (in)	Design?	Description	Notes	Max Diam end #1 (mm)	Max Mdpt Diam (mm)	Max Diam end #2 (mm)	Max Diam Bore hole end #1	Max Diam Bore hole end #2	Mthpc
90	186		2						30.21	1.189	no			8.48	8.50	8.67	4/64	4/64	no
91	186		3						20.53	0.807	no	includes the elbow leading to the bowl		7.88	8.48	12.43	5/64	5/64	no
92	186		4						20.41	0.803	no			7.69	7.63	7.42	5/64	5/64	no
93	186		5						11.41	0.448	no			7.96	7.62	7.74	4/64	4/64	no
94	193	1	1	336	148	Unit	6	7	32.5	1.279	no			7.18	7.46	7.80	5/64	5/64	no
95	195	1	1	336	149	Unit	20	30	29.89	1.169	no			7.59	7.45	7.58	5/64	5/64	no
96	198	1	1	336	151	Unit	43	47	31.08	1.223	no	includes the elbow leading to the bowl		9.57	9.71	10.38	5/64	5/64	no
97	200	2	1	336	152	Unit	16	27	38.67	1.522	no			7.45	7.68	7.99	5/64	5/64	no
98	200		2						27.5	1.083	yes	motif of 3 dot pattern with single lines that separate dots; motif goes around stem		8.00	7.88	7.34	5/64	5/64	no
99	201	1	1	336	152	Unit	27	30	29.16	1.147	no			7.86	7.80	7.63	4/64	4/64	no
100	204	4	1	336	153	Unit	14	24	38.06	1.498	no			7.58	7.82	8.05	5/64	5/64	no
101	204								25.69	1.01	no			7.98	8.47	8.69	6/64	6/64	no
102	204								23.6	0.928	no			7.35	7.20	7.09	5/64	5/64	no
103	204								20.52	0.808	no	fragment is small in diameter		5.52	5.63	5.59	6/64	6/64	no
104	206	1	1	336	154	Unit	16	25	10.58	0.416	yes	junction of stem and bowl with a spur; vertical ribs on exterior of bowl, fade and become horizontal at the stem		9.75			5/64	5/64	no
105	205	1	1	336	153	Unit	24	30	30.65	1.206	no	fragment is small in diameter		5.91	5.59	5.51	5/64	5/64	yes
106	207	4	1	336	154	Unit	25	35	36.65	1.443	no			7.21	7.39	7.41	5/64	5/64	no
107	207		2						24	0.944	no			8.11	8.53	8.72	4/64	4/64	no
108	207		3						21.14	0.832	no			6.86	6.95	7.20	5/64	5/64	no
109	207		4						10.2	0.401	no	half a stem fragment; fractured vertically along shaft							
110	210	3	1	337	148	Unit	20	21	22.22	0.874	yes	2 dot motifs separated by a single horizontal line; dots in a single line under motifs that connect to vertical ribs		7.80	8.16	8.63	5/64	5/64	no
111	210		2						29.86	1.175	no			8.60	8.58	8.53	5/64	5/64	no
112	210		3						27.26	1.073	no			7.40	7.36	7.21	4/64	4/64	no
113	212	3	1	337	149	Unit	26	36	28.79	1.132	yes	2 motifs of a single line of 3 dots; one motif has 2 "x's" above dots		7.49	6.83	6.70	5/64	5/64	no
114	212		2						25.75	1.013	no			7.33	7.47	7.88	6/64	6/64	no
115	212		3						23.42	0.922	no			9.00	8.77	8.53	6/64	6/64	no

Appendix A-1: Mount Pleasant Site Pipe Stem Data

ID#	Cat #	Qty	Frag #	North	East	STP/Unit/ Fea	Depth Low (cm)	Depth High (cm)	Mea (mm)	Mea (in)	Design?	Description	Notes	Max Diam end #1 (mm)	Max Mdpt Diam (mm)	Max Diam end #2 (mm)	Max Diam Bore hole end #1	Max Diam Bore hole end #2	Mthpc
116	213	1	1	337	150	Unit	31	41	12.89	0.507	no	half a stem fragment; fractured vertically along shaft							
117	215	5	1	337	152	Unit	17	27	44.34	1.745	no			6.90	6.65	6.32	4/64	4/64	no
118	215		2						35.68	1.405	yes	alternating panels of motifs by single horizontal ribs; small vertical lines and circles with dots inside		7.32	7.36	7.55	5/64	5/64	no
119	215		3						29.26	1.152	yes	alternating panels of motifs by single horizontal ribs; 5 dots and circles with dots inside		7.56	7.99	8.30	6/64	6/64	no
120	215		4						15.6	0.614	no	white exterior and gray bore hole		8.92	9.20	9.78	4/64	4/64	no
121	215		5						12.04	0.474	no	white exterior and light gray core		6.15	6.18	6.21	5/64	5/64	no
122	216	1	1	337	152	Unit	27	33	28.09	1.105	no			8.10	8.17	8.24	5/64	5/64	no
123	218	1	1	337	153	Unit	13	22	27.66	1.089	no	fragment is curved		9.34	9.72	11.27	4/64	4/64	no
124	219	5	1	337	153	Unit	22	32	27.9	1.098	no	white exterior and gray core		7.81	8.02	8.24	6/64	6/64	no
125	219		2						28.66	1.128	no			8.85	9.39	10.43	4/64	4/64	no
126	219		3						17.04	0.67	no	mouthpiece is a ball		6.97	5.59	5.84	6/64	5/64	yes
127	219		4						15.93	0.628	no	half a stem fragment; fractured vertically along shaft							
128	219		5						12.86	0.506	no	half a stem fragment; fractured vertically along shaft							
129	220	2	1	337	153	Unit	32	38	35.62	1.402	no			8.77	8.73	8.72	5/64	5/64	no
130	220		2						16.58	0.652	no			6.72	6.75	6.78	4/64	4/64	no
131	221	1	1	337	154	Unit	23	29	22.99	0.905	no			9.63	9.60	9.57	5/64	5/64	no
132	222	6	1	337	154	Unit	29	40	25.76	1.013	no			6.62	6.50	6.31	5/64	5/64	no
133	222		2						26.59	1.046	no	stem has 3 bore holes, an error in manufacture		11.10	10.33	9.96	5/64	5/64	no
134	222		3						21.04	0.827	no			7.47	7.69	7.77	5/64	5/64	no
135	222		4						17.32	0.682	no			8.36	8.27	8.20	4/64	4/64	no
136	222		5						16.94	0.666	no			8.70	8.73	8.81	4/64	4/64	no
137	222		6						12.94	0.509	no	half a stem fragment; fractured vertically along shaft							no
138	226	1	1	338	148	Unit	18	29	33.46	1.317	no	white exterior and black core		8.15	8.22	8.25	5/64	5/64	no
139	228	2	1	338	149	Unit	30	39	31.13	1.225	no			5.51	5.53	5.17	6/64	6/64	yes
140	228		2						9.04	0.356	no			7.63	7.61	7.57	4/64	4/64	no
141	231	4	1	338	152	Unit	22	32	31.3	1.232	no	portion of the stem was broken/sliced off in 2 layers		8.00	7.75	7.28	5/64	5/64	no

Appendix A-1: Mount Pleasant Site Pipe Stem Data

ID#	Cat #	Qty	Frag #	North	East	STP/Unit/ Fea	Depth Low (cm)	Depth High (cm)	Mea (mm)	Mea (in)	Design?	Description	Notes	Max Diam end #1 (mm)	Max Mdpt Diam (mm)	Max Diam end #2 (mm)	Max Diam Bore hole end #1	Max Diam Bore hole end #2	Mthpc
142	231		2						29.07	1.144	no			8.06	7.94	7.80	5/64	5/64	yes
143	231		3						25.74	1.013	no			7.52	7.48	7.93	5/64	5/64	no
144	231		4						18.84	0.741	no			8.70	8.76	8.82	5/64	5/64	no
145	232	4	1	338	152	Unit	32	36	20.24	0.796	no	half a stem fragment; fractured vertically along shaft; white exterior and gray core							
146	232		2						19.25	0.756	no			7.18	7.46	7.52	4/64	4/64	no
147	232		3						18.01	0.708	no	one-third of fragment end has broken off		7.47	7.43	7.27	5/64	5/64	no
148	232		4						15.18	0.597	no	half a stem fragment; fractured vertically along shaft							
149	235	4	1	338	153	Unit	30	40	36.12	1.422	no	junction of the stem and bowl with spur		8.81	9.26	11.00	4/64	4/64	no
150	235		2						27.86	1.096	no			7.22	7.50	7.85	5/64	5/64	no
151	235		3						28.34	1.116	no	white exterior, black core and black residue on the exterior edge of one end		7.50	7.09	6.82	6/64	6/64	no
152	235		4						11.88	0.467	no			6.83	6.79	6.73	5/64	5/64	no
153	236	1	1	338	153	Unit	40	42	23.26	0.915	no			7.83	7.74	7.58	4/64	4/64	no
154	239	3	1	339	146	Unit	7	19	32.29	1.271	no			8.52	8.85	9.21	5/64	5/64	no
155	239		2						29.1	1.145	no			6.97	7.18	7.30	5/64	5/64	no
156	239		3						17.52	0.69	no			8.78	8.80	8.83	5/64	5/64	no
157	245	1	1	339	150	Unit	13	22	27.74	1.092	no			6.41	6.47	6.70	4/64	4/64	no
158	247	2	1	339	151	Unit	16	26	21.32	0.839	no	yellow exterior and interior		6.26	6.47	6.41	4/64	4/64	no
159	247		2						12.02	0.473	yes	junction of stem and bowl; motif is horizontal ribs on the stem and curve vertically leading up the bowl				10.00	5/64	5/64	no
160	248	1	1	339	152	Unit	21	27	33.86	1.333	yes	horizontal ribs cover one-third of the fragment, one vertical band, band of single line of dots, 3 horizontal bands of single line circles, one vertical band of single line of dots		7.53	7.48	8.80	5/64	5/64	no
161	249	2	1	339	152	Unit	27	37	29.69	1.169	no			7.11	6.56	6.12	5/64	5/64	yes
162	249		2						26.87	1.058	no			8.92	8.97	9.05	5/64	5/64	no
163	260	3	1	340	152	Unit	8	17	23.66	0.931	no			7.77	7.55	7.76	5/64	5/64	no
164	260		2						15.07	0.593	no			5.86	6.00	6.24	5/64	5/64	yes
165	260		3						12.68	0.499	no	white exterior and light gray core		5.89	5.90	6.03	6/64	6/64	no

Appendix A-1: Mount Pleasant Site Pipe Stem Data

ID#	Cat #	Qty	Frag #	North	East	STP/Unit/ Fea	Depth Low (cm)	Depth High (cm)	Mea (mm)	Mea (in)	Design?	Description	Notes	Max Diam end #1 (mm)	Max Mdpt Diam (mm)	Max Diam end #2 (mm)	Max Diam Bore hole end #1	Max Diam Bore hole end #2	Mthpc
166	263	1	1	340	153	Unit	16	26	12.99	0.51	no			7.47	7.48	7.57	5/64	5/64	no
167	264	1	1	340	153	Unit	26	28	24.75	0.974	no			7.13	6.83	6.62	5/64	5/64	no
168	268	2	1	345	154	Unit	39	44	34.47	1.357	no			8.60	8.97	11.96	5/64	5/64	no
169	268		2						11	0.433	no			9.09	8.69	8.38	6/64	6/64	no
170	269	1	1			Fea 16 S1/2	30	35	15.38	0.605	no			7.03	7.09	7.12	6/64	6/64	no
171	276	1	1			Fea 16 N	38	43	19.16	0.754	no	white exterior and gray core		7.21	6.90	6.67	6/64	6/64	no
172	284	1	1	337	151	Unit	14	24	25.97	1.022	no	fragment is small in diameter		4.53	5.18	5.47	5/64	5/64	yes
173	286	1	1	336	147	Unit	23	32	22.29	0.877	yes	motif of 5 dots, separated by one vertical band and repeats 3 times		7.29	7.09	6.96	5/64	5/64	no
174	290	3	1	338	151	Unit	18	23	26.38	1.037	no			7.72	7.96	10.44	4/64	4/64	no
175	290		2						17.57	0.691	no			7.72	7.92	8.00	6/64	6/64	no
176	290		3						13.97	0.55	no			8.21	8.09	7.97	4/64	4/64	no
177	291	2	1	338	151	Unit	23	30	18.45	0.725	no	half a stem fragment; fractured vertically along shaft							
178	291		1						7.09	0.279	no	junction of stem and bowl; small part of stem and base of bowl		10.62			5/64	5/64	no
179	293	1	1	338	147	Unit	44	54	38.53	1.517	no			9.19	8.88	8.71	4/64	4/64	no
180	296	1	1	337	143	Unit	10	20	37.66	1.482	no			9.56	10.29	14.46	5/64	5/64	no
181	299	1	1	337	144	Unit	18	21	14.15	0.557	no	half a stem fragment; fractured vertically along shaft							
182	300	3	1	337	144	Unit	21	36	35.08	1.381	no			7.37	7.59	7.40	5/64	5/64	no
183	300		2						14.12	0.556	no			8.46	8.39	8.30	5/64	5/64	no
184	300		3						9.46	0.372	no	one-fourth of a stem fragment; fractured vertically along shaft							
185	309	1	1	338	144	Unit	42	44	25.42	1	no			7.82	7.91	8.12	6/64	6/64	no
186	*312	1	1	339	147	Unit	13	23											
187	314	3	1	339	149	Unit	29	39	34.35	1.352	no			7.74	8.07	8.33	5/64	5/64	no
188	314		2						29.86	1.174	no			7.09	7.14	7.26	4/64	4/64	no
189	314		3						23.98	0.944	no			7.44	7.22	7.18	5/64	5/64	no
190	317	1	1	342	146	Unit	38	48	21.14	0.832	no			5.86	5.85	5.83	5/64	5/64	no
191	321	1	1	345	155	Unit	33	43	11.93	0.469	no	white exterior and gray core		6.83	6.66	6.60	5/64	5/64	no
192	324	3	1	346	154	Unit	29	39	27.52	1.083	no			6.37	6.51	6.82	5/64	5/64	no

Appendix A-1: Mount Pleasant Site Pipe Stem Data

ID#	Cat #	Qty	Frag #	North	East	STP/Uni/ Fea	Depth Low (cm)	Depth High (cm)	Mea (mm)	Mea (in)	Design?	Description	Notes	Max Diam end #1 (mm)	Max Mdpt Diam (mm)	Max Diam end #2 (mm)	Max Diam Bore hole end #1	Max Diam Bore hole end #2	Mthpc
219	376		3						3.51	0.138	no								
220	378	1	1			Fea 9, Block A	63	68	11.43	0.45	no								
221	379	1	1			Fea 9, Block A	63	68	26.81	1.055	no			5.92	6.41	6.42	4/64	5/64	yes
222	393	1	1			Fea 9, Block B	31	37	33.18	1.306	no			8.57	8.45	8.20	5/64	5/64	no
223	396	1	1			Fea 9, Block B	37	43	50.97	2.006	no	one end has a portion that was broken off		7.47	7.63	8.04	5/64	5/64	no
224	399	1	1			Fea 9, Block B	43	49	44.27	1.743	no			7.98	7.68	7.58	5/64	5/64	no
225	402	1	1			Fea 9, Block B	49	55	11.94	0.47	no	half a stem fragment; fractured vertically along shaft							
226	405	5	1			Fea 9, Block B	55	60	73.79	2.905	no			6.68	7.16	7.44	6/64	5/64	no
227	405		2						42.36	1.668	no	2 curved cut lines on exterior		8.88	8.17	7.40	6/64	5/64	no
228	405		3						25.12	0.989	no			7.71	7.57	7.42	5/64	5/64	no
229	405		4						14.33	0.564	no	half a stem fragment; fractured vertically along shaft							
230	405		5						22.84	0.899	no	juncture of stem and back of bowl; top on interior of bowl fragment is brown, bottom is white		9.85			5/64	5/64	no
231	408	3	1			Fea 9, Block B	60	65	33.17	1.306	no			7.69	8.26	8.67	5/64	5/64	no
232	408		2						26.66	1.049	no			6.72	6.75	6.40	5/64	5/64	no
233	408		3						8.3	0.327	no								
234	411	6	1			Fea 9, Block B	65	70	46.78	1.842	no	one deep cut and scrap marks		7.34	7.20	6.94	4/64	4/64	no
235	411		2						39.12	1.54	yes	one embossed square		6.45	6.60	6.56	5/64	5/64	no
236	411		3						32.97	1.298	no	4 incised cut lines		6.41	6.33	5.58	5/64	5/64	yes
237	411		4						31.03	1.221	no	fine cut lines		7.73	7.49	7.42	5/64	5/64	no
238	411		5						22.24	0.875	no	half a stem fragment; fractured vertically along shaft							
239	411		6						19.67	0.774	no	half a stem fragment; fractured vertically along shaft							yes
240	414	3	1			Fea 9, Block B	70	75	49.86	1.963	no	white exterior with brownish-black speckles near mouthpiece		6.26	6.38	6.50	6/64	5/64	yes
241	414		2						13.66	0.538	no			6.87	6.77	6.77	5/64	5/64	no
242	414		3						13.75	0.541	no			6.74	6.61	6.47	5/64	5/64	no

Appendix A-1: Mount Pleasant Site Pipe Stem Data

ID#	Cat #	Qty	Frag #	North	East	STP/Unit/ Fea	Depth Low (cm)	Depth High (cm)	Mea (mm)	Mea (in)	Design?	Description	Notes	Max Diam end #1 (mm)	Max Mdpt Diam (mm)	Max Diam end #2 (mm)	Max Diam Bore hole end #1	Max Diam Bore hole end #2	Mthpc
243	424	1	1			Fea 9, Block C	30	36	18.26	0.718	no			9.01	9.01	8.99	5/64	5/64	no
244	430	2	1			Fea 9, Block C	41	46	49.27	1.939	no			7.98	7.71	7.70	5/64	5/64	no
245	430		2						14.82	0.583	yes	junction of stem and bowl; stem, part of spur and back of bowl; design is vine motif along seam		11.79			4/64	4/64	no
246	433	1	1			Fea 9, Block C	46	51	8.96	0.353	no	junction of stem and back of bowl; brownish black interior of bowl fragment		10.60			5/64	5/64	no
247	436	3	1			Fea 9, Block C	51	56	26.07	1.026	no	white exterior; white core at one end of fragment, dark gray core at the other end		11.95	10.44	9.50	4/64	4/64	no
248	436		2						16.07	0.633	no			6.01	6.24	6.17	5/64	5/64	yes
249	436		3						12.25	0.482	no			8.40	8.28	8.22	5/64	5/64	no
250	440	1	1			Fea 9, Block C	56	61	28.33	1.115	no			7.57	7.31	7.04	5/64	5/64	no
251	441	1	1			Fea 9, Block C	56	61	6.04	0.238	no								
252	443	1	1			Fea 9, Block C	61	66	47.92	1.886	no	white exterior with brown speckle; white core at one end of fragment, light brown core at the other		6.48	7.08	7.36	5/64	5/64	no
253	452	1	1			Fea 9, Block D	28	33	32.45	1.277	no			8.20	8.55	8.56	5/64	5/64	no
254	461	1	1			Fea 9, Block D	43	48	22.64	0.891	no			7.46	7.64	7.49	4/64	4/64	no
255	466	1	1			Fea 9, Block D	48	53	23.24	0.914	no	white/gray exterior and black core		7.48	7.32	7.10	5/64	5/64	no
256	467	1	1			Fea 9, Block D	53	58	19.31	0.76	no			6.67	6.49	6.45	4/64	4/64	no
257	476	1	1			Fea 9, Block D	28	33	37.1	1.46	no	white exterior with brown speckles		6.38	6.04	5.49	4/64	4/64	yes
258	479	1	1			Fea 9, Block E	33	38	13.03	0.513	no	half a stem fragment; fractured vertically along shaft							
259	485	1	1			Fea 9, Block E	48	53	35.68	1.404	no			7.32	7.44	7.58	4/64	4/64	no
260	498	1	1			Fea 9, Block E	68	73	12.02	0.473	no	half a stem fragment; fractured vertically along shaft							
261	502	2	1			Fea 9, Block F	28	33	44.25	1.742	no			7.64	8.33	8.87	5/64	6/64	no
262	502		2						22.56	0.888	no			6.72	6.51	6.56	5/64	5/64	no

Appendix A-1: Mount Pleasant Site Pipe Stem Data

ID#	Cat #	Qty	Frag #	North	East	STP/Unit/ Fea	Depth Low (cm)	Depth High (cm)	Mea (mm)	Mea (in)	Design?	Description	Notes	Max Diam end #1 (mm)	Max Mdpt Diam (mm)	Max Diam end #2 (mm)	Max Diam Bore hole end #1	Max Diam Bore hole end #2	Mthpc
263	528	1	1			Fea 23	46	51	19.7	0.775	no	white/gray exterior and core; thermally altered; half a stem fragment; fractured vertically along shaft		8.53	8.74	9.02	4/64	4/64	
264	539	1	1			Fea 23	69	74	77.12	3.036	no	white and brown speckled exterior		8.66	7.58	7.38	5/64	5/64	no
265	552	1	1			Fea 23	71	76	56.38	2.22	no			6.91	6.64	6.42	5/64	5/64	no
266	572	3	1	340	154		18	28	34.17	1.345	no	light brown exterior and core; seam is brown		7.80	7.76	7.71	5/64	5/64	no
267	572		2						22.44	0.883	no	light brown exterior and core; exterior also with black speckles		5.92	6.00	6.12	5/64	5/64	no
268	572		3						17.68	0.696	no	white exterior and light brown core		7.33	7.25	7.20	5/64	5/64	no
269	573	3	1	340	154		28	33	13.35	0.525	no	white exterior and brown core		7.02	7.13	7.29	5/64	5/64	no
270	576	2	1	341	152		16	26	46.2	1.819	no			6.89	6.66	6.57	5/64	5/64	no
271	576		2						15.77	0.62	no	white exterior and light brown core		7.32	7.23	6.97	6/64	6/64	no
272	577	2	1	341	152		26	29	42.82	1.686	no	light brown seam		6.94	7.36	7.79	5/64	5/64	no
273	577		2						20.61	0.811	yes	motif is panels of 4 or 5 dots separated by horizontal lines; portion of the stem and bore hole broken off		7.53	7.20	7.57	5/64	5/64	no
274	601	1	1			Fea 12 NW1/4	42	44	42.63	1.678	no			7.36	7.23	7.01	5/64	5/64	no
275	603	1	1			Fea 12 SE1/4	52	57	27.55	1.084	no	one deep vertical cut and many horizontal cut lines		7.20	7.31	7.47	5/64	5/64	no
276	623.1	1	1			Fea 12	65	70	91.21	3.591	no	white exterior; fragment includes stem, spur and bowl; interior of bowl is brown		7.13	7.21	9.70	5/64	5/64	no
277	634	1	1			Fea 12 SE1/4	73	76	47.83	1.883	no	white exterior with black residue and gray core		7.58	7.91	8.49	5/64	5/64	no
278	644	1	1	327	144		24	34	20.86	0.821	no			6.64	6.72	6.56	5/64	4/64	no
279	649	1	1	328	143		39	44	15.18	0.597	no	half a stem fragment; fractured vertically along shaft							
280	650	1	1	328	144		15	23	34.31	1.35	no	gray core around bore hole		7.88	8.28	8.43	5/64	5/64	no
281	651	2	1	328	144		23	32	29.14	1.147	no	juncture of stem and back of bowl		7.96	8.72	10.08	4/64	4/64	no

Appendix A-1: Mount Pleasant Site Pipe Stem Data

ID#	Cat #	Qty	Frag #	North	East	STP/Unit/ Fea	Depth Low (cm)	Depth High (cm)	Mea (mm)	Mea (in)	Design?	Description	Notes	Max Diam end #1 (mm)	Max Mdpt Diam (mm)	Max Diam end #2 (mm)	Max Diam Bore hole end #1	Max Diam Bore hole end #2	Mthpc	
282	651		2						12.35	0.486	no	brown residue on exterior		7.54	7.60	7.80	5/64	5/64	no	
283	656	1	1	329	143		39	45	15.21	0.599	no	fragment is small in diameter								
284	661	1	1	330	143		23	33	14.91	0.586	no			7.24	7.28	7.32	5/64	5/64	no	
285	667	4	1	338	146		37	47	39.95	1.573	no	light brown exterior and core		7.76	7.89	7.54	5/64	5/64	no	
286	667		2	338	146				16.34	0.663	no			8.46	8.47	8.53	5/64	5/64	no	
287	667		3						14.81	0.583	no	half a stem fragment; fractured vertically along shaft								no
288	667		4						13.43	0.528	no			8.55	8.55	8.61	5/64	5/64	no	
289	668	1	1	338	146		47	51	14.49	0.57	no	white exterior and black core		7.93	8.15	8.27	5/64	5/64	no	
290	671	1	1	340	148		34	41	10.47	0.412	no	fragment includes the stem, spur and bottom portion of the bowl		11.43			5/64	5/64	no	
291	675	2	1	340	150		20	28	34.21	1.347	no			6.88	7.22	7.57	5/64	5/64	no	
292	675		2						37.85	1.489	yes	juncture of stem and back of bowl; motif is vertical ribs around the bowl and a vertical vine along the seam; there are 3 bore holes, an error in manufacture		8.98	9.63	10.89	5/64	5/64	no	
293	680	1	1	341	148		36	39.5	35.48	1.397	no	white exterior with some brown residue and gray core		8.26	8.30	10.07	5/64	5/64	no	
294	681	1	1	341	149		10	23	22.14	0.871	no			7.74	7.57	7.17	5/64	5/64	no	
295	706	1	1	341	151		13	23	36.29	1.428	no	narrow portion of the stem has broken off		7.28	7.10	7.04	4/64	4/64	no	
296	710	1	1	341	153		22	32	24.62	0.969	no			7.85	7.92	7.98	6/64	6/64	no	
297	711	1	1	341	153		32	38	13.36	0.526	no	half a stem fragment; fractured vertically along shaft								
298	713	1	1	341	154		24	34	25.5	1.004	no	portion of the stem has broken off; 2 possible seams on stem		9.33	9.41	9.54	5/64	5/64	no	
299	716	4	1	342	153		29	39	45.43	1.788	no			8.87	9.19	8.91	5/64	5/64	no	
300	716		2						29.63	1.166	no			7.12	7.10	6.97	5/64	5/64	no	
301	716		3						27.01	1.063	no	white exterior with brown residue and gray core		7.15	7.27	7.64	5/64	5/64	no	
302	716		4						25.27	0.995	no	white exterior with gray streak and gray core		7.20	7.10	7.10	5/64	5/64	no	
303	720	1	1	342	154		42	47	24.47	0.963	no			8.42	8.38	8.34	4/64	4/64	no	
304	733	1	1	331	138		44	49	19.94	0.785	no			7.09	7.20	7.26	5/64	5/64	no	

Appendix A-1: Mount Pleasant Site Pipe Stem Data

ID#	Cat #	Qty	Frag #	North	East	STP/Unit/ Fea	Depth Low (cm)	Depth High (cm)	Mea (mm)	Mea (in)	Design?	Description	Notes	Max Diam end #1 (mm)	Max Mdpt Diam (mm)	Max Diam end #2 (mm)	Max Diam Bore hole end #1	Max Diam Bore hole end #2	Mthpc
305	738	1	1	332	145		24	30	22.86	0.9	no	light brown exterior and core; core also has brown residue		6.35	6.40	6.40	4/64	4/64	no
306	742	3	1	333	143		37	41	22.23	0.875	no			5.72	5.82	6.03	4/64	4/64	no
307	742		2						20.13	0.792	no	white exterior with some gray residue		6.92	7.76	6.85	5/64	5/64	no
308	742		3						17.22	0.678	no			6.98	7.07	7.26	4/64	4/64	no
309	784	1	1	345	140	Unit	27	37	29.62	1.166	no			7.23	7.51	7.53	5/64	5/64	no
310	795	1	1	346	147	Unit	42	56	26.27	1.034	no			7.86	8.14	8.27	5/64	5/64	no
311	796	1	1	347	149	Unit	18	28	36.64	1.442	no			8.32	8.06	7.90	5/64	5/64	no
312	801	1	1	350	148	Unit	27	37	28.6	1.126	yes	fragment includes stem, spur and bottom portion of the bowl; white exterior, gray core and black around bore hole; motif is ribs at the elbow leading up to the bowl		7.05	8.49	9.88	5/64	5/64	no
313	802	1	1	350	148	Unit	37	47	18.39	0.724	no			6.41	6.44	6.40	4/64	4/64	no
314	864	3	1	328	152	Unit	33	45	38.79	1.527	no	oval-shaped portion of the stem is missing		7.70	7.52	7.50	4/64	4/64	no
315	864		2						21.31	0.839	no	half a stem fragment; fractured vertically along shaft		8.22	8.25	8.23			no
316	864		3						18.12	0.713	no	gray core around bore holes		10.47	9.88	9.12	5/64	5/64	no
317	867	6	1	329	152	Unit	27	37	49.79	1.96	no			9.49	8.43	8.23	5/64	5/64	no
318	867		2						33.36	1.313	no	fragment includes stem, spur and bottom portion of the bowl		9.76	9.96	11.41	4/64	5/64	no
319	867		3						19.39	0.763	no	gray core around bore holes		7.73	7.71	7.37	6/64	6/64	no
320	867		4						18.74	0.737	no			6.46	6.50	6.53	4/64	4/64	no
321	867		5						20.17	0.794	no	half a stem fragment; fractured vertically along shaft					5/64	5/64	
322	867		6						13.69	0.539	no	gray core around bore holes		8.77	8.58	8.46	4/64	4/64	no
323	870	3	1	330	152	Unit	38	40	27.56	1.085	no			7.90	8.09	8.43	4/64	4/64	no
324	870		2						17.92	0.705	no			6.77	6.55	6.48	5/64	5/64	no
325	870	3	3	330	152	Unit			17.52	0.69	no			6.81	6.67	6.57	4/64	4/64	no
326	874	1	1	330	153	Unit	36	45	28.97	1.14	no			8.15	8.22	7.99	5/64	5/64	no
327	875	2	1	330	153	Unit	45	49	24.2	0.952	no	light gray exterior with black residue and gray core		8.35	8.20	8.03	4/64	4/64	no
328	875		2						13.63	0.536	no	white exterior and dark gray core		8.80	8.43	8.22	5/64	5/64	no

