THE 1997–2001 EXCAVATIONS AT FORT PIERRE CHOUTEAU

VOLUME 2: MATERIAL CULTURE

EDITED BY MICHAEL FOSHA AND JAMES K. HAUG

SOUTH DAKOTA STATE HISTORICAL SOCIETY
ARCHAEOLOGICAL RESEARCH CENTER
RESEARCH REPORT NO. 3

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Contents

List of Figures

List of Tables

Preface

Between 1980 and 1981 and 1997–2001 the Office of Historic Preservation (1980–1981 seasons) and the Archaeological Research Center (1997–2001 seasons) of the South Dakota State Historical Society undertook testing and data recovery on behalf of the South Dakota State Historical Society at Fort Pierre Chouteau (39ST237) along the Missouri River in Stanley County, South Dakota. The field seasons were approximately two weeks in duration and were accomplished using a supervised volunteer staff. The site is multi-component most notable for the fur trade occupation between the years 1832–1856. A military component (1855–1856) is also present at the site along with some ephemeral indications of the ranching period (1890–1911) and pre-fur trade activity of Post-Contact Coalescent populations (ca. 1675–1780). The investigations were designed to address questions regarding the presence and/or integrity of the archaeological deposits, how much of the fort remains from past flood and erosion events, and the location of the perimeter of the fortification.

Volume 2 is a collection of research papers covering various classes of the thousands of artifacts recovered over the seven years of limited testing at Fort Pierre Chouteau. This phase of the project would not have been possible without the dedication of the avocational and professional friends who assisted with this volume. Special thanks go to Dr. William Billeck of the Smithsonian Institution, Dr. Richard Fox and Dr. Patrick Collison of the Department of Anthropology, University of South Dakota for contributing to this volume. You were asked to participate in this volume not only for your expertise, but I knew I could count on your friendship and longstanding dedication to the profession and students to see this project through to fruition despite the minimal funding. I owe you a debt of gratitude.

This project was also able to incorporate students and add to their training as participants in this report. Thank you to the students from the University of South Dakota. These include: Gregory Brothers, Hilary G. Dutcher, Brandy Feaster, Rebecca Magee, and Melissa E. VanOtterloo, who worked on the glass assemblage, and Melissa E. Adams, Hilary

G. Dutcher, Mandy M. Klein, and David Thomas Williams, who completed the analysis on nails and fasteners. Thanks again to Richard Fox and Patrick Collison for working with these students and giving them the opportunity to participate.

As always, the volunteers are one of the greatest assets to the South Dakota State Historical Society. I want to acknowledge and thank those who assisted with washing, cataloging, and data entry for artifacts that were not completed in the field. Know that your efforts are not only appreciated but essential. In no particular order sincere thanks go to South Dakota Archaeological Society members Carol Hjort, David Williams, Doris MacDonald, Wini Michael, Rose Fosha, Ellen Tilley, Dick and June Axelson, and Carol Kjar. I would also like to thank Bess Brown for proofreading the copy.

The Fort Pierre Chouteau collections are curated at the Archaeological Research Center, Rapid City. In addition to the catalog records, multiple volumes of artifact class summary sheets were by Dr. Richard Fox and students of the University of South Dakota.

Michael Fosha
August 2010

Chapter 1

Glass, Shell and Metal Beads at Fort Pierre Chouteau

William T. Billeck[1]

Introduction

Glass, shell, and metal beads recovered during the 1980–1981 and 1997–2001 excavations and from surface collections from the fur trade post at Fort Pierre Chouteau are described and analyzed in this report. These beads provide a significant comparative assemblage because of the large number of beads from a dated context, from the founding of the post in 1832 to its abandonment in 1855. A total of 8,816 beads were recovered from the archaeological investigation at the post. Seventeen areas within the post, some certainly in the locations of former buildings, have been designated as separate geographic analytical units and have been assigned area designations A, B, C, D, E, G, H, I, J, K, L, M, N, W, X, Y, and Z. The beads had been grouped by these areas when they arrived for analysis. There are 8,808 glass beads that were classified into 81 bead varieties. An additional eight metal or shell beads bring the total number of beads in the assemblage to 8,816.

[1]Department of Anthropology, National Museum of Natural History, Smithsonian Institution

Bead Distribution by Area

Beads derive from 16 defined areas within or adjacent to the post (Table 1.1). In addition, beads derive from some excavations and from the surface that were not assigned to an area and are listed in Table 1.1 under the category of "general." The number of glass beads organized by excavation unit and listed by area and provenience order is listed in Table 1.10 at the end of this report. The number of beads by catalog order is listed in similar fashion in Table 1.11. According to a base map of the excavations provided by Michael Fosha, all areas except L and M appear to be within or along the walls of the post. The excavations in Areas L and M are located a few meters north of the exterior post walls.

