THE EXCAVATION OF AUGUSTINE HEERMANS' WAREHOUSE AND ASSOCIATED 17TH CENTURY DUTCH WEST INDIA COMPANY DEPOSITS

Joel W. Grossman, Ph.D.
Principal Investigator

with contributions by:

Karen Bluth
Bonnie A. Bogumil
Diane Dallal
Michael Davenport
Joseph E. Diamond
Haskell Greenfield
Leo Hershkowitz
Melba J. Myers
George J. Myers, Jr.
Peter Namuth
Andrew Neuhart
Lisa Panet
William I. Roberts IV
Nancy A. Stehling
Sara Stone
Mindy H. Washington

The Broad Financial Center Mitigation Report: Draft

VOLUME II

Prepared By: GREENHOUSE CONSULTANTS INCORPORATED
for:

Fox & Fowle Architects, P.C.
92 Lexington Avenue
New York, N.Y. 10016

HRO International, LTD.
126 East 56 Street
New York, N.Y. 10022

January 1985

322

VII ARTIFACT ANALYSIS: CLAY PIPES

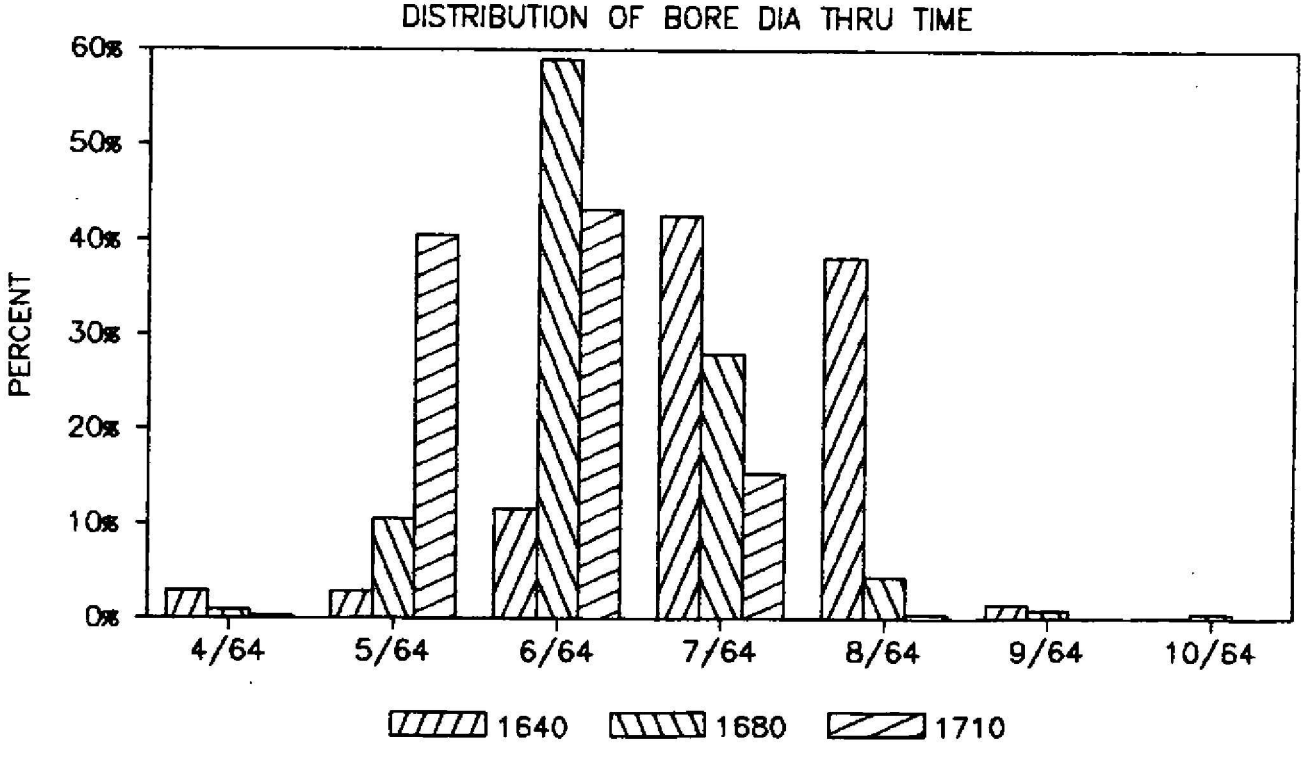
INTRODUCTION

1. Nature of the Sample - The Broad Financial Center excavation yielded a total of 9720 fragments of clay tobacco pipes. All were analyzed. However, 9298 fragments (96%) from the 53 Components which contained pipes, represented unmixed deposits of stratigraphically defined units of contemporaneity and, therefore, constituted THE SAMPLE. Pipes were unevenly distributed over the site - the heaviest concentration (78%) being the pipe cache in Lot II (78%).

Almost all pipes were made of ball clay. Exceptions were several red clay stems and possibly a stub-stemmed pipe. Colors and textures represented the relative purity of the clay, its source, and/or differences in firing temperatures. Colors ranged from white, buff, yellow, gray and black, to pink and red.

A total of 3489 stem fragments was examined and measured, none of which could be reconstructed in its entirety. Graph VII-1 shows a distribution of pipe bore diameters through time. From the Graph, it is clear that the 1640 Temporal Group contains the greatest percentage of large-bored pipestems with the 1680 Temporal Group following suit. A trend towards narrower bores is evident as one progresses in time into the early 18th Century.

There were 53 decorated stems which constituted 1.5% of the total stem sample, although the vast majority of bowls and stems recovered were unmarked or undecorated. Pipes that were marked, as well as those that were complete enough to reveal bowl shape, provided information about trade networks. A total of 552



Graph VII - 1

0.00000

distinctive makers' marks or motifs (6% of the sample) revealed that 10 different cities, areas or states were represented. These were: Amsterdam, Bristol, Dorking, Exeter, Glasgow, Gouda, Liverpool, London, North Carolina, and the Western Netherlands. Of the makers' marks, 6% were Dutch (31) and 94% English (520). This disparity in percentages was the direct result of the presence of the Pipe Cache. When the cache was deleted, 36% of the marks were Dutch (31) and 64% (54) English.

2. Clay pipe analysis objectives - The Broad Financial Center site presented archaeologists with an opportunity to lay the foundation for a chronological framework with which to address material change through time. Based upon the fact that the site contained deposits dating from the earliest settlement of 17th century Dutch Nieuw Amsterdam by Agents or Factors of the Dutch West India Company, through the English Colonial Period and into the 19th century, pipe analysis focused upon the following objectives:

1. The establishment of a terminus post quem and mean date for each controlled stratigraphic unit of association.

2. A characterization of the range of variation and diversity of pipe material for each temporal period.

3. A documentation of shifts in this aspect of the material record through time.

Changes in bowl morphology and the fact that pipemakers identified their products with distinctive marks proved clay tobacco pipes to be valid temporal indicators as well as herbingers of the shifting trade patterns of mid-17th Century Nieuw Amsterdam as well as late 17th/early 18th Century New York.

This general framework of analysis allowed the generation of secondary pipe research questions:

1. To what extent did the pipe sample reflect or herald the economic and political changeover from Dutch to English Colonial New York? How long did it take before this change was reflected in the material record?

2. Was it possible to refine the relative chronology of two or more 17th century deposits that had been dated with ceramic terminus post quems to the same date and to differentiate what was earlier from what was later?

3. Does the 17th century pipe data reflect shifts in trade patterns through time or does it only reflect the monopoly of certain cities upon the pipe trade in general?

4. Is it possible to correlate specific features with individuals in the historical record?

5. To establish a typology for EB types and then see if this typology correlates with or contradicts the typology established at Fort Orange by Paul Huey.

Archaeologists have long been aware that clay pipes are useful temporal indicators of site occupation periods. Three factors permit us to use the pipe as a dating tool:

1. There was a continuous reduction in stem bore diameters through time. This trend was a gradual and possibly uneven process.

2. Specific stylistic and morphological changes occurred having to do with bowl shape, stem-to-bowl angle and size.

3. Manufacturers identified their products with distinctive marks which also provide key chronological indicators.

Pipemaking formally began in England with the granting of a charter by James I to the Worshipful Company of Pipemakers of Westminster in 1619 (Jackson and Price:1974). Bristol formed its own Guild of Pipemakers in 1652 and by the beginning of the 18th Century, it was the primary center of trade to the American Colonies.

During the late 16th and early 17th Century, waves of English-speaking peoples immigrated to the Netherlands. Perhaps the earliest wave of "immigrants" had been sent by Queen Elizabeth I in order to gain "a Protestant foothold on the Continent." (Duco 1981:371). These soldiers aided the Dutch in their battle against Spanish occupation.

The English introduced tobacco smoking to the Netherlands by the end of the 16th Century and dominated the Amsterdam pipe industry during the period 1630-1660. The Amsterdam industry reached its zenith in the 1640s and 1650s. Duco has implied (1981) an inter-connection between the tobacco trade and the pipe industry in Amsterdam - both industries employing an equal number of people. Because of this relationship, Amsterdam had an advantage over cities such as Gouda, which had no trade in tobacco.

This advantage might have been due to the fact that agents of the Dutch West India Company, which was based in Amsterdam, owned and/or operated warehouses for trade products in satellite colonies outside of the Netherlands in locales such as Brazil and Nieuw Amsterdam. Augustine Heermans, the builder of the warehouse designated BUILDING A on the Broad Financial Center site, described himself as "the first beginner of the Virginia tobacco trade" in Nieuw Amsterdam (Innes 1902:54).

For reasons not quite understood, the rise of the Gouda industry after the foundation of the Pipemakers' Guild in 1660, sounded the death knell for Amsterdam as a pipemaking center.

Clay pipes were easily broken which made their period of utilization short. This makes them useful temporal indicators

for specific site occupation periods. Pipes can be examined in a number of ways to determine relative date of deposit, place of origin and name of manufacturer.

PIPESTEM DATING

In 1954, J.C. Harrington noted differences between earlier and later pipes in the artifact collection from Jamestown, Virginia. Earlier pipes had relatively larger bore holes through their stems than later ones which were narrower. He measured a sample of three hundred and thirty pipe bores from sites with known occupation periods and compared the pipestem measurements with specific periods of time. His bar graph expressed in percentages showed a reduction in bore hole size from 1620 through 1800. (1954).

Based upon Harrington's research, Lewis R. Binford (1962), devised a regression formula which could be applied to statistically large enough samples of pipestems to arrive at a single date, theoretically the median figure for the occupation time of the sample.

The formula is $Y = 1931.85 - 38.26X$

Where Y is the desired date

1931.85 is the date at which the bore diameter theoretically reaches zero

38.26 is the slope of the line representing the number of years between each 1/64" decrease in size.

X is the mean bore diameter for the sample to be dated.

The result is a single theoretically median figure for the occupation time of the material under examination. (Walker 1971:88)

Binford's formula has been applied, often misused, and extensively discussed since its original publication. In Volume 4 of the Conference on Historic Site Archaeology Papers, Lee H. Hanson, Jr. (1969), attacked Binford on a number of grounds, the most significant of which was to claim that pipestem bore diameters do not follow a straight-line regression but instead change at different rates during different periods of time. Hanson suggested replacing the single formula with ten different formulas, computed for varying periods of time from the Harrington data, using the line of least squares method (Hanson 1971: 2). What Hanson did not realize was that Harrington had never published his complete data, and it was on that more extensive collection that Binford had based his original calculation (Binford 1962). As Binford showed in his rebuttal to Hanson (Binford 1972), his formula consistently works better than any of Hanson's, for collections with known time durations. Hanson pleaded for better-documented samples in order to derive accurate dates, while Binford countered with an emphasis on the "basic properties of organized variability in the archaeological record." Binford claims that what we need to do is "begin the fascinating study of the distribution, temporally and spatially, of discrepancies between the age estimates given by the pipestem formula and historically documented contexts as well as correlations with other classes of artifacts" (Binford 1972: 249). He goes on to say that he expects discrepancies between pipestem-derived dates and sites to "cluster spatially with regard to the territories supplied from different ports and

through different logistical contacts" and he speculated that "greater differences between pipestem estimates and known dates will be shown to cluster during the initial periods of the establishment of settlements" (Binford 1972: 249).

In Volume 6 of the Conference on Historic Site Archaeology Papers, Robert F Heighton and Kathleen A. Deagan (1972) presented yet another, and what they consider a better, formula for arriving at dates based on pipestem bore diameters. Using a total of 26 stem samples from 14 sites, they argue that an exponential curve fits the data better than Binford's straight line regression. Hanson (1971a) has pointed out the unreliability of their results because of the weaknesses in many of their samples (small, from questionably-dated sites, etc.).

Other researchers have noticed additional limitations with the pipestem dating method. Audrey Noel-Hume found (1963) when working with pipestems from the Williamsburg Virginia collection, that a minimum of 900 stem fragments were necessary to produce reliable results. She also demonstrated that the Binford formula was not reliable for samples dating earlier than 1670 nor later than 1760. Stems from later sites yielded dates which were consistently too early as one progressed into the 19th century. Walker (1977) explained the phenomenon as the result of two occurrences: an increase in production which resulted in a multiplicity of pipe types; the size of the bore holes could not reduce indefinitely.

Harrington and Binford (1954;1962) recognized the limitation of pipestem dating techniques for the late 18th and 19th centuries. They also appreciated the problem created by the fact

that the mean date formula was based upon size variation in English pipes and could not be directly applied to pipes of Dutch manufacture (Dallal 1982).

Dutch bores grew narrow earlier than English bores of comparable time periods. For archaeologists working with 17th century sites containing Dutch or mixed Dutch and English pipe remains, the use of Binford or Harrington's statistical methods is not possible without some interpretation and/or modification. John McCashion found, after working with mixed Dutch/English deposits on dated New York State sites, the subtraction of 10 years from mean dates up to 1660 and the addition of 10 years after 1660 was a valid method of dealing with the differences in Dutch and English stem bore diameters.

The analysis of the Broad Financial Center site pipe sample incorporated all the aforementioned methods of pipe dating. It was then established that by looking at the relative percentages of bore diameters in 1/64" increments, using bar graphs to demonstrate these bore diameter distributions, it was possible to refine the chronology of two or more 17th century deposits that had been dated with ceramic terminus post quems to the same date.

DECORATION

Ornamented pipes can be dated within ranges of time during which certain styles were popular, and by changes in design elements. Decoration was mainly on the stems in the 17th century. However, elaborately decorated molded bowls are known from 17th century Dutch sites in the Netherlands. Favorite subjects were Sir Walter Raleigh being spat out by a crocodile

(also known as Jonah pipes) and "Orange" pipes which depict Stadtholders, Royalty and/or motifs related to the House of Orange. (Duco 1981)

During the second half of the 18th century, elaborately molded bowls decorated with Royal Arms, heraldic figures, Masonic emblems and Prince of Wales feathers became popular in England. Heraldic marks were relatively uncommon before 1750 and came into their fully developed form during the last 50 years of the century. By 1800, they had gone out of style (Atkinson and Oswald 1969).

Decorated, two-piece relief-molded bowls with scalloped ridges or fluting predominated in the 19th century. Oswald (1975:10) states that "there is a marked resemblance in many styles, implying mold makers delivering patterns from an order book with modifications to suit customers' requirements" as was the case with architectural pattern books. The result of this borrowing was that styles originally characteristic of one manufacturing area were quite often imitated in other regions and/or periods.

In the 19th century, a wider range of design motifs including fluting, bars and beads, floral and botanical ornamentation, was employed. Oswald dates one specific combination commonly found on London sites - leaf decoration along mold seams - to between 1790 and 1830. (Walker 1966). Hand applied rouletting popular as a decoration on early pipes, disappeared in England before 1710. Dutch pipemakers, however, continued the tradition throughout the 18th and 19th centuries

but the results were poorly-executed molded imitations. Partial rouletting on the front of the rim was done to cheaper pipes.

Duco (1981:191) states that until the 19th century, Gouda "potters fired pipes for the pipemaker". Glazed pipes offer evidence of the close relationship "between the pipemaker and the potter who fired his pipes and dipped them into the lead glaze." (Duco 1981:385) Most pipes were completely covered with lead glaze - the bowl as well as the stem. Green was the most common color but yellow and brown occurred. (See Strata Group 11B). Glazing began before the 1620's and continued until the end of the 17th century.

Rouletting on bowl rims may indicate the status of the pipe since "to apply it fully and carefully is more time consuming." (Davey 1982:206). In general, rouletting on pipes found on New York City sites seems to be arbitrarily and haphazardly applied. This implies that the Dutch were shipping cheaper pipe products to Nieuw Amsterdam.

Pinched stems were molded between the fingers while the boring wire was still in the bore. "This was done both horizontally and vertically, producing a tortuous effect, which may derive from a pattern in furniture legs popular in Holland during the 1650's" (Duco 1981:454). This was done with both Dutch and English stems.

CHANGES IN PIPE SHAPE AND THE RELATIVE ORIENTATION OF BOWL TO STEM

The use of tobacco was learned from the American Indian. The prototype for the earliest British pipe was an aboriginal model which promptly took on a distinctly European flavor. Very

small bowls, contracting slightly at the rim attached to thick stems at an obtuse angle gradually changed until, by the early 18th century, stems were thinner and longer and the bowls were larger "with gently curving lines while the large flat bases had given way to small ovals or single spurs" (Petersen 1963).

Duco (1981) hypothesized that bowls became larger around the middle of the 17th century because the cost of tobacco declined. He further concluded that larger bowls were necessary because smokers had become habituated to nicotine.

F.H.W. Friedrich (1964) evolved a dating method based upon three bowl shape elements which changed through time - the height of the bowl measured from the rim to the juncture of the stem at the back of the bowl, the greatest outer diameter of the bowl and the largest inner diameter of the mouth of the bowl. These were measured in millimeters, then multiplied together, resulting in a series of graphs which equated these figures with dates.

The Friedrich method was not employed on the Broad St. sample because of an early estimate of the minimum numbers of bowls (approximately 900) and because of time and budget constraints. However, pipe bowl measurements were taken and the information available for future study.

Bowl-shape typologies, and therefore dates, were based primarily on Atkinson and Oswalds' typology for London pipes (1969), Ivor Noel-Hume's "simplified evolutionary series of English clay pipes" (1979) and Duco's comprehensive study of 17th century Dutch clay pipes (1981).

The wide angle between bowl and stem was retained in Holland

and England for nearly 100 years. When the angle was reduced the bowls sat more erectly on their stems. Simultaneously, "the plane of the rim of the bowl, which, if projected, formed an acute angle with the stem in the older pipes, now became parallel with the plane of the stem." According to Omwake (1967:1) this change in the relationship of rim to stem is a valid criterion for dating a pipe (Dallal 1982).

STUB - STEMMED PIPES

The earliest known stub-stemmed clay pipe industry in the United States was that established by Gottfried Aust at Bethabara, North Carolina in 1755. This pipe style is based upon Turkish models and had Central European origins. Aust's successors, Rudolph Christ and Johann Krause stayed at Bethabara when Aust moved to Winston-Salem in 1772.

South (1967) recovered seven varieties of stub-stemmed pipes at the site of Aust's worksnop in Bethabara, two varieties of which are called "Anthropomorphic". Glazed examples of all types were also recorded.

The "Anthropomorphic" pipe excavated from the Broad St Financial Plaza appeared to be type H. (See Fig. 1 Walker 1980), with a clear or colorless glaze. The Christ/Krause anthropomorphic reeded style dated 1786 to 1802. Christ reopened the Bethabara pottery in 1786, abandoned in 1789 and was succeeded by Gottlob Krause.

MAKER'S MARKS

Fortunately for archaeologists, pipemakers often stamped their products with distinctive marks. These marks usually

consisted of the manufacturer s initials and can be traced to individual pipemakers who were in business during specific periods of time. From the second half of the seventeenth century onwards there are written records (Freedom Rolls, wills, marriage licenses, parish registers) which identify individuals as pipemakers. Unfortunately, there is no comparable written record extant for Dutch pipemakers. The registry of Dutch Guild marks for the period between 1660 and 1720 was sold at a London public auction in 1876 and has subsequently been lost. Peter Marsden's excavation of the 18th century Dutch merchant ship Amsterdam (Marsden 1974) however, has provided a dated collection of mid 18th century Dutch Gouda pipes. The ship is known to have sunk off the British shore near Hastings in 1748. Thus, although the written records on Dutch pipemaking are weak, this archaeological evidence fills the gap for a specific, and fortunately, relevant period.

The initials on a maker s mark, be the mark Dutch or English, cannot always be assigned to one individual. In the case of the commonly-found pipes of the British manufacturer Robert Tippet, for instance, several generations of pipemakers had the same mark. This absolute identification of pipemakers is complicated further by the fact that the marks had the status of chattel and could be bought, sold, rented, traded, or inherited. A mark that had acquired prestige in one period might be used by a second or third manufacturer many years later.

In addition to elements of style, the placement of the maker's mark has chronological significance. The earliest marks

were stamped on the flattened part of the base of the pipe. If the pipe was spurred, the mark was often placed on the stem or on the back of the bowl. Sometimes initials were placed on the heel and bowl of the same pipe. About 1670, the placement of the mark was changed to the sides of the heel on London pipes (Oswald 1951). Eighteenth century Bristol pipes often had a relief-molded maker s mark in a cartouche on the side of the bowl and an incised mark at the bowl back (Jackson and Price 1974).

Three major types of makers marks were associated with Dutch-made pipes. Like British marks, one type consisted of the maker s initials in relief, sometimes joined together and sometimes crowned (Omwake 1967). Numbered marks, often surmounted by a crown, were also used (Omwake 1961), as were symbolic representations of an object, trade, mythological figure, or facet of everyday life (Omwake 1967). A shield-shaped mark signifying the Arms of the City of Gouda came into existence in 1739, distinguishing "fine" pipes from "ordinary" ones. In 1740, a new ruling allowed pipemakers to place the Arms of the City of Gouda, accompanied by the letter 'S' (first letter of the Dutch word, "slecht", meaning "ordinary" on both sides of the heel or bowl (Dallal 1982).

A dot on one or both sides of the heel may be a "quality control" mark, (McCashion 1979) but it is not clear why this should have been done.

DATE RANGE

The pipes from the Broad St Financial Plaza site span the 17th, 18th and 19th centuries. The majority of the identifiable

bowls were manufactured in England during the late 17th - early 18th century. The collection was also marked by a large collection of mid-late 17th century Dutch pipes.

A CHRONOLOGY FOR EB PIPES

EB pipes were manufactured by Edward Bird, an Englishman from Surrey who came to the Netherlands as a soldier in 1624 and married a Dutch woman named Aaeltie Govaert in 1630. The documents list him as a pipemaker in that year. After his first wife died, Bird wed Anna Maria van der Heijde in 1661. Bird, himself, died in 1665 but his son Evert continued manufacturing pipes. At his marriage in 1668 he was listed as a tobacco pipemaker, and the record also indicates that the house belonged to his father. The Bird family was mentioned in a real estate transaction in 1683 but never again after that time.

The distribution of EB pipes on Amsterdam sites as well as the number of EB pipes found in New York "suggests that he worked for one or more large merchants who exported pipes to many countries." (Duco 1981:399). The quality of these pipes is quite ordinary, "decorated or other types are unknown" (Duco 1981:400), therefore his success was based on quantity not quality.

In a document dating to 1683, the pipe merchant, Adriaen van der Cruis, complains to the Gouda Guild that the EB mark owned by him is being plagiarized by other pipemakers. He claims to have owned the mark since 1672. (Duco 1981; McCashion 1979) See Strata Group IIB.

Twenty two EB marks were recovered from the Broad St. site. Of these, 12 were within undisturbed stratigraphically distinct units of

association. Ten were from mixed deposits or were surface finds.

Paul Huey (Pers. Comm. 1984) has established a rough chronological typology for EB marks at Ft. Orange. His types are generally in stratigraphic sequence, meaning that #3 is earlier than #10, etc.

Fort Orange EB Marks

Beaded EB #3
Dashed EB #10
EB in concentric circles #25
EB in Sunburst #26
Plain EB #31

The EB sample from stratigraphically defined units of temporal homogeneity contradicted the Fort Orange typology. The earliest temporal unit with a TPQ of 1640 contained EB marks in concentric circles (Huey's type #25), and had 8/64" bore diameters. Bowls were thicker and heavier than pipes from the 1680 temporal group. At Fort Orange, the above mark falls midway between the earliest and the latest EB examples. Huey found this mark to be later than the Beaded EB.

At the Broad Street site, the deposits with a TPQ of 1680 contained the following EB marks:

EB in concentric circles (7/64", 6/64")
Beaded EB (6/64", 7/64", 9/64")
Plain EB (7/64")

Since no dates were given in association with Huey's EB marks, one can only state that the Broad St. EB marks did not correlate with the rough chronological sequence from Ft. Orange.

The following facts were established for the Broad St. collection:

a) The EB in concentric circles seems to be associated

with a heavier, thicker bowl (both in the 1640 and 1680 temporal groups) and may be earlier than the other marks.

b) EB pipes had stem bores ranging from 6/64" - 9/64" indicating that Bird was producing pipes with many styles and bore diameters.

c) Beaded EB marks were on the heels of the thinner, more delicate pipes (late 17th Century).

d) In the temporal group with a 1680 TPQ, the EB marks in concentric circles, as well as beaded and plain EB, were contemporaneous.

METHODOLOGY

As stated above, 80 components were defined by the Stratagraphic analysis. These natural units of association and contem-poraneity served as primary analytical units. Components ranged from structural elements, features, construction and destruction debris to deposits from interfaces, drainage systems and 20th century intrusions.

Pipes under analysis were described in a standardized manner which reflected aspects of clay pipes which could be used for diagnostic purposes:

1. Stem Fragments
2. Bowl Fragments
3. Makers' Marks

Identification was based primarily upon the following sources:

1. 17th and 18th century Bristol pipes (Jackson and Price 1974, 1981; Walker 1977)

2. 17th Century Dutch pipes (McCashion 1979; Duco 1981)

3. English pipes (Atkinson and Oswald 1969; Ivor Noel Hume 1976).

4. 17th and 18th century Dutch and English pipes from New York City sites (Dallal, in press).

Pipe tabulation and identification began with the context

number (the basic provenience level) within a specific component and proceeded to larger and more complex stratagraphic groupings, the Component, the Strata Group and ultimately, the Temporal Group. By maintaining association with the minimal unit, (the context number), pipes could be reorganized, and therefore re-interpreted, if the need arose. (Myers 1982; see Roberts above - "Stratigraphy".)

The sample of pipe fragment from each context number was measured and defined in terms of the fragment's dimensions and specific characteristics.

MEASUREMENTS

Although pipes generally increased in size until the end of the 18th century, size alone is not considered a secure diagnostic feature, and is not always consistent with stylistic or other technological indicators (Oswald 1951). Measurements were made on the Broad St. collection, however, in order to establish the range of variation present within components. The following measurements were taken consistently for bowls:

1. Bore diameter in 1/64" increments
2. Measurements of bowls in millimeters
   a) Height of bowl measured from the bowl/stem juncture (back of the bowl facing the smoker) to the rim.
   b) Circumference of widest part of bowl
   c) Height of bowl measured from top of bowl rim to beginning of heel.
   d) Circumference of bowl rim.
3. Heel dimensions: Length, Width, Circumference and shape of bottom

The size of the bore diameter, as discussed above, (See Pipe Stem Dating), is used to characterize the groups of stems. Measurements are usually taken with a set of 7 metal drill bits

gauged in 1/64" increments between 4/64" and 10/64", the expected size range for stem diameters. A single tool, the Step Gauge, developed by Edward J. Lenik (1971), which incorporates the idea of a graded set of drills into one instrument, was used to measure the Broad St. sample. This tool allows measurements to be made in less than half the time it would take using the separate drill bit method. It was necessary to use individual drill bits when a short stem attached to a bowl, or a bowl with no stem was to be measured, because the length of the Step Gauge inhibited maximum insertion capabilities gave an inaccurate reading.

Since measurements of makers' marks did not contribute to the identification of the mark nor help to differentiate one maker from another,. no measurements were taken. Bowl/Stem angles changed through time and could have been measured with a standard protractor. however, the estimated mimimum numbers of bowls (approximately 900), was thought to be too great, given time and budget constraints. and it was determined that the difference in the angle of the bowl to the stem could be gauged with the naked eye. Comparisons were made between mid and late 17th century bowls as well as 18th and 19th century bowls. These angles could be determined by holding one bowl up against the other.

Relevant information for each complete, or nearly complete bowl, makers' mark and/or unusual decorative motif was entered, traced or sketched onto a 3 X 5" index card. In this way, it was not necessary to handle the artifact more than was absolutely required. Index cards were easily transportable to libraries, conferences, etc. without the accompanying artifact and the

chance of loss or misplacement of pipes was greatly reduced.

WEAR

Wear or use-related marks were noted on tabulation sheets, i.e. smoked, water-worn, reworked. The presence or absence of wear or use-related marks was important in both the dating and/or interpretation of deposits. For example, reworked pipe stems are directly associated with whistle-making, a mid to late 17th century phenomenon at Fort Orange, Albany, New York where it is associated with the Dutch West India Company's heaviest period of trade with the Indians (Huey 1974). The re-working or whittling of pipe stems also occurred, occasionally, when a stem broke and the smoker needed to smooth the jagged edges of the new mouthpiece. This phenomenon, as well as the presence of smoked pipes might reveal a domestic or tavern deposit as opposed to a commercial or merchant-related deposit which would theoretically have a greater percentage of unsmoked pipes.

COUNTRY OF ORIGIN

The country of origin was also tabulated. Unlike ceramics, it is often possible to determine the country of origin of a particular pipe, even without a maker's mark, especially from the 17th through the mid-18th centuries, it becoming progressively more difficult as one travels toward the 19th century. This is due to the proliferation of molds and pipe styles (Walker 1977). For 19th century pipes it is nearly impossible to determine country or city of origin. Fortunately, however, this information is often stamped on the stem.

Although it is possible to distinguish 17th century Dutch from English pipes, it is more difficult to determine the pipe's city of origin. For example, "London type" pipes upon closer scrutiny often bear the name of a Bristol manufacturer. "Gouda" pipes are sometimes marked EB on the heel and Edward Bird was an Amsterdam pipemaker (See Strata Group IIB).

DECORATIVE MOTIF

Decorative motif was tabulated, though not measured (See above). This information is temporally and nationally specific helping to date and define deposits.

Upon completion of the stratagraphic analysis, examination of the pipes could proceed to the next step which which was the establishment or the terminus post quem for each component.

MENDING

Mending began at the context level. Crossmending at the intra and inter-component level was undertaken in order to determine bowl shape, stem length and in order to piece together missing portions of pipes bearing makers marks renderding them illegible had an attempt to mend them not been made. Mending also provided further evidence of bowl shape which allowed determination of country or city of origin. This matching of separately recovered fragments established the relative isolation or contemporaneity between apparently distinct strata.

Pipes were mended by the pipe analyst after consultation with the Conservator.

THE PIPE DATA BASE

As with other diagnostic artifact classes, selected information resulting from the pipe analysis was tabulated and entered into the IBM XT Computer in order to produce a quantified data base. However in the case of pipe data a slightly different approach was applied to the data entry. In order to get fragment totals of each bore diameter easily, a separate field was established for each of seven possible diameters and the data was organized in such a way that each record in the file represented the data from an entire Context No. Since the individual record represented an entire sample rather than only those pipes from a sample which exhibited the same attributes (as with the other diagnostic artifact files), the additional fields of recorded information in the pipe files were also conceived somewhat differently. They are as follows:

Component
Context Number
Count (total number of fragments in the Context)
TPQ
End Date
Total 4/64" Bores
Total 5/65" Bores
Total 6/64" Bores
Total 7/64" Bores
Total 8/64" Bores
Total 9/64" Bores
Total 10/64" Bores
Basis for TPQ (i.e., maker's marks, bowl type, decorative motif, etc.)
Maker (numerical code, refers only to TPQ pipe)
Decorative Motif (numerical code)
Bowl Diagnostic (coded, shape=belly bowl; stub-stemmed, etc.)
Other TPQs (other diagnostic pipes within the Context)

The coding system was numeric and the pipe taxonomy is included here as Appendix 6.

STRATA GROUP 1A

Strata Group 1A consists of 5 Components - structural elements of Building A. This deposit of mid-17th century pipes contained a total of 143 pipe fragments. With the exception of one English pipe bowl, each of the diagnostic elements was Dutch. All makers' marks were Tudor Roses (Plate VII-2 top, bottom), which were popular until after the middle of the 17th century when they began to decline and give way to other marks. "The best known and most popular maker's mark in the 17th century was the Crowned Tudor Rose." (Duco 1981:376 Plate VII-2, top). The English dominated the Amsterdam pipe industry during the period 1630-1660, after immigrating in great numbers. The Tudor Rose remained a symbol of freedom and prosperity.

The fact that all makers marks and bowl shapes ranged from the early to mid-17th century is consistent with the history of Building A which was identified as the warehouse of Augustine Heermans and built sometime before 1651 (Innes 1902).

The 1640 TPQ was based upon a tiny belly bowl from the Western Netherlands, decorated with a 5-petalled Rose on both sides of the lower portion of the bowl. It had an 8/64" bore diameter (Duco 1981, Plate VII-1, bottom:3).

Decorated stems comprised 14% of the total stems (100) present within this Strata Group. One red stem may be from Virginia. This too, is consistent with the historical record. Augustine Heermans described himself as "the first beginner of the Virginia tobacco trade" (Innes 1902).

Forty percent of the stem bore diameter were 7/64". Thirty four percent were 8/64". This was indicative of an earlier

rather than later deposit.

Component 2 yielded 37 pipe fragments. Key diagnostic chronological indicators revealed this to be a 17th century Dutch deposit. It mostly consisted of various types of decorated Dutch stems although there were fragments of 17th century Dutch belly bowls. The various motifs included:

1) rouletting at the juncture of the bowl and stem (8/64"). Dutch, 17th century;

2) pinched stem (fingerprints can be seen, indicating that this decorative technique was applied while the clay was still wet and that the stem decoration was not mold imparted. 7/64", Dutch, 17th century;

3) 4-in-diamond fleur de lys in cartouche separated by a line of rouletting. 7/64". Dutch, 17th century;

4) fleur de lys in beaded diamond. 7/64". 17th century Dutch: (Plate VII-1, top:2)

5) fleur de lys in diamond (unmeasurable bore). 17th century Dutch;

6) 4-in-diamond fleur de lys with lines of rouletting overlaying the diamond shaped cartouches. This implies that the rouletting was applied after the fleur de lys were stamped into the stem. 17th Century Dutch (Plate VII-1, top:1)

A mean date of 1659 was calculated based upon 29 stem bores. McCashion suggested that for pre-1660 Dutch deposits, a deduction of 10 years from the date gives a more accurate portrait of the mean date of deposition.

50% of the pipes had 7/64" bore diameters. 39% of the stems were 8/64" - signifying a 17th century deposit, probably dating between 1650-1680 (Harrington 1954).

Component 6 the Building A cobbled floor. 95 pipe fragments were excavated from the cobbled floor of Building A. Key diagnostics within this group included:

1) belly bowl fragments with rouletted rims - 17th century (pre-1710);

2) stems decorated with rouletting, probably Dutch. 6/64". 17th century;

3) bowl with heel & rouletted rim: burnished finish indicating better type of pipe. , 7/64". Amsterdam circa 1640; similar to Noel-Hume's #8, 1620-1660; (1976) (Plate VII-1, bottom:2)

4) belly bowl, rouletted all the way around the rim indicating a better class of pipe, stroke burnished, Tudor Rose on heel, 7/64". Dutch, probably Amsterdam and similar to Noel-Hume's 1976 #8 type, dated 1620-1660; (Plate VII-1, bottom:1)

5) tiny heeled belly bowl with rouletting only on back of rim. Five-petalled rose-mark on lower part of bowl (one on either side), 8/64". Western Netherlands 1640-1670 (Duco 1981:25, #32); (Plate VII-1, bottom:3)

6.) red clay stem (unmeasurable bore). Virginia. However, red stems have been found on Dutch sites; (Plate VII-2, bottom)

7) molded 7/64" stem with elaborate decoration composed of connecting branches interspersed with diamond shaped dots; lozenges, bars and scallops below the branches. This stem is similar to Le Cheminant's (1981) #162 which he calls a "London type" ca. 1660. The London stem, however, is described as "crude". The molded piece from Component 6 is beautifully made and I am inclined to think it is Dutch, based upon craftsmanship and the large number of molded Dutch stems found in 17th century Components on other sites (de Pernambucco 1983), and the rarity of 17th century English stems. In Brazil, molded stems began to take precedence over stamped stems in the later part of the 17th century, probably after 1660. It is odd that molded 17th century stems are not present in any quantity on New York City sites. (Plate VII-1 top:3)

8) thick belly bowl with rouletting on back of the bowl, 8/64" bore. "English" (McCashion 1984 & Huey 1984, pers. comm.) 17th century. However, it is unlike any English pipe published and the back of the bowl is similar to "Leiden-type" bowls illustrated by Duco 1981; (Plate VII-1 bottom:4)

9) thick, double conical bowl, rouletted rim, large round heel 4mm long (most are 1-2mm long). Similar to Noel-Hume's (1976) type #8 dated 1620-1660. Heelmark is Tudor Rose. Amsterdam pipe (Duco 1981). 6/64"; (Plate VII-1 bottom:5; Plate VII-2 top)

10) stems with diamond cartouches inside of which are single fleur de lys. Dutch 17th century. 7/64"-8/64" (Plate VII-1 top:4)

11) 2 stems with single fleur de lys in diamond cartouche surrounded by beads or pearls. Dutch 17th century. 7/64" (Plate VII-1 top:2)

12) heelless bowl fragment 5/64" bore. Slight belly. Bristol(?) Late 17th century(?).

13) 3 very thick belly bowl fragments with heavily impressed rouletted rims;

14) stem with large 4-in-diamond fleur de lys (each 18mm long,

others are usually 17mm long). 8/64"; 17th Century Dutch; (Plate VII-1 top:1)

15) (P26) - stem with 3 lines of rouletting and a fleur de lys in a diamond cartouche;

16) stem with 4-in-diamond fleur de lys, 7/64".

This was basically a Dutch deposit. A mean date of 1665 based upon 66 stem bores was calculated. However, since Dutch stems were shorter and narrower than comparable English pipes of the same time period, the mean date may be approximately 10 years later. (1655; McCashion:Pers. Comm.)

38% or 14 of the stems were 7/64" while 35% or 23 were 8/64". Only 21% or 14 of the stem bore diameters were 6/64". 4/64" and 5/64" were only 3% each. With English pipes, 8/64" stems had their greatest period of popularity between 1620-1650 while 7/64" bores were most popular between 1650-1680.

It is better to date pipes by makers marks, when available, and by bowl shape. Component o, however, offered no makers initials. The only marks were decorative motifs of Tudor Roses on the side of the bowls and on the heels. This component had more Tudor Rose marks than any other Component on the site. Tudor Roses were among the earliest makers marks in Amsterdam (ie: Holland) and they retained their popularity until the middle of the 17th century when they gave way to other marks. Englishmen dominated the Amsterdam pipe industry during the period 1630-1660 and the crowned Tudor Rose continued to be a symbol of the freedom and prosperity that was unavailable to English pipe makers under the restrictive reign of James I.

There was a total of nine 17th century Dutch decorated stems; 3 bowls from Amsterdam; 1 from the Western Netherlands; 1 stem possibly made in Virginia; 1 mid-17th century English bowl (or Leiden?); 1 fragment of the heeless type bowl popular in Bristol in the late 17th century. Their was an interface problem with either the robber trench of Building A (CMP 11, Strata Group IVA), next to it, or the CMP 34 (sand and silt below the rubble Strata Group VI), above it.

The TPQ was based upon bowl shapes as well as marks, keeping in mind the popularity of Tudor Roses as makers' marks up until the middle of the 17th century. The predominance of Amsterdam bowls is consistent with historical evidence. After 1600 there was a slow decline in the Amsterdam pipe industry and by 1670 it was almost non-existent. There are no Gouda pipes in this Component. It was the foundation of the Gouda Pipe Makers Guild in 1650 that sounded the tocsin for Amsterdam as a pipe making center.

This component dates before 1660 (which I will propose as a possible end date). The TPQ was based upon the latest bowl dating 1640-1670 (Duco 1981:25, #32) from the Western

Netherlands, although this bowl, too, is similar to Amsterdam bowls (Plate VII-1 bottom:3).

Component 42 the robbed internal dividing wall. There were eleven clay tobacco pipe fragments in this Component. Unfortunately none were diagnostic, although this was one of the earliest strata groupings on the site. Surprisingly, stem bores ranged from 4/64" to 7/64".

STRATA GROUP IC

Strata Group IC contained 5 Components. 3 of the 5, or 60%, contained pipes. However, the total number of pipes was four. There was one diagnostic bowl with a maker's mark, (overlapping W's), that came from the workshop of William White of Exeter, 1670-1720, see Component 1, (Plate VII-3). There were no other diagnostic elements.

Component 1 the silt surface east and north of Building A. Two pipe fragments were recovered from Component 1. The only diagnostic artifact, and therefore the TPQ, was part of a late 17th century bowl with a mark on the tip of its oval heel, consisting of overlapping W s. The pipe appears to be a "second", as the mark only hit part of the heel. In addition, the tool used for boring holes through stems punctured the bowl itself. This pipe, with a bore diameter of 5/64", was manufactured by William White of Exeter, 1670-1720. (Bradley et al 1983). (Plate VII-3 top & bottom)

The peak period of Exeter exports to New England, especially Boston, was between 1670 and 1720 (Arnold and Allan 1980). William White was one of Exeter's major producers. A pipe with this mark was excavated at the Onondaga Iroquois Sevier site in New York State, and dated circa 1700-1720 (Bradley 1979).

Component 37 the silt surface behind Building A. One plain 4/64" bore was excavated from this silt surface.

Component 46 the silt surface west of Building A. 1 pipe fragment was excavated from Component 46. This was not diagnostic.

STRATA GROUP ID

Strata Group ID consisted of 4 Components. Three out of the four or 75% contained pipe fragments, which totalled 139. Strata Group ID contained Dutch and English material. A TPQ of 1680 is suggested, based upon bowl morphology (Atkinson and Oswald, type #22, 1680-1710, Plate VII-4 #5). The placement of maker's marks on the heel of pipes is a 17th century manifestation. The "Fortune" mark or "David with Shield and Sword" mark from Component 3 with a TPQ of 1675 (Plate VII-5 bottom), the heelmark of IW from Component 4 with a TPQ of 1667 (Plate VII-5 center) as well as the RT mark stamped on the back of a heeless "export" type probably developed by Robert Tippet II. TPQ 1678, suggest that a TPQ of 1680 for Strata Group ID is acceptable.

An infusion of English elements shows up in Component 4. Although it is difficult to differentiate Dutch stems from English stems unless they have markers marks or are decorated with specific motifs known to have national significance, one can assume that stems decorated with fleur de lys and/or rouletted runs of dots are Dutch (Plate VII-4 #2,#4).

Decorated stems constituted 6% of the total stem sample as opposed to 14% in Strata Group IA, which had been determined to be an earlier deposit.

Eight complete or nearly complete bowls were grouped based on morphology, into the following two categories:

1) Heeless export type, late 17th-early 18th century; Bristol (Walker 1977). Total of 5.

2) Type 22, 1680-1710; England (Atkinson and Oswald 1969). Total of 3 (Plate VII-4 #5).

All bowls were English. 63% were Bristol pipes. The other 38% were definitely from England but it could not be determined if these Type 22 pipes were from Bristol, London, or indeed, from both cities.

The preponderance of 7/64" and 6/64" bore diameters, 37% for the former and 33% for the latter, as well as 18% of the stems having a bore diameter of 5/64", indicated that Strata Group 1D was later than Strata Group IA.

Component 3 the construction debris west of Building A. This component consisted of 20 pipe fragments. Of these, only one was of chronological value. This was the heel of a Dutch pipe (7/64") with a picture-mark that appeared to be either the "Fortune" mark or "David with a Shield and Sword". Fortunately, both marks had a TPQ of 1675 and were used until 1881. These were Gouda marks. The shape of the fragment indicated that it is a 17th century pipe (Duco 1976).

A mean date of 1691 was calculated, based upon the measurement of 14 stems. In this instance, a mean date of 1691 seemed reasonable. As stated above, however, it is better, where possible, to date deposits based upon bowl shapes and maker's marks. Since we were fortunate to have the aforementioned mark, we used this as the basis for our Terminus Post Quem.

Component 4 the yellow brick debris west of Building A. There were 108 pipe fragments excavated from this Component. Key diagnostic indicators included:

1) Heel with IW* mark (7/64"). This is an unknown Amsterdam maker's mark dating 1667-1693 on New York State sites. (McCashion 1979). It is interesting to note that IW* marks have been found at the Stadt Huys and 7 Hanover Square sites in Manhattan and that all have had 7/64" bore diameters. (Dallal in press) (Plate VII-5 center; Plate VII-4 #3)

2) Fragments of a heeless "export" type pipe (6/64"). This had a double bore hole through the stem. (See Components 53 and 54). Bristol, late 17th-early 18th centuries.

3) Heeless pipe stamped RT on the back of the bowl. Manufactured by one of the Robert Tippets of Bristol, who spanned three generations, 1660-1722.

4) Reworked pipe stem (an attempt at whistle making). Mid-late 17th century (Huey 1974). 8/64" (Plate VII-3D).

5) Stem decorated with large (14mm) fleur de lys in beaded, diamond shaped cartouches. Dutch 17th century. 7/64" (Plate VII-4 #2).

6) Stem decorated with rouletting (wide and narrow) and runs of dots with a coggle above and below each circle, caused by the line of dots being applied below the line of rouletting. Dutch, 17th century. 6/64" (Plate VII-4 #4).

Eight complete or nearly complete bowls were grouped, based upon morphology, into the following categories: 1) Heeless Export type, Late 17th - early 18th century, Bristol, (Walker 1977); and 2) Type 22; 1680-1710, England. (Atkinson and Oswald 1969). (Plate VII-4 #5)

All of the above bowls were English. 5 or 63% were Bristol pipes. The other 3, or 38% were from England but it could not be determined with certainty if Type 22 pipes were from Bristol, London or, indeed, from both cities.

It should be noted that a unique Gouda heel mark by an unknown maker consisting of an 8-pointed star and dating 1670-1690 (Duco 1981) was recovered from Context 591. It was decided to excise CX 591 from Component 4 due to interface problems with Component 34, directly above it. The mark is noted here because it was unique to the site and dated to the mid-17th century based on Onondaga sites in New York State (Bradley and DeAngelo 1981). (Plate VII-5 top; Plate VII-4 #1)

Component 4 was a composite of Dutch and English pipes. There was a trend towards an increase in English material towards the end of the 17th century, which was wholly consistent with the historical record. The TPQ of 1680 was based upon a bowl morphologically dating from 1680.

Although this was a mixed deposit, a mean date of 1684 was calculated based upon 49 bore diameters. McCashion (pers. comm.) feels that for mixed Dutch/English deposits after 1660, an additional 10 years should be added to the mean which gives a more accurate reading of the mean date of deposits. (1694) In this case, however it should be noted that a TPQ of 1680 was found by independent analysts of ceramics, pipes and glass, each working separately.

Component 40 the trench fill. Eleven pipe fragments were excavated from Component 40 but none of these were diagnostic.

STRATA GROUP IIA

Strata Group IIA, composed of mid-17th century features, contained 7 Components. 6 of these or 86% contained pipe fragments. A total of 48 fragments were recovered and analyzed. 11% of the stems were decorated. Decorations included two types: 1) fleur de lys in beaded cartouches, 14mm long (8/64"; unmeasurable); a total of 3 (Plate VII-6 bottom:1). 2) 4-in-diamond fleur de lys (7/64"); this stem was reworked which suggests whistle making activity; total of 1 (Plate VII-30).

Maker's marks were a plain EB on the heel and an EB in

concentric circles (Plate VII-6 top). Both were manufactured in Amsterdam. The diagnostic pipes speak for themselves. This was a Dutch mid-17th century deposit of clay tobacco pipes, probably from Amsterdam.

There was a predominance (44%) of 8/64" stems as well as 41% of 7/64" bore diameters. English pipes with 8/64" bore diameters went out of style by ca. 1680 and had their greatest period of popularity between 1620-1650 (Harrington 1954). Dutch pipes were narrower during this same temporal period which suggests that if 8/64" English pipes were most popular between 1620-1650, and with this being an exclusively Dutch deposit, earlier date than 1650 might be suggested as the peak popularity period for these Dutch pipes. This is equally true of the 7/64" bores which were most popular with the English pipe makers between 1650-1680.

Component 8 the small barrel in the builder's trench. Although only 9 pipe fragments were excavated from this Component, all were consistently early. Stem bore diameters which were predominantly 8/64" (50%), 7/64" (38%) and 9/64" (13%), also point to an early date.

Two Dutch stems (8/64" and unmeasurable) were decorated with elaborate beaded fleur de lys each with 14mm long cartouches. A mean date of 1638 is close to the ceramic TPQ of 1640.

Component 9 the builder's trench for the large barrel. Eleven fragments were excavated from Component 9. Diagnostic elements included:

1) Whistle made from a 7/64" stem decorated with a 4-in-diamond fleur de lys, bisected by a line of rouletting. 17th century Dutch. Whistles have been associated with mid-late 17th century New York sites (Huey 1974). (Plate VII-30);

2) belly bowl fragments; 17th century Dutch.

A mean date of 1664 was calculated based upon 9 stems with the majority of the stems 7/64" (56%) and 22% each of 6/64" and 8/64" bore dimensions. The sample was too small to be statistically significant, however it was close to the ceramic TPQ of 1650.

Component 10 the builder's trench for the oval yellow brick cistern in Lot 8. Of the 7 pipe fragments excavated from this Component, none were diagnostic.

Component 12 the pit associated with the small barrel. Only two fragments were in this component, one of which was an 8/64" stem. There were no bowls or maker's marks.

Component 13 the fill of the small barrel in Lot 8. This component was mid-17th century Dutch. There were 17 pipe fragments.

Key diagnostic and chronological indicators were:

1) belly bowl fragments with rouletted rims, 17th century, probably Dutch;

2) belly bowl with rouletted rim, heel with EB mark in concentric circles (1630-1683), Amsterdam (Duco 1981). 8/64". Similar to Huey's type #25 at Fort Orange (Paul Huey, pers. comm.). Bowl shape is 1645-1665, and similar to Noel-Hume's type #'s 9, 10 and 11; This pipe was used as the Terminus Post Quem (Plate VII-6 bottom:2).

3) whistle (8/64"). associated with mid-late 17th century New York sites (Huey 1974) (Plate VII-30);

4) stem decorated with fleur de lys in beaded lozenges (7/64"). Dutch (Plate VII-6 bottom:1).

The Binford mean date was 1645, however, this was based on only 10 stems. McCashion felt that for deposits dating pre-1660, subtracting 10 years from the mean date would be appropriate. This gives a mean date of 1635. Whether or not one accepts the viability of using mean dates for Dutch pipe deposits, in this case, the date is unreasonable.

Component 22 the builder's trench for the rectangular yellow brick structure. Of the 2 pipe fragments excavated from this Component, both mended to form a belly bowl with a thick stem and a heel marked EB in concentric circles (8/64"). The pipe was manufactured by Edward Bird of Amsterdam, 1630-1683.

STRATA GROUP IIB

Five Components were within Strata Group IIB. All had clay tobacco pipe fragments which totalled 418. These late 17th century features contained 8% decorated stems (26) out of total

of 311 stems.

Ten pipes had maker's marks. 80% (8) were EB marks (1630-1683, Edward Bird) from Amsterdam. 10% (1) were HG, Hendrik Gerdes, Amsterdam 1668-1684, and 10% (1) were RT, Robert Tippet, 1678-1722. This meant that 90% of the makers were Dutch and 10% were English.

Whole bowls were grouped into types based upon morphological characteristics. One would expect an influx of English pipes after the British occupation of Nieuw Amsterdam in 1664 and that this takeover would have expedited the importation of English goods to the Colonies. Indeed, 22 pipe bowls in Strata Group IIB were identified as to country and, in some cases, city of origin. Date ranges were established. Pipe bowls were grouped into 8 typological categories. Dutch bowls were divided into two distinct groups while English bowls as expected were more diversified with 6 typological groupings:

1) Type: Dutch contracting bowl base (EB pipes). late 17th century. Origin: Amsterdam. Total: 6. Reference: Duco 1981 (Plate VII-7 #8,#9).

2) Type: 21, 1680-1710. Origin: England. Total: 1. Reference: Atkinson & Oswald 1969. (Plate VII-7 #7).

3) Type: 13, 1650-1680. Origin: England. Total: 1. Reference: Noel Hume 1976 (Plate VII-7 #1).

4) Type: 22, 1680-1710. Origin: England. Total: 4. Reference: Atkinson & Oswald 1969 (Plate VII-7 #2).

5) Type: 10B, 1690-1740. Origin: England. Total: 1. Oswald 1965 (Plate VII-7 #6).

6) Type: Longer, thicker Dutch pipe, 3rd quarter 17th century. Origin: Amsterdam. Total: 5. Reference: Duco 1981 (Plate VII-7 #8).

7) Type: 9C, 1680-1730. Origin: England. Total: 1. Reference: Oswald 1965 (Plate VII-7 #4).

8) Type: 20, 1680-1710. Origin: England. Total: 2. Reference: Atkinson & Oswald 1969 (Plate VII-7 #10).

9) Type: Molded Bowl, late 17th century. Origin: Gouda. Total: 1. Reference: personal observation. (Plate VII-7 #5)

55% of the bowls were Dutch. (11 of these were from Amsterdam, 1 from Gouda). 45% of the bowl were English.

Initially, it was surprising that the quantity of Amsterdam pipes overshadowed the Gouda pipes by 11 to 1. The historical record states that after the 1660's, the growth of the GOuda pipe industry nearly wiped Amsterdam off the face of the map as an important pipemaking center. A closer look at the pipes grouped as "Dutch contracting bowl base (EB pipes)" revealed them to be nearly identical to Gouda pipes, dated 1680-1710, by DUco, 1981 (Plate VII-7 #14). These were EB pipes, though, and Edward Bird was an Amsterdam pipe maker. Duco (1981), as if in answer to our dilemma, mentions a document dating to 1683. "The pipe merchant, Adriaen van der Cruis, complains to the (Gouda) Guild that the pipes, which he had made for him by Jacobus de Vrient, and which were marked EB on the heel, had been imitated by other pipe makers. Van der Cruis declared his right to the EB mark, used by him since 1672. Other pipe makers were then forbidden to use the EB mark, though the crowned EB was allowed" (Duco 1981:420).

Is it possible then, that the o "Dutch contracting bowl base EB pipes" were made in Gouda. If this is true, then the archaeological remains support the historical record.

65% of the stem bore diameters were 6/64" and 22% were 7/64". This is nearly the ratio predicted by Harrington for English pipes between 1680-1710 (Harrington 1954).

Component 14 the large barrel fill, contained 145 pipe fragments. 7 pipe bowls were complete enough to establish an

approximate date of manufacture as well as country of origin. The bowls were subdivided into typological groups as follows:

Type: 9A, 1690-1740. Origin: England. Total: 1. Reference: Oswald 1951. (not shown - too fragmentary)

Type: 13, 1650-1680. Origin: England. Total: 1. Reference: Noel Hume 1976. (Plate VII-7 #1)

Type: 22, 1680-1710. Origin: England. Total: 3. Reference: Atkinson & Oswald 1969. (Plate VII-7 #2)

Type: 10B, 1690-1740. Origin: England. Total: 1. Reference: Oswald, 1965. (Plate VII-6 #6)

Type: Molded bowl, late 17th century (* see below, Number six). Origin: Gouda. Total: 1. Reference: personal observation 1984. (Plate VII-7 #5; Plate VII-8)

All but the one molded bowl were English; i.e., 86% were English, 14% were Dutch. Other diagnostic indicators included:

1) A bowl fragment with rim rouletting, pre-1710 (McCashion 1979).

2) 2 reworked pipe stems (beginnings of whistle making, mid-late 17th century). (Huey 1974). (Plate VII-30)

3) RT stamp on bowl fragment with rouletted rim. Robert Tippet II (1678-1722). Bristol. (Jackson & Price 1981). (Plate VII-9 bottom)

4) Plain EB mark on heal (8/64"). Edward Bird, Amsterdam 1630-1683 (Duco 1981).

5) Stem with rouletted runs of dots. Dutch, 17th century.

6) Elaborately decorated bowl with spur (6/64"). On left side facing the smoker is an African woman bare to the waist and looking up at the sky. She carries a long, smoking, tobacco pipe in her left hand and a tobacco roll in her right. Grass grows at her feet. The obverse depicts a man with a turban-like headdress. He may be a Turk or an idealized version of an American Indian. He wears a long cape and ankle length skirt, a shirt with seven buttons and soft boots. Grass grows at his feet. One of his arms is crooked at the waist, resting on his hip, the other arm is extended. He appears quite elegant, and may represent a "cigar store Indian". There is beading along the mold seam. A survey of the available literature revealed no other pipe with this motif. However, the bowl shape is nearly identical to late 17th century Gouda pipes (Plate VII-8).

53% of the bore diameters in this deposit measured 6/64%; 30% measured 7/64". The greatest period of popularity for English pipes with 6/64" stems was 1680-1710; for 7/64" stems it

was 1650-1680, but these are not usually found in stratified deposits after 1710 (Harrington 1954). Because of the overwhelming predominance of English pipe bowls, 86%, the mean date of 1697 is an acceptable one. The TPQ was based upon a combination of the RT mark and the approximate date of the bowl types.

Component 38 the basket and its contents. Of the seven fragments in the basket, two stems were decorated with fleur de lys. One 7/64"-8/64" stem had a single diamond cartouche with a large single fleur de lys inside. This imprint was repeated vertically down the stem (Plate VII-10 top right). Each was 1cm long. The other stem had a fleur de lys with a scallop-like decoration outlining a lozenge or cartouche. A 10/64" stem bore (the single largest bore on the site) was also included in the sample. This was a 17th century Dutch deposit.

Component 62 the barrel fill of Lot 14. This Component contained 52 clay tobacco pipe fragments. The possibility exists that this or cistern was utilized by the Kiersteae family, who owned and/or occupied the property from 1647 until at least 1710. (Stokes, 1927).

Five pipe bowls with an EB mark on the heel were complete enough to establish that they were of a late 17th century date, being contracted near the base and longer and narrower than earlier EB pipes Plate VII-7 #14). (See 1640 temporal group). EB pipes were manufactured by Edward Bird of Amsterdam 1630-1685. For a discussion of the possibility that these pipes were manufactured in Gouda, see Strata Group IIB. One of these EB pipes was unique in that it was colored with a yellow lead glaze on the inside of the bowl and partially at the rim. Glazed pipes usually indicate a "close relationship between the pipemaker and the potter who fired his pipes and dipped them into the lead glaze" (Duco 1981:385) (Plate VII-7 #15; Plate VII-10 bottom left). EB's initials were either surrounded by concentric circles or tiny beads (Plate VII-10 top left, center left).

Another maker's mark on a heel was the HG, which was manufactured by Hendrik Gerdes of Amsterdam, 1664-1684 (McCashion 1979). Hendrik Gerdes married Edward Bird's widow. Bird died in 1665. The #6 mark served as the TPQ for this Component. (Plate VII-9 top)

A whistle made from a rouletted stem fragment was another diagnostic indicator. Whistles were found at Fort Orange, Albany, New York which was occupied by Dutch West India Company traders and later by the English. Huey has reported reworked pipe stems in contexts dating as early as 1647 as well as in late 18th century backfill and intrusions. At Fort Orange, the reworked pipe stem was a "mid-17th century Dutch phenomenon.....at the height of activity in the Indian trade." (Huey 1974:106). Whistles might have been Contact Period trade items. (Plate VII-30)

It is known that Sarah Kierstede, as the Governor's interpreter had a close relationship with the Indians, her yard serving as a workplace and sanctuary for Indian women coming into the vicinity of the Fort (see Historical Section).

Other decorated stems had the following motifs:

1) Rouletted stem with scallops and dots/highly burnished/ 2 mend, 6/64". This appears to be a variation of the Bristol Diamond motif and is unique.

2) Rouletting with rows of "teeth" and bars (6/64"-7/64").

3) Rouletted runs of dots (7/74").

4) Rouletted Bristol diamonds with dots (6/64").

This was a deposit of predominantly Dutch pipes. Therefore, the mean date of 1684 may not be applicable (Binford 1962). McCashion, however, feels that the addition of 10 years to Dutch or mixed Dutch and English deposits which are post-1660, gives a more accurate mean for the date of deposit. In the case of CMP 62, the addition of 10 years would bring the mean up to 1694, which is in line with the 1697 mean of CMP14, which is the Large Barrel fill, also in Lot 14 and which also may have belonged to the Kierstede family. However, once again in a 17th Century deposit, the pipe mean date is identical, or close to the ceramic TPQ.

Component 76 the Pearl Street Contexts, contained 206 pipe fragments. Of these, 193 or 94% had measurable holes through their stems. Decorated stems constituted 6% (12) of the total stem sample (206). Stems were decorated with the following motifs: rouletted Bristol diamonds, total of 5 or 41%; rouletting, total of 5 or 41%; rouletted cogteeth, total of 1 or 8%; rouletted runs of dots, total of 1 or 8%.

Component 76 contained 10 bowls complete enough to be typed by bowl shape as to approximate date of manufacture and as to origin. These were:

1) Type: 9C, 1680-1730. Origin: England. Total: 1. Reference: Oswald 1969. (Plate VII-7 #4)

2) Type: 20, 1680-1710. Origin: England. Total:2. Reference: Atkinson & Oswald 1969. (Plate VII-7 #10)

3) Type: 22, 1680-1710. Origin: England. Total: 1. Reference: Atkinson & Oswald 1969. (Plate VII-7 #2)

4) Type: Dutch pipe, longer than those in the 1640 Temporal group, 3rd quarter of the 17th century. Origin: Amsterdam. Total: 1. Reference: Duco 1981. (Plate VII-7 #13)

5) Type: Dutch pipe with contracting base (EB), late 17th century. Origin: Amsterdam. Total: 1. Reference: Duco 1981. (Plate VII-7 #12)
6 of the 10 bowls, or 60% were Dutch (Amsterdam). 4, or 40% were English. The TPQ was based upon the approximate date of the period of popularity of these bowl models.

Maker's marks were represented by an EB mark on the heel, surrounded by a sloppily applied beaded circle. EB pipes were manufactured by Edward Bird, an Englishman from Surrey, who came to the Netherlands as a soldier in 1624 and married a Dutch woman, Aaeltie Govaert in 1630. He is listed as a pipe maker in that year. After his first wife died, Bird wed Anna Maria van der Heijde in 1661. Bird himself died in 1665 (McCashion 1979). His son, Evert, continued making pipes, however. Evert Bird married in 1668 and was listed as a tobacco pipe maker. He was living in his father's house at this time. The Bird family was mentioned again in 1683, when property was sold (Duco 1981), but never after that date.

It is not certain that Evert Bird was using the EB mark, but the date range for EB pipes 1630-1683 has been used as beginning and end dates with the thought in mind that both Birds were probably using the mark. Pipe analysts at other sites (Miller 1983 and McCashion 1979) have used the 1630-1665 time period for EB pipes. I have chosen to be more conservative, extending the date range to 1683, given that a whole bowl with a later Dutch 17th century shape marked EB has been excavated from this Component, as well as English bowls dating from 1680-1730.