Appendix A-1: Mount Pleasant Site Pipe Stem Data

ID#	Cat #	Qty	Frag #	North	East	STP/Unit/ Fea	Depth Low (cm)	Depth High (cm)	Mea (mm)	Mea (in)	Design?	Description	Notes	Max Diam end #1 (mm)	Max Mdpt Diam (mm)	Max Diam end #2 (mm)	Max Diam Bore hole end #1	Max Diam Bore hole end #2	Mthpc
329	881	1	1	339	144	Unit	46	33	14.23	0.56	no	half a stem fragment; fractured vertically along shaft							
330	884	1	1	340	145	Unit	24	34	18.42	0.725	no			7.03	6.96	6.82	5/64	5/64	no
331	885	4	1	340	145	Unit	34	41	23.25	0.915	no	some portions of black residue on the core		6.76	7.11	7.41	5/64	5/64	no
332	885		2						21.25	0.836	no			8.58	8.39	8.23	5/64	5/64	no
333	885		3						18.55	0.73	no	white exterior and one end has a black core and rim		8.09	8.18	8.13	5/64	5/64	no
334	885		4						15.92	0.627	no	half a stem fragment; fractured vertically along shaft							
335	889	1	1	340	146	Unit	16	23	20.83	0.82	no	half a stem fragment; fractured vertically along shaft							
336	891	2	1	340	144	Unit	22	32	26.41	1.039	no			6.94	7.32	7.43	4/64	4/64	no
337	891		2						21.71	0.854	no			6.73	6.84	6.96	5/64	5/64	no
338	916	2	1	322	144	Unit	31	41	21.8	0.858	no			5.86	6.04	6.13	5/64	5/64	no
339	916		2						40.49	1.594	no			5.34	5.54	5.80	5/64	5/64	no
340	939	4	1	323	147	Unit	35	45	28.6	1.126	no			7.32	7.56	7.88	5/64	5/64	no
341	939		2						27.65	1.088	no			8.00	7.98	7.91	5/64	5/64	no
342	939		3						25.84	1.017	no			7.03	7.20	7.17	5/64	5/64	no
343	939		4						22.65	0.891	no			7.97	7.52	7.00	5/64	5/64	no
344	948	1	1	324	145	Unit	15	25	23.47	0.924	no			6.93	7.05	7.15	5/64	4/64	no
345	949	2	1	324	145	Unit	25	34	38.43	1.513	no			6.48	6.74	6.87	5/64	5/64	no
346	949		2						22.48	0.885	no			8.45	8.40	8.34	5/64	5/64	no
347	953	1	1	324	147	Unit	36	46	26.52	1.044	no	light brown exterior and core; small gray portion in the core		11.27	7.67	7.20	5/64	4/64	no
348	954	1	1	324	147	Unit	46	50	28.15	1.108	no	dark gray core		7.83	7.78	7.50	5/64	5/64	no
349	956	1	1	325	143	Unit	23	26	18.16	0.715	no	junction of stem and bottom portion of bowl; fragment is oval in cross-section and includes a spur		8.90	9.47	11.29	5/64	5/64	no
350	959	1	1	325	144	Unit	37		26.22	1.032	no	bore hole is in tact but portions of the stem have broken off		7.62			5/64	5/64	no
351	960	1	1	325	144	Unit	37	46	33.1	1.303	no	white exterior with brown speckles and a gray core		7.79	7.67	7.67	5/64	5/64	no
352	965	1	1	325	146	Unit	22	32	48.59	1.913	no	white exterior with brown speckles		7.64	7.27	7.26	4/64	4/64	no
353	968	2	1	325	147	Unit	32	42	28.04	1.104	yes	motif is 8 panels of flowers, circles and dots, separated by single horizontal lines		7.62	7.32	7.09	5/64	5/64	no

Appendix A-1: Mount Pleasant Site Pipe Stem Data

ID#	Cat #	Qty	Frag #	North	East	STP/Unit/ Fea	Depth Low (cm)	Depth High (cm)	Mea (mm)	Mea (in)	Design?	Description	Notes	Max Diam end #1 (mm)	Max Mdpt Diam (mm)	Max Diam end #2 (mm)	Max Diam Bore hole end #1	Max Diam Bore hole end #2	Mthpc
354	968		2						14.85	0.584	no	white exterior with brown speckles		8.18	8.18	8.09	6/64	6/64	no
355	969	1	1	325	147	Unit	42	51	35.5	1.397	no	crack in the mouthpiece/end of bore hole		6.98	6.70	6.02	5/64	5/64	yes
356	974	1	1	326	145	Unit	12	22	17.76	0.699	no	half a stem fragment; fractured vertically along shaft							
357	975	1	1	326	145	Unit	22	33	29.55	1.163	no	fragment includes 2 seams		8.42	8.63	8.73	5/64	5/64	no
358	980	3	1	326	147	Unit	30	40	17.31	0.681	no	fragment includes stem, spur, portion of bowl; stem is round in cross-section		8.30	8.75	9.90	4/64	4/64	no
359	980		2						28.16	1.108	yes	motif is 2 panels with horizontal embossed lines and patterns of circles and dots		7.65	7.26	6.76	6/64	6/64	no
360	980		3						27.18	1.07	no			7.50	7.70	7.67	5/64	5/64	no
361	984	1	1	327	145	Unit	25	35	37.33	1.469	no	white exterior with some black speckles		7.61	7.54	7.61	5/64	5/64	no
362	989	3	1	327	147	Unit	32	42	42.89	1.688	no	5 scrape marks on exterior		7.67	8.12	8.27	6/64	6/64	no
363	989		2						33.6	1.323	no			6.77	6.37	6.43	5/64	5/64	no
364	989		3						18.95	0.746	no								
365	991	1	1	328	146	Unit	17	27	20.56	0.809	no	white and gray core exterior and core are white with gray residue		12.34	9.53	9.24	5/64	4/64	no
366	992	1	1	328	146	Unit	27	37	20.38	0.802	no								
367	994	1	1	328	147	Unit	29	35	18.91	0.744	no	crack in the mouthpiece/end of bore hole		6.93	7.05	7.05	4/64	4/64	no
368	995	1	1	328	147	Unit	35	45	23.92	0.941	no	white exterior, brown core and gray around bore hold		7.17	7.34	7.18	5/64	5/64	no
369	996	1	1	328	147	Unit	45	48	32.24	1.269	no	white exterior and black core		9.80	9.04	8.84	5/64	5/64	no
370	1022	1	1	321	142	Fea 34	76	81	4.5	0.177	no	junction of stem and back of bowl; white exterior and interior; core is gray and has some black residue		10.53			5/64	5/64	no
371	1029	1	1	321	147	Fea 34	49	54	17.3	0.681	no	fragment is small in diameter		5.32	5.15	4.90	5/64	5/64	no
372	1133	2	1	323	147	Fea 34	51	56	22.8	0.897	no			7.17	7.08	7.31	4/64	4/64	no
373	1133		2						11.96	0.47	no								
374	1135	1	1	323	144	Fea 34	51	56	15.73	0.619	no								
375	1141	1	1	323	144	Fea 34	56	61	37	1.456	no	brownish-red core		9.03	8.99	9.14	5/64	5/64	no

Appendix A-1: Mount Pleasant Site Pipe Stem Data

ID#	Cat #	Qty	Frag #	North	East	STP/Unit/ Fea	Depth Low (cm)	Depth High (cm)	Mea (mm)	Mea (in)	Design?	Description	Notes	Max Diam end #1 (mm)	Max Mdpt Diam (mm)	Max Diam end #2 (mm)	Max Diam Bore hole end #1	Max Diam Bore hole end #2	Mthpc
376	1152	1	1	323	144	Fea 34	67	72	13.69	0.539	no	gray core around bore hole		7.39	7.41	7.35	4/64	4/64	no
377	1168	1	1	323	144	Fea 34	77	82	20.88	0.822	no								
378	1204	2	1	323	146	Fea 34	53	58	25.53	1.005	no	fragment includes stem and base of bowl; core is dark gray		9.06	9.36	10.42	6/64	6/64	no
379	1204		2						32.16	1.266	no	gray core around bore hole		7.61	8.12	8.11	5/64	5/64	no
380	1208	1	1	323	146	Fea 34	48	53	6.25	0.246	no			8.02			5/64	5/64	no
381	1214	1	1	323	146	Fea 34	56	61	14.17	0.558	no								
382	1224	1	1	323	146	Fea 34	63	68	24.02	0.945	no			6.94	6.78	6.24	5/64	5/64	no
383	1247	1	1	323	146	Fea 34	99	104	40.14	1.58	no			6.29	6.52	6.70	5/64	5/64	no
384	1276	1	1	325	144	Fea 34	73	78	12.8	0.504	no	half a stem fragment; fractured vertically along shaft							
385	1305	2	1	325	144	Fea 34	55	60	34.54	1.36	no	white exterior with some gray residue and gray core		7.66	8.08	9.25	5/64	5/64	no
386	1305		2						22.31	0.878	no			7.01	6.81	6.63	5/64	5/64	no
387	1307	1	1	325	144	Fea 34	60	65	32.99	1.299	no			7.68	7.68	8.02	4/64	4/64	no
388	1313	1	1	325	144	Fea 34	75	80	32.05	1.261	no			6.63	6.27	5.59	5/64	5/64	no
389	1355	1	1	325	146	Fea 34	77	82	17.05	0.671	no	half a stem fragment; fractured vertically along shaft							
390	1366	1	1	325	146	Fea 34	84	89	42.51	1.674	no	deep cut mark on exterior		6.34	6.74	7.25	5/64	5/64	no
391	1377	1	1	325	146	Fea 34	107	112	39.76	1.565	no			8.79	8.80	8.91	5/64	5/64	no
392	1411	1	1	327	145	Fea 34	72	77	36.28	1.428	no			7.69	7.73	8.29	5/64	5/64	no
393	1413	1	1	327	145	Fea 34	87	92	15.15	0.926	no	half a stem fragment; fractured vertically along shaft; dark gray portion of gray							
394	1433	1	1	327	146	Fea 34	75	80	23.84	0.938	no			6.94	7.05	7.03	4/64	5/64	no
395	1451	1	1	327	146	Fea 34	90	95	11.64	0.458	no	half a stem fragment; fractured vertically along shaft; gray core around bore hole							
396	1463	1	1	327	146	Fea 34	83	88	21.84	0.86	no	white exterior with 2 large spots of exposed gray core		8.25	8.34	8.81	5/64	5/64	
Max							107.00	112.00	91.21	3.591				12.340	10.440	14.960			
Min							0.00	7.00	3.51	0.138				4.530	5.150	4.900			
Ave							35.56	42.87	25.94	1.022				7.730	7.635	7.785	5/64	5/64	

Appendix A-2: Mount Pleasant Site Pipe Bowl Data

ID#	Cat #	Qty	# in Qty	North	East	STP/Unit/Fea	Design?	Description	Notes
1	22	2	1	335	145	STP	yes	vertical ribs on exterior of bowl fragment	
2	22		2				no	half a bowl fragment	
3	64	1	1	326	144	Unit	no		
4	70	1	1	335	144	Unit	yes	stem and bowl juncture; fragment includes bowl and stem; vertical lines and leaves	
5	71	1	1	335	144	Unit	yes	vertical ribs on exterior of bowl fragment	
6	77	2	1	336	150	Unit	no		
7	77		2				no		
8	79	2	1	336	150	Fea 11	yes	vertical vine of leaves	
9	79		2				no		
10	92	1	1	335	146	Unit	no		
11	99	1	1	336	145	Unit	no	large fragment	
12	102	1	1	337	145	Unit	no	large fragment	
13	111	3	1	341	150	Unit	yes	3 diamond shapes below the rim of bowl	supposed to be 1 stem fragment, there are no stems, supposed to be 2 bowls, there are 3 bowls
14	111		2				no		
15	111		3				no		
16	114	1	1	341	155	Unit	yes	large fragment with 4 vertical ribs	
17	126	3	1	326	150	Unit	no	medium-sized fragment	
18	126		2				no	large fragment; black and gray interior of bowl fragment	
19	126		3				no	small fragment	
20	128	1	1	326	155	Unit	yes	2 vertical ribs separated by 2 dot columns; see Hume 1970	
21	129	1	1	326	155	Unit	no		
22	131	3	1	331	150	Unit	no	medium-sized fragment	supposed to be 2 bowl fragments and 1 stem fragment, there are 3 bowl fragments and 1 stem fragment
23	131		2				no	stem and bowl juncture; is the base of bowl and spur	
24	131		3				yes	criss-cross rib pattern	
25	133	1	1	331	155	Unit	no		
26	135	1	1	336	151	Unit	no		
27	138	3	1	338	150	Unit	no	1 fragment broke into 2 fragments	
28	138		2				no		
29	138		3				no		
30	149	1	1	337	150	Unit	yes	thin vertical ribs on exterior of bowl fragment	
31	164	1	1	334	150	Unit	no	black interior of bowl fragment	
32	182	1	1	335	152	Unit	no	black interior of bowl fragment	
33	185	1	1	335	153	Unit	no		
34	186	3	1	335	153	Unit	yes	vertical ribs on exterior of bowl fragment; black interior of bowl fragment	

Appendix A-2: Mount Pleasant Site Pipe Bowl Data

ID#	Cat #	Qty	# in Qty	North	East	STP/Unit/Fea	Design?	Description	Notes
35	186		2				no		
36	186		3				no		
37	187	1	1	335	153	Unit	no		
38	203	1	1	336	153	Unit	no	black interior of bowl fragment; black edge on rim of the exterior	
39	204	1	1	336	153	Unit	yes	ribs on exterior of bowl fragment	A bowl from cat #204 is missing
40	205	3	1	336	153	Unit	yes	2 vertical ribs and 2 diamonds on exterior of bowl fragment	
41	205		2				no		
42	205		3				no	black interior of bowl fragment	
43	215	2	1	337	152	Unit	yes	2 embossed lines at 90 degree angle; white exterior of bowl fragment, black interior	
44	215		2				no		
45	218	2	1	337	153	Unit	yes	3 ribs on white exterior of bowl fragment	
46	218		2				yes	incised line banding below the rim of bowl fragment; white and brown speckled exterior, black interior	
47	219	2	1	337	153	Unit	yes	2 vertical ribs with single line of dots in between them (11 dots total) on exterior of bowl fragment	
48	219		2				no		
49	225	1	1	338	148	Unit	no		
50	228	1	1	338	149	Unit	no	white and black interior of bowl fragment	
51	231	4	1	338	152	Unit	no		
52	231		2				no		
53	231		3				no	white interior at top half of bowl fragment, black interior at the bottom half	
54	231		4				yes	white exterior with flower motif of bowl fragment; black interior of bowl fragment	
55	245	1	1	339	150	Unit	no		
56	247	1	1	339	151	Unit	yes	white exterior with branch-like motif; white interior at top half of bowl fragment, black interior of bowl fragment	
57	253	2	1	339	153	Unit	no		
58	253		2				no		Supposed to only be 1 fragment
59	260	1	1	340	152	Unit	no	white exterior and black interior of bowl fragment	
60	289	1	1	338	151	Unit	no		
61	290	2	1	338	151	Unit	yes	dentate square pattern at the rim of the exterior of the bowl; light brown interior and exterior of bowl fragment	
62	290		2				yes	Single rib on exterior of bowl fragment	
63	296	1	1	337	143	Unit	no	white exterior and gray core bowl fragment	
64	300	1	1	337	144	Unit	no	white exterior and brown interior of bowl fragment	
65	332	1	1	347	155	Unit	no	junction of stem and bowl; white exterior and interior of bowl fragment; the core is gray; a tall fragment, 41.44 mm, 1.632 in.	

Appendix A-2: Mount Pleasant Site Pipe Bowl Data

ID#	Cat #	Qty	# in Qty	North	East	STP/Unit/Fea	Design?	Description	Notes
66	343	1	1			Fea 25, West H	no		
67	348	1	1			Fea 9, Block A	no		
68	351	1	1			Fea 9, Block A	no		
69	372	4	1			Fea 9, Block A	no	large bowl fragment; white exterior and light gray interior; 29.49 mm tall, 23.41 mm at rim	
70	372		2			Fea 9, Block A	no		
71	372		3			Fea 9, Block A	no	white exterior and brown interior of bowl fragment	
72	372		4			Fea 9, Block A	no	rust brown exterior and black interior of bowl fragment	
73	375	5	1			Fea 9, Block A	no	white exterior, light brown interior at top of bowl fragment, white at the bottom	
74	375		2			Fea 9, Block A	no		
75	375		3			Fea 9, Block A	no	white exterior; brown and white interior of bowl fragment	
76	375		4			Fea 9, Block A	no	white exterior, light brown interior and a portion of core is gray	
77	375		5			Fea 9, Block A	no	large bowl fragment; white exterior with black speckles of bowl fragment	
78	405	1	1			Fea 9, Block B	no	white exterior and brown interior of bowl fragment	
79	411	2	1			Fea 9, Block B	no	white exterior; dark brown interior and rim of bowl fragment	
80	411		2				no	blue-ish white interior of bowl fragment	
81	417	1	1			Fea 9, Block B	no		fragment found in cat# 204 and cat# 417 is not in database
82	421	2	1			Fea 9, Block C	yes	white exterior and interior; exterior has 6 leaves and flower motif; thin black stripe in interior of bowl fragment; fragment broke into 2 fragments	
83	421		2				yes	(see above description)	
84	424	1	1			Fea 9, Block C	no	large fragment	
85	427	1	1			Fea 9, Block C	no		
86	430	3	1			Fea 9, Block C	yes	vine motif on exterior bowl fragment; interior of bowl fragment at the rim is brownish-black	
87	430		2				no	brown exterior and black interior of bowl fragment	
88	430		3				no	light brown exterior of bowl fragment	
89	436	1	1			Fea 9, Block C	no	an oval-shaped piece of slip has cracked off of exterior of bowl fragment	
90	440	2	1			Fea 9, Block C	no	light brown exterior and light gray interior of bowl fragment	
91	440		2				no		
92	443	1	1			Fea 9, Block C	yes	white exterior with black speckles, 2 leaves with 4 vertical ribs of bowl fragment; white interior of bowl fragment, gray and white core	
93	467	1	1			Fea 9, Block D	no	whole bowl fragment, includes a spur at the elbow; white exterior, black interior	
94	473	1	1			Fea 9, Block D	no	white exterior with black at the rim of the bowl fragment; top of interior of bowl is black and the bottom of interior is brown	

Appendix A-2: Mount Pleasant Site Pipe Bowl Data

ID#	Cat #	Qty	# in Qty	North	East	STP/Unit/Fea	Design?	Description	Notes
95	475	1	1			Fea 9, Block D	no	small fragment; white exterior with black at the rim of the bowl fragment; black interior of the bowl	
96	479	2	1			Fea 9, Block E	no	large fragment; top of interior of bowl fragment is gray, the bottom is brownish-black	
97	479		2				no	light green exterior and black interior of bowl fragment	
98	536	1	1			Fea 23	no	large fragment	
99	539	1	1			Fea 23	no		
100	573	2	1	340	154		no	white exterior and black interior of bowl fragment	
101	573		2				no	is a fragment that broke from the larger fragment in bag of cat# 573; white exterior and black interior of bowl fragment	
102	575	1	1	341	152		no	light brown exterior; top of interior of bowl fragment is gray, the bottom is white	
103	576	2	1	341	152		no	white exterior that includes 3 spots of gray where slip is missing and black interior of bowl fragment	
104	576		2				no	white exterior and black interior of bowl fragment	
105	582	1	1			Fea 10	yes	white exterior with vine pattern on seam; top of interior of bowl is brown, white at the bottom	
106	592	3	1			Fea 10	no	fragment is one-half of the bowl; rim of interior of bowl is black, white at the bottom	
107	592		2				no	is a fragment that broke from the larger fragment	
108	592		3				no	light brown exterior; rim of interior of bowl is black, white at the bottom	
109	609	1	1			Fea 12	no	white and gray exterior; white and black interior of bowl fragment with gray core	
110	619	1	1			Fea 12	no	white and gray exterior with deep cut line; black and brown interior of bowl fragment	
111	641	1	1	327	143		no	fragment is one-third of the bowl with the spur	
112	644	3	1	327	144		no		
113	644		2				no	white exterior and interior; interior has some black residue	
114	644		3				no	white exterior and interior; interior has some black residue	
115	648	1	1	328	143		no	yellowish exterior and interior; portions of gray core	
116	649	1	1	328	143		no	interior of bowl fragment has gray residue at the rim	
117	653	1	1	329	142		no	white exterior and black interior of bowl fragment	
118	656	1	1	329	143		no		
119	660	1	1	330	142		no		
120	665	1	1	330	144		no		
121	675	1	1	340	150		no	white exterior with some black residue and white interior	
122	682	3	1	341	149		yes	white exterior with alternating wide and narrow ribs with 3 diagonal ovals; the interior of bowl fragment is one-third black, two-thirds is white	
123	682		2				no		
124	682		3				no		

Appendix A-2: Mount Pleasant Site Pipe Bowl Data

ID#	Cat #	Qty	# in Qty	North	East	STP/Unit/Fea	Design?	Description	Notes
125	699	1	1	329	144	Fea 29	no	white exterior; brown and white interior of bowl fragment; brown core	
126	708	1	1	341	153		yes	white interior and brown-speckled exterior with possible light vertical ribs and 2 embossed oval dots	
127	710	1	1	341	153		yes	grayish-black interior; white exterior with alternating motifs of single line dot pattern and vertical ribs with a vine pattern on the seam	
128	713	1	1	341	154		no	large fragment	
129	714	2	1	341	154		no	large fragment with light gray exterior and black interior; core is white and gray	
130	714		2				yes	white exterior with a corner that has 3 small portions of ribs; black interior of bowl fragment; black and gray core	
131	716	1	1	342	153		no		
132	738	1	1	332	145		no	white exterior and brown interior of bowl fragment	
133	741	1	1	333	143		yes	white exterior has eight, eight-pointed star motif	
134	742	3	1	333	143		no	white exterior and interior; interior has gray residue and some black residue on fractured edges; portions of the core are gray and white	
135	742		2				no	white exterior and black interior of bowl fragment	
136	742		3				no		
137	754	1	1	335	141		no	white exterior and interior of bowl fragment; portions of the core are gray and white	
138	768	1	1	338	140		no	white exterior and interior of bowl fragment; some gray residue on interior bowl edges	
139	870	1	1	330	152	Unit	no	white exterior of bowl fragment; interior rim of bowl is grayish-black and bottom of interior is white	
140	872	1	1	330	152	Unit	no	white exterior and brown interior of bowl fragment	
141	877	1	1	339	145	Unit	yes	white exterior with 5 vertical ribs; white interior of bowl fragment with some black residue	
142	888	1	1	340	146	Unit	no	white exterior with vertical hairline lines and light gray residue at the rim of the exterior and interior of the bowl fragment	
143	889	1	1	340	146	Unit	no	white exterior and interior of bowl fragment with some brown residue	
144	918	1	1	322	145	Unit	no	white exterior and black interior of bowl fragment	
145	919	1	1	322	145	Unit	no	white exterior and interior of bowl fragment with some light gray residue	
146	926	1	1	323	143	Unit	no		
147	939	1	1	323	147	Unit	no	white exterior and interior of bowl fragment with some black residue at the bottom of the bowl interior	
148	949	1	1	324	145	Unit	no	large fragment	
149	969	1	1	325	147	Unit	no	white exterior and black interior of bowl fragment	
150	977	1	1	326	146	Unit	no		

Appendix A-2: Mount Pleasant Site Pipe Bowl Data

ID#	Cat #	Qty	# in Qty	North	East	STP/Unit/Fea	Design?	Description	Notes
151	980	2	1	326	147	Unit	yes	white exterior with a motif of 9 leaves and a dot; interior of bowl fragment is dark brown/black at the top and white at the bottom	
152	980		2				no	white exterior and black residue on the interior of the bowl fragment	
153	984	2	1	327	145	Unit	no	exterior and interior of the bowl fragment are pinkish-peach in color and there are extra clay excretions on the exterior	
154	984		2				no	white exterior and black interior of bowl fragment; portions of the core are gray and white	
155	989	1	1	327	147	Unit	no		
156	995	2	1	328	147	Unit	no	white exterior and interior of bowl fragment; the interior has hairline lines	
157	995		2				yes	white exterior with scroll motif; interior of bowl fragment is white with some black residue on the interior edge	
158	1063	1	1	321	144	Fea 34	no	white exterior with light gray residue on bowl fragment	
159	1144	1	1	323	144	Fea 34	no	light brown exterior and interior; gray core	
160	1161	1	1	323	144	Fea 34	no	small fragment, possibly a bowl fragment; white exterior and interior	
161	1176	1	1	323	144	Fea 34	no	narrow thin fragment	
162	1182	1	1	323	144	Fea 34	no	white exterior and interior of bowl fragment; there are some rust-colored portions of the core	
163	1188	1	1	323	144	Fea 34	no		
164	1195	1	1	323	146	Fea 34	no		
165	1201	1	1	323	146	Fea 34	no	white exterior with black residue on the exterior edge; black interior of the bowl fragment; white core	
166	1219	1	1	323	146	Fea 34	no	large fragment	
167	1311	1	1	325	144	Fea 34	no	large fragment	
168	1317	1	1	325	144	Fea 34	no	white exterior with some gray residue	
169	1320	1	1	325	146	Fea 34	no	white exterior and interior of bowl fragment; interior has brown speckles	
170	1322	2	1	325	146	Fea 34	no	white exterior and core; interior of bowl is white with some gray residue	
171	1322		2				no	light brown exterior and core; dark brown interior	

Appendix A-3: Mount Pleasant Site Stem and Bowl Juncture Data

ID#	Cat #	North	East	STP/Unit/Fea	Depth Low (cm)	Depth High (cm)	Length (mm)	Length (in)	Design	Description	Max Diameter	Bore Diameter	Mthpc
1	22	335	145		0	80	16.18	0.636	no	front of bowl and stem	11.61	6/64	No
2	70	335	144		23	35	14.28	0.562	yes	back of bowl and stem; design is vertical lines and leaves	11.46	6/64	No
3	97	336	145		45	48	24.66	0.971	no	stem and bottom of bowl	10.49	5/64	No
4	131	331	150		29	37			no	front of bowl and spur			No
5	173	335	149		13	23	14.64	0.576	yes	stem and spur; design is parallel horizontal ribs around stem	9.04	5/64	No
6	178	335	151		29	39	28.51	1.122	no	stem and bottom of bowl	14.96	5/64	No
7	179	335	151		39	40	25.94	1.02	yes	stem and bottom of bowl; design is geometric horizontal, parallel lines	12.6	4/64	No
8	206	336	154		16	25	10.58	0.416	yes	small part of stem, spur and bottom of bowl; design is vertical ribs on bowl that become horizontal at the stem	9.75	5/64	No
9	235	338	153		30	40	36.12	1.422	no	stem and spur	11	4/64	No
10	247	339	151		16	26	12.02	0.473	yes	small part of stem and bottom of bowl; design is horizontal ribs on stem and curve vertically up bowl	10	5/64	No
11	291	338	151		23	30	7.09	0.279	no	small part of stem and base of bowl	10.62	5/64	No
12	296	337	143		10	20	37.66	1.482	no	stem and base of bowl	14.46	5/64	No
13	332	347	155		48	58			no	back of bowl and small part of stem		5/64	No
14	369			Fea 9, BI A	48	53	44.44	1.749	no	stem and base of bowl	13.17	5/64	No
15	405			Fea 9, BI B	55	60	22.84	0.899	no	stem and back of bowl	9.85	5/64	No
16	430			Fea 9, BI C	41	46	14.82	0.583	yes	stem, part of spur and back of bowl; design is vine motif along seam	11.79	4/64	No
17	433			Fea 9, BI C	46	51	8.96	0.353	no	part of stem and back of bowl	10.6	5/64	No

Appendix A-3: Mount Pleasant Site Stem and Bowl Juncture Data

ID#	Cat #	North	East	STP/Unit/Fea	Depth Low (cm)	Depth High (cm)	Length (mm)	Length (in)	Design	Description	Max Diameter	Bore Diameter	Mthpc
18	467			Fea 9, BI D	53	58			no	whole bowl, spur and small part of stem	10.09	5/64	No
19	641	327	143		20	30			no	base/side of bowl, spur and bore hole		5/64	No
20	651	328	144		23	32	29.14	1.147	no	stem and back of bowl	10.08	4/64	No
21	671	340	148		34	41	10.47	0.412	no	small part of stem, spur and back of bowl	11.43	5/64	No
22	675	340	150		20	28	37.85	1.489	yes	stem and back of bowl	10.89	5/64	No
23	801	350	148		27	37	28.6	1.126	yes	spur, stem and base of bowl; design is parallel ribs	9.88	5/64	No
24	867	329	152		27	37	33.36	1.313	no	spur, stem and base of bowl	11.41	4/64	No
25	956	325	143		23	26	18.16	0.715	no	spur, stem and base of bowl	11.29	5/64	No
26	980	326	147		30	40	17.31	0.681	no	spur, stem and base of bowl	9.9	4/64	No
27	1022	321	142		76	81	4.5	0.177	no	small part of stem, back of bowl	10.53	5/64	No
28	1204	323	146		53	58	25.53	1.005	no	stem and base of bowl	10.42	6/64	No