Beads are most common in the 1980 excavation in Area X, where a total of 3,809 were recovered. The majority of the beads from Area X derive from a single excavation unit, S36-E94, which yielded 2,099 beads. It is not known why so many beads were recovered from within this excavation unit. Area X is to the north and east of living quarters on the 1833 Maximilian sketch of the post, and in the vicinity of a building that appears to have functioned as living quarters on the 1855 Warren and 1855 Turnley sketches of the post (Maximillian 1843; Schuler 1990:Figures 12 and 13).

Areas B and C have 1,883 and 925 beads, respectively, and each area is marked as a shop located just inside the main gate on the 1855 Turnley and Warren sketches of the post (Schuler 1990:Figures 12 and 13). The shops probably represent a main location where Native Americans traded at the post. Buildings also show up in about the same location on the 1833 Maximilian sketch of the post (Maximillian 1843). A late period blacksmith shop was in Area B.

Areas I and Y have 857 and 267 beads, respectively. These excavations were near the clerk's quarters office, the residence of the bourgeois, and locations where visiting dignitaries would be housed (Maximillian 1843; Schuler 1990:Figures 12 and 13). Excavations in Areas K and E may be in the locations of former store houses (Schuler 1990:Figure 13), and these areas yielded 198 and 103 beads, respectively. Area A, D, G, H, J, L, M, X, and Z all have less than 100 beads recovered from each.

Excavation recovery methods may have varied between the 1980–1981 and 1997–2001 excavation periods, resulting in differences in the recovery rates of glass beads. In some excavation units where large numbers of beads were being found in the 1997–2001 excavations, the sediment had been subjected to a finer screen, specifically to recover more beads (Michael Fosha, personal communication). Many of the glass beads at Fort Pierre Chouteau are very small and could easily pass through the $^{1}/_{4}$-inch

(6.35 mm) or 1/8-inch (3.17 mm) screen that are typically used in excavations. When a finer screen size, such as a 1/16-inch (1.58 mm) screen is regularly used, a greater number of smaller beads are recovered. Because of the difference in recovery methods, the density of beads in an excavation area is probably not directly comparable. However there are some broad patterns that are evident. Beads are most common and have higher densities (see Table 1.1) in the area of the shops near the post entrance that are designated by Area B (55.3 beads/m^2) and Area C (31.9 beads/m^2). Area X, near the employee quarters, also has a high density of beads (95.2 beads/m^2). Areas I (65.6 beads/m^2) and Y (53.4 beads/m^2) are near the buildings occupied by the post bourgeois and his clerks, as well as the dwellings where visiting dignitaries stayed. All other areas have bead densities that are much lower, ranging only up to 9.5 beads/m^2. The concentration of beads in just a few areas indicates that the shops and the buildings where the post bourgeois and post clerks worked and lived were the most significant for glass bead exchange and storage.

Methodology

Glass beads were individually described by manufacture technique, size, color, diaphaneity, and assigned to varieties.

Varieties

Each bead variety is a discrete group that differs from other varieties based on manufacture technique, bead shape, and glass color and diaphaneity. The size of a bead was not a factor in assigning a bead to a variety. Differences in the sizes of beads within a variety are noted in the description of each variety. Glass beads were placed into 81 varieties, described below. Each variety is described by manufacture, color, diaphaneity, shape, Kidd and Kidd (1970) classification system as revised by Karklins (1985), size distribution by diameter and length, average diameter, average length, and compared with the bead assemblages from Fort Union (Ross 2000) and Fort Clark (Billeck and Badorek 2003). Varieties are presented by manufacture type beginning with the 42 drawn varieties and then continuing with the 28 wound varieties, 7 mold-pressed varieties, and the 4 blown varieties present in the assemblage (Table 1.2).

Table 1.1: Distribution of beads by excavation area at Fort Pierre Chouteau.

Area	Excavated Area (m^2)	Description	Glass Beads	Other Beads	Est. Bead Density (m^2)	Total Beads
A	50	Interior near the southeast of block house in front of dwellings shown on 1833 Maximilian map from early fort period	57		1.1	57
B	34	Near early period dwelling shown on Maximilian map and near late period blacksmith shop near south side of gate	1,876	4 shell	55.3	1,880
C	29	Dwellings, shops and area near north side of post gate	926		31.9	926
D	12	Northeast corner of post near early period dwelling.	8		0.7	8
E	20	Maximilian's map indicates warehouses on north side of post. After the post remodeling, a shed is identified on the maps and later a sawmill	103		5.15	103
G	14	Near northwest block house	24		1.7	24
H	10	West palisade line and near early manager of the post dwelling	28		2.8	28
I	13	West palisade line, the early period post bourgeois dwelling and visiting dignitary housing. Late period kitchens	853		65.6	853
J	12	West palisade line, early clerk's office and quarters. Possibly the late period clerk's quarters	74		6.2	74