It should be mentioned that Context 17 from the Pearl Street Cut deleted from the sample because of mixture, contained the greatest number of EB pipes (6). All but one, were stamped EB within a beaded circle on the heel. A single "export" type was stamped EB at the base of the bowl/stem juncture. This EB was inside a "sunburst" surround. (See A CHRONOLOGY FOR EB PIPES in the Introduction of the PIPES section)

Another mark in Context 17 was a Bell in a beaded circle on the heel of a delicate Gouda pipe. This mark has been reported on New York sites dating ca. 1667-1693 and ca. 1667-1685 (McCashion 1979). Although this mark is identical to the bell-mark illustrated by McCashion (1976:26) and which he states is "probably from Amsterdam" (ibid), the Broad Street example sits on a finely made Gouda pipe with a morphological shape dating to ca. 1680 (Plate VII-9 center).

Decorated stems had the following motifs: rouletted variation of Bristol Diamond total of 1 (Plate VII-10 bottom right); Bristol DIamond, total of 1; and rouletted, total of 9.

If one includes Context 17 in the calculations, a total of 26 diagnostic bowls can be attributed to a specific country of origin. Of these, 81% are Dutch, 19% are English. Of the maker's marks, 88% are from Amsterdam, 13% from Gouda and none

from England.

STRATA GROUP III

Strata Group III was made up of two well defined deposits, a cistern located in Lot 14 and a deposit inside a small building in Lot 11 which contained a unique cache of pipes. These deposits together contained 7,464 pipe fragments.

The Pipe Cache

Quite unexpectedly, within the confines of the stone foundation walls of a small outbuilding dating to the period of British occupation, excavators came down upon a cache of clay tobacco pipes. A total of 7,196 pipe fragments, or 77% of the pipe fragments from the entire sample came from this cache as well as 80% of the marked bowls.

Morphologically, these pipes were examples of the "ordinary" late 17th/early 18th Century English type archaeologists find after the Dutch occupation period in Manhattan (post 1664) (Plate VII-11 bottom). They could be roughly divided into the following categories:

1) Heeless export type with RT mark stamped on the back of the bowl approximately 36% of the total.

2) Heeless export type, unmarked approximately 8%.

3) Heeless type, unmarked approximately 56%.

4) Heeless type, marked TW less than 1%.

5) Heeless type, marked RT on heel less than 1%.

These were further divided into subtypes based primarily upon variations in size, thickness of bowl, and angle of the bowl to the stem. Fifty percent of all bowls were of the Bristol

variety and 50% were "London" shapes (Jackson & Price Pers. Comm. September, 1984). None, but one, had rim rouletting a 17th Century characteristic. A list of"irregularities" taken from field notes during the excavation phase of the project, noted with increasing incredulity . . .

> "Squashed bowl rims, (looks like someone sat on them); bumps near the base; bowl rims with visible fingerprints; squashed heels; pinched stems; holes in the bowls; clay patch on bowl (looks like someone tried to mend it); barriers inside bore holes (couldn't have smoked them); clay blockage (dottle) inside bowl; RT stamp near the rim; nearly illegible RT marks; RT mark to the side; reversed RT; RRI1/RRRT mark on back of bowl!!!" (Plate VII-12; Plate VII-13; Plate VII-14 top & bottom)

There was also a bowl that was completely folded up in itself.

What did we have here?

The minimum number of bowls was estimated to be 882. This is a little more than six gross of pipes, or approximately 74 dozen. All makers' marks were Tippet marks with the exception of four TW marks (Plate VII-14 center).

By the close of the 17th Century, Bristol, England was perhaps the most important pipe manufacturing and exporting center in England. The extent of their trade with the American colonies is evidenced by the large number of wide distribution of Bristol pipes found in the United States.

The Tippet family exported nearly as many pipes to North America as all the other Bristol makers of the period combined (Walker 1977). Tippet pipemakers spanned three generations, their styles predominating between 1660 and 1780. Their family history is pertinent to this discussion because almost all the marked pipes from the pipe cache were marked with

variations of the Tippet marks.

Robert Tippet I

It was customary for pipemakers to begin their careers by apprenticing to experienced manufacturers. Robert Tippet I received his freedom in 1660, when he married Joan Thomas. He acquired an apprentice in the same year, indicating that he was already producing pipes of his own (Jackson and Price 1974). Gifford (1940) has speculated that it was Robert Tippet I who first manufactured pipes for the American export market. After the death of Robert Tippet I in either 1682 or 1689 (the records conflict) his wife continued the export business. Pipes marked with her insignia have been found at a colonial house site in Whitestone Bridge, New York and date to ca. 1700 (Oswald 1959)

Robert Tippet II

Born about 1660, he was an apprentice of Lluellin and Elizabeth Evans until 1678. A kiln in Bristol, England, attributed to Tippet II, was excavated by Marochan and Reed in 1956; the pipes found have been dated to between 1699 and 1730 by Omwake (Jackson and Price 1974). However, Tippet II was listed as deceased in 1722 (Jackson & Price 1981).

Robert Tippet III

Born ca. 1692, he was apprenticed to his father (Robert Tippet II) and took his freedom in 1713. He was certainly deceased by May 1716. ; before ; father ; Who was making the Tippet pipes in the 1730's to 1780?

Telling the Tippets Apart

Because the RT mark did not change radically through time,

it is difficult to identify individual pipes with their maker. The first Robert Tippet can be differentiated from the latter two, however, by general stylistic changes. Pipebowls made by Robert Tippet I are distinguished from later Tippet bowls by consistently larger letters within the relief-molded maker's mark. Early Tippet pipes also have thicker walls than the later models. Until ca. 1710, the median portion of the pipebowl swelled up. Rim rouletting was also used until that date.

Assigning specific identifications to later Tippet pipes is complicated by the fact that it is not known who inherited or used (legally or otherwise) specific Tippet molds. Joan Tippet, the widow of Robert I, continued to manufacture pipes after her husband's death, but she may have shared molds with her son Robert II, as their products are nearly identical (Walker 1977:174). This does not preclude the possibility that both were using Tippet I's marks. Joan Tippet's marks also appear to vary. A fragment found at Raritan Landing, N.J. (Dallal in Grossman 1982) with the cartouche IR/TIP/PET differs from those found at Whitestone Bridge, New York, marked IR/TIP/ET and I-R/TIP/ET (Oswald 1959). Walker states that all pipes attributable to Joan are marked with the IR or I-R but a bowl found by Marochan at a Tippet family kiln in Bristol, England (Jackson and Price 1974) is identical to the one from Raritan Landing.

Pipes with a relief-molded heart surrounding the initials RT have been reported from American sites dating between 1740 and 1780 (Hanson and Hsu 1975; Lenick 1977; McCashion 1980, pers. comm). Marochan and Reed date this cartouche to the 1780's

through the mid-1790's (Jackson & Price 1974).

Tippet Pipes from the Broad St. Pipe Cache

A comparison of Tippet pipes from the Pipe Cache with examples from other NY state (McCashion pers comm 1982), New Jersey (Dallal in Grossman 1982) (Lenick 1977) and Bristol (Jackson and Price 1974; Walker 1977) pipes, strongly suggests that bowl shapes and makers' marks from the pipe cache were manufactured by Robert Tippet II (16871722).

Why would a firm as prestigious as the Tippet's ship poor quality pipes to the Colonies? Although the tradition in the pipe business was "CAVEAT EMPTOR (let the buyer beware), the retailer taking the loss of any breakages", and, it seems to follow logically, any loss due to poor quality, a "firm would not keep its clients long if its products did not consistently arrive in good condition." (Walker 1977:152)

Was it possible that these substandard pipes were "wasters" from an, as yet, undiscovered kiln site in lower Manhattan, or its environs? After examining selected samples of pipes from the cache, it was suggested by regional experts on Bristol pipes (Roger Price, Reg and Philomena Jackson) that our deposit might represent wasters from a pipe kiln. Unfortunately, however, archaeologists had discovered no kiln furniture indeed, no kiln on the Broad St. site.

One answer to the enigma of the Pipe Cache might be that these products were "seconds." When pipes were removed from the kiln, the saggars were emptied and the products examined carefully. They were sorted and inspected individually. Broken

pipes were set aside and those with slightly warped stems or pipes with slight defects were sold as "seconds." (Duco 1980)

Walker stated that piece rate production "mitigated against carefully produced pipes and particularly against properly trimmed pipes." (1977:154) However, pipe manufacturies in the late 17th and early 18th Centuries tended to be small concerns and the piece rate system extant at that time, (even in large concerns) was ideal for checking the quality of each employee's work. (Workers were paid by the piece rate per gross of pipes.) The kind of supervision present in a cottage industry or in a Master-Journeyman-Apprentice situation argues against indifferent workmanship. The authority the Master pipemaker wielded in his domain was absolute. (Duco 1980)

Documentary evidence recently unearthed by this analyst points to the existence of, at least, four "pypmakers" in New York City during the late 17th and early 18th Centuries. One of these pipemakers, Thomas Worden, received the Freedom of the City of New York in 1702. It is intriguing that the only other maker's mark extant within the Pipe Cache deposit was TW. According to Atkinson and Oswald, (1969), three Thomas Wordens are listed in the London Freedom Rolls. All date between 1692 and 1700. It is interesting to note that the shape of the single complete bowl stamped with the TW mark is a London type.

L.T. Alexander (1983) stated that the Tippet pipes from the Caleb Pusey House site were "all of a fine quality; a typical Tippet characteristic", and that because of this, "it is quite unlikely they are plagiarizations."

Is it possible that one of the London Thomas Wordens emigrated to New York City and was manufacturing pipes in the area? Until we have more evidence documenting the forerunners of the fledgling American pipe industry, we will have to hold this hypothesis in abeyance. We can only present the evidence, as it stands today.

A mean date of 1716 based upon 1098 stems was established for the upper fill layer. A mean date of 1706, based upon 1152 stem fragments was established for the lower fill. There was a preponderance of 6/64" stems (43%) as well as an increase in the number of 5/64" stems to 40%.

With minimal time for mending, our limited goal was a complete stem for each of the major bowl types - the RT heeless Bristol type and the heeled 'London' type bowl. "Problems posed by the reconstruction of clay tobacco pipes are somewhat different than those of pottery" (Davey 1982:197). Potsherds can usually be sorted by fabric, by glaze or by decorative motif.

It is not possible to group clay tobacco pipes by paste (except for the few exceptions that stand out such as clay color differentials - brown, red, orange and gray) and the loss of one small piece means that the stem length cannot be completed. The loss of one small pottery sherd makes little difference in the vessel's reconstruction.

The 1710 agreement signed by the Bristol pipemaker's Guild established standardized stem lengths for at least five types of pipes. "Virginia" pipes were specified as being 8 1/2" long; "Jamayca" pipes - 13" long, etc. Each reconstructed stem from the pipe cache was 8" long. In each case, the mouthpiece was

missing, which would account for the missing half inch of a "Virginia" pipe.

Nearly complete stems mended with both RT heeless bowls as well as the 'London-type' heeled pipe. We can now state that heeless pipes stamped with the RT mark on the back of the bowl were being manufactured by Robert Tippet II, during the first quarter of the 18th century and that Tippet abided by the Mold size Agreement of 1710, making his pipes 8 1/2" long. These would have been known as "Virginia" pipes. It seems likely that London pipemakers had the similar regulations (Plate VIII1 top).

The pipe cache was discovered in Lot 11 of the Broad St Financial Plaza Block. Lot 11 originally belonged to Paulus van der Grift, a Sea Captain and Trader (Kouwenhoven 1972). He built a warehouse on this "lot upon t'water" after 1649 (Innes 1902).

A document sent to the States-General in Holland by Adriaen Van der Donck and others calling attention to abuses prevailing in Nieuw Amsterdam in 1649, complained that Van der Grift "hath but trifling wages, and yet has built a better dwelling-house here than any other person. How this is done is too deep for us, for though the Director is aware of these things, he nevertheless observes silence when (Van der Grift) begins to get excited, which he would not suffer from any other person, and this gives rise to unfavorable surmises" (Innes 1902:51).

'Van der Grift's warehouse was the principle shipping office of Nieuw Amsterdam for a considerable period of time, however. After the English takeover of 1664, Van der Grift began to liquidate his holdings in New York and by 1671, had returned

to the Netherlands.

The New York City tax lists of 1665-1669 mention Col. Lewis Morris as the owner of the property which is still described as a "warehouse" with a real estate value of 140 pounds. Morris was a merchant. A will, written in 1690, states that Morris had intended to make his nephew, Lewis Morris, sole executor, but because of "his many and great miscarriages and disobediences towards me and my wife....and his adhering to...those of bad life and conversation, contrary to my directions", Morris left his "land in New York City over against the bridge" to his wife, Mary (Abstracts of Wills, Volume 1 1651-1707, p. 182).

After 1669/1700, a Michael Hawdon or Harding may have owned the property. He is listed as paying 140 pounds in taxes but for a "house". His name appears in the records until 1709. A gap in the records until 1721 obscures the chain of ownership of Lot 11.

The the documentary record, although fragmentary, indicates that there was a Tavern in the adjoining lot during this time period and it is possible that the pipe cache represents debris from Hunt's Tavern. (See Lot 10 History)

It should be noted that less than 1% of the pipes were smoked. It has been suggested that the pipe cache represents a group of pipes deposited over a long period of time and which is the result of the Merchant (Lewis Morris) or Tavern keeper (Obadiah Hunt), culling "bad" pipes from each shipment received and then dumping them in the outbuilding on Lot 11.

This would not explain, however, the great similarities of defects in the pipes, which appear in many cases to have been produced in the very same inferior molds.

This hypothesis also does not explain the lack of variety. One would expect that an abundance of maker's marks would abound in such a deposit culled from many shipments over time. For example, consider the pipes excavated from the cistern on Lot 14, which has been dated by ceramic TPQ's to 1710 - the same time period as the pipe cache, and which may be a deposit representing the material remains of members of the Kierstede family which owned the property until, at least, 1710 (Stokes 1927:264).

Comparison of the Pipe Cache with Cistern in Lot 14

The range of variation within the cistern in Component 63 was more than 3 to 1. Although Tippet and TW marks were represented, other makers included: RC/PW (1690-1710); Isaac EVans (1698-1713); WV (1700+); James Jenkins (1707-1739); Devereaux Jones (1691-1727); __S/* (1690-1720), all from Bristol and a Goblet mark (1667-1693) from Gouda. (It should be noted that the __S/* and the Goblet mark are from 102.01, the topmost stratum of the cistern. It was decided to remove this layer from analysis of Component 63 because it is a slightly later deposit and also contains intrusive materials from the rubble above. (See CMP 63)

This analyst suggests that the pipe cache represents a single consignment of English pipes which were found to be substandard and unsalable, and were, therefore dumped into an outbuilding after the structure had gone out of use.

Component 51 the subsoil of Lot 11. Two pipe fragments were excavated from Component 51. Neither were diagnostic.

Component 52 the construction debris from Lot 11. 74 fragments were excavated from this Component. It was expected that this Component would be slightly earlier than Component 53 (the lower fill of Building D). However, there were only nine stem bores. This was not thought to be a large enough sample to use to calculate a mean date which could be taken seriously. However, unexpectedly, the mean date came to 1707, close to the 1706 mean date of Component 53, the lower fill. This suggests that as small a sample as nine stem bores may be enough to calculate a mean date

There were no decorated stems. Fragments of bowls suggested that pipes were of the same variety as those in Components 53 and 54. A single bowl rim fragment was stamped RT, (Robert Tippet 1660-1722). Bristol.

Component 53 the lower fill of Building D. 3,431 fragments were excavated from this Component. It was an integral part of the pipe cache. The pipe deposit was English and originated in the ports of Bristol and London. A Binford date of 1706 based upon the measurement of 1069 stem bore diameters was established.

There were no decorated stems. Stem decoration died out by ca. 1700. However, a pinched stem, stated in the literature as being Dutch (Alexander 1979) was found to mend with a heeless bowl with no maker's mark. It is evident that the British as well as the Dutch were manufacturing this type of odd stem shape.

Of the 3431 pipe fragments, only 27 sherds or .8% had been smoked.

Pipes in this Component had the following anomalies:

1) whole bowl, heeless,6/64", stamped RRII/RRRT; 1 (Plate VII13 bottom right)
2) squashed bowl rims; 32 (Plate VII12 top left)
3) double bores; 9 (Plate VII12 top right)
4) orange clay layered with gray; 19
5) bump near base of bowl; 2
6) attempts at reworking; 1
7) squashed stem; 2
8) fingerprints on bowl rim; 1
9) brown clay; 2
10) stretched bore; 33 (Plate VII12 bottom right)
11) backwards RT; 1
12) squashed heel; 3
13) RT stamp near bottom of bowl; 3
14) rouletted rim; 1
15) pinched stem; 1 (Plate VII13 top left)
16) twisted stem/curved; 1
17) flat bore; 1
18) RT nearly to side of bowl; 1
19) RT near rim; 1

20) string in damp clay; 1
21) buff clay bowl/angular base; 1
22) buff & gray layered clay; 3
28) indented bump; 1
29) stem with plant-like material inside; 2
30) dottle still in bowl; 1 (Plate VII12 bottom left)
31) clay patch on right side of bowl; 1 (Plate VII13 bottom left)
32) barrier or obstruction inside bore hole; 1
33) incomplete bore hole; 1
TOTAL: 85 or 2.4%.

When a list of anomalies was compiled and the "offending" sherds tallied, a total of 85 sherds was arrived at. This was 2.4% of the total sherds of the Component - surely not a great number. However, if one considers that each error represents one pipe bowl and that the estimated m.n. of bowls is approximately 441, 85 is 19.3% or almost 1/5 of all the bowls. A full 7 dozen out of the total 37 dozen in this Component would have been rejected or considered possibly unusable.

The above numbers were derived at by evenly dividing the estimated mnb for the entire pipe cache, equally between Component 53 and 54.

A preponderance of 516 or 45% of the bores measured 6/64", 377 or 33% were 5/64", and 249 or 22% were 7/64", indicating a slightly earlier deposition than the upper fill of CMP 54. For an in- depth discussion of the pipe cache, see STRATA GROUP III and 1710 Temporal Group.

The bowl shapes represented a time range of ca. 1680-1720. Maker's marks consisted of RT stamps on the backs of bowls (facing the smoker) and dated to RT II, 1678-1718 (Jackson & Price 1981). No other pipe maker was represented. A breakdown of these marks is as follows:

RRII/RRRT; stamp on back of bowl; 1 (Plate VII-13 lower right)
RT; stamp on back of bowl; 189 (Plate VII14 top)
R__; stamp on back of bowl; 85
__T; stamp on back of bowl; 17
RT; stamp on back of bowl and cartouche on right side of bowl; 1
RT; stamp on heel; 1 (Plate VII14 bottom)
TOTAL = 294

Component 54 the upper fill of Building D/Lot 11. This Component contained a total of 3,691 pipe fragments. A mean date of 1716, based upon 1098 stem bores, was established for this upper fill layer. As stated above, statistical dating of the stem bore material to obtain a mean year for the deposit is viable, provided the sample is large enough, the dates are no later than ca. 1760 and the pipes English. Using these criteria, the 1716 mean date is more than reasonable. 502 bores or 46% were 5/64" in diameter; 478 or 44% were 6/64" in diameter.

168 out of a total of 172 or (98%) of the maker's marks were some variation of RT. The predominant mark (167 total) was the RT stamp on the back of bowl facing the smoker (Plate VII14 top). One fragment had R/TIPP/ET on the right side of the bowl in a cartouche. A close examination of the bowl shapes leads me to hypothesize that these RT pipes were manufactured by RT II, 1678-1718. Morphologically, the bowls indicated a date range of 1680-1720.

The other makers mark, TW, stamped on back of a bowl (1 fragment) and the T*W (3 fragments) may have been manufactured by Thomas Watts (1675-1717+) of Bristol (Jackson & Price 1974) (Plate VII14 center). Several of the pipes with the TW mark, however, are of the typical "London" heeled variety and may be the work of one of the London Thomas Wordens (Wordin), ca. 1692-1700.

Documentary evidence recently unearthed by the author points to the existence of a Thomas Worden, who received the freedom of the City of NY. in 1702. According to Atkinson & Oswald (1969), three Thomas Wordens (Wording) are listed in the London Freedom Rolls. All date between 1692 and 1700. It is interesting to note that when mended, the shape of the single complete bowl stamped with the TW mark is a "London" type.

Is it possible that one of the London Thomas Wordens emigrated to New York City and was manufacturing pipes in the New York area?

For an in-depth discussion of the pipe cache as an integral unit, see STRATA GROUP III.

Component 63 (CX 102.01) the fill of the red brick cistern in Lot 14, yielded a total of 266 tobacco pipe fragments. Due to the presence of a 19th century pipe as well as other late material, it was decided to separate the top layer of CX 102.01 from the rest of the cistern and treat it as a separate unit.

55 pipe fragments were recovered from CX 102.01. It was apparent that this Context # consisted of rubbish thrown onto the top of the cistern, and which probably seeped into the upper stratum. Many pipes and maker's marks were chronologically diagnostic.

Because many of these diagnostic bowl types contained maker's marks, which narrowed the date range of a particular pipe. Each diagnostic pipe was discussed separately so that a full description could be given.

1) Large upright 19th century bowl. The rim was mold rouletted in the style of 19th century Gouda pipes. The heelmark was illegible. It is odd that this pipe contained a heelmark, since this type of demarcation died out by the end of the 17th century. The stem with a 6/64" bore was decorated on both sides

with the faint outlines of an indeterminate motif which suggesting a young child's sketch of a house with a pitched roof (Plate VII15 #2).

2) Spurred Bristol pipe, similar to Atkinson & Oswald's type #23 (1969), dating to 1690-1720. The cartouche on the right side of the bowl was broken, omitting the first letter of the pipemaker's initials, ____*S. The bore diameter was 6/64" which had its greatest period of popularity between 1680-1710 (Harrington 1954). (Plate VII15 #1; Plate VII16 bottom)

3) A heeless, slightly bellied bowl with a cartouche on the right side: RC/PW. McCashion (1979) dated these Bristol pipes 1690-1710. The bore diameter was 5/64", a dimension which began to appear on archaeological sites with English deposits by 1650, but enjoyed it greatest period of popularity between 1710-1750 (Harrington 1954). (Plate VII15 #4; Plate VII16 top)

4) Delicate bowl with heel similar to Atkinson & Oswald's type #25 (17001770), only much smaller and dating 1680-1710. Bowl made of poor quality English clay which is expressed in its uneven, wrinkled appearance (Plate VII15 #3).

5) Pinched stem (7/64"). These stems are known from other Components along with with pipes manufactured by Robert Tippet II, 1678-1722, Bristol. (See CMP's 53 and 54). However, they are also found on Dutch sites (Duco 1981). (Plate VIII3 top left)

6) Base of "export" pipe with a Goblet or Roemer stamped on the base. Unknown maker. Gouda (5/64"). 1667-1693 (McCashion 1979). (Plate VII16 center)

7) Back of bowl fragment stamped RT. Robert Tippet, II or III, 1678-1722. Bristol (Jackson & Price 1981). (See CMP's 53 and 54).

8) Partial bowl with heel (7/64"). Similar to Noel-Hume's type #15, 1700-1770. London. (Hume 1976).

9) Belly bowl with broken heel or spur (5/64"). Cartouche on right side of bowl nearly illegible but mark may be JONES. 1691-1713+. Manufactured by Devereaux Jones I of Bristol, who was free in 1691, alive in 1713 and dead by 1727. Jones was apprenticed to Lluellin Evans of Bristol (1661-1688) (Jackson & Price 1981) whose pipes have been recovered from 7 Hanover Square and Stadt Huys sites in Manhattan (Dallal in press).

10) Fragment of funnel-elbow "trade" pipe. Probably Dutch, ca. 1700 (McCashion 1979).

11) Bowl with heel (7/64"), similar to Atkinson & Oswald type #25, 1700-1770 (Atkinson and Oswald 1969).

Except for the 19th century pipe, diagnostic artifacts ranged from 1667 through the 1st quarter of the 18th century.

The Binford mean date for CX 102.01 was 1699, based upon 43 bore diameters. The date of 1699 is a perfectly reasonable date.

44% of the bores were 6/64"; 33% were 7/64" and 23% were 5/64" in diameter.

This cistern may have belonged to the Kierstede family, who owned or occupied the property until at least 1710.

Component 63 (CX 102.02-102.04) Lot 14 cistern. 211 pipe fragments were excavated from the lower strata of the Lot 14 cistern. These included CX #'s 102.02-102.04. Chronologically significant pipes included:

1) TW/TW in cartouche on right side of bowl. Probably manufactured by Thomas Watts of Bristol, 1675-1717+. 5/64" bore diameter. (Jackson & Price 1974). (Plate VII18 top left)

2) WV stamped on back of bowl with heel (5/64"). Maker unknown. Bristol. Bowl shape similar to Noel-Hume's #15, dating 1700-1770. (Hume 1976). (Plate VII19 center; Plate VII17 #2)

3) EVANS in cartouche on right side of heeled bowl, 1698-1713. Manufactured by Isaac Evans who received his freedom in 1698. By 1710 he was Master of the Pipe Makers' Company. He is believed to have been in partnership with Robert Tippet II (1678-1722). For examples of the RT stamp on the back and the EVANS/ANCHOR on the right side of the bowl, see Jackson & Price 1974. Omwake dated these partnership pipes between 1699 and 1730. Robert Tippett II may have continued manufacturing this model. However, Isaac Evans' will was proved in 1713. (5/64") (Plate VII19 top; Plate VII17 #3, #4)

4) I*I stamped on back of a heeled bowl. Rouletted rim (6/64"). Manufactured by James Jenkins of Bristol 1707-1739 (Walker 1977). Jenkins was apprenticed to William Tippet I (1689-ca.1727/28), the son of Robert Tippet I (1660-1687). James Jenkins was Master of the Pipe makers Guild in 1734 (Jackson & Price 1981). There was a total of 2 of these marks. (Plate VII-18 lower right)

5) Three whistles (5/64"). Mid-late 17th century at Fort Orange. (Huey 1974). (Plate VII30)

6) I/IENK/INS in cartouche on right side of belly bowl with heel and rouletted rim (5/64"). James Jenkins 1707-1739. Bristol (See above #4). There were 3 of these marks. (Plate VII18 top right; Plate VII17 #6)

7) The most popular mark in the cistern (total 13) was the RC/PW in cartouche on the right side of a heeless slightly bellied bowl. Unknown maker. Bristol, 1690-1710. (5/64", 6/64") (McCashion 1979). (Plate VII16 top)

8) D/JONES/* in cartouche on right side of heeless bowl. Bore

broken. Partially rouletted rim. Devereaux Jones 1691-1713+. Bristol. Jones was apprenticed to Lluellin Evans (1661-1688) another Bristol pipe maker whose products reached New York (Dallal in press). The Tolzey Court Records of 1687 record that Evans sought to have the boy discharged after he had run away after stealing some clothes belonging to a fellow apprentice. The complaint states that Jones had been "Guilty of other Crimes and former truancies" and seeks his dismissal unless "good cause be shown to the contrary" (Jackson & Price 1981:n.p.). Good cause must have been shown, because Devereaux Jones finished his apprenticeship in 1691. His will was proved in 1713 (ibid). (Plate VII18 bottom left)

9) 9 bowls with large heel (5/64"). All from the same mold. Similar to Noel-Hume's type #15, 1700-1770. (Hume 1979). England (Plate VII17 #5)

10) Bowl fragment with letter T in cartouche. Probably manufactured by one of the Robert Tippet, 1660-1722. Bristol.

11) TW stamped on back of bowl and ___W in cartouche on right side of bowl. Thomas Watts (1675-1717+). Bristol. Tom Watts was an apprentice of Robert Tippet I and was free in 1675. He was already deceased by 1722 (Jackson & Price 1974; 1981).

12) RT stamp on back of bowl. __/TIPP/ET in cartouche on right side of the bowl (5/64"). Robert Tippet I-III 1660-1722. Bristol (Jackson and Price 1981). (Plate VII-17 #1)

13) TW stamp on back of bowl. Thomas Watts. Bristol. 1675-1717+ (Jackson & Price 1974).

14) RT stamp on back of heeless bowl (5/64"). Robert Tippet I-III 1660-1722. Bristol.

15) Heeless export type bowl similar to above. Late 17th-18th century. Bristol. (Plate VII17 #1)

Maker's marks and bowls were 100% Bristolian. Note, however, that a Gouda mark and pipe bowl were included in 102.01 above. There were no decorated stems. 62% of the bore diameters were 5/64" and 30% were 6/64". These 2 bore sizes had their greatest period of popularity between 1680-1750. A mean date of 1725 was calculated based upon 858 stems.

STRATA GROUP IVA

Strata Group IVA was the 18th century destruction debris, and consisted of 6 Components. 4 of the 6 or 67% contained 46 pipe fragments. The pipes represent a mixture of Dutch and English

material. Only two of the 46 fragments were diagnostic, however (4%), and both were fragmentary. They consisted of a molded Dutch stem (Plate VIII top #3) and a fragment from an English 18th century (13) of the 28 stems had 5/64" bore diameters.

Component 11 the Building A robbers trench. Of the 22 pipe fragments in the robber trench of Building A, the following were diagnostically or chronologically significant:

1) molded stem decorated with "branches". Although fragmentary, this artifact appeared to be identical to a stem from Component 6, Strata Group IA (see Plate VIII top #3). It is similar to an illustration in Le Cheminant (1981:158), which describes the stem as a London type ca. 1660, and as being "crude". Both fragments from CMP 11 and CMP 6 are beautifully made, a Dutch characteristic; therefore I believe them to be of 17th century Dutch manufacture;

2) 18th century English bowl fragment.

It is obvious that this was a mixed Dutch/English deposit. Stem bores ranged from 4/64" to 7/64". Ceramic TPQ's were 1795, therefore the mean date of 1708 based upon 12 stems could not be used.

Component 22 the Building B robber trench. Only four pipe fragments came from this deposit and none were diagnostic.

Component 21 the fill of the circular red brick cistern. The total number of pipes excavated from this Component was 18. None were diagnostic.

Component 23 the fill of the rectangular yellow brick structure. 2 fragments of clay tobacco pipes were found in this Component. Neither were diagnostic.

STRATA GROUP IVB

Strata Group IVB is the 19th century destruction debris, and is comprised of 6 Components. 5 of the 6, or 85% had clay tobacco pipes. There was a total of 139 fragments. Although this group was defined as 19th century destruction debris, 17th century Dutch material was included in the sample as well as 18th century English and 19th century American pipes. Such an admixture is impossible to define, except to say that most of the

stem bore diameters were 5/64" (39%) and 6/64" (31%) with a range of variation of 16% 4/64" stems and 13% 7/64" stems. Once again, this covered a wide spectrum of over 200 years of clay tobacco pipe making.

Component 7 the Building C beam slot fill, had 20 pipe fragments. Diagnostic elements included a Dutch stem decorated with 3 lines of rouletting and 2 cartouches with the 4-in-diamond motif encasing tiny fleur de lys (see Plate VII22 top left). The broken heel appears to have been marked but is too fragmentary to be legible. The bore diameter is 7/64". There were 2 raised lines at the bowl/stem juncture.

The other diagnostic indicator was a heel fragment with a raised dot. These dots outside of the heel are often spoken of as Dutch quality control dots but it is not clear why this should be true.

A Binford date of 1702 based upon 12 stem bores was calculated. However, the presence of 19th century ceramics negates the use of the formula as a dating tool.

Component 15 the fill of the oval yellow brick cistern. Fragments in this Component totalled 84. The deposit was composed of English pipes and spanned the 18th-19th centuries. Key diagnostic chronological indicators included:

1) English pipe similar to Noel-Hume's (1976) type #15 (1700-1770). This was stamped W____ on the back of the bowl and may have come from London or Bristol. Pipe makers with the first initial "W" are too numerous to mention. The "W" was executed differently than the typical stamped marks. (Plate VII21 lower right)

2) G/T on either side of the heel. Manufactured by George Thornton II of Dorking (1762-1823) (Higgins 1981). The CMP TPQ was based upon this fragment. (Plate VII21 left & top right)

3) Bowl with a cartouche on the right side of the bowl inside of which is a hand or gauntlet surrounded by the name R/TIP/PET. Bristol 1660-1722. (Jackson and Price 1974). (Plate VII20 lower left, lower right)

4) Bowl fragment with ___T stamp. Robert Tippet 1713-1722, Bristol (Walker 1977).

5) A bowl rim fragment with rim rouletting. Pre-1710 (McCashion 1979). Dutch or English.

Because the deposit post-dated 1760 and contained a pipe fragment dating to the 19th century, the Binford mean date of

1730 had no meaning.

Component 56 the stone filled pit in Lot 11. This Component contained 15 pipe fragments. Key diagnostic indicators included a single finely rouletted 17th century stem. This artifact could have come from Holland or England. Another stem had been reworked as if an indentation for a whistle had been ground. This type of artifact is associated with mid-17th century Dutch contact period deposits at Fort Orange in New York and with mid to late 17th century deposits on the Broad Financial Center Site (See CMP 62).

The stem sample was not large enough for a mean date nor were there enough bowls or makers marks to a firmly establish a date. At first glance, it was assumed that this was a 17th century Dutch pipe deposit. However the presence of glass with a TPQ of 1903 and ceramics with a TPQ of 1830 shows this to be a mixed deposit. One must not use one group of artifacts as the chronological determinant of a deposit. There were 2 (29%) bores with 5/64" diameters and 5 (71%) with a 6/64" diameter.

Component 66 the pit at N65 E25. This Component held 4 pipe fragments. Only one was diagnostic.

1) Buff-colored anthropomorphic stub-stemmed pipe with clear lead glaze. Appears to be the head of an American Indian (Hume 1976). This is probably the product of the North Carolina pipe industry. The eyes of the Indian are gray as is the band above the brows. The mold appears to have been quite worn. Noel-Hume dates these pipes 1770-1840 (Noel-Hume 1976). This pipe may represent the work of either Randolph Christ who worked at Beth (1786-1789) or Gottlob Krause who took over from 1789-1802. (Plate VII20 top left & right)

2) Context 206 was deleted from CMP 66; however, a 19th Century Glasgow stem, unique to the site, was recovered and is shown in Plate VII22 center.

Component 77 the Bridge Street cut, contained 16 fragments. This was a mixed deposit, comprised of 17th-18th century pipes.

1) A thick stem with a 7/64" stem bore diameter had a multiple patterned fleur de lys, typically a 17th century Dutch manifestation. (Plate VII22 top right)

2) A single red clay stem with a 5/64" bore was probably of local or Virginia manufacture. It was not possible to date this artifact. Red stems have been found in 17th, 18th and 19th century deposits in the United States.

3) A stem with a 4/64" bore diameter contained a cartouche: W. MORGAN LIVERPOOL, dating 1767-1796 (Coney 1980). (Plate VII22 bottom)

The Binford date of 1725 which is much too early, highlights the problems of dating pipe deposits which are post-1760 (A. Noel

Hume 19).

STRATA GROUP VA

Strata Group VA consisted of the Building E structural elements. 43 pipe fragments were excavated from this Strata Group, which consisted of two Components. Both contained pipes, the majority of which (40) were in the builders trench of Building E (CMP 17). All diagnostic pipes came from this Component. 17th century decorated stems could have been Dutch and/or English. Amsterdam makers were represented by HG (1668-1684) and EB (1630-1683) Hendrick Gerdes and Edward Bird. An R/TIP/PET mark was manufactured in Bristol by one of the Robert Tippets (1660-1722). This deposit was made up of late 17th century pipes similar to Strata Group ID or IIB. However, the presence of ceramics with a TPQ of 1800 in this Strata Group delineates the importance of cross-checking TPQ's of ceramics, glass and pipes.

Component 17 the Building E builder's trench in Lots 8 and 10, yielded 40 clay tobacco pipes.

Diagnostic elements revealed this to be a mixed Dutch/English pipe deposit. This determination was based upon the following facts:

Decorated stems equalled 7% of the total stems (30). They consisted of:

Rouletted stems, total of 1, 7/64".
Plain fleur de lys, total of 1, 7/64". (Plate VII23 #3)

Makers marks were Dutch and English and consisted of the following:

1) EB in concentric circles on heel, 1630-1683. Amsterdam (McCashion 1979) (Duco 1981). Edward Bird 8/64". Total of 1. (Plate VII10 top left)

2) HG on heel. Hendrik Gerdes 1668-1684, Amsterdam. 8/64". (McCashion 1979). Total of 1. (Plate VII9 top)

3) R/TIP/PET in cartouche on right side of the bowl;, Robert Tippet II or III, 1660-1722, Bristol (Walker 1977). Total of 1. (Plate VII23 #2)

Whole bowls consisted of one early Dutch (Amsterdam) belly bowl with rouletted rim, and the above EB mark in concentric circles on the heel; 8/64". (Plate VII23 #1)

The TPQ and date range for CMP 17 was a composite based upon the HG mark which had a beginning date of 1668, and the end date based upon the Tippet fragment which had an end date of 1722.

Most of the stems (37%) had 7/64" bore diameters. 27% were 5/64" with 17% each of 6/64" and 8/64" bore diameters.

The presence of 19th century ceramics would negate the validity of both the pipe TPQ of 1668 as well as the mean date of 1679. Component 17 cuts across Building A, (Components 2, 5, 6 and 41 See Strata Group 1A) which explains the presence of early Dutch material remains.

Component 18 the Building E wall matrix, Lots 8 & 10. Only 3 fragments were in Component 18. All were stems and none were diagnostic.

STRATA GROUP VB

Strata Group VB consisted of the Building B structural elements. This Strata Group was composed of only one Component (CMP 19), the cobbled floor of Building B. It contained 13 pipe fragments.

50% of the stems had 6/64" bore diameters, and 20% each were 5/64" and 8/64".

Based only upon the diagnostic elements (a rouletted bowl rim and a TP mark) this appears to be a pre-1710 Dutch deposit (Plate VII24).

Component 19 Building B cobbled floor, Lot 10. 13 pipe fragments were excavated from the cobbled floor of Building B. A bowl rim fragment was decorated with extremely large rouletting (1.25mm long) (Plate VII24 top). Most rouletting on N.Y.C. pipes is less than 1mm. It is not known if this is chronologically significant. Most rim rouletting was rather haphazardly executed on 17th century pipes which reached N.Y.C., indicating that they were not shipping their best quality pipes. A belly bowl with a

rouletted rim was marked TP on its heel. It is possible that this pipe was manufactured by Thiel Jansz Proost 1652-1665 of Gouda (Duco 1981), or that the mark is ITP manufactured by Jan Thielen Proost (1681-1689) also of Gouda. Eight Proost family pipes were excavated at the Stadt Huys site, one block from the Broad Financial Center Site (Dallal in press).

This Component was 17th century Dutch in composition. A Binford date of 1695, based only upon 10 bore diameters was established and is certainly reasonable.

STRATA GROUP VI

Strata Group VI was composed of 19th century interface deposits. 6 Components made up this Strata Group. 83% contained pipes of which there was a total of 562. The range of variation within this Strata Group was staggering with pipe bowls, maker's marks and stem decorations spanning the 17th, 18th and 19th centuries.

Maker's marks included:

1) EB, Edward Bird 1630-1683, Amsterdam (Duco 1981).

2) 5-petalled rose, unknown maker, 1640-1660, Amsterdam (Duco 1981). (Plate VII26 center)

3) IAK Susanna Jacobse, 1686-1695, Gouda (Duco 1981). (Plate VII26 top)

4) IWI, Johannes van Zutphen, 1832-1867, Gouda (Duco 1976), Or P. Goedewaagen and Zoon, ca. 1890, Gouda (Duco 1980). (Plate VII27 lower right)

5) LE, Lluellin Evans, 1661-1689, Bristol (Jackson & Price 1974). (Plate VII26 bottom)

6) RT, Robert Tippet, 1660-1722, Bristol (Walker 1977).

7) TW Thomas Watts, 1675-1717+, Bristol (Jackson & Price 1974) or Thomas Worden, 1692-?, London (Atkinson & Oswald 1969).

Of the 10 pipe fragments with maker's marks, 20% were from Amsterdam, 20% from Gouda and 50% from Bristol, with 10% from either Bristol or London. As stated above, bowl types ran the

gamut of 17th, 18th and 19th century types. (See CMP's 57, 68, 34 and 35).

Bowl types included:

1) Noel-Hume #14, 1680-1710, (same as Atkinson and Oswald type #20); total: 1; Origin: England; (Noel-Hume 1976). (Plate VII25 #3)

2) Type 25, 1700-1770; total: 1; Origin: England; (Atkinson and Oswald 1969).

3) 19th century upright 90 degree angle, 19th century; total:1; Origin: Gouda; (Duco 1980). (Plate VII27 lower left)

4) Dutch bowl, mid-19th century; total:1; Origin: Amsterdam; (Duco 1981).

5) Noel-Hume #13, 1650-1680; total: 1; Origin: Amsterdam/Gouda; (Noel-Hume 1976). (Plate VII25 #4)

6) Heeless export type, late 17th-early 18th century; total: 1; Origin: Bristol; (Jackson & Price 1974).

7) Type 10, 1640-1660; total: 1; Origin: Amsterdam/London/Gouda; (Atkinson & Oswald 1969). (Plate VII25 #1)

8) 19th century fluted bowl, total: 1; Origin: American/English; (Higgins 1981). (Plate VII-25 #2)

38% of the bowls were of definite Dutch manufacture, and 38% of English manufacture. 13% could have been manufactured either in America or England, while another 13% could have been either Dutch or English.

Stem bores were almost evenly divided between 34% 5/64" and 35% 6/64". However, since this was a mixed 17th, 18th and 19th Century deposit, it meant little in terms of dating.

Component 34 - the sand and silt below the rubble in Lots 8 and 10. The pipe deposit from Component 34 contained a range of variation which spanned the 17th through 19th centuries. 371 pipe fragments were excavated and analyzed.

35% of the bores were 5/64", 32% were 6/64" and 23% were 7/64". 6% and 5% of the bores were 4/64" and 8/64" respectively. Because this was a deposit composed of American, Dutch and English pipes and because the date range extended past 1760, the

mean date of 1707 (208 fragments) was not statistically significant. See PIPE STEM DATING.

Decorated stems constituted only 3% of the total. The stems included the following motifs, however:

1) 4-in-diamond fleur de lys (8/64"), total of 1; 17th century Dutch.

2) Bristol diamonds, rouletting and LE, Lluellin Evans, (8/64"), 1661-1689, Bristol. (Jackson and Price 1974) (Plate VII-26 bottom)

3) Fluting (5/64"), total of 1; mid-18th -19th centuries, English/American.

4) Coggle-tooth rouletted lines alternating with Bristol diamonds (6/64"), total of 1. 17th century. Dutch or English.

5) Rouletting and 4-in-diamond fleur de lys (6/64"), total of 1. 17th century, Dutch.

6) Bands of raised lines; large and small flutes (5/64"), total of 1. 19th century. American or English (Higgins, 1981). (Plate VII25 #2)

7) Rouletting (7/64"). Total of 1. 17th century Dutch or English.

Clays consisted of 4 distinct colors: white, orange/gray, black and buff. This may reflect clay source and/or the firing temperatures.

Diagnostic bowls were of the following types:

1) Tiny belly bowl, mid-17th century. Total of 1. Amsterdam (Duco 1981).

2) Type #13, 1650-1680. Total of 1. England (Noel-Hume 1976). (Plate VII25 #4)

3) Heeless export, late 17th-early 18th centuries. Total of 1. Bristol (Jackson & Price 1974).

4) Type 10, 1640-1660. Total of 1. Amsterdam/Gouda/London (Atkinson & Oswald 1969). (Place VII25 #1)

5) Fluted bowl, 19th century shape. Total of 1. American/English (Higgins 1981). (Plate VII25 #2)

6) Type #14, 16801710 English (Noel Hume 1976) (Plate VII25 #3)

Maker's marks were plentiful and included the following:

1) EB beaded circle (possible sunburst); 1630-1683; Edward

Bird, Amsterdam (Duco 1981).

2) LE with Bristol diamond on stem; 1661-1689; Lluellin Evans, Bristol (Jackson & Price 1982). (Plate VII26 bottom)

3) IAK on heel; 1686-1695; Susanna Jacobse, "zelfstandig, merkt IAK"; Gouda (Duco 1981). (Plate VII26 top)

4) RT stamp, 1660-1722, Robert Tippet, Bristol (Walker 1977).

5) 5-petalled Tudor rose, 1640-1660; unknown maker, Amsterdam (Duco 1981). (Plate VII26 center)

6) TW stamp, 167-1717+, Thomas Watts, Bristol (Jackson & Price 1982).

Dutch maker's marks constituted 50% of the whole while English marks were also 50%. A further breakdown revealed that marks from Amsterdam were 33%, Gouda marks were 17% and Bristol marks remained at 50%.

The presence of 19th century pipes, ceramics and glass along with mid-17th century pipe debris shows the mixed nature of this deposit.

Component 68 -the olive silt. 5 pipe fragments were excavated from Component 68. The single diagnostic/chronological indicator in this Component was a 19th century bowl with rouletted rim and 5/64" bore diameter. The stem was decorated with bands, five-petalled flowers or botanical decorations. The maker's mark IWI was on the back of the stroke-burnished bowl, facing the smoker. This mark was owned by Johannes van Zutphen of Gouda, 1832-1867 (Duco 1976). The prestigious firm of P. Goedewaagen and Zoon of Gouda also used this mark ca. 1890 (Duco 1980, plate 41, Bar IV). (Plate VII-27 lower left & right)

Component 57 the top debris in Lot 11, contained 143 pipe fragments. The deposit was English and most probably Bristolian. Key diagnostic indicators included pipes manufactured by Robert Tippet (RT), 1660-1722, Bristol (Walker 1977); Thomas Watts (TW), 1675-1717, Bristol (ibid) or Thomas Wordin, 1692-?, London (Atkinson and Oswald 1969).

28 or 49% of the bore were 6/64", 20 or 35% were 5/64". This would indicate a wide date range of between 1680-1750, according to Harrington's bar graph (1954). The pipe deposit was English and within acceptable criteria for calculating a Binford mean date. This was 1708, based on 57 bore diameters. There were no decorated stems. A 1708 date seemed accurate enough based upon the maker's marks, bowl shapes and stem bores. However, the presence of ceramics with a TPQ of 1830 negated the mean. The pipes in this Component were identical to those of the pipe cache and indeed probably were part of the original deposit (see CMPs 53 and 54) which had been mixed with 19th century

material at a later date.

Component 35 the stone rubble. 39 fragments were excavated from this Component, in Lots 8 and 10. 11 bores of 33% of the sample were 6/64", 9 or 27% were 7/64" and 8 or 24% of the sample had 5/64" bore diameters.

Key diagnostic indicators included a complete pipe similar to Hume's type #14 (1680-1710). The pipe was a heeled English type, with a slight belly and rouletted rim. Bellied pipes with rouletted rims generally went out of fashion by 1710. This pipe was a transitional shape and was more upright on its stem than mid-17th century pipes. (Plate VII27 top)

Another time marker was an 8/64" stem with a line of fleur de lys, each 14mm long, and each surrounded by beads. This was a 17th century Dutch stem.

Because this was a mixed deposit with a ceramic TPQ of 1830 and a glass TPQ of 1903, the mean date of 1702 was not statistically significant.

Component 75 - the interface with the concrete floors. Component 75 had a total of 4 pipe fragments, 3 stems and one bowl fragment. Nothing, however, was diagnostic in this deposit.

STRATA GROUP VII

Strata Group VII consisted of 19th century structural elements and was composed of 8 Components, only 3 (38%) of which had clay tobacco pipes. A total of 92 fragments were in this mixed deposit.

Maker's marks consisted of: RT - Robert Tippet, Bristol, 1660-1722 (Jackson and Price 1974); 6-petalled daisy on either side of the heel. Bowl shape London, 1700-1770 (type is Noel-Hume 1976) (Plate VII28 lower left #1 & right). 5-petalled Tudor Rose with leaves. Bowl shape 1630-1650 Amsterdam (Duco 1981). (Plate VII28 top left)

On the surface this appears to be a 17th -18th century deposit. Bowl shapes also ran the gamut from 1630-1650, 1660-1700, 1700-1770. There were, however, late 18th and 19th Century

ceramics mixed into the deposit.

Component 24 the builder's's trench for Lots 8-10, Lot wall. The sample consisted of 81 fragments which were a mixture of Dutch and English elements as well as a conglomeration of 17th and 18th century pipes. The Binford date of 1710 (52) was not applicable because of the presence of 19th century ceramics.

Diagnostic bowls included:

1) Heeless export, late 17th-early 18th century; total of 1; Bristol (Jackson & Price 1974).

2) Type #25, 1700-1770, total of 1; London (Atkinson and Oswald 1969). (Plate VII28 #1, lower left)

3) Double conical bowl, 1630-1650; total of 1; Amsterdam (Duco 1981). (Plate VII28 lower left #3)

4) American export type B, 1660-1700; total of 1; English (Alexander 1979). (Plate VII28 lower left #2)

Diagnostic marks included:

1) RT on back of bowl, Robert Tippet, Bristol 1660-1722 (Jackson & Price 1974).

2) 6-petalled Daisy on either side of heel of London pipe, type #25, 1700-1770, London (Atkinson & Oswald 1969). (Plate VII28 right)

3) 5-petalled Tudor rose with leaves on heel of double conical bowl, dated by bowl shape to 1630-1650, and probably from Amsterdam. (Plate VII28 top left)

Decorated stems were only 2% of the total stem fragments and the single motif included a fleur de lys with angled lines radiating outward. English diagnostic bowls from London and Bristol were 75% of the total while the Dutch bowls from Amsterdam constituted only 25%. Dutch maker's marks, however, were 33%, while English marks were 67% and also from London and Bristol.

Component 25 the builders trench for the Lot 10/11 wall. Five clay tobacco pipe fragments were found in this Component. None were diagnostic.

Component 26 the builders trench for the Lot 8/7 (Clearing House) wall. 26 fragments of pipes were excavated from this Component. None were diagnostic in any way except for a stem decorated with a row of fleur de lys in single diamond cartouches. This stem was Dutch and dated to the 17th century.

This Component was not only a 17th century Component, however, as evidenced by the presence of Creamware (TPQ 1762).

STRATA GROUP VIII

Strata Group VIII was composed of the 19th century pier pit fill in Lot 8. 201 clay tobacco pipe fragments were excavated. This Group was composed of 4 Components, 3 of which or 75%, contained pipes.

Diagnostic pipe bowls and maker's marks were English, from Bristol, and dated from the middle of the 17th century through the end of the 18th century.

42% of the stems had a 5/64" bore; 34% had 6/64" bores.

Pipe makers included Robert Tippet (1660-1722) and William Nicholas, 1730-1775+, both from Bristol (Walker 1977). (Plate VII29 top & bottom)

Component 27 the pit for the stone pier at N60. Only 5 pipe fragments were excavated from this pit and none were diagnostic.

Component 28 the pit for the stone pier at N70. 189 pipe fragments were excavated from the pit at N70. With the exception of one rouletted stem fragment, which could have been Dutch or English, maker's marks as well as bowl shapes were English.

The TPQ of 1730 was based on the maker's mark W*N. This pipe was probably manufactured by William Nicholas of Bristol who received his freedom in 1730 and was still alive in 1775. Nicholas served his apprenticeship with James Jenkins (1707-1739). Comparisons with bowls manufactured by Jenkins, from this site, showed a direct resemblance. It is likely that Nicholas copied Jenkin's style. It is also true that the apprentice agreement might have required Jenkins to give Nicholas a pipe mold at the termination of his apprenticeship, at which time he gained his freedom (Plate VII29 bottom).

Other key chronological indicators were pipes manufactured by one of the Robert Tippets from Bristol (1660-1722). These marks took the following different forms:

1) sunburst cartouche on the right side of the bowl with parts of a "P" and "T". (R/TIP/PET would have been the mark if it had been complete);

2) T stamp on the back of the bowl with R/TIP/PET in a cartouche on the right side of the bowl; (Plate VII29 top)

3) I T stamp on the back of the bowl (should be RT);

Diagnostic bowls spanned the 17th and 18th centuries. They consisted of:

1) English heeled type 1650-1680 (Noel-Hume 1976, #13);

2) Bristol heeless type, late 17th-early 18th century, (one had a "squashed" rim. See CMPs 53 and 54) (Plate VII29 center #3);

3) London heeled pipe 1700-1770 (Noel-Hume 1976, #15) (Plate VII29 center #1);

4) English spurred variety ca. 1730-1770 (Noel-Hume 1976, #20). (Plate VII29 center #2)

Due to the nature of the sample, i.e. English and probably pre-1760, a mean date was calculated. This was 1711, based upon the measurement of 124 bore diameters. 5/64% stems (42%) were predominant, and according to Harrington's bar graphs, were most popular between 1710-1750. Nearly the same amount of 6/64" stems, 45 fragments or 36% were in the sample. A reduction in the number of 7/64" stems (only 14 or 11%) shows a waning in popularity of the larger and thicker stems. However, the fact that the ceramic TPQ for this Component was 1795 negated the validity of the Binford mean date. It is important to compare pipes with ceramics and glass.

Component 29 the pit for the stone pier at N80. There were 7 pipe fragments in this Component. None of them were diagnostic.

STRATA GROUP IX

Strata Group IX was the 19th century pier pit fill in lot 10. This Strata Group contained 4 Components. Three of these, or 75%, contained a total of 13 pipe fragments. None were diagnostic.

Component 31 the pit for the stone pedestal at N80. Of the 2 pipe fragments in this Component, none were diagnostically useful as temporal indicators.

Component 32 the pit for the stone pedestal at N90. There were only 10 pipe fragments in this Component. None were diagnostic.

Component 79 the pit for the stone pier at N60 E160. Only one

pipe stem was excavated from this Component. Stem was 5/64".

STRATA GROUP X

Strata Group X was the 19th century brick drain system. Two Components made up Strata Group 10. Together, there were a total of 22 clay tobacco pipe fragments. None were diagnostic except a rouletted pipe stem which suggested an attempt at whistle making. Whistles made from pipe stems were a mid- to late 17th century phenomena at Fort Orange N.Y., (see CMP 47).(Huey 1974) (Plate VII30)

Component 33 the fill of the brick drain system in Lot 10. Nine pipe fragments were excavated from this Component in Lot 10. None were diagnostic.

Component 47 the brick drain system. 13 pipe fragments were excavated from this Component. A reworked pipe stem, probably an attempt at whistle making, was the only diagnostic artifact. Whistles were a mid- to late 17th century phenomena at Fort Orange, New York (Huey 1974). (Plate VII30)

A mean date of 1702 was calculated. However, the mixed character of the deposit (ceramics with a TPQ of 1820 and glass with a TPQ of 1850 in addition to the 17th and 18th Century materials), negated the validity of the mean date.

STRATA GROUP XI

Strata Group XI was composed of 20th century intrusions. It consisted of 4 Components, Only one had clay tobacco pipe fragments, which totalled seven. The single key diagnostic indicator was a fragment of a 17th century belly bowl with rouletting on the rim.

Component 36 the disturbances which cut the stone rubble. 7 pipe fragments were in this Component. Diagnostic indicators were fragmentary. These included a bowl rim fragment with rouletting, which is a 17th century phenomena. The shape of the fragment suggests bellying which is also predominant in 17th century pipe bowls.

1640 TEMPORAL GROUP

The artifact sample with a 1640 TPQ based upon ceramic dates, consisted of two Strata Groupings, IA, which is a functional group consisting of Building A Structural Elements and IIA, consists of mid-17th century features. The 1640 Temporal Group contained 11 Components, 8 of which or 73%, yielded a total of 96 clay tobacco pipe fragments (Plates VII1; VII2; and VII6).

The pipes formed a distinct cluster of identifiable elements, (units of contemporaneity), compatible with the 1640 ceramic TPQ. Two complete bowls were of the thick, double conical belly bowl type, a typical Dutch shape indicative of the Amsterdam Industry. Both were marked on the heels with an EB mark indicating manufacture by Edward Bird of Amsterdam, 1630-1663 and/or (possibly) his son Evert until 1683. These pipes, definitely of a 17th century shape, had shorter, thicker bowls which sat upon their stems at a wide angle.

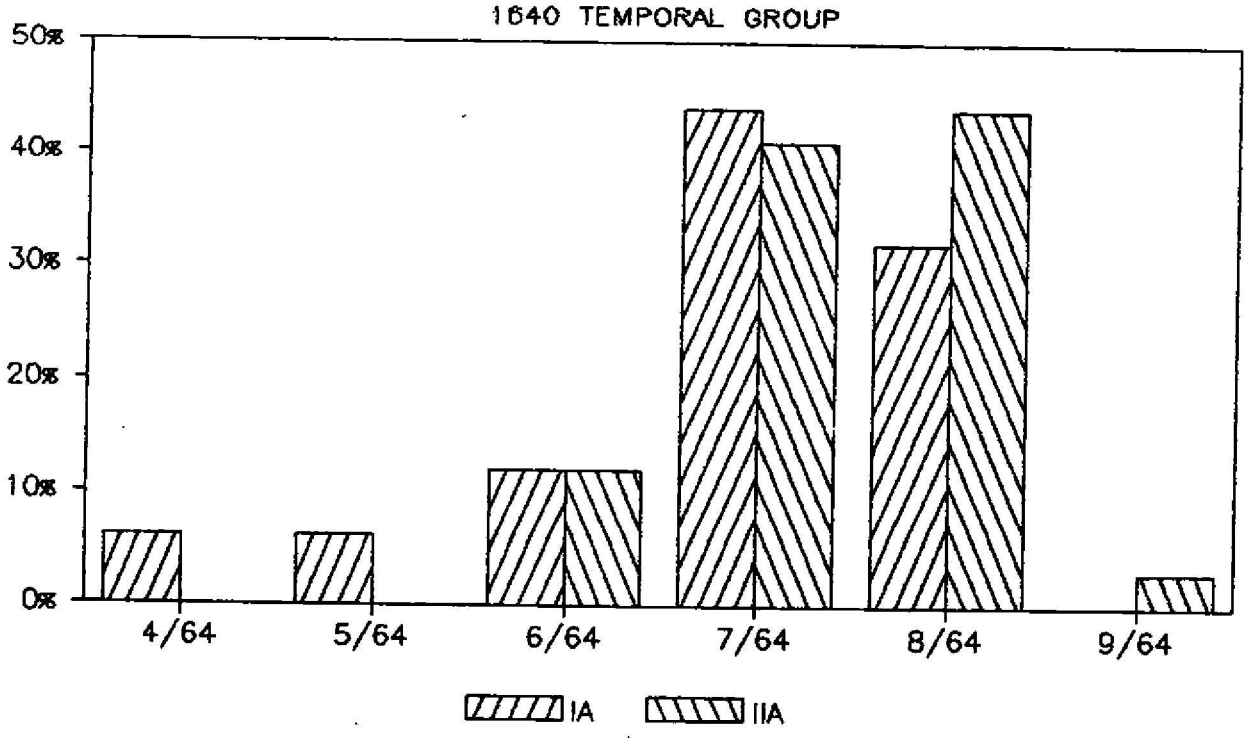
Ten stem fragments were decorated out of the total sample of 68 (15% of all stems.) These decorations consisted of: rouletting, 20%; fleur de lys in beaded lozenges, 40%; fleur de lys in plain lozenge, 10%; and four-in-diamond fleur de lys bisected by rouletting, 30%. (Plate VII1 top)

Maker's marks in the 1640 Temporal Group were scarce. As mentioned above, however, the two existing marks were EB's in concentric circles on the heels, originating in Amsterdam (Plate VII6 top). Comparing the 1640 Temporal Group with its scant two maker's marks to later Temporal Groups with their many maker's marks, stretches the 1640 data too far. However, when one

supplements the marks with those from Component 6, which had been removed from the 1640 Temporal Group because it contained several fragments of later ceramics and glass (see Strata Group IA), it was found that here, too, maker's marks originated in Amsterdam (except for one which may have been from the Western Netherlands), and all that were various forms of Tudor Roses, the most popular Dutch mark until the mid-17th century (see Component 6) (Plate VII2). It could then be stated with some assurance that 100% of the marks were Dutch with, at minimum, 90% hailing from Amsterdam and a possible 10% from the Western Netherlands.

The 1640 Temporal Group, although small, contained a consistently Dutch sample of pipes, all of which, undoubtedly, come from Amsterdam. This is consistent with historical and documentary records - the earliest settlement on this block having been established by agents of the Dutch West India Company. The Amsterdam pipe industry had many ties with the Virginia tobacco trade, one of whose earliest founders, Augustine Heermans, had a warehouse on the site.

There is some indication that Strata Group IIA is earlier than IA. This is based upon the hypothesis that by looking at the relative percentages of bore diameter distributions, it is possible to refine the chronology of 2 or more 17th century deposits that have been dated with ceramic TPQ's to the same date. Given that Strata Groups IA and IIA have the same ceramic TPQ of 1640, one can utilize the relative percentage of pipe stem bore distributions to further refine the dating of the deposits. A look at Graph VII2 shows that for Strata Group IIA, the percentage


1640 TEMPORAL GROUP
50%
40%
30%
20%
10%
0%
4/64
5/64
6/64
7/64
8/64
9/64
IA
IIA

Graph VII:2

of 8/64" bores is slightly greater, 44%, than it is for Strata Group IA, 32%. According to Harrington (1954), larger bores indicate greater age. The percentage of 7/64" stems in IA, 44%, is nearly identical to IIA, 41%. However, IA and IIA have an equal amount, 12% of the later dated 6/64" bores.

Based primarily upon the relative percentage of 8/64" stems, one can then hypothesize that IIA, the group of features dating to the mid-17th century, is slightly older than IA, the building A warehouse group, although both have the same ceramic TPQ.

In summary, the 1640 Temporal Group was characterized by the following elements:

1) Dutch pipe bowls from Amsterdam, which were short, bellied and thick.

2) Lack of English pipes.

3) Amsterdam maker's marks.

4) 15% decorated stems.

5) 80% of decorated stems stamped with fleur de lys motif.

6) Areas producing concentrations of 17th century ceramics were found to have the largest percentage of large bored pipes complementing them, with a predominance of 7/64" (43%) and 8/64" (38%) bore diameters.

7. 3% reworked stems. (Whistle making activity).

1680 TEMPORAL GROUP

The 1680 Temporal Group contained 570 clay tobacco pipe fragments. It was made up of 3 Strata Groups: ID, the 17th century construction/destruction debris; IIB, the late 17th century features; and VB, the Building B structural elements.

The pipes formed a distinct cluster of identifiable elements, compatible with the 1680 ceramic TPQ. (Plates VII4; VII5; VII7; VII8; VII9; VII10; and VII24)

When discussing this Temporal Group which is based upon a specific TPQ of 1680, Key Diagnostic Indicators will be only those bowls which are complete enough to offer a country or city of origin based upon bowl morphology. Types of stem decorations will be discussed as well as their place of origin. Maker's marks will be identified as to time and place of manufacture, as well as the name of the manufacturer.

The 1680 Group as a whole will then be compared to the 1640 Temporal Group.

The 1680 Temporal Group had many of the same diagnostic elements as the 1640 Temporal Group. For instance, the 29 or 7% of total stems (388) with decorations in 1680 consisted of: rouletting (7; 24% or 2% of total stems); fleur de lys in beaded lozenges (1; 3% or .3% of total) (Plate VII4); fleur de lys in plain lozenges (4; 14% or 1% of total stems). (Plate VII10 upper right)

The fleur de lys bisected by rouletting which composed 30% of the decorated stems in 1640, has dropped out by 1680 and the fleur de lys in beaded lozenge, 40% in 1640 dwindled to 3% by 1680.