Appendix B-1: Experiment 1 Pipe Fragment Data

Frag ID#	Catalog #	Frag #	Name of Participant	Gender	Pipe Length	Breakage Type	Breakage Direction	Breakage Method	Proximity of Hands	Change of Breakage Method	Method Changed to	Fragment Length (mm)	Fragment Length (in)	Proximal End Break Angle	Proximal End Break Pattern One	Proximal End Break Pattern Two	Proximal End Break Pattern Three	Proximal End Pattern-Notes	Distal End Break Angle	Distal End Break Pattern One	Distal End Break Pattern Two	Distal End Break Pattern Three	Distal End Pattern-Notes	Participant Comments	Author Comments
11	1	1	Lauren Roeglin	F	6	1-Intentional	1-Top Down	1-Thumb to thumb	1-Close together	No		21.96	0.864	5-Mouthpiece	3-Mouthpiece				1-Straight	2-Lip Scar	2-Outward Divet	1-Flaking	flaking occurred between lip and lip scar of break 1-2	see #1 catalog sheet	after the entire pipe was broken, she commented how the first fragment only seemed to break because she expected the pipe material to be hard to break
2	1	2	Lauren Roeglin	F	6	1-Intentional	1-Top Down	1-Thumb to thumb	1-Close together	No		32.25	1.27	1-Straight	1-Lip	1-Inward Divet	1-Flaking		1-Straight	2-Lip Scar	2-Outward Divet			commented how it was harder to break closer towards the bowl	on catalog sheet she describes her breaking method one way, but explained it to me in person another way
3	1	3	Lauren Roeglin	F	6	1-Intentional	1-Top Down	1-Thumb to thumb	1-Close together	No		20.43	0.804	1-Straight	1-Lip				1-Straight	2-Lip Scar		1-Flaking	flaking occurred between lip and lip scar break from 3-4		
4	1	4	Lauren Roeglin	F	6	1-Intentional	1-Top Down	1-Thumb to thumb	1-Close together	No		22.51	0.886	1-Straight	1-Lip		1-Flaking		3-Bows-in	2-Lip Scar		1-Flaking	flaking occurred between lip and lip scar break from 4-5		
5	1	5	Lauren Roeglin	F	6	1-Intentional	1-Top Down	1-Thumb to thumb	1-Close together	No		29.62	1.166	4-Bows out	1-Lip		1-Flaking		1-Straight	2-Lip Scar		1-Flaking	flaking occurred between lip and lip scar break from 5-6		
6	1	6	Lauren Roeglin	F	6	3-Stem and Bowl Juncture	6-Stem and Bowl Juncture	10-Stem and Bowl Juncture	4-Stem and Bowl Juncture	3-Stem and Bowl Juncture		10.2	0.401	1-Straight	1-Lip					5-Stem and Bowl Juncture	3-Stem and Bowl Juncture				4 out of the 5 breaks flaking occurred, and all lips and lip scars occurred on the under side of the pipe
7	2	1	Melyssa Huston	F	6	1-Intentional	1-Top Down	2-Hands overlap	1-Close together	No		39.57	1.558	5-Mouthpiece	3-Mouthpiece				1-Straight		2-Outward Divet	1-Flaking	only flaking occurred between break 1-2; no lip or lip scar	see #2 catalog sheet	the stem of the pipe has flattened sides so it would have been easier to hold and break the pipe from the sides; the participant did not make this comment
8	2	2	Melyssa Huston	F	6	1-Intentional	1-Top Down	2-Hands overlap	1-Close together	No		33.64	1.324	1-Straight		1-Inward Divet			3-Bows-in	2-Lip Scar	2-Outward Divet				
9	2	3	Melyssa Huston	F	6	1-Intentional	1-Top Down	2-Hands overlap	1-Close together	No		33.35	1.313	1-Straight	1-Lip				1-Straight	1-Lip					
10	2	4	Melyssa Huston	F	6	3-Stem and Bowl Juncture	6-Stem and Bowl Juncture	10-Stem and Bowl Juncture	4-Stem and Bowl Juncture	3-Stem and Bowl Juncture		28.42	1.119	1-Straight						5-Stem and Bowl Juncture	3-Stem and Bowl Juncture				commented how it was harder to break closer towards the bowl, could not make a break closer to the bowl
11	3	1	Mark Kelly	M	6	1-Intentional	1-Top Down	2-Hands overlap	1-Close together	Yes	moved hands further down the stem	35.06	1.381	5-Mouthpiece	3-Mouthpiece				1-Straight	2-Lip Scar	1-Inward Divet	1-Flaking	slight lip	commented how he had to move his hands further down the stem to get more leverage in order to break the 1st fragment	
12	3	2	Mark Kelly	M	6	1-Intentional	1-Top Down	2-Hands overlap	1-Close together	No		20.76	0.817	2-Slanted	1-Lip	2-Outward Divet			3-Bows-in	2-Lip Scar	1-Inward Divet	1-Flaking			Intentionally made this fragment a shorter one
13	3	3	Mark Kelly	M	6	1-Intentional	1-Top Down	2-Hands overlap	1-Close together	No		33.6	1.322	1-Straight	1-Lip	2-Outward Divet			1-Straight	1-Lip	2-Outward Divet	1-Flaking	straight break with the exception of the lip		Fragment #3 he definitely had to have changed his breakage method because this fragment has a lip on either end of the fragment and could only result from this change
14	3	4	Mark Kelly	M	6	1-Intentional	1-Top Down	2-Hands overlap	1-Close together	No		31.22	1.229	1-Straight	2-Lip Scar	1-Inward Divet		straight break with the exception of the lip scar	1-Straight	1-Lip	2-Outward Divet		straight break with the exception of the lip	frag broke shorter and didn't mean to	
15	3	5	Mark Kelly	M	6	3-Stem and Bowl Juncture	6-Stem and Bowl Juncture	10-Stem and Bowl Juncture	1-Close together	No		15.31	0.603	1-Straight	2-Lip Scar	1-Inward Divet		straight break with the exception of the lip scar	5-Stem and Bowl Juncture	3-Stem and Bowl Juncture					
16	4	1	Melissa Carlson	F	6	1-Intentional	1-Top Down	2-Hands overlap	1-Close together	No		33.26	1.309	5-Mouthpiece	3-Mouthpiece				1-Straight	2-Lip Scar		1-Flaking		see #4 catalog sheet	
17	4	2	Melissa Carlson	F	6	1-Intentional	1-Top Down	2-Hands overlap	1-Close together	No		31.01	1.221	1-Straight	1-Lip		1-Flaking		3-Bows-in	2-Lip Scar	1-Inward Divet		lip scar is very small but is the lip scar as the proximal end of the 3rd fragment is a lip		
18	4	3	Melissa Carlson	F	6	1-Intentional	1-Top Down	2-Hands overlap	1-Close together	No		43.64	1.718	4-Bows-out	1-Lip			very small lip	1-Straight	1-Lip	1-Inward Divet		slight lip scar	commented how this frag was the hardest to break and it was her longest fragment	
19	4	4	Melissa Carlson	F	6	3-Stem and Bowl Juncture	6-Stem and Bowl Juncture	10-Stem and Bowl Juncture	4-Stem and Bowl Juncture	3-Stem and Bowl Juncture		25.08	0.987	1-Straight	1-Lip	2-Outward Divet			slight lip	5-Stem and Bowl Juncture	3-Stem and Bowl Juncture				
20	5	1	Steph Zink	F	6	1-Intentional	1-Top Down	3-Thumb on top parallel to stem	2-Hands apart	No		28.16	1.108	5-Mouthpiece	3-Mouthpiece				1-Straight	2-Lip Scar	1-Inward Divet	1-Flaking	small lip scar; flaking occurred between break 1-2	see #5 catalog sheet	
21	5	2	Steph Zink	F	6	1-Intentional	1-Top Down	3-Thumb on top parallel to stem	2-Hands apart	Yes	switched hands	28.66	1.128	1-Straight	1-Lip	2-Outward Divet	1-Flaking	slight lip	3-Bows-in	2-Lip Scar	1-Inward Divet	1-Flaking	flaking occurred between break 1-2	she switched hands for frag #2 and frag #1 and #2 are similar in length	
22	5	3	Steph Zink	F	6	1-Intentional	1-Top Down	3-Thumb on top parallel to stem	2-Hands apart	Yes	switched hands back	39.39	1.55	1-Straight	1-Lip	2-Outward Divet			1-Straight			1-Flaking	a rectangular piece flaked off between break 3-4		
23	5	4	Steph Zink	F	6	3-Stem and Bowl Juncture	6-Stem and Bowl Juncture	10-Stem and Bowl Juncture	4-Stem and Bowl Juncture	3-Stem and Bowl Juncture		32.82	1.292	1-Straight						5-Stem and Bowl Juncture	3-Stem and Bowl Juncture				
24	6	1	Sarah Nickel	F	6	1-Intentional	1-Top Down	3-Thumb on top parallel to stem	2-Hands apart	No		29.75	1.171	5-Mouthpiece	3-Mouthpiece				1-Straight	2-Lip Scar	2-Outward Divet		prominent outward divet	see #6 catalog sheet	

Appendix B-1: Experiment 1 Pipe Fragment Data

Fragment ID#	Catalog #	Participant Name	Gender	Pipe Length	Breakage Type	Breakage Direction	Breakage Method	Proximity of Hands	Change of Breakage Method	Method Changed to	Fragment Length (mm)	Fragment Length (in)	Proximal End Break Angle	Proximal End Break Pattern One	Proximal End Break Pattern Two	Proximal End Break Pattern Three	Proximal End Pattern-Notes	Distal End Break Angle	Distal End Break Pattern One	Distal End Break Pattern Two	Distal End Break Pattern Three	Distal End Pattern-Notes	Participant Comments	Author Comments
256	2	Sarah Nickel	F	6	1-Intentional	1-Top Down	4-Thumb on top perpendicular to stem	2-Hands apart	Yes	perpendicular ar	28.23	1.111	1-Straight	1-Lip	1-Inward Divet			1-Straight	2- Lip Scar			slight slant towards lip scar		
266	3	Sarah Nickel	F	6	1-Intentional	1-Top Down	4-Thumb on top perpendicular to stem	2-Hands apart	Yes	slid thumb closer to hand holding the bowl	34.02	1.339	1-Straight	1-Lip			small lip	3-Bows-in			1-Flaking	sheet commented how she slid her thumb back towards the bowl and frag broke behind her thumb		
276	4	Sarah Nickel	F	6	1-Intentional	1-Top Down	4-Thumb on top perpendicular to stem	2-Hands apart	No		28.18	1.109	1-Straight					3-Bows-in	2- Lip Scar			slight slant towards lip scar		
286	5	Sarah Nickel	F	6	3-Stem and Bowl Juncture	6-Stem and Bowl Juncture	10-Stem and Bowl Juncture	4-Stem and Bowl Juncture		3-Stem and Bowl Juncture	18.6	0.732	1-Straight	1-Lip					5-Stem and Bowl Juncture	3-Stem and Bowl Juncture				
307	1	Kyra Kaercher	F	6	1-Intentional	2-Bottom Up	4-Thumb on top perpendicular to stem	2-Hands apart	No		34.17	1.345	5-Mouthpiece	3-Mouthpiece				1-Straight		1-Inward Divet			see #7 catalog sheet; commented how this fragment was the easiest to break	she commented how it broke at the front of her thumb
317	2	Kyra Kaercher	F	6	1-Intentional	2-Bottom Up	4-Thumb on top perpendicular to stem	2-Hands apart	Yes	switched hands	34.35	1.352	1-Straight	1-Lip	2-Outward Divet		very small lip	1-Straight		1-Inward Divet				
327	3	Kyra Kaercher	F	6	1-Intentional	2-Bottom Up	1-Thumb to thumb	2-Hands apart	Yes	thumb to thumb; moved hands so thumbs were touching	32.88	1.294	1-Straight		2-Outward Divet			1-Straight		2-Outward Divet				
337	4	Kyra Kaercher	F	6	3-Stem and Bowl Juncture	6-Stem and Bowl Juncture	10-Stem and Bowl Juncture	4-Stem and Bowl Juncture		3-Stem and Bowl Juncture	27.82	1.095	1-Straight		1-Inward Divet				5-Stem and Bowl Juncture	3-Stem and Bowl Juncture	1-Inward Divet			
348	1	Kassie Praska	F	6	1-Intentional	2-Bottom Up	4-Thumb on top perpendicular to stem	2-Hands apart	No		33.69	1.326	5-Mouthpiece	3-Mouthpiece			jagged edge	3-Bows-in	2- Lip Scar	2-Outward Divet	1-Flaking	very small lip scar; small flake	see #8 catalog sheet	
358	2	Kassie Praska	F	6	1-Intentional	2-Bottom Up	1-Thumb to thumb	1-Close together	Yes	thumb to thumb	37.82	1.489	1-Straight	1-Lip	1-Inward Divet		very small lip; jagged edge	1-Straight	2- Lip Scar	1-Inward Divet	1-Flaking	flaking occurred between break 2-3		
368	3	Kassie Praska	F	6	1-Intentional	2-Bottom Up	1-Thumb to thumb	1-Close together	Yes	put hand holding bowl on the table	36.84	1.442	1-Straight	1-Lip	2-Outward Divet			1-Straight					commented how she "had to put hand on table to break" to break between 3-4	
378	4	Kassie Praska	F	6	3-Stem and Bowl Juncture	6-Stem and Bowl Juncture	10-Stem and Bowl Juncture	4-Stem and Bowl Juncture		3-Stem and Bowl Juncture	26.92	1.06	1-Straight					5-Stem and Bowl Juncture	3-Stem and Bowl Juncture					
389	1	Lisa Jennings	F	6	1-Intentional	2-Bottom Up	1-Thumb to thumb	2-Hands apart	No		26.44	1.041	5-Mouthpiece	3-Mouthpiece				3-Bows-in	2- Lip Scar	2-Outward Divet	1-Flaking	flaking to one side of lip scar	see #9 catalog sheet	
399	2	Lisa Jennings	F	6	1-Intentional	2-Bottom Up	1-Thumb to thumb	1-Close together	Yes	moved hands closer together	30.95	1.218	1-Straight	1-Lip	2-Outward Divet			1-Straight	2- Lip Scar	1-Inward Divet	1-Flaking	flaking occurred between break 2-3		
409	3	Lisa Jennings	F	6	1-Intentional	2-Bottom Up	1-Thumb to thumb	1-Close together	1-No		31.67	1.247	1-Straight	1-Lip	1-Inward Divet			1-Straight	2- Lip Scar		1-Flaking	flaking occurred between break 3-4		
419	4	Lisa Jennings	F	6	3-Stem and Bowl Juncture	6-Stem and Bowl Juncture	10-Stem and Bowl Juncture	4-Stem and Bowl Juncture		3-Stem and Bowl Juncture	39.31	1.547	1-Straight	1-Lip				5-Stem and Bowl Juncture	3-Stem and Bowl Juncture					
420	1	Jonathan Bush	M	6	1-Intentional	2-Bottom Up	1-Thumb to thumb	1-Close together	No		18.59	0.732	5-Mouthpiece	3-Mouthpiece				1-Straight	2- Lip Scar				see #10 catalog sheet	
430	2	Jonathan Bush	M	6	1-Intentional	2-Bottom Up	1-Thumb to thumb	1-Close together	No		23.02	0.906	1-Straight	1-Lip				3-Bows-in	2- Lip Scar					
440	3	Jonathan Bush	M	6	1-Intentional	2-Bottom Up	1-Thumb to thumb	1-Close together	No		27.13	1.068	1-Straight	1-Lip				3-Bows-in	2- Lip Scar	2-Outward Divet	1-Flaking	flaking to one side of lip scar		
450	4	Jonathan Bush	M	6	1-Intentional	2-Bottom Up	1-Thumb to thumb	1-Close together	No		31.22	1.229	1-Straight	1-Lip	1-Inward Divet			1-Straight	2- Lip Scar	1-Inward Divet		slants towards lip scar		
460	5	Jonathan Bush	M	6	3-Stem and Bowl Juncture	6-Stem and Bowl Juncture	10-Stem and Bowl Juncture	4-Stem and Bowl Juncture		3-Stem and Bowl Juncture	36.96	1.455	1-Straight	1-Lip	2-Outward Divet			5-Stem and Bowl Juncture	3-Stem and Bowl Juncture					commented how the fragments were harder to break as the diameter of the stem increased
4711	1	Marisa Meisner	F	6	1-Intentional	3-Right Left	4-Thumb on top perpendicular to stem	1-Close together	1-No		22.54	0.887	5-Mouthpiece	3-Mouthpiece				3-Bows-in	2- Lip Scar	2-Outward Divet	1-Flaking		see #11 catalog sheet	
4811	2	Marisa Meisner	F	6	1-Intentional	3-Right Left	4-Thumb on top perpendicular to stem	1-Close together	1-No		25.9	1.019	4-Bows-out	1-Lip	1-Inward Divet			3-Bows-in	2- Lip Scar	1-Inward Divet	1-Flaking			all 4 breaks have lip and lip scars on the left side of the stem
4911	3	Marisa Meisner	F	6	1-Intentional	3-Right Left	4-Thumb on top perpendicular to stem	1-Close together	1-No		23.96	0.943	4-Bows-out	1-Lip	2-Outward Divet			3-Bows-in	2- Lip Scar	2-Outward Divet	1-Flaking	prominent outward divet		
5011	4	Marisa Meisner	F	6	1-Intentional	3-Right Left	4-Thumb on top perpendicular to stem	1-Close together	1-No		26.14	1.029	4-Bows-out	1-Lip	1-Inward Divet			3-Bows-in	2- Lip Scar	2-Outward Divet		slants towards lip scar		
5111	5	Marisa Meisner	F	6	3-Stem and Bowl Juncture	6-Stem and Bowl Juncture	10-Stem and Bowl Juncture	4-Stem and Bowl Juncture		3-Stem and Bowl Juncture	42.65	1.679	4-Bows-out	1-Lip	1-Inward Divet			5-Stem and Bowl Juncture	3-Stem and Bowl Juncture				all 4 breaks correlate to where the most pressure was applied	all 4 breaks have lip and lip scars on the top of the stem
5212	1	Jackie Richmond	F	6	1-Intentional	2-Bottom Up	1-Thumb to thumb	1-Close together	No		31.51	1.24	5-Mouthpiece	3-Mouthpiece				1-Straight	2- Lip Scar	1-Inward Divet	1-Flaking		see #12 catalog sheet	
5312	2	Jackie Richmond	F	6	1-Intentional	2-Bottom Up	1-Thumb to thumb	1-Close together	No		36.43	1.434	1-Straight	1-Lip	2-Outward Divet			2-Slanted	2- Lip Scar	1-Inward Divet	1-Flaking	prominent inward divet		
5412	3	Jackie Richmond	F	6	1-Intentional	2-Bottom Up	1-Thumb to thumb	1-Close together	No		38.1	1.5	2-Slanted	1-Lip	2-Outward Divet		prominent outward divet	2-Slanted	2- Lip Scar	1-Inward Divet	1-Flaking	prominent inward divet		
5512	4	Jackie Richmond	F	6	3-Stem and Bowl Juncture	6-Stem and Bowl Juncture	10-Stem and Bowl Juncture	4-Stem and Bowl Juncture		3-Stem and Bowl Juncture	28.16	1.108	2-Slanted	1-Lip	2-Outward Divet		prominent outward divet	5-Stem and Bowl Juncture	3-Stem and Bowl Juncture					all 4 breaks correlate to where the most pressure was applied
5613	1	Vicki Twinde-Javner	F	6	1-Intentional	3-Right Left	1-Thumb to thumb	1-Close together	1-No		59.13	2.328	5-Mouthpiece	3-Mouthpiece				3-Bows-in	1-Lip		1-Flaking	2 small flakes	see #13 catalog sheet	
5713	2	Vicki Twinde-Javner	F	6	1-Intentional	3-Right Left	1-Thumb to thumb	1-Close together	1-No		36.74	1.446	1-Straight	2-Lip Scar				3-Bows-in	2- Lip Scar		1-Flaking			

Appendix B-1: Experiment 1 Pipe Fragment Data

Fragment ID#	Catalog #	Participant Name	Gender	Pipe Length	Breakage Type	Breakage Direction	Breakage Method	Proximity of Hands	Change of Breakage Method	Method Changed to	Fragment Length (mm)	Fragment Length (in)	Proximal End Break Angle	Proximal End Break Pattern One	Proximal End Break Pattern Two	Proximal End Break Pattern Three	Proximal End Pattern-Notes	Distal End Break Angle	Distal End Break Pattern One	Distal End Break Pattern Two	Distal End Break Pattern Three	Distal End Pattern-Notes	Participant Comments	Author Comments	
58	13	Vicki Twinde-Javner	F	6	3-Stem and Bowl Juncture	6-Stem and Bowl Juncture	10-Stem and Bowl Juncture	4-Stem and Bowl Juncture	3-Stem and Bowl Juncture		40.11	1.579	1-Straight	1-Lip				slight lip	5-Stem and Bowl Juncture	3-Stem and Bowl Juncture					
59	14	Krysten Kirsch	F	6	1-Intentional	3-Right Left	1-Thumb to thumb	1-Close together	No		21.67	0.853	5-Mouthpiece	3-Mouthpiece					3-Bows-in	2-Lip Scar			slants towards lip scar	see #14 catalog sheet	
60	14	Krysten Kirsch	F	6	1-Intentional	3-Right Left	1-Thumb to thumb	1-Close together	No		32.66	1.285	2-Slanted	1-Lip					1-Straight	2-Lip Scar	1-Inward Divet	1-Flaking		commented how it was harder to break closer to the bowl	
61	14	Krysten Kirsch	F	6	1-Intentional	3-Right Left	1-Thumb to thumb	1-Close together	No		27.74	1.092	1-Straight	1-Lip	2-Outward Divet				3-Bows-in	2-Lip Scar	1-Inward Divet	1-Flaking		commented "not breaking where I intend, usually longer"	
62	14	Krysten Kirsch	F	6	1-Intentional	3-Right Left	1-Thumb to thumb	1-Close together	No		33.38	1.314	1-Straight	1-Lip	2-Outward Divet				1-Straight	2-Lip Scar	1-Inward Divet	1-Flaking		"it hurt sometimes and had to use a lot of strength"	
63	14	Krysten Kirsch	F	6	1-Intentional	3-Right Left	9-Other	1-Close together	2-Yes	used the end of the table	23.35	0.919	1-Straight	1-Lip	2-Outward Divet				3-Bows-in	1-Lip	2-Outward Divet	1-Flaking	break 5-6 yielded a small lip using the table	break 5-6 she put the bowl face down off the edge of the table, pushed down with her palm and broke at the stem and bowl juncture leaving no stem attached to the bowl	this took a lot of force to do; she put her whole weight onto her palm and left an imprint after it broke using the table to break the stem and bowl juncture left no stem attached to the bowl
64	14	Krysten Kirsch	F	6	3-Stem and Bowl Juncture	6-Stem and Bowl Juncture	10-Stem and Bowl Juncture	4-Stem and Bowl Juncture	3-Stem and Bowl Juncture		0	0	3-Bows-in		1-Inward Divet	1-Flaking		no lip or lip scar	5-Stem and Bowl Juncture	3-Stem and Bowl Juncture					
65	15	Eric Olson	M	6	1-Intentional	3-Right Left	1-Thumb to thumb	1-Close together	1-No		19.95	0.785	5-Mouthpiece	3-Mouthpiece					3-Bows-in	2-Lip Scar		1-Flaking		see #15 catalog sheet	
66	15	Eric Olson	M	6	1-Intentional	3-Right Left	1-Thumb to thumb	1-Close together	1-No		21.85	0.86	4-Bows-out	1-Lip				lip and lip scar occur on top of stem	3-Bows-in	2-Lip Scar	1-Inward Divet	1-Flaking		"each break was about the length of the upper part of my thumb"	
67	15	Eric Olson	M	6	1-Intentional	3-Right Left	1-Thumb to thumb	1-Close together	1-No		22.37	0.88	4-Bows-out	1-Lip	2-Outward Divet				3-Bows-in	2-Lip Scar	1-Inward Divet	1-Flaking			
68	15	Eric Olson	M	6	1-Intentional	3-Right Left	1-Thumb to thumb	1-Close together	1-No		27.58	1.085	1-Straight	1-Lip	2-Outward Divet				2-Slanted	2-Lip Scar		1-Flaking	slants towards lip scar	"I applied more pressure with my left thumb on each break"	he commented how he had to apply more pressure going towards the bowl
69	15	Eric Olson	M	6	1-Intentional	3-Right Left	1-Thumb to thumb	1-Close together	1-No		27.91	1.099	2-Slanted	1-Lip					2-Slanted	2-Lip Scar	1-Inward Divet	1-Flaking	slants towards lip scar	all 5 breaks correlate to where the most pressure was applied	all 5 breaks have lip and lip scars on the left side of the stem
70	15	Eric Olson	M	6	3-Stem and Bowl Juncture	6-Stem and Bowl Juncture	10-Stem and Bowl Juncture	4-Stem and Bowl Juncture	3-Stem and Bowl Juncture		19.9	0.783	2-Slanted	1-Lip	2-Outward Divet			slants towards lip	5-Stem and Bowl Juncture	3-Stem and Bowl Juncture					
71	16	Bill Gresens	M	6	1-Intentional	3-Right Left	4-Thumb on top perpendicular to stem	1-Close together	No		38.2	1.504	5-Mouthpiece	3-Mouthpiece					1-Straight	4-Clean	1-Inward Divet			see #16 catalog sheet	
72	16	Bill Gresens	M	6	1-Intentional	3-Right Left	4-Thumb on top perpendicular to stem	1-Close together	No		29.65	1.167	1-Straight	4-Clean	2-Outward Divet				1-Straight	2-Lip Scar				"applied pressure RT to LT with left index finger acting as the fulcrum"	he only had one break with a lip and lip scar and only applied pressure with thumb and index finger was the pivot point or "fulcrum"
73	16	Bill Gresens	M	6	1-Intentional	3-Right Left	4-Thumb on top perpendicular to stem	1-Close together	No		38.95	1.533	1-Straight	1-Lip					1-Straight	4-Clean	2-Outward Divet		prominent outward divet		long fragments, had a pivot point but had 2 out of 3 straight, clean breaks
74	16	Bill Gresens	M	6	3-Stem and Bowl Juncture	6-Stem and Bowl Juncture	10-Stem and Bowl Juncture	4-Stem and Bowl Juncture	3-Stem and Bowl Juncture		24.54	0.966	1-Straight	4-Clean	1-Inward Divet			prominent inward divet	5-Stem and Bowl Juncture	3-Stem and Bowl Juncture					
75	17	Linda Strahl	F	6	1-Intentional	3-Right Left	3-Thumb on top parallel to stem	1-Close together	No		51.22	2.016	5-Mouthpiece	3-Mouthpiece					1-Straight	1-Lip	1-Inward Divet		slants towards lip	see #17 catalog sheet	eventhough her hands were close together, this was a long break because she had 3 fingers on the opposite side of the right thumb that was applying pressure; therefore her ring finger was the pivot point where the lip is
76	17	Linda Strahl	F	6	1-Intentional	3-Right Left	3-Thumb on top parallel to stem	1-Close together	Yes		41.86	1.648	1-Straight	2-Lip Scar	1-Inward Divet			slants towards lip scar	1-Straight	2-Lip Scar	2-Outward Divet		slants towards lip scar		she had to have changed the position of her hands because this fragment has 2 lip scars
77	17	Linda Strahl	F	6	1-Intentional	3-Right Left	3-Thumb on top parallel to stem	1-Close together	Yes	turned bowl upside down	41.55	1.635	1-Straight	1-Lip	2-Outward Divet			prominent outward divet	4-Bows-out	1-Lip	2-Outward Divet		break 3-4 was made turning the bowl upside down	broke at the stem and bowl juncture; she turned the bowl upside down; this took a lot of strength to do and also left an imprint on her hand	
78	17	Linda Strahl	F	6	3-Stem and Bowl Juncture	6-Stem and Bowl Juncture	10-Stem and Bowl Juncture	4-Stem and Bowl Juncture	3-Stem and Bowl Juncture		5.02	0.197	3-Bows-in	2-Lip Scar	1-Inward Divet				5-Stem and Bowl Juncture	3-Stem and Bowl Juncture			broke at the stem and bowl juncture, very small stem left at the bowl	for break 3-4 her left hand covered whole bowl and broke at her left index finger	
79	18	Kevin Krohn	M	6	1-Intentional	3-Right Left	3-Thumb on top parallel to stem	1-Close together	No		33.09	1.302	5-Mouthpiece	3-Mouthpiece					1-Straight	1-Lip	2-Outward Divet	1-Flaking	flaking occurred at the lip	see #18 catalog sheet	
80	18	Kevin Krohn	M	6	1-Intentional	3-Right Left	3-Thumb on top parallel to stem	1-Close together	No		35.38	1.393	1-Straight	2-Lip Scar	1-Inward Divet			prominent inward divet	1-Straight	2-Lip Scar	1-Inward Divet	1-Flaking	inward divet led up to lip scar; flaking to one side of lip scar	4 fingers wrapped around stem, thumb applied pressure on the right side of the stem and thumb was extended above index finger so broke at the index finger	lip and flaking occurred at the index finger at the left side of the stem

Appendix B-1: Experiment 1 Pipe Fragment Data

Fragment ID#	Catalog #	Participant Name	Gender	Pipe Length	Breakage Type	Breakage Direction	Breakage Method	Proximity of Hands	Change of Breakage Method	Method Changed to	Fragment Length (mm)	Fragment Length (in)	Proximal End Break Angle	Proximal End Break Pattern One	Proximal End Break Pattern Two	Proximal End Break Pattern Three	Proximal End Pattern-Notes	Distal End Break Angle	Distal End Break Pattern One	Distal End Break Pattern Two	Distal End Break Pattern Three	Distal End Pattern-Notes	Participant Comments	Author Comments	
81	18	Kevin Krohn	M	6	1-Intentional	3-Right Left	3-Thumb on top parallel to stem	1-Close together	2-Yes	right thumb close to index finger	40.47	1.593	1-Straight	1-Lip	2-Outward Divet			1-Straight	2- Lip Scar	1-Inward Divet	1-Flaking	slants towards lip scar; inward divet becomes lip scar			
82	18	Kevin Krohn	M	6	3-Stem and Bowl Juncture	6-Stem and Bowl Juncture	10-Stem and Bowl Juncture	4-Stem and Bowl Juncture	3-Stem and Bowl Juncture		26.13	1.028	1-Straight	1-Lip	2-Outward Divet		slants towards lip; outward divet becomes lip		5-Stem and Bowl Juncture	3-Stem and Bowl Juncture					the first two breaks held with thumb extended and got jagged breaks and flaking; then for break 3-4 held thumb close to index finger and got a straight edge, no flaking and characteristic lip and lip scar
83	19	Elizabeth Kelly	F	6	1-Intentional	4-Left Right	5-Fist to fist	1-Close together	No		41.03	1.615	5-Mouthpiece	3-Mouthpiece				1-Straight	2- Lip Scar	3-Both	1-Flaking	flaking to one side of the lip; has an outward and inward divet, but outward is more prominent	see #19 catalog sheet	lip and flaking occur where her index fingers braced the stem	
84	19	Elizabeth Kelly	F	6	1-Intentional	4-Left Right	5-Fist to fist	1-Close together	No		40.41	1.591	1-Straight	2-Lip Scar	3-Both		has inward and outward divet, but inward is more prominent	1-Straight	1-Lip	3-Both	1-Flaking	break 2-3 has the same flaking to one side of the lip as break 1-2; also has an inward and outward divet but inward is more prominent	fragments "are about the size of my fist"; all about equal length	using the same fist method, the fragments were the same long size	
85	19	Elizabeth Kelly	F	6	1-Intentional	4-Left Right	5-Fist to fist	1-Close together	No		41.23	1.623	1-Straight	2-Lip Scar	3-Both		slants towards lip scar; has inward and outward divet, but outward divet is more prominent	1-Straight	4-Clean	3-Both		core around the bore hole broke evenly-inward and outward divets		breaks were always between her fists; proximal and distal ends of fragments of the 3 breaks had both kinds of divets; break 3-4 was a straight, clean break so may have been equal pressure on both sides when broken; breaks 1-2 and 2-3 lips may have flaked off when it was broken	
86	19	Elizabeth Kelly	F	6	3-Stem and Bowl Juncture	6-Stem and Bowl Juncture	10-Stem and Bowl Juncture	4-Stem and Bowl Juncture	3-Stem and Bowl Juncture		13.06	0.514	1-Straight	4-Clean	3-Both		core around the bore hole broke evenly-inward and outward divets		5-Stem and Bowl Juncture	3-Stem and Bowl Juncture					
87	20	Connie Arzgian	F	6	1-Intentional	4-Left Right	6-Index fingers touching	1-Close together	No		37.98	1.495	5-Mouthpiece	3-Mouthpiece				1-Straight	2- Lip Scar	3-Both		slants towards slight lip scar; has both kinds of divets	see #20 catalog sheet		
88	20	Connie Arzgian	F	6	1-Intentional	4-Left Right	1-Thumb to thumb	1-Close together	Yes	thumb to thumb	32.41	1.276	1-Straight	1-Lip	3-Both		slants towards slight lip	1-Straight	1-Lip	2-Outward Divet				she changed her breakage method for all 3 breaks and still had a slight lip and lip scar between each of those breaks	
89	20	Connie Arzgian	F	6	1-Intentional	4-Left Right	5-Fist to fist	1-Close together	Yes	fist to fist	39.15	1.541	1-Straight	2-Lip Scar	1-Inward Divet		slants towards lip scar	1-Straight	1-Lip	3-Both		slants towards slight lip		only slight lip and lip scars because she was applying almost equal pressure for both hands in each of the breaks	
90	20	Connie Arzgian	F	6	3-Stem and Bowl Juncture	6-Stem and Bowl Juncture	10-Stem and Bowl Juncture	4-Stem and Bowl Juncture	3-Stem and Bowl Juncture		23.19	0.913	1-Straight	2-Lip Scar	3-Both				5-Stem and Bowl Juncture	3-Stem and Bowl Juncture					
91	21	Kaitlyn Borland	F	6	1-Intentional	4-Left Right	1-Thumb to thumb	1-Close together	No		22.52	0.886	5-Mouthpiece	3-Mouthpiece					3-Bows-in	2- Lip Scar				see #21 catalog sheet	this was Kaitlyn's second pipe
92	21	Kaitlyn Borland	F	6	1-Intentional	4-Left Right	5-Fist to fist	1-Close together	Yes	index fingers touching to fist to fist	31.23	1.229	4-Bows-out	1-Lip					3-Bows-in	2- Lip Scar	3-Both	1-Flaking	flaking occurred above lip scar		she tried to break with the index fingers touching but couldn't, so broke fist to fist because it was easier for her
93	21	Kaitlyn Borland	F	6	1-Intentional	4-Left Right	5-Fist to fist	1-Close together	No		40.34	1.588	4-Bows-out	1-Lip	3-Both				3-Bows-in	1-Lip		1-Flaking	slants towards lip		she tried to break fragments with the same methods as Connie, but had trouble with the index finger method
94	21	Kaitlyn Borland	F	6	3-Stem and Bowl Juncture	6-Stem and Bowl Juncture	10-Stem and Bowl Juncture	4-Stem and Bowl Juncture	3-Stem and Bowl Juncture		41.44	1.631	4-Bows-out	2-Lip Scar			slants towards lip scar		5-Stem and Bowl Juncture	3-Stem and Bowl Juncture			for her using the fist method was easier to break fragments as she got closer to the bowl "because of the power behind it"	her breaks had more prominent lip and lip scars than Connie	
95	22	Beth Hall	F	6	1-Intentional	3-Right Left	7-Thumbs on opposite sides of the stem	1-Close together	No		44.2	1.74	5-Mouthpiece	3-Mouthpiece					3-Bows-in	1-Lip	1-Inward Divet	1-Flaking	slants towards lip	see #22 catalog sheet	this was Beth's second pipe
96	22	Beth Hall	F	6	1-Intentional	3-Right Left	5-Fist to fist	1-Close together	Yes	fist to fist	46.63	1.835	3-Bows-in	2-Lip Scar	2-Outward Divet		slants towards lip scar		3-Bows-in	1-Lip			labeled "L" lip was hard to identify because the end is bowed-in and the lip is the slant		long fragments were the result of her grasping the stem by the width of her fists for every break
97	22	Beth Hall	F	6	3-Stem and Bowl Juncture	6-Stem and Bowl Juncture	10-Stem and Bowl Juncture	4-Stem and Bowl Juncture	3-Stem and Bowl Juncture		43.96	1.731	1-Straight	2-Lip Scar			slants towards lip scar		5-Stem and Bowl Juncture	3-Stem and Bowl Juncture		labeled "LS"		she used 2 different methods and had the same results of very small lip and lip scars	
98	23	Jackie Richmond	F	6	1-Intentional	4-Left Right	7-Thumbs on opposite sides of the stem	1-Close together	No		41.62	1.639	5-Mouthpiece	3-Mouthpiece					2-Stanted	2- Lip Scar	2-Outward Divet			see #23 catalog sheet	
99	23	Jackie Richmond	F	6	1-Intentional	4-Left Right	5-Fist to fist	1-Close together	Yes	fist to fist	42.07	1.656	2-Stanted	1-Lip	1-Inward Divet				1-Straight	1-Lip	3-Both		slants towards lip		

Appendix B-1: Experiment 1 Pipe Fragment Data

Fragment ID#	Catalog #	Participant Name	Gender	Pipe Length	Breakage Type	Breakage Direction	Breakage Method	Proximity of Hands	Change of Breakage Method	Method Changed to	Fragment Length (mm)	Fragment Length (in)	Proximal End Break Angle	Proximal End Break Pattern One	Proximal End Break Pattern Two	Proximal End Break Pattern Three	Proximal End Pattern-Notes	Distal End Break Angle	Distal End Break Pattern One	Distal End Break Pattern Two	Distal End Break Pattern Three	Distal End Pattern-Notes	Participant Comments	Author Comments	
100	23	Jackie Richmond	F	6	1-Intentional	4-Left Right	7-Thumbs on opposite sides of the stem	1-Close together	Yes	thumbs on opposite sides of the stem	40.63	1.599	1-Straight	2-Lip Scar	3-Both			1-Straight	1-Lip	1-Inward Divet	1-Flaking				
101	23	Jackie Richmond	F	6	3-Stem and Bowl Juncture	6-Stem and Bowl Juncture	10-Stem and Bowl Juncture	4-Stem and Bowl Juncture	Yes	3-Stem and Bowl Juncture	17.04	0.671	1-Straight	2-Lip Scar	2-Outward Divet		slants towards lip scar	5-Stem and Bowl Juncture	3-Stem and Bowl Juncture				all 3 breaks are about equal length	she used 2 different methods and all 3 breaks had lip and lip scars break 1-2 was in the air; broke the fragment the width of her hand	
102	24	Sarah Schreiner	F	6	1-Intentional	4-Left Right	1-Thumb to thumb	1-Close together	No		55.84	2.198	5-Mouthpiece	3-Mouthpiece				1-Straight	1-Lip	3-Both			see #24 catalog sheet		
103	24	Sarah Schreiner	F	6	1-Intentional	4-Left Right	1-Thumb to thumb	1-Close together	Yes	braced hand holding stem on her leg	21.13	0.832	1-Straight	2-Lip Scar	3-Both			1-Straight	2-Lip Scar		1-Flaking	large portion flaked off above lip scar		break 2-3 she rested the hand bracing the stem on her leg; more control and broke a considerably shorter fragment	
104	24	Sarah Schreiner	F	6	1-Intentional	4-Left Right	1-Thumb to thumb	1-Close together	No		33.73	1.328	1-Straight	1-Lip				1-Straight	2-Lip Scar	3-Both	1-Flaking				
105	24	Sarah Schreiner	F	6	3-Stem and Bowl Juncture	6-Stem and Bowl Juncture	10-Stem and Bowl Juncture	4-Stem and Bowl Juncture	Yes	3-Stem and Bowl Juncture	24.62	0.969	1-Straight	1-Lip	3-Both		prominent lip	5-Stem and Bowl Juncture	3-Stem and Bowl Juncture					Sarah and Kassi both used something to stabilize the hand bracing the stem for more control	
106	25	1	Mike Bednarchuk	M	16	1-Intentional	1-Top Down	8-Single hand with thumb	3-One hand	No	38.7	1.523	5-Mouthpiece	3-Mouthpiece				1-Straight	4-Clean		1-Flaking		see #25 catalog sheet		
107	25	2	Mike Bednarchuk	M	16	1-Intentional	1-Top Down	8-Single hand with thumb	3-One hand	No	38	1.496	1-Straight	4-Clean				2-Slanted	2-Lip Scar	2-Outward Divet	1-Flaking				
108	25	3	Mike Bednarchuk	M	16	1-Intentional	1-Top Down	8-Single hand with thumb	3-One hand	No	31.98	1.259	2-Slanted	1-Lip	1-Inward Divet			1-Straight	2-Lip Scar	1-Inward Divet	1-Flaking				
109	25	4	Mike Bednarchuk	M	16	1-Intentional	1-Top Down	8-Single hand with thumb	3-One hand	No	18.02	0.709	1-Straight	1-Lip	2-Outward Divet			3-Bows-in	1-Lip	2-Outward Divet	1-Flaking	slanted towards lip		smallest intentional break I've seen	
110	25	5	Mike Bednarchuk	M	16	1-Intentional	1-Top Down	8-Single hand with thumb	3-One hand	No	27.75	1.092	4-Bows-out	2-Lip Scar	1-Inward Divet	1-Flaking	slants towards lip scar	1-Straight	2-Lip Scar	1-Inward Divet	1-Flaking				
111	25	6	Mike Bednarchuk	M	16	1-Intentional	1-Top Down	8-Single hand with thumb	3-One hand	No	22.66	0.892	1-Straight	1-Lip	2-Outward Divet			1-Straight	2-Lip Scar	2-Outward Divet	1-Flaking	flaking above lip scar			
112	25	7	Mike Bednarchuk	M	16	1-Intentional	1-Top Down	8-Single hand with thumb	3-One hand	No	21.35	0.84	1-Straight	1-Lip	1-Inward Divet	1-Flaking	flaking at the lip	1-Straight	2-Lip Scar	3-Both	1-Flaking	flaking occurred between break 7-8			
113	25	8	Mike Bednarchuk	M	16	1-Intentional	1-Top Down	8-Single hand with thumb	3-One hand	No	26.8	1.055	1-Straight	2-Lip Scar	3-Both	1-Flaking	flaking at the lip	1-Straight	2-Lip Scar	2-Outward Divet	1-Flaking	flaking above lip scar			
114	25	9	Mike Bednarchuk	M	16	1-Intentional	1-Top Down	8-Single hand with thumb	3-One hand	No	32.4	1.275	1-Straight	1-Lip	1-Inward Divet			1-Straight	2-Lip Scar	1-Inward Divet	1-Flaking				
115	25	10	Mike Bednarchuk	M	16	1-Intentional	1-Top Down	8-Single hand with thumb	3-One hand	No	31.37	1.235	1-Straight	1-Lip	2-Outward Divet	1-Flaking		1-Straight	2-Lip Scar	2-Outward Divet	1-Flaking	flaking above lip scar			
116	25	11	Mike Bednarchuk	M	16	1-Intentional	1-Top Down	8-Single hand with thumb	3-One hand	No	26.09	1.027	1-Straight	1-Lip	1-Inward Divet			1-Straight	2-Lip Scar	2-Outward Divet	1-Flaking	flaking above lip scar and between break 11-12			
117	25	12	Mike Bednarchuk	M	16	1-Intentional	1-Top Down	8-Single hand with thumb	3-One hand	No	28.06	1.105	1-Straight	1-Lip	1-Inward Divet	1-Flaking	flaking at the lip	2-Slanted	2-Lip Scar	2-Outward Divet	1-Flaking	flaking above lip scar			13 out of the 14 breaks had a lip and lip scar and all 13 were at the bottom of the stem
118	25	13	Mike Bednarchuk	M	16	1-Intentional	1-Top Down	8-Single hand with thumb	3-One hand	No	25.56	1.006	2-Slanted	1-Lip	1-Inward Divet			1-Straight	2-Lip Scar		1-Flaking	flaking above lip scar			
119	25	14	Mike Bednarchuk	M	16	1-Intentional	1-Top Down	8-Single hand with thumb	3-One hand	No	22.38	0.881	1-Straight	1-Lip		1-Flaking	flaking at the lip	1-Straight	2-Lip Scar	3-Both	1-Flaking	flaking above lip scar			
120	25	15	Mike Bednarchuk	M	16	3-Stem and Bowl Juncture	6-Stem and Bowl Juncture	10-Stem and Bowl Juncture	4-Stem and Bowl Juncture	Yes	14.44	0.568	1-Straight	1-Lip	3-Both	1-Flaking	flaking at the lip	5-Stem and Bowl Juncture	3-Stem and Bowl Juncture						
121	26	1	Jenni Rich	F	16	1-Intentional	1-Top Down	3-Thumb on top parallel to stem	2-Hands apart	No	53.93	2.123	5-Mouthpiece	3-Mouthpiece				3-Bows-in	1-Lip		1-Flaking	flaking above lip	see #26 catalog sheet		
122	26	2	Jenni Rich	F	16	1-Intentional	1-Top Down	3-Thumb on top parallel to stem	2-Hands apart	No	59.16	2.329	4-Bows-out	2-Lip Scar		1-Flaking		1-Straight	4-Clean	3-Both		slight slanting on one side		fragments 1 and 2 were long because her "breaking hand" thumb was extended above her index finger allowing for longer fragments	
123	26	3	Jenni Rich	F	16	1-Intentional	1-Top Down	3-Thumb on top parallel to stem	2-Hands apart	Yes	30.95	1.218	1-Straight	4-Clean	3-Both			3-Bows-in	2-Lip Scar	1-Inward Divet	1-Flaking	flaking above lip scar and between break 3-4		after she moved her "breaking hand" thumb closer to her index finger the fragment broke smaller she left no stem above her "breaking hand" thumb, therefore the fragment broke the length of the lip segment, distal phalange of her thumb	
124	26	4	Jenni Rich	F	16	1-Intentional	1-Top Down	3-Thumb on top parallel to stem	2-Hands apart	Yes	25	0.984	4-Bows-out	1-Lip	2-Outward Divet	1-Flaking		1-Straight	2-Lip Scar	1-Inward Divet	1-Flaking	flaking above lip scar and between break 4-5			
125	26	5	Jenni Rich	F	16	1-Intentional	1-Top Down	3-Thumb on top parallel to stem	2-Hands apart	Yes	45.4	1.787	1-Straight	1-Lip	2-Outward Divet	1-Flaking		2-Slanted	2-Lip Scar	2-Outward Divet	1-Flaking	flaking above lip scar and between break 5-6		she moved her "breaking hand" further the stem towards distal end and broke a longer fragment	
126	26	6	Jenni Rich	F	16	1-Intentional	1-Top Down	3-Thumb on top parallel to stem	2-Hands apart	No	36.26	1.427	2-Slanted	1-Lip	1-Inward Divet			3-Bows-in	2-Lip Scar	2-Outward Divet		flaking occurred between break 6-7			
127	26	7	Jenni Rich	F	16	2-Accidental	1-Top Down	3-Thumb on top parallel to stem	2-Hands apart	No	86.24	3.395	4-Bows-out	1-Lip	1-Inward Divet	1-Flaking	flaking at the lip	1-Straight	2-Lip Scar	3-Both			comments it broke accidentally from "too much pressure from second hand" or bracing hand.	eventhough break 7-8 was accidental as it broke in her hand, it still had the characteristic lip and lip scar of an intentional break	
128	26	8	Jenni Rich	F	16	3-Stem and Bowl Juncture	6-Stem and Bowl Juncture	10-Stem and Bowl Juncture	4-Stem and Bowl Juncture	Yes	51.18	2.015	1-Straight	1-Lip	3-Both			5-Stem and Bowl Juncture	3-Stem and Bowl Juncture					stem of stem and bowl juncture was long because she did not want to break another fragment	
129	27	1	Branden Fjerstad	M	16	1-Intentional	1-Top Down	11-Distal phalange of index finger	2-Hands apart	1-No	19.76	0.778	5-Mouthpiece	3-Mouthpiece				1-Straight	2-Lip Scar	2-Outward Divet	1-Flaking	flaking above lip scar	see #27 catalog sheet		

Appendix B-1: Experiment 1 Pipe Fragment Data

Fragment ID#	Catalog #	Participant #	Name of Participant	Gender	Pipe Length	Breakage Type	Breakage Direction	Breakage Method	Proximity of Hands	Change of Breakage Method	Method Changed to	Fragment Length (mm)	Fragment Length (in)	Proximal End Break Angle	Proximal End Break Pattern One	Proximal End Break Pattern Two	Proximal End Break Pattern Three	Proximal End Pattern-Notes	Distal End Break Angle	Distal End Break Pattern One	Distal End Break Pattern Two	Distal End Break Pattern Three	Distal End Pattern-Notes	Participant Comments	Author Comments		
130	27	2	Branden Fjerstad	M	16	1-Intentional	1-Top Down	11-Distal phalange of index finger	2-Hands apart	1-No		15.84	0.623	1-Straight	1-Lip					3-Bows-in	2- Lip Scar		1-Flaking	flaking above lip scar and between break 2-3	his method of breakage produces the smallest fragments		
131	27	3	Branden Fjerstad	M	16	1-Intentional	1-Top Down	11-Distal phalange of index finger	2-Hands apart	1-No		16.27	0.64	4-Bows-out	1-Lip		1-Flaking	prominent lip flaking at the lip		3-Bows-in	2- Lip Scar		1-Flaking	flaking above lip scar flaking occurred between break 4-5		he had a lip and lip scar for every break and all looked similar	
132	27	4	Branden Fjerstad	M	16	1-Intentional	1-Top Down	11-Distal phalange of index finger	2-Hands apart	1-No		16.31	0.642	4-Bows-out	1-Lip		1-Flaking			1-Straight	2- Lip Scar	1-Inward Divet	1-Flaking				
133	27	5	Branden Fjerstad	M	16	1-Intentional	1-Top Down	11-Distal phalange of index finger	2-Hands apart	1-No		16.8	0.661	1-Straight	1-Lip	2-Outward Divet		1-Flaking		1-Straight	2- Lip Scar		1-Flaking	flaking above lip scar flaking occurred between break 6-7			
134	27	6	Branden Fjerstad	M	16	1-Intentional	1-Top Down	11-Distal phalange of index finger	2-Hands apart	1-No		28.39	1.117	1-Straight	1-Lip					3-Bows-in	2- Lip Scar	1-Inward Divet	1-Flaking	flaking above lip scar; slants towards lip scar			
135	27	7	Branden Fjerstad	M	16	1-Intentional	1-Top Down	11-Distal phalange of index finger	2-Hands apart	1-No		20.73	0.816	4-Bows-out	1-Lip	2-Outward Divet		1-Flaking	lip looks like it broke off	1-Straight	2- Lip Scar	3-Both	1-Flaking				
136	27	8	Branden Fjerstad	M	16	1-Intentional	1-Top Down	11-Distal phalange of index finger	2-Hands apart	1-No		22.27	0.876	1-Straight	1-Lip	3-Both			prominent lip	1-Straight	2- Lip Scar	3-Both	1-Flaking	flaking above lip scar			
137	27	9	Branden Fjerstad	M	16	1-Intentional	1-Top Down	11-Distal phalange of index finger	2-Hands apart	1-No		23.38	0.92	1-Straight	1-Lip	3-Both				1-Straight	2- Lip Scar	2-Outward Divet	1-Flaking	flaking above lip scar			
138	27	10	Branden Fjerstad	M	16	1-Intentional	1-Top Down	11-Distal phalange of index finger	2-Hands apart	1-No		28.8	1.133	1-Straight	1-Lip	1-Inward Divet			prominent lip	2-Slanted	2- Lip Scar	1-Inward Divet	1-Flaking	flaking above lip scar			
139	27	11	Branden Fjerstad	M	16	1-Intentional	1-Top Down	11-Distal phalange of index finger	2-Hands apart	1-No		21.5	0.846	2-Slanted	1-Lip	2-Outward Divet				1-Straight	2- Lip Scar	2-Outward Divet	1-Flaking	flaking above lip scar			
140	27	12	Branden Fjerstad	M	16	1-Intentional	1-Top Down	11-Distal phalange of index finger	2-Hands apart	1-No		21.11	0.83	1-Straight	1-Lip	1-Inward Divet				1-Straight	2- Lip Scar	1-Inward Divet	1-Flaking	flaking above lip scar			
141	27	13	Branden Fjerstad	M	16	1-Intentional	1-Top Down	11-Distal phalange of index finger	2-Hands apart	1-No		20.69	0.814	1-Straight	1-Lip	2-Outward Divet				1-Straight	2- Lip Scar	3-Both	1-Flaking	flaking above lip scar			
142	27	14	Branden Fjerstad	M	16	1-Intentional	1-Top Down	11-Distal phalange of index finger	2-Hands apart	2-Yes	moved breaking hand closer towards bowl	38.45	1.514	1-Straight	1-Lip	3-Both				1-Straight	2- Lip Scar	1-Inward Divet	1-Flaking	flaking above lip scar	switching to the different method he produced his longest fragment	even after switching methods break 14-15 had the same breakage patterns as all his other breaks	
143	27	15	Branden Fjerstad	M	16	1-Intentional	1-Top Down	11-Distal phalange of index finger	2-Hands apart	1-No		22.62	0.89	1-Straight	1-Lip	2-Outward Divet				1-Straight	2- Lip Scar	2-Outward Divet	1-Flaking	flaking above lip scar	commented that when 7.5 cm of the stem was remaining his method became too hard to use the same method		
144	27	16	Branden Fjerstad	M	16	1-Intentional	1-Top Down	8-Single hand with thumb	3-One hand	2-Yes	had to switch to new method	21.64	0.852	1-Straight	1-Lip	1-Inward Divet				1-Straight	2- Lip Scar	2-Outward Divet	1-Flaking	flaking above lip scar	using his method he continuously produced about the same lengths of fragments and the same breakage patterns		
145	27	17	Branden Fjerstad	M	16	1-Intentional	1-Top Down	8-Single hand with thumb	3-One hand	1-No		24.82	0.977	1-Straight	1-Lip	1-Inward Divet				2-Slanted	2- Lip Scar	1-Inward Divet	1-Flaking	flaking above lip scar	maybe the more you grip the stem and the more strength you put in to it, the more the breakage patterns will appear		
146	27	18	Branden Fjerstad	M	16	1-Intentional	1-Top Down	8-Single hand with thumb	3-One hand	1-No		25.46	1.002	2-Slanted	1-Lip	2-Outward Divet		prominent outward divet		2-Slanted	2- Lip Scar		1-Flaking	flaking above lip scar			
147	27	19	Branden Fjerstad	M	16	3-Stem and Bowl Juncture	6-Stem and Bowl Juncture	10-Stem and Bowl Juncture	3-One hand	1-No		16.55	0.651	2-Slanted	1-Lip					5-Stem and Bowl Juncture	3-Stem and Bowl Juncture						
148	28	1	Mike Straskowski	M	16	1-Intentional	1-Top Down	4-Thumb on top perpendicular to stem	1-Close together	1-No		32.63	1.284	5-Mouthpiece	3-Mouthpiece					1-Straight	2- Lip Scar	2-Outward Divet	1-Flaking	flaking above lip scar	see #28 catalog sheet		
149	28	2	Mike Straskowski	M	16	1-Intentional	1-Top Down	4-Thumb on top perpendicular to stem	1-Close together	2-Yes	moved hands down the stem	40.92	1.611	1-Straight	1-Lip	1-Inward Divet				1-Straight	2- Lip Scar			flaking above lip scar and between break 2-3			
150	28	3	Mike Straskowski	M	16	1-Intentional	1-Top Down	4-Thumb on top perpendicular to stem	1-Close together	1-No	moved hands closer to proximal end	29.33	1.154	1-Straight	1-Lip					2-Slanted	2- Lip Scar	1-Inward Divet					
151	28	4	Mike Straskowski	M	16	1-Intentional	1-Top Down	4-Thumb on top perpendicular to stem	1-Close together	1-No		27.88	1.097	2-Slanted	1-Lip	2-Outward Divet				2-Slanted	2- Lip Scar	3-Both	1-Flaking	flaking above lip scar			
152	28	5	Mike Straskowski	M	16	1-Intentional	1-Top Down	4-Thumb on top perpendicular to stem	1-Close together	2-Yes	switched hands	26.62	1.048	1-Straight	1-Lip	3-Both				1-Straight	2- Lip Scar	3-Both	1-Flaking	flaking above lip scar and between break 5-6	switched hands and go the same lip and lip scar patterns		
153	28	6	Mike Straskowski	M	16	1-Intentional	1-Top Down	4-Thumb on top perpendicular to stem	1-Close together	2-Yes	switched hands back	30.79	1.212	1-Straight	1-Lip	3-Both				2-Slanted	2- Lip Scar		1-Flaking	flaking above lip scar			
154	28	7	Mike Straskowski	M	16	1-Intentional	1-Top Down	4-Thumb on top perpendicular to stem	1-Close together	1-No		31.86	1.253	2-Slanted	1-Lip					1-Straight	2- Lip Scar	1-Inward Divet	1-Flaking				
155	28	8	Mike Straskowski	M	16	2-Accidental	1-Top Down	4-Thumb on top perpendicular to stem	1-Close together	1-No		41.48	1.633	1-Straight	1-Lip	2-Outward Divet				1-Straight	2- Lip Scar	3-Both		break 8-9 was an accidental break that broke in his hand flaking above lip scar; has both divets but outward is more prominent	the accidental break was a clean break and was his longest fragment		
156	28	9	Mike Straskowski	M	16	1-Intentional	1-Top Down	4-Thumb on top perpendicular to stem	1-Close together	1-No		21.25	0.836	1-Straight	4-Clean	3-Both				1-Straight	2- Lip Scar	2-Outward Divet	1-Flaking				
157	28	10	Mike Straskowski	M	16	1-Intentional	1-Top Down	4-Thumb on top perpendicular to stem	1-Close together	1-No		23.18	0.912	1-Straight	1-Lip	3-Both				2-Slanted	2- Lip Scar	3-Both	1-Flaking	flaking above lip scar and between break 10-11			
158	28	11	Mike Straskowski	M	16	1-Intentional	1-Top Down	4-Thumb on top perpendicular to stem	1-Close together	1-No		20.5	0.807	2-Slanted	1-Lip	3-Both				1-Straight	2- Lip Scar	3-Both					
159	28	12	Mike Straskowski	M	16	1-Intentional	1-Top Down	4-Thumb on top perpendicular to stem	1-Close together	1-No		19.15	0.752	1-Straight	1-Lip	3-Both				1-Straight	2- Lip Scar	3-Both					