By 1680 we see an influx of other decorative stem motifs: rouletted Bristol diamonds (7 or 24% of the decorated stems and 2% of the total stems); rouletted cogteeth (1 or 3% of the decorated stems and .3% of the total stem count); rouletted runs

of dots (4 or 14% of the decorated stems and .3% of the total stems) (Plate VII4); scalloped dots (2 or 7% of the decorated stems and .5 the total stem count); rouletted cogteeth and bores (1 or 3% of the decorated stems and .3% of the total); and a molded stem (1 or 3% of the decorated stems and .3% of the total).

A pattern begins to emerge when one compares stem decorations from 1640 with those of the 1680 group. Chart (# VII-5) , below, reveals a marked increase in new types of decorative motifs by 1680; there is also a sharp reduction in fleur de lys marks which were 80% of the total decorated stems in 1640 to only 21% in 1680. These figures reverse themselves, with only 20% of "other" types in 1640 as opposed to 80% "other" types by 1680.

Reworked pipe stems were another category of data. A total of 5 in this Temporal Group constituted 7% of the total number of stems (68).

Maker's Marks

Although a predominant number of pipe maker's marks (10) in the 1680 Group are from Amsterdam (71% of the marks), a comparison of the 1680 marks with the 1640 Temporal Grouping, reveals the addition of products from Gouda (14%) and Bristol (14%).

In 1680, not only are EB marks in concentric circles, but we find them plain as well as beaded circles (Plate VII10 left). HG (Hendrik Gerdes, Amsterdam, 1664-1688) marks usually begin to appear at the end of the EB period on New York State sites (McCashion 1979) (Plate VII9 top). The appearance of Gouda pipes on the site is also consistent with the history of the Dutch pipe

making industry. The Amsterdam industry reached its nadir in the 1640's and 1650's. As stated above, after 1660 there was a slow decline and it was almost non-existent by 1670. The rise of Gouda as a pipe making center, (after the foundation of the Gouda pipe makers Guild in 1660), sounded the death knell for Amsterdam as a pipe making center (Duco 1980). This is reflected in the pipe data when one compares the 1640 Temporal Group with that of 1680 and then again with the 1710 Temporal Group.

A comparison of EB pipes from the 1640 Group with those of the 1680 Group also reflects changes in bowl morphology. Although Edward Bird's workshop produced various sized pipes all at one time, it is better to date the bowls by shape rather than by size. In general, the EB pipes from 1640 were thicker and heavier than those from 1680 which were predominantly wasp-waisted and more delicate.

There were 29 bowls, or, at least, enough of the bowl to determine shape and in most cases, origin. These could be divided into roughly 10 bowl types (Plate VII7):

1) Contracting bowl base (EB pipes), late 17th century; total of 5; Amsterdam (Duco 1981).

2) Thicker but longer Dutch pipes, 3rd quarter of the 17th century; total of 5; Amsterdam.

3) Type 9A (Similar to type #25 but longer and has rouletted rim, 1690-1740; total of 1; England (OSwald 1951).

4) Type 9C export type, 1680-1730; total of 1; England.

5) Type 10B, but a bit wider than 10B, 1690-1740; total of 1; probably England (Oswald 1965).

6) Type 20, 1680-1710; total of 2; England (Atkinson & Oswald 1969).

7) Type 22 (one was slightly larger than the others) 1680-1710;

total of 7; England (ibid).

8) Type 25, 1700-1740; total of 1; England (ibid).

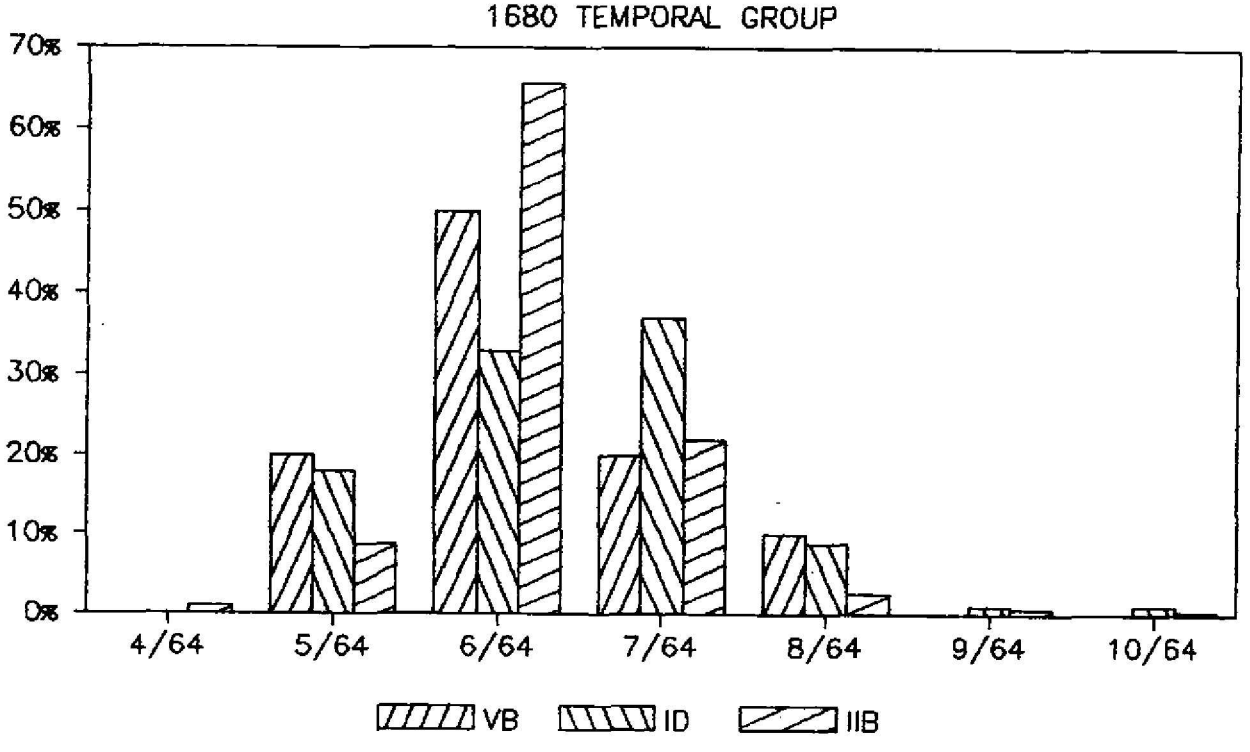
9) Heelless export (1 RT), late 17th - early 18th century; total of 5; Bristol (Walker 1977).

10) Molded bowl (may be same as contracting bowl base type as above), late 17th century; total of 1; Dutch.

Bowl Shapes

A look at the bowl types above shows that an influx of English pipes has occurred by 1680. Predictably, there was an absence of English pipes in the 1640 Temporal Group (See Temporal Group 1640). The Dutch capitulation to the English occurred in 1664. Dutch pipes were still being imported to New York City after the English takeover of Manhattan, despite harsh navigation laws and bans on trade with the enemy, (see Dallal April 1983, NYSAA paper, "English Clay Pipes to Nieuw Amsterdam - Dutch Clay Pipes to New York"). This is evidenced by the 11 identifiably Dutch (Amsterdam) pipes or 38% of the total. English pipes comprised 62% of the total identifiable pipes.

The Dutch pipes form two basic sub-groups, one group dating to the 3rd quarter of the 17th century. These were longer in the than the Dutch pipes from the 1640 Temporal Group but still retained their thick stems and bowl walls. The second group was contracted at the base, looking much like Gouda pipes from the same time period which were found at the 7 Hanover Square and Stadt Huys sites in Manhattan (Dallal, in press). It should be mentioned that the EB mark was owned by the merchant Adrian Van der Cruis in Gouda after 1683. It is possible (but not likely) that these EB pipes were manufactured in Gouda. English pipes


1680 TEMPORAL GROUP
70%
60%
50%
40%
30%
20%
10%
0%
4/64
5/64
6/64
7/64
8/64
9/64
10/64
VB
ID
IIB

Graph VII:3

were divided into 7 types, based upon bowl shapes. One pipe bowl, heavily decorated with figures was made in Gouda.

Documents from the Gemeente Archief Amsterdam dated 1670 show that the Dutch needed special permission from the British to make voyages to America. They were also concerned with knowing whether goods on board might be unloaded in New York without being confiscated by British authorities. Documents state that tobacco pipes were among the goods allowed for importation (Notorial Archives 1670).

A look at the bar graph for the 1680 Temporal Group (Graph VII3) reveals that 6/64" bores have the greatest percentage (59%) of stems. 6/64" English pipes had the greatest period of popularity between 1680-1710. Since this was a mixed Dutch/English deposit and since Dutch stems grew narrower earlier than English stems of comparable periods, this may represent a slightly earlier time period. However, the bar chart can probably be of more use in trying to determine the relative chronology of the three Strata Groups within the 1680 Temporal Group, which all have the identical ceramic TPQ of 1680.

Strata Group ID had a greater percentage of 7/64" bores than the other two Strata Groups, at 37%. Strata Group ID also had almost as many of 8/64" bores as VB at 9%. This leads one to the conclusion that ID was the earliest of the 1680 Temporal Groupings. It had the least amount of 6/64" and 5/64" bores, at 33% and 18% respectively. Since IIB had 66% 6/64" bores and 27% 5/64" bores (the greatest percentages of all the groups) one can hypothesize that the relative chronology of the Strata Groups sharing a 1680 TPQ, (based pipe data) from earliest to

latest are: ID, VB, IIB.

Summary

The 1680 Temporal Group differed from the 1640 Temporal Group in the following manner:

1) Introduction of English pipes

2) Increase in bowl capacity

3) A proliferation of maker's marks whose origins include Amsterdam, Gouda and Bristol

4) A reduction in the percentage of decorated stems to 7%

5) Reduced angle of bowl to stem

6) An increase in narrower bore diameters in the 1680 Temporal Group. Especially an increase in percentage of 6/64" bore diameters from 12% (1640) to 59% (1680) and from 3% (1640) to 11% (1680) in 5/64" bore diameters.

7) A reduction in fleur de lys stem decorations to 21% (1680) from 80% (1640) and an increase in "other" types to 80% (1680) compared with 20% (1640).

8) A slight increase in reworked pipe stems from 3% (1640) to 7% (1680).

1710 TEMPORAL GROUP

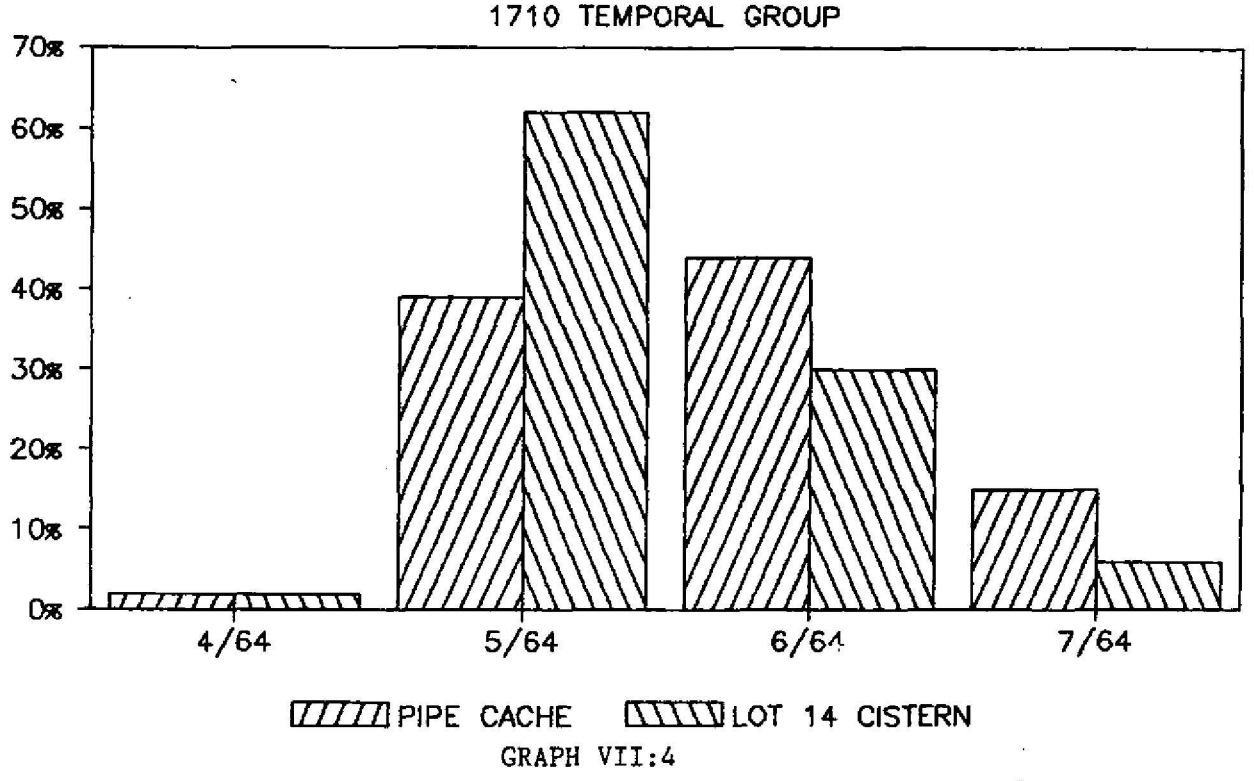
The 1710 Temporal Group, dated by ceramic TPQ's to no earlier than 1710, differed considerably from both the 1640 and 1680 Temporal Groups in the following manner:

1) 100% English pipes (See CMP 63 and Strata Group III)

2) A reduction in the percentage of decorated stems to zero

3) An increase in the variety of maker's marks (1 in 1640, 14 in 1680 and 15 in 1710)

4) Reduced angle of bowl to stem


1710 TEMPORAL GROUP
70%
60%
50%
40%
30%
20%
10%
0%
4/64
5/64
6/64
7/64
PIPE CACHE
LOT 14 CISTERN

GRAPH VII:4

5) A reduction of reworked stems (whistle making activity) to .1%6)

6) RT marks comprising 94% of total marks

7) A reduction in bowl variety from 10 types in 1680 to 4 in 1710

The 1710 Temporal Group consisted of 6 components, 5 of which were associated with a cache of pipes and 1 which was the Lot 14 cistern. 5 of the 6 Components, or 83%, contained pipe fragments. There was a total of 7,409 pipe fragments which comprised 79% of the pipes from the entire site (9353); or a total of 9298 without CX 102.01 in CMP 63. Without CX 102.01, the percentage of pipes with a ceramic TPQ of 1710 was 80%.

By combining the Temporal Groups for 1640, 1680, 1710, 1795 and 1844, it was found that the 1710 Temporal Group overshadowed the others with 96% (495) of the total maker's marks (517).

Almost all pipes with maker's marks were manufactured in Bristol with the exception of some of those marked TW which may have been produced in London or, least likely, in New York City. There were various manifestations of Tippet marks, and fully 94% were from the Tippet workshops (Plate VII14; Plate VII18; Plate VII19). There were no decorated stems
but there were 3 identifiable whistles which comprised only .1% of the total stems (2420).

The 1710 Temporal Grouping is made up of two distinct types of deposit; i.e., the pipe cache which represents a short term deposit and the Lot 14 cistern which represents a group of pipes deposited over a longer period of time.

Morphologically, the pipes in both deposits were examples of

the "ordinary" late-17th to early-18th century English type. Archaeologists often encounter following the English occupation of Manhattan. They could be roughly divided into 4 types:

1) The heelless export type, late 17th-early 18th century; 33%; Bristol (Jackson & Price 1974);

2) Type 21, 1680-1710; 62%; Bristol and/or London (Atkinson & Oswald 1969);

3) Type 20, 1680-1710; 4%; (ibid);

4) Type 23, 1690-1720; 8%; (ibid).

Port Royal, Jamaica, was destroyed by an earthquake in 1692. Pipe analysis from that city reports 5% Dutch pipes and 95% English pipes (Marx 1968). When Context 102.01 is retained, (see CMP 63), the Jamaican percentages are close to those from Component 63, which had 97% English and 3% Dutch pipes.

A histogram (Bar Graph VII4), shows pipe bore diameter distributions for the 1710 Temporal Group as an entity. As would be expected, there is a striking increase in 5/64" bore diameters (which are later) and which are most "popular" according to Harrington, between 1710 and 1750. The 1680 Temporal Group, in contrast, had only 11% of 5/64" bores.

Given that the pipe cache and the cistern in Lot 14 have the same ceramic TPQ of 1710, one can utilize the relative percentage of pipe stem bore distributions to further refine the dating of the deposits. A look at the graph reveals that for the pipe cache the percentage of 6/64" stems is greater, (44%), than it is for the cistern (30%). The percentage of 7/64" stems in the pipe cache (16%) is also greater than that of the cistern (6%). However, the Lot 14 cistern has a greater percentage of the later dated 5/64" bores (62%) as compared to the pipe cache (39%).

One can then hypothesize that the pipe cache is slightly older than the cistern, although both have the same ceramic TPQ.

What happened to your summary?

1795 TEMPORAL GROUP

The 1795 Temporal Group contained two Strata Groups, IVA, which was 18th century destruction debris and VA which consisted of structural elements associated with Building E. 89 pipe fragments were excavated and analyzed. (Plate VII23)

Maker's marks consisted of EB, manufactured by Edward Bird of Amsterdam, 1630-1683; HG, Hendrik Gerdes also of Amsterdam, 1668-1684 and an R/TIP/PET fragment from Bristol, made by one of the Robert Tippets (1660-1722), probably II or III. There was one of each mark. All came from the Building E builder's trench (see Component 17) in Lots 8 and 10. These earlier Dutch and English elements reflect the fact that Component 17 cuts through structural elements associated with Building A (see Strata Group IA). There must have been admixture.

Decorated stems comprised 5% of the total stem fragments and included rouletting and fleur de lys decorations as well as a molded Dutch stem.

Bowl types included a 17th century belly bowl with rouletted rim and EB on the heel, as well as an 18th century bowl fragment which is probably 18th century English being similar to Noel Hume's type #14, dated 1680-1710 (Hume 1976).

No trends could be determined due to the mixed nature of the deposits.

1844 TEMPORAL GROUP

The 1844 Temporal Group consisted of 1 Component (CMP 15),

which was within Strata Group IVB - the 19th century destruction debris. There was a total of 84 pipes. Bowl shapes were English and were all similar to Noel-Hume's (1976) type #15, dating 1700-1770. These totalled 3.

Maker's marks, too, were English and consisted of the following:

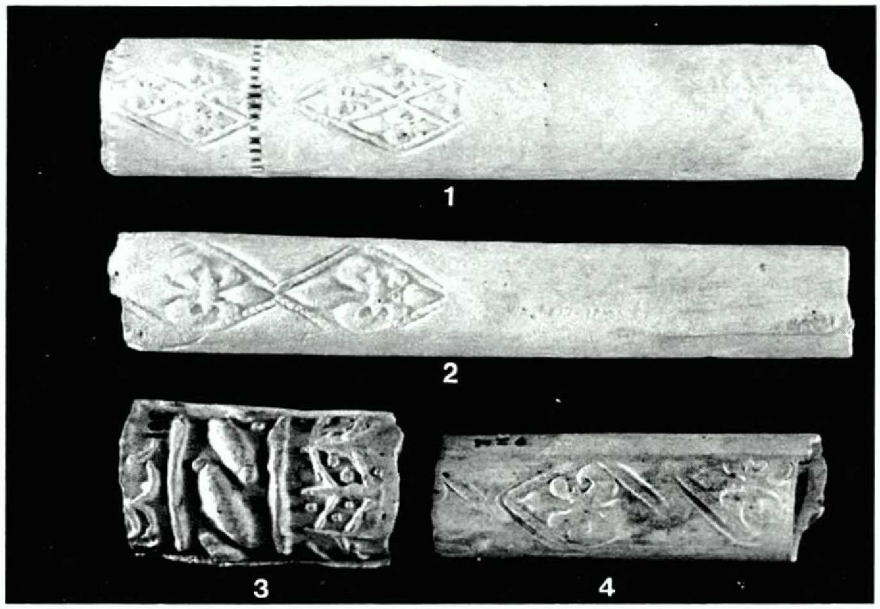
1) W on the back of the bowl; English; 1700-1770; based on Noel Hume bowl shape, Type #15 (Noel-Hume 1976). (Plate VII21 lower right)

2) GT of either side of the heel; Dorking; 1762-1823 (Higgins 1981). (Plate VII21 left & upper right)

3) Gauntlet with R/TIP/PET; most likely Bristol; Robert Tippet II, 1713-1722 (Walker 1977). (Plate VII20 lower left & right)

Stems revealed a predominance of 5/64" bores at 51%; 20% were 4/64". This is probably indicative of a later deposit.

A brief summary of this Temporal Group indicates that all pipes were English, specifically from Dorking and Bristol. There were no decorated stems, and Bore diameters were predominantly 4/64" and 5/64", which were most popular in the 18th and 19th centuries.



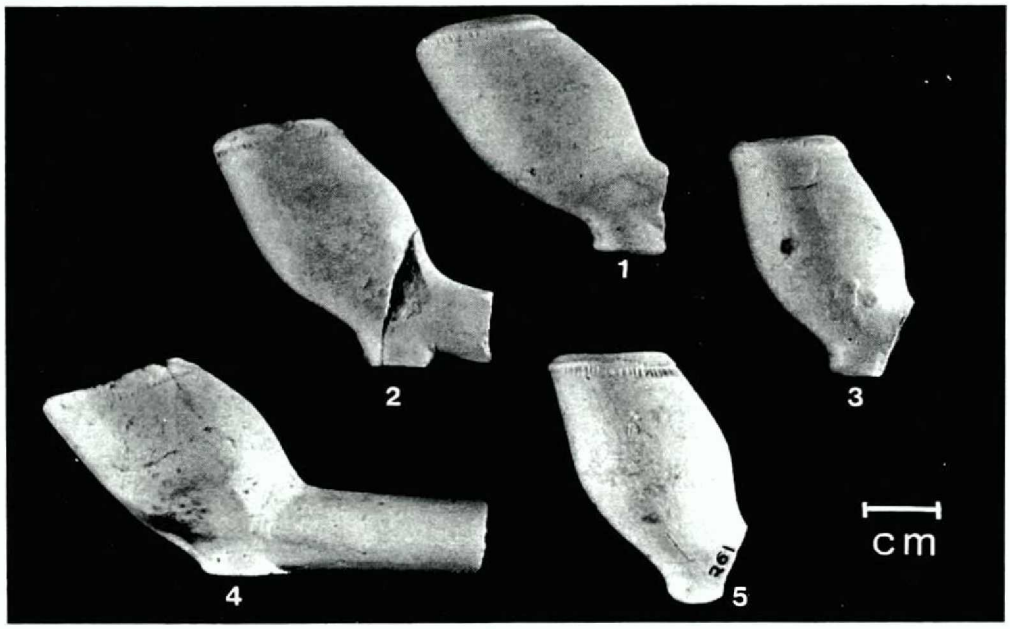
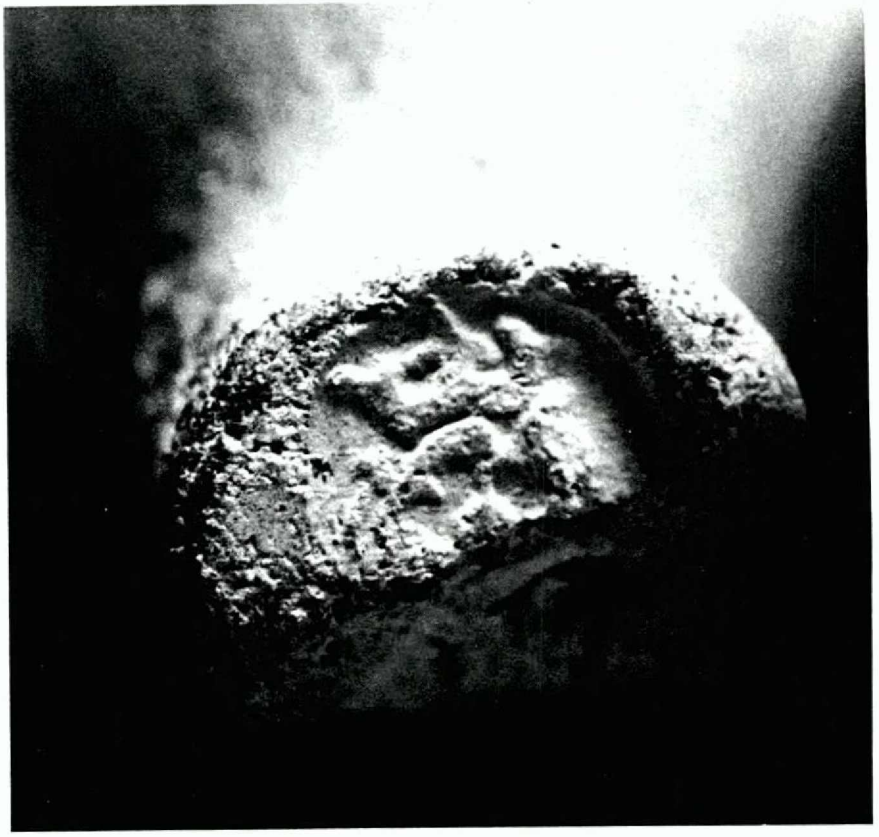


PLATE VII-1



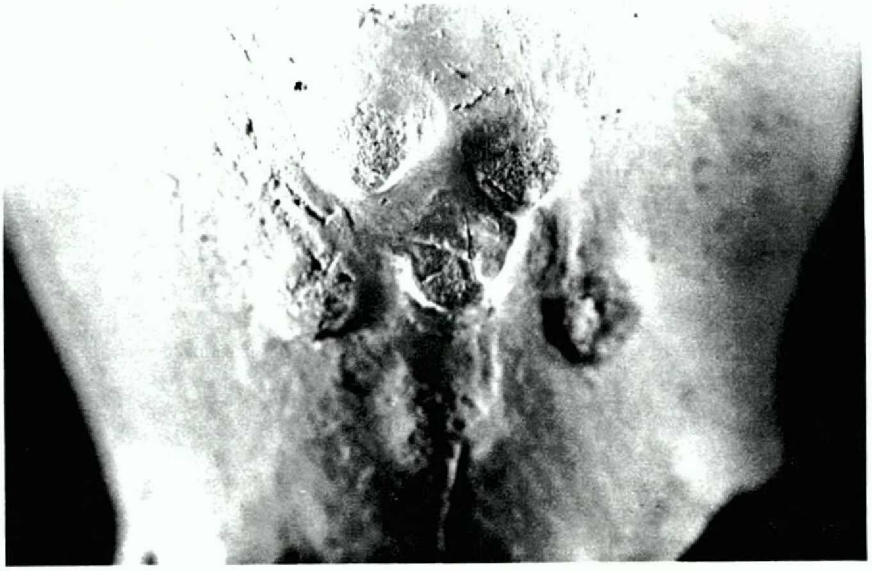
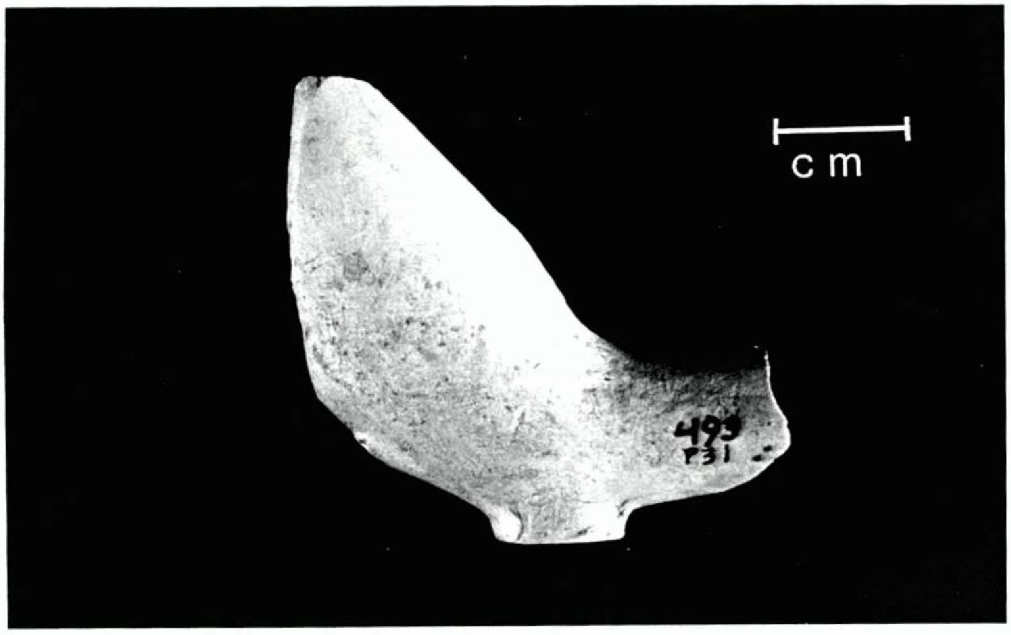


PLATE VII-2



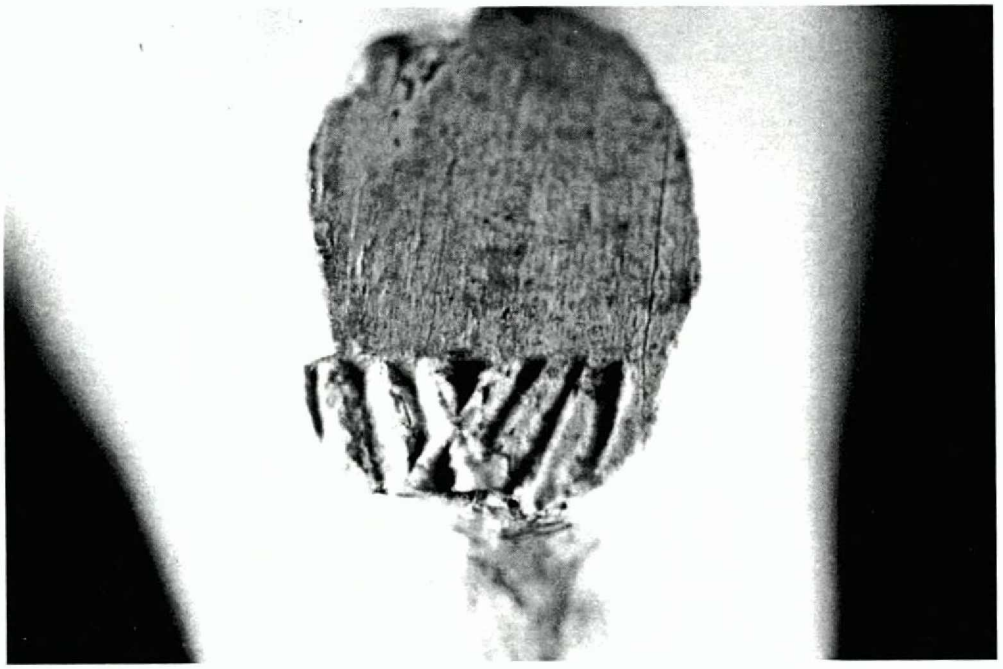


PLATE VII-3

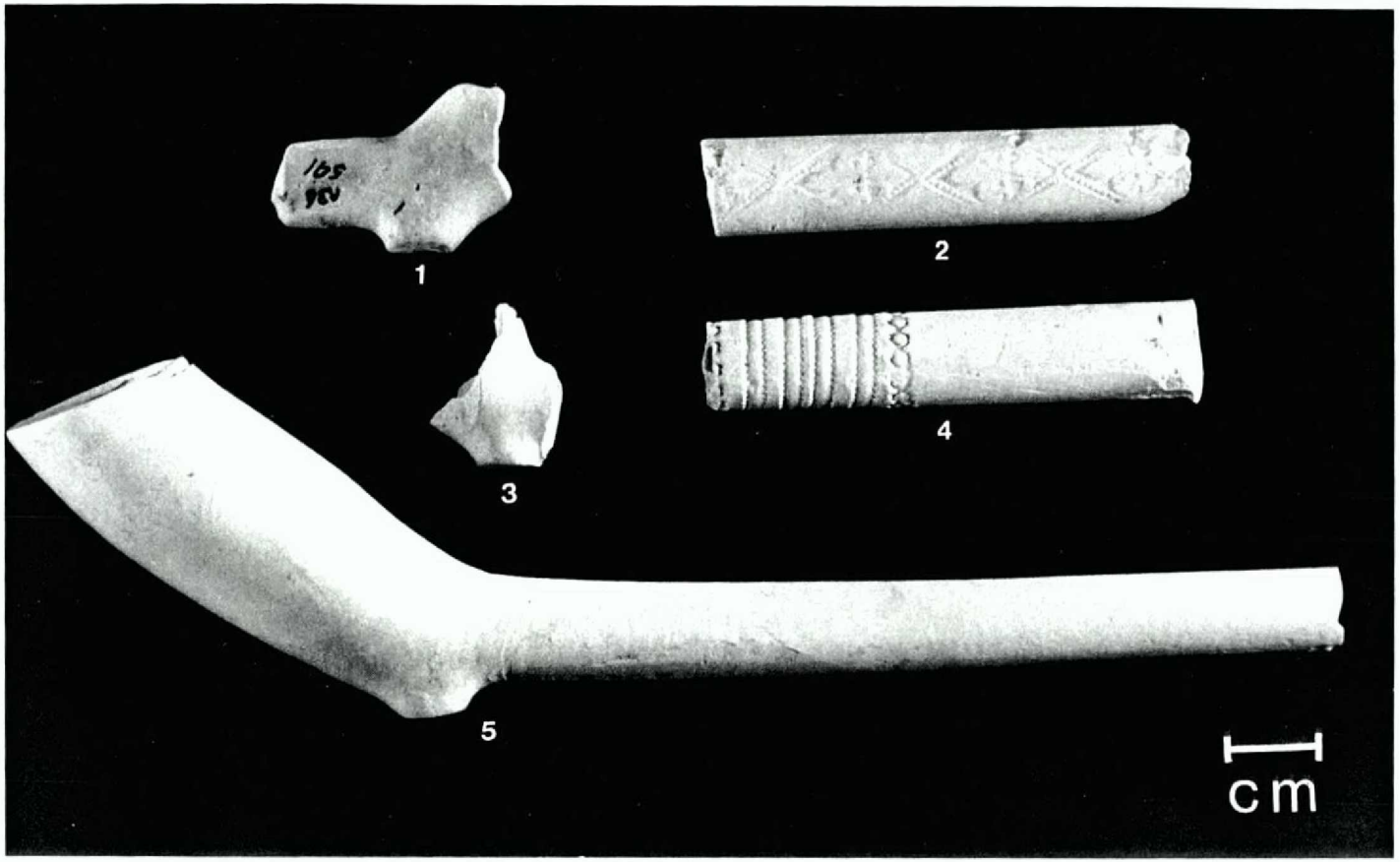


PLATE VII-4

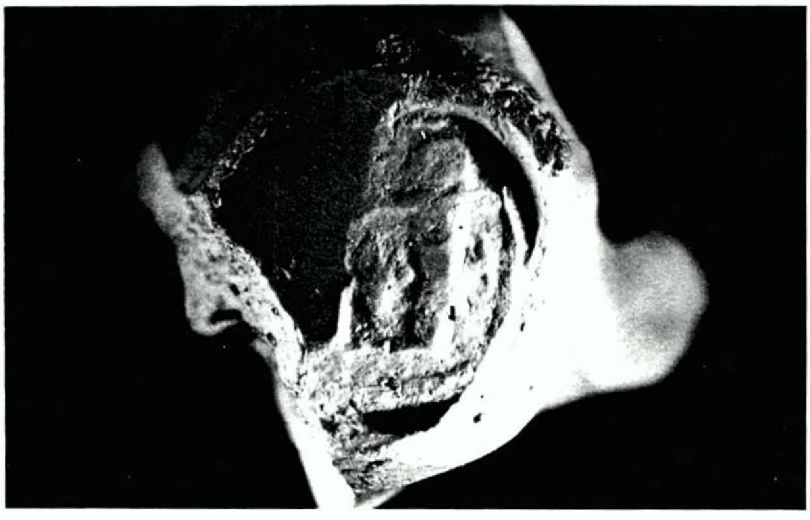


PLATE VII-5

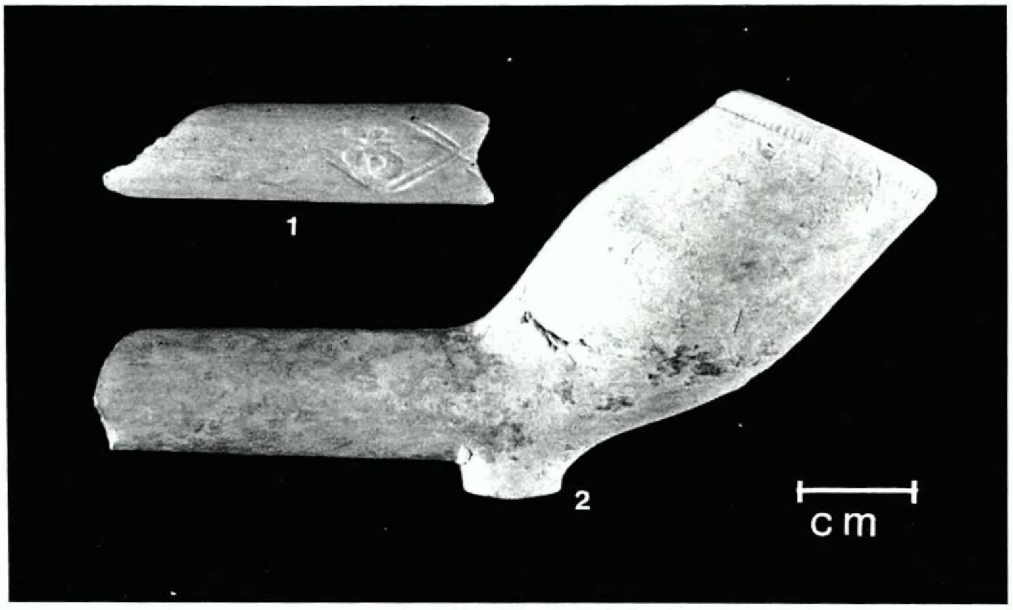


PLATE VII-6

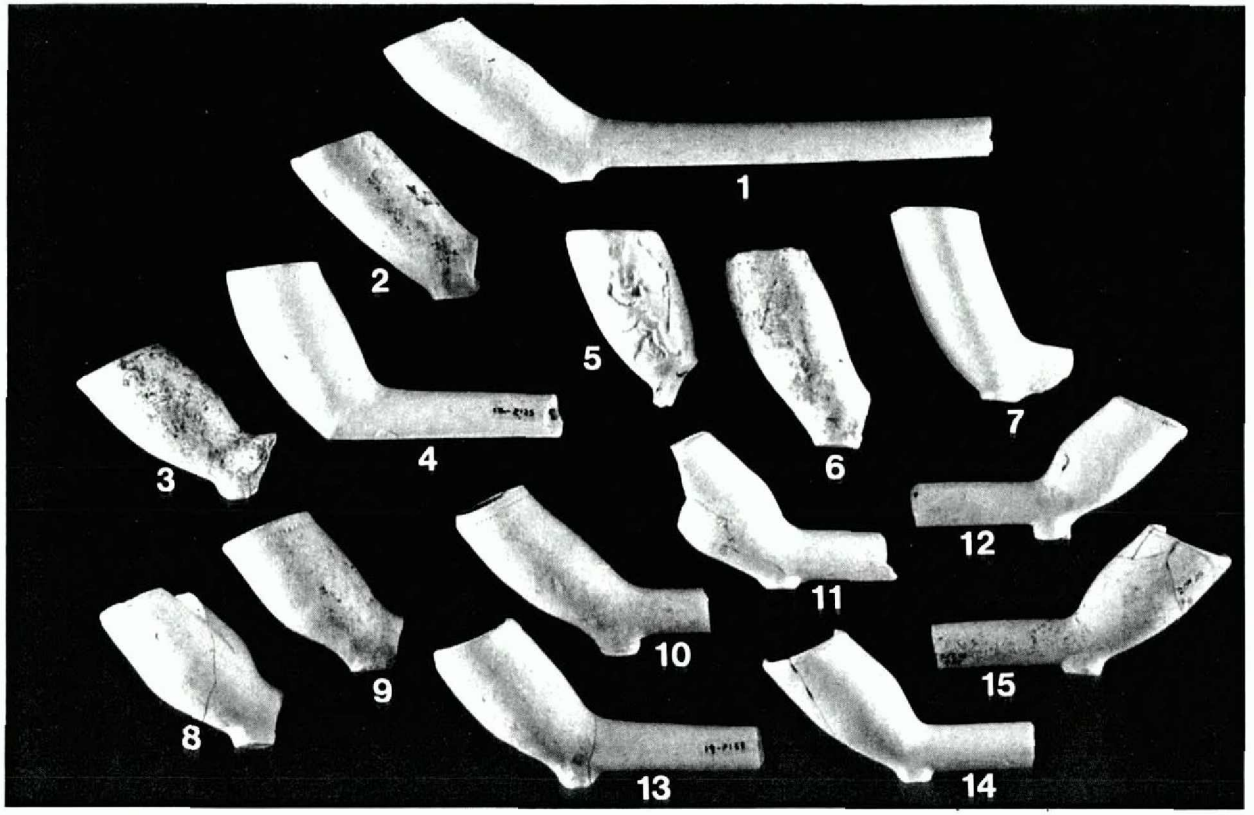


PLATE VII-7

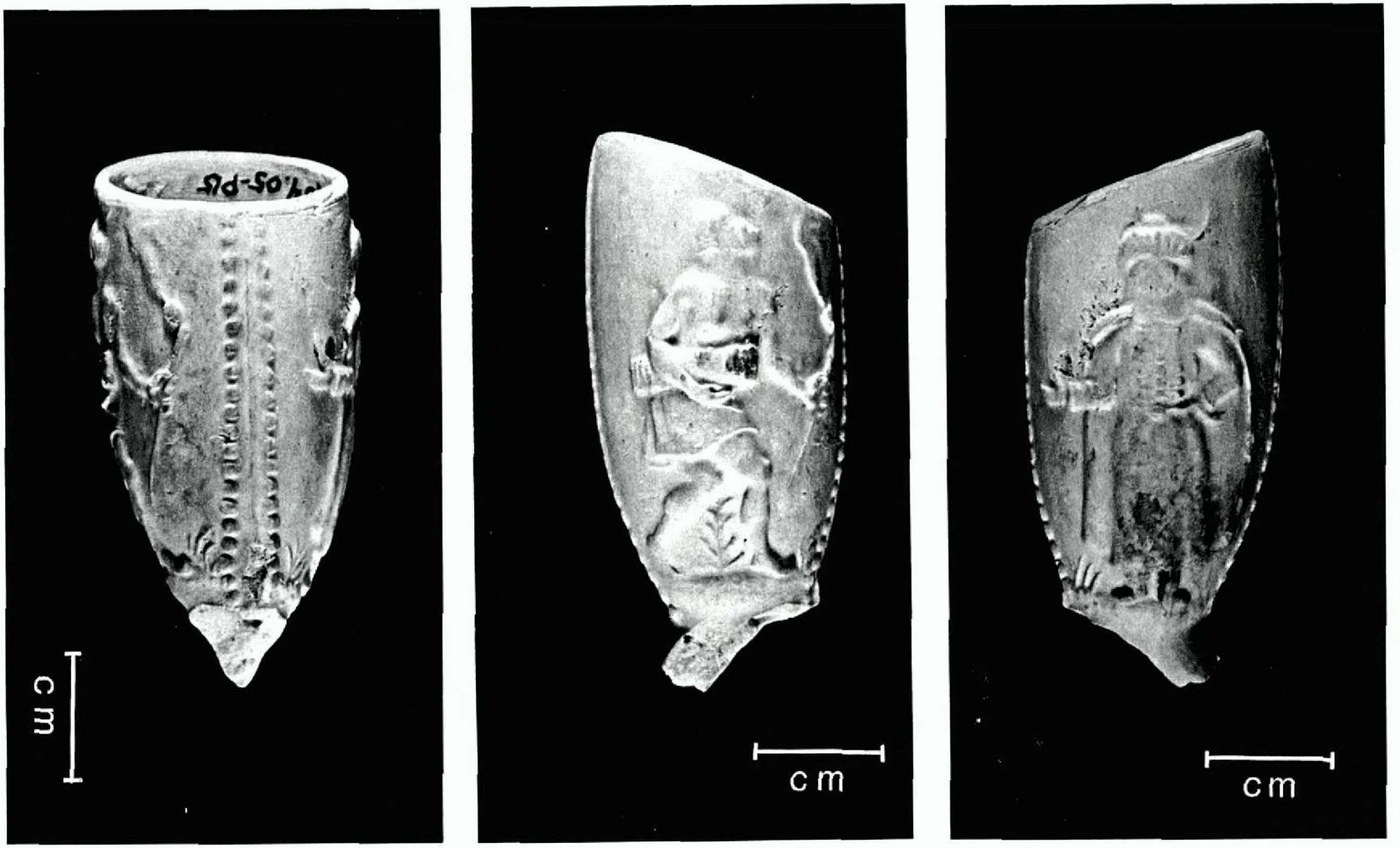
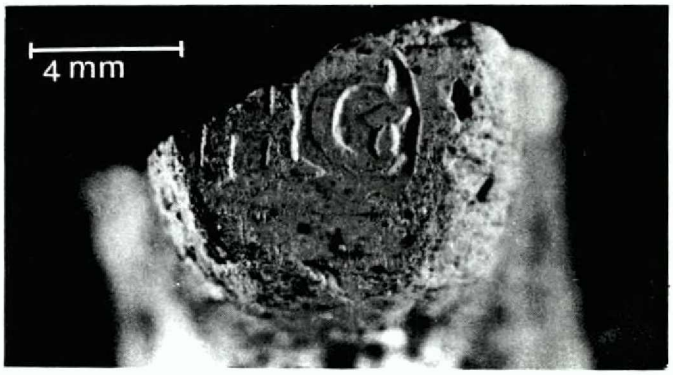
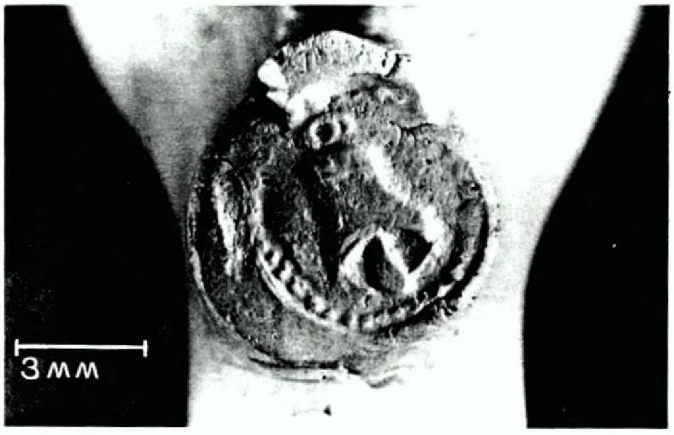


PLATE VII-8





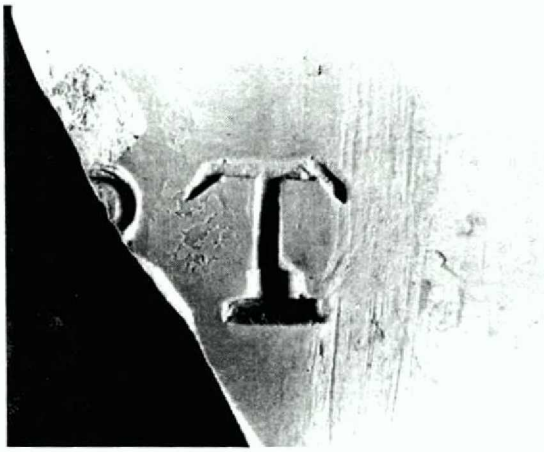


PLATE VII-9

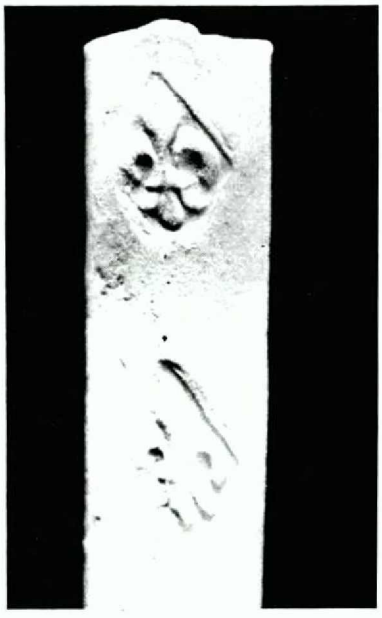


PLATE VII-10

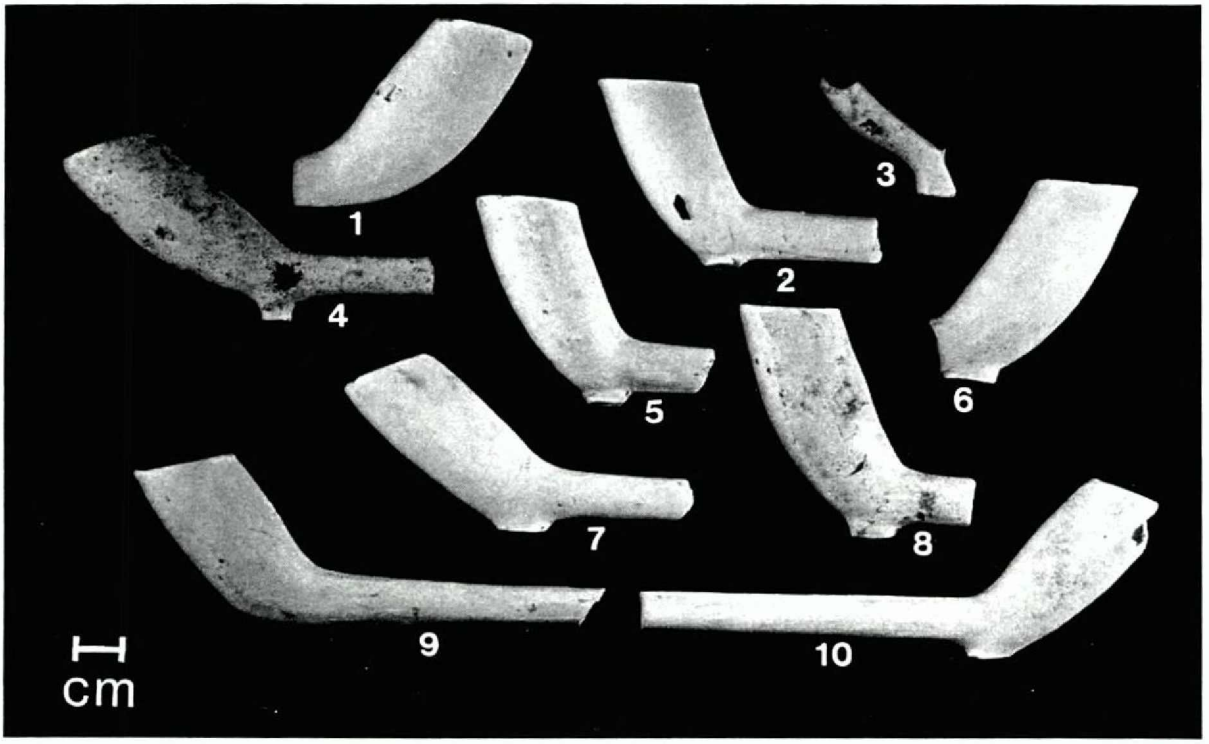
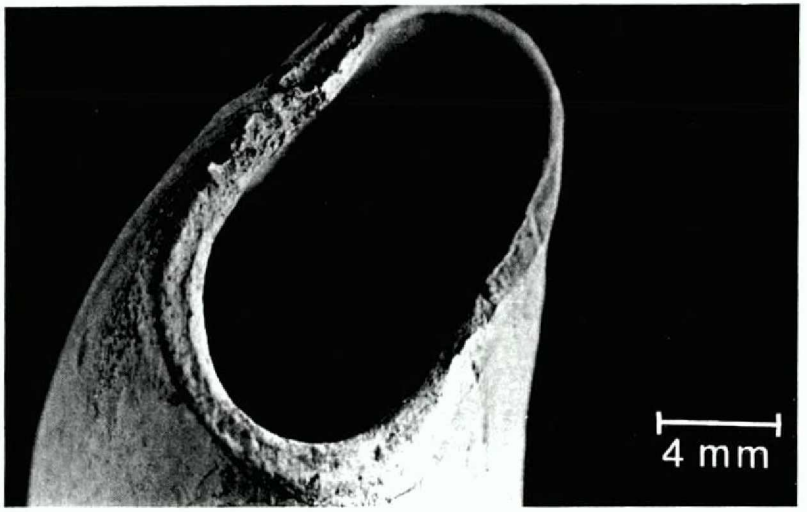
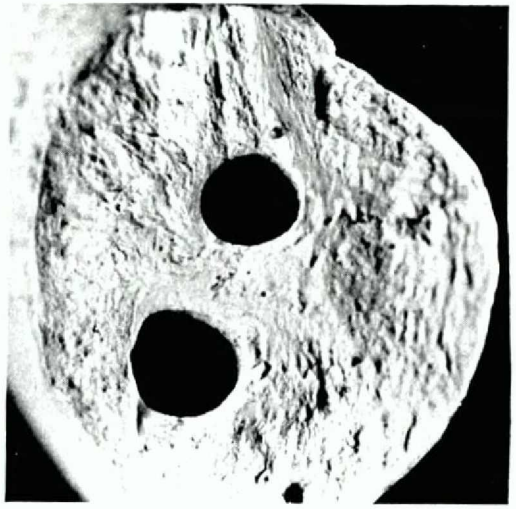
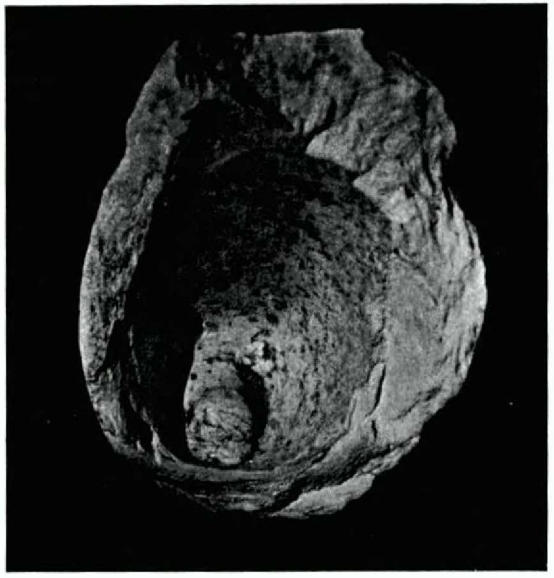


PLATE VII-11







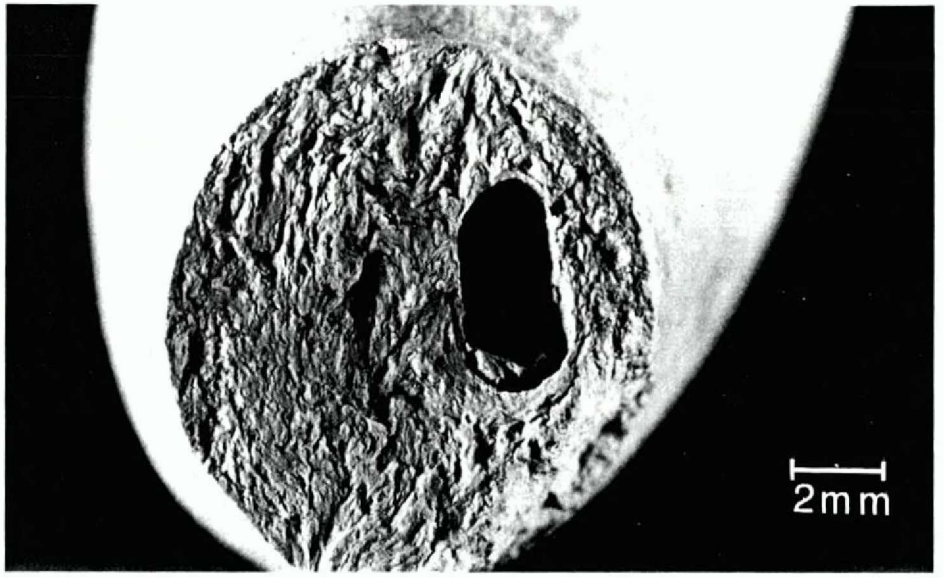


PLATE VII-12

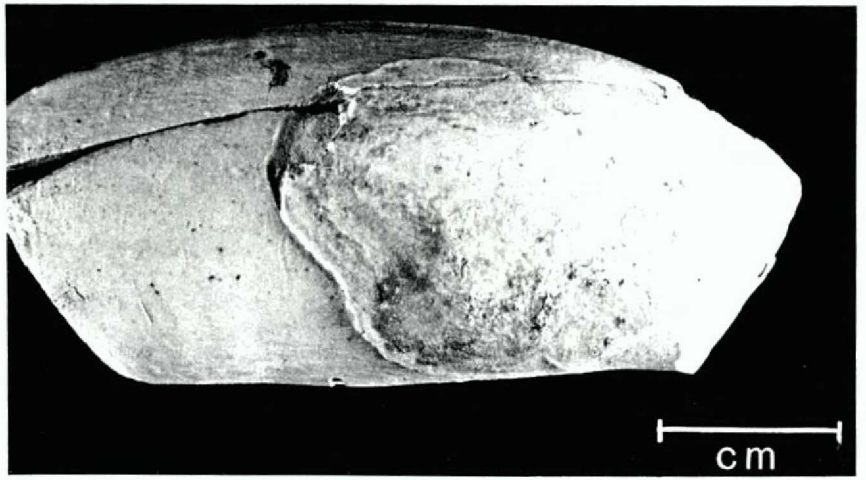


PLATE VII-13

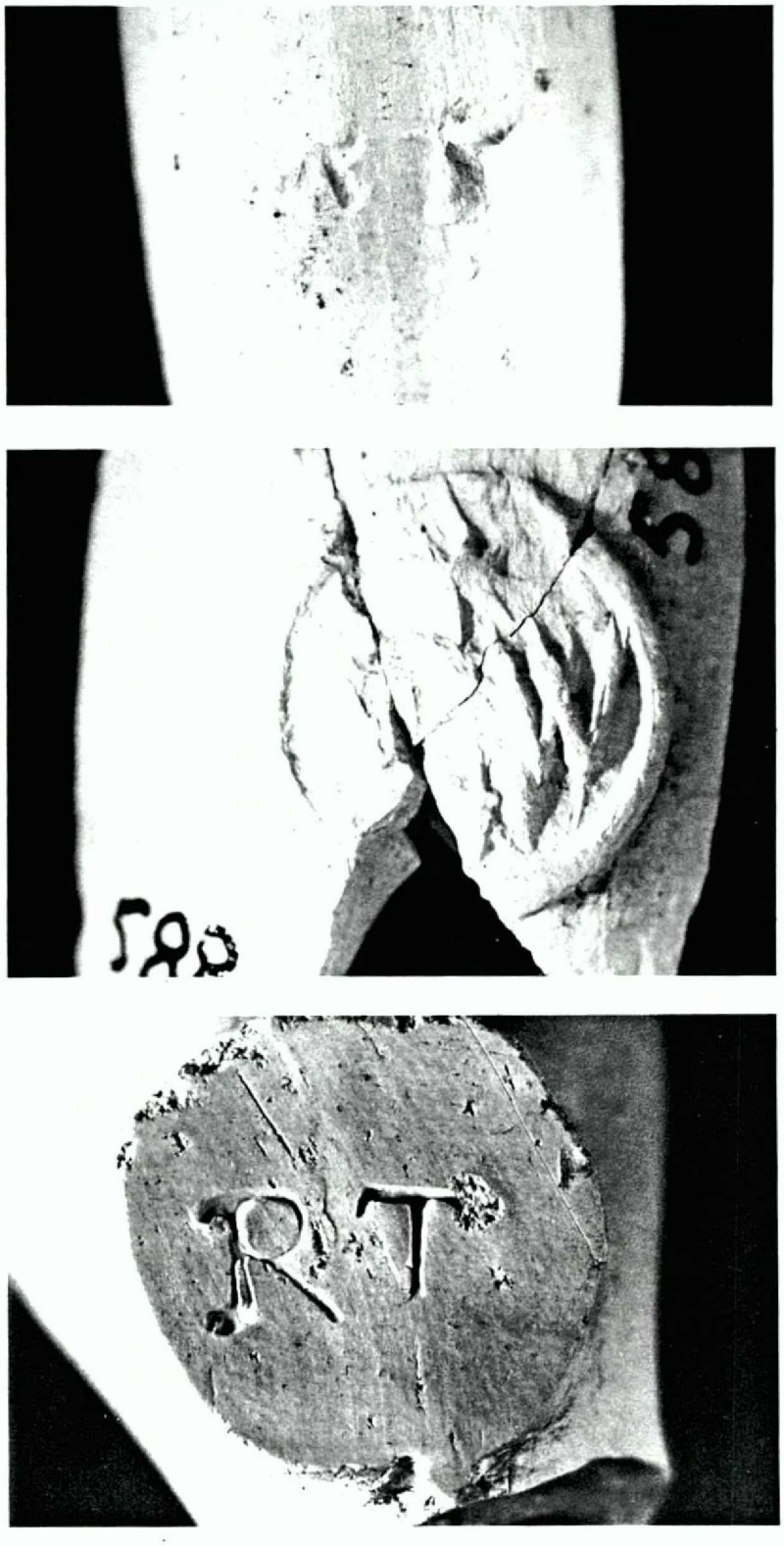


PLATE VII-14

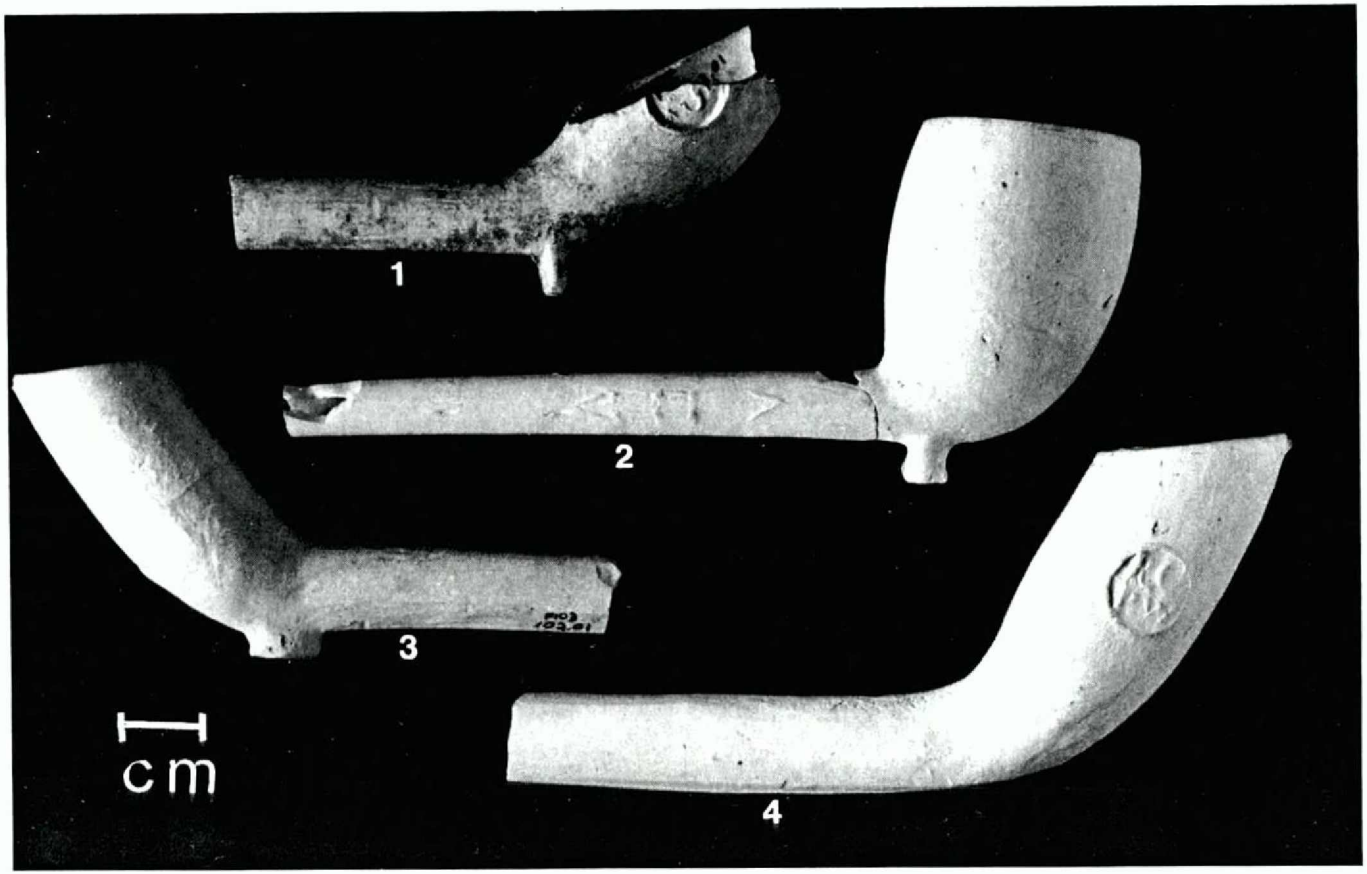
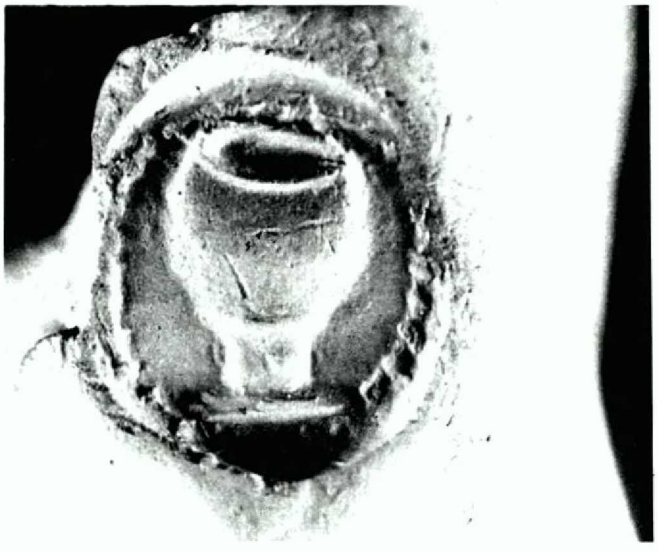