Appendix B-1: Experiment 1 Pipe Fragment Data

Fragment ID#	Catalog #	Participant Name	Gender	Pipe Length	Breakage Type	Breakage Direction	Breakage Method	Proximity of Hands	Change of Breakage Method	Method Changed to	Fragment Length (mm)	Fragment Length (in)	Proximal End Break Angle	Proximal End Break Pattern One	Proximal End Break Pattern Two	Proximal End Break Pattern Three	Proximal End Pattern-Notes	Distal End Break Angle	Distal End Break Pattern One	Distal End Break Pattern Two	Distal End Break Pattern Three	Distal End Pattern-Notes	Participant Comments	Author Comments	
160	28	13	Mike Straskowski	M	16	1-Intentional	1-Top Down	4-Thumb on top perpendicular to stem	1-Close together	1-No	22.32	0.878	1-Straight	1-Lip	3-Both			2-Slanted	2- Lip Scar	3-Both	1-Flaking	flaking above lip scar	commented how he had to apply more pressure as he got closer to the bowl		
161	28	14	Mike Straskowski	M	16	1-Intentional	1-Top Down	4-Thumb on top perpendicular to stem	1-Close together	1-No	25.46	1.002	2-Slanted	1-Lip	3-Both			2-Slanted	2- Lip Scar	3-Stem and Bowl Juncture	1-Flaking	flaking above lip scar and between break 14-15	stem and bowl juncture break was the hardest		
162	28	15	Mike Straskowski	M	16	1-Intentional	1-Top Down	10-Stem and Bowl Juncture	4-Stem and Bowl Juncture	3-Stem and Bowl Juncture	7.27	0.286	2-Slanted	1-Lip				5-Stem and Bowl Juncture							
163	29	1	Mandy Eggert	F	16	1-Intentional	1-Top Down	1-Thumb to thumb	1-Close together	1-No	18.94	0.745	5-Mouthpiece	3-Mouthpiece				1-Straight	2- Lip Scar		1-Flaking		see #29 catalog sheet	she commented how it felt harder to break when hands were closer together because she felt the pipe was bowing, therefore going to break.	
164	29	2	Mandy Eggert	F	16	1-Intentional	1-Top Down	1-Thumb to thumb	1-Close together	1-No	20.59	0.81	1-Straight	1-Lip				1-Straight	2- Lip Scar		1-Flaking	flaking above lip scar	break 1-2 may have been hard for her but the first fragment was her smallest fragment		
165	29	3	Mandy Eggert	F	16	1-Intentional	1-Top Down	1-Thumb to thumb	1-Close together	2-Yes	32.93	1.296	1-Straight	1-Lip				1-Straight	2- Lip Scar		1-Flaking	flaking above lip scar	3rd fragment she moved her hands farther apart and this fragment was longer than her first two fragments to secure the long stem and bowl she braced it between her breaking arm and body		
166	29	4	Mandy Eggert	F	16	1-Intentional	1-Top Down	1-Thumb to thumb	1-Close together	1-No	32.06	1.262	1-Straight	1-Lip				1-Straight	2- Lip Scar						
167	29	5	Mandy Eggert	F	16	1-Intentional	1-Top Down	1-Thumb to thumb	1-Close together	1-No	30.19	1.188	1-Straight	1-Lip				1-Straight	2- Lip Scar			small lip scar			
168	29	6	Mandy Eggert	F	16	1-Intentional	1-Top Down	1-Thumb to thumb	1-Close together	1-No	35.71	1.406	1-Straight	1-Lip			very small lip	1-Straight	2- Lip Scar	1-Inward Divet	1-Flaking	small lip scar			
169	29	7	Mandy Eggert	F	16	1-Intentional	1-Top Down	1-Thumb to thumb	1-Close together	1-No	24.5	0.964	1-Straight	1-Lip			2-Outward Divet	1-Straight	2- Lip Scar	2-Outward Divet	1-Flaking				
170	29	8	Mandy Eggert	F	16	1-Intentional	1-Top Down	1-Thumb to thumb	1-Close together	1-No	28.55	1.119	1-Straight	1-Lip				3-Bows-in	2- Lip Scar		1-Flaking	slants towards lip scar			
171	29	9	Mandy Eggert	F	16	1-Intentional	1-Top Down	1-Thumb to thumb	1-Close together	1-No	30.87	1.214	4-Bows-out	1-Lip				3-Bows-in	2- Lip Scar	2-Outward Divet					
172	29	10	Mandy Eggert	F	16	1-Intentional	1-Top Down	1-Thumb to thumb	1-Close together	1-No	29.18	1.148	4-Bows-out	1-Lip			1-Inward Divet	3-Bows-in	2- Lip Scar		1-Flaking				
173	29	11	Mandy Eggert	F	16	1-Intentional	1-Top Down	1-Thumb to thumb	1-Close together	1-No	36.72	1.445	4-Bows-out	1-Lip				1-Straight	2- Lip Scar	1-Inward Divet					
174	29	12	Mandy Eggert	F	16	1-Intentional	1-Top Down	4-Thumb on top perpendicular to stem	1-Close together	2-Yes	26.36	1.038	1-Straight	1-Lip				1-Straight	2- Lip Scar	1-Inward Divet	1-Flaking	slants towards lip scar	switched holding method because the stem was getting larger		
175	29	13	Mandy Eggert	F	16	1-Intentional	1-Top Down	4-Thumb on top perpendicular to stem	1-Close together	1-No	30.17	1.187	1-Straight	1-Lip			2-Outward Divet	1-Straight	2- Lip Scar	1-Inward Divet	1-Flaking		for her the closer her hands were the harder it was to break and the smaller the fragments		
176	29	14	Mandy Eggert	F	16	3-Stem and Bowl Juncture	6-Stem and Bowl Juncture	10-Stem and Bowl Juncture	4-Stem and Bowl Juncture	3-Stem and Bowl Juncture	19.95	0.785	1-Straight	1-Lip				5-Stem and Bowl Juncture	3-Stem and Bowl Juncture					the further her hands were apart the easier it was to break and this resulted in longer fragments	
177	30	1	Natasha Musalem	F	16	1-Intentional	1-Top Down	3-Thumb on top parallel to stem	1-Close together	1-No	35.45	1.395	5-Mouthpiece	3-Mouthpiece				1-Straight	2- Lip Scar	3-Both	1-Flaking		see #30 catalog sheet		
178	30	2	Natasha Musalem	F	16	1-Intentional	1-Top Down	3-Thumb on top parallel to stem	1-Close together	1-No	37.55	1.478	1-Straight	1-Lip	3-Both			1-Straight	2- Lip Scar	3-Both	1-Flaking				
179	30	3	Natasha Musalem	F	16	1-Intentional	1-Top Down	3-Thumb on top parallel to stem	1-Close together	2-Yes	38.29	1.508	1-Straight	1-Lip	3-Both			1-Straight	2- Lip Scar	1-Inward Divet	1-Flaking				
180	30	4	Natasha Musalem	F	16	1-Intentional	1-Top Down	1-Thumb to thumb	1-Close together	2-Yes	25.06	0.986	1-Straight	1-Lip				1-Straight	2- Lip Scar	2-Outward Divet	1-Flaking	flaking above lip scar; has both divets, outward is more prominent	she switched thumb to thumb and broke a smaller fragment than her first 3 fragments		
181	30	5	Natasha Musalem	F	16	1-Intentional	1-Top Down	1-Thumb to thumb	1-Close together	2-Yes	39.14	1.541	1-Straight	1-Lip				1-Straight	2- Lip Scar	2-Outward Divet	1-Flaking	had a typical lip scar	she held it thumb to thumb but intentionally broke it in the center of her hand nearest to the proximal end;		
182	30	6	Natasha Musalem	F	16	1-Intentional	1-Top Down	1-Thumb to thumb	2-Hands apart	2-Yes	52.12	2.052	1-Straight	4-Clean				3-Bows-in	2- Lip Scar	1-Inward Divet	1-Flaking				
183	30	7	Natasha Musalem	F	16	1-Intentional	1-Top Down	1-Thumb to thumb	1-Close together	2-Yes	36.58	1.439	4-Bows-out	4-Clean				2-Outward Divet				flaking occurred between break 7-8			
184	30	8	Natasha Musalem	F	16	1-Intentional	1-Top Down	1-Thumb to thumb	1-Close together	1-No	32.41	1.276	1-Straight	1-Lip				1-Straight	2- Lip Scar	1-Inward Divet	1-Flaking				
185	30	9	Natasha Musalem	F	16	1-Intentional	1-Top Down	1-Thumb to thumb	1-Close together	1-No	19.48	0.767	1-Straight	1-Lip				2-Outward Divet	2- Lip Scar	1-Inward Divet			"applied a lot of pressure"	her shortest fragment	
186	30	10	Natasha Musalem	F	16	1-Intentional	1-Top Down	1-Thumb to thumb	1-Close together	1-No	29.27	1.152	1-Straight	1-Lip				2-Outward Divet	2- Lip Scar	2-Outward Divet					
187	30	11	Natasha Musalem	F	16	1-Intentional	1-Top Down	1-Thumb to thumb	1-Close together	1-No	41.96	1.652	1-Straight	1-Lip				1-Inward Divet	2-Slanted	2- Lip Scar	3-Both	1-Flaking	flaking above lip scar and between break 11-12		
188	30	12	Natasha Musalem	F	16	3-Stem and Bowl Juncture	6-Stem and Bowl Juncture	10-Stem and Bowl Juncture	3-One hand	3-Stem and Bowl Juncture	5.92	0.233	2-Slanted	1-Lip	3-Both				5-Stem and Bowl Juncture	3-Stem and Bowl Juncture				commented that she held whole bowl in bracing hand	
189	31	1	Sara Wendt	F	16	1-Intentional	2-Bottom Up	3-Thumb on top parallel to stem	2-Hands apart	1-No	40.84	1.608	5-Mouthpiece	3-Mouthpiece				3-Bows-in	1-Lip	3-Both				see #31 catalog sheet	

Appendix B-1: Experiment 1 Pipe Fragment Data

Fragment ID#	Participant	Gender	Pipe Length	Breakage Type	Breakage Direction	Breakage Method	Proximity of Hands	Change of Breakage Method	Method Changed to	Fragment Length (mm)	Fragment Length (in)	Proximal End Break Angle	Proximal End Break Pattern One	Proximal End Break Pattern Two	Proximal End Break Pattern Three	Proximal End Pattern-Notes	Distal End Break Angle	Distal End Break Pattern One	Distal End Break Pattern Two	Distal End Break Pattern Three	Distal End Pattern-Notes	Participant Comments	Author Comments
190	Sara Wendt	F	16	1-Intentional	2-Bottom Up	3-Thumb on top parallel to stem	1-Close together	2-Yes	moved hands closer together	33.25	1.309	4-Bows-out	2-Lip Scar	3-Both			1-Straight	2- Lip Scar	1-Inward Divet	1-Flaking			
191	Sara Wendt	F	16	1-Intentional	2-Bottom Up	3-Thumb on top parallel to stem	2-Hands apart	2-Yes	hands 1 2/2 inches apart	37.7	1.484	1-Straight	1-Lip	2-Outward Divet			3-Bows-in	2- Lip Scar			small lip scar		
192	Sara Wendt	F	16	1-Intentional	2-Bottom Up	3-Thumb on top parallel to stem	2-Hands apart	2-Yes	moved both of her hands closer to the bowl	74.59	2.936	1-Straight	1-Lip				1-Straight	2- Lip Scar	2-Outward Divet	1-Flaking	flaking above lip scar		
193	Sara Wendt	F	16	1-Intentional	2-Bottom Up	3-Thumb on top parallel to stem	2-Hands apart	2-Yes	bracing hand always back by the bowl	37.78	1.487	1-Straight	4-Clean	1-Inward Divet		very small lip, wouldn't be able to tell if didn't have distal end of 4th frag	3-Bows-in	2- Lip Scar	2-Outward Divet	1-Flaking	flaking to one side of lip scar		
194	Sara Wendt	F	16	1-Intentional	2-Bottom Up	3-Thumb on top parallel to stem	2-Hands apart	1-No		32.41	1.276	4-Bows-out	1-Lip	1-Inward Divet			3-Bows-in	2- Lip Scar	2-Outward Divet	1-Flaking			
195	Sara Wendt	F	16	1-Intentional	2-Bottom Up	3-Thumb on top parallel to stem	2-Hands apart	1-No		29.41	1.158	4-Bows-out	1-Lip	1-Inward Divet			3-Bows-in	2- Lip Scar	2-Outward Divet	1-Flaking	prominent lip scar	flaking above lip scar	
196	Sara Wendt	F	16	1-Intentional	2-Bottom Up	3-Thumb on top parallel to stem	2-Hands apart	1-No		36.97	1.455	4-Bows-out	1-Lip	1-Inward Divet		prominent lip	1-Straight	2- Lip Scar	2-Outward Divet	1-Flaking	flaking above lip scar		
197	Sara Wendt	F	16	1-Intentional	2-Bottom Up	3-Thumb on top parallel to stem	2-Hands apart	1-No		20.34	0.8	4-Bows-out	1-Lip	1-Inward Divet		prominent lip	1-Straight	2- Lip Scar	1-Inward Divet	1-Flaking			
198	Sara Wendt	F	16	1-Intentional	2-Bottom Up	3-Thumb on top parallel to stem	2-Hands apart	1-No		25.88	1.018	1-Straight	1-Lip	2-Outward Divet			prominent lip	2- Slanted	2- Lip Scar		1-Flaking	flaking above lip scar	
199	Sara Wendt	F	16	3-Stem and Bowl Juncture	6-Stem and Bowl Juncture	10-Stem and Bowl Juncture	4-Stem and Bowl Juncture	3-Stem and Bowl Juncture		24.34	0.958	2-Slanted	1-Lip			prominent lip	5-Stem and Bowl Juncture	3-Stem and Bowl Juncture					
200	Phil Croteau	M	16	1-Intentional	2-Bottom Up	4-Thumb on top perpendicular to stem	1-Close together	1-No		22.94	0.903	5-Mouthpiece	3-Mouthpiece				1-Straight	2- Lip Scar				see #32 catalog sheet	
201	Phil Croteau	M	16	1-Intentional	2-Bottom Up	4-Thumb on top perpendicular to stem	2-Hands apart	2-Yes	hands a little bit further apart	32.52	1.28	1-Straight	1-Lip				1-Straight	2- Lip Scar	2-Outward Divet	1-Flaking	flaking to one side of lip scar		
202	Phil Croteau	M	16	1-Intentional	2-Bottom Up	4-Thumb on top perpendicular to stem	2-Hands apart	1-No		30.92	1.217	1-Straight	1-Lip	1-Inward Divet			1-Straight	2- Lip Scar	2-Outward Divet		slants towards lip scar		
203	Phil Croteau	M	16	1-Intentional	2-Bottom Up	4-Thumb on top perpendicular to stem	2-Hands apart	1-No		34.31	1.351	1-Straight	1-Lip	1-Inward Divet			3-Bows-in	2- Lip Scar	2-Outward Divet	1-Flaking			
204	Phil Croteau	M	16	1-Intentional	2-Bottom Up	4-Thumb on top perpendicular to stem	2-Hands apart	2-Yes	moved hands further apart	41.23	1.623	1-Straight	4-Clean	1-Inward Divet			1-Straight	4-Clean	1-Inward Divet	1-Flaking			
205	Phil Croteau	M	16	1-Intentional	2-Bottom Up	4-Thumb on top perpendicular to stem	1-Close together	2-Yes	moved hands closer together	27.69	1.086	1-Straight	1-Lip	2-Outward Divet		very small lip	1-Straight	2- Lip Scar	1-Inward Divet				
206	Phil Croteau	M	16	1-Intentional	2-Bottom Up	4-Thumb on top perpendicular to stem	1-Close together	1-No		35.57	1.4	1-Straight	1-Lip				1-Straight	2- Lip Scar	2-Outward Divet	1-Flaking			
207	Phil Croteau	M	16	1-Intentional	2-Bottom Up	1-Thumb to thumb	2-Hands apart	2-Yes	moved hands further apart	33.75	1.328	1-Straight	1-Lip	1-Inward Divet			1-Straight	2- Lip Scar	2-Outward Divet	1-Flaking			
208	Phil Croteau	M	16	1-Intentional	2-Bottom Up	1-Thumb to thumb	1-Close together	2-Yes	moved hands closer together	22.04	0.867	1-Straight	1-Lip				1-Straight	2- Lip Scar					
209	Phil Croteau	M	16	1-Intentional	2-Bottom Up	1-Thumb to thumb	1-Close together	1-No		39.63	1.56	1-Straight	1-Lip			prominent lip	1-Straight	2- Lip Scar	2-Outward Divet			he repositioned his hands for almost every break, yet still got lip and lip scars 10 out of the 12 breaks	
210	Phil Croteau	M	16	1-Intentional	2-Bottom Up	11-Distal phalange of index finger	1-Close together	2-Yes	to distal phalange of index finger	37.41	1.472	1-Straight	1-Lip	1-Inward Divet			1-Straight	4-Clean	2-Outward Divet	1-Flaking			
211	Phil Croteau	M	16	1-Intentional	2-Bottom Up	11-Distal phalange of index finger	1-Close together	1-No		27.09	1.066	1-Straight	4-Clean	1-Inward Divet			1-Straight	1-Lip	3-Stem and Bowl Juncture				
212	Phil Croteau	M	16	3-Stem and Bowl Juncture	6-Stem and Bowl Juncture	10-Stem and Bowl Juncture	4-Stem and Bowl Juncture	3-Stem and Bowl Juncture		9.19	0.362	1-Straight	2-Lip Scar				5-Stem and Bowl Juncture	3-Stem and Bowl Juncture					
213	Sam Martin	F	16	1-Intentional	2-Bottom Up	4-Thumb on top perpendicular to stem	1-Close together	1-No		45.36	1.785	5-Mouthpiece	3-Mouthpiece				1-Straight	1-Lip	3-Both	1-Flaking	flaking at the lip	see #33 catalog sheet	
214	Sam Martin	F	16	1-Intentional	2-Bottom Up	4-Thumb on top perpendicular to stem	1-Close together	1-No		34.11	33.78	1-Straight	2-Lip Scar	3-Both			1-Straight	1-Lip	2-Outward Divet	1-Flaking	flaking at the lip		
215	Sam Martin	F	16	1-Intentional	2-Bottom Up	1-Thumb to thumb	1-Close together	2-Yes	thumb to thumb; moved breaking hand towards bowl	60.56	2.384	1-Straight	2-Lip Scar	1-Inward Divet			3-Bows-in	1-Lip		1-Flaking	flaking occurred between break 3-4		fragment #3 was long because her breaking hand grasped the stem the full width of her hand
216	Sam Martin	F	16	1-Intentional	2-Bottom Up	1-Thumb to thumb	1-Close together	2-Yes	moved hands closer to proximal end	28.95	1.139	4-Bows-out	2-Lip Scar				3-Bows-in	2- Lip Scar		1-Flaking	flaking above lip scar		

Appendix B-1: Experiment 1 Pipe Fragment Data

Fragment ID#	Catalog #	Participant Name	Gender	Pipe Length	Breakage Type	Breakage Direction	Breakage Method	Proximity of Hands	Change of Breakage Method	Method Changed to	Fragment Length (mm)	Fragment Length (in)	Proximal End Break Angle	Proximal End Break Pattern One	Proximal End Break Pattern Two	Proximal End Break Pattern Three	Proximal End Pattern-Notes	Distal End Break Angle	Distal End Break Pattern One	Distal End Break Pattern Two	Distal End Break Pattern Three	Distal End Pattern-Notes	Participant Comments	Author Comments
253	36	4	Amy Lulloff	F	16	1-Intentional	2-Bottom Up	1-Thumb to thumb	1-Close together	1-No	18.18	0.716	2-Slanted	1-Lip				2-Slanted	2- Lip Scar		1-Flaking	flaking at the lip scar		
254	36	5	Amy Lulloff	F	16	1-Intentional	2-Bottom Up	1-Thumb to thumb	1-Close together	1-No	16.83	0.662	2-Slanted	1-Lip				1-Straight	2- Lip Scar		1-Flaking	flaking above lip scar and between break 5-6		
255	36	6	Amy Lulloff	F	16	2-Accidental	2-Bottom Up	1-Thumb to thumb	1-Close together	1-No	43.41	1.709	1-Straight	1-Lip		1-Flaking	flaking at the lip	1-Straight	2- Lip Scar	3-Both	1-Flaking	very small lip scar		this accidental break between 6-7 broke in the middle of her hand that was holding the stem
256	36	7	Amy Lulloff	F	16	1-Intentional	2-Bottom Up	1-Thumb to thumb	1-Close together	1-No	14.76	0.581	1-Straight	1-Lip			very small lip	1-Straight	2- Lip Scar		1-Flaking	flaking at the lip scar	her smallest fragment she said she held it "looser"	smaller fragment might have something to do with how much stem is being held in the "breaking hand"
257	36	8	Amy Lulloff	F	16	1-Intentional	2-Bottom Up	1-Thumb to thumb	1-Close together	1-No	27.65	1.088	1-Straight	1-Lip				2-Slanted	2- Lip Scar		1-Flaking	flaking at the lip scar		
258	36	9	Amy Lulloff	F	16	1-Intentional	2-Bottom Up	1-Thumb to thumb	1-Close together	1-No	24.06	0.947	2-Slanted	1-Lip				3-Bows-in	2- Lip Scar		1-Flaking	flaking at the lip scar		
259	36	10	Amy Lulloff	F	16	1-Intentional	2-Bottom Up	1-Thumb to thumb	1-Close together	1-No	19.97	0.782	4-Bows-out	1-Lip				3-Bows-in	2- Lip Scar		1-Flaking	flaking at the lip scar		
260	36	11	Amy Lulloff	F	16	1-Intentional	2-Bottom Up	1-Thumb to thumb	1-Close together	1-No	20.84	0.82	4-Bows-out	1-Lip				2-Slanted	2- Lip Scar		1-Flaking	flaking at the lip scar		
261	36	12	Amy Lulloff	F	16	1-Intentional	2-Bottom Up	1-Thumb to thumb	1-Close together	1-No	17.85	0.702	2-Slanted	1-Lip				3-Bows-in	2- Lip Scar	3-Both	1-Flaking	flaking at the lip scar		
262	36	13	Amy Lulloff	F	16	1-Intentional	2-Bottom Up	1-Thumb to thumb	1-Close together	1-No	17.36	0.683	4-Bows-out	1-Lip	3-Both	1-Flaking	flaking at the lip	1-Straight	2- Lip Scar	3-Both	1-Flaking	flaking at the lip scar		
263	36	14	Amy Lulloff	F	16	1-Intentional	2-Bottom Up	1-Thumb to thumb	1-Close together	1-No	20.85	0.821	4-Bows-out	1-Lip	3-Both	1-Flaking	flaking at the lip	1-Straight	2- Lip Scar	3-Both	1-Flaking	flaking at the lip scar		
264	36	15	Amy Lulloff	F	16	1-Intentional	2-Bottom Up	1-Thumb to thumb	1-Close together	1-No	21.07	0.829	1-Straight	1-Lip	3-Both			2-Slanted	2- Lip Scar	3-Both	1-Flaking	flaking at the lip scar		
265	36	16	Amy Lulloff	F	16	1-Intentional	2-Bottom Up	1-Thumb to thumb	1-Close together	1-No	20.07	0.79	2-Slanted	1-Lip	3-Both			2-Slanted	2- Lip Scar	1-Inward Divet	1-Flaking	flaking at the lip scar		
266	36	17	Amy Lulloff	F	16	1-Intentional	2-Bottom Up	1-Thumb to thumb	1-Close together	1-No	20.11	0.791	2-Slanted	1-Lip	3-Outward Divet	1-Flaking	flaking at the lip	2-Slanted	2- Lip Scar	3-Both	1-Flaking	flaking at the lip scar		
267	36	18	Amy Lulloff	F	16	3-Stem and Bowl Juncture	6-Stem and Bowl Juncture	10-Stem and Bowl Juncture	4-Stem and Bowl Juncture	3-Stem and Bowl Juncture	12.88	0.507	2-Slanted	1-Lip	3-Both			5-Stem and Bowl Juncture	3-Stem and Bowl Juncture					her fragments were some of the smallest fragments from all of the pipes; maybe 2nd to Branden's
268	37	1	Chris Driver	M	16	1-Intentional	3-Right Left	8-Single hand with thumb	3-One hand	1-No	27.35	1.076	5-Mouthpiece	3-Mouthpiece				2-Slanted	2- Lip Scar		1-Flaking	flaking at the lip scar	see #37 catalog sheet	
269	37	2	Chris Driver	M	16	1-Intentional	3-Right Left	8-Single hand with thumb	3-One hand	1-No	22.6	0.889	2-Slanted	1-Lip				2-Slanted	2- Lip Scar	2-Outward Divet	1-Flaking	flaking at the lip scar	he deliberately tried to make smaller fragments until fragments 7 and 8	
270	37	3	Chris Driver	M	16	1-Intentional	3-Right Left	8-Single hand with thumb	3-One hand	1-No	25.16	0.99	2-Slanted	1-Lip	1-Inward Divet			2-Slanted	2- Lip Scar	1-Inward Divet	1-Flaking	flaking at the lip scar	he commented how the lip was always left on the stem still connected to the pipe	and the lip scar is then always on the fragment that was just broken off
271	37	4	Chris Driver	M	16	1-Intentional	3-Right Left	8-Single hand with thumb	3-One hand	1-No	25.9	1.019	2-Slanted	1-Lip	2-Outward Divet			1-Straight	2- Lip Scar	1-Inward Divet	1-Flaking	flaking at the lip scar; prominent inward divet	found that as he was breaking left to right with his right hand, the lip always occurred on the left side of the stem of the pipe that was braced by the right index finger	
272	37	5	Chris Driver	M	16	1-Intentional	3-Right Left	8-Single hand with thumb	3-One hand	1-No	23.17	0.913	1-Straight	1-Lip	2-Outward Divet			3-Bows-in	2- Lip Scar	1-Inward Divet	1-Flaking	flaking at the lip scar; slants towards lip scar		all of the fragments he broke with the single hand and thumb method, all the fragments are consistent in length being the length of his thumb
273	37	6	Chris Driver	M	16	1-Intentional	3-Right Left	8-Single hand with thumb	3-One hand	1-No	26.42	1.04	4-Bows-out	1-Lip	2-Outward Divet			1-Straight	2- Lip Scar	2-Outward Divet	1-Flaking	flaking at the lip scar		
274	37	7	Chris Driver	M	16	1-Intentional	3-Right Left	8-Single hand with thumb	3-One hand	2-Yes	65.05	2.561	1-Straight	1-Lip	1-Inward Divet			3-Bows-in	2- Lip Scar	1-Inward Divet	1-Flaking	flaking occurred between the break 7-8	breaks 7-8 and 8-9 where he moved his thumb, no prominent lip and lip scars but occurred for all his other breaks	the divets always occurred at the bore hole on the left side of the stem since he was breaking right to left
275	37	8	Chris Driver	M	16	1-Intentional	3-Right Left	8-Single hand with thumb	3-One hand	1-No	65.21	2.567	1-Straight	4-Clean	2-Outward Divet			2-Slanted	2- Lip Scar	1-Inward Divet				
276	37	9	Chris Driver	M	16	1-Intentional	3-Right Left	8-Single hand with thumb	3-One hand	2-Yes	33.67	1.325	2-Slanted	1-Lip	2-Outward Divet			2-Slanted	2- Lip Scar	1-Inward Divet	1-Flaking	flaking at the lip scar		
277	37	10	Chris Driver	M	16	1-Intentional	3-Right Left	8-Single hand with thumb	3-One hand	1-No	30.22	1.19	2-Slanted	1-Lip	2-Outward Divet			3-Bows-in	2- Lip Scar	2-Outward Divet	1-Flaking	flaking at the lip scar		
278	37	11	Chris Driver	M	16	1-Intentional	3-Right Left	2-Hands overlap	1-Close together	2-Yes	24.94	0.981	4-Bows-out	1-Lip	1-Inward Divet			3-Bows-in	2- Lip Scar	2-Outward Divet	1-Flaking	flaking at the lip scar		
279	37	12	Chris Driver	M	16	1-Intentional	2-Bottom Up	2-Hands overlap	1-Close together	1-No	18.75	0.738	4-Bows-out	1-Lip	1-Inward Divet			1-Straight	2- Lip Scar	3-Both	1-Flaking	flaking at the lip scar		for his smallest fragment he had to change the direction in which he broke the fragment
280	37	13	Chris Driver	M	16	3-Stem and Bowl Juncture	6-Stem and Bowl Juncture	10-Stem and Bowl Juncture	4-Stem and Bowl Juncture	3-Stem and Bowl Juncture	13.92	0.548	1-Straight	1-Lip	3-Both			5-Stem and Bowl Juncture	3-Stem and Bowl Juncture					
281	38	1	Brendan Bobylak	M	16	1-Intentional	4-Left Right	3-Thumb on top parallel to stem	2-Hands apart	1-No	50.26	1.979	5-Mouthpiece	3-Mouthpiece				1-Straight	4-Clean	2-Outward Divet	1-Flaking	flaking occurred between break 1-2	see #38 catalog sheet; commented how he didn't intentionally break the first fragment	
282	38	2	Brendan Bobylak	M	16	1-Intentional	4-Left Right	11-Distal phalange of index finger	2-Hands apart	2-Yes	30.96	1.219	1-Straight	4-Clean	3-Both			3-Bows-in	2- Lip Scar		1-Flaking	flaking above the lip scar		this was his smallest fragment
283	38	3	Brendan Bobylak	M	16	1-Intentional	4-Left Right	11-Distal phalange of index finger	2-Hands apart	1-No	18.95	0.746	4-Bows-out	1-Lip				1-Straight	2- Lip Scar		1-Flaking	flaking above the lip scar		

Appendix B-1: Experiment 1 Pipe Fragment Data

Fragment ID#	Catalog #	Participant Name	Gender	Pipe Length	Breakage Type	Breakage Direction	Breakage Method	Proximity of Hands	Change of Breakage Method	Method Changed to	Fragment Length (mm)	Fragment Length (in)	Proximal End Break Angle	Proximal End Break Pattern One	Proximal End Break Pattern Two	Proximal End Break Pattern Three	Proximal End Pattern-Notes	Distal End Break Angle	Distal End Break Pattern One	Distal End Break Pattern Two	Distal End Break Pattern Three	Distal End Pattern-Notes	Participant Comments	Author Comments	
284	38	4	Brendan Bobylak	M	16	1-Intentional	4-Left Right	11-Distal phalange of index finger	2-Hands apart	1-No	21.63	0.851	1-Straight	1-Lip				1-Straight	2- Lip Scar		1-Flaking	flaking above the lip scar; slants to one side of lip scar			
285	38	5	Brendan Bobylak	M	16	1-Intentional	4-Left Right	11-Distal phalange of index finger	2-Hands apart	1-No	25.87	1.018	1-Straight	1-Lip				1-Straight	2- Lip Scar	2-Outward Divet	1-Flaking	flaking above the lip scar			
286	38	6	Brendan Bobylak	M	16	1-Intentional	4-Left Right	11-Distal phalange of index finger	2-Hands apart	1-No	23.12	0.91	1-Straight	1-Lip	1-Inward Divet			1-Straight	2- Lip Scar	1-Inward Divet	1-Flaking	flaking above the lip scar			
287	38	7	Brendan Bobylak	M	16	1-Intentional	4-Left Right	11-Distal phalange of index finger	2-Hands apart	1-No	19.5	0.767	1-Straight	1-Lip	2-Outward Divet			1-Straight	2- Lip Scar	2-Outward Divet	1-Flaking	flaking above the lip scar			
288	38	8	Brendan Bobylak	M	16	1-Intentional	4-Left Right	11-Distal phalange of index finger	1-Close together	2-Yes	33.81	1.331	1-Straight	1-Lip	1-Inward Divet			1-Straight	2- Lip Scar	1-Inward Divet	1-Flaking	flaking occurred between break 8-9; flaking above the lip scar	"thumb and forefinger were almost next to each other and broke longer"		
289	38	9	Brendan Bobylak	M	16	1-Intentional	4-Left Right	11-Distal phalange of index finger	2-Hands apart	1-No	25.68	1.011	1-Straight	1-Lip	2-Outward Divet		1-Flaking	1-Straight	2- Lip Scar	2-Outward Divet	1-Flaking	flaking above the lip scar			
290	38	10	Brendan Bobylak	M	16	1-Intentional	4-Left Right	11-Distal phalange of index finger	2-Hands apart	1-No	27.51	1.083	1-Straight	1-Lip	1-Inward Divet			3-Bows-in	2- Lip Scar	2-Outward Divet	1-Flaking	flaking above the lip scar			
291	38	11	Brendan Bobylak	M	16	1-Intentional	4-Left Right	11-Distal phalange of index finger	2-Hands apart	1-No	28.14	1.107	1-Straight	1-Lip	1-Inward Divet			1-Straight	2- Lip Scar	2-Outward Divet	1-Flaking	flaking above the lip scar			
292	38	12	Brendan Bobylak	M	16	1-Intentional	4-Left Right	11-Distal phalange of index finger	2-Hands apart	1-No	25	0.984	1-Straight	1-Lip	1-Inward Divet			1-Straight	2- Lip Scar	2-Outward Divet	1-Flaking	flaking above the lip scar			
293	38	13	Brendan Bobylak	M	16	1-Intentional	4-Left Right	11-Distal phalange of index finger	2-Hands apart	1-No	26.84	1.056	1-Straight	1-Lip	1-Inward Divet			1-Straight	2- Lip Scar	2-Outward Divet	1-Flaking	flaking above the lip scar			
294	38	14	Brendan Bobylak	M	16	1-Intentional	4-Left Right	11-Distal phalange of index finger	2-Hands apart	1-No	22.9	0.901	1-Straight	1-Lip	1-Inward Divet			1-Straight	2- Lip Scar	2-Outward Divet	1-Flaking	flaking above the lip scar; flaking between break 14-15			
295	38	15	Brendan Bobylak	M	16	3-Stem and Bowl Juncture	10-Stem and Bowl Juncture	4-Stem and Bowl Juncture	3-Stem and Bowl Juncture		26.21	1.032	1-Straight	1-Lip	1-Inward Divet			5-Stem and Bowl Juncture							
296	39	1	Savannah Lindsey	F	16	1-Intentional	3-Right Left	3-Thumb on top parallel to stem	2-Hands apart	1-No	40.03	1.576	5-Mouthpiece					1-Straight	2- Lip Scar	2-Outward Divet	1-Flaking	flaking above the lip scar; flaking between break 1-2	see #39 catalog sheet	there are two sides of her pipe that are relatively flat	
297	39	2	Savannah Lindsey	F	16	1-Intentional	3-Right Left	3-Thumb on top parallel to stem	2-Hands apart	1-No	40.31	1.587	1-Straight	4-Clean	1-Inward Divet			3-Bows-in	2- Lip Scar		1-Flaking	flaking above the lip scar			
298	39	3	Savannah Lindsey	F	16	2-Accidental	3-Right Left	3-Thumb on top parallel to stem	2-Hands apart	1-No	90.52	3.564	4-Bows-out	1-Lip				2-Slanted	1-Lip				accidental fragment broke behind her left bracing hand; it was accidental yet produced a lip and corresponding lip scar on fragment #4		
299	39	4	Savannah Lindsey	F	16	1-Intentional	3-Right Left	3-Thumb on top parallel to stem	2-Hands apart	1-No	36.4	1.433	1-Straight	2-Lip Scar				3-Bows-in	2- Lip Scar	2-Outward Divet	1-Flaking	flaking above the lip scar			
300	39	5	Savannah Lindsey	F	16	1-Intentional	3-Right Left	3-Thumb on top parallel to stem	2-Hands apart	1-No	46.88	1.845	4-Bows-out	1-Lip	1-Inward Divet			1-Straight	2- Lip Scar	2-Outward Divet	1-Flaking	flaking above the lip scar; flaking between break 5-6			
301	39	6	Savannah Lindsey	F	16	1-Intentional	3-Right Left	3-Thumb on top parallel to stem	2-Hands apart	1-No	45.87	1.806	1-Straight	1-Lip	1-Inward Divet			1-Straight	2- Lip Scar	2-Outward Divet	1-Flaking	flaking above the lip scar			
302	39	7	Savannah Lindsey	F	16	1-Intentional	3-Right Left	3-Thumb on top parallel to stem	2-Hands apart	1-No	48.05	1.892	1-Straight	1-Lip	1-Inward Divet			2-Slanted	2- Lip Scar						
303	39	8	Savannah Lindsey	F	16	1-Intentional	3-Right Left	3-Thumb on top parallel to stem	2-Hands apart	1-No	27.17	1.069	2-Slanted	1-Lip				2-Slanted	1-Lip	1-Inward Divet			fragment #8 was her smallest fragment maybe because she wanted and had to find a way to make the stem and bowl juncture fragment smaller		
304	39	9	Savannah Lindsey	F	16	1-Intentional	6-Stem and Bowl Juncture	10-Stem and Bowl Juncture	4-Stem and Bowl Juncture	3-Stem and Bowl Juncture	10.29	0.405	1-Straight	2-Lip Scar	2-Outward Divet		1-Flaking	flaking above the lip scar	5-Stem and Bowl Juncture	3-Stem and Bowl Juncture			exception of accidental fragment, all fragments were around 40mm and breaks showed lip and lip scars		
305	40	1	Ernie Boszhardt	M	16	1-Intentional	3-Right Left	4-Thumb on top perpendicular to stem	1-Close together	1-No	17.1	0.673	5-Mouthpiece	3-Mouthpiece				1-Straight	2- Lip Scar		1-Flaking	flaking above the lip scar	see #40 catalog sheet		
306	40	2	Ernie Boszhardt	M	16	2-Accidental	3-Right Left	4-Thumb on top perpendicular to stem	1-Close together	1-No	44.52	1.752	1-Straight	1-Lip				1-Straight	1-Lip		1-Flaking	flaking at the lip	"I think it broke due to length of pipe wiggling."	broke in his bracing hand	
307	40	3	Ernie Boszhardt	M	16	1-Intentional	3-Right Left	4-Thumb on top perpendicular to stem	1-Close together	2-Yes	21.87	0.861	1-Straight	2-Lip Scar			1-Flaking	1-Straight	2- Lip Scar		1-Flaking	flaking above the lip scar	"Frag #3 I consciously held stem firmer to try and prevent accidental break"		
308	40	4	Ernie Boszhardt	M	16	1-Intentional	3-Right Left	4-Thumb on top perpendicular to stem	1-Close together	1-No	23.16	0.912	1-Straight	1-Lip				1-Straight	2- Lip Scar	2-Outward Divet	1-Flaking	flaking above the lip scar			
309	40	5	Ernie Boszhardt	M	16	1-Intentional	3-Right Left	4-Thumb on top perpendicular to stem	1-Close together	1-No	22.74	0.895	1-Straight	1-Lip	1-Inward Divet			1-Straight	2- Lip Scar		1-Flaking	flaking above the lip scar			
310	40	6	Ernie Boszhardt	M	16	1-Intentional	3-Right Left	4-Thumb on top perpendicular to stem	1-Close together	1-No	21.36	0.841	1-Straight	1-Lip				prominent lip	1-Straight	2- Lip Scar		1-Flaking	flaking above the lip scar		
311	40	7	Ernie Boszhardt	M	16	1-Intentional	3-Right Left	4-Thumb on top perpendicular to stem	1-Close together	2-Yes	22.84	0.899	1-Straight	1-Lip				prominent lip	1-Straight	2- Lip Scar		1-Flaking	flaking above the lip scar	he changed the orientation of the pipe to break at the narrowest portion of the stem because the stem is getting wider; this resulted in an accidental break 8-9	
312	40	8	Ernie Boszhardt	M	16	2-Accidental	3-Right Left	4-Thumb on top perpendicular to stem	1-Close together	1-No	54.36	2.14	1-Straight	1-Lip				prominent lip	1-Straight	2- Lip Scar	3-Both	1-Flaking	flaking above the lip scar		
313	40	9	Ernie Boszhardt	M	16	1-Intentional	3-Right Left	4-Thumb on top perpendicular to stem	1-Close together	1-No	21.61	0.851	1-Straight	1-Lip	3-Both			1-Straight	2- Lip Scar	2-Outward Divet	1-Flaking				
314	40	10	Ernie Boszhardt	M	16	1-Intentional	3-Right Left	4-Thumb on top perpendicular to stem	1-Close together	1-No	18.56	0.73	1-Straight	1-Lip	1-Inward Divet			prominent lip	1-Straight	2- Lip Scar		1-Flaking	flaking above the lip scar; flaking between break 10-11		