PLATE VII-15



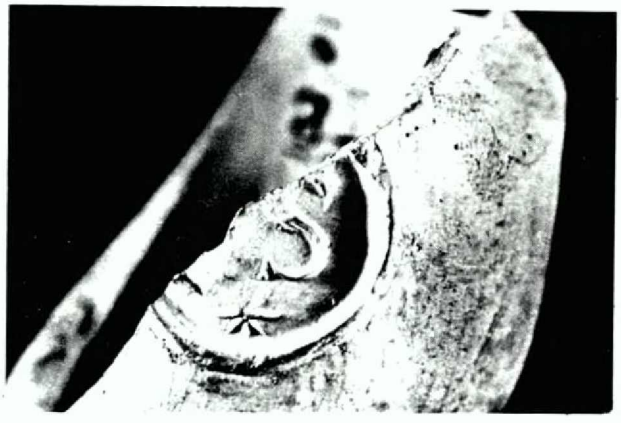


PLATE VII-16

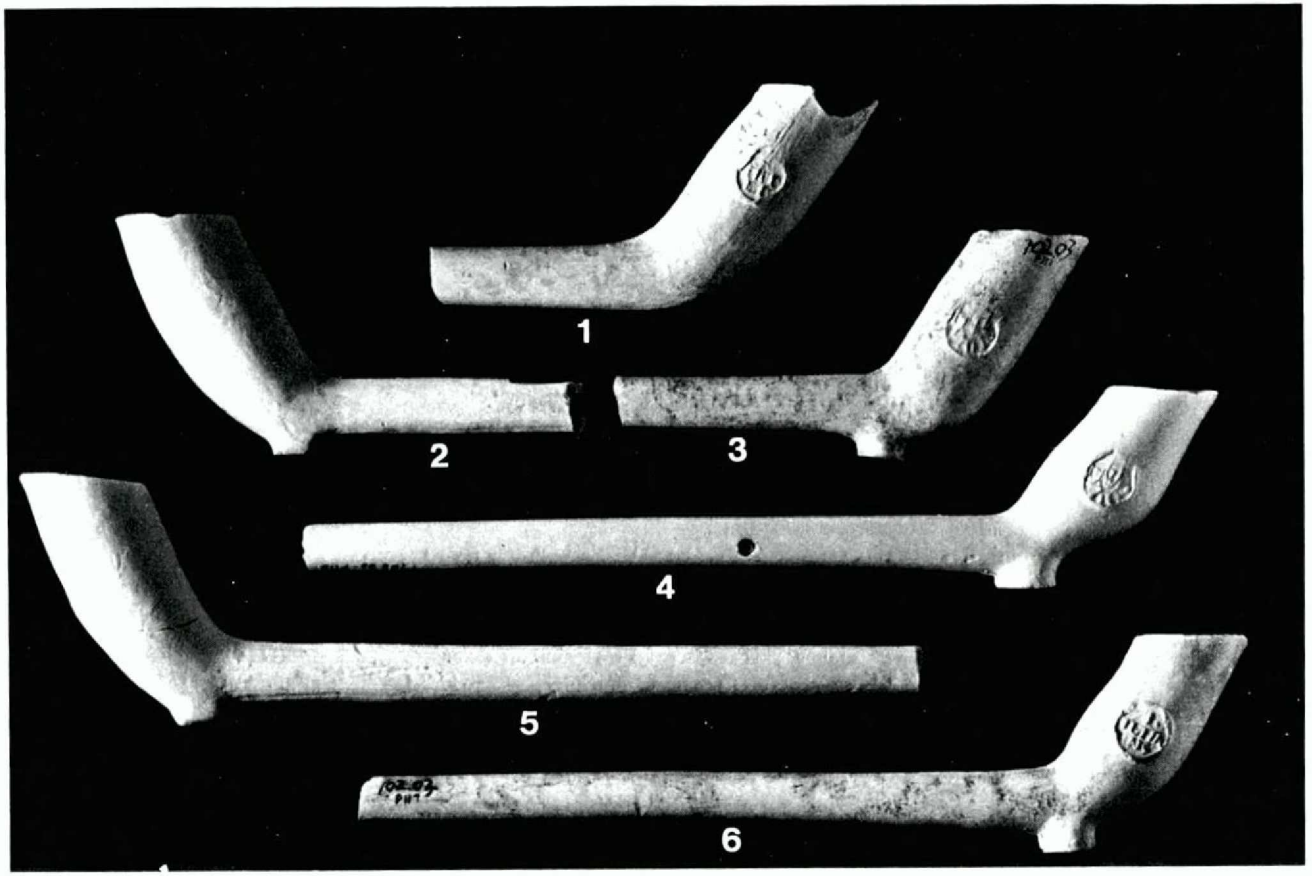


PLATE VII-17

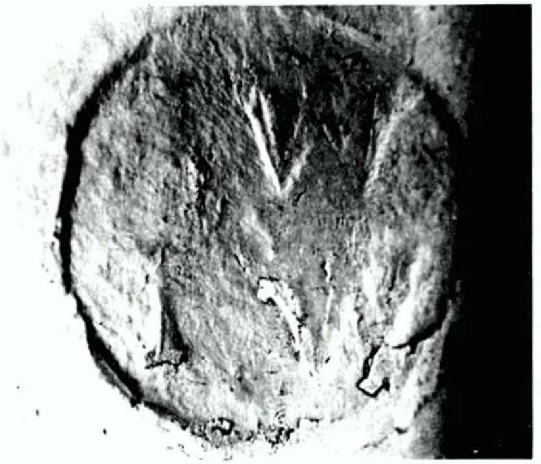
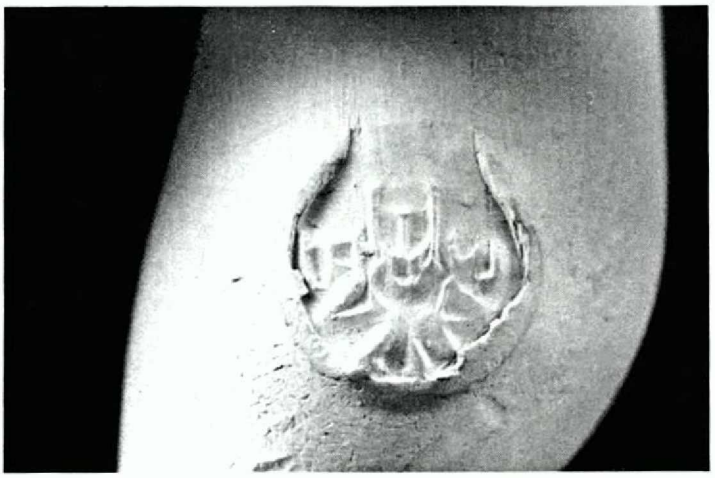


PLATE VII-18



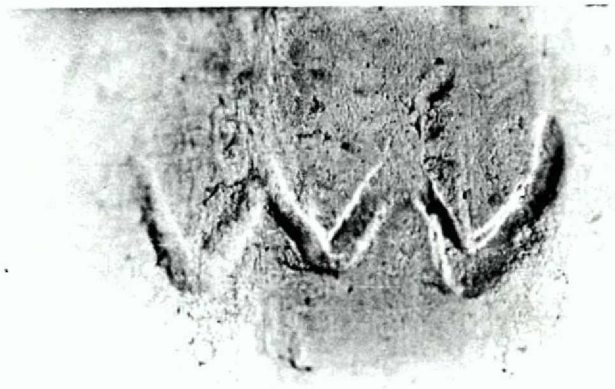
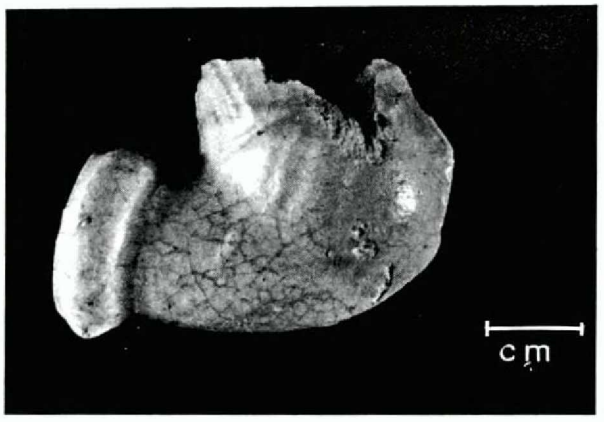
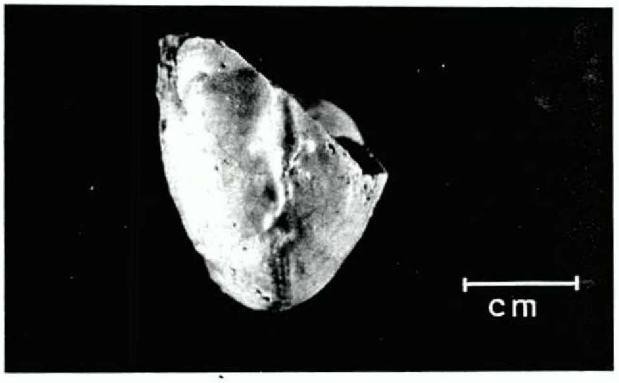
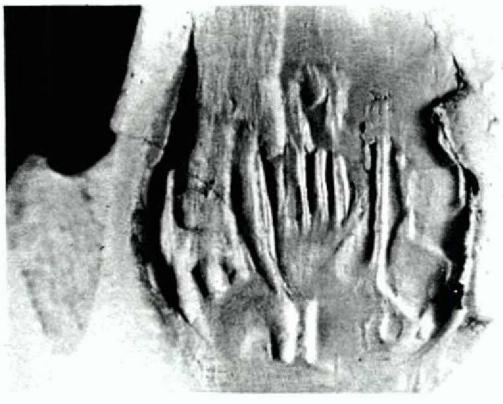


PLATE VII-19







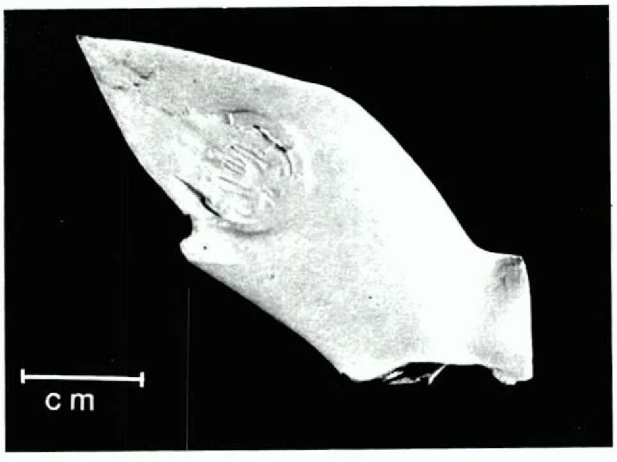
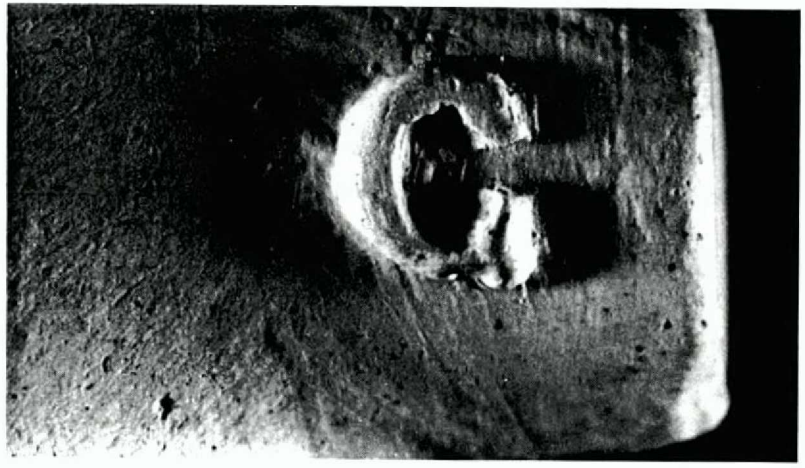


PLATE VII-20



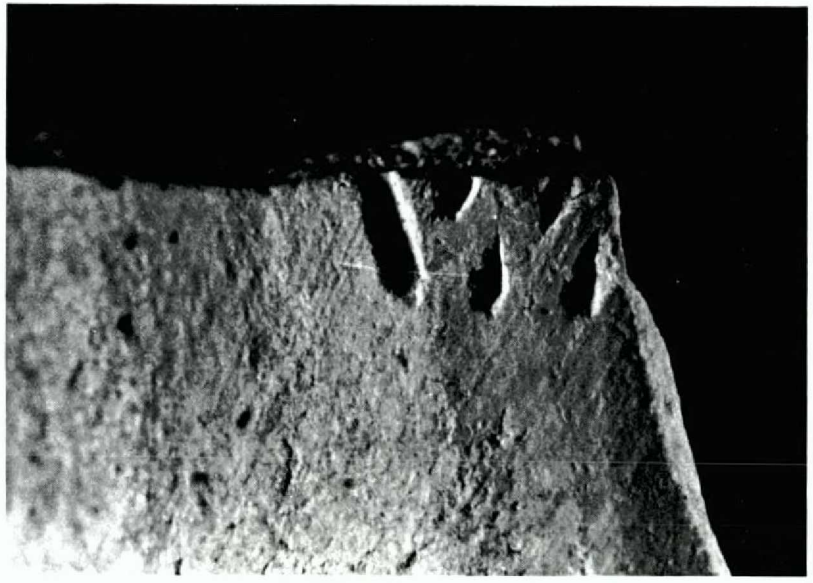


PLATE VII-21

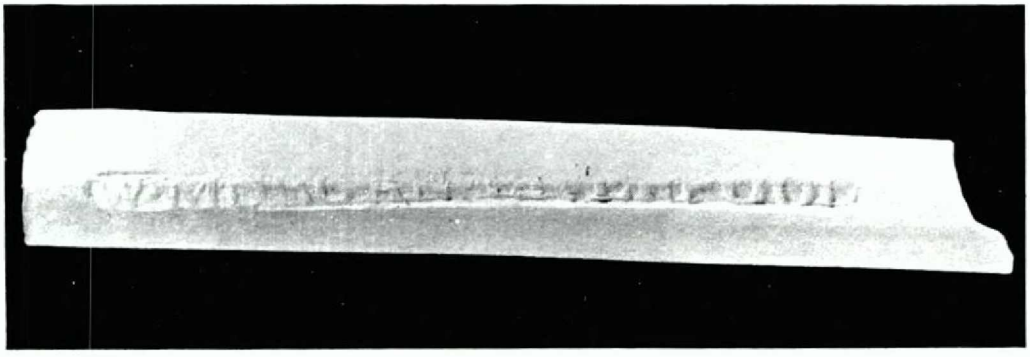


PLATE VII-22

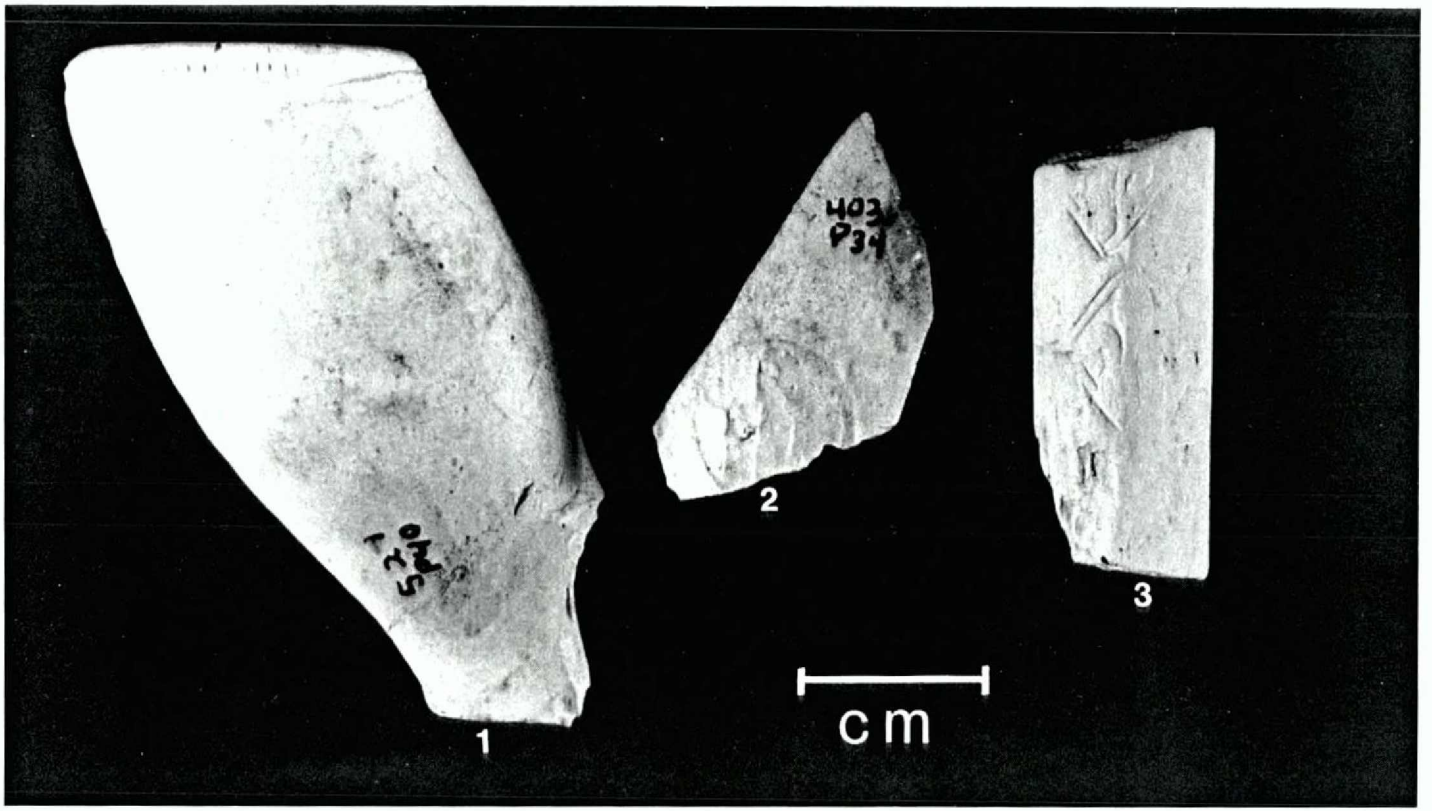


PLATE VII-23

PLATE VII-24

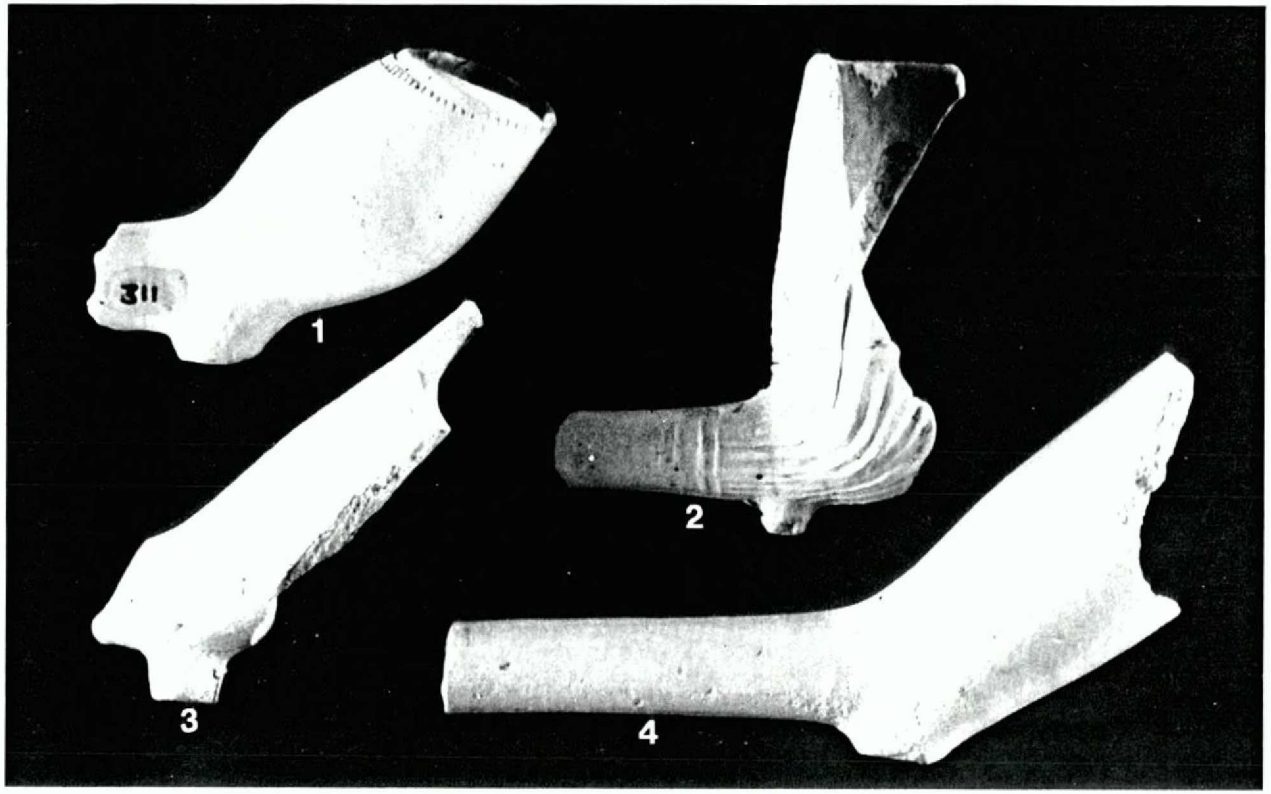


PLATE VII-25

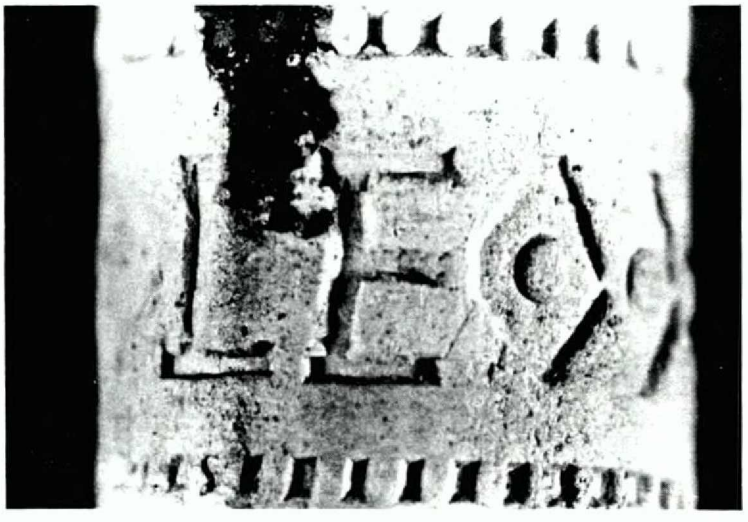
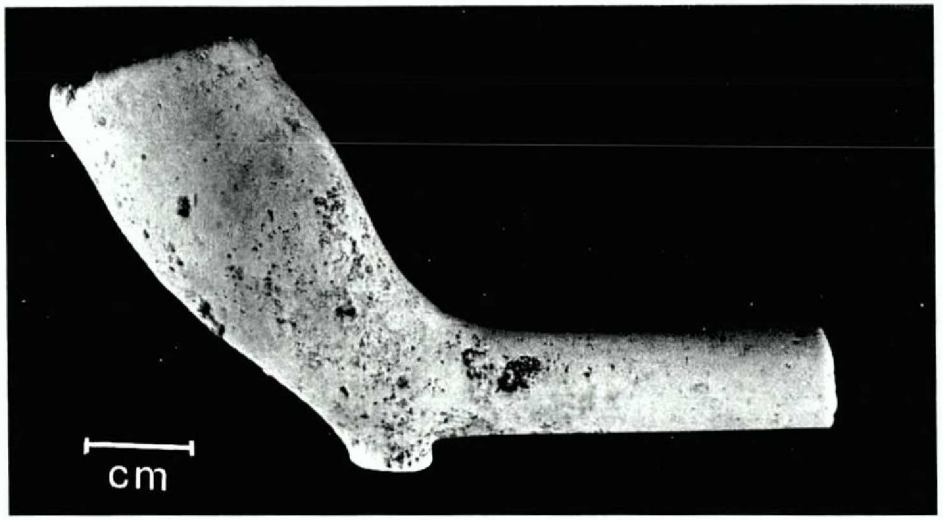
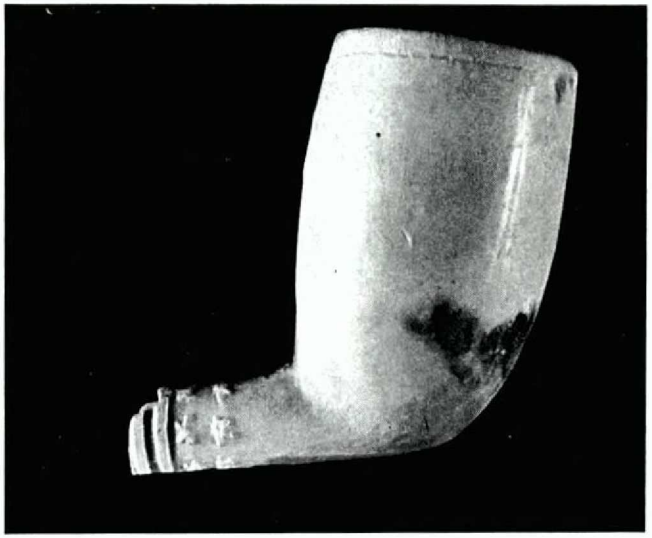


PLATE VII-26





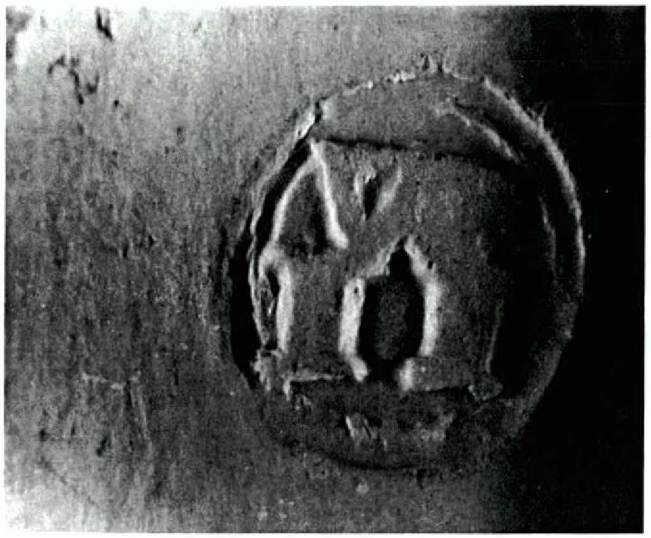
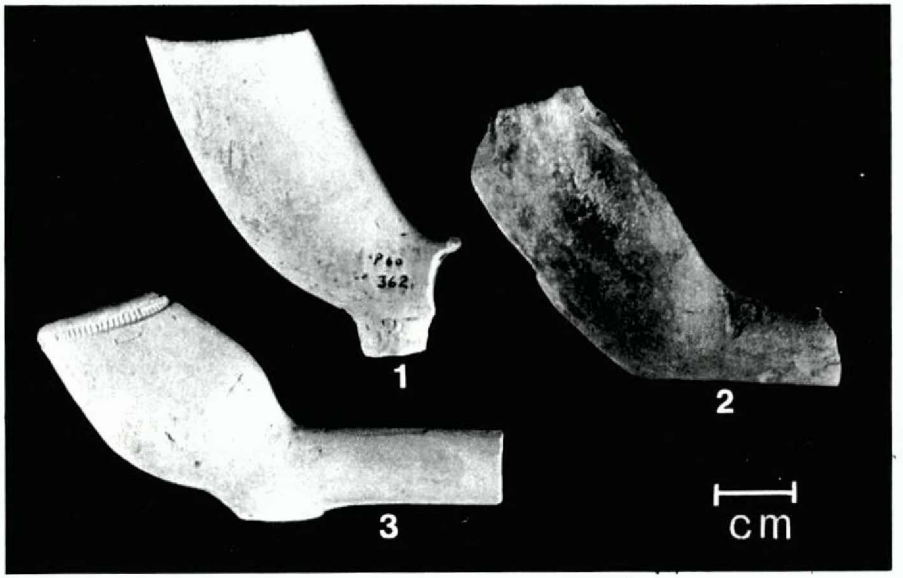


PLATE VII-27



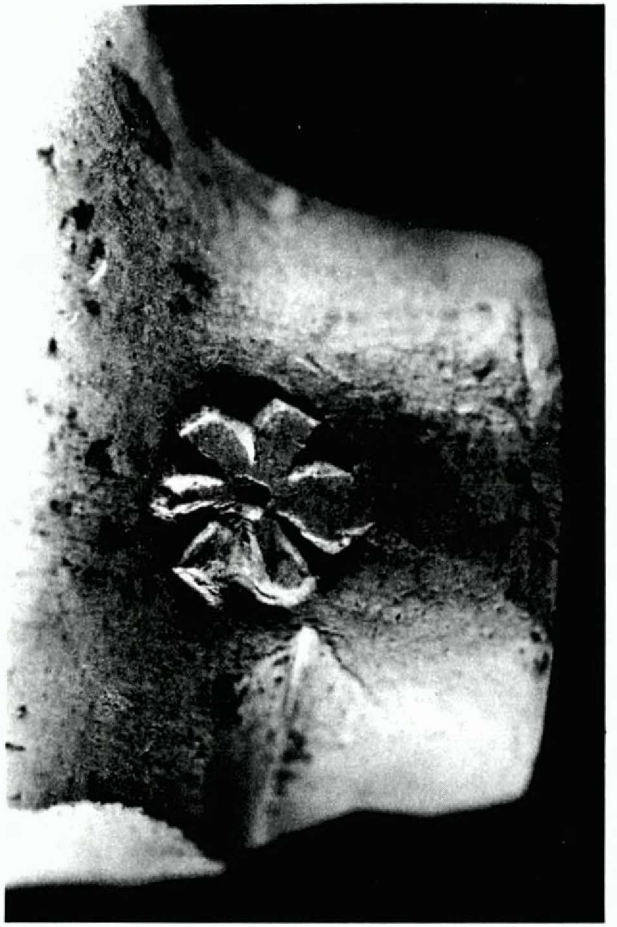
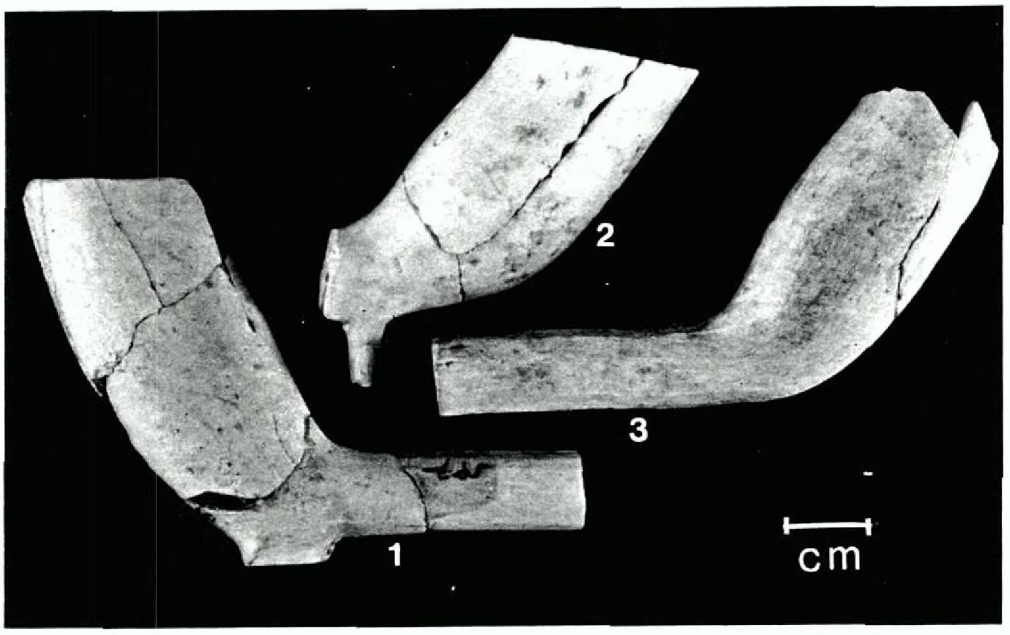


PLATE VII-28



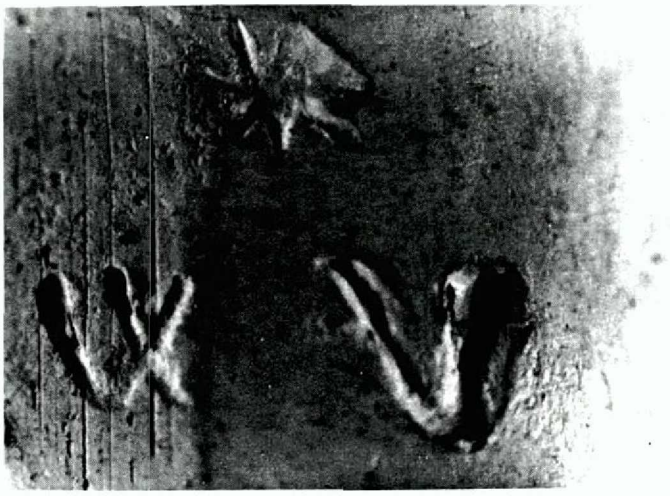


PLATE VII-29

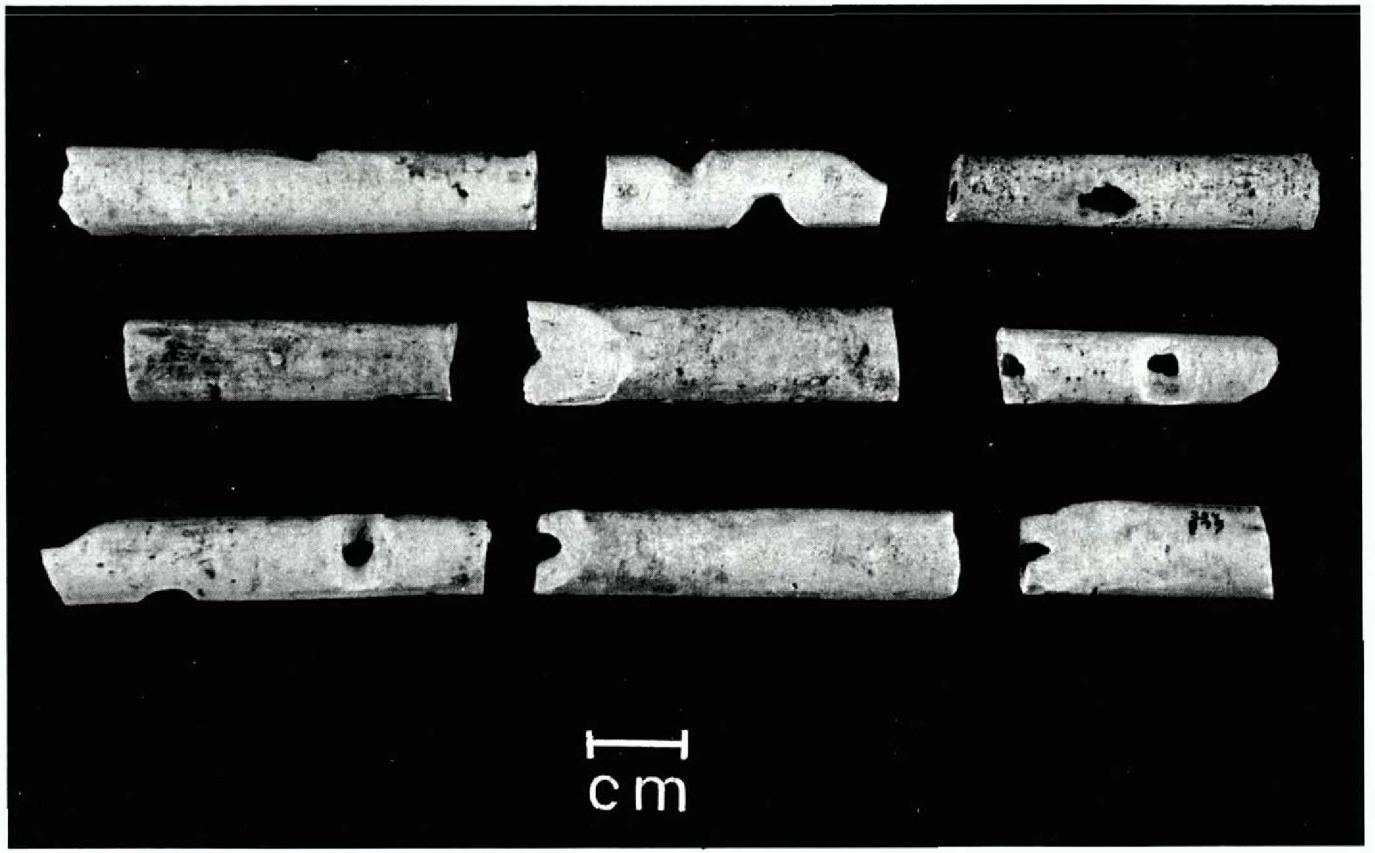


PLATE VII-30

SMALL FINDS: INTRODUCTION

A listing of the small finds recovered during the excavation of the Broad Financial Center site was produced as part of the general finds inventory for the entire site. This inventory was sorted by Group and Class codes of the National Park Service taxonomy. This series of descriptions reflects that process, presenting the small finds primarily ordered by Group and Class, and secondarily by Strata Group within the primary order. The following is a list of the Groups and Classes represented, and therefore also an outline for this section.

Kitchen Group:	Tableware
	Kitchenware
Architectural Group	Door and Window Hardware
Furniture Group:	Furniture Hardware
	Lighting Devices
Arms Group:	Projectiles (Shot)
	Accessories (Gunflints)
Clothing Group:	Making and Repair
	Fasteners
Personal Group:	Coins and Tokens
	Writing Paraphernalia
	Grooming and Hygiene
	Ornaments (Beads, etc.)
	Other Personal items
Activities Group:	Leisure (Toys)
	Fishing Gear
	Military Objects (Sword Parts)

A short introductory statement is included for each class represented. This includes a discussion of dating evidence for the objects and if any reliable information was available.

KITCHEN GROUP: TABLEWARE AND KITCHENWARE

Eleven items of tableware or kitchenware were recovered from the excavation of the Broad Financial Center site. A few of the items, cutlery handles and spoons, can be given broad date ranges on stylistic grounds. The eleven items are presented below in Strata Group order.

STRATA GROUP II A

CMP 13 CX 529 SF# F24 CODE 01-03-017 PLATE VIII-4
Length 7.5 cm
Description: Bone cutlery handle with central shaft protruding at end, and a band of incised geometric decoration just below. Probably 17th century (Noel Hume 1976 : 182, Fig.63,#1).

STRATA GROUP II B

CMP 14 CX 254.05 SF# F121 CODE 01-03-018
Length 11.0 CM
Description: Antler handle with heavily corroded iron concretion at end.

CMP 62 CX 209.08 SF# F124 CODE 01-03-149
Length 6.6 cm
Description: White metal bowl of spoon "Puritan" shape with rat tail on back. Circa 1660 to mid-18th century (Noel Hume 1976 : 181-183)

CMP 76 CX 012 SF# F123 CODE 01-04-028
LENGTH: 7.0 cm and 5.0 cm
DESCRIPTION: Two fragments of iron knife blade, now heavily corroded.

STRATA GROUP III

CMP 53/54 CX 604/589 SF# F122 CODE 01-03-017
LENGTH: 9.9 cm
DESCRIPTION: Five mending fragments of a bone cutlery handle of rectangular cross-section, with a rectangular sectioned tang running through its center, for at least 2/3's of its length.

CMP 63 CX 102.03 SF# F65 CODE 01-03-006 PLATE
LENGTH 8.2 cm
DESCRIPTION: Wooden cutlery handle with a sub-rectangular cross-section.

CMP 63 CX 102.03 SF# F119 CODE 01-03-026 PLATE VIII-10
LENGTH: 17.7 cm
DESCRIPTION: Three mending fragments of copper alloy spoon, with egg shaped bowl, possibly 18th century (Noel Hume 1976:183)

CMP 63 CX 102.03 SF# F120 CODE 01-03-026
LENGTH:
DESCRIPTION: Copper alloy spoon with egg shaped bowl, possibly 18th century (Noel Hume 1976:183)

STRATA GROUP IV A

CMP 11 CX 385 SF# F25 CODE 01-03-017 PLATE VIII-12
LENGTH: 7.6 cm
DESCRIPTION: Bone cutlery handle consisting of 2 pieces of bone decorated with an incised cross hatched pattern, riveted to a flat tang extending entirely through the handle. Mid 18th century (Noel Hume 1976:182, Fig 63 #6&8). Probably made from a rib of a large mammal.

STRATA GROUP VIII

CMP 28 CX 197.01 SF# F23 CODE 01-03-017 PLATE VIII-16
LENGTH: 8.3 cm
DESCRIPTION: Bone cutlery handle with a hole drilled at one end to accept a tang. Probably made from a rib.

CMP 28 CX 197.01 SF# F26 CODE 01-03-132 PLATE VIII-16
LENGTH: 4.1 cm
DESCRIPTION: Small ivory cutlery handle, with diamond shaped cross-section, and a tudor rose design on the end.

ARCHITECTURAL GROUP: DOOR & WINDOW HARDWARE

Six pieces of door and or window hardware were recovered from the excavation of the Broad Financial Center site. They are described below in Strata Group order.

STRATA GROUP II B

CMP 38 CX 397.01 SF# F127 CODE 03-04-034 PLATE VIII-9
LENGTH: 3.1 cm end 2.4 cm
DESCRIPTION: Two fragments of "turned lead" from a casement window probably, 17th century through mid 18th century (Noel Hume 1976:233)

CMP 76 CX 019 SF# CODE 03-04-028
LENGTH: 14.5 cm: Width 8.1 cm
DESCRIPTION: One fragment of possible iron hinge, heavily corroded with a section of clay pipe stem fused to the corrosion.

STRATA GROUP III

CMP 63 CX 102.03 SF# F125 CODE 03-04-034 PLATE N.I.
LENGTH: 3.8 cm
DESCRIPTION: One fragment of "turned lead" from a casement window probably 17th century through mid 18th century (Noel Hume 1976:233)

CMP 63 CX 102.04 SF# F126 CODE 03-04-034
LENGTH: 4.2 cm
DESCRIPTION: One fragment of "turned lead" from a casement window, probably 17th century through mid 18th century (Noel Hume 1976:233)

STRATA GROUP VI

CMP 38 CX 193 SF# CODE 03-04-149
LENGTH: 8.2 cm
DESCRIPTION: White metal cord tie-off for window blinds, etc. Two holes in center area for securing to window frame.

STRATA GROUP VIII

CMP 28 CX 197.01 CODE 03-04-034
LENGTH: ?
DESCRIPTION: Two iron fragments of "turned lead" from a casement window probably, 17th century through mid 18th century (Noel Hume 1976:233). Could not be located for analysis.

FURNITURE GROUP: HARDWARE

Three items of furniture hardware were found during the excavation of the Broad Financial Center site. Dating these items is a difficult process at best, involving detailed comparisons with hardware of furniture of known date. Since all of these examples are fragmentary and corroded, only a general date range is suggested for one example. The three items of furniture hardware are presented below in Strata Group order.

STRATA GROUP II B

CMP 62 CX 209.06 SF# F110 CODE 04-01-026
LENGTH: 9.5 cm; width 6.5 cm; thickness 1.0 cm
DESCRIPTION: Copper alloy drawer pull, heavily corroded, one end missing.

STRATA GROUP VI

CMP 34 CX 487 SF# F111 CODE 04-01-026
LENGTH: 2.7cm; width 2.0 cm; thickness 0.1 cm
DESCRIPTION: Copper alloy lock or handle plate fragment.

CMP 34 CX 487 SF# F163 CODE 04-01-026
LENGTH: 6.0 cm; width 2.8 cm; thickness 0.5 cm
DESCRIPTION: Copper alloy drawer pull, somewhat corroded, with bulbous center section and one end missing.
Date Range circa 1750-1775
(Noel Hume 1976:228-9, Fig. 72, #1).

FURNITURE GROUP: LIGHTING DEVICES

Four examples of lighting devices were found during the Broad Financial Center excavation. They are presented below in Strata Group order.

STRATA GROUP II B

CMP 62 CX 209.06 SF# F44 CODE 04-03-026 PLATE VIII-5
Diameter of base 12.0 cm; Height 15.8 cm
DESCRIPTION: Five fragments of copper alloy candlestick holder, now mended. This candlestick holder was made of sheet metal rivetted together. The only decoration visible consists of curvilinear designs with a series of dots filling in the spaces between the lines, produced by hammering small depressions into the surface.

CMP 62 CX 209.08 SF# F45 CODE 04-03-026 PLATE VIII-8
LENGTH: 17.5 cm
DESCRIPTION: Half of a copper alloy candle snuffer with a looped handle. Marked with what appears to be a portcullis surmounted by a cross stamped into the interior of the box. The handle loop closely resembles a mid 17th century scissors handle (Noel Hume 1970:208, fig 87, #4)

STRATA GROUP VI

CMP 57 CX 509 CODE 04-03-078
LENGTH: 4.4 cm
DESCRIPTION: Fragment of glass and wire light bulb, with covering of orange pigment. Probably a "Christmas" light.

CMP 68 CX 203 CODE 04-03-078
LENGTH: 4.4 cm
DESCRIPTION: Fragment of glass and wire from a light bulb base.

ARMS GROUP: PROJECTILES

A total of 18 weapon projectiles were recovered from the Broad St site. They are presented here ordered by Strata Group.

STRATA GROUP IIB

CMP 38 CX 397.01 SF# F152 CODE 05-01-034 PLATE VIII-8
DIAMETER: 0.5 cm Weight 1.4 gr
DESCRIPTION: 1 lead sphere, probably shot

CMP 38 CX 397.01 SF# F151 CODE 05-01-034 PLATE VIII-8
DIAMETER: 0.2 cm; Weight 0.4 gr
DESCRIPTION: 1 small lead sphere, probably bird shot.

STRATA GROUP IV B

CMP 15 CX 520.03 SF# F153 CODE 05-01-034
DIAMETER: 0.7 cm Weight: 1.75 gr each
DESCRIPTION: 14 lead spheres, probably shot.

STRATA GROUP VI

CMP 75 CX 009 SF# F129 CODE 05-01-028
DIAMETER: 8.4 cm WEIGHT: 1776 gr.
DESCRIPTION: 1 corroded iron sphere. A cannonball; probably 4 lb before corrosion.

STRATA GROUP VII

CMP 25 CX 016 SF# F130 CODE 05-01-028 PLATE VIII-15
DIAMETER: 11.0 cm WEIGHT ca 3990 gr.
DESCRIPTION: 1 corroded iron sphere. A cannonball; probably 9 lb before corrosion.

ARMS GROUP: ACCESSORIES (GUN FLINTS)

This overview of recent developments in gunflint research is not meant to include a history of their development, for several good accounts are available. (See Roberts in Grossman et al 1982: V 220-228). The first, and still one of the most important efforts is John Witthoft's "A History of Gunflints" published in 1966. This article introduced the idea that the form of gunflints changed significantly through time, and defined four categories based on their techniques of manufacture. Witthoft's's four groups are listed here with his original dates for their introduction to North America:

Bifacial Gunflints	1620
Flake Gunflints	1650
Blade Gunflints w/o micro-burin scar	1740
Blade Gunflints w/ micro-burin scars	1780

(Witthoft 1966: 16-37)

No serious challenges have been mounted to the applicability of the four basic categories, although several modifications to the dates have been suggested. The 1650 introduction date for Flake Gunflints has been challenged as too late by Jean-Francois Blanchette, who suggests a date as early as 1630 (Blanchette 1980: 70, Fig 53). This contention is not supported by other authors. The most recent study available examines evidence from several sites, and presents the relative percentages of the four gunflint categories by 25 year time brackets. No flake gunflints, referred to as wedge-shaped there, occur prior to the 1650-1675 bracket (Kent 1983:31, Table 2). Kent's evidence from 29 sites, 22 of which were from New York or Pennsylvania, seems far more reliable than Blanchette's single burial ground from Rhode Island, so no modification to Witthoft's original date is necessary.

The 1740 date for the appearance of blade gunflints without micro-burin scars has also been challenged. Witthoft suggested that a few flints of this variety, also called French, were made as early as 1675 but that they did not become an ordinary item of commerce here until 1740. Kent's evidence supports the earlier date. He reports 4% of flints from the 1675-1700 period as French, based on evidence from five sites. He also reports 4% French flints from the 1650-1675 period, but this is based on only one occurrence at the Strickler site in Pennsylvania (Kent 1983:30, Table 1). Therefore, until further corroborating evidence becomes available, it would seem prudent to use 1675 as the Terminus Post Quem for the introduction of blade gunflints

without micro-burin scars to North America.

PROCEDURE FOR ANALYSIS:

3 Gunflints and 5 possible gunflint fragments were found at the Broad Financial Center site. They were examined visually and classified where possible on the evidence of their techniques of manufacture. Flaking scars were considered of primary importance, although longitudinal cross-section and overall shape were also taken into consideration. The classification used recognizes four basic categories:

Bifacial Gunflints	Post 1620
Flake Gunflints	Post 1650
Blade Gunflints w/o micro-burin scar	Post 1675
Blade Gunflints w/ micro-burin scars	Post 1780

The Terminus Post Quem dates assigned are based on the sources cited in the above discussion (Witthoft 1966, Kent 1983).

STRATA GROUP I A

CMP 6 CX 312 CODE 98-00-052
DIMENSIONS: Length 22 mm; Width 25 mm; Thickness 4 mm.
DESCRIPTION: Possible Gunflint fragment or Flake, gray flint, translucent at edges.

STRATA GROUP 1 D

CMP 4 CX 591 SF# F79 CODE 05-03-052 PLATE VIII-3
DIMENSIONS: Length 20mm, Width 24 mm, Thickness 9 mm
DESCRIPTION: Flake Gunflint of light gray slightly translucent flint. Post 1650.

STRATA GROUP II A

CMP 9 CX 354 SF# CODE 05-03-052
DIMENSIONS: Length 19 mm; Width 25 mm; Thickness 5 mm.
DESCRIPTION: Possible Gunflint fragment or flake, gray brown flint, translucent in places.

STRATA GROUP IV A

CMP 20 CX 616 SF# F80 CODE 05-03-052 PLATE VIII-12
DIMENSIONS: Length 22 mm; Width 21 mm; Thickness 8mm
DESCRIPTION: Flake Gunflint of dark gray brown flint, slightly translucent at the edges. Post 1650.

STRATA GROUP VI

CMP 34 CX 487 SF# F2 CODE 10-03-052 PLATE VIII-14
DIMENSIONS: Length 20 mm; Width 20 mm; Thickness 4 mm
Possible Gunflint fragment or flake, tan flint, translucent at the edges.

CMP 34 CX 516 SF# CODE 10-03-052
DIMENSIONS: Length 26mm; Width 18mm; Thickness 5mm
Possible Gunflint Fragment or flake, tan flint translucent at the edges.

STRATA GROUP VII

CMP 24 CX 180 SF# F78 CODE 05-03-052 PLATE VIII-15
DIMENSIONS: Length 18 mm; Width 21 mm; Thickness 6 mm
DESCRIPTION: Flake gunflint of dark gray brown flint, barely translucent at the edges. Post 1650.

STRATA GROUP X

CMP 47 CX 124.03 CODE 05-03-052
DIMENSIONS: Length 9 mm; Width 12 mm; Thickness 4 mm
DESCRIPTION: Possible Gunflint fragment or flake, tan flint, translucent.

CLOTHING GROUP: MAKING & REPAIR

Twenty-eight items relating to clothing making or repair were found during the excavation of the Broad Financial Center site. They are presented here in Strata Group order.

STRATA GROUP II B

CMP 38 CX 397.01 SF# F34 CODE 06-03-026 PLATE VIII-9
DESCRIPTION: One copper alloy pin or needle fragment

CMP 38 CX 397.01 SF# F32 CODE 06-03-026 PLATE VIII-9
DESCRIPTION: Five copper alloy thimble fragments

CMP 62 CX 209.06 SF# F113 CODE 06-03-026
DESCRIPTION: Fourteen copper alloy pin fragments.

STRATA GROUP III

CMP 63 CX 102.03 SF# F115 CODE 06-03-026
DESCRIPTION: One copper alloy thimble.

CMP 63 CX 102.04 SF# F114 CODE 06-03-026
DESCRIPTION: Two copper alloy pin fragments.

STRATA GROUP IV B

CMP 15 CX 520.03 CODE 06-03-026
DESCRIPTION: Three fragments of alloy pins.

STRATA GROUP VI

CMP 34 CX 133 SF# F117 CODE 06-03-026 PLATE VIII-14
DESCRIPTION: One copper alloy thimble

STRATA GROUP VII

CMP 25 CX 606 SF# F116 CODE 06-03-026
DESCRIPTION: One copper alloy thimble

CLOTHING GROUP FASTENERS

The excavation of the Broad Financial Center site yielded a total of fifty five clothing fasteners. Included in this total are four buckle fragments, forty seven buttons and two hooks or eyes. Dating all three of these categories of clothing fasteners is problematical at best. Reasonably secure but rather broad date ranges have been suggested for various buckles, but these apply only to complete examples where both the frame and the elements of the backpiece are intact. Examples of frames without backpieces have proved to be nearly undatable (Stone 1974:34). Fragments of backpieces can only be assigned broad date ranges by comparison with securely dated well preserved buckles with similar backpieces. Copper alloy hook and eye fasteners have been documented in use by at least 1625 (Noel Hume 1976:255), and this date serves conveniently as a North American Terminus Post Quem for these fasteners. Buttons, although far more common than fasteners of other types on this and most other archaeological sites, are no less troublesome to date. Various attempts have

been made to date buttons from North American archaeological sites, but comparisons of these efforts support Ivor Noel Hume's claim that "few easy rules of thumb ..... can be followed in the dating of buttons" (Noel Hume 1976:88-9).

Two of the more commonly used classification and dating systems for buttons are those formulated by Stanley J. Olsen and Stanley South, published in 1963 and 1964, respectively. Olsen (1963: 551-554) distinguished 12 types, designated A through L, which are based primarily on construction and method of attachment. Unfortunately, Olsen did not specify the size or provenience of his sample. South distinguished 32 types, designated 1 to 32, also based on construction and method of attachment. (Hume 1969: 90-92). South based his study on the buttons recovered from the archaeological sites of Brunswick Town and Fort Fisher, North Carolina. A comparison of the two systems yielded seven types common to both. The following table presents these types with their date ranges.

In no case do Olsen and South give the same date ranges. In one case, (Types B and 3), Olsen's date range is wider and includes South's. In three cases (types D and 7, E and 11, J and 19), South's is wider and include's Olsen's dates. In one case (Types C and 8), there is some overlap and Olsen's range is later; in another case (Types K and 30), there is also some overlap, but South's range is later. In the last instance (Types G and 9), there is no overlap at all.

Because of the many discrepancies between the seven types to both systems, it is unlikely that the date ranges propo either author are reliable for dating buttons from histori archaeological sites, whether the buttons fall into the 7 types or the 37 types unique to either Olsen or South. I sets of dates had been identical, then there would be rea assume that time spans for the use of particular types of were consistent throughout Eastern North America. South's ranges, however, may prove applicable to dating other fin North Carolina, but there is no reason to assume applicab outside the geographical limitations of his sample. Olse date ranges cannot be assessed as to their validity for d buttons from any source, because no information is presen regarding the buttons provenience or the evidence used i them. Until a wider survey, based on properly documented from a number of seventeenth through nineteenth century s throughout North America is available, published date ran of limited value for assigning dates to archaeologically recovered buttons such as those from the Broad Financial Center site.

Another more complex and more recent classification schem buttons is that developed by Lyle M. Stone for the button For Michilimackinac, Michigan (Stone 1974: 45-67). The 1 buttons found there were assigned to 188 categories, usin hierarchical system based (in order of importance) on str method of manufacture, material, shape, decoration and si (Diameter). This generated a hierarchy of categories lab Classes; 2) Series 3) Types, and 4) Varieties. Unfortun

very few of the 188 categories proved datable, and those that could be dated, mostly those of military issue, are probably not pertinent to dating the Broad Financial Center finds. The finds from For Michilimackinac all come from a military site in Michigan, used only from 1715 to 1781, whereas the Broad Financial Center examples come civilian site in New Jersey occupied from the 2nd quarter of the seventeenth century to the present. Furthermore, there are no reasons to assume that a button dated to a particular time span at one of these sites should also have been used during the same period at the other. Despite the complexity of Stone's classification, it, like the earlier South and Olsen schemes, proved of limited assistance for assigning dates to the Broad Financial buttons.

During the analysis of the 117 buttons found during the Raritan Landing, New Jersey excavations, yet another button classification system was developed. This system somewhat resembled Stone's in that it was also hierarchical based on material, construction, size range, and decoration if present. A total of 51 types were recognized. Only the 7 types decorated with military insignia could be dated independently (Roberts in Grossman 1982:185, 200-206).

For the analysis of the 48 buttons from the Broad Financial Center excav it was decided to use a descriptive system based on the descriptions used in creating the Raritan Landing classification, but not to assign class numbers to these buttons. These would

only be numbers appended to the other classification.k which would be of of little value since no reliable date ranges can be suggested. The descriptive system used as a basis for the classification has been retained to ensure consistency for future inter-site comparisons necessary for establishing date ranges. The 55 clothing fasteners are presented below ordered by their Strata Group associations.

STRATA GROUP I A

CMP 6 CX 622 SF# F112 CODE 06-04-026
DIAMETER: 1.0 cm
DESCRIPTION: Copper alloy button. 1 piece construction with looped shank cast on.

CMP 6 CX 275 CODE 06-04-006
DIAMETER: 1.3 cm
DESCRIPTION: Gray plastic button. 1 piece construction with 2 holes. This button probably represents contamination of this context through holes made by the pneumatic hammer in breaking up the brick basement floor.

STRATA GROUP ID

CMP 4 CX 621 SF# F149 CODE 06-04-026
LENGTH: 1.2 cm
DESCRIPTION: Copper alloy hook from hook and eye fastener. Post 1625 (Noel Hume 1976: 255)

STRATA GROUP II A

CMP 9 CX 354 SF# F169 CODE 06-04-149 PLATE VIII-4
DIAMETER: 1.7 cm
DESCRIPTION: White metal button, probably of two piece construction with soldered on shank now missing. with two intertwined initials on the face, possibly "CS".

STRATA GROUP II B

CMP 38 CX 397.01 SF# F33 CODE 06-04-026 PLATE VIII-9
LENGTH: 0.9 cm
DESCRIPTION: Copper alloy eye from hook and eye fastener. Post 1625 (Noel Hume 1976: 255).

CMP 62 CX 209.08 SF# F146 CODE 06-04-149
DIAMETER: 1.9 cm
DESCRIPTION: Pewter button, heavily corroded, construction details not visible.

STRATA GROUP III

CMP 53 CX 604 SF# F160 CODE 06-04-026
LENGTH: 4.5 cm, Width 3.2 cm
DESCRIPTION: Complete Copper alloy frame, probably from a shoe buckle, with foliate designs at the center of each side.

CMP 53 CX 604 SF# F159 CODE 06-04-026
LENGTH: 2.9 cm Width 3.3 cm
DESCRIPTION: Complete Copper alloy shape probably from a shoe buckle.

CMP 63 CX 102.01 SF# F138 CODE 06-04-026
DIAMETER: 1.5 cm
DESCRIPTION: Copper alloy button, probably of one piece construction with cast on shank, but now too corroded to say with certainty.

CMP 63 CX 102.03 SF# F139 CODE 06-04-026
DIAMETER: 2.8 cm
DESCRIPTION: Copper alloy button, now too corroded to discern construction.

STRATA GROUP IV A

CMP 11 CX 485 SF# F142 CODE 06-04-026
DIAMETER: 2.3 cm
DESCRIPTION: Copper alloy button, probably of 2 or 3 piece construction, but now too corroded to say with certainty.

STRATA GROUP IV B

CMP 7 CX 379 SF# F162 CODE 06-04-026
LENGTH: 1.5 cm, Width 2.9 cm
DESCRIPTION: One fragment of a Copper alloy Chape probably from a shoe buckle. Very similar to complete ? from the wreck of the Amsterdam which sunk in Pevensey Bay on 26 Jan 1749 (Marsden 1974: Fig 29, #127).

CMP 15 CX 520.11 CODE 06-04-026
DIAMETER: 1.6 cm
DESCRIPTION: Two Copper alloy buttons, probably of two piece construction with brazed or soldered on loop, but now rather corroded.

CMP 15 CX 520.11 SF# F141 CODE 06-04-026
DIAMETER: 1.5 cm
DESCRIPTION: Copper alloy button, now too corroded to discern construction.

CMP 15 CX 520.11' SF# F54 CODE 06-04-017 PLATE VIII-13
DIAMETER: 1.5 cm
DESCRIPTION: Bone button back with one hole through center, probably from a three piece button of composite construction.