Appendix B-1: Experiment 1 Pipe Fragment Data

Fragment ID#	Catalog #	Participant Name	Gender	Pipe Length	Breakage Type	Breakage Direction	Breakage Method	Proximity of Hands	Change of Breakage Method	Method Changed to	Fragment Length (mm)	Fragment Length (in)	Proximal End Break Angle	Proximal End Break Pattern One	Proximal End Break Pattern Two	Proximal End Break Pattern Three	Proximal End Pattern-Notes	Distal End Break Angle	Distal End Break Pattern One	Distal End Break Pattern Two	Distal End Break Pattern Three	Distal End Pattern-Notes	Participant Comments	Author Comments	
315	40	11 Ernie Boszhardt	M	16	1-Intentional	3-Right Left	4-Thumb on top perpendicular to stem	1-Close together	1-No		21.47	0.845	1-Straight	1-Lip				1-Straight	2- Lip Scar		1-Flaking	flaking above the lip scar			
316	40	12 Ernie Boszhardt	M	16	1-Intentional	3-Right Left	4-Thumb on top perpendicular to stem	1-Close together	1-No		20.85	0.82	1-Straight	1-Lip				1-Straight	2- Lip Scar	2-Outward Divet	1-Flaking	flaking above the lip scar	"difficult to break within the last 6 inches" all of the breaks "have a distinct lip, which always remained in place where thumb of right hand (holding main portion of pipe) was pressed against stem; thumb absorbed shock?"	where the thumb braces the stem and leaves a lip, the finger is absorbing the shock from the break	
317	40	13 Ernie Boszhardt	M	16	1-Intentional	3-Right Left	4-Thumb on top perpendicular to stem	1-Close together	1-No		19.98	0.787	2- Slanted	1-Lip			prominent lip	1-Straight	2- Lip Scar		1-Flaking	flaking above the lip scar			
318	40	14 Ernie Boszhardt	M	16	2-Accidental	3-Right Left	4-Thumb on top perpendicular to stem	1-Close together	1-No		33.25	1.309	1-Straight	1-Lip				1-Straight	2- Lip Scar	1-Inward Divet	1-Flaking			even his accidental breaks had characteristic lip and lip scars; they all occurred within his bracing hand	
319	40	15 Ernie Boszhardt	M	16	1-Intentional	3-Right Left	4-Thumb on top perpendicular to stem	1-Close together	1-No		24.54	0.966	1-Straight	1-Lip				2- Slanted	2- Lip Scar		1-Flaking				
320	40	16 Ernie Boszhardt	M	16	1-Intentional	3-Right Left	4-Thumb on top perpendicular to stem	1-Close together	1-No		25.78	1.015	2- Slanted	1-Lip				1-Straight	2- Lip Scar		1-Flaking	flaking above the lip scar			
321	40	17 Ernie Boszhardt	M	16	3-Stem and Bowl Juncture	6-Stem and Bowl Juncture	10-Stem and Bowl Juncture	4-Stem and Bowl Juncture	3-Stem and Bowl Juncture		8.05	0.317	2- Slanted	1-Lip				5-Stem and Bowl Juncture	3-Stem and Bowl Juncture						
322	41	1 Beth Hall	F	16	1-Intentional	3-Right Left	7-Thumbs on opposite sides of the stem	1-Close together	1-No		27.06	1.065	5-Mouthpiece	3-Mouthpiece				2- Slanted	2- Lip Scar		1-Flaking	flaking above the lip scar	see #41 catalog sheet	this was Beth's first pipe	
323	41	2 Beth Hall	F	16	2-Accidental	3-Right Left	7-Thumbs on opposite sides of the stem	1-Close together	1-No		53.41	2.102	2- Slanted	1-Lip				3-Bows-in	2- Lip Scar	3-Both	1-Flaking	slants towards lip scar		unknown how her accidental fragments broke the breaks of her first pipe are distinctly different than the breaks of her second pipe	
324	41	3 Beth Hall	F	16	2-Accidental	3-Right Left	7-Thumbs on opposite sides of the stem	1-Close together	1-No		78.1	2.996	4-Bows-out	1-Lip	3-Both			2- Slanted	4-Clean					these breaks have jagged edges and cores; no one else produced these patterns	
325	41	4 Beth Hall	F	16	1-Intentional	3-Right Left	7-Thumbs on opposite sides of the stem	1-Close together	1-No		50.88	2.004	2- Slanted	4-Clean				3-Bows-in	4-Clean	1-Inward Divet	1-Flaking	extreme flaking not characteristic of intentional breaks			
326	41	5 Beth Hall	F	16	1-Intentional	3-Right Left	7-Thumbs on opposite sides of the stem	1-Close together	1-No		36.33	1.43	4-Bows-out	4-Clean				3-Bows-in		1-Inward Divet	1-Flaking	jagged edge			
327	41	6 Beth Hall	F	16	1-Intentional	3-Right Left	7-Thumbs on opposite sides of the stem	1-Close together	1-No		44.43	1.749	4-Bows-out				2-Outward Divet	jagged edge	1-Straight	2- Lip Scar	3-Both	1-Flaking	jagged edge		
328	41	7 Beth Hall	F	16	1-Intentional	3-Right Left	7-Thumbs on opposite sides of the stem	1-Close together	1-No		43.32	1.705	1-Straight	1-Lip	3-Both			2- Slanted	2- Lip Scar		1-Flaking	jagged edge and core			
329	41	8 Beth Hall	F	16	1-Intentional	3-Right Left	7-Thumbs on opposite sides of the stem	1-Close together	1-No		40.11	1.579	2- Slanted	1-Lip				jagged core	2- Slanted	2- Lip Scar	1-Inward Divet	1-Flaking	jagged edge and core		
330	41	9 Beth Hall	F	16	3-Stem and Bowl Juncture	6-Stem and Bowl Juncture	10-Stem and Bowl Juncture	4-Stem and Bowl Juncture	3-Stem and Bowl Juncture		19.92	0.784	2- Slanted	1-Lip				5-Stem and Bowl Juncture	3-Stem and Bowl Juncture						
331	42	1 Libby McCoy	F	16	1-Intentional	3-Right Left	12-One fist	2-Hands apart	1-No		51.34	2.021	5-Mouthpiece	3-Mouthpiece				1-Straight	4-Clean		1-Flaking		see #42 catalog sheet		
332	42	2 Libby McCoy	F	16	1-Intentional	3-Right Left	12-One fist	2-Hands apart	1-No		21.97	0.865	1-Straight	4-Clean				3-Bows-in	2- Lip Scar		1-Flaking	flaking between break 2-3	"held pipe in front of me horizontally (pointed straight out from me)"	her hands were far apart and the thumb of her breaking hand pointed away from the bowl so the fragments always broke at her pinky finger	
333	42	3 Libby McCoy	F	16	1-Intentional	3-Right Left	12-One fist	2-Hands apart	1-No		23.14	0.911	4-Bows-out	4-Clean			1-Flaking	looks like lip broke off	3-Bows-in	2- Lip Scar		1-Flaking	flaking between break 3-4	her left bracing hand was always just before the bowl	
334	42	4 Libby McCoy	F	16	1-Intentional	3-Right Left	12-One fist	2-Hands apart	1-No		45.64	1.797	4-Bows-out	4-Clean			1-Flaking	looks like lip broke off	1-Straight	1-Lip		1-Flaking	flaking between break 4-5		
335	42	5 Libby McCoy	F	16	1-Intentional	3-Right Left	12-One fist	2-Hands apart	1-No		41.66	1.64	1-Straight	2-Lip Scar				3-Bows-in	1-Lip	1-Inward Divet	1-Flaking	flaking between break 5-6			
336	42	6 Libby McCoy	F	16	1-Intentional	3-Right Left	12-One fist	2-Hands apart	1-No		78.09	3.074	4-Bows-out	2-Lip Scar				2-Outward Divet	1-Lip	1-Inward Divet	1-Flaking		her longest fragment and intentionally wanted a long fragment and just moved her breaking hand further down the stem closer to the bowl		
337	42	7 Libby McCoy	F	16	1-Intentional	3-Right Left	12-One fist	2-Hands apart	1-No		42.52	1.674	1-Straight	2-Lip Scar				1-Inward Divet		4-Clean					
338	42	8 Libby McCoy	F	16	1-Intentional	3-Right Left	12-One fist	2-Hands apart	1-No		35.22	1.386	1-Straight	4-Clean				1-Straight	2- Lip Scar	2-Outward Divet	1-Flaking	flaking above the lip scar			
339	42	9 Libby McCoy	F	16	1-Intentional	3-Right Left	12-One fist	2-Hands apart	1-No		34.37	1.353	1-Straight	1-Lip				looks like lip broke off	1-Straight	4-Clean					
340	42	10 Libby McCoy	F	16	3-Stem and Bowl Juncture	6-Stem and Bowl Juncture	10-Stem and Bowl Juncture	4-Stem and Bowl Juncture	3-Stem and Bowl Juncture		13.29	0.523	1-Straight	4-Clean				4-Bows-out	4-Clean						
341	43	1 Kaitlyn Borland	F	16	1-Intentional	4-Left Right	1-Thumb to thumb	1-Close together	1-No		15.03	0.591	5-Mouthpiece	3-Mouthpiece				3-Bows-in	2- Lip Scar		1-Flaking	flaking above the lip scar	see #43 catalog sheet	Kaitlyn's first pipe	
342	43	2 Kaitlyn Borland	F	16	1-Intentional	4-Left Right	1-Thumb to thumb	1-Close together	1-No		16.47	0.648	4-Bows-out	1-Lip				3-Bows-in	2- Lip Scar		1-Flaking	flaking above the lip scar			
343	43	3 Kaitlyn Borland	F	16	1-Intentional	4-Left Right	1-Thumb to thumb	1-Close together	1-No		29.61	1.165	4-Bows-out	1-Lip				2- Slanted	2- Lip Scar		1-Flaking	flaking above the lip scar			
344	43	4 Kaitlyn Borland	F	16	1-Intentional	4-Left Right	1-Thumb to thumb	1-Close together	1-No		19.73	0.777	2- Slanted	1-Lip				2- Slanted	2- Lip Scar		1-Flaking	flaking above the lip scar			
345	43	5 Kaitlyn Borland	F	16	1-Intentional	4-Left Right	1-Thumb to thumb	1-Close together	1-No		21.05	0.828	2- Slanted	1-Lip				2- Slanted	2- Lip Scar		1-Flaking	flaking above the lip scar			
346	43	6 Kaitlyn Borland	F	16	1-Intentional	4-Left Right	1-Thumb to thumb	1-Close together	1-No		23.08	0.908	2- Slanted	1-Lip				1-Straight	2- Lip Scar	1-Inward Divet	1-Flaking	flaking above the lip scar			

Appendix B-1: Experiment 1 Pipe Fragment Data

Fragment ID#	Catalog #	Participant Name	Gender	Pipe Length	Breakage Type	Breakage Direction	Breakage Method	Proximity of Hands	Change of Breakage Method	Method Changed to	Fragment Length (mm)	Fragment Length (in)	Proximal End Break Angle	Proximal End Break Pattern One	Proximal End Break Pattern Two	Proximal End Break Pattern Three	Proximal End Pattern-Notes	Distal End Break Angle	Distal End Break Pattern One	Distal End Break Pattern Two	Distal End Break Pattern Three	Distal End Pattern-Notes	Participant Comments	Author Comments
347	43	7	Kaitlyn Borland	F	16	1-Intentional	4-Left Right	1-Thumb to thumb	1-Close together	1-No	20.69	0.814	1-Straight	1-Lip	2-Outward Divet			1-Straight	2- Lip Scar	1-Inward Divet	1-Flaking	flaking above the lip scar		
348	43	8	Kaitlyn Borland	F	16	1-Intentional	4-Left Right	1-Thumb to thumb	1-Close together	1-No	29.12	1.146	1-Straight	1-Lip	2-Outward Divet			1-Straight	2- Lip Scar		1-Flaking	flaking above the lip scar	"my thumb slipped at the last second, so there is hardly any flaking on the pipe side"	the lip scar is wider, not as narrow as characteristic lip scars
349	43	9	Kaitlyn Borland	F	16	1-Intentional	4-Left Right	1-Thumb to thumb	1-Close together	1-No	20.35	0.801	1-Straight	1-Lip		lip is wider	2-Slanted	2- Lip Scar	2-Outward Divet	1-Flaking	flaking above the lip scar	flaking above the lip scar and between break 10-11		finger didn't slip on this break so lip and lip scar is characteristic and prominent
350	43	10	Kaitlyn Borland	F	16	1-Intentional	4-Left Right	1-Thumb to thumb	1-Close together	1-No	26.15	1.029	2-Slanted	1-Lip				1-Straight	2- Lip Scar	2-Outward Divet	1-Flaking	flaking above the lip scar; slants towards lip scar		
351	43	11	Kaitlyn Borland	F	16	1-Intentional	4-Left Right	1-Thumb to thumb	1-Close together	1-No	19.06	0.75	1-Straight	1-Lip	1-Inward Divet			2-Slanted	2- Lip Scar		1-Flaking			
352	43	12	Kaitlyn Borland	F	16	1-Intentional	4-Left Right	1-Thumb to thumb	1-Close together	1-No	25.87	1.018	2-Slanted	1-Lip				2-Slanted	2- Lip Scar	2-Outward Divet	1-Flaking	flaking above the lip scar		
353	43	13	Kaitlyn Borland	F	16	1-Intentional	4-Left Right	1-Thumb to thumb	1-Close together	1-No	23.13	0.91	2-Slanted	1-Lip	1-Inward Divet			2-Slanted	2- Lip Scar	1-Inward Divet	1-Flaking	flaking above the lip scar		
354	43	14	Kaitlyn Borland	F	16	1-Intentional	4-Left Right	1-Thumb to thumb	1-Close together	1-No	37.98	1.495	2-Slanted	1-Lip	2-Outward Divet			2-Slanted	2- Lip Scar	1-Inward Divet	1-Flaking	flaking above the lip scar	"thumb slipped again (needed more leverage) so flaking is much less significant on pipe end"	
355	43	15	Kaitlyn Borland	F	16	1-Intentional	4-Left Right	12-One fist	1-Close together	2-Yes fist method	43.79	1.724	2-Slanted	1-Lip	2-Outward Divet			1-Straight	1-Lip	1-Inward Divet				she switched methods that's why there are 2 lips on fragment #15
356	43	16	Kaitlyn Borland	F	16	1-Intentional	4-Left Right	12-One fist	1-Close together	1-No	31.36	1.234	1-Straight	2-Lip Scar	2-Outward Divet			2-Slanted	1-Lip	2-Outward Divet			"felt like I didn't have as much size control with fist method"	she commented how the fist method did not produce uniform pressure therefore no control over length
357	43	17	Kaitlyn Borland	F	16	3-Stem and Bowl Juncture	6-Stem and Bowl Juncture	10-Stem and Bowl Juncture	4-Stem and Bowl Juncture	3-Stem and Bowl Juncture	12.89	0.507	2-Slanted	2-Lip Scar	1-Inward Divet			5-Stem and Bowl Juncture	3-Stem and Bowl Juncture					the thumb to thumb method you have more control because you're concentrating the pressure
358	44	1	Kallie Seifert	F	16	1-Intentional	4-Left Right	1-Thumb to thumb	1-Close together	1-No	37.72	1.485	5-Mouthpiece	3-Mouthpiece				3-Bows-in	2- Lip Scar	2-Outward Divet	1-Flaking	flaking between break 1-2	see #44 catalog sheet	
359	44	2	Kallie Seifert	F	16	1-Intentional	4-Left Right	1-Thumb to thumb	1-Close together	1-No	31.94	1.257	4-Bows-out	1-Lip	1-Inward Divet			1-Straight	2- Lip Scar	1-Inward Divet	1-Flaking	flaking above the lip scar and between break 2-3		
360	44	3	Kallie Seifert	F	16	1-Intentional	4-Left Right	1-Thumb to thumb	1-Close together	1-No	28.69	1.129	1-Straight	1-Lip	2-Outward Divet			2-Slanted	2- Lip Scar		1-Flaking	flaking above the lip scar and between break 3-4		
361	44	4	Kallie Seifert	F	16	1-Intentional	4-Left Right	1-Thumb to thumb	1-Close together	1-No	23.67	0.932	2-Slanted	1-Lip				1-Straight	2- Lip Scar	1-Inward Divet	1-Flaking	flaking above the lip scar	commented how it was harder for her to break and left a larger lip on the proximal end of fragment #4	
362	44	5	Kallie Seifert	F	16	1-Intentional	4-Left Right	1-Thumb to thumb	1-Close together	1-No	31.67	1.246	1-Straight	1-Lip	2-Outward Divet			2-Slanted	2- Lip Scar	2-Outward Divet	1-Flaking	flaking above the lip scar and between break 5-6		
363	44	6	Kallie Seifert	F	16	1-Intentional	4-Left Right	1-Thumb to thumb	1-Close together	1-No	20.25	0.797	2-Slanted	1-Lip	1-Inward Divet			2-Slanted	2- Lip Scar	2-Outward Divet	1-Flaking	flaking above the lip scar and between break 6-7		
364	44	7	Kallie Seifert	F	16	1-Intentional	4-Left Right	1-Thumb to thumb	1-Close together	1-No	34.8	1.37	2-Slanted	1-Lip	1-Inward Divet			2-Slanted	2- Lip Scar	1-Inward Divet	1-Flaking	flaking above the lip scar and between break 7-8	commented how she had to "push harder with right thumb" and produced larger lip and lip scar	
365	44	8	Kallie Seifert	F	16	1-Intentional	4-Left Right	1-Thumb to thumb	1-Close together	1-No	34.25	1.348	2-Slanted	1-Lip	2-Outward Divet			1-Straight	2- Lip Scar		1-Flaking	flaking above the lip scar	"used more of whole hand" but "had pressure with other fingers"	
366	44	9	Kallie Seifert	F	16	1-Intentional	4-Left Right	1-Thumb to thumb	1-Close together	1-No	34.02	1.339	1-Straight	1-Lip				3-Bows-in	2- Lip Scar	2-Outward Divet	1-Flaking	flaking between break 9-10	she had to grip more of the bowl; harder to break and break was higher and wasn't just between the thumbs	
367	44	10	Kallie Seifert	F	16	1-Intentional	4-Left Right	1-Thumb to thumb	1-Close together	1-No	34.9	1.374	4-Bows-out	1-Lip	1-Inward Divet		lip was broken off	2-Slanted	4-Clean	2-Outward Divet	1-Flaking	flaking between break 10-11		
368	44	11	Kallie Seifert	F	16	1-Intentional	4-Left Right	12-One fist	1-Close together	2-Yes used fist to break downward	23.37	0.92	2-Slanted	4-Clean	1-Inward Divet			1-Straight	2- Lip Scar	2-Outward Divet	1-Flaking			
369	44	12	Kallie Seifert	F	16	2-Accidental	4-Left Right	12-One fist	1-Close together	1-No	55.03	2.165	1-Straight	1-Lip	1-Inward Divet			2-Slanted	2- Lip Scar	1-Inward Divet				
370	44	13	Kallie Seifert	F	16	3-Stem and Bowl Juncture	6-Stem and Bowl Juncture	10-Stem and Bowl Juncture	4-Stem and Bowl Juncture	3-Stem and Bowl Juncture	14.85	0.584	2-Slanted	1-Lip	2-Outward Divet			5-Stem and Bowl Juncture	3-Stem and Bowl Juncture					
371	45	1	Morgan Quamme	F	16	1-Intentional	4-Left Right	3-Thumb on top parallel to stem	2-Hands apart	1-No	28.57	1.124	5-Mouthpiece	3-Mouthpiece				1-Straight	2- Lip Scar	2-Outward Divet	1-Flaking	flaking above the lip scar	see #45 catalog sheet	fragment broke at her thumb
372	45	2	Morgan Quamme	F	16	1-Intentional	4-Left Right	3-Thumb on top parallel to stem	2-Hands apart	1-No	25.81	1.008	1-Straight	1-Lip	2-Outward Divet			3-Bows-in	2- Lip Scar	2-Outward Divet	1-Flaking	flaking above the lip scar and slants towards lip scar		fragment broke at her thumb
373	45	3	Morgan Quamme	F	16	1-Intentional	4-Left Right	3-Thumb on top parallel to stem	2-Hands apart	1-No	60.76	2.392	4-Bows-out	1-Lip	2-Outward Divet			2-Slanted	4-Clean	2-Outward Divet			the fragment broke at her fist instead of her thumb so the fragment was longer	fragment broke at her fist
374	45	4	Morgan Quamme	F	16	1-Intentional	4-Left Right	1-Thumb to thumb	1-Close together	2-Yes thumb to thumb switched hands	38.02	1.497	2-Slanted	1-Lip	1-Inward Divet			1-Straight	2- Lip Scar	2-Outward Divet	1-Flaking			fragment broke at her thumb
375	45	5	Morgan Quamme	F	16	1-Intentional	4-Left Right	1-Thumb to thumb	1-Close together	2-Yes	51.19	2.015	1-Straight	1-Lip	1-Inward Divet			1-Straight	2- Lip Scar	2-Outward Divet				fragment broke in the middle of her thumb
376	45	6	Morgan Quamme	F	16	1-Intentional	4-Left Right	1-Thumb to thumb	1-Close together	1-No	30.08	1.183	1-Straight	1-Lip	1-Inward Divet			1-Straight	2- Lip Scar		1-Flaking	flaking above and to one side of the lip scar	she intentionally wanted a smaller fragment	fragment broke at her thumb
377	45	7	Morgan Quamme	F	16	1-Intentional	4-Left Right	1-Thumb to thumb	1-Close together	1-No	82.98	3.267	1-Straight	1-Lip				2-Slanted	4-Clean	1-Inward Divet			she moved her breaking hand down closer to the bowl and the fragment broke at her fist	

Appendix B-1: Experiment 1 Pipe Fragment Data

Fragment ID#	Catalog #	Participant #	Name of Participant	Gender	Pipe Length	Breakage Type	Breakage Direction	Breakage Method	Proximity of Hands	Change of Breakage Method	Method Changed to	Fragment Length (mm)	Fragment Length (in)	Proximal End Break Angle	Proximal End Break Pattern One	Proximal End Break Pattern Two	Proximal End Break Pattern Three	Proximal End Pattern-Notes	Distal End Break Angle	Distal End Break Pattern One	Distal End Break Pattern Two	Distal End Break Pattern Three	Distal End Pattern-Notes	Participant Comments	Author Comments
378	45	8	Morgan Quamme	F	16	1-Intentional 3-Stem and Bowl Juncture	4-Left Right	1-Thumb to thumb	1-Close together	1-No		50.6	1.992	1-Straight	1-Lip	2-Outward Divet			1-Straight	1-Lip	1-Inward Divet				fragment broke at her thumb
379	45	9	Morgan Quamme	F	16	1-Intentional 3-Stem and Bowl Juncture	4-Left Right	10-Stem and Bowl Juncture	4-Stem and Bowl Juncture	1-No		33.55	1.321	2-Slanted	2-Lip Scar	2-Outward Divet			5-Stem and Bowl Juncture	3-Stem and Bowl Juncture					
380	46	1	Joe Tiffany	M	16	1-Intentional	4-Left Right	12-One fist	2-Hands apart	1-No		67.06	2.64	5-Mouthpiece	3- Mouthpiece			1-Straight	2- Lip Scar	2-Outward Divet	1-Flaking		see #46 catalog sheet	the breaking hand held the stem the length of his fist	
381	46	2	Joe Tiffany	M	16	1-Intentional	4-Left Right	12-One fist	2-Hands apart	1-No		37.12	1.461	1-Straight	4-Clean	1-Inward Divet			3-Bows-in	2- Lip Scar	2-Outward Divet	1-Flaking			
382	46	3	Joe Tiffany	M	16	1-Intentional	4-Left Right	12-One fist	2-Hands apart	1-No		38.57	1.516	1-Straight	4-Clean	2-Outward Divet			1-Straight	2- Lip Scar	2-Outward Divet	1-Flaking	jagged edge		
383	46	4	Joe Tiffany	M	16	1-Intentional	4-Left Right	1-Thumb to thumb	1-Close together	2-Yes	I told him to try to make smaller fragments	21.95	0.864	1-Straight	4-Clean	1-Inward Divet			2-Slanted	2- Lip Scar	1-Inward Divet	1-Flaking		he commented how he had to apply more pressure	as soon as he changed methods, concentrated all the pressure, break 4-5 has characteristic lip scar and corresponding lip
384	46	5	Joe Tiffany	M	16	1-Intentional	4-Left Right	1-Thumb to thumb	1-Close together	1-No		19.85	0.781	2-Slanted	1-Lip	2-Outward Divet			2-Slanted	2- Lip Scar					
385	46	6	Joe Tiffany	M	16	1-Intentional	4-Left Right	1-Thumb to thumb	1-Close together	1-No		22.64	0.891	2-Slanted	1-Lip				2-Slanted	2- Lip Scar		1-Flaking			
386	46	7	Joe Tiffany	M	16	1-Intentional	4-Left Right	1-Thumb to thumb	1-Close together	1-No		21.93	0.861	2-Slanted	1-Lip				2-Slanted	2- Lip Scar	2-Outward Divet	1-Flaking	flaking between break 7-8		
387	46	8	Joe Tiffany	M	16	1-Intentional	4-Left Right	1-Thumb to thumb	1-Close together	1-No		21.09	0.83	2-Slanted	1-Lip	1-Inward Divet			2-Slanted	2- Lip Scar		1-Flaking	flaking above the lip scar		
388	46	9	Joe Tiffany	M	16	1-Intentional	4-Left Right	1-Thumb to thumb	1-Close together	1-No		22.89	0.901	2-Slanted	1-Lip				2-Slanted	2- Lip Scar	3-Both	1-Flaking	flaking above the lip scar		
389	46	10	Joe Tiffany	M	16	1-Intentional	4-Left Right	1-Thumb to thumb	1-Close together	1-No		22.99	0.905	2-Slanted	1-Lip	3-Both 2-Outward Divet			2-Slanted	2- Lip Scar	1-Inward Divet	1-Flaking	flaking above the lip scar		
390	46	11	Joe Tiffany	M	16	1-Intentional	4-Left Right	1-Thumb to thumb	1-Close together	1-No		28.54	1.123	2-Slanted	1-Lip	2-Outward Divet			2-Slanted	2- Lip Scar		1-Flaking	flaking at the lip scar		
391	46	12	Joe Tiffany	M	16	1-Intentional	4-Left Right	1-Thumb to thumb	1-Close together	1-No		32.26	1.27	2-Slanted	1-Lip				2-Slanted	2- Lip Scar		1-Flaking	flaking above the lip scar		
392	46	13	Joe Tiffany	M	16	1-Intentional 3-Stem and Bowl Juncture	4-Left Right	1-Thumb to thumb	1-Close together	1-No		31.1	1.224	2-Slanted	1-Lip				1-Straight	1-Lip	1-Inward Divet				
393	46	14	Joe Tiffany	M	16	1-Intentional 3-Stem and Bowl Juncture	4-Left Right	10-Stem and Bowl Juncture	4-Stem and Bowl Juncture	1-No		17.08	0.672	1-Straight	4-Clean	3- Mouthpiece			5-Stem and Bowl Juncture	3-Stem and Bowl Juncture					
394	47	1	Jim Theler	M	16	1-Intentional	4-Left Right	1-Thumb to thumb	1-Close together	1-No		20.67	0.813	5-Mouthpiece	3- Mouthpiece				1-Straight	2- Lip Scar		1-Flaking	flaking above the lip scar	see #47 catalog sheet	
395	47	2	Jim Theler	M	16	1-Intentional	4-Left Right	1-Thumb to thumb	1-Close together	1-No		22.98	0.904	1-Straight	1-Lip				1-Straight	2- Lip Scar	2-Outward Divet	1-Flaking	flaking above the lip scar		
396	47	3	Jim Theler	M	16	1-Intentional	4-Left Right	1-Thumb to thumb	1-Close together	1-No		21.86	0.86	1-Straight	1-Lip	1-Inward Divet			1-Straight	2- Lip Scar	1-Inward Divet	1-Flaking	flaking above the lip scar		
397	47	4	Jim Theler	M	16	1-Intentional	4-Left Right	1-Thumb to thumb	1-Close together	1-No		19.67	0.774	1-Straight	1-Lip	2-Outward Divet			1-Straight	2- Lip Scar		1-Flaking	flaking above the lip scar		
398	47	5	Jim Theler	M	16	1-Intentional	4-Left Right	1-Thumb to thumb	1-Close together	1-No		22.7	0.894	1-Straight	1-Lip				1-Straight	2- Lip Scar		1-Flaking	flaking above the lip scar		
399	47	6	Jim Theler	M	16	1-Intentional	4-Left Right	1-Thumb to thumb	1-Close together	1-No		31.54	1.242	1-Straight	1-Lip				1-Straight	2- Lip Scar	2-Outward Divet	1-Flaking	flaking above the lip scar		
400	47	7	Jim Theler	M	16	1-Intentional	4-Left Right	1-Thumb to thumb	1-Close together	1-No		20.49	0.806	1-Straight	1-Lip	1-Inward Divet			2-Slanted	2- Lip Scar	1-Inward Divet	1-Flaking	flaking above the lip scar		
401	47	8	Jim Theler	M	16	2-Accidental	4-Left Right	1-Thumb to thumb	1-Close together	1-No		36.77	1.447	2-Slanted	1-Lip	2-Outward Divet			1-Straight	2- Lip Scar	1-Inward Divet	1-Flaking	flaking between break 8-9	at least 2 times he broke fragments using the table; unknown which fragments	
402	47	9	Jim Theler	M	16	1-Intentional	4-Left Right	1-Thumb to thumb	1-Close together	1-No		25.14	0.989	1-Straight	4-Clean	2-Outward Divet			1-Straight	2- Lip Scar	1-Inward Divet	1-Flaking	flaking between break 9-10		
403	47	10	Jim Theler	M	16	2-Accidental	4-Left Right	1-Thumb to thumb	1-Close together	1-No		56.41	2.221	1-Straight	1-Lip	2-Outward Divet			1-Straight	4-Clean	1-Inward Divet	1-Flaking	flaking between break 10-11		
404	47	11	Jim Theler	M	16	1-Intentional	4-Left Right	1-Thumb to thumb	1-Close together	1-No		22.31	0.878	1-Straight	1-Lip	2-Outward Divet			1-Straight	2- Lip Scar					
405	47	12	Jim Theler	M	16	1-Intentional	4-Left Right	7-Thumbs on opposite sides of the stem	1-Close together	2-Yes	thumbs on opposite sides of the stem	23.42	0.922	1-Straight	1-Lip				1-Straight	2- Lip Scar	2-Outward Divet	1-Flaking	flaking above the lip scar		
406	47	13	Jim Theler	M	16	1-Intentional	4-Left Right	7-Thumbs on opposite sides of the stem	1-Close together	1-No		22.03	0.867	1-Straight	1-Lip	1-Inward Divet			1-Straight	2- Lip Scar	1-Inward Divet	1-Flaking	flaking above the lip scar and between break 13-14		
407	47	14	Jim Theler	M	16	1-Intentional	4-Left Right	7-Thumbs on opposite sides of the stem	1-Close together	1-No		25.61	1.008	1-Straight	1-Lip	2-Outward Divet			1-Straight	2- Lip Scar	2-Outward Divet				
408	47	15	Jim Theler	M	16	1-Intentional 3-Stem and Bowl Juncture	4-Left Right	7-Thumbs on opposite sides of the stem	1-Close together	1-No		22.49	0.885	1-Straight	1-Lip				1-Straight	2- Lip Scar	1-Inward Divet				
409	47	16	Jim Theler	M	16	1-Intentional 3-Stem and Bowl Juncture	4-Left Right	10-Stem and Bowl Juncture	4-Stem and Bowl Juncture	1-No		13.72	0.54	1-Straight	1-Lip	2-Outward Divet			5-Stem and Bowl Juncture	3-Stem and Bowl Juncture					
410	48	1	Colin Thomas	M	16	1-Intentional	4-Left Right	3-Thumb on top parallel to stem	2-Hands apart	1-No		41.38	1.629	5-Mouthpiece	3- Mouthpiece				1-Straight	4-Clean	1-Inward Divet		see #48 catalog sheet		
411	48	2	Colin Thomas	M	16	1-Intentional	4-Left Right	3-Thumb on top parallel to stem	2-Hands apart	1-No		32.77	1.29	1-Straight	4-Clean	2-Outward Divet			1-Straight	2- Lip Scar		1-Flaking			
412	48	3	Colin Thomas	M	16	1-Intentional	4-Left Right	3-Thumb on top parallel to stem	2-Hands apart	2-Yes	changed orientation of pipe	18.54	0.73	1-Straight	4-Clean			ground the edge on the table to get a rounded edge	1-Straight	2- Lip Scar		1-Flaking	flaking above the lip scar; slants towards lip scar	orientation changed to bowl away from him	the proximal end of fragment #3 was ground down on the table to see what kind of rounded edge it would produce
413	48	4	Colin Thomas	M	16	1-Intentional	4-Left Right	3-Thumb on top parallel to stem	2-Hands apart	2-Yes	changed orientation of pipe back	30.19	1.188	1-Straight	1-Lip				1-Straight	2- Lip Scar	2-Outward Divet	1-Flaking	flaking above the lip scar and between break 4-5	orientation changed to bowl closest to him	
414	48	5	Colin Thomas	M	16	1-Intentional	4-Left Right	3-Thumb on top parallel to stem	2-Hands apart	1-No		62.07	2.444	1-Straight	1-Lip	1-Inward Divet			1-Straight	2- Lip Scar		1-Flaking		he moved his index finger closer towards the bowl	
415	48	6	Colin Thomas	M	16	1-Intentional	4-Left Right	4-Thumb on top perpendicular to stem	2-Hands apart	2-Yes	thumb on top perpendicular to stem	35.82	1.41	1-Straight	4-Clean	1-Inward Divet			1-Straight	2- Lip Scar		1-Flaking	flaking between break 6-7		

Appendix B-1: Experiment 1 Pipe Fragment Data

Fragment ID#	Fragment Log #	Participant Name	Gender	Pipe Length	Breakage Type	Breakage Direction	Breakage Method	Proximity of Hands	Change of Breakage Method	Method Changed to	Fragment Length (mm)	Fragment Length (in)	Proximal End Break Angle	Proximal End Break Pattern One	Proximal End Break Pattern Two	Proximal End Break Pattern Three	Proximal End Pattern-Notes	Distal End Break Angle	Distal End Break Pattern One	Distal End Break Pattern Two	Distal End Break Pattern Three	Distal End Pattern-Notes	Participant Comments	Author Comments	
416	48	7	Colin Thomas	M	16	1-Intentional	4-Left Right	3-Thumb on top parallel to stem	2-Hands apart	2-Yes	41.02	1.615	1-Straight	1-Lip				1-Straight	2- Lip Scar		1-Flaking	flaking between break 7-8			
417	48	8	Colin Thomas	M	16	1-Intentional	4-Left Right	3-Thumb on top parallel to stem	2-Hands apart	1-No	54.92	2.162	1-Straight	1-Lip				2- Slanted	2- Lip Scar		1-Flaking	flaking above the lip scar			
418	48	9	Colin Thomas	M	16	1-Intentional	4-Left Right	3-Thumb on top parallel to stem	2-Hands apart	1-No	26.34	1.037	2- Slanted	1-Lip				1-Straight	2- Lip Scar		1-Flaking	flaking between break 9-10			
419	48	10	Colin Thomas	M	16	1-Intentional	4-Left Right	3-Thumb on top parallel to stem	2-Hands apart	1-No	18.99	0.747	1-Straight	1-Lip				1-Straight	2- Lip Scar			slants towards lip scar			
420	48	11	Colin Thomas	M	16	1-Intentional	4-Left Right	3-Thumb on top parallel to stem	2-Hands apart	1-No	17.18	0.676	1-Straight	1-Lip				1-Straight	1-Lip	1-Inward Divet					
421	48	12	Colin Thomas	M	16	3-Stem and Bowl Juncture	6-Stem and Bowl Juncture	10-Stem and Bowl Juncture	4-Stem and Bowl Juncture	3-Stem and Bowl Juncture	10.86	0.427	1-Straight	2-Lip Scar	2-Outward Divet				5-Stem and Bowl Juncture	3-Stem and Bowl Juncture					
422	49	1	Tim McAndrews	M	16	1-Intentional	5-Other	8-Single hand with thumb	3-One hand	1-No	22.37	0.88	5-Mouthpiece	3-Mouthpiece				1-Straight	2- Lip Scar				see #49 catalog sheet	he broke on the flattest side of the stem because it was easiest to hold for him	
423	49	2	Tim McAndrews	M	16	1-Intentional	5-Other	8-Single hand with thumb	3-One hand	1-No	33.58	1.322	1-Straight	1-Lip				1-Straight	2- Lip Scar	2-Outward Divet	1-Flaking	flaking above the lip scar			
424	49	3	Tim McAndrews	M	16	1-Intentional	5-Other	1-Thumb to thumb	1-Close together	2-Yes	21.78	0.857	1-Straight	1-Lip	1-Inward Divet			1-Straight	2- Lip Scar	3-Both	1-Flaking	flaking above the lip scar			
425	49	4	Tim McAndrews	M	16	1-Intentional	5-Other	1-Thumb to thumb	1-Close together	1-No	31.29	1.232	1-Straight	1-Lip	3-Both			2- Slanted	2- Lip Scar		1-Flaking	flaking above the lip scar			
426	49	5	Tim McAndrews	M	16	1-Intentional	5-Other	1-Thumb to thumb	1-Close together	1-No	26.67	1.05	2- Slanted	1-Lip				3-Bows-in	2- Lip Scar						
427	49	6	Tim McAndrews	M	16	1-Intentional	5-Other	1-Thumb to thumb	1-Close together	1-No	22.15	0.872	4-Bows-out	1-Lip				3-Bows-in	2- Lip Scar		1-Flaking	flaking above the lip scar			
428	49	7	Tim McAndrews	M	16	1-Intentional	5-Other	1-Thumb to thumb	1-Close together	1-No	22.37	0.88	4-Bows-out	1-Lip				3-Bows-in	2- Lip Scar		1-Flaking	flaking between break 7-8			
429	49	8	Tim McAndrews	M	16	1-Intentional	5-Other	8-Single hand with thumb	3-One hand	2-Yes	29.17	1.148	4-Bows-out	1-Lip				3-Bows-in	2- Lip Scar	1-Inward Divet	1-Flaking	flaking above the lip scar			
430	49	9	Tim McAndrews	M	16	1-Intentional	5-Other	8-Single hand with thumb	3-One hand	1-No	26.55	1.045	1-Straight	1-Lip	2-Outward Divet			1-Straight	2- Lip Scar	2-Outward Divet	1-Flaking	flaking above the lip scar			
431	49	10	Tim McAndrews	M	16	1-Intentional	5-Other	8-Single hand with thumb	3-One hand	1-No	23.72	0.934	1-Straight	1-Lip	1-Inward Divet			3-Bows-in	2- Lip Scar		1-Flaking	flaking above the lip scar			
432	49	11	Tim McAndrews	M	16	1-Intentional	5-Other	8-Single hand with thumb	3-One hand	1-No	32.33	1.273	1-Straight	1-Lip				1-Straight	2- Lip Scar	1-Inward Divet	1-Flaking	flaking above the lip scar			
433	49	12	Tim McAndrews	M	16	1-Intentional	5-Other	8-Single hand with thumb	3-One hand	1-No	24.3	0.956	1-Straight	1-Lip	2-Outward Divet			2- Slanted	2- Lip Scar	1-Inward Divet	1-Flaking	flaking above the lip scar			
434	49	13	Tim McAndrews	M	16	1-Intentional	5-Other	8-Single hand with thumb	3-One hand	1-No	26.39	1.039	1-Straight	1-Lip	2-Outward Divet			1-Straight	2- Lip Scar	2-Outward Divet	1-Flaking	flaking above the lip scar			
435	49	14	Tim McAndrews	M	16	1-Intentional	5-Other	8-Single hand with thumb	3-One hand	1-No	21.04	0.828	1-Straight	1-Lip	1-Inward Divet			1-Straight	2- Lip Scar			flaking above the lip scar and slants towards lip scar			
436	49	15	Tim McAndrews	M	16	3-Stem and Bowl Juncture	5-Other	10-Stem and Bowl Juncture	4-Stem and Bowl Juncture	3-Stem and Bowl Juncture	34.76	1.368	1-Straight	1-Lip				5-Stem and Bowl Juncture	3-Stem and Bowl Juncture						

Appendix B-2:

Experiment #1- Intentional Breaking Participant Catalog Sheet

Instructions

- You can only break the stem fragments off from the *end* of the pipe, *not at any place within the shaft*.
- Each time you break a stem fragment off you must *number that fragment* with a *fine permanent marker*, starting with the mouthpiece at number 1.
- The *assigned direction* at which you are to break off the stem fragments, is the *only direction you are allowed to break it*—do not break it any other way.
- When you get to a point where you can't break off any more stem fragments, number the last stem and bowl juncture as well.

1. Catalog # of the pipe: _____
2. Name of the Experiment: Experiment #1- "Intentional Breaking"
3. 6 inch or 16 inch pipe: _____
4. Direction of Break: _____
5. Name of participant: _____
6. Date: _____
7. Total Count of broken fragments (including stem and bowl juncture): _____
8. Notes/Comments:

Appendix B-3: Experiment 1 Identification Notes

The first step in the analysis of the intentional breaking experiment were to number each fragment. As this allowed for a better investigation on how the fragments broke. The fragments were then labeled as either "proximal" or "distal," the proximal end being closest to the mouthpiece and distal being the end closest to the bowl. The proximal end of the mouthpiece fragment was always designated as a "mouthpiece angle" because the angle of the mouthpiece was a result of manufacture. The same was the case of the distal end of the stem and bowl juncture fragments as they were always designated as "stem and bowl juncture" as

the bowls were a result of manufacture and no bowls were broken in the first experiment.

Further classification is broken down and defined according to the compilation of

Experiment 1 data in Microsoft Access®.

- Hand Designations

1. The *bracing hand* is the hand that is holding the stem or bowl while the other hand is breaking.
2. The *breaking hand* is the hand that is breaking off the stem fragment while the other hand is bracing the stem.

- Breakage Type

1. An *intentional break* is the deliberate break of the stem in a planned location.
2. An *accidental break* of the stem occurs unexpectedly due to knocking, dropping or holding.

- Breakage Direction

The direction in which the stem fragments were broken off was tested to examine if the direction of the break affected the breakage pattern. When the front of the bowl is facing you, and the mouthpiece of the pipe is furthest away from you, the directions are: 1) Top-down, 2) Bottom-up, 3) Right-Left, and 4) Left-Right.

- Breakage Method

Each participant held the pipe differently, which affected not only the length of the fragment, but the resulting breakage pattern as well. The following is a list of my observations of the 10 common methods participants in *Experiment 1* used to break off the stem fragments.

- Thumb to Thumb—both hands wrapped around the stem with thumbs on top and parallel to the stem; stem breaks between the two thumbs (Plate 1).



Plate 1. Thumb to Thumb Method

○ Hands Overlap—hands overlap and fingers are wrapped around the stem; the thumb of one hand presses down on stem while the forefinger braces the stem underneath (Plate 2).



Plate 2. Hands Overlap Method

○ Thumb on Top Parallel to Stem—one hand braces the stem and other hand breaks with the thumb on top of and parallel to the stem; the forefinger braces the stem underneath (Plate 3).

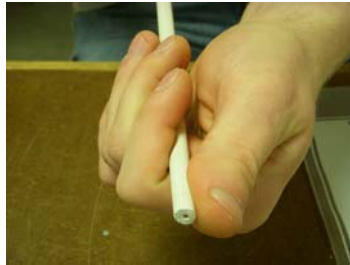


Plate 3. Thumb on Top Parallel to Stem Method

○ Thumb on Top Perpendicular to Stem—one hand braces the stem and other hand breaks with the thumb on top of and perpendicular to the stem; the forefinger braces the stem underneath (Plate 4).



Plate 4. Thumb on Top Perpendicular to Stem Method

○ Fist to Fist—all fingers are wrapped around stem and thumbs wrapped around fingers; the sides of the index fingers are touching (Plate 5).



Plate 5. Fist to Fist Method

○ Index Fingers Touching—the distal phalanges (tip segment) of index fingers are touching with thumbs a part on side of stem facing you; all other fingers are wrapped around stem (Plate 6).



Plate 6. Index Fingers Touching

○ Thumbs on Opposite Sides of the Stem—pipe is held perpendicular to the floor; one hand wraps around stem and the thumb is extended parallel to the stem pointed away from the floor; other hand is placed upside-down above the other hand, with thumb pointed down on the opposite side of the stem from the other thumb. The stem will always break in the opposite direction of where the bottom hand's thumb is placed (Plate 7).



Plate 7. Thumbs on Opposite Sides of Stem Method

○ Single Hand with Thumb—pipe is held perpendicular to the floor; the stem is held in one hand and the stem is broken with the thumb of that bracing hand that is extended above the forefinger (Plate 8).



Plate 8. Single Hand with Thumb Method

○ Distal Phalange of Index Finger—the stem is held in the bracing hand while with the breaking hand, the distal phalange or tip segment of the forefinger is wrapped around stem and the thumb braces the stem underneath (Plate 9).

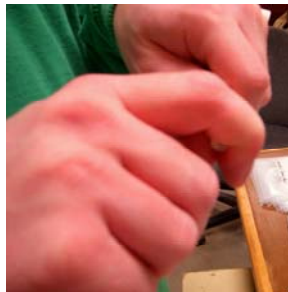


Plate 9. Distal Phalange of Index Finger Method

○ One Fist—bracing hand holds the stem while the breaking hand is wrapped around the proximal end of the stem.



Plate 10. One Fist Method

The following pie chart illustrates the percentages of stem fragments that were broken in the first experiment according to the breakage method that was used (Figure 1).

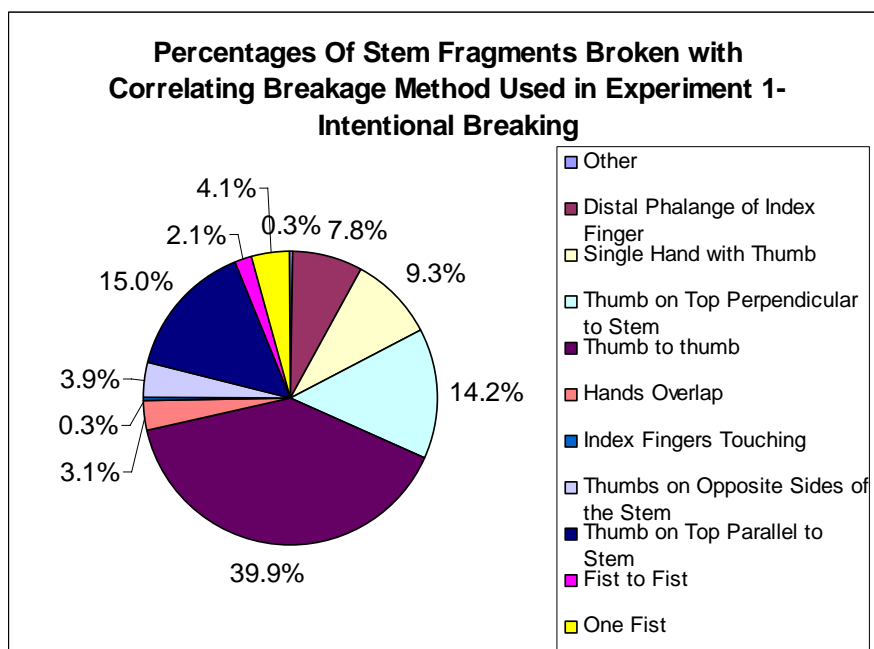


Figure 1. Percentages of Stem Fragments Broken with Correlating Breakage Method

- **Fragment Length**

All the stem fragments including the mouthpiece were measured by finding the maximum length of the fragment in millimeters using calipers. For the length of the stem and bowl juncture fragments, only the top of the stem was measured from the middle of the stem-bowl curve to the edge of the stem.

- How to Identify the Break Angle

Hold the stem fragment parallel to the ground and place your finger on top of the lip or lip scar. Next, rotate the fragment around. If there are at least two edges at a 90° angle, that is a *straight break*. If more than one edge is of an angle less than 90°, then that end is a *slanted break*. In the analysis, identification of a slanted break always took precedence over a straight break because a slanted break is characteristic of intentional breaking. If you place your finger on the cross-section on the end of a fragment, and more than one edge is lower than the interior of the core, then that end *bows-out*. If you place your finger on the cross-section on the end of a fragment, and more than one edge is higher than the interior of the core, then that end *bows-in*.

- How to Identify a Lip and Lip scar:

(See *Experiment 1- Intentional Breaking: Results* for description of lip and lip scars).

During the analysis of the fragments from *Experiment 1*, even if lip and lip scars were subtle, or slanted, they were still classified as either a lip or lip scar. A break was classified as a *clean break* if lip, lip scars, flaking, nor divets occurred.

- How to Identify a Divet

In looking at the cross-section of a broken fragment, if there is a single place on the edge of bore hole that has an excess of clay protruding, that is an *outward divet*. If there is a single place on the edge of a bore hole that looks like a portion of the clay gradually flaked away, that is an *inward divet*.

- How to Identify Flaking

Flaking that occurs from an intentional break will typically be shallow, or take place just below the exterior of the fragment.

Appendix C-1: Experiment 2 Pipe Fragment Data

ID	Cat alog #	Frag ment #	Name of Participant	Pipe Length	Place Held	Dropping Height	Type of Fragment	Fragment Length (mm)	Fragment Length (in)	Proximal End Break Pattern	Proximal End Break Pattern Comments	Distal End Break Pattern	Distal End Break Pattern Comments	Author comments
1	1	1	Branden Fjerstad	6	1-Mouthpiece		3 Stem	107.38	4.227	1-Mouthpiece		2-"Intentional Break"	could be considered a lip	
2	1	2	Branden Fjerstad	6	1-Mouthpiece		3 Stem	18.96	0.746	2-"Intentional Break"	could be considered a lip	3-Accidental	extreme bowing-in	
3	1	3	Branden Fjerstad	6	1-Mouthpiece		3 Lg Bowl	0	0	3-Accidental	extreme bowing-out	1-Stem and Bowl		the bowl shattered in 2 fragments
4	1	4	Branden Fjerstad	6	1-Mouthpiece		5 Lg Bowl	0	0	3-Accidental	extreme bowing-out	1-Stem and Bowl		none of the intentional breaks at the stem and bowl juncture bowed-out
5	2	1	Branden Fjerstad	6	1-Mouthpiece		5 Stem	121.47	4.783	1-Mouthpiece		3-Accidental	extreme bowing-in; large flakes at end	the 4 inch fragment broke while trying to measure it using the calipers; the data was taken putting the 2 fragments back together; no measurements were take from the accidental break during taking its measurements because that break wasn't a part of the e
6	2	2	Branden Fjerstad	6	1-Mouthpiece		5 Lg Bowl	0	0	2-"Intentional Break"	could be considered a lip scar	1-Stem and Bowl		
7	2	3	Branden Fjerstad	6	1-Mouthpiece		5 Lg Bowl	0	0	2-"Intentional Break"	could be considered a lip scar	1-Stem and Bowl		
8	2	4	Branden Fjerstad	6	1-Mouthpiece		5 Sm Bowl	0	0					small bowl fragment; none were present in first experiment
9	2	5	Branden Fjerstad	6	1-Mouthpiece		5 Sm Bowl	0	0					
10	2	6	Branden Fjerstad	6	1-Mouthpiece		5 Sm Bowl	0	0					
11	2	7	Branden Fjerstad	6	1-Mouthpiece		5 Sm Bowl	0	0					
12	2	8	Branden Fjerstad	6	1-Mouthpiece		5 Sm Bowl	0	0					this pipe had the most variety of sized breaks; long stem, shattered large bowl fragments, and smaller bowl fragments
13	3	1	Branden Fjerstad	2-Middle of 6	Stem		3 Stem	76.75	3.022	1-Mouthpiece		3-Accidental	could be considered an intentional lip but there is a ridge in the lip that was not present in any of the intentional breaks	On the first drop he held it horizontally or parallel to the floor and it didn't break, but a crack in the bowl occurred; On the 2nd try he held it in the middle of the stem, bowl facing the floor and it broke in the middle of the stem where he held it
14	3	2	Branden Fjerstad	2-Middle of 6	Stem		Stem and 3 Bowl	54.93	2.162	3-Accidental	could be considered a lip scar but there are 2 ridges in it that are not characteristic of an intentional break	1-Stem and Bowl		
15	4	1	Branden Fjerstad	2-Middle of 6	Stem		5 Stem	28.44	1.119	1-Mouthpiece		2-"Intentional Break"	end pattern looks like an intentional lip scar could be considered a lip but is not rounded; it has an angle to it that was not present in any of the intentional breaks	pipe was held parallel to the floor
16	4	2	Branden Fjerstad	2-Middle of 6	Stem		5 Stem	47.59	1.873	2-"Intentional Break"	pattern looks like an intentional lip scar	3-Accidental		
17	4	3	Branden Fjerstad	2-Middle of 6	Stem		Stem and 5 Bowl	58.14	2.289	3-Accidental	could be considered a lip scar, but like the lip, the scar also has a sharp angle, not present in any of the intentional lip scars	1-Stem and Bowl		
18	5	1	Branden Fjerstad	6	3-Bowl		3 Whole pipe	132.14	5.202					It was dropped twice by holding the bowl and the mouthpiece hitting the ground first and both times it didn't break; not even a chip on the pipe or a flake
19	6	1	Branden Fjerstad	6	3-Bowl		5 Stem	61.52	2.422	1-Mouthpiece		3-Accidental	could be considered a lip and it broke off or flaking but it isn't flaking characteristic of intentional breaks	
20	6	2	Branden Fjerstad	6	3-Bowl		Stem and 5 Bowl	70.37	2.77	2-"Intentional Break"	could be considered a small lip	1-Stem and Bowl		
21	7	1	Branden Fjerstad	16	1-Mouthpiece		3 Stem	134.59	5.299	1-Mouthpiece		2-"Intentional Break"	could be considered a characteristic intentional lip, but the fragment broke very long	

Appendix C-1: Experiment 2 Pipe Fragment Data

ID	Cat alog #	Frag ment #	Name of Participant	Pipe Length	Place Held	Dropping Height	Type of Fragment	Fragment Length (mm)	Fragment Length (in)	Proximal End Break Pattern	Proximal End Break Pattern Comments	Distal End Break Pattern	Distal End Break Pattern Comments	Author comments
22	7	2	Branden Fjerstad	16	1-Mouthpiece		Stem	246	9.685	2-"Intentional Break"	could be considered a lip scar	3-Accidental	the edge is jagged and the flaking is jagged, not characteristic of any of the intentional breaks	
23	7	3	Branden Fjerstad	16	1-Mouthpiece		Stem and Bowl	0	0	2-"Intentional Break"	could be considered a lip scar	1-Stem and Bowl		
24	8	1	Branden Fjerstad	16	1-Mouthpiece		Stem	129.46	5.096	1-Mouthpiece		2-"Intentional Break"	could be considered a straight, clean break with an inward divet	
25	8	2	Branden Fjerstad	16	1-Mouthpiece		Stem	13.12	0.516	2-"Intentional Break"	could be considered a straight break with a lip and outward divet	2-"Intentional Break"	could be considered a lip with an outward divet	this pipe shows length variation; very long fragments and a very short fragment
26	8	3	Branden Fjerstad	16	1-Mouthpiece		Stem	135.13	5.32	2-"Intentional Break"	could be considered a straight, clean break with an inward divet	2-"Intentional Break"	could be considered a straight, clean break with an outward divet with some jaggedness on an edge	
27	8	4	Branden Fjerstad	16	1-Mouthpiece		Stem	102.68	4.042	2-"Intentional Break"	could be considered a lip scar with jaggedness on an edge	3-Accidental	the flaking on the end is too extreme to be considered intentional	
28	8	5	Branden Fjerstad	16	1-Mouthpiece		Stem and Bowl	0	0	3-Accidental	could be considered a lip scar but there is an incised line or ridge that was not characteristic of any stem and bowl juncture intentional breaks	1-Stem and Bowl		
29	9	1	Branden Fjerstad	16	2-Middle of Stem		Stem	35.64	1.403	1-Mouthpiece		2-"Intentional Break"	could be considered a lip	
30	9	2	Branden Fjerstad	16	2-Middle of Stem		Stem	74.09	2.917	2-"Intentional Break"	could be considered a lip scar	3-Accidental	could be considered a lip but has two ridges on the lip not characteristic of an intentional break	
31	9	3	Branden Fjerstad	16	2-Middle of Stem		Stem	35.75	1.408	3-Accidental	could be considered a lip scar but has ridges not characteristic of an intentional break	2-"Intentional Break"	could be considered a lip scar	
32	9	4	Branden Fjerstad	16	2-Middle of Stem		Stem	10.02	0.394	3-Accidental		3-Accidental		the fragment is so small it could not be an intentional break
33	9	5	Branden Fjerstad	16	2-Middle of Stem		Stem	27.37	1.078	2-"Intentional Break"	could be considered a lip scar	2-"Intentional Break"	could be considered a straight, clean intentional break	
34	9	6	Branden Fjerstad	16	2-Middle of Stem		Stem	22.24	0.875	2-"Intentional Break"	could be considered a straight, clean intentional break	2-"Intentional Break"	could be considered a straight, clean intentional break	
35	9	7	Branden Fjerstad	16	2-Middle of Stem		Stem	10.74	0.423	2-"Intentional Break"	could be considered a straight, clean intentional break	3-Accidental	could be considered a lip but has ridges in it not characteristic of an intentional break	has a ridge on one end on the lip and is too small to be an "intentional" fragment
36	9	8	Branden Fjerstad	16	2-Middle of Stem		Stem	32.93	1.257	3-Accidental	could be considered a lip scar but has ridges on it not characteristic of an intentional break	2-"Intentional Break"	could be considered a lip	
37	9	9	Branden Fjerstad	16	2-Middle of Stem		Stem	41.22	1.623	2-"Intentional Break"	could be considered a lip or lip scar	3-Accidental	could be considered a lip but has ridges on it not characteristic of an intentional break	
38	9	10	Branden Fjerstad	16	2-Middle of Stem		Stem	24.32	0.958	2-"Intentional Break"	could be considered a lip that was broken off the flaked off portion of the end is not characteristic of an intentional break	3-Accidental	there's a portion of the end that flaked off; not a characteristic flake of an intentional break	
39	9	11	Branden Fjerstad	16	2-Middle of Stem		Stem	44.48	1.751	3-Accidental		3-Accidental	large groove across the cross-section of the end	
40	9	12	Branden Fjerstad	16	2-Middle of Stem		Stem	9.04	0.356	3-Accidental		3-Accidental	fragment is too small to be intentional	
41	9	13	Branden Fjerstad	16	2-Middle of Stem		Stem	29.31	1.154	3-Accidental	the flaked off portion of the end is not characteristic of an intentional break	2-"Intentional Break"	could be considered a straight, clean intentional break	