CMP 15 CX 520.03 SF# F55 CODE 06-04-017 PLATE VIII-13
DIAMETER: 1.6 cm
DESCRIPTION: Bone button back with one hole through center, probably from a three piece button of composite construction.

CMP 15 CX 520.03 SF #F56 CODE 06-04-017 PLATE VIII-13
DIAMETER: 1.2 cm
DESCRIPTION: Bone button back with one hole through center, probably from a three piece button of composite construction.

CMP 15 CX 520.03 SF# F57 CODE 06-04-017 PLATE VIII-13
DIAMETER: 1.0 cm
DESCRIPTION: Bone button back with one hole through center, probably from a three piece button of composite construction.

CMP 15 CX 520.03 SF# F59 CODE 06-04-017 PLATE VIII-13
DIAMETER: 1.6 cm
DESCRIPTION: Bone button with raised edge and four holes drilled through center, and one extra hole through the edge probably the result of a defect in the bone.

CMP 15 CX 520.03 SF# F60 CODE 06-04-017 PLATE VIII-13
DIAMETER: 1.6 cm
DESCRIPTION: Bone button with raised edge and four holes drilled through center.

CMP 15 CX 520.02 SF# F61 CODE 06-04-017 PLATE VIII-13
DIAMETER: 1.7 cm
DESCRIPTION: Bone button back with one hole drilled through center, probably from a three piece button of composite construction.

STRATA GROUP VI

CMP 34 CX 487 SF# F161 CODE 06-04-026
LENGTH: 3.6 cm, Width 3.5 cm
DESCRIPTION: One fragment of copper alloy buckle frame.

CMP 34 CX 543 SF# F143 CODE 06-04-026
DIAMETER: 1.9 cm
DESCRIPTION: Copper alloy button, probably of one piece construction but heavily corroded, and with shank missing.

CMP 34 CX 399 SF# F144 CODE 06-04-026 PLATE
DIAMETER: 2.3 cm

DESCRIPTION: Copper alloy button of two piece construction with loop originally brazed or soldered on but now missing.

CMP 34 CX 399 SF# F145 CODE 06-04-149
DIAMETER: 2.8 cm
DESCRIPTION: Pewter button of one piece construction with shank cast on, now somewhat corroded.

CMP 34 CX 338 SF# F137 CODE 06-04-089
DIAMETER: 0.9 cm
DESCRIPTION: Shell button of one piece construction with four holes through center.

CMP 34 CX 543 SF# F62 CODE 06-04-017
DIAMETER: 1.5 cm
DESCRIPTION: Bone button back with one hole through center, probably from a three piece button of composite construction.

CMP 34 CX 374 SF# F131 CODE 06-04-017
DIAMETER: 1.1 cm
DESCRIPTION: Bone button back with one hole through center, probably from a three piece button of composite construction.

CMP 34 CX 399 SF# F132 CODE 06-04-017
DIAMETER: 1.5 cm
DESCRIPTION: Bone button back with one hole through center, probably from a three piece button of composite construction.

CMP 34 CX 311 SF# F134 CODE 06-04-017
DIAMETER: 0.8 cm
DESCRIPTION: Bone button back with one hole through center, probably from a three piece button of composite construction.

CMP 34 CX 303 SF# F155 CODE 06-04-008 PLATE VIII-13
DIAMETER: 1.3 cm
DESCRIPTION: Brown plastic button with two holes through center, one piece construction. This button may represent contamination of this context through the holes made by the pneumatic hammer in breaking up the brick basement floor.

CMP 35 CX 139 SF# F156 CODE 06-04-008 PLATE VIII-13
DIAMETER: 1.8 cm
DESCRIPTION: Tan plastic button of 1 piece molded construction with two holes through its center, and a raised ridge around them.

CMP 35 CX 240 SF# F157 CODE 06-04-008 PLATE VIII-13
DIAMETER: 1.5 cm
DESCRIPTION: Brown plastic button of 1 piece molded construction with four holes through center and a raised ridge around the edge.

CMP 35 CX 158 SF# F158 CODE 06-04-008 PLATE VIII-13
DIAMETER: 1.3 cm
DESCRIPTION: Gray plastic button of 1 piece molded construction with two holes through center and slightly raised edge.

CMP 35 CX 251 CODE 06-04-008
DIAMETER: 1.3 cm
DESCRIPTION: Three gray plastic buttons identical to F158.

CMP 35 CX 240 CODE 06-04-008
DIAMETER: 1.3 cm
DESCRIPTION: Three gray plastic buttons identical to F158.

CMP 35 CX 193 CODE 06-04-008
DIAMETER: 1.3 cm
DESCRIPTION: Brown plastic button of 1 piece molded construction with two holes through center and slightly raised edge.

CMP 35 CX 317 CODE 06-04-008
DIAMETER: 1.3 cm
DESCRIPTION: Half of a gray plastic button identical to F158.

CMP 35 CX 138 SF# F133 CODE 06-04-001
DIAMETER: 2.1 cm
DESCRIPTION: Fragment of white porcelain button probably of one piece molded construction.

STRATA GROUP VII

CMP 26 CX 434 SF# 58 CODE 06-04-017
DIAMETER: 0.9 cm
DESCRIPTION: Bone button back with one hole drilled through center, probably from a three piece button of composite construction.

STRATA GROUP VIII

CMP 27 CX 189 SF# F140 CODE 06-04-067
DIAMETER: 0.9 cm
DESCRIPTION: Mother of pearl button of one piece construction with four holes drilled through center.

STRATA GROUP IX

CMP 32 CX 353 SF# F135 CODE 06-04-017
DIAMETER: 1.4 cm
DESCRIPTION: Bone button back with wire loop through single hole drilled in center, from a three piece button of composite construction.

CMP 36 CX 302 SF# F136 CODE 06-04-089
DIAMETER: 1.3 cm
DESCRIPTION: Shell button of one piece construction with four holes through center and a low wide ridge around the edge.

CMP 36 CX 302 SF# F147 CODE 06-04-028
DIAMETER: 3.0 cm
DESCRIPTION: Two iron button facings now heavily corroded.

CMP 36 CX 302 SF# F148 V CODE 06-04-028
DIAMETER: 2.4 cm
DESCRIPTION: Four iron button facings and one iron button back from two or three piece buttons, all now corroded.

PERSONAL GROUP: COINS

Five coins or tokens were recovered from the Broad Financial Center excavations. They were all initially examined visually and notes made concerning their identification. Final identification was made by careful comparison with similar specimens in museum collections or through published references with photographs. Thanks are due to Dr Alan Stahl, Associate Curator of Medieval Coins and Medals, American Numismatic Society, for his assistance in identifying the Dutch token. The five coins or tokens are presented below in Strata Group order.

STRATA GROUP I A

CMP 6 CX 135 SF# F175 CODE 07-01-026 PLATE VIII-2
MATERIAL: Copper Alloy
DIAMETER: 3.0 cm
OBVERSE: Six arms (representing the six provinces of the Netherlands) hold up a column, surmounted by the hat of Liberty, and resting on the bible. Below the hat and just above the column is the inscription: LIBERT. Just above the bible is the inscription RELIG. Around the perimeter are the inscriptions: HANC. TVEMVR and HAC NITIMVR separated by what appears to be small floral designs.
REVERSE: Six arrows (also representing the six provinces) with their points facing up are clasped by two hands. Above the arrows is the inscription DEO, and below the inscription IVVANTE. Around the perimeter is the inscription: 1590 CALC SENAT

PROVINC VNIT BELGII. which translates as: Struck in 1590 by the Senate of the United Provinces of Northern Gaul (Belgii being the latin term for the northern division of Gaul).

This is a token (privately issued coin) issued in 1590 by Prince Maurice of Nassau (b. 1567, d. 1625) to commemorate his election as a statdholder of the city of Utrecht. The engraving was done by Van Loon (Dugniolle 1877: 102, Cat#3256; Encyclopedia Britannica 1955: Vol.15:106).

STRATA GROUP VI

CMP 35 CX 236 SF# F165 CODE 07-01-149
MATERIAL: Nickel Alloy DIAMETER: 2.0 cm
OBVERSE: Bust of Jefferson surrounded by inscription and date: 1940
REVERSE: Monticello surrounded by inscriptions.

This is a U.S.A. five cent coin dating to 1940, minted in Philadelphia.

CMP 35 CX 351 SF F167 CODE 07-01-026
MATERIAL: Copper Alloy DIAMETER: 1.8 cm
OBVERSE: Bust of Lincoln surrounded by inscriptions and wheat ears.
REVERSE: The words ONE CENT surrounded by inscriptions and wheat ears.

This is a U.S.A. one cent coin dating to 1917, minted in Philadelphia.

CMP 57 CX 512 SF# 168 CODE 07-01-026
MATERIAL: Copper Alloy DIAMETER: 1.8 cm
OBVERSE & REVERSE: As for #F167 above except date: 1942.

This is a U.S.A. one cent coin, dating to 1942, minted in Philadephia.

STRATA GROUP XI

CMP 36 CX 302 SF# F166 CODE 07-01-026
MATERIAL: Copper Alloy DIAMETER: 1.8 cm
OBVERSE: as for #F167, above, except date 1919.
REVERSE: Completely corroded.

This is a U.S.A. one cent coin dating to 1919, minted in Philadephia.

PERSONAL GROUP: WRITING PARAPHERNALIA

A total of four items of writing paraphernalia was found during the excavation of The Broad Financial Center site. All wer

pencils, which are not datable. They are presented below in Strata Group order.

STRATA GROUP I A

CMP 6 CX 127 SF# F81 CODE 07-03-040 PLATE VIII-1
LENGTH: 3.1 cm DIAMETER 0.5 cm
DESCRIPTION: Slate pencil.

STRATA GROUP IV B

CMP 15 CX 520.03 SF# F82 CODE 07-03-040
LENGTH: 3.0 cm DIAMETER: 0.5 cm
DESCRIPTION: Slate pencil.

STRATA GROUP VII

CMP 24 CX 342 SF# F118 CODE 07-03-040
LENGTH: 2.7 cm DIAMETER: 0.6 cm
DESCRIPTION: Slate pencil.

CMP 24 CX 499 SF# F83 CODE 07-03-040
LENGTH: 3.5 cm DIAMETER: 0.6 cm
DESCRIPTION: Slate pencil.

PERSONAL GROUP : GROOMING & HYGIENE

A total of eight items relating to personal grooming or hygiene was found during the excavation of the Broad Financial Center site, of wi three were combs or brushes and five pipe clay hair curlers. The former category are undatable due to the extremely long production periods for these items, but the latter category can at least be assigned broad date ranges for their production. There are no detailed studies of pipe clay hair curlers currently available, but some preliminary research has been carried out and a basic sequence of development has been worked out (Le Cheminant 1982:345-354). An attempt has been made to assign date ranges to the five examples (Rutter & Davey 1980: 263-6). The eight items relating to personal grooming or hygiene are presented here ordered by their Strata Group associations.

STRATA GROUP II B

CMP 14 CX 254.05 SF# F27 CODE 07-04-062
LENGTH: 2.6 cm DIAMETER: at end, 1.4 cm, center 0.9 cm.
DESCRIPTION: Half of a kaolin hair or wig curler, handmade, with irregularly shaped enlarged end. Probably late 17th century (Rutter & Davey 1980:264, Fig.85,#1)(Le Cheminant 1982:348, Fig.1,#4&6).

CMP 14 CX 254.07 SF# F50 CODE 07-04-017
LENGTH: 3.8 cm WIDTH 3.2 cm THICKNESS 0.3 cm
DESCRIPTION: Fragment of bone comb with fine teeth on one side and coarse teeth on the other. This is a style of comb for which the TPQ is at least as early as the Medieval period.

STRATA GROUP III

CMP 63 CX 102.03 SF# F51 CODE 07-04-132 PLATE VIII-11
LENGTH: 6.2 cm WIDTH 4.8 cm THICKNESS 0.2 cm
DESCRIPTION: Two mending fragments of Elephant ivory comb with fine teeth one side and coarse teeth on the other. Date range as for #F50. It is very similar to the one shown in Baart et al (1977:131), both in form and size. This type is common in the Netherlands from the 15th century.

CMP 63 CX 102.03 SF# F84 CODE 07-04-062 PLATE VIII-10
LENGTH 3.2 cm DIAMETER AT END 1.6 cm CENTER 1.1 cm
DESCRIPTION: Half of a kaolin hair or wig curler, hand-made with roughly shaped slightly enlarged end. Probably late 17th or early 18th century (Rutter & Davey 1980: 264, Fig 85 #4).

CMP 63 CX 102.03 SF# F84 CODE 07-04-062 PLATE VIII-12
LENGTH: 4.7 cm DIAMETER AT END 1.9 cm CENTER 1.3 cm.
DESCRIPTION: Half of a kaolin hair or wig curler, hand-made with roughly shaped enlarged twisted and rounded end. Probably late 17th century (Rutter & Davey, 1980:264, Fig.85 #1).

STRATA GROUP IV A

CMP 11 CX 620 SF# F85 CODE 07-04-062 PLATE
LENGTH: 3.5 cm DIAMETER AT END 0.6 cm CENTER 0.8 cm
DESCRIPTION: Half of a kaolin hair or wig curler, machine-made with lathe turning marks visible on exterior, and a neatly trimmed end. Last half of the 18th century. (Le Cheminant 1982:349).

STRATA GROUP VIII

CMP 25 CX 016 SF# F86 CODE 07-04-003
LENGTH: 3.5 cm DIAMETER AT END 0.7 cm CENTER 1.1 cm
DESCRIPTION: Half of a kaolin hair or wig curler, possibly

machine made with neatly finished exterior, and a trimmed end with a small indentation. Probably mid 18th century. (Le Cheminant 1982:350, Fig 2,# 12).

STRATA GROUP IX

CMP 31 CX 453 SF# F53 CODE 07-04-017 PLATE VIII-17
LENGTH: 16.3 cm
DESCRIPTION: bone toothbrush made from a rib of a pig or a small deer. Probably 19th century.

PERSONAL GROUP: ORNAMENTS

with so much work on glass beads as trade items - it is very odd that you do not mention this in the text!

Seventy-three beads of various materials were the only items of personal ornamentation found during the excavation of the Broad Financial Center site. They were initially entered into the base using three codes:

07 05 (Personal Group: Ornaments)
06 02 (Clothing Group: Ornaments)
10 08 (Prehistoric Group: Ceremonial/Ornamental)

All three codes are included in this section. Of the total of 73 beads, 56 were wooden and came from one context, 11 were glass, 1 was ivory, and 5 were shell also from only one context. All the glass beads were classified utilizing the system devised by Kenneth and Martha Kidd and originally published in 1970 (Kidd & Kidd 1982:219-256). Attempts were made to date the glass trade beads by comparison with similar beads found on sites of known date ranges, and date ranges for several of the varieties are suggested. The 73 beads are presented below, ordered by their Strata Group Associations.

STRATA GROUP I A

CMP 2 CX 541 SF# F30 CODE 06-02-134 PLATE VIII-1
DESCRIPTION: One tubular glass bead of Kid type I b 13, size range large, with 3 opaque redwood stripes on an opaque pale blue background.

STRATA GROUP II A

CMP 13 CX 529 SF# F52 CODE 07-05-006
DESCRIPTION: 56 spherical wooden beads without any decoration. Average diameter ca. 0.7 cm. Possibly from a rosary.

STRATA GROUP II B

CMP 14 CX 254.05 SF# F76 CODE 06-02-078 PLATE VIII-6
DESCRIPTION: One round glass bead of Kidd type W I b 7, size range medium, of translucent amber color. Exhibits end wear typical of beads strung on necklaces (Karklins 1982:111).

CMP 38 CX 397.01 SF# F35 CODE 10-08-089 PLATE VIII-6
DESCRIPTION: Five tubular shell beads or bead fragments (wampum). Best preserved example is 0.4 cm long with a diameter of 0.3 cm.

CMP 38 CX 397.01 SF# F48 CODE 07-05-078 PLATE VIII-6
DESCRIPTION: One tubular glass bead of Kidd type I a 18, size range small, of translucent ultramarine color. Kidd type I a 18 beads occur on Susquehanna sites in Pa. from 1645 to 1743 (Kent 1982:79-81), and at Fort Orange, Albany, New York from 1647 to 1676 (Huey 1982:87,96), which suggests a date range of mid 17th through mid 18th century.

CMP 38 CX 397.01 SF#F49 CODE 07-05-078 PLATE VIII-6
DESCRIPTION: One round glass bead of Kidd type II a 22, size range very small, of opaque mustard tan color.

CMP 62 CX 209.03 SF# F77 CODE 06-02-078
DESCRIPTION: One tubular glass bead of Kidd type I a 5, size range large, of opaque white color. Kidd type I a 5 beads occur on Seneca sites in New York from 1570 to 1820 (Wray 1982:40-47), and on Ontario sites from 1600 to 1620 (Kenyon & Kenyon 1982:60), which suggests a date range of late 16th through early 19th centuries.

CMP 76 CX 012 SF# F170 CODE 07-05-078
DESCRIPTION: Two round glass beads, on of Kidd type II a 40, and size range small, of opaque robin s egg blue color; and on of Kidd type II a 43, size range small of opaque bright blue color. Kidd type II a 40 beads occur on sites in Ontario from 1550 to 1650 (Kenyon & Kenyon 1982:60), on Seneca sites in New York from 1560 to 1687 (Wray 1982:40-47) and on Chesapeake Bay sites in Maryland from 1638 to 1720 (Miller et al 1982:137). Kidd type II a 40 and 43 beads have been found at the St. John's Chancellor s Point and Village Center sites at St. Mary's City, Maryland. At St. John's, they came from pre 1660 contexts, and at least one of the Village Center Kidd type II a 40 beads was in association with a contact period aboriginal but not in use just after 1634 (Miller 1983:33,103). Kidd type II a 43 beads occur on Seneca sites in New York from 1710 to 1745 (Wray 1982:40-47). This information indicates a date range of mid-sixteenth through early eighteenth centuries for Kidd type II a 40 beads, and a date range of mid-seventeenth to mid-eighteenth century for Kidd type II a 43 beads. However, the two varieties are so close in appearance that a general date range of mid sixteenth through mid eighteenth centuries appears warranted for both Kidd type II a 40 and 43 beads.

STRATA GROUP IV A

CMP 21 CX 144 SF# F28 CODE 06-02-078
DESCRIPTION: One round glass bead of Kidd type II bb'*, size range very large, with decoration consisting of three

compound stripes of bright blue on white, six simple redwood stripes and three simple yellow stripes, all on an opaque black body.

STRATA GROUP VI

CMP 34 CX 307 SF# F1 CODE 07-05-132
DESCRIPTION: One tubular ivory bead approximately 0.5 cm in length and 0.2 cm in diameter, undecorated.

CMP 34 CX 516 SF# F74 CODE 06-02-078 PLATE VIII-14
DESCRIPTION: One tubular glass bead of Kidd type I a*, size range very large, of opaque mustard tan color.

CMP 34 CX 625 SF# F29 CODE 07-05-078 PLATE VIII-14
DESCRIPTION: One faceted glass bead of Kidd type WIIc*, of completely clear colorless glass, size range large.

STRATA GROUP IX

CMP 32 CX 420 SF# F75 CODE 07-05-078
DESCRIPTION: One tubular glass bead of Kidd type Iei, size range very large, of opaque redwood color.

PERSONAL GROUP: OTHER PERSONAL ITEMS

Only one artifact classified as on "other personal item" was found during the excavation of the Broad Financial Center site. presented below.

STRATA GROUP VII

CMP 24 CX 342 SF# F164 CODE 07-06-026 PLATE VIII-15
LENGTH: 1.4 cm WIDTH 1.2 cm THICKNESS 0.2 cm
WEIGHT: 4.2 gr.
DESCRIPTION: Small rectangle of Copper alloy with stamped "S" and "A" on obverse. No decoration on reverse. Possibly a weight, similar to some described in the wreck of the ship WASA, 1628 (Huey, pers.comm. 1984).

GROUP ACTIVITIES: LEISURE

A total of 42 artifacts suggesting use for leisure activities were recovered from the Broad Financial Center site. T presented here ordered by Strata Group. They ranged in size from 1.1 cm to 3.9 cm in diameter with 34 measuring from 1.4 to 1.6 cm.

STRATA GROUP I A

CMP 6 CX 127 SF# F87 CODE 09-03-047
DIAMETER: 1.4 cm
DESCRIPTION: Earthenware marble, brown exterior.

CMP 6 CX 601 SF# F88 CODE 09-03-003
DIAMETER: 1.4 cm
DESCRIPTION: Earthenware marble, with orange-brown marbling on surface.

STRATA GROUP I D

CMP 4 CX 621 SF# F103 CODE 09-03-003
DIAMETER: 1.3 cm
DESCRIPTION: Earthenware marble, roughly made, brown exterior.

STRATA GROUP II A

CMP 13 CX 529 SF# F102 CODE 09-03-134
DIAMETER: 1.3 cm
DESCRIPTION: Stoneware marble with brown salt-glazed exterior.

STRATA GROUP II B

CMP 14 CX 254.05 SF# F101 CODE 09-03-003
DIAMETER: 1.5 cm
DESCRIPTION: Earthenware marble with mottled tan and gray exterior.

CMP 38 CX 397.01 SF# F3 CODE 09-03-003 PLATE VIII-7
DIAMETER: 3.3 CM
DESCRIPTION: Stoneware marble with brown salt-glazed exterior.

CMP 38 CX 397.01 SF# F4 CODE 09-03-003 PLATE VIII-7
DIAMETER: 3.0 cm
DESCRIPTION: Earthenware marble with part brown part orange exterior.

CMP 38 CX 397.01 SF# F5 CODE 09-03-003 PLATE VIII-7
DIAMETER: 2.8 cm
DESCRIPTION: Earthenware marble with mottled black and brown manganese glazed exterior.

CMP 38 CX 397.01 SF# F6 CODE 09-03-002 PLATE VIII-7
DIAMETER: 1.4 cm
DESCRIPTION: Stoneware marble with gray salt-glazed exterior.

CMP 38 CX 397.01 SF# F7 CODE 09-03-003
DIAMETER: 1.4 cm
DESCRIPTION: Earthenware marble with mottled gray and black exterior.

CMP 38 CX 397.01 SF# F8 CODE 09-03-003
DIAMETER: 1.3 cm
DESCRIPTION: Earthenware marble with light brown exterior.

CMP 38 CX 397.01 SF# F9 CODE 09-03-003
DIAMETER: 1.4 cm
DESCRIPTION: Earthenware marble with brown exterior

CMP 38 CX 397.01 SF# F10 CODE 09-03-003
DIAMETER: 1.4 cm
DESCRIPTION: Earthenware marble with brown exterior

CMP 38 CX 397.01 SF# F11 CODE 09-03-003
DIAMETER: 1.4 cm
DESCRIPTION: Earthenware marble with mottled orange and brown exterior.

CMP 38 CX 397.01 SF# F12 CODE 09-03-003
DIAMETER: 1.4 cm
DESCRIPTION: Earthenware marble with brown exterior slightly mottled with orange.

CMP 38 CX 397.01 SF# F13 CODE 09-03-003
DIAMETER: 1.5 cm
DESCRIPTION: Earthenware marble with mottled grey and orange exterior.

CMP 38 CX 397.01 SF # F14 CODE 09-03-003
DIAMETER: 1.5 cm
DESCRIPTION: Earthenware marble with brown exterior.

CMP 38 CX 397.01 SF# F15 CODE 09-03-003
DIAMETER: 1.5 cm
DESCRIPTION: Earthenware marble with mottled orange and brown exterior.

CMP 38 CX 397.01 SF# F16 CODE 09-03-003
DIAMETER: 1.5 cm
DESCRIPTION: Earthenware marble with grey brown exterior.

CMP 38 CX 397.01 SF# F17 CODE 09-03-003
DIAMETER: 1.4 cm
DESCRIPTION: Earthenware marble with brown exterior.

CMP 38 CX 397.01 SF# F18 CODE 09-03-003
DIAMETER: 1.5 cm
DESCRIPTION: Earthenware marble with mottled brown and dark brown exterior.

CMP 38 CX 397.01 SF# F19 CODE 09-03-003 PLATE VIII-7
DIAMETER: 1.1 cm
DESCRIPTION: Earthenware marble with mottled orange and brown exterior.

CMP 62 CX 209.06 SF# 46 CODE 09-03-003 PLATE VIII-8
DIAMETER: 2.9 cm THICKNESS 0.5 cm
DESCRIPTION: Circular gaming piece made from reused body sherd of clear lead glazed red earthenware.

CMP 62 CX 209.06 SF# 47 CODE 09-03-003 PLATE VIII-8
DIAMETER: 2.1 cm THICKNESS 0.5 cm
DESCRIPTION: Circular gaming piece made from re-used body sherd of clear lead glazed red earthenware.

CMP 76 CX 019 SF# 105 CODE 09-03-002
DIAMETER: 1.4 cm
DESCRIPTION: One stoneware Marble and one stoneware marble fragment. with gray to dark gray exteriors.

CMP 76 CX 019 SF# 106 CODE 09-03-002
DIAMETER: 3.9 cm
DESCRIPTION: Stoneware marble fragment with gray fabric and brown exterior.

STRATA GROUP III

CMP 52 Cx 602 SF# F99 CODE 09-03-003
DIAMETER: 1.4 cm
DESCRIPTION: Earthenware marble with mottled gray brown and white exterior.

CMP 63 CX 102.02 SF# 89 CODE 09-03-047
DIAMETER: 1.3 cm
DESCRIPTION: Earthenware marble with brown exterior

CMP 63 CX 102.03 SF# 90 CODE 09-03-047
DIAMETER: 1.4 cm
DESCRIPTION: Earthenware marble with mottled brown and orange exterior.

CMP 63 CX 102.03 SF# 91 CODE 09-03-047
DIAMETER: 1.4 cm
DIAMETER: Earthenware marble with tan exterior.

CMP 63 CX 102.03 SF# 92 CODE 09-03-047
DIAMETER: 1.3 cm
DESCRIPTION: Earthenware marble with mottled brown and tan exterior.

CMP 63 CX 102.04 SF# 93 CODE 09-03-047
DIAMETER: 2.6 cm
DESCRIPTION: Stoneware marble fragment with brown salt-glazed exterior and gray fabric.

STRATA GROUP IV B

CMP 15 CX 520.03 SF# F31 CODE 09-03-047
DIAMETER: 1.6 cm
DESCRIPTION: Earthenware marble with 2 hand painted brown floral patterns on yellow slip background and thin light gray line around the circumference.

STRATA GROUP VI

CMP 34 CX 366 SF# F94 CODE 09-03-002
DIAMETER: 1.6 cm
DESCRIPTION: Earthenware marble with mottled brown and orange exterior.

CMP 34 CX 374 SF# F95 CODE 09-03-134
DIAMETER: 1.4 cm
DESCRIPTION: Earthenware marble with mottled brown and black glaze(?) over beige fabric.

CMP 34 CX 376 SF# F96 CODE 09-03-003
DIAMETER: 1.4 cm
DESCRIPTION: Earthenware marble with mottled brown and orange fabric covered in places by a little dark brown glaze.

CMP 34 CX 516 SF# F97 CODE 09-03-003
DIAMETER: 1.6 cm
DESCRIPTION: 2 Earthenware marble fragments, mending, with white fabric and exterior.

CMP 34 CX 583 SF# F98 CODE 09-03-134
DIAMETER: 1.4 cm
DESCRIPTION: Stoneware marble with brown glaze over gray fabric.

CMP 68 CX 110 SF# 100 CODE 09-03-047
DIAMETER: 1.4 cm
DESCRIPTION: Stoneware marble with very light unglazed exterior.

STRATA GROUP VII

CMP 24 CX 342 SF# F104 CODE 09-03-047
DIAMETER: 1.5 cm
DESCRIPTION: Earthenware marble with mottled brown and gray exterior, probably glazed, now rather eroded.

ACTIVITIES GROUP: FISHING GEAR

Two items of fishing gear were recovered from the Broad St site. They are presented here in Strata Group order.

STRATA GROUP II B

CMP 14 CX 254 SF# F109 CODE 09-04-034 PLATE VIII-4
DIAMETER: 2.0 cm THICKNESS 1.5 cm WEIGHT 21.9 gr
DESCRIPTION: Lead fishing sinker, spherical with hole pierced through, mold flange visible on exterior, one end somewhat broken.

STRATA GROUP VIII

CMP 28 CX 197.01 SF# F108 CODE 09-04-034
DIAMETER: 1.9 cm THICKNESS 1.5 cm WEIGHT 26.0 gr
DESCRIPTION: Lead fishing sinker, spherical with hole pierced through, mold flange visible on exterior.

ACTIVITIES GROUP: MILITARY OBJECTS

Only one military object was recovered from the excavation of the Broad Financial Center site. It is described here.

STRATA GROUP III

CMP 63 CX 102.01 SF# F128 CODE 09-13-026 PLATE VIII-11
DIMENSIONS: WIDTH 6.1 cm LENGTH 6.9 cm THICKNESS 0.4 cm
DESCRIPTION: A copper alloy sword part, decorated with molded heraldric decorations on both sides, now too corroded to decipher. A "shell" guard from a small sword, probably dating to the early 18th century. American examples are known from 1722, 1725 and 1740 (Peterson 1956:265-6, Pl. 259-61).

SUMMARY:

A grand total of 236 small finds from the Broad Financial Center site, representing 16 different categories within the NPS taxonomy, were analyzed and described. A chart has been prepared listing the numbers of finds from the various NPS taxonomic categories by their Strata Group associations and it is presented here as Table VIII. For the purpose of assembling this table, all groups of similar finds from the same component were treated as individual finds unless they were mending fragments of the same object, in which case they were treated as on item. The only exception to this rule was that any groups of pin or needle fragments from the same context were treated as one item. Concentrations of small finds occurred in the following: Strata Groups: II a, II b, III, IV b and VI. The 60 finds in Strata Group IIa were almost exclusively from CMP 13, the north barrel in lot 8, where 56

wooden beads were found. The 52 small finds from Strata Group II b are primarily from three features: CMP 14, the south barrel in lot 8; CMP 38, the buried basket; and CMP 62, the barrel in lot 14. The finds in these three features were from various NPS taxonomic categories, the only significant group being a small concentration of 17 items representing leisure activities from CMP 38. The 22 finds from Strata Group III were nearly all from CMP 63, the red brick cistern in lot 14, with the remainder from components associated with building D. The 28 small finds from Strata Group IV b came primarily from CMP 15, the oval yellow brick cistern in Lot 8. There were 44 small finds from Strata Group VI, but these are not seen as a significant concentration because nearly all were from Components 34 and 35. These deposits consisted of redeposited building debris and stone rubble, and hence cannot be interpreted as primary deposits from any particular time period. In conclusion, it can be seen that the major concentrations of small finds on the Broad Financial Center site were FROM the fills of the features: The basket, the brick cisterns, and the barrel privies.

COMPARISON OF BUTTON DATE RANGES

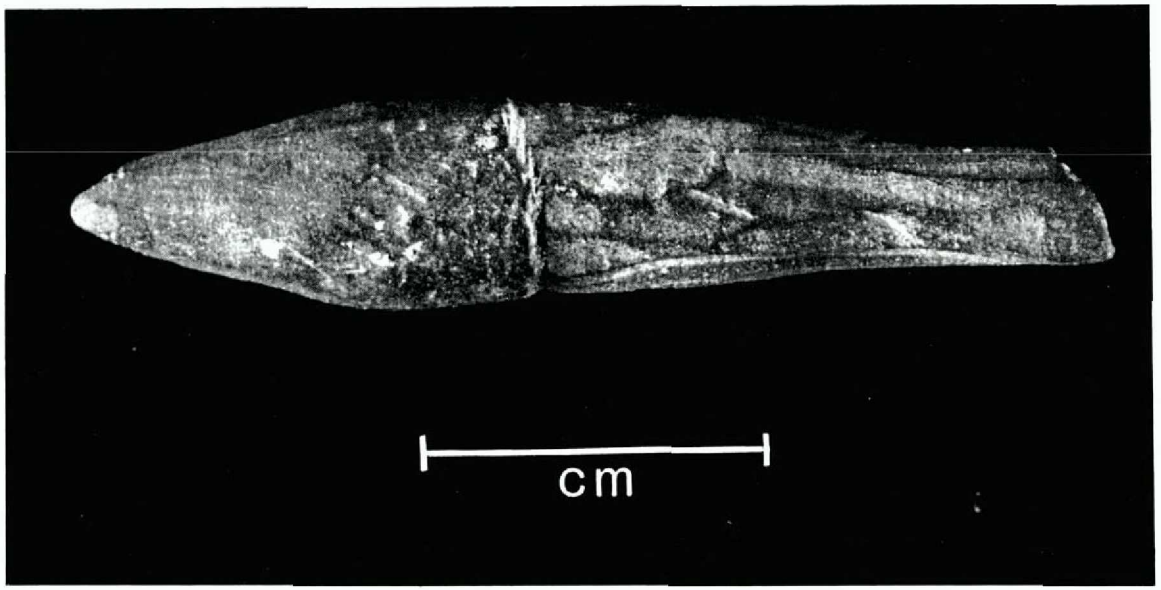
Olsen (1963)		South (1964)	
Type	Date range	Type	Date range
B	1700-1780	3	1726-1776
C	1760-1790	8	1726-1776
D	1760-1785	7	1726-1865
E	1750-1812	11	1726-1865
G	1785-1800	9	1726-1776
J	1750-1830	19	1750-1865
K	1800-1860	30	1837-1865

TABLE VIII: 1

TABLE : BROAD STREET SMALL FINDS BY STRATA GROUP

N.P.S. Categories	Ia	Ib	Ic	Id	IIa	IIb	III	IVa	IVb	Va	Vb	VI	VII	VIII	IX	X	XI	Totals
Kitchenware/ Tableware					1	3	4	1						2				11
Door/Window Hardware						3	2					1		2				8
Furniture Hardware						1						2						3
Lighting Devices						2						2						4
Arms, Projectiles						2			14			1	1					18
Arms, Accessories	1			1	1			1				2	1			1		8
Clothing Making & Repair						3	2		1			1	1					8
Clothing Fasteners	2			1	1	2	4	1	11			22	1	1	1		8	55
Coins	1											3					1	5
Writing Paraphenalia	1								1				2					4
Grooming & Hygiene						2	3	1					1		1			8
Beads	1				56	11		1				3			1			73
Other Personal													1					1
Leisure	2			1	1	22	6		1			7	1					41
Fishing Gear						1								1				2
Military Objects							1											1
Totals	8	0	0	3	60	52	22	5	28	0	0	44	9	6	3	1	9	250

Table VIII-2



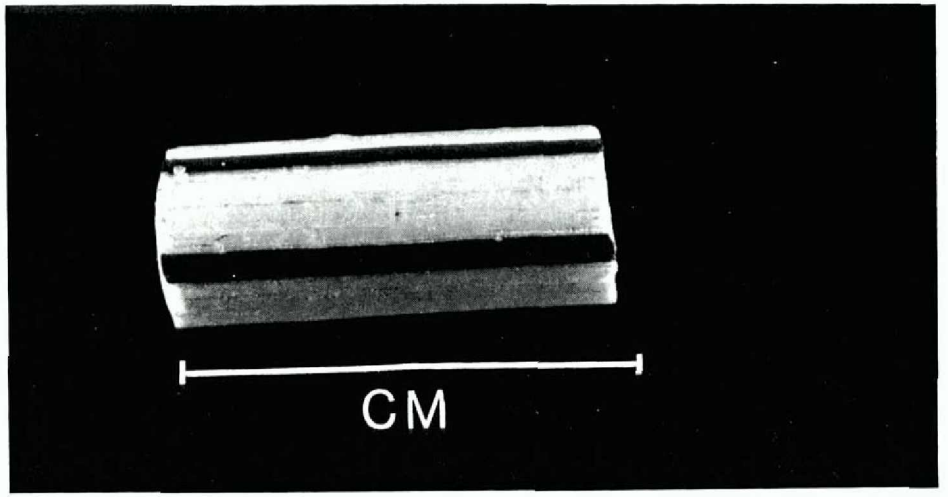
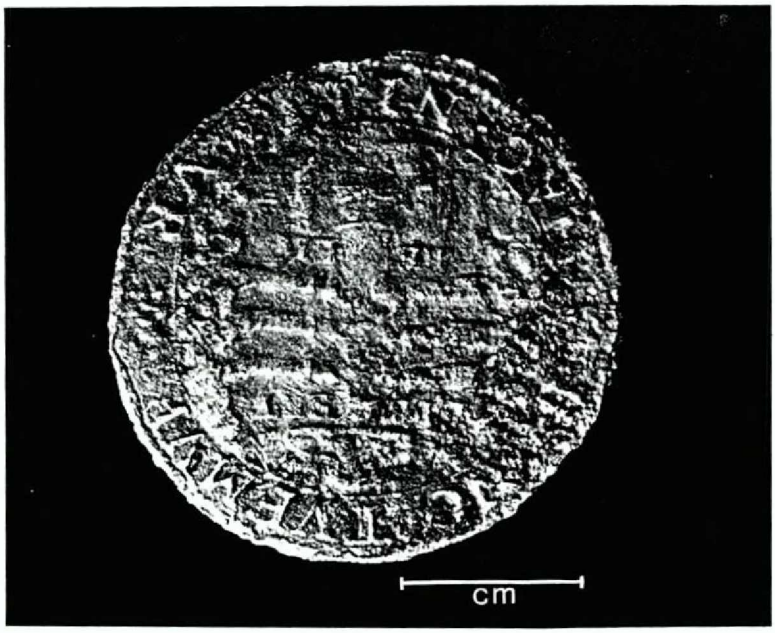


PLATE VIII-1



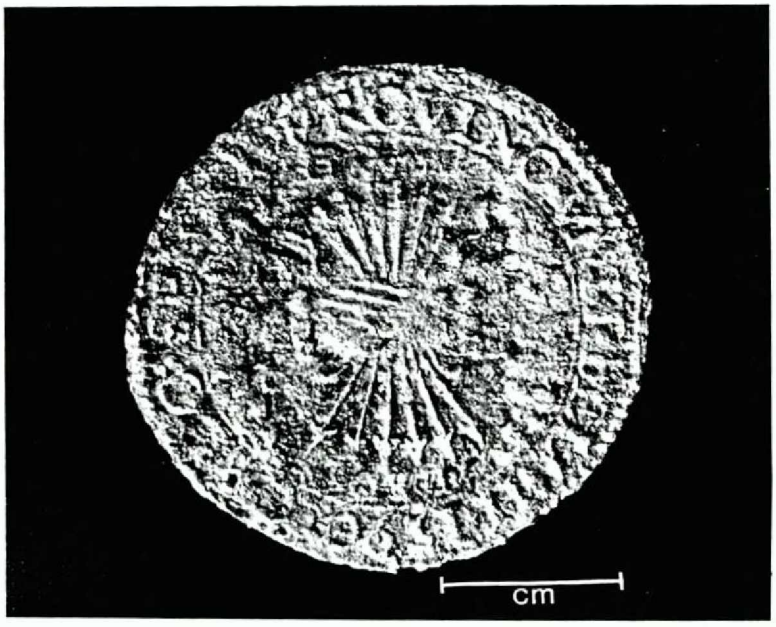


PLATE VIII-2

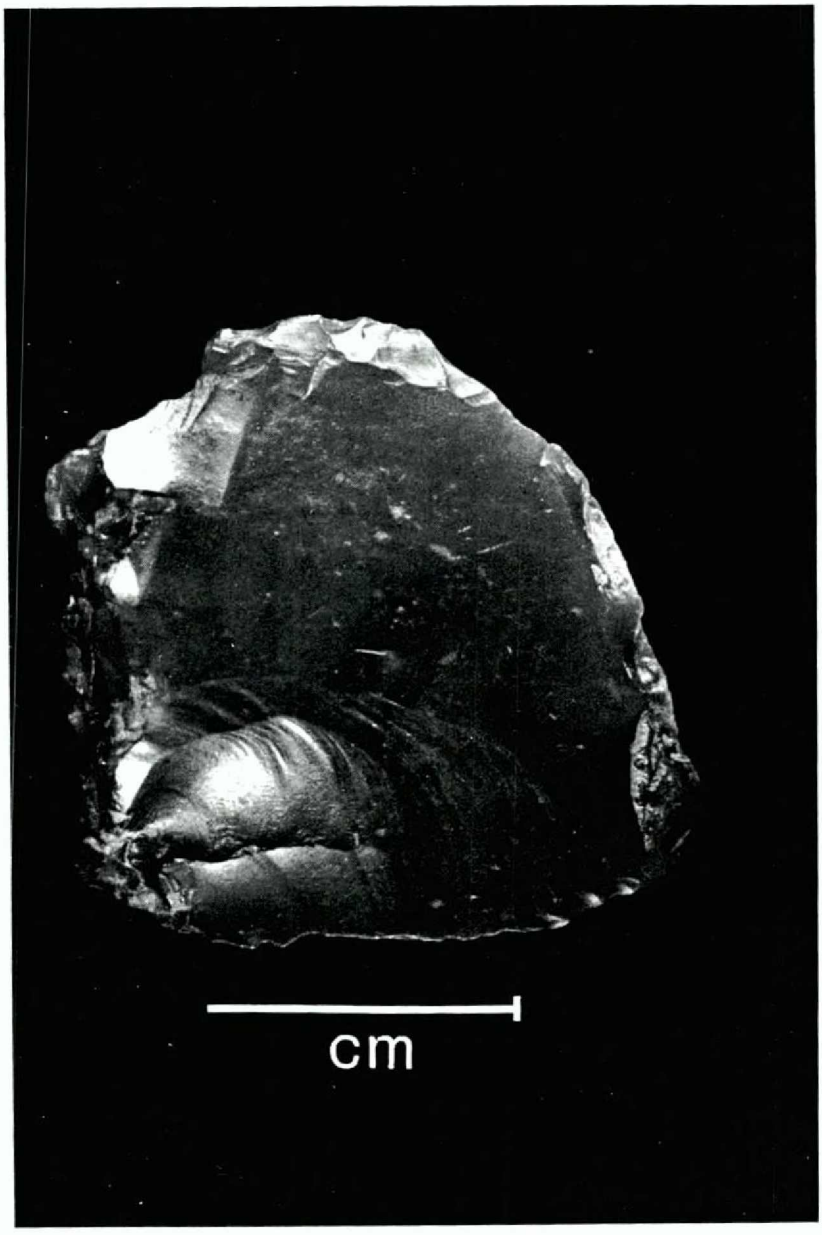
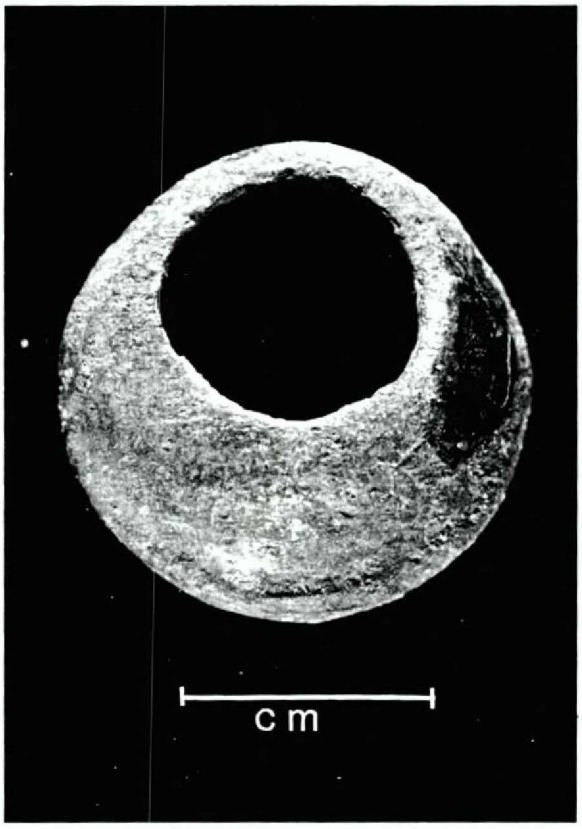
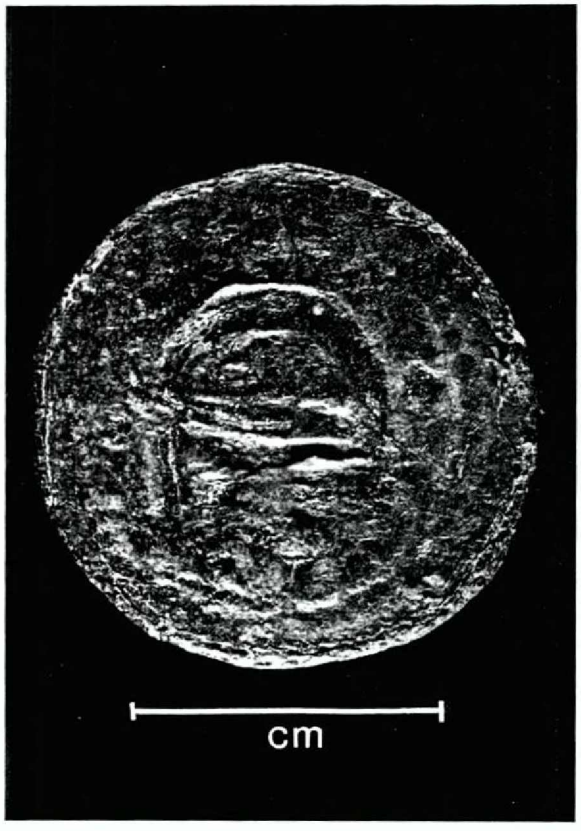


PLATE VIII-3





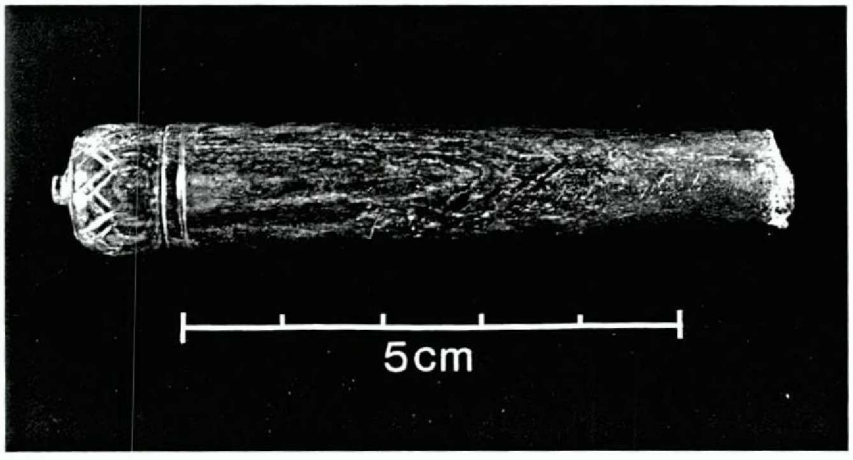
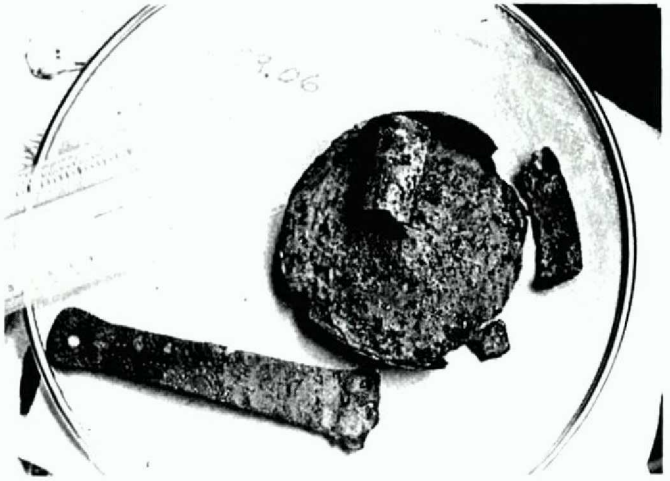
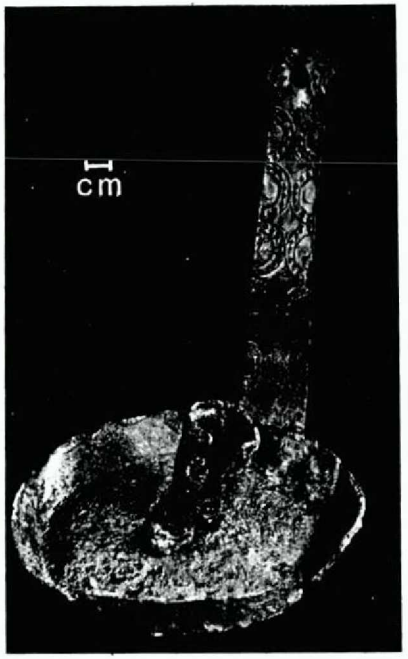
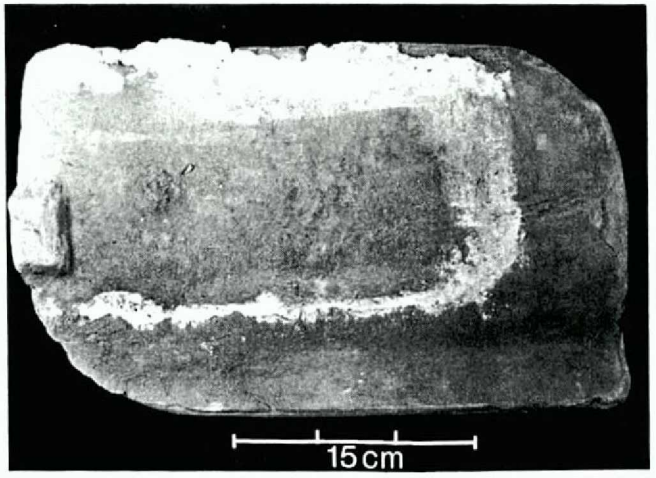


PLATE VIII-4







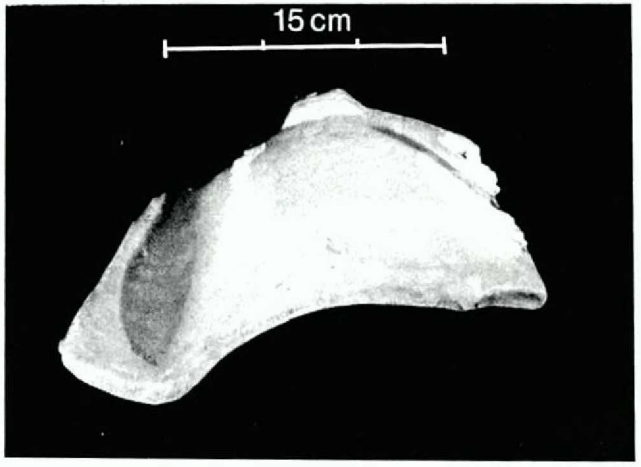
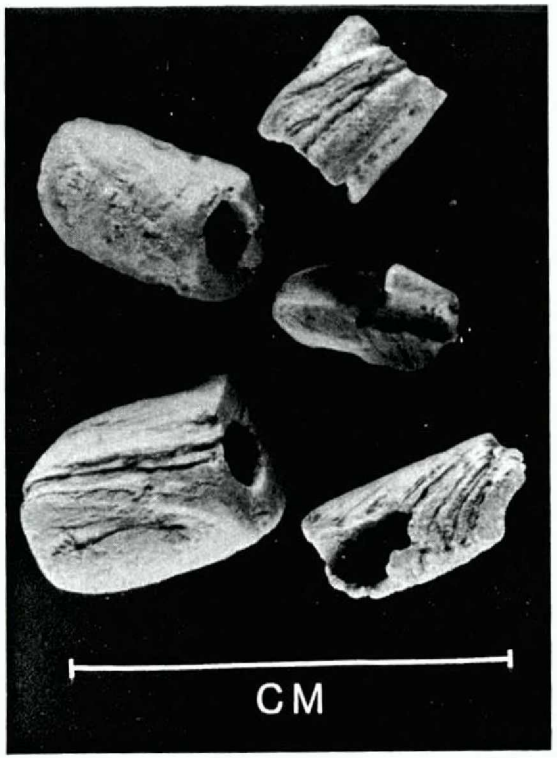
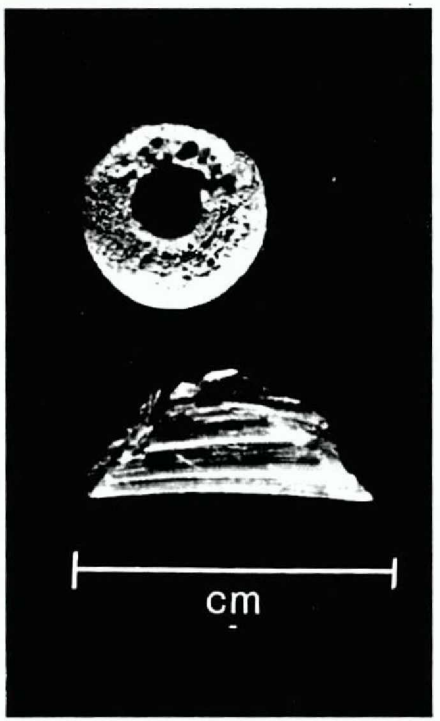


PLATE VIII-5





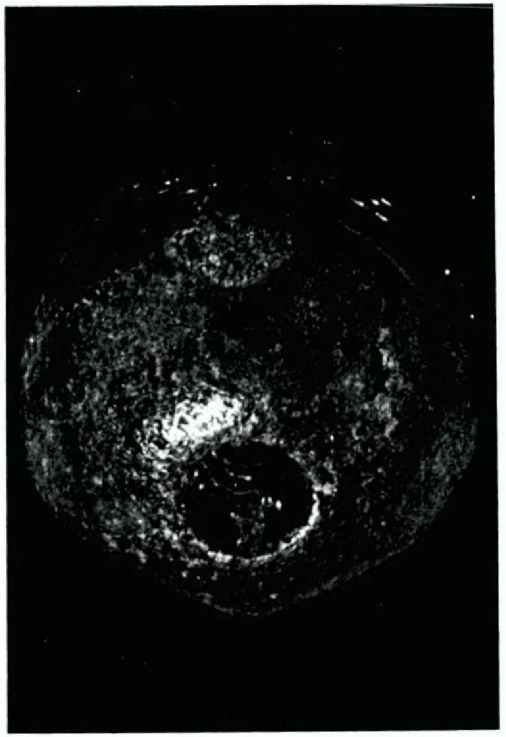
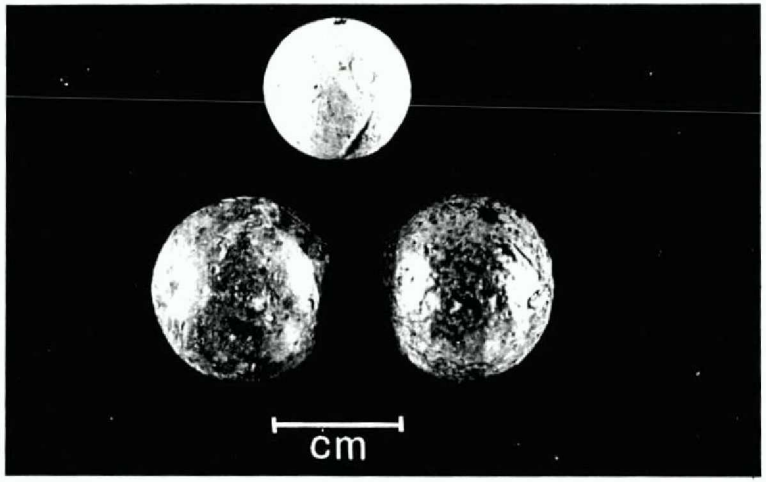
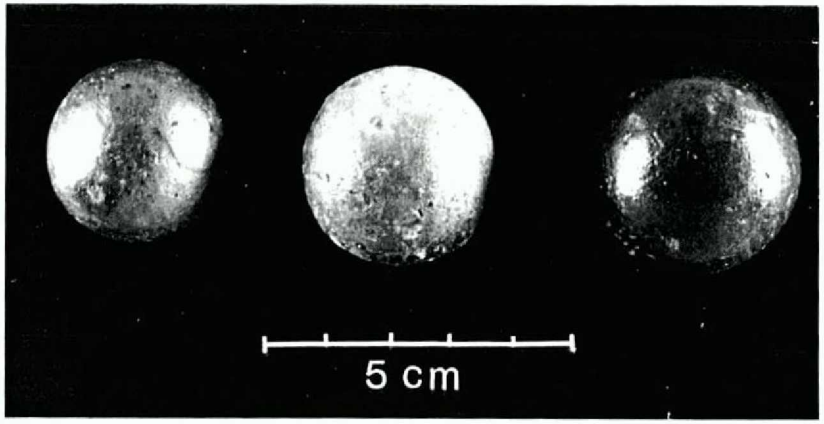


PLATE VIII-6





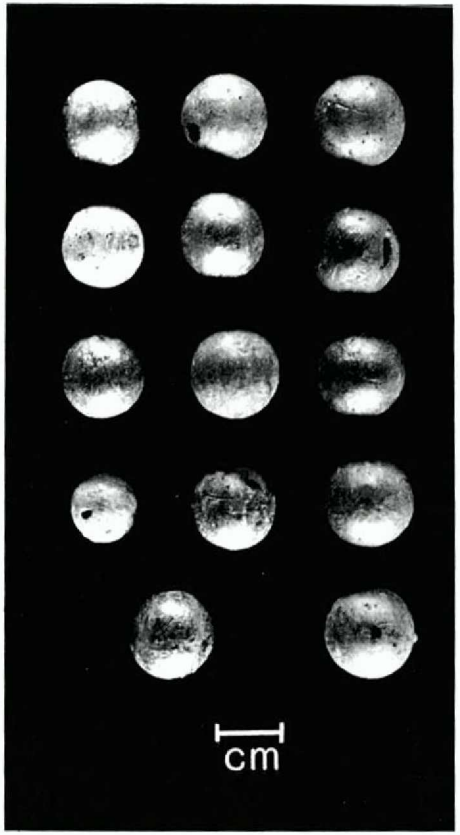
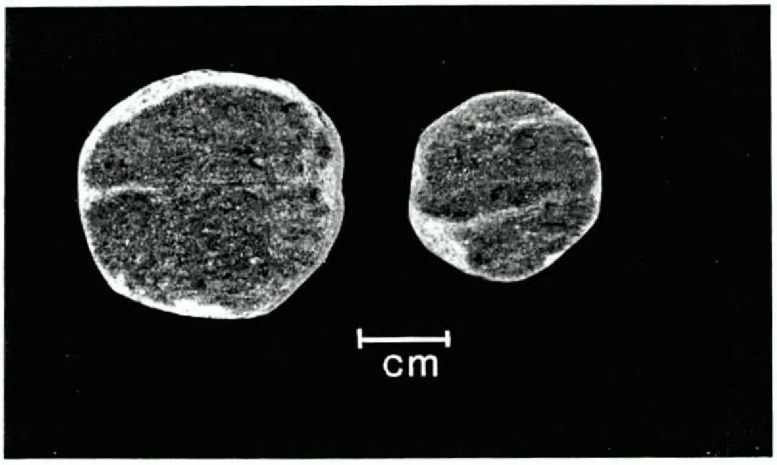
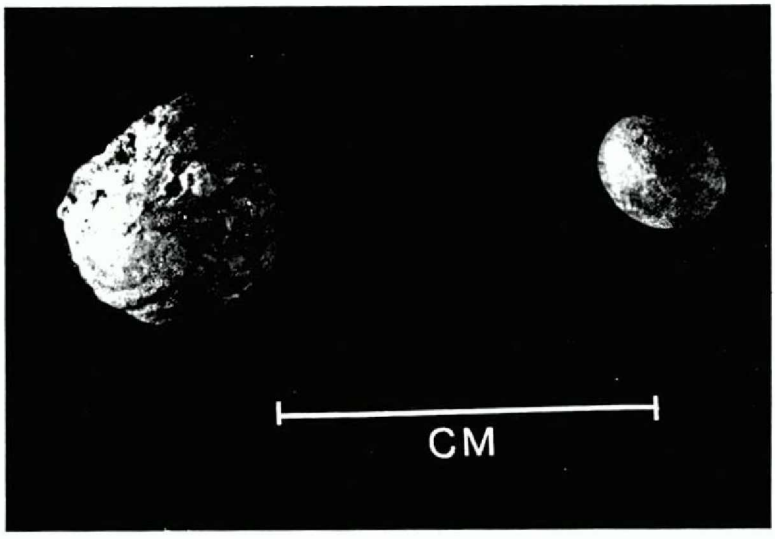


PLATE VIII-7





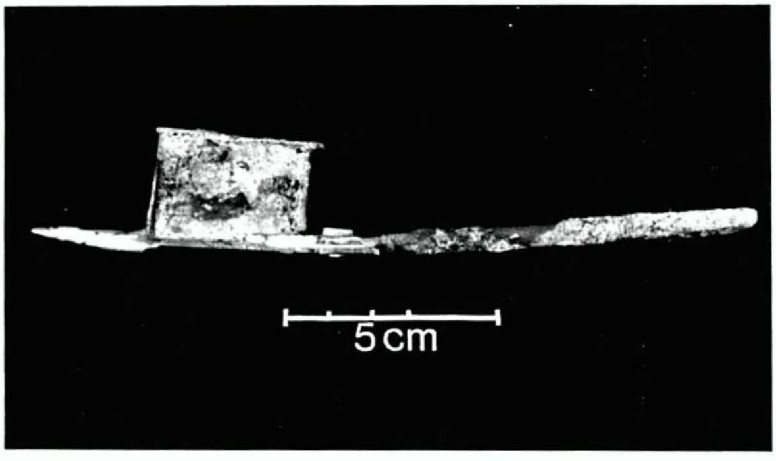
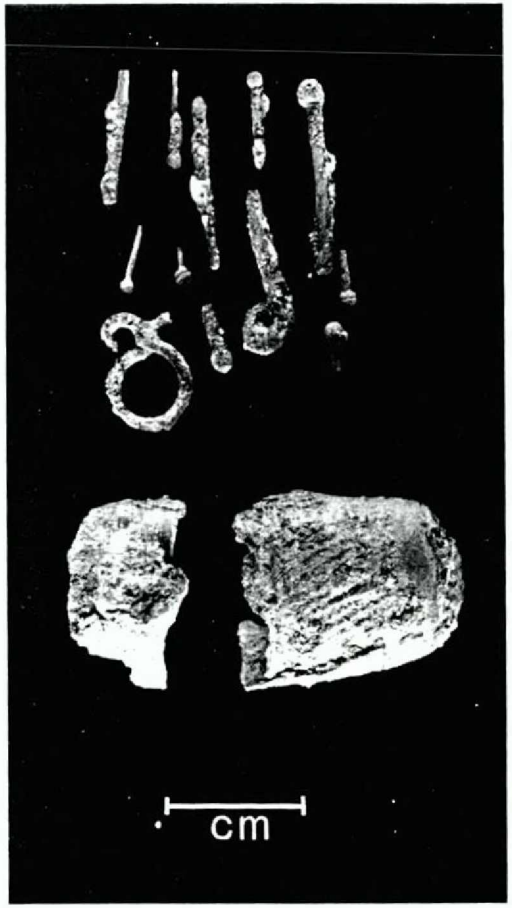
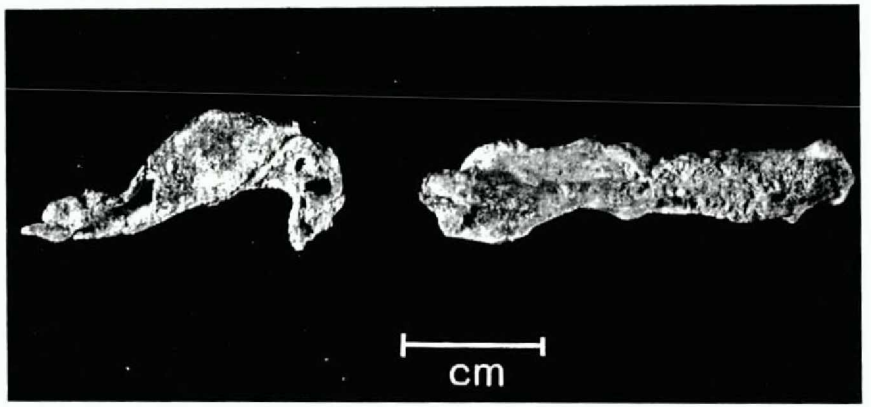