Appendix C-1: Experiment 2 Pipe Fragment Data

ID	Catalog #	Fragment #	Name of Participant	Pipe Length	Place Held	Dropping Height	Type of Fragment	Fragment Length (mm)	Fragment Length (in)	Proximal End Break Pattern	Proximal End Break Pattern Comments	Distal End Break Pattern	Distal End Break Pattern Comments	Author comments
42	9	14	Branden Fjerstad	16	2-Middle of Stem		3 Stem and Bowl	9.29	0.365	2-"Intentional Break"		1-Stem and Bowl		
43	10	1	Branden Fjerstad	16	2-Middle of Stem		5 Stem	26.74	1.053	1-Mouthpiece		2-"Intentional Break"	could be considered a lip	
44	10	2	Branden Fjerstad	16	2-Middle of Stem		5 Stem	34.8	1.369	2-"Intentional Break"	could be considered a lip scar	2-"Intentional Break"	could be considered a lip	
45	10	3	Branden Fjerstad	16	2-Middle of Stem		5 Stem	28.5	1.122	2-"Intentional Break"	could be considered a lip scar	2-"Intentional Break"	could be considered a lip	
46	10	4	Branden Fjerstad	16	2-Middle of Stem		5 Stem	39.14	1.541	2-"Intentional Break"	could be considered a lip scar	3-Accidental	could be considered a lip, but the bowing-out core and outward divet are not characteristic of an intentional lip	
47	10	5	Branden Fjerstad	16	2-Middle of Stem		5 Stem	26.26	1.033	3-Accidental		3-Accidental		
48	10	6	Branden Fjerstad	16	2-Middle of Stem		5 Stem	13.42	0.528	3-Accidental		3-Accidental		the fragment is so small it could not be an intentional break
49	10	7	Branden Fjerstad	16	2-Middle of Stem		5 Stem	20.71	0.815	3-Accidental		3-Accidental		both ends look accidental
50	10	8	Branden Fjerstad	16	2-Middle of Stem		5 Stem	27.89	1.098	3-Accidental		3-Accidental	could be considered a lip but has ridges on it	
51	10	9	Branden Fjerstad	16	2-Middle of Stem		5 Stem	39.83	1.568	2-"Intentional Break"	could be considered a lip that broke off	3-Accidental	large groove across the cross-section of the end	
52	10	10	Branden Fjerstad	16	2-Middle of Stem		5 Stem	16.27	0.639	3-Accidental	raised peak in the core	3-Accidental	jagged core	uncharacteristic intentional ends and small fragment
53	10	11	Branden Fjerstad	16	2-Middle of Stem		5 Stem	12.8	0.504	3-Accidental	jagged core	3-Accidental	extreme lip	fragment is very small and both ends are uncharacteristic of an intentional fragment
54	10	12	Branden Fjerstad	16	2-Middle of Stem		5 Stem	34.51	1.359	3-Accidental	this type of break is in the Mt.Pleasant collection	3-Accidental		
55	10	13	Branden Fjerstad	16	2-Middle of Stem		5 Stem	23.23	0.914	3-Accidental		3-Accidental	lip is too long/extreme and has ridges on it	
56	10	14	Branden Fjerstad	16	2-Middle of Stem		5 Stem	43.04	1.694	3-Accidental		3-Accidental	lip is too wide/extreme	
57	10	15	Branden Fjerstad	16	2-Middle of Stem		5 Stem	25.49	1.004	3-Accidental	could be considered a lip scar but doesn't have the intentional fading, it's a sharp flaking off and has ridges in it	3-Accidental	broke right at the juncture and has a large sharp flake gone at the end	
58	10	16	Branden Fjerstad	16	2-Middle of Stem		5 Stem and Bowl	0	0					
59	10	17	Branden Fjerstad	16	2-Middle of Stem		5 Sm Bowl	0	0					
60	10	18	Branden Fjerstad	16	2-Middle of Stem		5 Sm Bowl	0	0					2 fragments broke off of the bowl the pipe broke at the stem and bowl juncture first
61	11	1	Branden Fjerstad	16	3-Bowl		3 Stem	62.36	2.455	1-Mouthpiece		3-Accidental	jagged edge	
62	11	2	Branden Fjerstad	16	3-Bowl		3 Stem	14	0.551	3-Accidental	jagged edge	3-Accidental	jagged edge and core	
63	11	3	Branden Fjerstad	16	3-Bowl		3 Stem	363	14.29	3-Accidental	jagged edge and core	3-Accidental	there's a sharp angle and edge to the break at the stem and bowl juncture; none of the intentional participants broke it at there that sharply	
64	11	4	Branden Fjerstad	16	3-Bowl		3 Stem and Bowl	0	0	3-Accidental	an extreme break at the stem and bowl juncture	1-Stem and Bowl		
65	12	1	Branden Fjerstad	16	3-Bowl		5 Stem	164	6.457	1-Mouthpiece		2-"Intentional Break"	could be considered a clean, straight break	
66	12	2	Branden Fjerstad	16	3-Bowl		5 Stem	97.67	3.845	2-"Intentional Break"	could be considered a clean, straight intentional break	2-"Intentional Break"	could be considered a lip scar	
67	12	3	Branden Fjerstad	16	3-Bowl		5 Stem	34.76	1.369	3-Accidental	looks like a lip broke off	3-Accidental	the lip scar stops suddenly and has ridges in the core	

Appendix C-1: Experiment 2 Pipe Fragment Data

ID	Catalog #	Fragment #	Name of Participant	Pipe Length	Place Held	Dropping Height	Type of Fragment	Fragment Length (mm)	Fragment Length (in)	Proximal End Break Pattern	Proximal End Break Pattern Comments	Distal End Break Pattern	Distal End Break Pattern Comments	Author comments
68	12	4	Branden Fjerstad	16	3-Bowl		5 Stem	38.22	1.506	3-Accidental	looks like a lip broke off could be considered a lip, but there is a flake that broke off the back of the lip	3-Accidental	the lip scar stops suddenly and has ridges in the core	
69	12	5	Branden Fjerstad	16	3-Bowl		5 Stem	45.9	1.807	3-Accidental	could be considered a lip but there are ridges in the core	3-Accidental	the lip scar has ridges in the core	
70	12	6	Branden Fjerstad	16	3-Bowl		5 Stem and Bowl	15.92	0.626	3-Accidental		1-Stem and Bowl		
71	12	7	Branden Fjerstad	16	3-Bowl		5 Sm Bowl	0	0					

Appendix C-2: Experiment 2 Hand Placement on Pipe Photos

To determine if the “accidental” dropping of a pipe by a certain method will affect the lengths, quantities and observable breakage patterns of the stem fragments, pipes were dropped: 1. From holding the bowl (Plate 11), 2. From the middle of the stem (Plate 12), and 3. From the mouthpiece (Plate 13).



Plate 11. Participant Dropping from the Bowl



Plate 12. Participant Dropping from the Middle of the Stem



Plate 13. Participant Dropping from the Mouthpiece

Appendix D-1: Comparing Experimental Data to Mount Pleasant Site Data

ID #	Catalog #	Fragment #	Length (mm)	Length (in)	Proximal End Break Angle	Proximal End Break Pattern One	Proximal End Break Pattern Two	Proximal End Break Pattern Three	Proximal End Break Pattern Four	Proximal End Break Pattern Five	Prox-Int/Accid/Other	Distal End Break Angle	Distal End Break Pattern One	Distal End Break Pattern Two	Distal End Break Pattern Three	Distal End Break Pattern Four	Distal End Break Pattern Five	Distal-Int/Accid/Other	Distal End Break Pattern-Notes	Final Identification
2	10	1	33.85	1.332	Straight	Lip scar	Inward divet	Flaking	Even core	Rounded edge	Intentional	Straight	Clean		Flaking	Even core	Even edges	Other	flaking stops abruptly	Unknown
4	22	2	23.42	0.922					Uneven core	Jagged edges	Other	Straight				Even core	Rounded edge	Accidental	there is a ridge in the lip scar, characteristic of an accidental break	Accidental
5	22	3	25.86	1.018					Uneven core	Jagged edges	Accidental					Even core	Jagged edges	Other	definitely accidental or post-depositional; there is a portion of the stem missing from the cross-section of the stem end; not characteristic of an intentional or accidental break	Accidental
8	22	6	24.53	0.965					Uneven core	Jagged edges	Other	Straight	Clean			Even core	Even edges	Intentional		Unknown
11	40	1	26.23	1.033	Straight				Even core	Rounded edge	Other	Slanted			Flaking	Uneven core	Jagged edges	Accidental		Accidental
16	75	1	34.53	1.359	Straight	Lip			Even core	Even edges	Intentional	Slanted	Lip		Flaking	Even core	Jagged edges	Intentional	distal end looks like it has both a lip and lip scar	Intentional
19	77	2	31.06	1.223	Straight	Lip		Flaking	Even core	Even edges	Accidental	Straight	Clean			Even core	Even edges	Other		Accidental
26	97	3	33.27	1.309	Straight				Uneven core	Rounded edge	Other	Stem and Bowl juncture					Rounded edge	Other		Unknown
27	97	4	23.79	0.936	Straight	Lip scar		Flaking	Even core	Even edges	Intentional	Straight	Lip scar	Inward divet	Flaking	Even core	Even edges	Intentional	a large portion of the stem near the edge of the fragment is missing; not present in either experiment	Unknown
30	103	2	38.27	1.506	Straight	Extreme Lip			Uneven core	Jagged edges	Accidental	Stem and Bowl juncture					Jagged edges	Other		Accidental
40	109	1	43.42	1.708	Straight	Extreme Lip		Flaking	Even core	Even edges	Accidental					Uneven core	Jagged edges	Accidental	distal end definitely accidental-uneven edges and core	Accidental
44	114	1	17.95	0.706				Flaking	Uneven core	Jagged edges	Accidental				Flaking	Uneven core	Jagged edges	Accidental	flaking stops abruptly	Unknown
46	126	2	27.55	1.084	Mthpc							Straight	Clean	Outward divet		Even core	Even edges	Intentional	definitely intentional	Intentional
50	133	1	24.88	0.979	Straight	Lip scar	Inward divet	Flaking	Even core	Rounded edge	Intentional	Straight	Clean			Even core	Even edges	Intentional		Intentional
53	135	2	23.09	0.909					Uneven core	Jagged edges	Accidental	Straight	Lip scar			Even core		Accidental	deep lip scar	Accidental
55	136	2	26.01	1.024	Straight	Extreme Lip		Flaking		Jagged edges	Accidental	Slanted			Flaking	Uneven core	Jagged edges	Accidental	portion of the stem end is missing and core is uneven	Accidental
61	142	1	8.51	0.335							Other							Other		Unknown
65	154	1	38.54	1.517	Straight	Clean			Even core	Even edges	Intentional	Straight			Flaking	Even core	Even edges	Intentional	flaking on the edges	Unknown
70	164	1	45.53	1.792	Straight	Lip scar		Flaking	Even core	Even edges	Intentional	Slanted			Flaking	Uneven core	Jagged edges	Accidental		Intentional
75	173	1	14.64	0.576	Slanted	Lip					Other	Slanted			Flaking	Uneven core	Jagged edges	Accidental		Unknown
81	178	2	28.51	1.122	Straight	Clean		Flaking	Even core	Rounded edge	Intentional	Stem and Bowl juncture	Stem and Bowl juncture				Jagged and Rounded edges	Other	Distal end has jagged and rounded edges	Unknown
85	182	1	31.82	1.252	Straight	Lip scar		Flaking	Even core	Even edges	Intentional					Uneven core	Jagged edges	Accidental		Intentional
86	182	2	29.77	1.171	Slanted	Lip scar		Flaking	Even core	Even edges	Intentional		Lip			Uneven core	Jagged edges	Intentional	the core and edges look accidental, but there is one edge that looks like a small lip	Unknown
88	185	1	24.27	0.995	Straight	Lip scar				Rounded edge	Intentional	Bows-in	Clean			Uneven core	Even edges	Intentional	has slight bowing-in	Intentional
93	186	5	11.41	0.448	Straight	Clean			Even core	Even and Rounded edges	Intentional	Straight	Clean			Even core	Even edges	Intentional		Unknown
102	204	3	23.6	0.928	Slanted	Lip scar	Inward divet	Flaking	Even core	Even and Rounded edges	Intentional	Straight	Lip			Even core	Even and Rounded edges	Intentional	slight lip that could be intentional	Intentional
113	212	1	28.79	1.132	Slanted				Uneven core		Accidental	Bows-in					Even and Rounded edges	Other		Accidental
114	212	2	25.75	1.013	Slanted	Lip scar		Flaking	Even core	Even and Rounded edges	Other					Uneven core	Jagged edges	Accidental	definitely accidental as the end edges and core are jagged	Accidental
118	215	2	35.68	1.405	Straight	Clean		Flaking	Even core	Even and Rounded edges	Intentional					Uneven core	Jagged and Rounded edges	Accidental		Accidental
120	215	4	15.6	0.614	Straight				Even core	Rounded edge	Other	Straight	Clean			Even core	Rounded edge	Other	distal end is also rounded on the edges and core	Unknown
122	216	1	28.09	1.105				Flaking	Uneven core	Jagged edges	Other	Straight	Lip			Even core		Accidental	lip scar on distal end stops abruptly, characteristic of an accidental break	Accidental

Appendix D-1: Comparing Experimental Data to Mount Pleasant Site Data

ID #	Catalog #	Fragment #	Length (mm)	Length (in)	Proximal End Break Angle	Proximal End Break Pattern One	Proximal End Break Pattern Two	Proximal End Break Pattern Three	Proximal End Break Pattern Four	Proximal End Break Pattern Five	Prox-Int/Accid/Other	Distal End Break Angle	Distal End Break Pattern One	Distal End Break Pattern Two	Distal End Break Pattern Three	Distal End Break Pattern Four	Distal End Break Pattern Five	Distal-Int/Accid/Other	Distal End Break Pattern-Notes	Final Identification
123	218	1	27.66	1.089	Slanted				Uneven core	Jagged edges	Accidental	Stem and Bowl juncture	Stem and Bowl juncture			Uneven core	Jagged edges	Accidental		Accidental
124	219	1	27.9	1.098	Straight	Clean			Even core	Even edges	Intentional	Straight	Clean			Even core	Even and Rounded edges	Intentional		Unknown
131	221	1	22.99	0.905					Uneven core	Jagged and Rounded edges	Accidental	Straight	Lip scar			Even core	Even and Rounded edges	Intentional		Accidental
134	222	3	21.04	0.827	Straight				Uneven core	Even edges	Other	Straight	Lip			Even core	Even edges	Intentional	definitely intentional as the lip has a smooth core and even edges	Intentional
136	222	5	16.94	0.666	Straight			Flaking	Even core	Even and Rounded edges	Accidental	Straight	Extreme Lip			Even core	Even and Rounded edges	Accidental		Accidental
137	222	6	12.94	0.509							Other							Other		Unknown
139	228	1	31.13	1.225	Mthpc							Slanted	Lip			Even core	Rounded edge	Intentional	this mouthpiece fragments is the intentional length and the distal end looks like it has an intentional lip	Intentional
141	231	1	31.3	1.232	Straight					Rounded edge		Straight	Extreme Lip				Rounded edge	Other	this end is definitely accidental, but there are portions of the stem that are missing, looks like possible gnaw marks; not intentional or accidental	Unknown
144	231	4	18.84	0.741	Straight	Lip scar		Flaking	Even core	Even and Rounded edges	Accidental	Straight	Lip			Even core	Even and Rounded edges	Intentional	possibly a small lip; has even, rounded edges and an even core	Accidental
158	247	1	21.32	0.839	Mthpc							Straight	Lip		Flaking	Even core	Even edges	Intentional	definitely intentional with a smooth sloping lip with even edges	Intentional
162	249	2	26.87	1.058	Slanted	Lip scar		Flaking	Uneven core	Rounded edge	Other	Slanted				Even core	Jagged and Rounded edges	Accidental	definitely accidental	Accidental
167	264	1	24.75	0.974	Straight	Clean			Even core	Even edges	Intentional	Straight	Lip			Even core	Even edges	Intentional	definitely intentional with a smooth sloping lip with even edges	Intentional
168	268	1	34.47	1.357	Straight	Lip			Even core	Even and Rounded edges	Intentional	Stem and Bowl juncture				Uneven core	Jagged and Rounded edges	Accidental		Accidental
177	291	1	18.45	0.725							Other							Other	cannot classify as either intentional or accidental as half of the cross-section along the length of the stem is missing	Unknown
178	291	1	7.09	0.279	Slanted	Lip					Other	Stem and Bowl juncture						Accidental		Unknown
179	293	1	38.53	1.517	Straight	Clean		Flaking	Uneven core	Jagged edges	Accidental		Extreme Lip		Flaking	Uneven core	Jagged edges	Accidental	definitely accidental	Accidental
181	299	1	14.15	0.557							Other							Other	cannot classify as either intentional or accidental as half of the cross-section along the length of the stem is missing	Unknown
186	314	1	34.35	1.352	Slanted			Flaking	Uneven core		Accidental				Flaking	Uneven core	Jagged edges	Accidental	a portion of the cross-section along the length of the stem is missing	Accidental
194	328	1	18.38	0.723	Straight	Clean			Even core	Even and Rounded edges	Other	Slanted			Flaking	Uneven core	Jagged and Rounded edges	Accidental	definitely accidental with jagged, rounded edges and uneven core	Accidental
202	367	1	37.36	1.47	Bows-in	Lip			Uneven core	Jagged and Rounded edges	Intentional	Slanted				Uneven core	Jagged and Rounded edges	Accidental	almost 2 cm of the exterior of the stem end looks like it has been gnawed on	Unknown
205	369	3	17.11	0.673	Slanted	Lip			Even core	Even edges	Intentional	Slanted			Flaking	Uneven core	Jagged and Rounded edges	Accidental	uneven core and jagged edges	Unknown
211	375	2	30.26	1.191	Slanted			Flaking	Even core	Even edges	Accidental	Straight	Lip			Even core	Even edges	Other		Accidental
217	376	2	11.72	0.461							Other							Other	most likely intentional or post-depositional because the fragment is so small; it flaked off along of the length of the stem	Unknown
219	378	1	11.43	0.45							Other							Other	most likely intentional or post-depositional because the fragment is so small; it flaked off along of the length of the stem	Unknown
220	379	1	26.81	1.055	Mthpc							Straight	Lip scar			Flaking	Uneven core	Even edges	Intentional	Intentional

Appendix D-1: Comparing Experimental Data to Mount Pleasant Site Data

ID #	Catalog #	Fragment #	Length (mm)	Length (in)	Proximal End Break Angle	Proximal End Break Pattern One	Proximal End Break Pattern Two	Proximal End Break Pattern Three	Proximal End Break Pattern Four	Proximal End Break Pattern Five	Prox-Int/Accid/Other	Distal End Break Angle	Distal End Break Pattern One	Distal End Break Pattern Two	Distal End Break Pattern Three	Distal End Break Pattern Four	Distal End Break Pattern Five	Distal-Int/Accid/Other	Distal End Break Pattern-Notes	Final Identification	
223	399	1	44.27	1.743	Slanted					Jagged edges	Accidental	Slanted			Flaking		Even edges	Accidental	there's a portion of the core that broke off; a deep flake; not characteristic of an intentional or accidental break	Accidental	
224	402	1	11.94	0.47							Other							Other	cannot classify as either intentional or accidental as half of the cross-section along the length of the stem is missing	Unknown	
227	405	3	25.12	0.989	Straight			Even core	Even and Rounded edges	Other	Straight	Lip				Even core	Even edges	Accidental	sloping lip is thick and wide but has an even core and edges	Accidental	
233	411	1	46.78	1.842	Straight	Clean		Even core	Even edges	Intentional	Straight	Clean				Even core	Even edges	Intentional		Unknown	
234	411	2	39.12	1.54	Straight	Lip scar		Even core	Even and Rounded edges	Intentional	Straight	Extreme Lip				Even core	Even edges	Accidental	the lip is too long to be an intentional lip	Unknown	
237	411	5	22.24	0.875							Other							Other	cannot classify as either intentional or accidental because it is a partial fragment; the fragment is about 1/3 of the cross-section along the length of the stem	Unknown	
240	414	2	13.66	0.538	Slanted	Lip		Even core	Even edges	Accidental	Straight	Lip				Even core	Even edges	Intentional	there is a slight lip, but might not be intentional as the fragment is so small	Unknown	
243	430	1	49.27	1.939	Slanted	Lip scar	Flaking	Even core		Accidental	Straight	Clean				Even core	Even edges	Intentional		Accidental	
244	430	2	14.82	0.583	Straight	Lip	Flaking	Uneven core	Jagged edges	Accidental	Stem and Bowl juncture										Accidental
245	433	1	8.96	0.353	Bows-out				Jagged and Rounded edges	Accidental	Stem and Bowl juncture										Unknown
248	436	3	12.25	0.482	Straight	Clean	Flaking	Even core	Even edges	Other	Slanted	Lip				Uneven core	Even edges	Other	could be either intentional or accidental; might be a slight lip on one edge	Unknown	
251	443	1	47.92	1.886	Mthpc						Straight	Lip				Even core	Even edges	Intentional	lip is the width of the fragment	Intentional	
257	479	1	13.03	0.513							Other							Other	cannot classify as either intentional or accidental because it is a partial fragment; the fragment is about 1/2 of the cross-section along the length of the stem	Unknown	
261	502	2	22.56	0.888	Straight	Lip		Even core	Even and Rounded edges		Straight	Extreme Lip				Even core	Even and Rounded edges	Accidental	the lip is too long to be intentional	Unknown	
264	552	1	56.38	2.22	Straight	Lip		Even core	Even and Rounded edges	Other	Straight	Lip scar				Even core	Even edges	Accidental	deep lip scar	Unknown	
271	577	1	42.82	1.686	Straight	Lip scar		Even core	Even edges	Accidental	Straight	Lip scar				Even core	Even edges	Accidental	ridge in the lip scar	Accidental	
272	577	2	20.61	0.811	Straight					Other								Other	a large portion of the stems cross-section is missing	Unknown	
275	623.1	1	91.21	3.591	Straight	Clean		Even core	Even edges	Intentional	Stem and Bowl juncture							Accidental	portions of the bowl are missing	Unknown	
279	650	1	34.31	1.35	Bows-out	Clean			Jagged and Rounded edges	Other	Straight	Lip				Even core	Even and Rounded edges	Intentional	definitely an intentional break	Intentional	
283	661	1	14.91	0.586	Straight	Clean	Flaking	Even core	Even edges	Intentional	Slanted	Clean				Even core	Even edges	Other	could be identified as either intentional or accidental	Unknown	
285	667	2	16.34	0.663	Straight	Clean		Even core	Even and Rounded edges	Other	Straight	Lip scar				Uneven core	Even edges	Accidental	deep lip scar with a ridge in it; characteristic of accidental breaking	Accidental	
292	680	1	35.48	1.397	Slanted	Lip scar		Even core	Even and Rounded edges	Intentional		Stem and Bowl juncture						Accidental		Intentional	
297	713	1	25.5	1.004				Uneven core	Jagged and Rounded edges	Accidental						Uneven core	Jagged and Rounded edges	Accidental	fragment end has lots of portions missing	Unknown	
302	720	1	24.47	0.963	Straight	Clean	Flaking	Even core	Even and Rounded edges	Intentional	Straight	Lip		Flaking		Even core	Even and Rounded edges	Intentional	small lip; the small flaking looks like it was scraped, possibly a result of depositional processes	Intentional	

Appendix D-1: Comparing Experimental Data to Mount Pleasant Site Data

ID #	Catalog #	Fragment #	Length (mm)	Length (in)	Proximal End Break Angle	Proximal End Break Pattern One	Proximal End Break Pattern Two	Proximal End Break Pattern Three	Proximal End Break Pattern Four	Proximal End Break Pattern Five	Prox-Int/Accid/Other	Distal End Break Angle	Distal End Break Pattern One	Distal End Break Pattern Two	Distal End Break Pattern Three	Distal End Break Pattern Four	Distal End Break Pattern Five	Distal-Int/Accid/Other	Distal End Break Pattern-Notes	Final Identification
309	795	1	26.27	1.034	Straight	Lip		Flaking	Even core	Even and Rounded edges	Intentional	Straight	Clean	Inward divet	Flaking	Even core	Even and Rounded edges	Other	possibly intentional; depositional processes possibly affected it	Intentional
310	796	1	36.64	1.442	Slanted	Lip scar			Uneven core	Jagged and Rounded edges	Accidental	Straight	Extreme Lip			Uneven core	Jagged and Rounded edges	Accidental	ridges in the core; large lip; definitely accidental	Accidental
313	864	1	38.79	1.527	Slanted	Lip scar					Accidental	Straight				Uneven core	Jagged edges	Accidental	uneven core with recent flaking in the core and in the middle of the stem	Accidental
314	864	2	21.31	0.839							Other							Other		Unknown
317	867	2	33.36	1.313	Straight	Lip scar		Flaking	Even core	Jagged and Rounded edges	Accidental	Stem and Bowl juncture								Accidental
319	867	4	18.74	0.737	Slanted	Clean			Even core	Even and Rounded edges	Other	Slanted	Extreme Lip			Uneven core	Jagged and Rounded edges	Accidental	definitely accidental	Accidental
321	867	6	13.69	0.539	Bows-in			Flaking	Uneven core	Jagged edges	Accidental	Slanted				Uneven core	Jagged edges	Accidental	definitely accidental	Accidental
327	875	2	13.63	0.536	Slanted				Uneven core	Jagged edges	Accidental	Slanted	Lip scar			Even core		Accidental		Accidental
330	885	1	23.25	0.915	Straight	Clean			Even core	Even and Rounded edges	Intentional	Straight	Lip			Even core	Even and Rounded edges	Intentional	possibly a lip	Intentional
334	889	1	20.83	0.82							Other							Other		Unknown
342	939	4	22.65	0.891							Other	Slanted	Lip scar				Even and Rounded edges	Accidental	a deep, abrupt lip scar with a ridge across it is characteristic of an accidental break	Unknown
344	949	1	38.43	1.513	Slanted	Lip scar		Flaking	Uneven core	Jagged edges	Other	Straight	Clean	Inward divet	Flaking	Even core	Even edges	Intentional	end looks intentional	Unknown
346	953	1	26.52	1.044	Slanted	Extreme Lip			Uneven core	Jagged edges	Accidental	Stem and Bowl juncture					Jagged edges		break at the stem and bowl juncture has sharp edges	Accidental
348	956	1	18.16	0.715	Straight	Lip			Even core	Even and Rounded edges	Intentional	Stem and Bowl juncture			Flaking		Jagged edges	Accidental		Unknown
351	965	1	48.59	1.913	Straight	Lip			Even core	Even edges	Intentional	Straight	Clean			Even core	Even edges	Other	a possible intentional straight, clean break	Unknown
361	989	1	42.89	1.688	Slanted			Flaking	Even core	Jagged edges	Other	Straight	Clean	Inward divet	Flaking	Even core	Even edges	Accidental	large flake on the exterior of the end looks intentional; large and deep	Accidental
376	1168	1	20.88	0.822							Other							Other		Unknown
380	1214	1	14.17	0.558							Other							Other		Unknown
393	1433	1	23.84	0.938	Slanted	Lip scar	Inward divet	Flaking	Even core	Even edges	Intentional	Bows-in				Uneven core	Even edges	Other	end looks intentional but a portion of the core is missing	Unknown

Appendix D-2: Identification Notes from Comparing the Three Datasets

Each of the 99 fragments were analyzed by noting the following characteristics for both the proximal and distal ends of the stems: the type of break (straight, slanted, bows-in, bows-out), for lips, extreme lips, lip scars, clean breaks, divets, flaking, the type of core (even or uneven), and the type of edges (jagged, even, rounded, even and rounded, or jagged and rounded). The proximal end was designated as the end with the smaller diameter, and the end with the larger diameter, the distal end. A final classification was given, *accidental*, *intentional*, or *unknown* for the fragment. A standard classification was determined that if there was one end of the fragment that was unquestionably an intentional or accidental pattern, that is what it was classified as. However, there were fragments that appeared to have one end intentional and the other end accidental. In this case, those fragments that exhibited an intentional proximal end and an accidental distal end were classified as intentional. In contrast, if a fragment showed an intentional distal end and an accidental proximal end, it was classified as accidental. The reasoning for this is that it would make the most sense for the end with the smaller diameter to have served as the mouthpiece, and if that fragment was accidentally broken, the end with the larger diameter would have been the accidental break. It would be unreasonable for someone to modify stem fragments after having accidentally dropped a pipe or accidentally broke those fragments off.

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