PLATE VIII-8





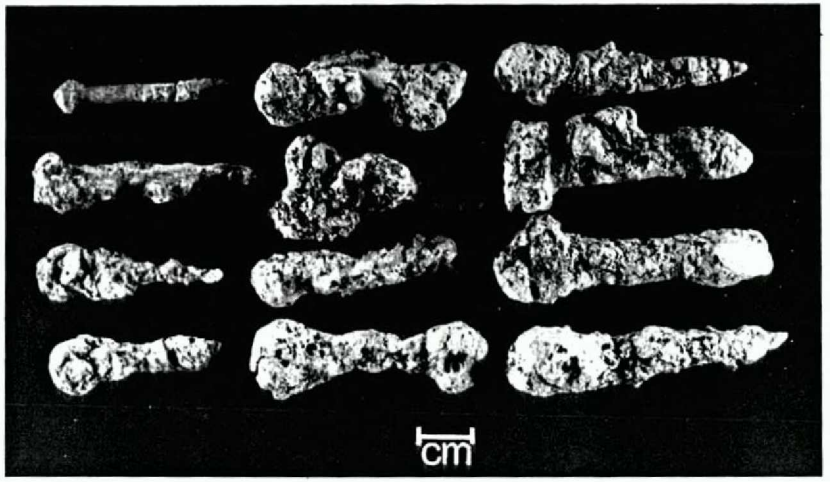
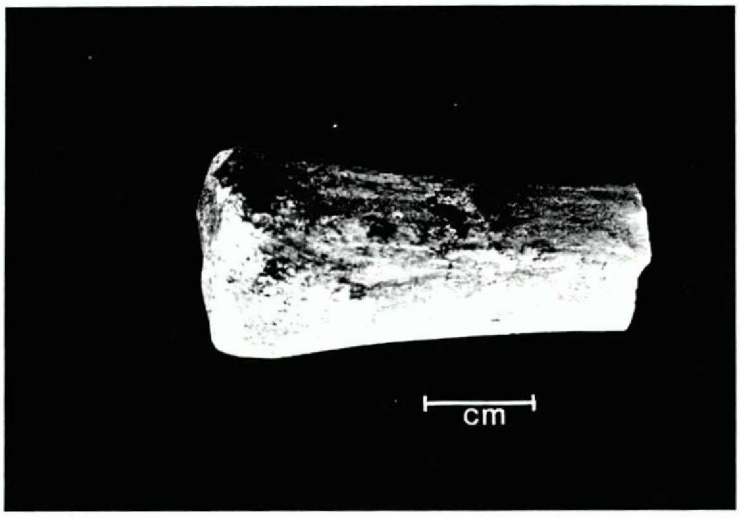


PLATE VIII-9



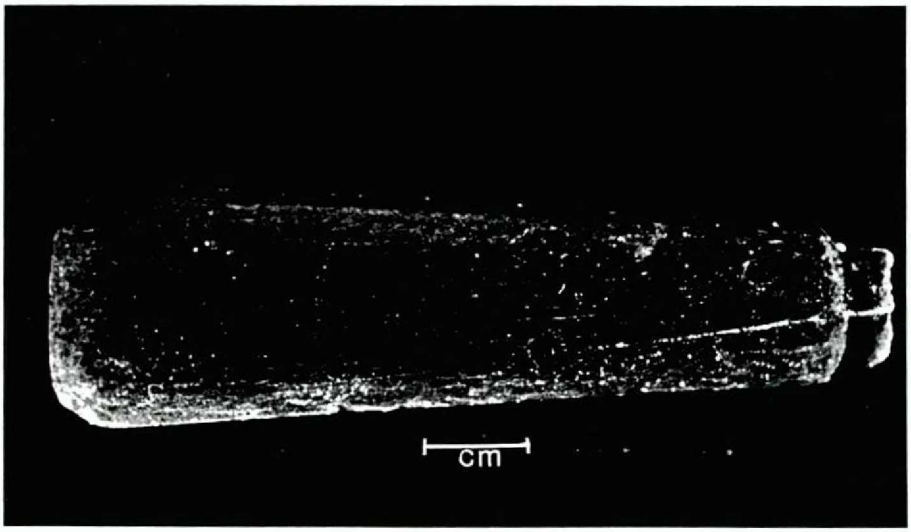


PLATE VIII-10

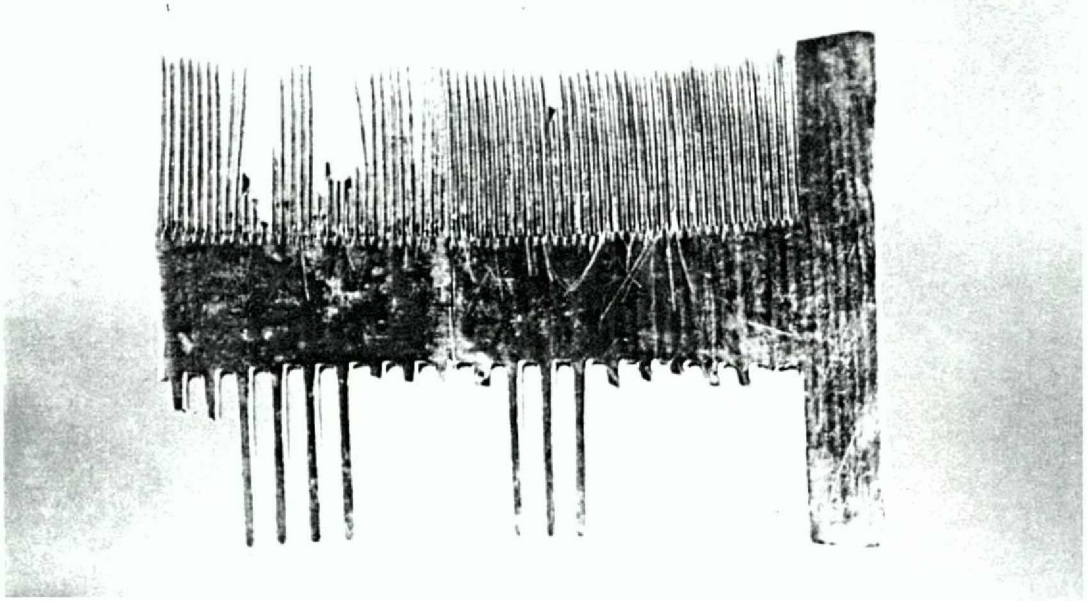
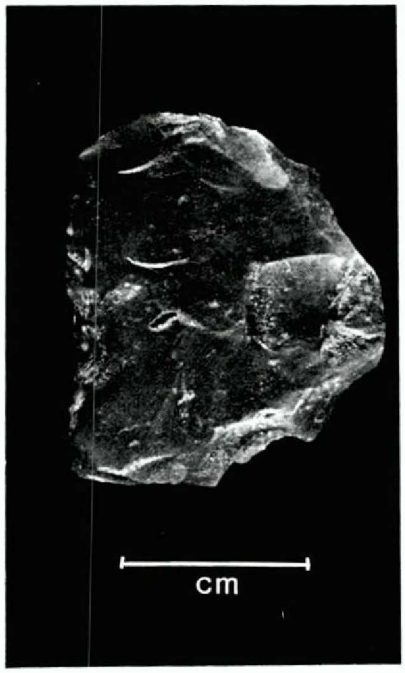
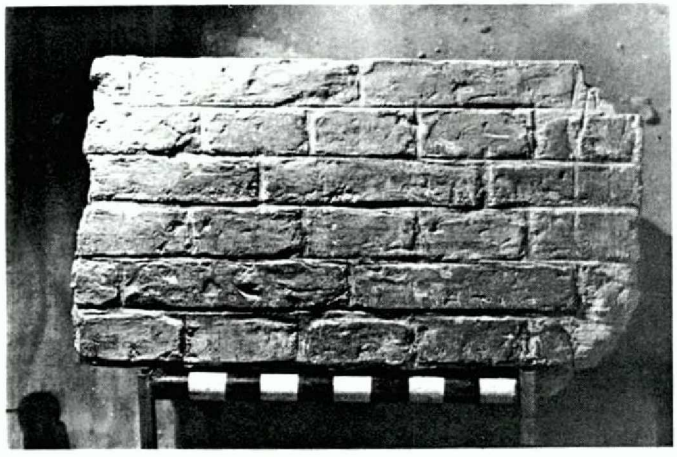
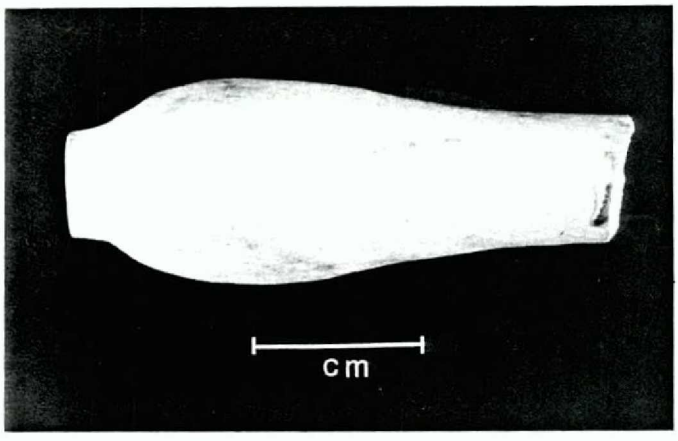


PLATE VIII-11







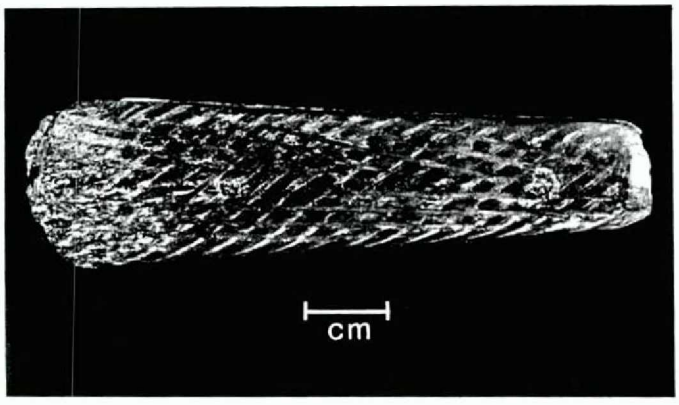
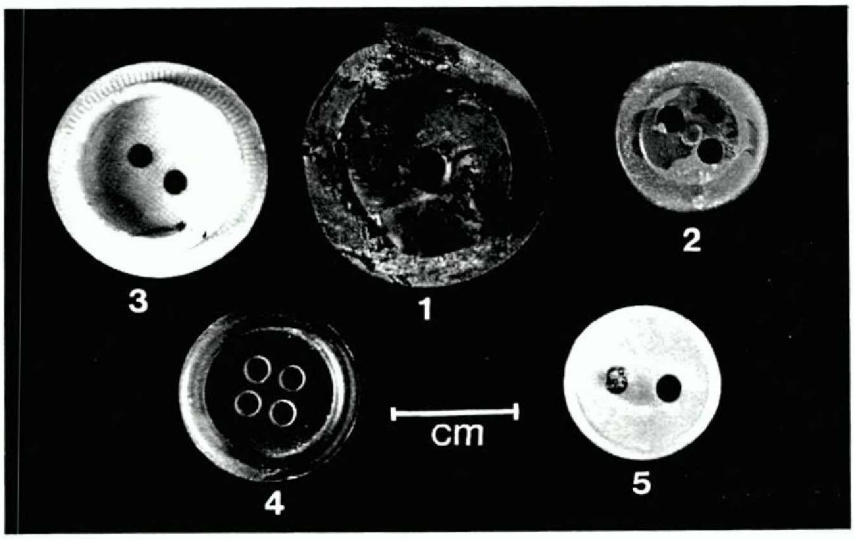


PLATE VIII-12



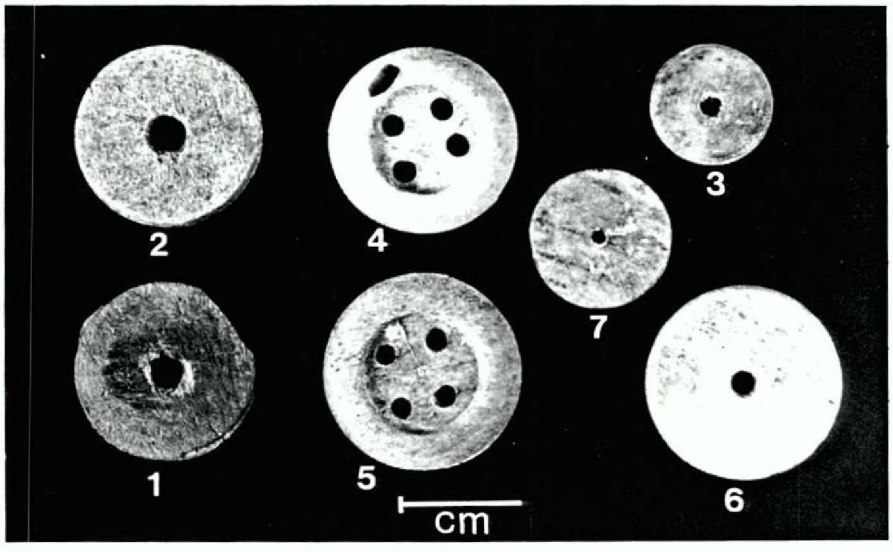
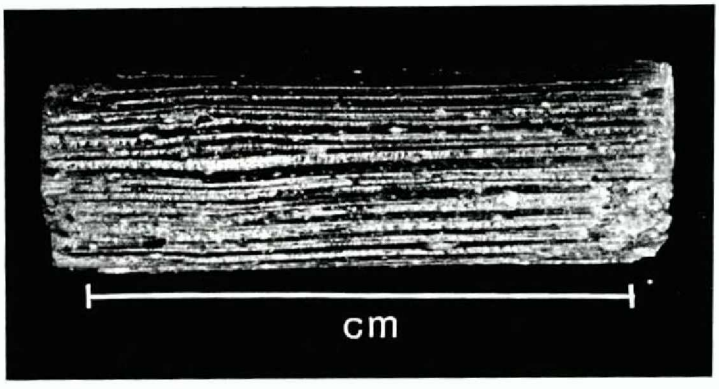
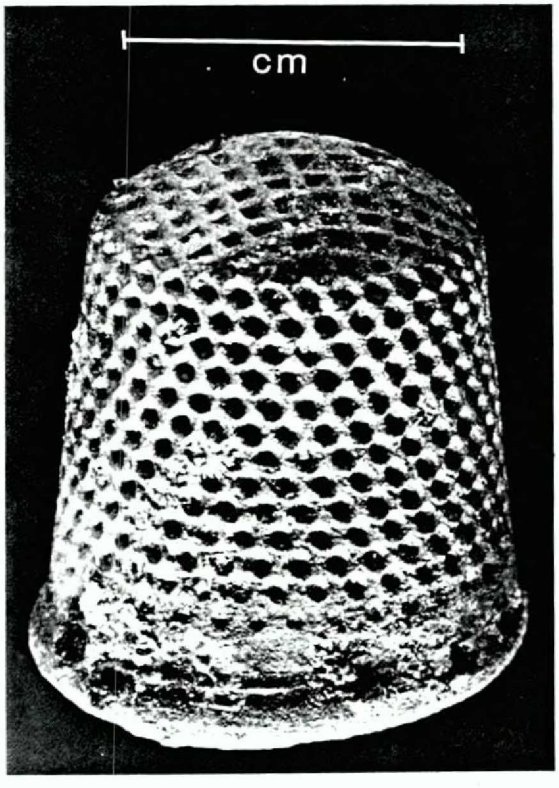


PLATE VIII-13





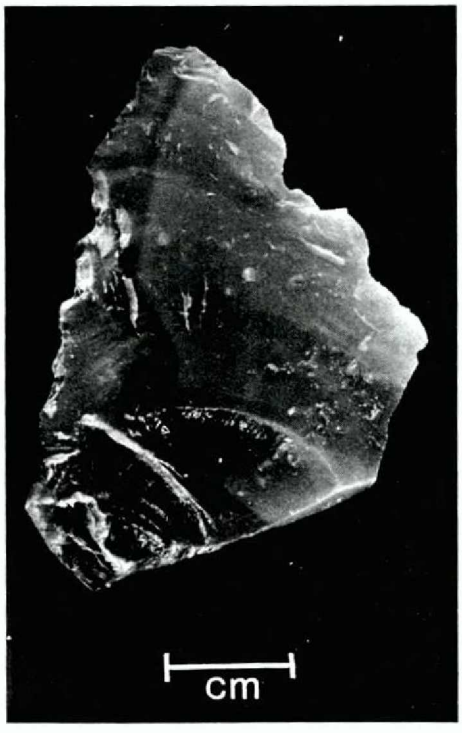
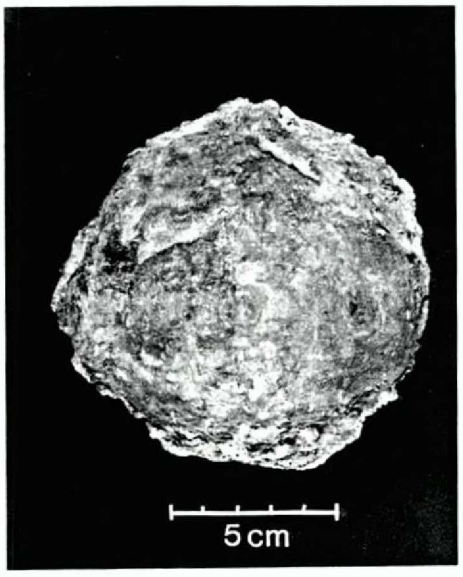


PLATE VIII-14



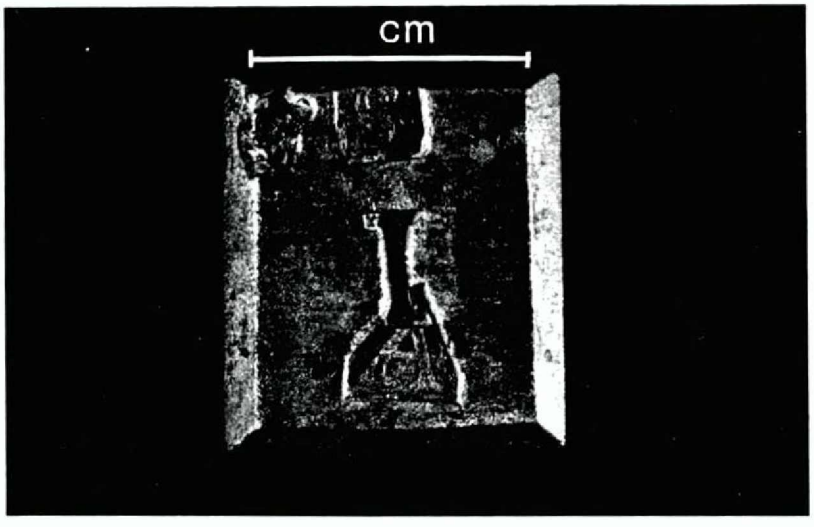
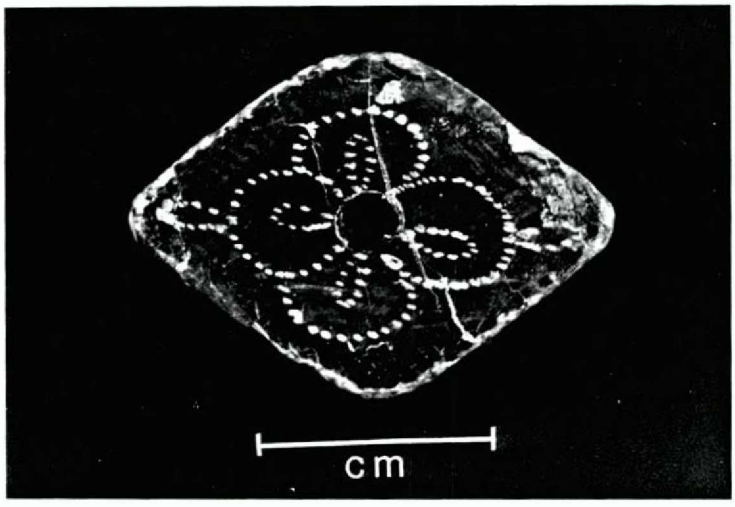
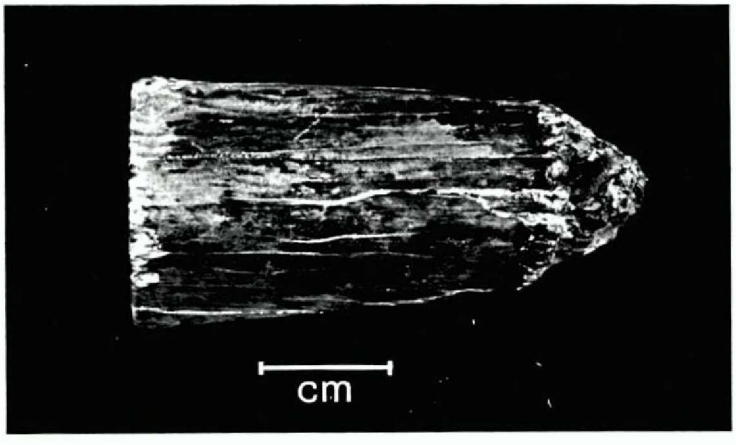


PLATE VIII-15





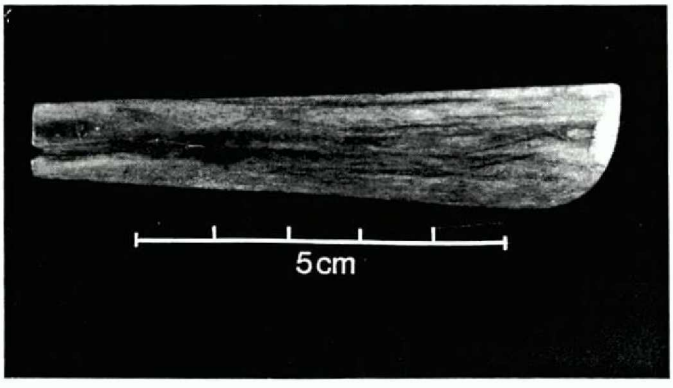


PLATE VIII-16

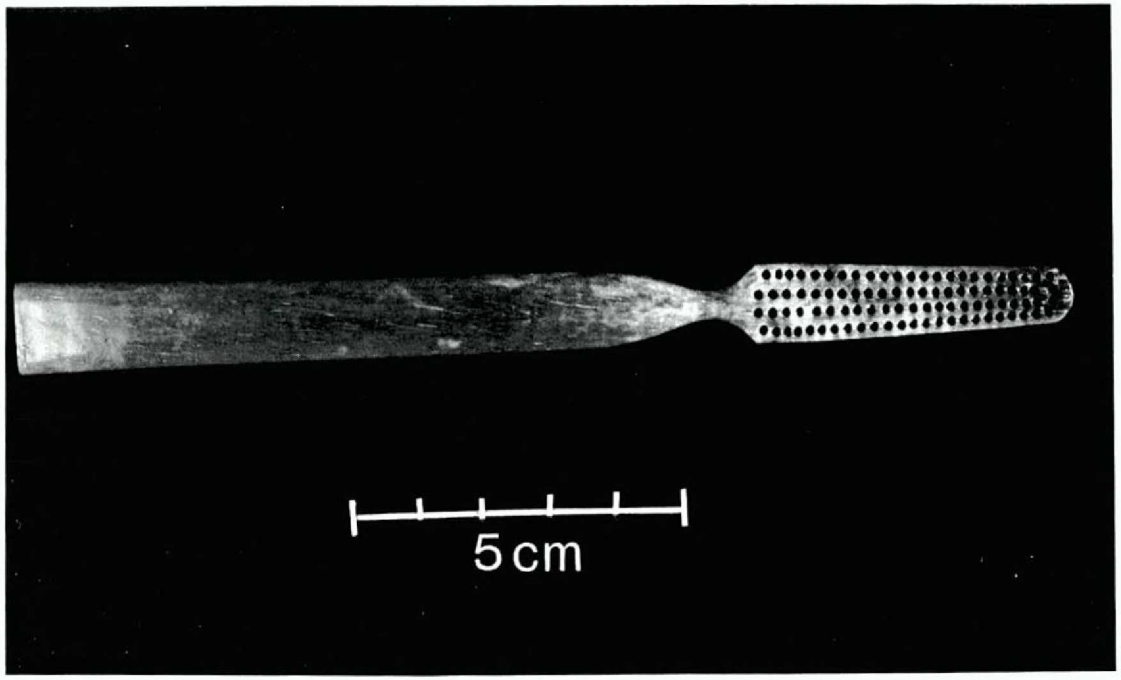


PLATE VIII-17

Zooarchaeological Analysis of the Broad Street Site, Lower Manhattan

by Haskel J. Greenfield

Dept. of Anthropology

Graduate Center, CUNY

I. Introduction

IA. This report details the analysis of the animal bones recovered from the 80 Broad Street site in Lower Manhattan, New York City. The excavations were conducted by Dr. Joel W. Grossman, Greenhouse Consultants, Inc., during the latter part of 1983 and early 1984. The zooarchaeological analysis was carried out between June and August 1984 by the author. The fish remains were analyzed by Dan Russell. Tom Amorosi assisted during the avian analysis (see attached analysis).

The faunal remains from Broad Street were subjected to a detailed analysis for several reasons: 1. The site spans the period of time from the Dutch settlement, in New Amsterdam (ca. 1650) through the first half of the 19th century (1800-1850 A.D.); 2. It is the first site with multiple temporal horizons that were collected and analyzed separately. Most of the previous excavations remain unpublished (Stadt Huys, Telco, 7 Hanover Square), were restricted to single phase deposits (175 Water Street), or had lumped together multiple temporal-stratigraphic horizons; and 3. Prior to land-filling operations, the site fronted the East River shoreline. It contained 3 Dutch West India warehouses, the first church in the New York area, the first provincial pharmacy, and, possibly, the first customs house. The block lay adjacent to Fort Amsterdam, and the primary market and fortified area of New Amsterdam. It was a central location for early colonial activities in New York City. The excavations at 80 Broad Street spanned the time of early urbanism in the New World colonies, thereby allowing changes over time in a limited area to be monitored. It will provide the rare opportunity to act as a comparative sample for other early urban New World samples (St. Augustine - Deagan et al 1983). As such, the Broad Street site represents a significant locality for the early Colonial through the Federal period and a control sample by which more temporally-restricted sites may be compared.

IB. The Problem

Faunal analysis or Zooarchaeology has become an integral part of archaeological research over the past decade. Unfortunately, few excavations of historic period significance in the New World have systematically collected and analyzed the animal bones. Zooarchaeological analysis need not be considered an arcane appendix to a larger archaeological research or salvage operation. It can play as important a role in contextual analysis and the analysis of site formation processes

as the other artifactual domains. It adds yet another means by which we may increase our understanding of human activities. With this in mind, several objectives were established through discussions with the Principal Investigator prior to the initiation of this search. They were the following: a. What animals were exploited in early historic New York City? How did utilization of animals change over time - from the 17th to the 19th centuries? Which animals were preferentially exploited during each of the major phases of occupation? Can changes in age groups, butchering and other food processing activities be detected?

2. How does refuse discard behavior vary over time and space in an urban context? Are there differences between deposits that can be traced to behavioral or other sources of assemblage manipulation (e.g. exposure, dogs, rodents, etc.)? 3. If there are recognizable differences between deposits, what may this suggest about site function - i.e. are there differences between domestic and industrial waste disposal patterns? Can these be distinguished archaeologically? Do the survival probabilities of assemblages vary from context to context?

The sample from 80 Broad Street was used to examine as many of these questions as could be found relevant - i.e. to illuminate the ways in which animals were exploited in early historic New York and how this translates into socio-economic processes of change visible in the historical archaeological record. Before this could be undertaken, the taphonomy of the assemblage must be considered.

II. Taphonomic Considerations

IIA. Nature of the Deposits

There are several sources of sample bias that must be considered. The first entails the depositional contexts from which the assemblage derived. The vast majority of excavation units that were analyzed were temporally secure and limited. Terminus post quem's (TPQ) were establishable for each. Probable time spans of the deposits probably did not exceed 50 years, except in any single case (strata group VI). Few, if any, of the deposits were of a residential character. They were the result of destruction/construction activity episodes on the site. Only a single set of strata derived from "in situ" domestic components (i.e. backyard privies - strata group IIB). These were quickly filled in with debris as surrounding structures were destroyed and the area leveled for new construction. The types of depositional contexts that the material derives from is largely unlike that found at 175 Water Street (Biddick 1982). With the exception of this single set of components, there is a certain degree of contextual uniformity between each of the periods at Broad Street, reducing the possibility of contextual variability as a significant source of bias. A more detailed analysis of the strata groups is presented below.

IIB. Bone Recovery and Treatment

The bone sample from Broad Street was largely excavated with the use of trowels. Dry screening through 1/4" mesh was performed only on deposits from the uppermost levels. Water-sieving through 1/4" sieve mesh was the primary means of recovery. The water-table fluctuated widely, soaking and degrading most of the organic remains. The bones were separated from the heavier artifacts on-site and transported in separate plastic bags to the field laboratory, where they were dried slowly in a shaded area. Special care was taken in the drying phase since excavation took place in mid-winter , many of the bones had been water saturated and frozen. None were treated with any preservatives or stabilizing solutions. The bones from each context (the smallest excavation unit) were counted, placed together in a bag, labelled and stored for eventual detailed analysis. A rough count and separation of the major classes of vertebrates was undertaken by field personnel (mammal, bird, and fish). These provided an approximate determination of the sample size for each category by context, which, in turn, allowed a more accurate estimation of the time and cost required for zooarchaeological analysis.

IIC. Other Sources of Attrition

The bone assemblage was extremely well-preserved. Very few of the bones exhibited any signs of lengthy exposure to the elements. Among samples where exposure has been endemic, evidence for weathering or erosion of the surface of the bone by water, wind, sun, etc. can be extensive. In addition, the substantial quantity of immature remains, often preserved whole, further support the assumption that most of the deposits were the result of rapid or single phases of deposition. Otherwise, the immature percentage of the sample would have been found in an extremely fragmentary state a frequent function of lengthy exposure.

Another source of attrition is destruction by fire. Bone that has been directly exposed to a flame or heat source undergoes recognizable and predictable alteration. The bonds holding the constituent molecules together dissolve (Bonfield and Li 1966). Burnt bone becomes more susceptible to fragmentation and disintegration. Very few burnt pieces of bone will survive for any great length of time in unprotected contexts. The species identification rate among the burnt bones was extremely low (92.7% unidentifiable to the species/genus). No preserved hearths or other "in situ" features, where burning may have taken place, were found. All were re-deposited materials - not deposited where they had been used. Only two burnt specimens were identifiable to the species/genus level of analysis - a sheep metacarpal in stratum VI and an astragalus in strata group IVB. The rest consisted of ribs (N = 4) or bone scrap (N = 16) identifiable to a size class or unidentiable mammalian bone fragments (N = 37). A single exception may have been a burnt large mammal (cow?) lumber vertebra (table 7). A

single burnt bone was also butchered and only one was chewed by a rodent after it had been burnt. Only 51 pieces of burnt bone were recognized in the sample. They were well distributed throughout each of the temporal phases, ranging from a low of 0.0% in the earliest to 6.7% in the temporally heterogeneous stratum VI.

Rodent and canid gnawing can also function to alter the original bone distribution. Bones experiencing gnawing disappear at much more rapid rates than undisturbed remains. Chewing acts to destroy the outer hard periosteum, exposing the softer spongy cancellous core. The bone disintegrates much quicker without its protective surface. Sixteen pieces of bone show gnawing marks (11 rodent; 5 canid). Two of the bones were butchered and one was burnt. Most of the canid chew marks were found on the shaft or ends of early fusing (prior to adulthood) ends of the bone (e.g. distal humerus) - 2 early fusing, 1 late fusing and 2 shaft fragments. The rodent chew marks were found mostly on bone shafts - 2 early fusing, 1 late fusing, and 8 shaft fragments. The differential distribution in the location of chewing marks may be linked to mouth size of the different genera. The smaller mouth of rodents precluded attaining a proper hold on the large bone ends, while the canids could grip it (table 8). All of the major species were affected. Most of the rodent chew marks were found on bones from strata group VI - a disturbed group of components. The appearance of a rodent chewed bone in IA, one of the earliest strata groups may indicate the appearance of rats in an earlier phase than concluded below or that the single specimen was intrusive into the earlier deposits. Most of the canid chew marks come from IIB, the series of privy-like deposits.

III. Stratigraphic Analysis

In order to understand why certain excavation units were analyzed and how they were grouped together to form coherent units of analysis, this section will summarize the information concerning the major stratigraphic divisions at the site and how they are relevant for this section of the analysis. Each context, or the minimal excavation unit, was combined with stratigraphically related context units to form "components". A component may be defined as a feature (architectural, depositional, etc.) or series of stratigraphically connected contexts. Sets of components consisting of single phases of activity over the site were combined to form a "strata group". Each group would represent a different set of activity foci during a specific time span. For example, strata IA and IB represents temporally sequential sets of components - construction and subsequent use of Building A (builders trench, walls, etc. -see table 1). As a result of the complex amalgamation of contexts, components and strata, a brief description of the major strata that contained bone material and that were analyzed will be presented below. These are of importance since they became the major units of analysis used in this study, providing both a temporal and structural

framework for the data.

IIIA. Strata IA and IIA - These strata are the earliest deposits in our sample, yielding TPQ's of 1640 A.D. Stratum IA represents a series of related components functionally connected to the construction of Building A and includes the builders trenches and substrate under the floors of the structure. These were ground (surface) debris present on-site before construction began and which later became sealed by the architecture (components 2 and 6 -below the cobble stone floor). Stratum IIA is a set of isolated primary and secondary fill deposits found in the builder's trenches and abandoned features. They were rapidly filled-in by a single episode of deposition with material that predates the 1650 A.D. TPQ of the overlying stratum IIB. Ceramic cross-mends between the different contexts of stratum IIA occurred attesting to the rapidity of deposit accumulation. The features were not in use for any great length of time.

IIIB. Strata ID and VB - These strata yielded TPQ's of 1650 A.D. Stratum ID represents the construction debris from Building A and is from the second half of the 17th century. It is a group of horizontal strata that were exposed to the elements. They are primary and secondary deposits, but not fill. Only 3 of the components contained any bone (components 3, 4, and 40), with most of the fragments coming from component 4 (N = 91). Stratum VB consisted of four bone fragments found within the cobbled floor from Building B.

IIIC. Strata IC and IIB - These strata groups date to the late 17th century (TPQ - 1680 A.D.). Strata group IIB consists of features from earlier phases that were finally abandoned and filled by discarded refuse. Included within this strata group are the only examples of backyard "privy-like" deposits (components 62, 14, and 16). Whether the deposits found within them can be attributed to be domestic household refuse in origin remains to be seen. They have not been associated with any particular domestic structures. Strata group IC consists of a set of substrates or old surfaces, with some possible 18th century intrusions.

IIID. Strata Group III - This group of components dates to the early part of the 18th century (TPQ - 1710/1720 A.D.). They include destruction debris from Building D (Components 51-54) and 4 natural fill deposits from the fill of an early 18th century cistern in Lot 14 (Component 63). Bome materials were well distributed throughout each of the Components.

IIIE. Strata Group IVB - Only a single components (15) from this strata group contained a significant number of bones from a relatively unmixed deposit which dated to the early part of the 19th century (TPQ - 1800-1850 A.D.). The sample of destruction debris deposits filling a 17th century oval yellow brick cistern contained the largest bone sample from any of the components on the site.

IIIF. Strata Group VI - In this case also, only a single component was analyzed (34 - sand and silt building rubble). This component represented the 19th century interface between the upper layer of basement floors of 19th century structures and the 17th century levels. It was heavily mixed with both early and late artifacts, yielding TPQ's between 1650 and 1900 A/D. It was a deposit caused by the cutting down to 17th century deposits by the 19th century builders. It was included in some of the analyses for comparative purposes and to enlarge the sample size for certain types of analyses using the entire sample without regard for temporal/stratigraphic sub-divisions (e.g. age distributions -table 6).

IV. Analytical Methodology

A crucial part of any analysis is the way in which the data are recorded. This predetermines the analytical complexity that can eventually be achieved. The flexibility of data retrieval systems can enhance or limit the ease in which various questions are posed. With this in mind, a recording system devised by the author, which describes several parameters for each bone fragment or group of similar fragments, was employed. The data were coded into a computer compatible mode and were eventually entered into the Broad Street site computer data banks. All data were then sorted by the various variables with the aid of an IBM PC. This allowed a very rapid turn-around time between data coding and report writing. Each bone in every analyzed context was identified to the species, or next highest analytical level (genus, size-class, etc.). Problemmatic specimens (e.g. exotic species) were identified with the aid of comparative museum collections (at the American Museum of Natural History) and a variety of osteological atlases. The vast majority were, however, well within the range of species previously studied by the author. Each fragment was coded for a number of variables. These included information on the element, certainty of identification, domestication, symmetry, sex, age, butchering, gnawing, burning, fusion, element part, articulation with other elements, and frequency (see appendix B: Bone Code).

No measurements of the remains were undertaken because of a lack of time and the high degree of fragmentation. Measurements, however, should be taken in the future since they would be particularly useful in identifying breed and/or sex of the various specimens, as well as the size parameters of the species. The large number of bone remains from immature animals also precluded metric analysis of the sample. Young animals, with unfused epiphyses, are inappropriate specimens for such analyses. Butchering and fragmentation destroyed many of the points on which measurement are frequently taken. A similar situation appears to have existed at 175 Water Street (Biddick 1982: 539).

Several operational decisions were made to speed up the

analysis. Vertebrae and ribs were not analyzed in the same detail as other body elements. Fragmentation and butchering activities destroyed many of the diagnostic criteria. Also, the great variability within any one species and the possibility of confusing the remains from closely-related species (e.g. vertebrae and ribs from Ovis/Capra/Odocoileus) required their classification into size-classes of animals. The absence of horse and other large mammals points to cattle as the source for all or most of the vertebrae and ribs in the large mammal size classes. Most of the medium mammal vertebrae and ribs were probably from sheep and pigs. The early recognition of Odocoileus in this as well as other early historic samples (e.g. Stadt Huys/Stone Street, Lower Manhattan) required great caution in assigning medium-sized mammalian ribs and vertebrae to a species.

Age profiles for each of the species were constructed on basis of epiphyseal fusion and tooth eruption and wear data (cf. Grant 1975; Payne 1973; Silver 1969; Wilson et al 1982). Butchery analyses initially utilized the illustrations of commonly occurring historical cuts presented by Lyman (1977). When examples of previously illustrated patterns were identified, the illustration numbers from Lyman's study were coded directly into the computerized data set. However, it was found that in the earlier half of the deposits, Lyman's system did not correspond to the data. As a result, a list of previously unillustrated butchering forms were compiled, coded, and entered into the data bank. The illustrations and photographs of the latter are presented below, with their assigned code values. Quantification procedures were kept to a minimum for several reasons. The most cogent is that the most popular techniques for calculating species proportionality are severely flawed (Minimum Numbers of Individuals, Total Number of Fragments, Adjusted Frequency - e.g. Grayson 1979; Gilbert et al 1981). When and if more powerful predictive tools are developed in the future, the raw data, presented in appendix A, can be re-analyzed. In this analysis, each bone was counted separately. When articulated or potentially articulated specimens were discovered, they were counted only once, as if they were a single fragment. This avoided the problem of frequency inflation due to whole or partial skeletons. Occassional articulations among the mammals and birds were encountered. Among the rodents, it was a much more frequent problem. After the analysis, all bones were returned to Greenhouse Consultants, Inc. lab facilities for long term storage.

V. The Animal Bone Sample

A total of 5471 fragments of bone were recovered during the excavations at Broad Street. Approximately 57% (N = 3121) fragments were from mammals, 23.2% (N = 1268) from birds, and 19.7% (N = 1081) from fish. The mammal remains were the most intensively studied, while only "laundry" lists of the fish and birds were compiled. Fish scales were not identified at all.

A total of 1925 mammalian remains were found in the group of components and contexts selected for detailed stratigraphic/temporal analysis. These represent the sample of bones to be discussed in the rest of this report.

Several species of animals were identified to the species/genus level in the sample (table 4). The most common of the mammalian non-rat remains, were cattle (38.9%). Sheep (26.6%), followed in decreasing frequency by pig (24.2%), deer (3.3%), dog (2.7%), rabbit (2.4%), turtle (1.5%), and beaver (0.3%) were also present in lees quantities. 106 fragments of rattus sp. were identified, including several partial skeletons representing at least 8 separate individuals, were also discovered. Slightly more than half of the collection was composed of unidentifiable bone scrap. A smaller percentage of the elements were identified only to size classes (25.5%). Only 18.4% of the total sample, with the exception of rattus sp. remains, was identifiable to the species/genus level. This is not an unusual fraction for sived collections. In hand-collected assemblages, the rate of identification may range up to 100%, depending mostly upon recovery efficiency. Shifts in the proportion of identifiable:size class:unidentifiable specimens varies widely from context to context or component to component. The source of most of this variation appears to have been depositional integrity and type of deposit. The less disturbed and exposed the remains, the better the shape they will be in. Privies in IIB have the highest percentage of identified remains (table 3). When IIB is removed from consideration, there is a fairly pronounced temporal trend in the data indicating that more of the later strata groups were identifiable to the species level (ca. 28%) than in previous deposits (ca. 19%). This may be somewhat attributable to the lesser length of time the remains spent in the ground (see table 3). The proportion of domestic:wild specimens increases over time from a low of 78.6% (IA) domestic in the earliest strata group to a high of 93.7% domestic in the latest strata group. In the following section of the report, the remains of each species will be discussed strata group by strata group. In this way, stratigraphic and temporal patterning in the data may be uncovered. Little contextual variability is expected in this sample due to the overall uniformity of the deposits.

VA. Ovis aries

Approximately half of the ovicaprine specimens were identifiable to domestic sheep. The rest were not species specific or had lost their species specific diagnostic characteristics. They were, as a result, initially coded as sheep/goat. In the final analysis, it was realized that at Broad Street, as at virtually all other lower Manhattan archaeological sites with analyzed faunal assemblages (Telco, Stadt Huys, 7 Hanover Square, 175 Water Street), goats were absent. They do not appear to have been among the food animals. Therefore, all of the ovicaprine remains have been treated in this report as if they were sheep. In the earliest

phase (Strata IA and IIA - TPQ 1640), sheep represent 20.6% of the assemblage identified to the species level (with the exception of rats). Over the course of time, sheep continued to increase in relative frequency until by the early 1800's, they represented 31.9% of the assemblage. There is a small decrease recorded for Strata ID and VB (TPQ 1650). Several factors come to mind to explain the increasing proportions of sheep. The first may entail the change in lower Manhattan from Old World migrants with a lowland Dutch/Germanic to Anglo-Saxon origin. The shift in political sovereignty of New Amsterdam from Dutch to British colonial rule in the late 17th century would only have been indirectly responsible. The concomitant decline in pigs over this time would support this hypothesis. A second variable may be found in the decrease over time of wild foods (i.e. deer). A small proportion of the increase in sheep may also be related to the decline in deer.

The table showing the distribution of the major body parts (table 5) allows us to observe major biases for or against particular sections of the body. This is especially useful when the more detailed element distribution data are too dispersed to yield obvious patterning, limiting the level of analytic detail. In this table, the body was divided into major units of articulation. The element data were grouped accordingly. The table will group similar or co-occuring elements (e.g. podia = carpals, tarsals, calcaneii, astragalii, and phalanxes; podial = podia and metapodia). It can be easily observed that in Strata IA and IIA, cranial elements are present in relatively high relative frequencies. Can this be interpreted as a function of primary butchering on-site or neary? or may it reflect other depositional processes? There is little architectural or documentary evidence showing butchering and dismemberment of animals at the site. It is likely that then as today local butcher shops or stands in the markets sold cranial parts, which were then taken home, eaten and discarded in backyard waste disposal areas. Mandibles and loose teeth comprise the bulk of the sheep remains in these phases. Their higher than ususal frequency and the very small sample sizes in these two strata attests to their durability. The edible category includes all those body parts with a great deal of meat (vertebrae, ribs, pelvis, forelimbs and hindlimb bones). These bones are treated separately from the podial remains because of the vaster quantity of meat present. Most of the podial remains reflect meat-poor parts, with little meat mass relative to bone. Such body parts may have been less desirable. The cranial remains may have included delicacies, such as tongue.

The relative proportions of each of these major categories can be used to convey information about the sources of attrition and the economic status of the households from which the assemblages derive. In the strata groups with larger samples (IIB, III, and IVB) the proportion of edible body parts greatly outweighs the cranial and podial. The age distribution data (table 6) reveals wide variation in population structure between strata groups. This is somewhat traceable to sample

size variance, although some temporal trends are discernable. However, the sample sizes are so small for any one phase that each of the strata groups were combined to enahance frequencies. Strata group VI was included since it contained remains from the entire range of the more temporally restricted strata. There are few, if any, newborn or infant specimens. The fragility of very immature specimens makes them excellent candidates for attrition. However, the large number of juvenile bones, whose bones are only slightly more dense, indicates that attrition was less of a problem in this case. Their bones survived in large numbers, so why not others? Sub-adults are found in fewer numbers, exceeding adults in only two strata groups (IIB and VI). Such an age distribution, with little evidence for attrition, may reflect toward an economy oriented toward production of sheep for meat, not for milk or wool. In such a situation, large numbers of lambs, far fewer sub-adults, and the remaining adult stock once it had aged beyond reproductive usefulness would have been slaughtered.

VB. Bos taurus

Domestic cattle are present in nearly every strata group. In the earliest, they represent 35.3% of the identified assemblage. They, then, decrease to 42.1% (1650 - TPQ), decrease to 36.6% (1680 - TPQ), increase to 46.5% (1720 - TPQ) and finally drop to 31.9% (1800 - TPQ). The variation in cattle relative frequencies is negatively correlated with those of pig. As cattle decrease, pig increase and vice versa. This may be more of a reflection of the ways in which pigs were handled in New York City, which will be discussed in the subsequent section. Edible meat parts are the most frequently found section of the b-dy, even with the placement of most vertebrae and ribs in the large mammal group. In Strata Group III, a large number of phalanxes were found, but not in any single context. Cranial elements in all strata consisted mostly of loose teeth. A look at the large mammal element distribution data showed that few vertebrae and ribs were present in the earlier strata groups (IA, IIA, ID, and IIB). It is only in the later groups (III and IVB) that larger numbers appear. This indicates some alteration in the treatment of trunk parts, either in processing, consumption or discard. It cannot simply be explained as a function of better preservation or different depositional contexts, since a parallel situation among the medium-sized mammals is not apparent. The larger frequencies of edible meat body parts in IID, relative to the other deposits, is directly related to the better condition for preservation. The age distribution varies widely from phase to phase, with few observable temporal trends. If the aggregate pattern is examined, it strongly contrasts with the sheep data. Adults were the largest single group (36.3%), while sub-adults (30.1%), juveniles (22.2%) and infants/foetus (11.0%) followed in decreasing frequency. The majority of cattle were slaughtered prior to adulthood (63.7%), with half as many for veal (less than one year of age). The relative frequency of immature cattle bones may be

underrepresented somewhat, since such bone is more affected by various destructive processes (e.g. exposure, cooking, etc.).

VC. Sus scrofa domesticus

Domestic pigs are present throughout the sequence. In the lowest strata groups (IA, IIA, ID, and IIB), they ranked second in importance varying between 26.3 and 32.0%. The trend in 1640 to 1680 TPQ strata is toward a slight increase over time. By the time of the 1720 TPQ deposits, they dropped to third position (15.1%) after sheep. They declined to half of their former importance in the assemblage (III - 15.3%) before regaining some of their lost significance in the final strata group (IVB - 19.1%). Cattle and sheep take up much of the slack. How can this shift be explained. The magnitude of the decline is not explainable as simple random variation over time between deposits. It is expected that when simple random variation in relative frequencies occurs over time, it will vary within a few percentage points of a mean value. This was not the case, however. During this time period, the conditions for pig husbandry in New York were altered. By the end of the 18th century (1780's), pigs were no longer allowed to freely roam city streets. They had become such a serious health hazard and impediment to the flow of traffic through the city streets that a new set of city ordinances were passed prohibiting lax husbandry practices within city limits. Any pig found freely wandering on city streets became the property of the finder (Pomerantz 1938: 270). However, the strictures on the use and movement of pigs may have begun before these 18th century ordinances. A second variable may have been the shift over time toward increasing frequencies of the city's occupants with dietary preferences oriented toward artiodactyls. The decline in pig frequencies may be attributable to these processes.

The body part distribution (table 5) reveals that a wide range of body parts were found in each of the strata groups. Cranial, trunk, limb and podial elements appear in each. Only pelvic areas are consistently absent. Meat producing parts outnumber cranial and podial elements in strata groups IIB and IVB. A similar situation was found among sheep and cattle. It is apparent from these data that either each of the species were butchered and consumed in an identiical manner or that the depositional context of the remains has skewed the distribution. From the past experience of the author with other assemblages, the former is highly unlikely. Cattle, sheep and pigs are butchered and consumed differently. For example, large parts of pigs are regularly consumed, even today, which are rarely available in the other species for household consumption (e.g. boars head, pig knuckles, etc.). What is so different about these two contexts? Strata IIB and IVB represent the fill of privies and a brick structure. They were household refuse that were dumped directly into these features after they were no longer in use. The other strata groups consisted of material left lying on the surface for various periods of time. Attrition was extensive, removing

much of the less dense meat bearing bones, leaving the harder cranial and podial elements in disproportionate frequencies. The age distribution of pigs shows that the vast majority of ageable remains were immature (table 6). Only 6% were adults. The largest single group were juveniles (51.66%). 68% of the sample were piglets, under a year of age. Half of the adult remains came from loose teeth, while the other half were hind limb parts (femur and fibula). Sub-adults and juveniles were well represented in all body parts. Pork production was very age selective. Immature individuals were preferentially culled because of their rapid growth rates to generate higher profits for the breeders.

VD. Canis familiaris

Domestic dog appeared in three strata groups (IIB, III, and IVB). All of the remains were phalanxes from sub-adult/adult or old adults specimens, with the exception of a single puppy phalanx (IVB). They never were very common in the strata groups, varying from 2.1% in the earlier to 4.2% in the later groups. Why only phalanxes were found is a difficult question to answer at this moment.

Felis cattus

Three articulated fragments of an 6-8 week old kitten were encountered in component 76 (IIB). It was probably thrown into the fill deposit soon after death, since the very fragile remains were well preserved and articulated.

VE. Ocoileus virginianus

Virginia white-tailed deer are present throughout the early phases of the stratigraphy history of the site. They were somewhat of a surprise since none were found at 175 Water Street (Biddick 1982), although the author did find deer remains in the earliest layers from the Stadt Huys/Stone Street site. They are relatively common in the earliest strata groups (IA and IIA - 11.8%) and increase slightly in the succeeding group (ID and VB - 15.8%). Subsequently, they experience a dramatic decline to approximately 1% (IC, IIB, and III). By the final strata group (IVB), they have completely disappeared from the assemblage. The decline and disappearance of deer is directly associated with the urbanization of the region and the disappearance of extensively forested areas near to the city. Early settlers did rely upon wild game to some extent, but less and less over time. There is no evidence for the use of wild game in the later periods for either the higher or lower status communities. It had been thought that, as in contemporary 19th century Europe, deer would continue to appear as a trophy animal for the rich or as a supplementary food source for the very poor. A wide distribution of body parts was found, including cranial vertebrae, forelimb, hindlimb and podial elements. No evidence for the use of antler for tools or selection of only certain body parts to be brought from the

kill sites to the city. The age distribution indicated that most of the specimens were adults (1 sub-adult, 4 sub-adults/adults, and 4 adults).

VF. Sylvilagus/Lepus sp.

Rabbit/Hare remains were few and fragmentary. They appear in strata group IIB (2.1%), increase in III (4.9%) and then decrease in IVB (2.4%). They are not found in the earliest strata groups at all. This may be a function of sample size bias, since these were the smallest. They would have been expected even in the earliest, since trapping was an important activity in the early trading post days. Most of the remains, with the exception of a single problemmatic rib, were phalanxes or mandibles. This may indicate that rabbits were collected more for pelts, which retained the face and podial elements, than for food (IIB - 2 second phalanxes; III - 1 mandible, 3 first phalanx; IVB - 1 worn tooth). All of the phalanxes were from sub-adult/adults, while the mandible and tooth came from adult individuals.

VG. Emydidae (family)

Turtle remains were found in IIA (5%), IIB (1.1%), III, (1.0%) and IV (2.4%). All remains were from pieces of turtle shell. Whether they were from land or river species was not determinable due to their fragmentary state. Both forms were probably collected as a food source, since turtle soup is a well known delicacy.

VH. Castor canadensis

A single lower incisor of a beaver was found in strata group IA (7.1%). Beaver were locally available throughout the area in early colonial times, and were hunted both for their meat and pelt.

VI. Rattus sp.

The remains of several rats appear in strata groups ID, IIB, III, and IVB. Only one bone each were found in ID and III, laying open the possibility of intrusions. In IIB and IVB, where larger numbers of bones comprising several individuals were found, we have returned, once again, to our privies (IIB) and fill of oval yellow brick structure (IVB). These are the same kinds of contexts that rat specimens were found in at 175 Water Street (T. Amorosi - pers. comm.). They are not considered to be intrusive elements, since these contexts were very protective of even the most fragile remains found within them. All were from adults, with both ends of the bones being fused. With the appearance of European spcies of rats in early colonial urban agglomerations, new vectors for the transmission of disease come into play.

VI. Butchering

59 fragments of bone showed evidence of butchering activities. Only remains with clear-cut knife, saw or cleaver marks were considered in the analysis. This was to avoid the frequently made assumption that recurring patterns in the shape of bone fragments probably reflects systematic butchering activites. However, this confuses natural lines of fracture with butchering. The fraction of butchered remains (table 9 and 10) never exceeded 5.3% of the total fragment count from any single strata group. Strata group III contained the largest absolute and relative frequencies (5.3%), while group II contained the smallest (0.9%). When the earliest strata groups (IA and IIA) are combined and the rest are arranged in chronological order, the percentage of butchered remains in the assemblage increases over time. Only group III breaks the pattern, with a higher than expected relative frequency (table 10). This trend may be a reflection of sample size bias, where the probability of finding larger numbers of the normally infrequent butchered bones increase with sample size. The later strata groups' samples are generally larger. Context variability also appears to play a role. The unusualy deposits in IIB and IVB contain larger quantities of fragile material that normally would have disintegrated when left exposed. Butchering cuts through and exposes the softer spongy interior of the bone, allowing destructive orces to more quickly act. Strata group III represents an exceptional situation. It is unlikely that changes in meat preparation, such as cooking, could have accounted for this trend (e.g. from roasting to boiling). None of the butchered pieces were burnt of show any obvious signs of cooking. Only a single piece had been chewed by a dog (IIB). A rat chewed a second (VI). If a piece had been butchered, it was highly unlikely to have been left exposed where dogs or rodents could later get at it. Conversely, those that were not cut up did have a slightly greater probability of being chewed. This could also imply that most of the bones that were thrown to the dogs or rats were lost to the archaeological record. None of the features showed any concentration of remains that may have indicated an industrial use of bone material (e.g. for glue roduction). All appear to have been domestic household.

There is strong evidence for a shift in butchering practices over time. When the study was first undertaken, Lyman's (1977) well illustrated code for common early 20th century butchered bones from Fort Walla Walla was employed. The choice of this system was reinforced by its use at 175 Water Street. However, as analysis progressed, it was soon realized that a large proportion of the butchered remains did not conform to the various forms in the code. This took on a temporal dimension (table 10), where the earlier periods had increasingly greater frequencies of previously unrecorded butchering marks. It was only in the latest deposits (IVB - from the 19th century) that Lyman's forms became most useful as a guide. This is probably a reflection of the development of meat processing into an organized large-scale industry, where

practices became codified and widespread. The question whether large sides of meat or smaller cuts were purchased is difficult to answer with such few data. The few articulated cattle distal limb remains indicate that some parts were sold together. Most of the butchered vertebrae derive from the later deposits. This does not indicate that sides of beef were not sold in the earlier periods, but that the earlier strata either did not contain or that the sample were too severely biased from attrition to preserve such fragile body parts.

TOTAL BONE COUNTS

CLASS	NO.	%
MAMMALIA	3122	(57.0)
AVES	1268	(23.2)
PISCES	1081	(19.7)
TOTAL:	5471	

Table 2: TOTAL BONE COUNTS

Table 3: FOOD SPECIES PERCENT DOMESTIC VS PERCENT WILD

TPQ	STRATUM	DOMESTIC:WILD (%)[x]	SPECIES:SIZE-CLASS:UNIDENTIFIED (%)[xx]
1640	IA	11:3 (78.6:21.4)	14:24:35 (19.2:32.9:42.9)
1640	IIA	17:3 (85.0:15.0)	20:25:64 (18.3:22.9:58.7)
1640	TOTAL:IA, IIA	4.66:1 (4.50:1)	34:49:99 (18.7:26.9:54.4)
1680	ID	16:2 (88.8:11.1)	24:44:52 (20.0:36.6:43.3)
1680	VD	0:1 (0.0:100.0)	1:3:0 (25:75:0.0)
1680	TOTAL: ID, VD	(5.33:1)	25:47:52 (20.2:37.9:41.9)
1680	IIB	90:6 (93.7:63)	117:111:109 (34.7:32.9:32.3)
1680	TOTAL	106:9 (11:78)	
1720	III	92:7 (92.9:7.1)	135:105:212 (29.8:23.2:46.9)
	TOTAL: III	(13.14:1)	
1844	IVB	43:4 (91.5:8.5)	129:70:257 (27.8:15.3:57.4)

x = excludes rat and cat; only potential food species.
xx = species includes all remains identified to the genus/species.

TABLE 1: SPECIES FREQUENCY BY COMPONENT, STRATUM AND TPQ GROUP

(CORRECTED FOR ARTICULATIONS AND MENDABLE FRAGMENTS)

TPQ	STRATUM	LOT	SPECIES	SHEEP		CATTLE		PIG		DEER		RODENT		BEAVER		DOG		TURTLE		RAT		ARTIODACTYL		MARSUPIAL			UNIDENTIFIED		TOTAL	NOTES
				NO.	%	NO.	%	NO.	%	NO.	%	NO.	%	NO.	%	NO.	%	NO.	%	NO.	%	NO.	%	NO.	NO.		NO.		NO.	
1640	IA	2		1		4		1		—		—		—		—		—		—		—		5		1	6		18	
		5		—		—		—		—		—		—		—		—		—		—		—		—	1		1	
		6		2		—		3		2				1								1		16		1	28		54	
	SUB-TOTAL			3	21.0	4	28.6	4	28.6	2	14.3	—		1	7.1	—		—		—		1		21		2	35		93	
1640	IIA	8		—		3		2		—		—		—		—		—		—		—		—		3	6		14	
		9		3		2		—		—		—		—		—		1		—		—		2		2	36		46	
		10		1		1		—		—		—		—		—		—		—		—		3		1	13		19	
		12		—		—		1		—		—		—		—		—		—		—		8		1	—		10	
		13		—		1		2		2		—		—		—		—		—		—		4		1	8		18	
		61		—		1		—		—		—		—		—		—		—		—		—		—	1		2	
	SUB-TOTAL			4	20.0	8	40.0	5	25.0	2	10							1	1.0					17		8	64		109	
1640	IA, IIA	TOTAL		7	20.6	12	35.3	9	26.5	4	11.8			1	2.9			1	2.9	—		—		38		10	99		182	
1680	ID	3		1		2		1		—		—		—		—		—		—		—		6		—	—		10	ⓐ+1 ARTICUL. FRAG. ⓑ+7 ARTICULATED ARTIC. FRAGS.
		4		2		3		2		1ⓐ		—		—		—		—		1		1		22		12	48		92	
		40		—		3		2		1ⓑ		—		—		—		—		—		—		3		—	4		20	
	SUB-TOTAL			3	16.7	8	44.4	5	27.8	2	11.1											1		30		12	52		123	
	VB	19		—		—		—		1	100.	—		—		—		—		—		—		1		2	—		4	
1680	ID, VB	TOTAL		3	15.8	8	42.1	5	26.3	3	15.8									1		1		32		14	52		127	
1680	IC	1		—		—		—		—		—		—		—		—		—		—		—		—	2		2	*-AT LEAST 3 INDIVIDUALS.
	IIB	14		21		23		24		1		2		—		1		—		18*		—		2		68	11	71		242	
		16		1		9		3		—		—		—		1		—		9**		—		—		3	—	16		30	**-AT LEAST 1 INDIVIDUAL
		38		—		—		—		—		—		—		—		—		—		—		—		3	1		4	
		62		—		5		—		—		—		—		—		1		—		1		—		—	5		12	ⓐ-3 ARTICUL.
		76		1		3		3		—		—		—		—		—		—		—		7		7	16		37ⓐ	
	SUB-TOTAL			23	28.7	34	44.6	30	38.3	1		2	2.1	—		2	2.1	1	1.4	21		1		2		78	21	109		308	
	IC, ID, IIB	TOTAL		26	24.9	42	34.6	36	32.7	4	3.7	2	2.1			2		1		21		1		2		78	21	111		330	
1720	III	51		1		1		1		—		—		—		—		—		—		—		—		—	1		4	8	ⓐ+4 ARTIC. FRAGS.
		52		—		1		—		—		—		—		—		—		1		—		1		2	—		8	13	ⓑ+12 ARTIC. FRAGS.
		53		5ⓐ		6		2		—		4ⓑ		—		—		—		—		—		8		13	11	87		149	ⓒ+18 ARTIC. FRAGS.
		54		4		4		—		—		1		—		4		—		—		—		8		6	11	43		81	ⓓ+1 ARTIC. FRAG.
		63		17ⓒ		34ⓓ		12		1		—		—		1*		1		—		—		3		23	18	70		201	*-SMALL CARNIVORE.
		TOTAL		22	27.2	46	46.5	15	15.1	1	1.0	5	5.0	—		4	4.0	1	1.0	1		—		20		44	41	212		449	
1760-1800	IVB	15		15ⓐ		15ⓑ		9ⓒ		—		3		—		2		1		75*				3		51	16	261		454	*-AT LEAST 3 INDIVID. ⓐ+6 ARTIC. FRAGS. ⓑ+5 ARTIC. FRAGS.
		TOTAL		15	3.9	15	3.9	9	1.9	—		3	0.4	—		2	0.2	1	2.1	75				3		51	16	261		454	
1650-1800	VI	34		15		15		13		2		—		—		1		1		1		5		7		68	22	206		356	
	TOTAL, ALL PERIODS			90		130		81		11		10		1		9		5		116		7								1,913	

NUMBER OF FRAGMENTS FROM MAJOR BODY PARTS

	STRATUM	TPQ	CRANIAL	VERT./RIB	PELVIS	FORELIMB	HINDLIMB	METAPODIA	PODIA	TOTAL	CRANIAL	EDIBLE	PODIAL
SHEEP	IA	1640	2	1	-	-	-	-	-	3	2(666)	1(333)	-
	IIA	1640	2	-	-	-	1	1	-	4	2(50)	1(25)	1(25)
	ID	1650	1	1	-	-	-	-	1	3	1(333)	1(333)	1(333)
	IIB	1680	1	5	3	7	5	2	-	23	1	20	2
	III	1720	8	5	-	8	-	3	-	24	8	13	3
	IVB	1800	2	-	2	3	5	3	-	15	2	10	3
	VI	1700-1800	4	1	-	3	1	6	-	15	4	5	6
CATTLE	IA		-	1	-	1	-	1	1	4	-	2	-
	IIA		1	3	-	-	1	-	3	8	1	4	3
	ID		3	3	-	1	-	-	-	7	3	4	-
	IIB		4	17	4	2	3	-	4	34	4	26	4
	III		4	7	2	6	7	3	21	50	4	22	24
	IVB		2	5	1	1	4	1	5	19	2	11	6
PIG	IA		1	-	-	-	1	-	2	4	1	1	2
	IIA		3	1	-	-	1	-	-	5	3	2	-
	ID		1	1	-	1	1	1	-	5	1	3	1
	IIB		4	5	-	5	10	2	4	30	4	20	6
	III		2	1	-	1	4	1	6	15	2	6	7
	IVB		1	3	-	1	4	-	-	9	1	8	-

Table 5: NUMBER OF FRÁGMENTS FROM MAJOR BODY PARTS

Table 6: AGE DISTRIBUTION BY STRATA GROUP (%)

Strata Group----		IA, IIA	ID	IIB	III	IVB	VI	TOTAL	%
SHEEP									
Unknown	(?)	2	-	-	3	1	1	7	-
Young	(Y)	-	-	-	-	-	-	-	-
Newborn/Feotal	(F)	-	-	-	-	1(8.3)	-	1	1.6
Infantile (3mos)	(I)	-	-	-	-	1(8.3)	-	1	1.6
	(I/J)	-	-	-	-	-	-	-	-
Juvenile(3-12mos)	(J)	5(50)	-	8(47)	8(44.4)	3(25)	5(62.5)	26	43.3
	(J/S)	-	-	-	-	-	-	-	-
Sub-adult(1-3yr)	(S)	-	-	5(29.4)	2(11.1)	3(25.0)	2(25.0)	12	20.0
	(S/A)	1	2	6	5	2	1	22	-
Adult	(A)	2(50)	1(100)	4(23.5)	6(33.3)	4(33.3)	1(12.5)	18	30.0
Young Adult	(YA)	-	-	-	2(11.1)	-	-	2	3.3
Old Adult	(OA)	-	-	-	-(11.1)	-	-	-	-
TOTAL		7(100)	3(100)	23(100)	26	15(100)	15(100)	89	-
CATTLE									
	(?)	-	1	1	-	-	-	2	-
	(F)	-	-	1(7.6)	-	-	-	1	1.5
	(I)	-	-	1(7.6)	4(15.4)	1(10)	0	6	9.5
	(I/J)	-	-	-	-	-	-	-	-
	(J)	-	1(20)	-	8(30.7)	4(40)	1	14	22.2
	(J/S)	-	-	-	-	-	-	-	-
	(S)	1(25)	3(60)	7(53.8)	5(19.2)	3(30)	-	19	30.1
	(S/A)	8	2	20	20	5	11	66	-
	(A)	3(75)	1(20)	4(30.1)	8(30.7)	-	3	19	30.1
	(YA)	-	-	-	1(3.8)	1(10)	-	2	3.1
	(OA)	-	-	-	-	1(10)	1	2	3.1
TOTAL:		12	8	34	46	15	15	130	-
PIG									
	(?)	-	-	1	-	-	-	1	-
	(F)	1	-	2	-	2	-	5	8.3
	(I)	-	-	4	-	1	-	5	8.3
	(I/J)	-	-	-	-	-	-	-	-
	(J)	3	-	12	9	1	6	31	51.6
	(J/S)	-	-	-	-	-	2	2	3.33
	(S)	3	1	4	2	1	2	13	21.66
	(S/A)	2	3	4	4	4	3	20	-
	(A)	-	-	3	-	-	-	3	6.66
	(YA)	-	1(50)	-	-	-	-	1	6.66
TOTAL:		9	5	30	15	9	13	81	-

TABLE 7: DISTRIBUTION OF BURNT BONE

STRATUM	SPECIES	SHEEP		SMALL MAMMAL		MEDIUM MAMMAL		LARGE MAMMAL		UNKOWN	TOTAL	%
	ELEMENT	META-CARPAL	ASTRA-GALUS	RIB	SCAPULA	RIB	SCRAP	LUMBAR VERT.	SCRAP	SCRAP		
IA		—	—	—	—	—	1	—	—	1	2	2.7
IIA		—	—	—	—	—	2	—	1	1	4	3.6
IIB		—	—	—	—	2	1	—	1	11	15	4.6
III		—	—	—	—	1	1	—	1	4	7	1.4
IVB		—	1	—	—	—	—	—	—	2	3	0.7
VI		1	—	1	1	2	7	1	1	10	24	6.7
										TOTAL:	55	

TABLE 8: DISTRIBUTION OF GNAWED BONES (A = CARNIVORE; B = RODENT)

STRATUM	SPECIES	SHEEP						COW				PIG				DOG		MEDIUM MAMMAL				UNKOWN		TOTAL	%
	ELEMENT	META-CARPAL		TIBIA		ILIUM		HUM-ERUS		ULNA	ILIUM	HUM-ERUS		TIBIA		PITAL-ANX I		LUMBAR VERT.		RIB		SCRAP			
		A	B	A	B	A	B	A	B	A	B	A	B	A	B	A	B	A	B	A	B	A	B		
IA		-	-	-	-	-	-	-	-	1	-	-	-	-	-	-	-	-	-	-	-	-	-	1	
IIB		1	-	1	-	-	-	-	-	-	-	1	-	1	-	-	-	-	-	-	-	1	-	5	
III		-	-	-	-	-	-	1	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	1	
VI		-	1	-	-	-	1	-	-	-	1	-	-	-	-	-	1	-	2	-	1	-	2	9	

DISTRIBUTION OF BUTCHERED BONES

STRATUM	SPECIES	ELEMENT	PART	FREQ.[1]	LYMAN	CODE[2]	COMMENTS
IA	Deer	Thor. Vert		1		9S	
TOTAL:				1(1.4%)			
ID	Pig	Femur	Dist.	1	6F		
	Cow	Thor. Vert		1	8A		
TOTAL:				2(1.6%)			
IIA	Cow	Cuboid		1		01	Chopped 1/2 way through
	Cow	Femur	shaft	1		6P	lateral side.
IIB	Sheep	Metacarpal	shaft	1		07	Knife slice
	Sheep	scapula	body	1		07	knife slice
	Cow	Cerv.vert		1		9T	
	Cow	Humerus	Dist.	1	2F		
	Cow	Pelvis	Acet.	1		4F	
	Cow	Femur	Prox.	1		6o	
	Cow	Femur	Prox.shaft	1	6C		
	Med. Mammal	sacrum		1	9o		
TOTAL:				9(2.3%)			
III	Sheep	cerv. vert		1		9U	
	Sheep	cerv. vert		1		9T	
	Sheep	thor.vert		1		9T	
	Sheep	lum. vert		1		9T	
	Sheep	rib	prox.	1	7I		
	Cow	cerv. vert		1		9T	
	Cow	thor. vert		1		9T	
	Cow	lum. vert		1		9U	
	Cow	scapula	body	2	1G		
	Cow	humerus	prox.	1		2J	
	Cow	metacarpal	whole	1			split lengthwise down shaft
	Cow	femur	dist.	1	6K		
	Cow	tibia	dist.	1		7M	
	Pig	femur	shaft	1		6N	
	Med. Mammal	vert.		4		9T	
	Med. Mammal	rib	prox.	2	7Iprox		
	Lge. Mammal	vert.		1		9T	
	Lge. Mammal	unidentified		1			meat removal mark
	unknown	thor. vert		1		9T	
TOTAL:				24(5.3%)			
IVB	Sheep	humerus	dist.	1		01	slice on medial side for dismemberment
	Cow	vert.		1	8L		
	Cow	vert.		1	8D		
	Cow	thor. vert		1		9S	cleaver
	Cow	lum. vert		1	9M		cleaver
	Cow			1	9P		saw, senile, exotos
	Cow	ilium		1	5E		
	Cow	tibia	prox.	1	7Eprox.		
	Pig	lum. vert		1	9M		
	Med. Mammal	vert.		1	9P		
	Med. Mammal	lum. vert		1		9T	
	Med. Mammal	Lum. vert		1		9T	also slice marks (07)
	Lge. Mammal	vert.		1	8D		cleaver
	Unidentified	vert.		1		01	chopped
TOTAL:				14(3.1%)			
VI	Cow	humerus	prox.	1	6P		chopped
	Cow	radius	prox.	1		07	slice mark on medial side
	Cow	ilium	body	1	5E		saw
	Pig	ilium	body	1		05	saw
	Lge. Mammal	lum. vert		1		01	saw
	Med. Mammal	thor. vert		1		01	saw
	Med. Mammal	lum. vert		1		9T	saw
	Unidentified	scapula	body	1	IJ		saw
	Unidentified	unident		1		01	saw
TOTAL:				9(2.5%)			

NOTES: [1] = percentages are for entire component.
[2] = Code additions - schematic illustration in report appendix. 01, 05, 07 - see code appendix.

Table 9: DISTRIBUTION OF BUTCHERED BONES

DISTRIBUTION OF BUTCHERED FRAGMENTS BY CODE

STRATA	BUTCHERED	LYMAN	GREENFIELD
	FREQ.(%)	FREQ.(%)	FREQ.(%)
IA	1(1.4) (1.15%)	-	1(100%)
IIA	1(0.9) (1.15%)	-	1(100%)
ID	2(1.6)	2(100%)	-
IIB	8(2.5)	3(37.5%)	5(62.5%)
III	24(5.3)	4(21%)	15(79%)
IVB	14(3.1)	9(64%)	5(36%)
VI	9(2.5%)	3(33.3%)	6(66.6%)

Table 10: DISTRIBUTION OF BUTCHERED FRAGMENTS BY CODE

Table 11: DISTRIBUTION OF BIRD BONES BY STRATUM AND COMPONENT

STRATUM	CMP	SPECIES: GALLUS GALLUS (Chicken)	MELEAGRIDAE GAL. (Turkey)	ANAS SP. (Duck)	ANSER SP. (Goose)	GALLIFORME	CHARADRIFORME (Shorebird)	LARIDAE (Gull)	FALCONIDAE (Falcon?)	UNKNOWN	NOTES
IA	2									6	
	5										
	6	5		2	1[c]					59	[c]Brant
										3	sp.
IIA	8									2	
	9	2								9	
	10	1								5	
	12									3	
	13	1								3	
	61	1									
1640 TOTAL:		10	-	2	1	-	-	-		90	
ID	3	2								3	
	4	1	1							17	
	40									5	
TOTAL:		3	1	-	-	-	-	-		25	
IC	1	1									[b]1-anasplatra (mallard)
IIB	14	31	3		1			2		57	1-aytha co (ringneck)
	38	3								5	
	62		1						1	3	1-anas sp.
	76	14	2	3[b]		2		1		29	
1680 TOTAL:		49	6	3	1	2	-	3	1	94	
III	52	2								3	*same individual
	53	7+31*					1				
	54	6								11	[a]-possible turkey
	63	3	2+1[a]								
1720 TOTAL:		49	3	-	-	-	1	-		29	
IVB	15	42	-	1	-	1	-	-		199	
SUM TOTAL:		153	10	6	2	3	1	3	1	423	602

A. SUMMARY OF RESULTS: THE CHRONOLOGICAL RECORD

This rescue excavation has documented the stratigraphic record and range of variation of all excavated remains from this Colonial shorefront block of the Dutch West India Company, which was found sealed and buried under the 19th century basement floors of the site's most recent construction phase. In addition to recording the location and construction details of Augustine Heermans' warehouse fronting on Pearl Street, the rescue effort retrieved 43,318 artifacts, the traces of three other 17th century structures and a number of Colonial features which could be linked in time and place with important early Dutch residents of New Amsterdam and the Dutch West India Company.

The primary goals of this study and the priorities of this rescue effort have been based on a few key assumptions and perspectives. First, that these archaeological remains represent a non-renewable unwritten archive which is fast being lost as an independent source of study for this period of American history. Second, that these archaeological traces both augment and at times, contradict written documentary accounts of past events and patterns. Third, that given the rapid loss and considering the importance of these material remains for reconstructing an objective overview of past cultural and environmental events, then the primary goal must be one of data documentation so as to provide a resource base for future students, regardless of current theoretical views and biases. Fourth, that given the

fact that these dated remains can reflect patterns both through the nuances and idiosyncracies of the ornate artifact categories as well as through the shifts in the relative proportions of these and more mundane remains through time, then this archive must be preserved in a stratigraphically based, precisely recorded and quantified three dimensional data base of all excavated materials. Finally, considering the fact that the 17th century organic remains predate scientific records by hundreds of years, the dated plant and animal materials emerge as important environmental time capsules for reconstructing past conditions.

Accordingly, this perspective has dictated both the topic and forms of the analysis of all categories throughout both the excavation and data documentation phase. The computerized data base included the Component by Component definition of the identity, date, origin (where determinate), count, weight and associations of all excavated materials. For both the strata defined, and the material remains recovered, the precise computer-transit recordings of the X.Y.Z. locations to 1/100th of a foot have been generated and recorded to 1/100th of a foot accuracy. This level of accuracy is important because of the winter field conditions under which this study was conducted, and because, as was demonstrated by this buried Colonial site, differences of decades of even centuries can be reflected by locational and depth differences of less than a few centimeters.

In addition to the final computerized data base and the descriptive and analytical sections of this report, a primary

focus of this report has involved the photographic documentation of both the range of variation as well as the key chronological indicators for each of the unmixed 17th and 18th century deposits. This is due to the central importance of clearly defined dating evidence for reconstructing the chronology and proper associations of contemporary events and remains. This photo documentation includes both elaborate artifacts, as well as less aesthetically pleasing clues to the identity and date of important features and events in the site's history.

Finally, in addition to its primary objective of documenting these now destroyed remains, the recovery of well dated stratigraphic deposits has permitted the identification of some significant shifts and transformations in the nature and proportions of the excavated materials through time. The purpose of this final summary of results will be to focus on these changing cultural patterns as documented from a 70 year period (from 1650-1720) represented by unmixed primary Colonial deposits identified from the site. As will be summarized below, this chronological framework has permitted the identification of changes in the nature and construction techniques of the structural remains and associated features identified for the 17th century deposits, many of which were either not documented by contemporary, or if discussed, did not match the written versions. This dichotomy between the written and archaeological record was especially evident in the case of Mr. Heermans' warehouse. These shifts in the nature of the structural remains were also matched by significant shifts in the origins and

cultural affiliation of the artifacts encountered between 1650 and 1720. Finally, through the study of changes in the relative composition and percentages of animal and plant remains through time, the early Dutch and British remains have provided some strong indications of important changes in both the food patterns and environmental conditions of this settlement and its inhabitants.

B. THE ARCHAEOLOGICAL SEQUENCE:

The purpose of this section is to summarize the stratigraphic, chronological and documentary correlates for all of the excavated deposits or Components. Subsequent to being defined (by Mr. William I. Roberts IV) as distinct stratigraphic deposits or Components, the artifact analysts provided independent assessments of the time range of each Component containing artifacts through identification of the TPQ or initial manufacture date of the latest artifact encountered. These independently dated artifact categories were then compiled and compared to establish the most acceptable TPQ date for each of the deposits of Components. Finally, based on these multiple independent lines of chronological information, it was possible to compare and group the various defined and dated Components, or natural stratigraphic deposits, into larger clusters of temporally and functionally defined groups designated as Strata Groups.

This process resulted in the incremental reconstruction of eleven distinct Strata Group clusters comprised of 80 natural stratigraphic Components, which in turn were defined from a total of 576 Contexts during the actual data recovery. The preceding body of this descriptive report has focused on the detailed Component by Component analysis of the range of variation and dating evidence for each major artifact category: Ceramics, Glass, Pipes, and Small Finds. The purpose of this overview is to summarize the multiple lines of chronological evidence for each of the major Strata Groups through time and space throughout

the project area.

Based on criteria of relative stratigraphic and chronological isolation and contemporaneity, these eleven defined Strata Groups reflect two major subdivisions of the data base: 1) Primary and relatively undisturbed natural stratigraphic deposits, features and structural remains dating from the mid-17th through the first decade of the 18th centuries (Strata Groups 1-3); and 2) Subsequent multi-Component and mixed secondary deposits and feature fills representing mixed and later intrusions and impacts to the original buried remains dating from the late 18th through to the 20th century. With few exceptions (Component 15), these later deposits of Strata Groupings or Components contain mixtures of both earlier remains together with later materials dating to their time of deposition. Although through the use of TPQ dates versus Ceramic mean dates it was possible to fix their date of deposition, their utility as units of relative contemporaneity are limited because of the long time span represented by their artifact contents. As summarized in Table VII-1, these later deposits with long time spans are indicated by a wide divergence of dates between the distinct artifact categories, for example, early pipe dates and late glass or ceramic TPQ dates. As pointed out in the stratigraphic section of this report, these wide divergences generally do not reflect stratigraphic contamination or mixture during excavation. Throughout the identification process, Contexts which were mixed or disturbed or that represented poorly distinguished interfaces were segmented from

the sample and generally excluded from the dated sample in order to provide valid time ranges for each dated Component and defined Strata Group.

Finally, as a preface for the following summary, it is pertinent to point out that during the actual data recovery and during the data processing phase, a major stress involved the stratigraphic identification and definition of the dates of the contents of builders' trenches for both features and structural remains, as well as the contents of the features themselves. This distinction is important and central for any overall site reconstruction. The fill of features dates the time span of use or abandonment of a feature. The dates of artifacts from the contents of the builder's trench provide a date for establishing the time after which the feature was initially constructed. Thus, by addressing the feature deposits and their dateable builder's trenches, it has been possible to reconstruct both the date of construction as well as that of the abandonment of each through time. In some cases this difference presented a span of a decade or two, and in others indicated a longer gap in time of a half a century or more between the initial feature construction and subsequent abandonment; used for the deposition or disposal of later materials.

Of the total of 43,318 artifacts catalogued, 21,746 or 50% were associated with the earliest, mid-17th through early 18th century deposits. In terms of the stratigraphic sequence, 226 or 40% of all excavated Contexts, and 35 or 44% of the 80 identified

Components belonged to primary undisturbed Colonial-era remains. The remaining artifacts and Strata Groups post-dated 1720 and pertain to the subsequent three hundred years of late 18th through 20th century intrusions and alterations to the original buried shorefront Dutch West india Company settlement. the

The Chronological Framework:

This approach permitted the definition of five major phases spanning from the mid-17th century through to the mid-19th century. A sixth phase reflecting subsequent late 19th and early 20th century impacts and intrusions could be identified, but its physical manifestations were limited to interfaces below the latest building construction phases. The relatively small numbers of diagnostic cultural material, rendered this phase of limited cultural and chronological utility as a primary analytical unit.

The five major Time Phases of the reconstructed site sequence represented by clusters of contemporary and single component Strata Groups are: 1) 1640-1650 (Strata Groups 2A and 1A) early-mid 17th century deposits and features; 2) a 1680 sample (1D, 2B and 5B) late 17th century deposits and feature fills; 3) 1710 (Strata Group 3)deposits and structural remains; 4) a group of mixed late 18th century post 1795 Components (Strata Groups 4A and 5A) and 5) the mixed 18th and 19th century fill of a single feature (Component 15 of Strata Group 4B), the fill of the oval yellow brick cistern which was filled and abandoned sometime after 1844. These primary stratigraphic and chronological Phase clusters of natural stratigraphic units reflect only the refined

and dated deposits of primary chronological utility. They are characterized by clear natural stratigraphic units of contemporaneity and relatively larger sample sizes of dated artifacts. However, based on their stratigraphic relationships, additional Components and Strata Groups could be associated in time and space and will be addressed accordingly in the following discussion.

While some of the archaeological sites previously excavated and reported on for urban Manhattan could be discussed in time and space relative to their 19th century lot lines, this physical framework is not applicable to the early remains at the Broad Financial Site for two reasons. First, the later 19th century lot lines do not correlate with the early Colonial period lot dimensions and locations; and second, the long sequence of dated deposits identified reflecting different periods of occupation, were not contemporary throughout the site. Thus, although their locations relative to the most recent lot numbers and locations will be used as convenient reference points throughout this discussion, the excavated remains will be addressed principally as relative units of contemporaneity within the five phase temporal framework described above.

With a few exceptions, the Components comprising the earliest dated deposits are composed of the builders trenches of the early features and structural remains encountered. The definition of the subsequent temporal group at the site conversely consists of

the fill contents of these features as well as secondary deposits overlying the original 17th century surfaces. Taken as a group, the excavation identified the remains of four 17th century structures which included the three walls and cobble floor of Mr. Heermans' post-1650 warehouse (Strata Group 1A), the original surface upon which it was built (Strata Group 1C), a group of contemporary but unrelated wall elements in Lot 8, (Strata Group 1B), the builders trenches and fill of three early double-barreled buried wooden privies or cistern features (2A and 2B), a post-1680 series of secondary construction or destruction debris deposits (Strata Group 1D), and finally three 17th century yellow brick features, one an oval yellow brick cistern, a rectangular yellow brick structure at the rear of the excavated warehouse which was cut through and associated with a semicircular oval yellow brick earlier cistern at its northern end. While the construction of these features dates to the 17th century, the fill deposits within are later.

Thus, in addition to Heermans' warehouse, the 17th century features were restricted to three double-barreled buried wooden cisterns or privies and three yellow brick features. One of these barrel features was found in Lot 14, at the western end of the site, and the other two were found in close proximity in the rear of Lot 8 at the eastern end of the site. The three yellow brick features were all encountered in the rear of Lot 10, associated with and situated behind and to the north of Mr. Heermans' warehouse. The subsequent early 18th century, post-1710 deposits were represented by the fill of the small stone

structure at the rear of lot 11, and by the fill of a circular red brick cistern initially encountered during the testing phase in the rear of the western-most Lot 14. The dating evidence for each will be discussed on à Phase by Phase basis so as to maintain their relative and distinct chronological relationships throughout the 350 year occupation at this site.

The Historic Occupation Surfaces

The earliest stratified remains were the original 17th century occupation surfaces, represented by Strata Group 1C. These five Components (1, 37, 46, 48 and 59) were comprised of two primary deposits, a reddish sand in several cases permeated by concretions of precipitated iron oxides, and two by a distinctive greenish silt deposit. Both were encountered throughout the site, but the two also overlapped in several areas. The reddish sand substrate visible at or near the surface in the front or southern end of each 19th century lot was overlain with increasingly thicker greenish silt deposits towards the northern or rear end of each lot. Both are being interpreted as the original and predominantly sterile primary surfaces and substrates upon and into which the initial 17th century features and structural remains were either cut or overlain during the occupation phases. The greenish silt surfaces also correlate in character with the historic documentary descriptions of Manhattan's characteristic "green bank" of the original shore line (Historic Tales of Olden Times, p.102).

Both of these primary substrates were almost culturally sterile and contained only 131 artifacts (11 fragments of glass, 12 ceramics and 4 pipe fragments) which together amounted to less than 1% of the pre-1720 sample. Only Component 1 of this Strata Group 1C sample contained diagnostic artifacts, dateable by a pipe TPQ to post-1670 with an end date of 1720, in addition to a glass TPQ of 1676 reflecting the presence of lead glass. Although these substrates represent the original surfaces and interfaces for all subsequent deposits, and while their stratigraphic position argues for a pre-1640 time frame, the limited number of dated artifacts suggest that they were exposed and lived on from the mid-17th century through to the early 18th century based on the date range of Strata Group 3, which post-dates 1710.

THE EARLIEST 1640-50 FEATURES AND DEPOSITS

The earliest deposits cutting into these primary surfaces consisted of the contents of 17th century builders trenches (BT) and the fill of the northern-most wooden double barreled feature found in Lot 8 (CMP8). Grouped together into Strata Group 2A, these seven contemporary Components deposits (8, 9, 10, 12, 13, 22, and 61) all contained dated artifacts with early TPQ's post-dating 1640-1650, but without diagnostic artifacts which are hallmarks of the next 1680 time phase. The 1640-50 group consisted of the builders trenches of the three buried double features and that of the rectangular yellow brick structure. In

addition, the sample was represented by the fill of the earliest double barrel feature (CMP 13) encountered under an 18th century wall in Lot 8, and the contents of an associated pit outside of it (CMP 12) with a wooden plank in the bottom, which appears to have functioned as a stepping platform.

As a group, these deposits yielded a total of 1454 artifacts representing only 6.6% of the pre-1720 sample. This sample in turn contained only 247 identifiable ceramic, glass and pipe fragments, but permitted the identification of ceramic TPQ dates for each of the Components, pipe Mean dates for three of the Components, and two post-1630 glass dates for Components 12 and 13. Each of the seven ceramic TPQ dates post-1640, two date post-1650. These clustered and consistent dates indicate that each of these were initially constructed between 1640 and 1680 and represent the initial manifestation of occupation at the site. Of the seven contemporary and dated Components in this sample, three were associated and functionally interrelated as the builders trench (CMP 8), the fill (CMP13) and contents of the associated pit (CMP12) of the earliest double barrel feature encountered in Lot 8. Together these associated components yielded 50.6% of the mid-17th century sample.

The 17th Century Features:

Of the three double barreled wooden privies or cisterns, one was located in the middle of Lot 14, the former location of the Kierstede family at this time. The second early double barreled

feature was found in lot 8, under an 18th century wall in the rear and behind the former mid-17th century warehouse and home of Van Tienhoven. The third of these features (CMP) was also in lot 8, but to the south of, and inside of the 18th century wall. This stone wall ran east-west across both Lots 8 and 10, and cut through the north-south wall of the mid-17th century wall of Heermans' cobbled floor warehouse.

The chronological placement of the three 17th century wooden

what happened to the rest of the sentence?

The first of these double barreled features (CMP 61) was encountered during the backhoe scraping of the truncated and frozen surface in Lot 14. The upper portion of the top barrel was eclipsed and lacked approximately a foot of its original height. The builders trench around it contained a total of 149 artifacts, 3 fragments of glass and 5 of ceramics. Nevertheless, the ceramics provided a TPQ date of 1640 indicating that the feature had been constructed sometime after this decade. However, the fill (CMP 62) contained 563 artifacts, including 10 fragments of glass, 25 of ceramics and 52 pipe fragments which yielded a series of four consistent TPQ dates which clustered in the 1680's (Table VII-). These construction and fill dates correlate in time with the period of occupation by the Kierstede family which spanned from 1647 to 1710. The contents of this feature, analyzed in detail in each of the artifact sections of this report, can be taken to reflect the belongings of at least the first or second generation of the Dutch Doctor's family.

It would be useful to summarize this information. What does this tell us about the Doctor's family?

The second and third wooden barrel features, both located in Lot 8 are chronologically consistent, both based on the artifacts associated with them and by their stratigraphic interrelationships to each other and to the stone wall which overlay them. The earliest of these two features, found under the wall appears to have been constructed and filled over a short time period, after 1640 and before 1680. The builders trench (CMP 8) which contained 154 artifacts yielded a ceramic TPQ of 1640 and a pipe Mean date of 1635. The pit associated with this feature (CMP 12) which contained 124 artifacts yielded a ceramic TPQ date of 1640 and a glass TPQ date of 1630. The fill of the barrel feature itself (CMP 13) contained 459 artifacts with four consistent glass, ceramic, and pipe dates indicating that it was filled sometime after 1650 but before the 1670's. The pipe end date of 1665 and the lack of lead glass together strongly suggest that the fill of this feature at least predates 1676.

This date range corresponds with the occupation dates of Von Tienhoven's "warehouse and Greathouse "which are mentioned in 1653 and 1656 deeds respectively. Cornelis Van Tienhoven was a political and economic force and official under three administrations until he was discredited and dropped out of the documentary record in 1656. Tienhoven was also infamous for leading the first Dutch raids on the natives of Staten Island, which in turn precipitated the Indian Wars of the 1640's. However, his wife continued to reside there until her death in 1663, and then his son until 1679. Thus, this double barreled feature appears to have been constructed while he was alive, and

then abandoned and filled during his wife's and son's occupancy in this lot (Stokes I, 266). Again, what do these artifacts tell us about this family?

The third double barrel feature (CMP14) and the second in Lot 8 were identified and excavated to the south of the first, inside the 18th century east-west wall. This association was important because the wall was built over the earliest wooden barrel feature, and its builders trench cut through the builder's trench of the second double barrel feature. As shown in both the drawn profile and the photo (Fig.___ , Plate___), this stratigraphic relationship demonstrates that the second barrel predated the construction of the east-west wall which, based on the ceramic TPQ date of 1800, may have been built as late as the beginning of the 19th century.

In addition to this stratigraphic evidence, the latest dateable artifacts from the fill of the builder's trench of this third double barrel feature (CMP 9) appears to have first been constructed at least ten years after the earlier double barreled feature in Lot 8, or around the 1660's. It yielded a ceramic TPQ of 1650 and a pipe Mean date of 1664. The latest dateable pipe fragments have an end date of 1700, so the feature must have been built within this time bracket.

The fill of this barrel feature (CMP 14), in addition to a larger number of well preserved artifacts (a total of 1985 which included a series of intact red ceramic roof tiles), yielded

parallel ceramic and pipe TPQ dates of 1680, a pipe Mean date of 1697, and a pipe end date of 1710. This cluster of independently derived lines of dating evidence indicates that the feature was filled during the last decade in the 17th century, and that the artifacts found within it date to (or before) this decade.

Unfortunately, it is not possible to correlate this dated feature with an historic occupant within this old Tienhoven lot. The deed history has a gap of almost one hundred and twenty years between the last Tienhoven deed of 1656 and the next record of 1795 when the lot was registered as containing a dwelling of Robert Watts.

In the front of the eastern Lot 8, and south of this second double barreled feature (CMP 14), the excavation crew uncovered a group of short stone wall segments consisting of a line of dry laid stone (CMP 43), a line of mortared wall stones (CMP 44) and a single square stone slab (CMP 45) resting on the sterile reddish sand. These three stone wall segments were difficult to date because they lacked any association with diagnostic artifacts and were difficult to stratigraphically relate to the warehouse walls to the west because they were separated from it by a 8-10 foot wide oval shaped 19th century pedestal pier pit. Grouped together as Strata Group 1B, they are tentatively being associated in time based on their general stratigraphic relationship to the Heermans' 17th century warehouse. In his stratigraphic reconstruction, Will Roberts noted the potential sequence of construction for this group based on the presence of

beam slots in the sterile underlying silt matrix, one parallel to the laid stone wall, with three decayed beam slots oriented perpendicular and to the south of it. He suggests that the beam slots represent an initial wooden foundation structure, followed by the dry stone alignment, and finally followed in time by the mortared stone alignment.

The idea that the sand filled decomposed beam slot represents an early construction phase is augmented by the presence of two dateable artifact categories. The sand beam slot fill contained twenty sherds, one of which provided a ceramic TPQ of 1820. The 20 pipe fragments encountered provided a Mean date of 1702 and an End date of 1700. These two lines of evidence suggest that the wooden beam slots had decomposed prior to the 1820 ceramic TPQ date. Their stratigraphic position suggests that the beams were in place during the 17th century. If indeed the case, these associations argue for a 17th century date for the original wooden beams, and thus would correlate in time with the general period of Secretary Tienhoven's residence in this lot. The location of these probably multi-phase structural elements, which have collectively been called "Building C" also correspond in location with the position of Tienhoven's home as shown on the 1655 Innes lot plan of the block (Fig.).

In addition to the 1650 and 1680 structural remains and feature fill deposits which could be associated with recorded structures, and people of the original Dutch occupation, this temporal sample

was augmented by three components to the west of Heermans' under the 19th century Lot 10. Grouped together under Strata Group 1D, these four post-1680 Components (CMP's 3, 4, 39 and 40) consisted of two deposits of refuse and construction (CMP39,40) or destruction debris (CMP3,4) and the builders trench and fill of north-south trench or drain which ran roughly parallel to the western wall of Heermans' warehouse (Fig.). The two construction/destruction debris deposits were both identified in four 5'x5' excavation units. the trench was identified in the last days of excavation in one 5'x10' floor unit. Within the Strata Group, the Yellow Brick debris (CMP 4) yielded the second largest number of artifacts from this temporal sample, 602, and the second largest concentration of pipe fragments from the 1680 sample.

Interpretation of these deposits is limited by the restricted area coverage, but the presence of a crossmend ceramic 46, a ginger/green glazed redware dairy pan, between this group of Components and the adjacent Lot 11 building destruction debris suggest that they may not have been related to Heermans' warehouse, but instead to 17th century events in Lot 10, the location of the documented but archaeologically invisible Dutch West India Company Pach-Huys warehouse.

Heermans' Mid-17th Century Warehouse and Associated Features:

The rescue excavation identified and exposed three walls and the interior cobbled floor of the pre-1651 warehouse of Augustine Heermans and three associated yellow brick features to the rear

of it. It corresponds in location with the former Lot 9 which was subsequently covered over and incorporated sometime during the 19th century into Lots 8 and 10. The most recent dividing wall separating these two lots cut through the center of the 17th century warehouse. The warehouse identification is further established by the precise correspondence of its recorded dimensions with the documented dimensions of 26 by 59 English feet (Innes 1902:53). This exact overlay of the archaeological building with the 1655 building and block plan compiled by Innes permitted the reconstruction of the actual and original Pearl Street shore front block, relative to modern city lot and block dimensions. Both Mr. Heermans and his warehouse structure were central and important elements in the 17th century economy and physical make-up of the original financial district of 17th century New Amsterdam. Described by Innes as one of the "most substantial buildings" in the 1650's, it is recorded as a three story brick building with two foot thick walls, with a tall gabled roof. The large number of 17th century red roof tiles excavated from features and destruction debris in both Lots 8 and 10, suggest that it may have been roofed with red tiles as well. The warehouse was both visually imposing and represented a major financial investment of this period, with an assessed value in 1653 of 8500 Dutch guilders, or approximately three times the value of a contemporary farmstead consisting of a house, barn, outbuildings and land (Innes 1902:280, 285).

Heermans was both multilingual (Latin, German, English, Dutch, French and Spanish) and multifaceted in his skills. Described by others as a "soldier, scholar, artist, merchant, land-surveyor, speculator and manoral proprietor" he was also a privateer and in his own words..."the first beginner of the Virginia tobacco trade" (Innes 1902:54,281). This reference indicates that not only did the excavated warehouse play a central role in the early inter-colonial tobacco trade, but also that this inter-regional exchange network was actively facilitating commercial exchange between the Dutch and English Colonies prior to 1658.

Heermans came to New Amsterdam in 1644 as the agent of the Amsterdam trading house of Peter Gabrys. In 1653, when he ran into severe financial troubles following the illegal pirating of a Spanish ship. The warehouse was taken over and remained under the financial control of this Amsterdam firm until it, together with the adjoining Dutch West India Company warehouse, was confiscated by the British in 1664 (Innes 1902:54-55). Thus "Heermans' Warehouse" was really another financial holding of a Dutch controlled, Amsterdam based company, which as indicated by Rink's work (cited in the introduction to this report) played important roles in the diversified multi-corporate control of New Amsterdam's pre-British economic base. This Amsterdam based control of both the warehouse and the coastal tobacco trade also corresponds with the shift to local inter-regional tobacco trade routes subsequent to the prohibition of direct Amsterdam-Virginia trade in tobacco precipitated by the English Navigation Acts

after 1656 (Rink 1983:7).

The archaeological and structural remains relating to Heermans' warehouse are grouped together as Strata Group 1A, and consist of deposits identifiable as the original builders trenches of the building (CMP 5), the sandy matrix below the floor (CMP 2), the cobbled floor of the warehouse (CMP 6), the cobble-free decomposed beam slot, tentatively identified as the remains of a former interior wall within the warehouse (CMP 42). Because of the concentrated later intrusions of 19th century pier and column support stone footers and builders trenches, together with the superimposed elements of an apparent rebuilding phase identified as Building B, post-dating the last decade of the 17th century (Strata Group 5B, CMP 19), the clarity of associated dateable artifacts with the earlier warehouse remains, is obscured by disturbances and limited sample sizes. Dateable artifacts found in the warehouse wall builders trench (CMP 5) were limited to a post-1580 sherd. The disturbed interior sandy substrate of the warehouse cobbled floor yielded a ceramic TPQ of 1640, a pipe Mean date of 1659 from 37 pipe fragments, and fragments of lead glass post-dating 1676. The floor cobbles themselves were associated with a combination of 17th century pipe and glass dates but a late TPQ date of 1762 which is consistent with the documentary indicators that this interface with overlying destruction debris was in use well into the mid-18th century after the British confiscated the three Dutch warehouses on the block. The long period of use indicated by the late date of some of the artifacts in the cobbled floor was matched by a number of

early finds as well. Among these was the only 17th century coin recovered from the site, a 1590 Dutch token (Fig.) which was found wedged between the cobbles.

The structural alterations indicated by the overlain Building B wall and cobble floor elements found superimposed and cut into the earlier Heermans warehouse corresponds in general date (assuming an archaeological "fudge" factor of plus or minus 5-10 years in the reliability of the dateable artifacts) with documentary indications that the original Heermans warehouse was altered and joined with a common facade to the adjoining Dutch West Indian Pach-Huys sometime between 1664 and 1679 (Innes 1902:55). The 1680 ceramic TPQ and post 1676 lead glass fragments found associated with this Building B reconstruction phase of the warehouse, demonstrated that the stratigraphically earlier Building A elements predate the 1680's. The Building B (CMP 19) floor and wall elements yielded a small number of pipe fragments with a mean date of 1695, but the sample of 13 pipe fragments is too small to provide a reliable date and must be rejected. Thus, despite the multiple intrusions and subsequent alterations and mixture of dateable artifacts between these different building elements, the building dimensions and location together with the stratigraphic interrelationships fix Building A in both time and place with that of Augustine Heermans, dating to the mid-17th century.

Did the artifacts give any clue to the material being stored in the warehouse?

Associated Yellow Brick Features:

Associated with the rear or backyard area of Heermans' warehouse were three yellow brick features which were built after 1640 and destroyed by 18th and 19th century site alterations. The northernmost of these, was an oval yellow brick cistern defined in time by its builders trench (CMP 10) and later fill deposits (CMP 15). The builder's trench yielded a ceramic TPQ of 1640. The limited number of diagnostic ceramic, glass and pipe fragments recovered precluded the definition of either glass or pipe dates, although the lack of lead glass supports a pre-1676 date of construction. However, this low sample size combined with the small percentage of TPQ material in each of the 17th century deposits suggests that the oval yellow brick cistern could have been constructed at a considerably later time period. The presence of yellow brick alone is not sufficient to argue a 17th century date range given the fact that yellow brick construction elements have been documented from both 18th and 19th century sites (Paul Huey, pers. comm., 1984).

The potentially late date of this feature is also indicated by the fact that many of the brick elements were broken, suggesting that they may represent re-use of earlier materials at a much later date. The second line of argument for a relatively late date for this particular feature derives from the fact that the feature fill (CMP 15) contained a large number (2957) of mixed mid-18th through mid-19th century artifacts. The earlier 18th century fill elements are indicated by a pipe mean date for the

recovered 84 pipe fragments of 1730, a pipe TPQ of 1762 and a pipe end date of 1823. The glass yielded a TPQ of 1800 and the ceramic TPQ was 1844.

However, the other two yellow brick structures both appear to share a 17th century construction date and were found adjacent to each other outside the rear northeast corner of Heermans' warehouse. The most prominent of these was a unique rectangular yellow brick structure measuring 5 feet by 10 feet in plan, with an interior rectangular basin and a thick 7 course yellow brick base. The interior of this feature was plastered with triangular tiles sealing the basin corners. At the western end of this feature was a half yellow brick cistern which appears to have been built prior to the rectangular feature. This sequence is indicated by the fill of a builders trench associated with the rectangular yellow brick feature which separated the semicircular yellow brick feature from it. The builders trench contained only mid-17th century ceramics (CMP 22) and only two pipe fragments which suggested a TPQ date of 1630. The two features were not structurally related and the two ends of the half cistern had jagged stretchers and header bricks clearly separated by several inches from the well finished outer surface of the buried rectangular brick feature. These artifact and stratigraphic indicators suggest that the rectangular feature was built through and after the half-yellow brick cistern at its western end. However, both appear to represent mid-17th century features and correspond in time with the period of use of the warehouse.

The stratigraphically indicated multiple construction sequence of the yellow brick features suggests also that their function may have shifted through time. Potential functional interpretations depends on four lines of evidence: 1) dating; 2) the nature of Dutch use patterns for yard areas; 3) physical evidence such as stains or ash and 4) the potential availability of comparative samples published or recorded by previous documentary or archaeological examples for comparisons.

Beginning with the last line of evidence, this rectangular yellow brick feature which has not been previously documented in the archaeological or written record, does not match any cistern or feature types known from this period and had no clear archaeological clues associated with it. Aside from traces of plaster liner, there were no burn or chemical stains or debris. However, given documentary and ethnohistoric descriptions of Dutch attitudes and use patterns of backyard areas, there are several possibilities indicated.

Because of the thickness of the floor, several observers suggested a possible use as a powder magazine. But the walls were relatively thin double course brick and the interior area a small, less than 50 square feet. Another suggestion was as a tanning vat, but no stains of tannic acid were visible and illustrations of 17th century tanning facilities in Diderot illustrate lines of circular vats in a large work area. On

possibility, given the location at the corner of the building, is that the two features represented first and second attempt water catchment cisterns for rain runoff. One 17th century account referred to the use of backyard cisterns for clothes washing and the cleaner well water from the street as drinking water ( ). Finally, there is another consideration, the configuration of the rectangular well-built feature with a semicircular basin at one end suggests a planned or ornamental function. A semi-ornamental function is also suggested by the open join between the circular and rectangular feature. As Dr. Hershkowitz documents, Dutch backyards were a focus of carefully maintained flower gardens. gardens were also shown to be highly visible in this block in the _____ view of New Amsterdam. The backyard garden was an enclave and source of independent income in the local market system ( ).

Ornate gardens with landscape hedges and exotic flowers are described for the high status residences in general, explicitly for this block, and was a noted feature of the backyard and rectory area of the 1633 church on the block. Thus, it may also have served as a garden element, a cistern of some sort, both or neither.

Research on the uses of yellow brick in 17th century New York by Joe Sopko of the N.Y.S. Bureau of Parks provided a 1703 reference to the use of imported yellow Dutch bricks as "Soap-boilers fats (Vats), and in making of Cisterns." (Moxon 1703; Huey 1984 pers. comm.). This early 18th century "Doctrine of Handyworks" also

describes Dutch versus English bricks with the following coverage: "In Holland, they make small ones, being about six inches long, three inches broad and one inch in thickness. They are made of Earth, or which the whitish chalky sort of Earth, and the Redish are the best. At Lunenburg in Saxony, they make them of a fat Earth full of Allom. Also there are good bricks made at Pitane in Asia, of a Pumice sort of Earth, which being dryed, will swim in Water and not Sink. Likewise, the Antients made them of Earth which was Sandy. But here in England they are made for the most part of a yellowish coloured fat Earth somewhat Redish. And they are made of several sorts of sizes. In Holland they make small ones, being about six inches long, three inches broad and one inch in thickness. Which sort of Bricks, is commonly used here in England, to pave Yards or Stables withal; and they make a good Pavement, and are very Durable, and being laid edge-ways looks handsomely, especially if laid Herring-bone fashion. They are also used in Soap-boiler Fats, and in making of Cisterns. The common Bricks that are made here in England, are nine Inches in length, four Inches and 1/4 in Breadth, and two and an half in thickness; and sometimes three Inches thick...".

single space this lengthy quote

The yellow bricks of the rectangular yellow brick feature matches the Dutch versus English dimensions, measuring 1.5 by 3 by 7 inches. These probably imported Dutch bricks as well as with the corner tiles to seal the interior together suggest that the rectangular feature functioned as a cistern for Heermans'

warehouse. This interpretation is supported by the wear and erosion evident in the thin interior plaster veneer suggestive of being water worn.

Unfortunately, the archaeological presence of these two associated and stratigraphically interrelated yellow brick features does not coincide with the documentary description for the rear of Heermans' warehouse. There are also inconsistencies over the interior of warehouse. Innes described the warehouse as having a cellar on the inside and in the rear yard an "out-kitchen, fitting it for a residence as well as a store house" (1903:54).

In contrast, the mid-17th century building matching Heermans' location and dimensions found in the excavation had a cobbled floor at the same elevation as the original buried 17th century surface. No below-ground cellar was indicated. The archaeological finds also did not match the written rear yard description. Only the possibly late oval yellow brick cistern in the rear, and the corner yellow brick features were found. No building or structural elements were identified.

The Early 18th Century Deposits: Strata Group III

In terms of stratigraphic integrity and chronological isolation, the final temporal group of archaeological remains which survived the subsequent 18th century and 19th century impacts, were two groups of Components which consistently date to the first and second decades of the 18th century. These Components represented

undisturbed and stratigraphically sealed deposits both with large and well-preserved diagnostic artifact yields. The first of these post-1710 Components (CMP 63) was represented by the fill of a red brick feature found in the rear of Lot 14, Dr. Kierstede's residence, during the first week of the initial testing program. The second group of contemporary Components (CMP's 51-55) came from the rear of Lot 11 and from the interior destruction debris of a small stone rectangular outbuilding.

This red brick cistern fill, previously described in detail in the Phase I testing report, contained 3337 artifacts, including 204 pieces of glass, 127 ceramic sherds including whole reconstructable vessels, and 265 diagnostic pipe fragments. Its contents from this 1710-1720 period included a pewter goblet, reconstructable earthenware vessels, and a number of domestic utensils, and one of two complete onion shaped glass bottles recovered from the site.

This early red brick cistern post-dates the first double barrel feature (CMP's 61) found in the same lot by over half a century. It's date range also corresponds with the 1710 date of the last Kierstede family occupant in this lot, Lucus Kierstede, their son by a second marriage of Mrs. Kierstede, the doctor's wife. Unfortunately, the surviving documentary record from Wills is blank for over eighty years, from 1710 to 1795, when the property is registered as belonging to Miles Sherbrook.

From the fill in this red brick cistern can you draw any X-30 generalizations about Lucus Kierstede?

The second group of Components dating to this short chronological period, was represented by 11,522 artifacts which included ornate Delft plates and unique deposit of over 7000 English pipe fragments, which represent one of the largest single lot collections of clay smoking pipes excavated from a single and undisturbed stratum for this time period. As analyzed in detail by Diane Dallal in this report, the collection of pipes probably represents a single shipment from a single manufacturer in Bristol, England. This unit of stratigraphic and chronological contemporaneity has provided a large sample which will provide control of the range of variation of Bristol imports for this period of Colonial history. The sample included numerous discards, pipes with two holes, and clay repair patches, stems reworked into whistles, and finally, a sufficient sample to permit the reconstruction of several complete pipe bowl and stems prior to being shortened with use. This sample included the most mendable ceramic vessels recovered from the site, including a delft chamber pot, posset pot and Steinzug tankard.

Mid 18th-19th Century Intrusions and Impacts: Strata Groups VI-X

The next identifiable temporal group of deposits skips in time to the post-1795 period and is represented only by the bases of truncated features, destruction debris over earlier 17th century materials or structural remains, and the fill of robbers' trenches. Like all subsequent deposits, this cluster of late 18th century destruction debris is characterized by temporally

mixed artifacts ranging in date from the mid-17th century through to the late 18th century. In other words, these later and overlying deposits reflect the re-deposition of both early and late destruction debris, and thus are of limited archaeological value for characterizing the artifact range and cultural or material patterns for any one period. They are useful, however, in the reconstruction of the site formation processes. They suggest by their mixed and multi-component contents that the mid-18th century was destroyed and left only as secondary fill deposits over earlier, but relatively undisturbed and deeper 17th century remains. The dates of the overlying and later Components from 19th century construction activities suggest that the mid-18th century surfaces were higher than that of the 17th century, but was cut away sometime after the mid-19th century during the construction of uniformly deep brick and cement laminated basement floors.

The ceramic and glass dates combined from this post-1795 group of Components in Strata Group 4A, document that the underlying rectangular yellow brick structure had been destroyed and abandoned by this time period, and that both the earlier foundations of Buildings A and B associated with Heermans' warehouse had been pilfered by robbers trenches at least by the end of the 18th century.

In addition to the fill of the oval yellow brick cistern (CMP 15) and the beam slot fill from Lot 8 (CMP 7) the second group of destruction debris-related deposits (Strata Group 4B) all date

to the mid-19th century. These were represented by the fill of two mid-late 19th century truncated trash pits under the brick basement floor of Lot 14 (CMP's 65 & 66). Like the 18th century destruction debris, these 19th century deposits also contained a multi-component mixture of mid-18th century through 19th century debris.

The sealed and stratigraphically isolated 17th century and early 18th century remains recorded in the eastern end of the site under Lots 8 and 10 were uniformly capped by a layer of sand and silt (CMP 34) and then by a layer of stone rubble (CMP 35) under the brick basement floors which yielded large numbers of diagnostic artifacts and consistent TPQ dates from both ceramics and glass of post-1830 and 1820, respectively. However, these destruction debris interface deposits also contained a number of safety glass fragments with reinforced wire mesh which post-date 1891. These very late artifacts may either represent mixture from the most recent demolition phase or possibly, the existence of two 19th and 20th century phases of basement construction. The 1830 cluster of ceramic and glass dates correspond in time with documentary indications mentioned in the introduction which suggest a series of early 19th century reconstructions in and around the block, many related to the Great Fire of 1835.

The Lot Walls

The reconstruction of subsequent impacts and alterations to the site are further clarified by the dates of artifacts from the

fill of the most recent lot walls and from the contents of eight large pits dug into and through the earlier 17th century remains to support a series of multi-element stone pedestal piers. The wall builders trench fills are represented by Strata Group VII, and the Pier Pit column fill deposits by Strata Group VIII for Lot 10 intrusions, and by Strata Group IX for the Lot 8 pedestal pier fills. The three Components of Strata Group VII from the most recent lot wall construction post-date the 1770 and 1780 period. One builders trench from the Lot 8-10 wall builders trench (CMP 26) yielded an 1844 ceramic TPQ. The earlier late-18th century TPQ dates probably reflect the relatively small sample sizes from these Components, while the post-1844 TPQ dates for the Lot 8-10 wall builders trench came from a more secure sample of 785 artifacts. This evidence, together with the recovery of a post-1857 glass bottle base under the brick floor of Lot 14, suggest that the most recent impacts and alterations to the site occurred after the mid-19th century.

The eight pedestal pier pits running at 10 foot intervals down the center of Lots 8 and 10 were associated with and structurally integrated with the overlying brick floors from the post mid-19th century construction phase. Two of the eight identified pedestal pier pits were excavated and yielded a large number (5637) of diagnostic artifacts spanning in time from the early 18th century to the late 18th century. The largest pit fill sample (CMP 28) also from under Lot 10, the western half of the company warehouse, yielded thousands of broken roof or pan tiles, as well as the personal bottle seals of Archibald Kennedy, the first

British tax collector for the requisitioned Company warehouse which was renamed the Customs House after 1664.

Sometime after the mid-19th century, the underlying 17th century deposits were again disturbed by the construction of a red brick drain and catchment system (Strata Group 10) which contained post 1850 glass fragments and stratigraphically could be argued as post-dating the pedestal pier pit intrusions because the brick drains were curved around the pier pits when constructed (See Plate).

This sequence of events and site formation processes suggests from several lines of evidence that the mid-18th century deposits which once accumulated over the deeply buried 17th century remains were cut away and preserved only as mixed, multi-component strata sometime in the mid-19th century. This gap in the archaeological record for the 18th century coincides with the loss of the rear backyard areas indicated by the 19th century Atlas maps for the block used as an initial excavation strategy tool in the first stages of the testing program. The destruction of the 18th century surfaces and remains is also indicated by the recovery of only the base of a plaster lined red brick cistern whose bottom was on the 17th century surface in the rear of Lot 8. The subsequent deep basement construction cut off or truncated all but the base of this 18th century feature. The fact that its base was at the 17th century level and that it coincided with the modern mean water table which today also

corresponds in depth with the 17th century surface, suggests that survival of the deep remains very likely was an artifact of the rising water table.

The deep brick basements extended only to the depth of the fluctuating water table. Multiple lines of evidence (citations for water table fluctuation) indicate that the historic water table had been lower than it is today, and that it has risen at a rate of approximately one foot per century since the Colonial era. Given the modern depth of the water table at the 17th century surface level, it appears probable that the water had risen at least two feet since 1650, and that by the mid-19th century it had reached the level of the buried 17th century archaeological remains at high tide. Thus, it appears probable that the increasing thickness of the laminated brick and cement 19th century basement floors stopped in depth at the 19th century water table, or at least the high water mark.

Finally, this review of the stratigraphic record and in particular of the dating evidence for establishing the dates of initial construction and subsequent filling of each of the features permits the definition of a general but consistent chronological contrast of these colonial features. In particular, this sequence highlights the significant shifts in construction techniques and materials before and after the 1680 temporal phase of the site sequence. specifically, the analysis of builders trenches TPQ's versus feature fill TPQ's for each of the features excavated highlights the fact that the use of double

barrel and yellow brick construction consistently pre-date the 1680 phase. In contrast, the use of red brick in cistern construction does not become evident until after the 1680 period. In addition to the 2 features excavated, this transition was also evidenced by the comparison of quantified total for yellow versus red brick when contrasted through time between the 1640, 1680 and 1710 deposits. As illustrated in Figure X-3, although red brick fragments from some construction-related activities were present in the two earlier phases, yellow brick predominates in both. The 1640 and 1680 deposits showed a severe shift in relative proportion to a predominance of red brick in the 1710 deposits. Thus, in addition to documenting the relative shift in structural materials, this example illustrates the utility of using quantified stratigraphically based samples for the definition of general chronologically specific patterns through time for the early historic occupations.

C. ARTIFACT CONTINUITY AND CHANGE THROUGH TIME: 1640-1850

Although tightly dated, stratigraphically controlled studies of artifact variability are only beginning to emerge for the archaeological study of 17th century non-English Colonial period, similar work in other regions such as Spanish St. Augustine in Florida, have demonstrated that changes in artifact patterning through time can be clearly linked to historical and cultural shifts which may or may not be documented elsewhere in the written record (Deagan 1982). In addition, as will be addressed in the following section, other archaeological work with quantified animal remains have shown...."that there is a predictable relationship between the specific components and proportions in a given faunal assemblage, and the function of the site from which it came, the ethnic affiliations of the site's inhabitants and the economic status of the inhabitants" (Deagan 1982:166; Cumbaa 1975; Mudar 1978; Reitz 1979).

Most recently, and or immediate relevance to this Dutch data from New York, the comparison of the relative percentages of identifiable European and Native American ceramic types from early and late 17th century Spanish sites in Florida has demonstrated a pattern of cultural assimilation which was quite distinct from that of the contemporary British colonial traditions in the Atlantic coastal regions. Specifically, through the use of well controlled, naturally stratified and dated ceramic sample, Julia King has argued that towards the end of the 17th century, the Spanish settlers had increasingly become

acculturated with the native population, which was reflected in the archaeological record by an increasing dependence on aboriginal ceramic types (1982, 1981). Through the use of quantified computer data base of the St. Augustine excavation, she was able to demonstrate an overall drop from 58% to 33% in European Ceramic types, which were replaced by a parallel increase from 41 to 66% of Aboriginal types. This shift was most noticeable in the specific replacement of the Iberian Olive jar forms with functionally equivalent native vessels (King 1982:78).

Although published comparisons of contemporary non-English colonial assemblages from the New York region are not as yet available, comparable quantified work on Dutch material from the 17th century Fort Orange site are suggesting that shifts in the relative proportions of different artifact types through time are also identifiable and suggestive of historical and cultural trends. In particular, Paul Huey's work with this collection has shown a chronologically significant shift in the relative proportions of certain ceramic ware types at the Fort Orange site, which are specific for each identified time period (P. Huey, pers. comm., 1984).

An internal analysis of the quantified and dated stratigraphic sequence of both the artifacts and the animal and plant remains has provided some clear indications of significant cultural, economic and environmental shifts through time from this site as well. As the final step in the data documentation and identification aspect of this study, each analyst was directed to

identify shifts in the character of the stratified samples through time. Using the computer based inventory which codified the identity, provenience, dates, of all excavated materials this chronological comparison focused both on the addition of new material or artifact types through time as well as shifts in the relative proportions and percentages of different groups or attributes of the excavated materials throughout the sequence.

By the last month of the data reduction laboratory phase of the analysis, it was possible to identify five stratified temporal groups of dated materials or phases of the site's history. Based on the use of the TPQ dates for each artifact category included in the analysis, (ceramics, glass, pipes, small finds, as well as faunal and floral remains) these five phases could be defined as post-dating: 1640, 1680, 1710, 1795 and 1844.

When the attributes used in the analysis of each artifact category were tabulated and compared through time, this dated sequence of deposits from the mid-17th century through to the most recent 19th century remains showed both individually and together, clear and numerically identifiable shifts in the diversity of identified types, the origins of imported and domestic goods, and in the cultural preferences and changing ethnic makeup of the inhabitants of the block through time. These changes in the dated and quantified excavation materials also provides a basis for addressing one of the central questions posed at the outset of the excavation and analysis phase of this

study. To what extent and when, if at all, does the material record permit the identification of a shift or transition in the sequence from a "Dutch" to a "British" orientation? And, in general, what patterns or associations of material attributes characterize the cultural patterns of each of these distinguishable periods of the site's history?

Beginning with the 1640 material as a baseline, it is possible to generally characterize the range of variation and salient characteristics of all excavated materials for this period as a basis for identifying shifts and contrasts in the character and makeup of subsequent dated samples. These shifts are reflected by the advent of new artifact types, changes in the relative proportion of previously identified types, as well as preliminary indications of changes in the origins and sources of manufacture of a small number of identifiable artifact sources of manufacture through time.

Although these trends and patterns have only recently been defined for the dated collection, and that it is easier to describe what happened versus why it happened, it is apparent that beginning with the 1640-50 collection there are strong consistencies in the range of variation of all identifiable artifacts in each of the diagnostic artifact categories. Both ceramics and pipes showed a limited diversity and restricted origins. All but the late 16th century Westerwald sherds were exclusively earthenwares. Limited in number to seven types, versus 10 for the subsequent phase, 87% of the sample was

characterized by a predominance of Redware (47%) followed by several varieties of Delft (36%) and 4% Majolica. Five types made up the remaining 13% of the diagnostic sherds. This earliest temporal group at the site contained no Midlands or Buff-Bodied Slipware, which provided the 1680 TPQ for the subsequent phase at the site. These early deposits also contained the largest number of Delft tiles in the collection.

Parallel with this limited range of ceramic variation and the majority limited two types, Dallal's analysis of the pipes showed a similar clustering. These early pipes were characterized by exclusively Dutch bowl forms and a complete lack of English varieties. All of the identified bowls were manufactured in Amsterdam, and were associated exclusively with Amsterdam makers' marks. The 1650 sample was also distinguished from later ones by the fact that 15% of the stems were decorated, of which 80% were decorated with a specific, and presumably Dutch "fleur de lys" design. Validating the use of bore stem diameters for 17th century samples, Dallal demonstrated how the majority of the bores were consistently large relative to later examples.

Consistent with this pattern, she found that 43% were 7/64" and 38% a larger 8/64". Later 1680 and 1710 samples were consistently smaller than this mode. Finally, the earliest sample included a relatively small number of reworked stems, many notched into whistles, an artifact category which increased in proportion through time.

Of the three artifact categories, the analysis of glass by Joseph Diamond was the most difficult for several reasons. Dated comparative examples are limited for this period. Because of early plateaus in technology, much of the earliest glass probably did not survive the archaeological burial, and finally, glass appears to have been less common in the earliest sample at the site. Nevertheless, Diamond was able to show shifts through time in several categories of the glass analysis. Because Diamond was able to detect the presence or absence of lead with ultraviolet rays, the scanning of the entire collection established that this earliest 1650 sample lacked identifiable examples of lead glass. The 1650 sample was also characterized by a low 10% presence of wine bottles, and within the category of table glass, 50% consisted of imported German Waldglas. Furthermore, of the small number of fragments which could be identified as to country or region of origin, all of the earliest examples from unmixed deposits came either from France, Germany or continental Europe. The earliest Dutch residents in the block were clearly not of limited means and had access to imported European glass vessels.

Each of these pattern showed a shift in the subsequent 1680 artifact samples. For ceramics, this shift was demarcated in time by the introduction of two new pottery types - Midlands and Buff-Bodied Earthenware, both English types and both first manufactured after 1680. This period was also distinguished by the introduction of Porcelain and two new identifiable vessel forms, Delft Chargers and Chamber pots after 1660. There are also quantifiable shifts in the relative percentage of ceramic

ware types. Red Bodied slipware increases in proportion while Delft and other Redware types stay the same as in the earlier sample. The earliest identifiable ceramics, Majolica and Westerwald, both decline in relative percentage, from 4% to 3%, to 2% and 1% respectively. Finally, beginning with the 1680 sample, Nancy Stehling has pointed out that during this phase it becomes possible to identify specific origins versus having no control or ability to identify origins for the previous 1640-50 materials.

By 1680, the smoking pipes showed a comparable increase in the diversity of types and forms represented. This shift was marked by the initial introduction of English pipes, an increase in the number and diversity of makers' marks and an increase in the source of supply to several manufacturing centers, including Amsterdam, Gouda and Bristol, England. Although Dutch pipe bowl varieties comprise a large proportion of the post-1680 sample, it is marked by a sharp increase in the number of identifiable bowl types and by a general trend towards larger capacity bowl sizes. This group showed a marked 50% drop in the percentage of decorated stems from 15% to 7% and a sharp reduction in the number of fleur de lys designs from 80% in the 1650 sample to 21% for the 1680 sample. There was also an increase in reworked stems from 3% to 7%. Finally, this sample was characterized by a reduction in the diameter of pipe stem bores. Stems with a diameter of 6/64" increased from 12% to 59%, and those with a 5/64" diameter increased from 3% to 11% of the sample. Larger

7/64" and 8/64" diameters, characteristic of the earlier phase, dropped from 43% to 24%, and from 38% to 4%, respectively.

The introduction of lead glass after 1676 was reflected in the 1680 sample by an increase to 20.6% of all glass, a major shift and key chronological indicator for this time period. This phase was also marked by a general trend in the increase of wine/liquor bottles, a trend which continued throughout each of the successive phases.

For the succeeding 1710 phase, the ceramic collection is defined by the advent of two new types, Nottingham and Fulham stoneware, both English varieties; shifts in the relative percentage or proportion of ceramic types which were predominant in the previous phases, and finally by the dropping out of two earlier ceramic types. No Dutch majolica and no red-bodied slipwares were represented in the sample. Although Dutch varieties of Delft continue into post-British period of Colonial New York, the introduction of British Delft by this time increased the proportion of Delft in general to 57% of the sample. By this period also, the percentage of redware drops from 47% of the previous samples, by nearly 50% to a low of 19%. Porcelain increases slightly from 2% to 3% in the post-1710 sample.

It is not until after 1710, forty years after the British takeover, that the smoking pipes shift to only British sources. This domination of British pipe makers after 1710 is also characterized by almost a 100% increase in the diversity of

makers' marks, from 8 in the 1680 sample to 15 different makers in the post-1710 sample. This period is also marked by a decrease in the percentage of decorated stems, an almost complete drop out in the number of reworked stems during this British dominated phase of the site's history. FInally, consistent with the general trends through time, the stem bore diameters decrease in size with the highest concentration clustering at 41% for 5/64" diameter stems. It is pertinent to point out that in this 1710 sample, over 11,000 specimens came from the interior fill of the small outbuilding (Building D) in the rear of Lot 11. This collection came almost entirely from a single workshop and over 94% of the identified makers' marks were that of Robert Tippet II.

This shift after 1710 is also demonstrated for glass. Of the 39 identifiable glass objects, tentatively identifiable as to origin, all but 1 came from England.

Thus, in summary, the use of both the advent of new characteristics and the quantified shifts in the relative proportions of identifiable artifact types in all three categories, clearly demonstrated that the shift to a predominantly British pattern of material culture is not identifiable until after the British takeover of New York. Furthermore, until the first or second decade of the 18th century, there is a clear continuity in Dutch artifact types. The relative proportions of Dutch and Germanic forms shifts through time, but based on this date and stratified sample, it

would appear that the transition was both a gradual and long term one. However, as the following section points out, the shift from Dutch to British patterns in the remains may be more clearly discernable from the food habits and preferences of the people as is evident in the food remains.

The fledgling status of 17th century ceramic chronology in general, and the limited availability of comparative samples from the New York region from this period prohibit broad-based pattern recognition, Stehling's analysis of the ceramics from the Broad Street Site did provide an indication of general shifts in the origin of ceramics through time. As summarize in Table ( ), and although limited to only regional and national categories, it was possible to discern some patterns. There was a general drop from 68% to 7% in identifiable European varieties between 1640 and the 1844 samples. This shift coincides with a general decline in the relative percentages of ceramic types from Holland and Germany, and a general increase overall through time in relative presence of English and Chinese ceramic types. These consistent and phase specific shifts add credence to the use of quantified comparative samples in archaeological analysis in general. The technical and chronological analysis of the 17th century sample was not only marked by the advent of new artifact categories, but also by clear and definable shifts in the relative percentages of identified ceramic types and attributions of origin in general.

D. CHANGING FOOD PATTERNS THROUGH TIME:

The definition of natural stratigraphic deposits with relatively small date ranges permitted the evaluation of the relative presence and changes in percentages of types, in the recovered animal bones in a temporal framework spanning the mid-17th century through to the 19th century. The identified faunal remains could be grouped into four distinct temporal groups: 1640-1650; 1680-1710; 1710-1720 and finally an 1850 group. Greenfield's bone identifications show significant shifts in the relative proportion of domesticated and wild species when contrasted through time, as well as major shifts in the relative abundance of different domesticates between the Dutch colonial and later British periods of occupation at the site. These contrasts and changing trends in turn are pertinent to discussions of the changing food and resource base of Colonial New York. The sharp changes through time also appear to reflect or correlate with differences in ethnic food preference between the Dutch and English populations as well as correlations with role and impact on certain domesticates, in particular pig, and on the 17th and 18th century landscape and environment. Finally, in light of the defined research goal of identifying material indicators of Dutch versus English cultural patterns in the material record, these shifts also may reflect changing cultural preferences of the shifting population makeup of early Nieuw Amsterdam and New York which may be as sensitive an indicator as changing artifact styles through time.

In addition to fish and aviary remains identified, Greenfield's analysis provided relative percentage counts for four major groups of domestic and wild animals, cattle, sheep, pig and deer. Of the four, cattle, while fluctuating showed the least dramatic changes. Beginning with 40% in the 1640 sample, cattle rose in frequency to 47% by 1710 and then leveled off at a slightly lower proportion of the sample by the 19th century (32%). This relatively subtle change is sufficiently low to suggest that the identified shifts may reflect no more than relative sample sizes and the fact that the latest sample was derived from a single refuse filled cistern versus a number of deposits as was the case for the earlier samples. However, the shifts for deer, pig and sheep were more dramatic and appear to indicate real changes either in availability or cultural preference between the 17th and 18th centuries.

Of these, the sharpest change through time was evident from the deer remains. Deer comprised 12% of the faunal sample in the 1640-1650 period but then dropped precipitously to less than 4% by 1680 and from then on continued to decline until it was entirely absent from the latest 1844 deposit. This drastic decline translates into a 66% drop between 1650 and 1680, implying that well before the British takeover, deer had ceased to be a major food source for at least the elite residents living along the Strand in the financial center of the settlement.

This archaeological pattern correlates well with what we know from Colonial records of the changing environmental conditions along the Atlantic seaboard. The demise of the deer population in this region came about for two reasons, hunting overkill and environmental degradation caused by European land use practices, specifically competition from domestic herbivores and changing habitat caused by intensive agriculture (Cronon 1983:108). In New England, the deer populations were so decimated by the end of the 17th century that Massachusetts..."enforced its first closed season on their hunting for a closed term of three years" (Cronon 1983:101). By the end of the 1700's, deer were only to be found in limited numbers below the 44th parallel, and could only be found in quantity away from the major population centers, in northern Vermont, New Hampshire and Maine (Cronon 1983:101).

Within this context, the drastic demise of deer remains through time from the Broad Street Site essentially parallel the documentary indications for the early 17th century for the New England region. Given the fact that the fur trade began relatively early on in the New York region, (private Dutch traders or advance men and trappers were active in the Delaware, Hudson and Connecticut drainages by the first decade of the 17th century), it would not be surprising if this depopulation of deer began even earlier in this area than in the more northern colonies of New England. The quantified and dated faunal remains suggest that this might in fact be the case. The precipitous drop in identified deer between the 1650 and 1680 samples suggest

that this process was well underway in the New York area by at least the mid-17th century. In fact, the very low 1680 sample counts suggest that deer may have ceased as a significant food source in Nieuw Amsterdam even prior to the British arrival in 1664.

The implications for the status of the 17th century environment are not positive. As indicated above, the deer populations declined both because of hunting overkill and loss of their habitat. Cronon has recently argued that this habitat change had both to do with European farming practices, the enclosure laws, impacts from European short grass eating herd animals as well as the loss of the deer habitat from the demise of native fire clearing, slash and burn agriculture which fostered edge area and shrub growth favored by deer (Cronon 1983:). If the deer populations indeed fluctuated with these impacts, then this data suggests that the New York region's environment was undergoing extensive and devastating landscape alterations at least as early as the mid-17th century.

Aside from these deer remains and a few small animal bones, the only major meat or fur producing wild game encountered was a single beaver bone found only in the 1650 Contexts. None was encountered in the 1680 or later sealed deposits.

Of the last two categories of animal bones encountered, sheep and pig, both showed strong and contrasting trends through time. Both animals were significant economic elements in colonial

Be more Specific

society, and both were strongly linked to the distinct ethnic food preferences of the Dutch versus the British. The shift in the relative abundance of these two European introduced species were both sharp and consistent through time.

During the earliest Dutch period represented at the site by deposits postdating the 1640 decade (Strata Groups 1A and 2A), sheep represented 20% of the faunal remains. By the next period of 1680, sheep rose to 24% and continued to increase in representation throughout the British period to a high of 32% in the 19th century. In contrast, the initial representation of pig bones started off at a higher incidence than sheep at 25% and rose to 32% of the sample by the decade of the 1680's. As noted in the introduction, multiple lines of documentary evidence indicate that the Dutch cultural patterns were still highly visible in early British New York until at least the 1680's.

However, for the subsequent 1710 sample, a time of increasing British cultural replacement, the pig remains dropped to 15%, nearly half the 1650 ratios of the Dutch occupation phase of the site's history, while the percentage of sheep rose steadily through time to 27%. No mid-18th century unmixed deposits or samples survived or were identified, but the single cistern fill sample (CMP 15) containing both 18th and 19th century refuse showed a slightly higher density percentage over the 1720 sample. Again, this slight increase may reflect the limited number of late samples or the effect of mixture or both.

What stands out is the clear and strong contrast in the indicated trends, a drop in pig and rise in sheep populations after the British takeover, and demise of the Dutch colonial patterns in the everyday life of early New York. This is of more than passing interest; both pig and sheep were closely tied to the distinct cultural traditions of the Dutch and English, respectively.

The introduction of the pig into the New World played a significant economic and environmental role in the 17th century development of both Spanish, British and Dutch colonial history. It played a central and distinct role as a food source for each, it had direct and devastating impacts on the landscape of each settled region, and may have played a central role in precipitating the Dutch-Indian conflicts of the 1640's in Nieuw Amsterdam, and other settled areas. However, despite these shared impacts on each group, it also appears to have been viewed very differently by the Dutch and English settlers both as a food source and as a status indicator, which may explain the shifts in relative proportions of pig remains through time at this site.

The impact of pigs into the Carribbean Islands, New England and New Netherland, and its subsequent impacts has a great deal to do with the distinctive reproductive and foraging patterns of the pig, in contrast to those of cattle and sheep. Unlike other European domesticates, the pig thrives on poorer pastures, and reproduces faster than either of the others. Described as the "weed" creatures of colonial New England, pigs can produce

litters three to four times per year and yield 12-16 young per litter (Cronon 1983:135). In addition, unlike their heavily inbred domestic cousins, if left to roam wild, the pig reverts to a feral state with strikingly different physical characteristics than a barnyard hog. Within a few generations of going to the wild, pigs commonly reverted to a "fast, tough, lean self-sufficient greyhound of a hog, much closer in appearance and personality to a wild boar..." (Crosby 1972:77). It was also appropriately more dangerous than the modern barnyard animal. Like their wild counterparts, both for the Dutch and the English, these feral pigs posed a serious threat to both children and adults in the 17th century (Cronon 1983:136).

Given their unselective foraging habits and high meat yields, pigs were big business in Colonial America for the British, Spanish and Dutch settlers in both North and South America. They first made their mark and established their utility as moveable meat supplies through their use by the Spanish Conquistadores. First introduced into the Antilles in the 15th century, these island bred swine were herded by Indian servants during Cortez's conquest of Mexico, and were brought to Florida by De Soto in 1539 (Crosby 1972:77-78).

It is not unreasonable to suspect that the British and Dutch ventures in North America nearly a century later were influenced in their use of pig by the successes they provided the earlier Spanish expeditions. Their profusion and easy adaptability in

the north Atlantic coastal regions is marked by the enactment of enclosure laws and other administrative attempts to control their range and impacts in English settlements in Connecticut and Massachusetts as early as the 1630's.

In both New England and Nieuw Amsterdam, two solutions were enacted to address the impacts of swine on Colonial farmlands. Responding to complaints in 1650 by Connecticut farmers that "...they would plant no corn, for it would be eaten up..." by swine, New Haven mandated that no pigs could run loose closer than eight miles from town (Cronon 1983:137). However, pigs could not read sign posts and as town became closer and denser in distribution, communities began to enact fencing and enclosure laws to separate the animals from the fields. Plymouth passed its first enclosure laws in 1633, Massachusetts in 1642 and Nieuw Amsterdam (under Peter Stuyvesant) in 1657 (Cronon 1983:134-35; Stokes :61). The second solution for both New England and Nieuw Amsterdam was convenient for the farmers, but devastating for the native populations. In both regions, pigs were moved to isolated peninsulas or islands to separate them from farmlands. The New England colonists began this process in the 1630's (Cronon 1983:136). The Dutch in Nieuw Amsterdam appear to have followed similar policies in the same decade. The 1639 Manatus map names our modern Roosevelt Island as Hog Island, implying that it functioned as an offshore holding area for otherwise difficult to control pig populations for the Dutch as well.

However, in both regions, while this solution may have been beneficial for the farm field, it was devastating for the native clam and oyster shellfish-gathering sites. As Roger Williams observed in the 1630's "...the English swine dig and root these clams wherever they come, and watch the low water (as the Indian women do)...Of all the English chattel, the Swine (as also because of their filthy dispositions) are most hateful to all Natives, and they call them filthy cut throats." (Cronon 1983:137).

Thus, by the mid-1600's, both European farm practices in general, tree cutting, and grazing animals (the pig in particular) were actively impacting the environment and the traditional food base of the native landscape and populations. In New England, the Narragansett Indian leader Miantonomo complained, in 1642, that "...their cows and horses eat our grass, and their hogs spoil our clam banks, and we shall all be starved" (Cronon 1983:137).

The date and focus of these complaints concerning pigs may also be pertinent to the advent of the 1643 Indian wars in Nieuw Amsterdam as well. In his 1973 study of Religion and Trade in Nieuw Amsterdam, Smith noted that although the origins were obscure, Dutch cattle roaming through Indian corn fields played a role in bringing about the initial hostilities (Smith 1973:154). However, in light of the fact that "cattle" often referred to all hooved grazing animals, and given the strong archaeological evidence for large pig populations at this time in Nieuw

Amsterdam, and the documented impacts to the shell banks (on which the Indians depended) from the roaming pigs, it is not unreasonable to suggest that the Dutch pig may have played a larger part in precipitating these hostilities than had previously been stressed for Nieuw Amsterdam.

However, aside from these general parallels, there are several lines of evidence which suggest that the pig may have played a very different role in Dutch colonial history than it did in New England. In fact, the marked drop-off of pig remains after the transition from Dutch to British control of Nieuw Amsterdam may reflect both differences of ethnic preference as well as class differences between the Dutch and New England colonial populations. It may also correlate with differences in economy between the two populations which are, it can be argued, discernable in the archaeological record of this period.

In his recent study of New England history and ecology during the Colonial period, Cronon cited the large number of complaints to the 17th century Massachusetts courts over the enacted swine laws to argue"...It is quite likely that disputes over swine expressed a disguised class conflict. Because pigs were so cheap and easy to raise, they were favored by poorer colonists as a source of meat; wealthier colonists, who could afford to keep larger numbers of cattle, had less need of them." (Cronon 1983:nt. 14; 201). While possibly pertinent for ethnically distinctive New England populations, this thesis does not fit well for the early Dutch of New York.

The Dutch, like their European Spanish counterparts, loved pork. Speck ende kool, or pork and cabbage, as well as other pork dishes were central to the Dutch diet (Earle 1903:143-44). The Pearl Street excavation site was also not a block of lower class residences, but instead, the center of power of the Dutch West India Company and of elite members of Nieuw Amsterdam society. Thus, it is not unreasonable to suggest that the relative presence of pig bones in 17th century refuse deposits, in conjunction with the independent evidence of the artifacts, may serve as an archaeological indicator or correlate for the identification of Dutch cultural patterns for 17th century New York. While the lack of comparative sites and materials from contemporary sites in and around New York prevents a broad-based conclusion, the date shifts through time at least suggest a material pattern in the archaeological record, which deserves comparison with contemporary English and Dutch sites for additional parallels and contrasts from other sites in the future. At the very least, the combined documentary and archaeological data suggest a potential archaeological indicator for distinguishing colonial English and Dutch remains from contrasts in the quantified food remains from stratigraphically controlled samples of the same mid-17th century time period.

Finally, the available documentary records suggest that the pig may have been permitted to roam freely longer in Nieuw Amsterdam than in New England settlements because of the distinctive maritime economic base of the Dutch in 17th century New York. In

addition to scavenging native shell banks, pigs seem to have played an important role in keeping the streets clean in 17th century New York. Until 1657, and probably for a period after, when ordinances against such disposal practices were established, the inhabitants of Nieuw Amsterdam were in the habit of throwing "their rubbish, filth, ashes, dead animals..." into the public streets, the slips in front of the Strand or Pearl Street, and into the Canal where Broad Street now runs (Stokes Vol I:61). The streets also served as the primary areas for the processing and disposal of salted shad, "...great heaps were left when purchased at each door, and the necessary cleaning and preparation of the shad was done in the street." (Earle 1903:124). In this context, the author also noted that "...those public scavengers, the domestic hogs who roamed the town streets unchecked (and even welcomed), must have been especially useful at shad-time." (Earle 1903:125). Thus, given the Dutch preference for pork, and the role of pigs in disposing of the refuse from fish and shellfish processing for the Dutch of New York, it appears likely that pigs may have been permitted more license in Nieuw Amsterdam than in New England colonies (for a longer period). The drop-off of the relative proportion of pig bones in the date deposits only after 1680, suggests that both as a preferred food source and its treatment within Nieuw Amsterdam, may have been quite different than was the case in the predominantly English settlements to the north and south. As Greenfield points out in his analysis of the faunal remains for this study, roaming pigs in New York City's streets continued until the late 18th century, with ordinances preventing their

wandering free being passed as late as 1780. However, it is also clear that pigs continued to have a special place in New York well into the 19th century. Valentine's Manual of the City of New York commented on the state of the N.Y.C. Streets and problems of public health with the following note on the situation around 1816: "...the streets of N.Y. are the dirtiest in the U.S. There appears to be one radical cause of this and that is the number of swine which are allowed to go constantly at large...(and despite the existence of laws to the contrary)...so long as immense numbers of swine are allowed to traverse the streets, so long will the inhabitants think themselves justified in throwing their garbage to them for food." (1916-17:120).

Thus, in addition to demonstrating order of magnitude shifts in the relative percentages of different varieties of animal remains from 1650 through to 1710, the faunal remains also suggest themselves to be sensitive reflectors or indicators of both cultural and environmental transformations. The demise of the deer populations matched documentary evidence that these meat and hide supplies were facing near extinction throughout both coastal New york and New England by the end of the 17th century. The archaeological evidence for their sudden drop-off also reflects historic impacts to the environment necessary for their survival. The magnitude of these archaeologically recorded shifts adds credence to the recent thesis by Condon which argues that the environment of colonized eastern North America had undergone profound degradation at least by 1800, long before the Industrial

Revolution of the 19th century. The 17th century data from this site covering the period from 1650 to 1720 suggests that this shift may have been well underway in the New York region as early as 1700.

The archaeological faunal remains also diverged from the documentary indicators in one important area. While the incidence of sheep and cattle rose steadily after the British takeover (an acceptable pattern given the known English preference for beef and veal), the pig dropped precipitously in its archaeological representation through time. Although this drop-off was consistent with a decline of Dutch cultural patterns, it does not fit well with the documentary indicators for pig remaining highly visible on the streets of New York into the 19th century. If, as the historic documents suggest, pig remained a vivid part of the urban landscape, it appears likely that it served functions other than as a primary food source after 1700. Although clearly consumed, it was not as central to the diet as had been the case during the period of Dutch cultural patterns, which clearly were highly visible for at least 40 years after the British political takeover. The parallels between the changes evident in the ceramic, glass and pipe inventories and those of the faunal remains, suggest that at least for the Colonial era, food preferences may be equally sensitive indicators of cultural preferences and patterns as the more visible artifacts.

E. PLANT REMAINS:

The Changing Plant Community:

Plant remains were recovered both during the excavation, and afterward through the use of water flotation techniques to extract minute trace and seed elements from the site matrix. Samples were taken only from well dated, unmixed strata and thus are best documented for the undisturbed 17th and early 18th century Components. Although a large number of seed types were extracted and catalogued, the number of identified specimens comprised only about half of the total sample. This was due in part to the limited botanical and museum comparative collections that were available for study. Nevertheless, once the identified varieties were grouped into large typological categories and then sorted by dated Strata Group or temporal units, several clear and chronologically consistent trends could be observed.

As illustrated in Fig. 6, when the two general categories of weeds (or edge area plants) were contrasted to the relative percentage of fruits, two opposing shifts are suggested. First, there was a continuous and steep decline in the incidence of "weed" types from over 45% of the 1640 identifiable sample to less than 30% by 1680, and finally down to less than 10% by the 1720 sample. Weeds are important indicators of disturbed or altered environments. In contrast, there was a marked increase in the presence of European domestic fruit specimens over the same period. Although less pronounced in its rise than the decline of weeds, fruit pits increased from a little over 50% to

in excess of 90% of the sample between 1650 and 1720. Although the actual percentages must be tempered by the fact that over 69% of the latest 1720 sample was unidentified, the direction and magnitude of these shifts must be addressed.

If one works from the assumption, as Condon documents, that most Colonial weeds were 1) indicative of disturbed environments, and 2) that they were primarily of European origin, then several implications are apparent. On one hand, the high incidence of weed in the earlier mid-17th century sample suggests that this biological colonization process was actively replacing native species in the faunal remains, and the rising ratios of domesticates versus wild species (Fig.), these archaeological plant remains also suggest that at least the habitat and landscape of the New York region had been "Europeanized" with such domesticates as the often mentioned growths of Colonial fruit trees at least as early as the end of the 17th century. The concomitant decline of "weed" types would be consistent with this transformation of the landscape to a fenced, manmade environment.

Finally, it is pertinent to mention the recovery of small numbers of identifiable tobacco seeds from the earliest dated deposits. Although it may represent simple sample size and preservation conditions, it is interesting to note that this important economic base of Dutch New York, was not represented in the post-1720 British period sample. The largest number of specimens came

from the 1650 sample, with a few examples present in the post-1680 sample. As has been mentioned in the introductory historic context portion of this report, New Amsterdam in general and Mr. Heermans' in particular served as primary entrepot and transhipment mechanisms for the indirect tobacco trade from Virginia, until the British Colonial administration negated this intermediate step and shipped directly to England from Virginia. It is intriguing to suggest that the lack of tobacco remains from the later sample is consistent with this general regional and trans-Atlantic economic re-adjustment.

This section is very interesting
This certainly is an area a graduate
student could do a more
detailed study.

F. CONTACT PERIOD INDIGENOUS ARTIFACTS

The historical research has shown that Native traders and wampum producers were working and participating in the shore front markets during both the 17th and early 18th centuries. At least two residents on the block had intimate dealings with the indigenous peoples. Mrs. Kierstede, wife of Nieuw Amsterdam's first doctor, harbored Indian women traders in her rear yard. Secretary Tienhoven led the Dutch into battle against the native inhabitants and precipitated the devastating Indian Wars of the 1640's. There also exist several general references to the possibility of pre-contact villages and coastal shell midden work-stations in the vicinity of the site.

A total of 11 indigenous ceramic sherds and 31 flakes, cores, and stone tools were recovered during the excavation. Based on the reconstruction of dated strata, these Contact-period artifacts could be grouped into two major sets - those which came from secure unmixed and firmly dated contexts, and a second group which was found in association with mixed, multi-component deposits with long time spans from the mixture of earlier and later deposits. However, none come from the pre-Dutch sand and silt substrates which underlay the 17th century occupation remains, which would suggest pre-Contact settlement of the site.

Ceramics

Of the former, three of the native ceramic sherds came from well dated post-1640 and 1650 Components. In addition, a single broken native pipe stem was recovered from post-1694 historic

fill deposits found during the utilities work under Pearl Street. the remaining eight sherds came from late secondary mixed deposits post-dating 1795, and spanning into the mid-19th century (Strata Groups 4A-10).

Out of the total of 31 stone flakes, cores and stone tools, 7 came from early, well dated single component post-1650 Components. Ten flakes, including a reworked blade awl, came from well dated post-1680 contexts. the remaining 15 flakes and cores came from mixed post-1795 deposits with artifact dates spanning a century or more. Five cores were recovered in this set, and all were found in the post-1830 sediment which separated the buried and sealed 17th century strata from the overlying mid-19th century rubble and most recent brick basement floors.

Of the three mid-17th century sherds, one was a plain body sherd from the post-1650 builders trench of Heermans' warehouse (Strata Group 2A, CMP 5, Fig). The only dateable historic artifact in this fill deposit was a post-1580 Dutch majolica sherd, but we know from the documentary record that the warehouse was probably built between 1647 and 1651.

The two other well dated native pottery fragments were both decorated and both came from post-1640 deposits. The first of these decorated specimens (Fig b) was a small 2-3cm body or neck sherd with a series of thin parallel incisions with acute indentations and a line of punctuation running at an acute angle

to the incisions. It was found in the post-1640 fill of the northernmost double-barrel feature in Lot 8, associated with the location and time period of Secretary Tienhoven's tenure on the block. This distinctive sherd seems most similar to Late Woodland types from the Mid-Atlantic region, although detailed analysis may permit its association with more regionally specific ethnic affiliations. Its late stylistic affiliations and late Contact Period associations suggest that it may have been utilized or discarded after the arrival of the Dutch.

The second decorated ceramic sherd is a larger 5cm wide body sherd with wide shallow herringbone incisions on its surface (Fig c). It was found in association with post-1640 Dutch pottery (delft) in the fill of the 1/2 yellow brick cistern to the west of the rectangular brick structure at the rear of Heermans' warehouse (Strata Group 2B, CMP 16). Although distinct from the first in its light paste color and thickness, this decorative pattern suggests a Woodland Period affiliation, it is more difficult to assign to a particular woodland phase than the first example.

The final diagnostic prehistoric artifact, a pipe stem, from well dated contexts was recovered from post-1694 levels on the deep fill under Pearl Street (CMP 76, CX 18, Fig). It measured 5.9cm in length and 1.9cm in diameter at its smoking end. There was no decoration on it, and its only stylistic affiliations are to the general trait of thick, wide stems on Late Woodland Indian pipes. However, it does demonstrate that indigenous artifacts

were clearly being deposited in the refuse associated with the 17th century Dutch occupations site well into the 1680 period.

Of the thirty-one flakes and cores, two lithic artifacts appeared, both worked and altered by use. The first of these, a unifacial thumb nail scraper measuring 1.75cm by 1.9cm, showed edge wear and micro-chipping around its curved edge. Unfortunately, this worked flake came from the mixed silt deposit (CMP 34) between the basement floor and the underlying 17th century deposits containing mixed 18th through mid-19th century artifacts.

The second indigenous stone tool was more interesting and came from well dated contexts clearly associated with the 17th century occupation. This reworked chalchedony blade tool had two long chipped edges, and a pointed triangular and abraded tip (Fig). The type of this tool, probably an awl or graver, was well worn with multiple lateral micro-chips suggesting that it had been used in circular drilling motions. It was found associated with the Yellow Brick destruction debris (CMP 4) to the west of Heermans' warehouse which yielded consistent TPQ dates of 1680 for ceramics, glass and pipes. Although purely speculative, it is noteworthy that wampum manufacture was a major activity for the local surviving natives of this period.

The Basket:

Finally, it is pertinent to include the recovery and preservation through negative mold casting techniques by the project conservator Melba Myers, the form, surface pattern and contents of a buried coiled basket dating to the 17th century in the yellow/brown sandy silt of Lot 8, behind the former location of Secretary Tienhoven's home. Described in detail in the conservation section, the basket contained a wooden board in its bottom which may have served a variety of purposes. Of the total of 167 artifacts found within it, the sample included in addition to a Dutch blue on white Delft Wan-Li motif plate(Plate F), 36 fish bones, 20 iron nails, a piece of lead shot, a copper thimble, hook and eye, 16 marbles, three glass beads, five unworked stone flakes (Fig) and four complete examples and one fragment of Indian wampum (Fig). These four clam shell beads (Venus mercenaria?) included three white and one purple example. All were ground flat at either end and all were bilaterally drilled with a straight drill bit versus being drilled by conical. This feature suggests that they were probably manufactured using European straight drawn metal drills (Fig).

The basket appeared to be buried in beach sandy silt characterized by sloping lamination towards the shore. Several theories about its function and purpose of burial have been suggested. Because of the regular holes in the circular wooden board in the bottom of the basket, together with the 16 marbles

of various sizes, it was tentatively thought that this might present a game set similar to Chinese Parchese. However, late in the analysis process, a visiting Dutch amateur archaeologist, Edwin van Drecht, pointed out that researchers in Amsterdam had repeatedly found as basement features, buried barrels and baskets in contemporary Dutch sites which functioned as site drains and run-off basins. The perforated wooden base would have served this function equally well as that of a game board. The dated material in the stratigraphic contexts containing the diagnostic contact period artifacts is consistent with the documentary indications that native Indians were indeed an active social and economic element of this shore line Dutch West India Company complex in the second half of the 17th century.

CHANGING ANIMAL BONE RATIOS THROUGH TIME

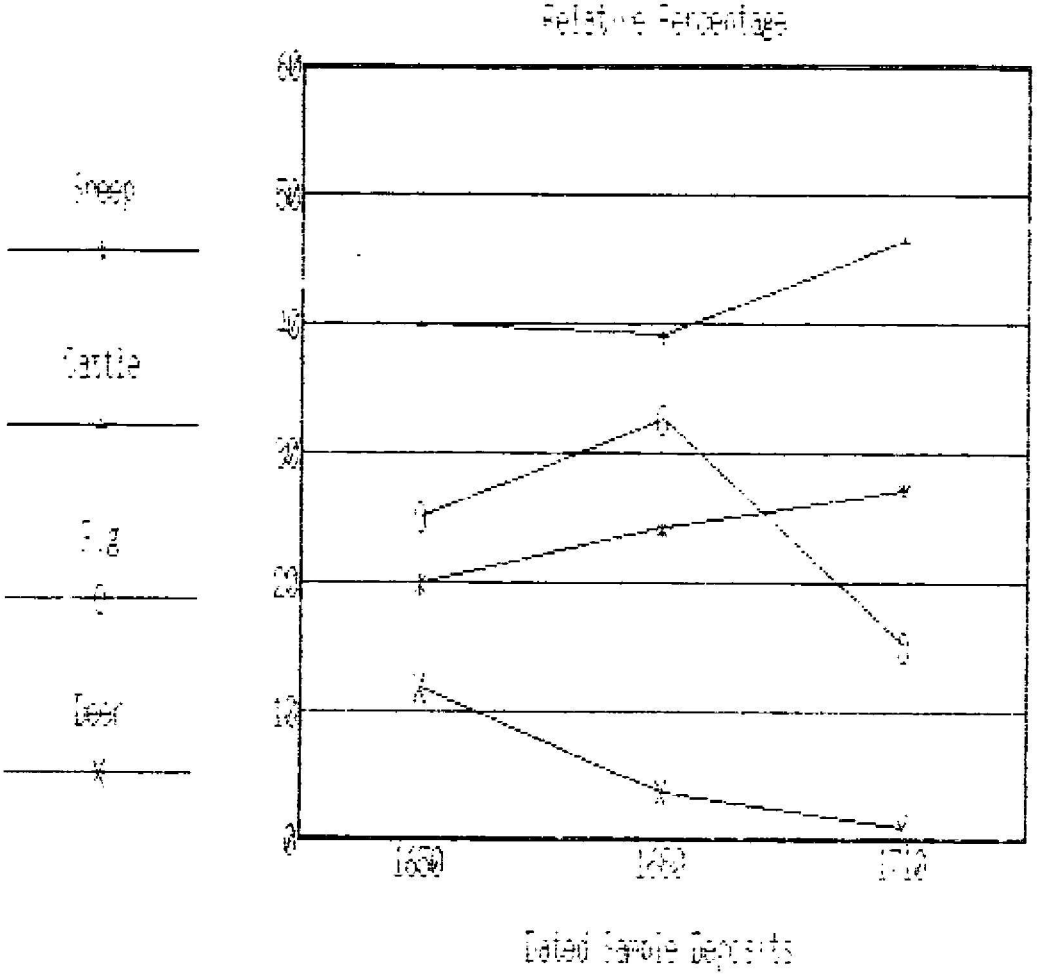


FIGURE X-1

CHANGING RED-YELLOW BRICK RATIOS

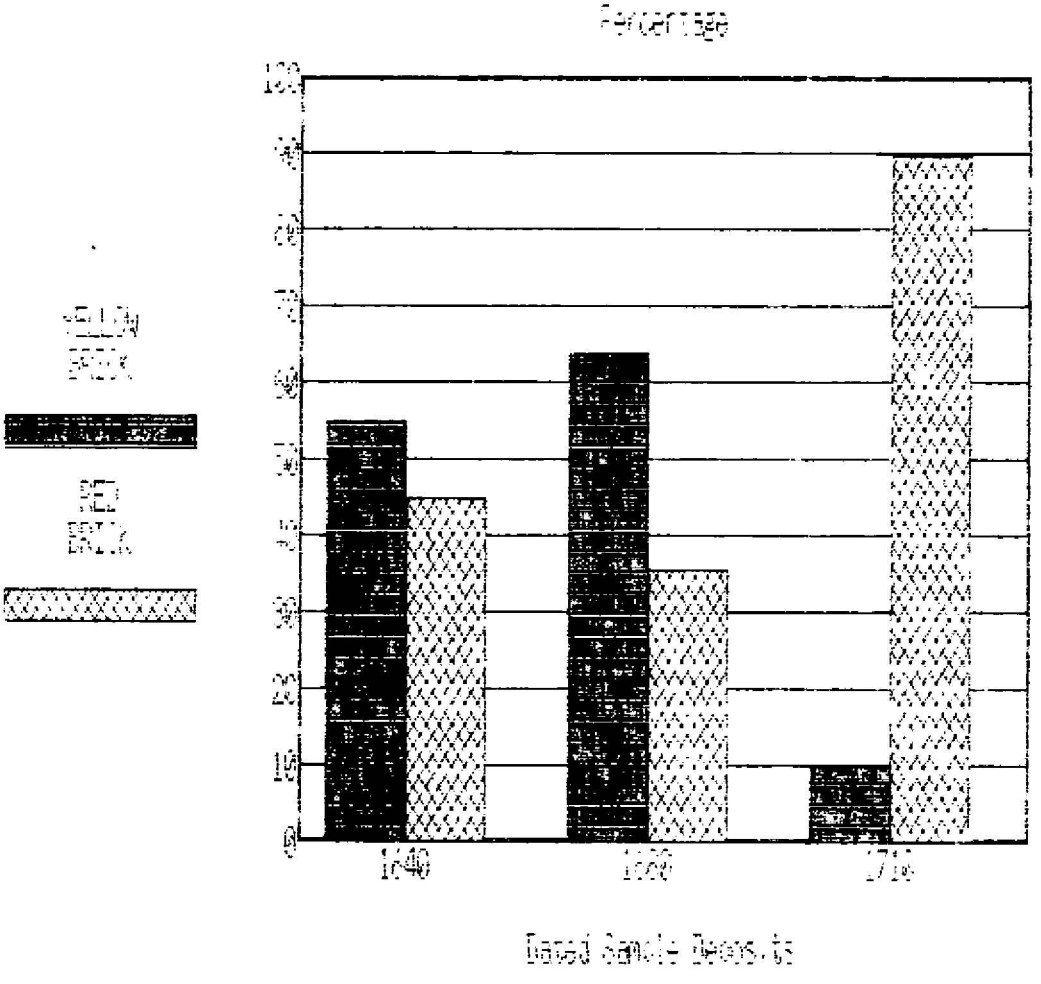


FIGURE X-2

CHANGING CERAMIC ORIGINS 1650-1710

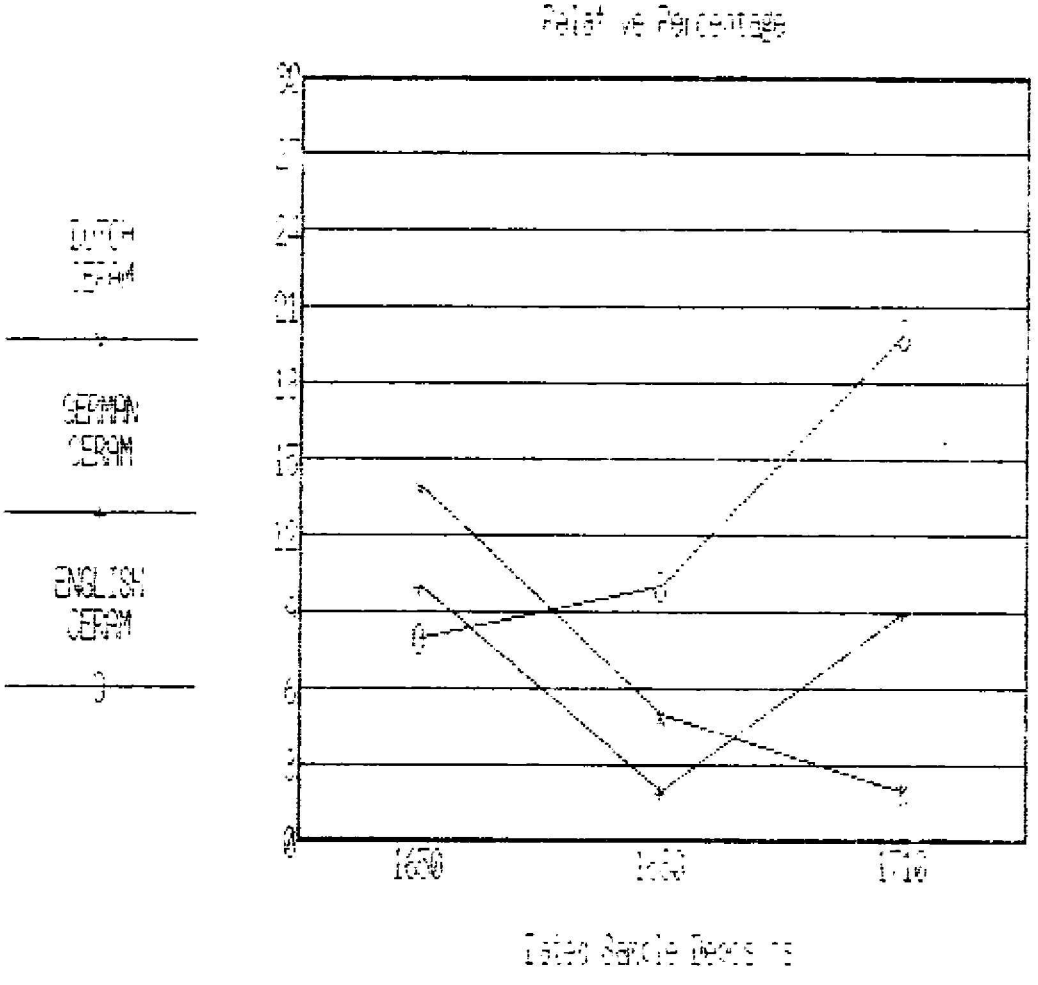
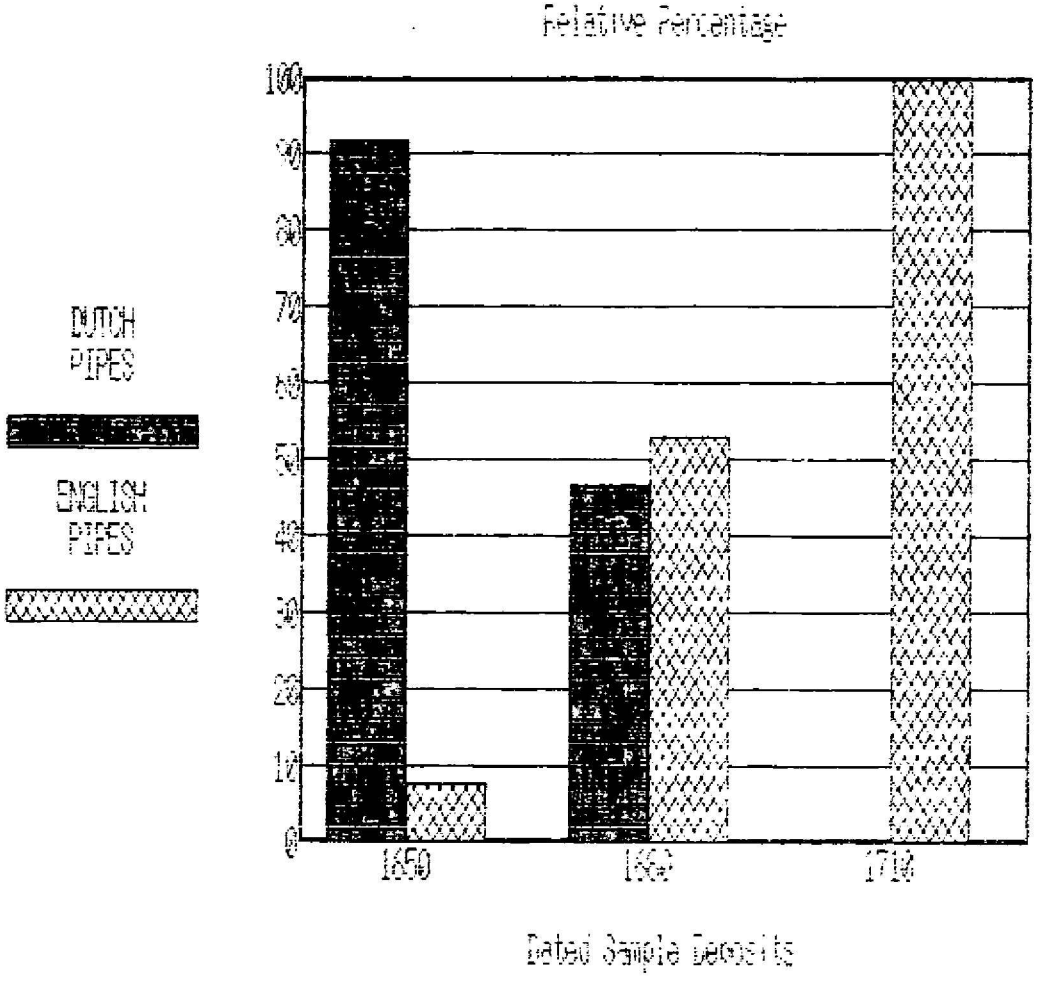


FIGURE X-3

CHANGING PIPE ORIGINS 1650-1710



CHANGING CERAM ORIGINS 1650-1710

FIGURE X-4

CHANGING WEED FRUIT RATIOS 1650-1710

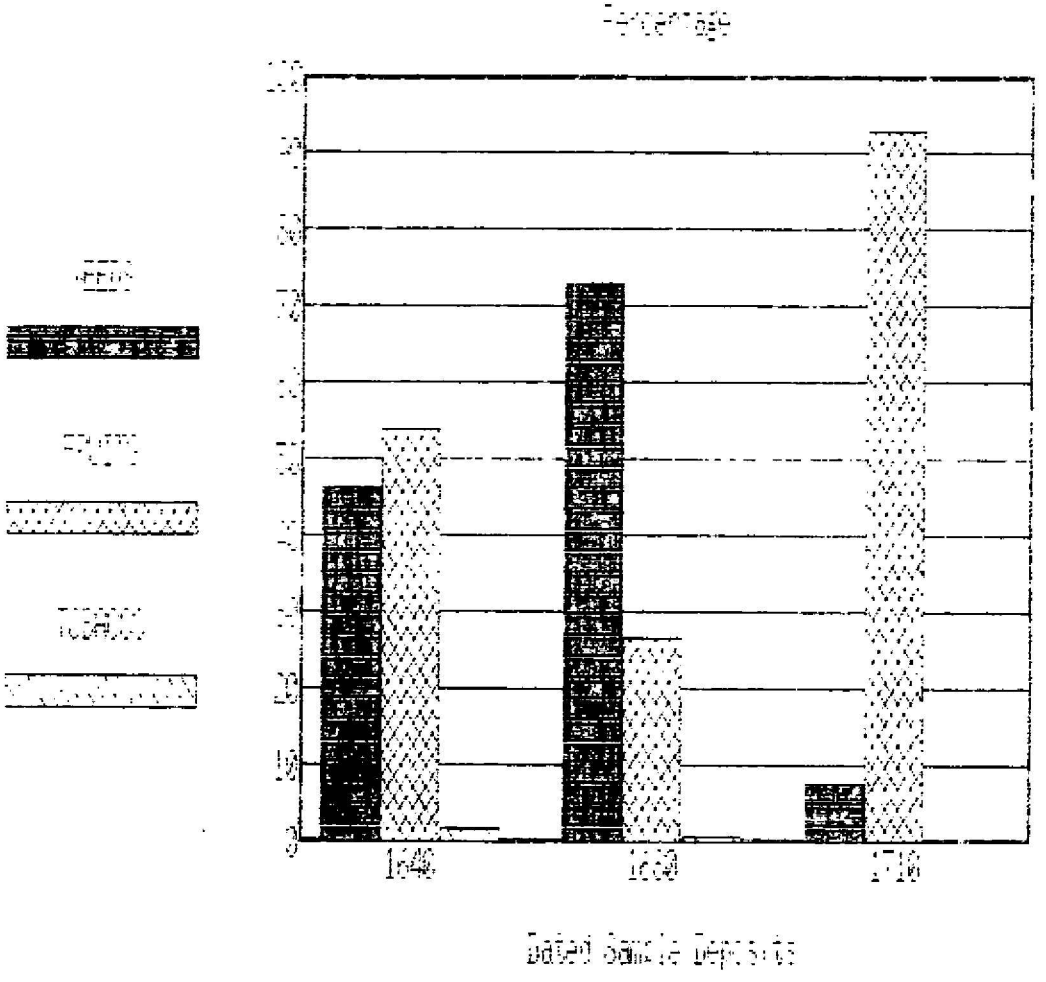


FIGURE X-5

STRATA-GROUP ARTIFACT TOTALS AND DATES BY NATURAL STRATIGRAPHIC COMPONENTS

STRAT	COMPONENT	ARRTIFA	TOT GL	TOT CE	PIPE F	CERAM	PIPE	PIPE	GLASS
IA	02-BLD A INT BELOW COBBS	411	17	23	37	1640	1658	1657	16
IA	05-BLD A BT	33	1	3	0	1580	0	0	0
IA	06-BLD A COBBLED FLOOR	922	189	26	95	1762	1669	1660	1676
IA	41-WALLS OF BLD A	1	0	0	0	0	0	0	0
IA	42-INT DIV WALL BLD A	133	30	0	11	0	0	0	0
	IA	1500	237	52	143				
IB	43-BLD C DRY STONE WALL	1	0	0	0	0	0	0	0
IB	44-BLD C MORTARED WALL	0	0	0	0	0	0	0	0
IB	45-DRY LAID STONE	1	0	0	0	0	0	0	0
	IB	2	0	0	0				
IC	01-SILT SURF E&N OF BLD A	83	5	12	2	0	0	1670	1676
IC	37-SILT SURF BEHIND BLD A	25	1	1	1	0	0	0	0
IC	46-SILT SURF W OF BLD A	12	5	0	1	0	0	0	0
IC	48-BOG IRON DEPOSIT	11	0	0	0	0	0	0	0
IC	59-DRK BROWN SAND LOT 13	0	0	0	0	0	0	0	0
	IC	131	11	13	4				
ID	03-CONT DEBRIS W OF BLD A	150	14	11	20	1640	1678	1675	0
ID	04-YELLOW BRICK DEBRIS	603	45	67	108	1680	1684	1680	1680
ID	39-TRENCH BT	12	0	0	0	0	0	0	0
ID	40-TRENCH FILL	71	6	12	11	1640	0	0	1676
	ID	836	65	90	139				
IIA	08-SMALL BARREL BT	154	9	12	9	1640	1635	0	0
IIA	09-LARGE BARREL BT	309	18	31	11	1650	1664	0	0
IIA	10-BT YELLOW BRK CISTERN	251	1	18	7	1640	0	0	0
IIA	12-PIT W SM. BARREL	124	4	8	2	1640	0	0	1630
IIA	13- SMALL BARREL FILL	459	28	44	17	1650	1645	1630	1630
IIA	22-BT REC BRK STRUC.	8	0	3	2	1640	0	1630	0
IIA	61- LT 14 BARREL (BT)	149	3	5	0	1640	0	0	0
	IIA	1454	63	121	48				
IIB	14-LG. BARREL FILL	1985	224	113	145	1680	1697	1680	1630

DA

TABLE X-I

STRATA-GROUP ARTIFACT TOTALS AND DATES BY NATURAL STRATIGRAPHIC COMPONENTS

STRAT	COMPONENT	ARTIFA	TOT GL	TOT CE	PIPE F	CERAM	PIPE	PIPE	GLASS
IIB	16-FILL OF 1/2 YEL. CIST.	148	15	10	3	1640	0	0	1550
IIB	38-BASKET AND CONTENTS	168	6	6	7	1664	1616	0	0
IIB	62-LT 14 BARREL FILL	563	10	25	52	1680	1684	1668	0
IIB	76-PEARL ST CONTEXTS	1080	0	289	206	1670	1698	1680	0
	IIB	3944	255	443	413				
III	51-SUBSOIL LT 11	31	9	2	2	1680	0	0	0
III	52-CONST.DEBRIS LOT 11	151	14	7	74	1640	1707	1678	0
III	53-LOWER FILL BLD D.	4115	450	200	3431	1675	1706	1678	1705
III	54-BLD D UPPER FILL	6225	477	188	3691	1700	1716	1678	1705
III	55-WALLS OF BLD D	0	0	0	0	0	0	0	0
III	63-LT 14 CISTERN	3337	204	127	265	1680	1720	1707	1710
	III	13859	1154	524	7463				
IVA	11-BLD A. ROBBERS TRENCH	840	188	101	22	1795	1708	1660	1780
IVA	20-BLD. B ROBBERS TRENCH	86	23	14	4	1780	0	0	1760
IVA	21-FILL CIR. RD BRK CIST	363	20	40	18	1795	1692	0	0
IVA	23-FILL REC YLO BRK STRUC	139	17	5	2	1762	0	0	1620
IVA	50-RD BRK CISTERN &BT	0	0	0	0	0	0	0	0
IVA	64-ROBBER TRENCH EW WALL	65	0	1	0	1762	0	0	0
	IVA	1493	248	161	46				
IVB	07-BLD C BEAM SLOT FILL	264	17	21	20	1820	1702	0	0
IVB	15-FILL OF OVAL YEL. BRK	2957	519	489	84	1844	1730	1738	1800
IVB	56-STONE FILLED PIT LT 11	186	62	14	15	1830	0	0	1903
IVB	65-PIT AT N38 E27	120	31	1	0	1850	0	0	1880
IVB	66-PIT AT N65 E25	281	30	11	4	1813	0	1786	0
IVB	77-BRIDGE ST. CUT	0	386	322	16	1780	1725	1767	1780
	IVB	3808	1045	858	139				
VA	17-BLD.B BLD.TRNCH	333	33	55	40	1800	1688	1668	1725
VA	18-BLD.B WALL MATRIX	43	2	3	3	0	0	0	0
	VA	376	35	58	43				
VB	19-BLD. B COBBLED FLOOR	81	3	12	13	1680	1695	1652	0

STRATA-GROUP ARTIFACT TOTALS AND DATES BY NATURAL STRATIGRAPHIC COMPONENTS

STRAT	COMPONENT	ARTIFA	TOT GL	TOT CE	PIPE F	CERAM	PIPE	PIPE	GLASS
	VB								
		81	3	12	13				
VI	34-SAND &SILT BLO RUBBLE	4018	729	522	371	1830	1707	1800	1820
VI	35-STONE RUBBLE	2066	431	61	39	1830	1702	1680	1903
VI	57-TOP DEBRIS LT. 11	1222	326	123	143	1830	1707	1700	1903
VI	60-RED BR SILT LOTS 13/14	12	0	0	0	0	0	0	0
VI	68-OLIVE SILT	560	74	16	5	1820	0	1832	1903
VI	75-INTERFACE W CONCRETE F	149	8	12	4	1780	0	0	1857
	VI								
		8027	1568	734	562				
VII	24-BT LTS 8-10 LOT WALL	785	84	123	81	1844	1710	1700	1630
VII	25-BT LOTS 10-11 LOT WALL	125	42	4	5	1780	0	0	1760
VII	26-BT LOT 8-7 CLR HS WALL	98	14	9	6	1762	0	0	1770
VII	67-WOODEN PLANKS WITH BT	0	0	0	0	0	0	0	0
VII	69-LT 12/13 WALL BT	109	1	0	0	0	0	0	0
VII	70-LT 13/14 WALL SPREAD F	0	0	0	0	0	0	0	0
VII	72-BRK PIER SPREAD FOOTER	18	0	0	0	0	0	0	0
VII	73-WALL SEG-ST. SLAB FOUN	0	0	0	0	0	0	0	0
	VII								
		1135	141	136	92				
VIII	27-PIT STONE PIER @N60	262	39	35	5	1795	0	0	1735
VIII	28-PIT STONE PIER @ N70	5041	620	138	189	1795	1711	1730	1726
VIII	29-PIT STONE PIER @N80	334	51	21	7	1830	0	0	1800
VIII	49-PIT STONE PIER@N90E125	0	0	0	0	0	0	0	0
	VIII								
		5637	710	194	201				
VIIII	30-PIT STONE PIT AT N40	17	0	1	0	0	0	0	0
VIIII	31-PIT STONE PIT AT N80	10	0	1	2	0	0	0	0
VIIII	32-PIT STONE PED AT N90	419	107	63	10	1795	0	0	1760
	VIIII								
		446	107	65	12				
X	33-FILL BRK DRAIN SYSTEM	100	20	3	9	1780	0	0	1750
X	47-BRK DRAIN SYSTEM	239	48	17	13	1820	1702	0	1850

STRATA-GROUP ARTIFACT TOTALS AND DATES BY NATURAL STRATIGRAPHIC COMPONENTS

STRATAS	COMPONENT	ARTIFA	TOT GL	TOT CE	PIPE F	CERAM	PIPE	PIPE	GLASS
X		339	68	20	22				
XI	36-DISTURB CUTTING RUBBLE	230	91	11	7	1762	0	0	1780
XI	58-PIPE TRENCH LT 11	0	0	0	0	0	0	0	0
XI	71-BRICK PLATFORM	5	0	0	0	0	0	0	0
XI	74-CONCRETE PIERS	15	0	0	0	0	0	0	0
XI		250	91	11	7				
GRAND TOTAL		43318	5801	3492	9347				

Phase / Strata Group Correlation Chart

Temporal Phase	Strata Groups
PHASE 1640	IIa, Ia
PHASE 1680	Id, IIb, Vb
PHASE 1710	III
PHASE 1795	IVa, Va
PHASE 1844	Comp. 15

TABLE X-2

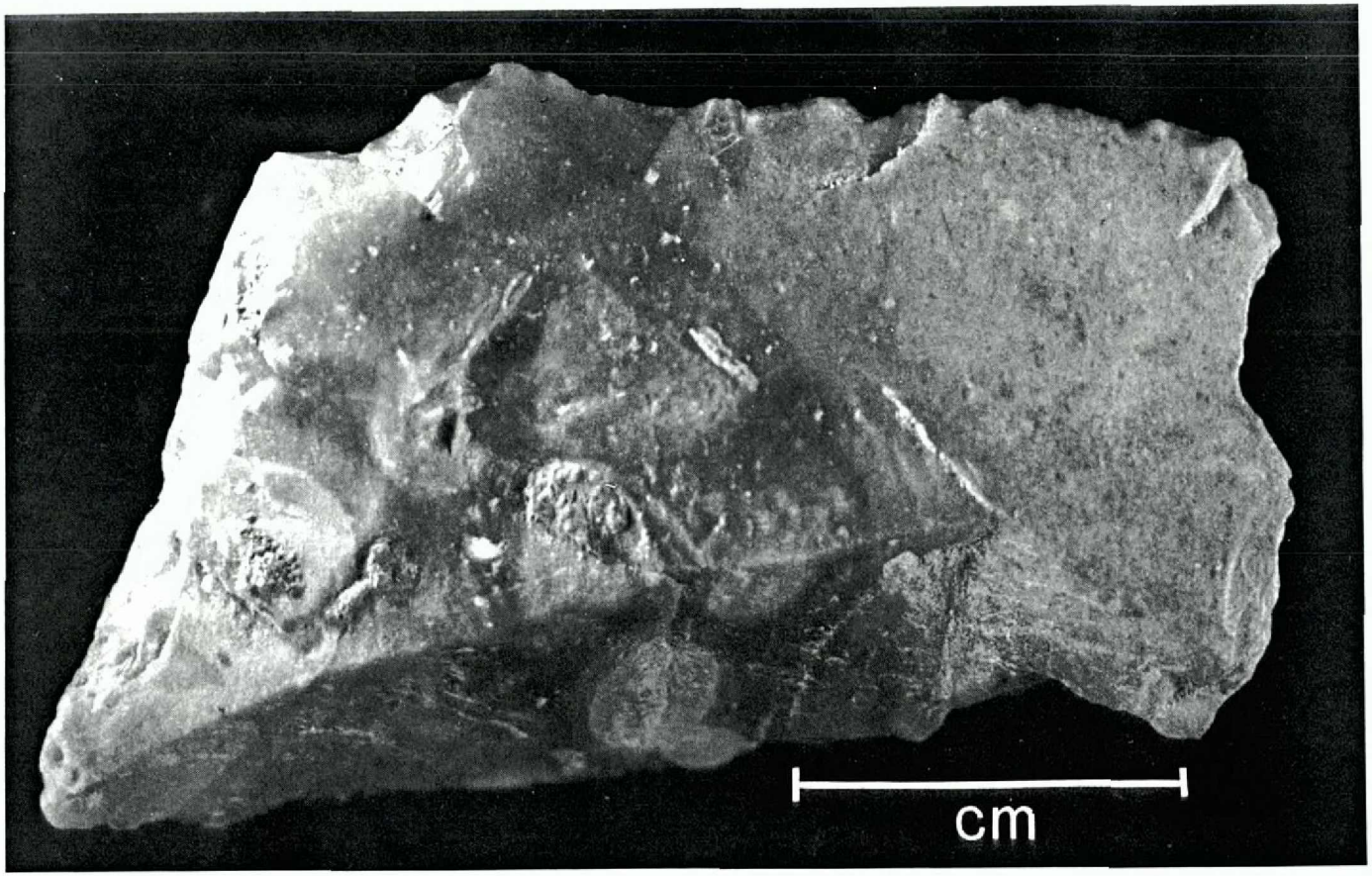
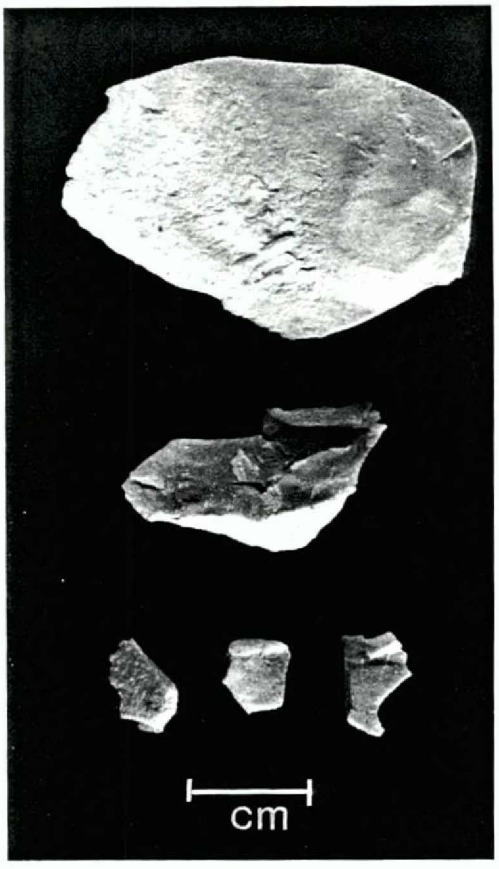


PLATE X-F1



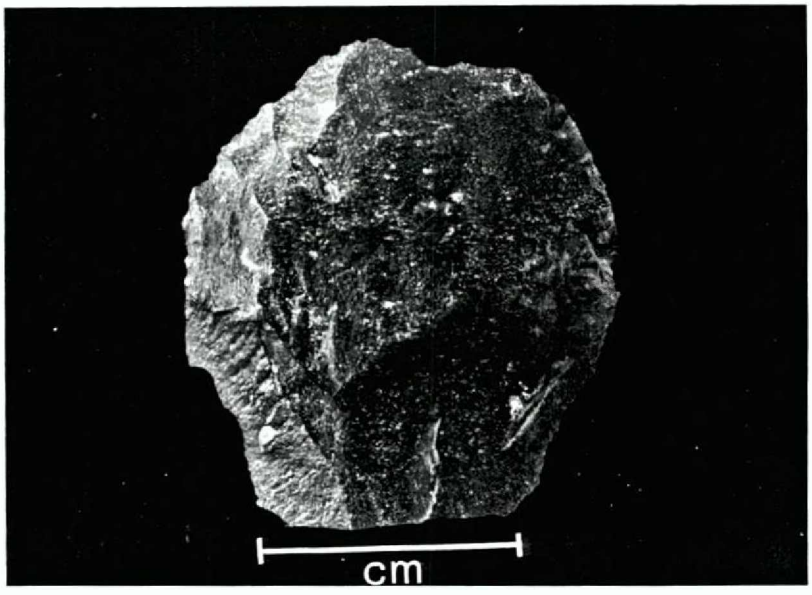
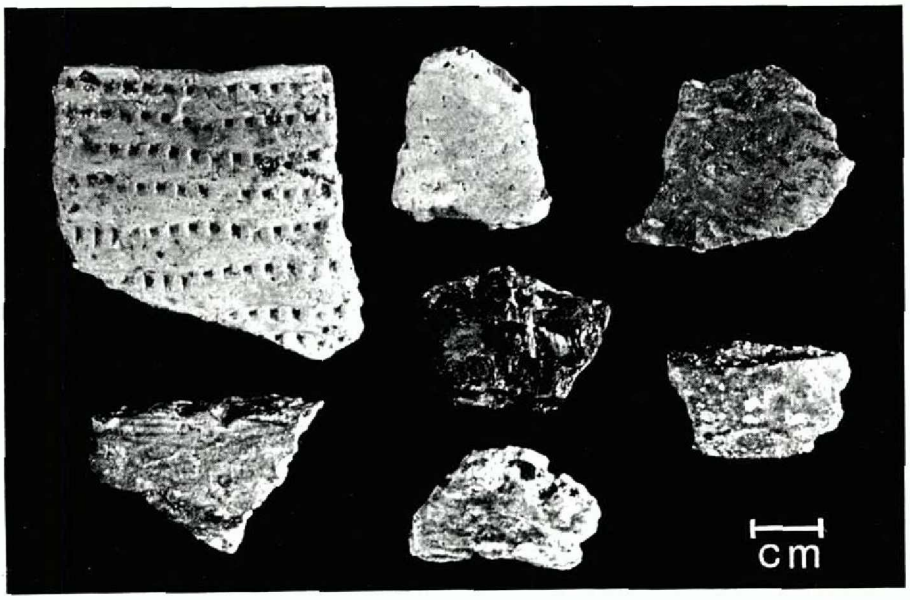


PLATE X-F2



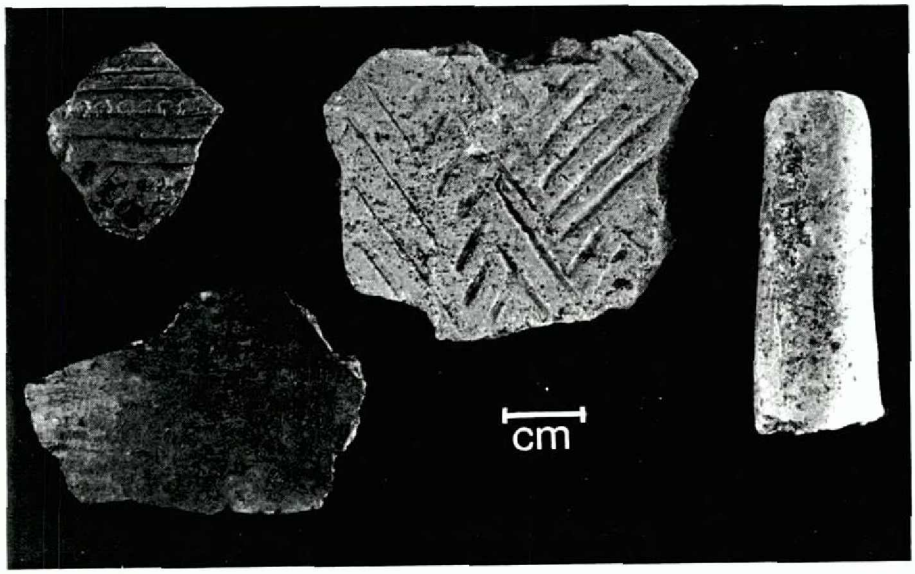


PLATE X-F3