Table 1.1: continued

Area	Excavated Area (m^2)	Description	Glass Beads	Other Beads	Est. Bead Density (m^2)	Total Beads
K	21	Southwest corner of the palisade and near the early clerk's office and residence and the general employee's quarters. Late period store house is near this location	200		9.5	200
L	4	North of palisade	13		3.2	13
M	1	South of palisade or near dwellings	4		4.0	4
W	ca. 15	Possible outside palisade	16		1.1	16
X	ca. 40	Early period employee's quarters near southeast block house	3,805	1 metal, 2 shell	95.2 (43.8)*	3,808
Y	5	Early period clerk's quarters and office. Late period quarters and visiting dignitary housing	266	1 shell	53.4	267
Z	2	Interior post, south of Area H	1		0.5	1
Other			553			553
Total			8,808	8		8,816

Note: In addition Area X has two gemstones or faceted glass for jewelry settings; a metal hook, and two flakes; Areas C, M, and General each have a button; Area A has a metal dangle; Area K has a lead shot; Area B has two pieces of window glass.

* density in Area X when excavation unit with 2,099 beads is not included.

Manufacture Technique

Glass beads can be made by several methods. The manufacturing techniques that are represented in the Fort Pierre Chouteau assemblage are drawn, wound, molded, and blown. Descriptions of the difference between these manufacture techniques and the evidence that is displayed on the resulting glass beads can be found in Karklins (1985), Kidd and Kidd (1970), DeVore (1992), Good (1977), and Ross (2000). The manufacture codes for the glass beads at Fort Pierre Chouteau are derived from Kidd and Kidd (1970) and Karklins (1985) and the abbreviated codes and their meanings are presented in Table 1.3.

Table 1.2: Bead varieties at Fort Pierre Chouteau.

Variety	Color	Manufacture	Count
1	Opaque white	Drawn, circular cross-section, not heat-rounded (Ia)	20
2	Opaque black	Drawn, circular cross-section, not heat-rounded (Ia)	4
3	Colorless	Drawn, circular cross-section, heat-rounded (IIa), disk-shaped	21
4	Opaque white	Drawn, circular cross-section, heat-rounded (IIa), disk-shaped	3,880
5	Opaque white	Drawn, circular cross-section, heat-rounded (IIa), tubular	46
6	Opaque black	Drawn, circular cross-section, heat-rounded (IIa), disk-shaped	101
7	Transparent to translucent red	Drawn, circular cross-section, heat-rounded (IIa), disk-shaped	274
8	Opaque pink	Drawn, circular cross-section, heat-rounded (IIa), disk-shaped	183
9	Opaque light pink	Drawn, circular cross-section, heat-rounded (IIa), disk-shaped	244
10	Opaque orange	Drawn, circular cross-section, heat-rounded (IIa), disk-shaped	3
11	Transparent to transparent brown	Drawn, circular cross-section, heat-rounded (IIa), disk-shaped	17
12	Opaque yellow to yellow-brown	Drawn, circular cross-section, heat-rounded (IIa), disk-shaped	103
13	Transparent to translucent green	Drawn, circular cross-section, heat-rounded (IIa), disk-shaped	55
14	Translucent green	Drawn, circular cross-section, heat-rounded (IIa), disk-shaped	23
15	Translucent to opaque blue-green	Drawn, circular cross-section, heat-rounded (IIa), disk-shaped	987
16	Translucent blue-green	Drawn, circular cross-section, heat-rounded (IIa), tubular-shaped	40

Table 1.2: continued

Variety	Color	Manufacture	Count
17	Translucent light blue-green	Drawn, circular cross-section, heat-rounded (IIa), disk-shaped	214
18	Translucent to opaque blue	Drawn, circular cross-section, heat-rounded (IIa), disk-shaped	959
19	Opaque light blue	Drawn, circular cross-section, heat-rounded (IIa), disk-shaped	21
20	Translucent to opaque dark blue	Drawn, circular cross-section, heat-rounded (IIa), disk-shaped	559
21	Opaque light purple-blue	Drawn, circular cross-section, heat-rounded (IIa), disk-shaped	18
22	Opaque medium purple blue	Drawn, circular cross-section, heat-rounded (IIa), disk-shaped	36
23	Opaque dark purple-blue	Drawn, circular cross-section, heat-rounded (IIa), disk-shaped	33
24	Transparent to translucent medium purple	Drawn, circular cross-section, heat-rounded (IIa), disk-shaped	81
25	Opaque black	Drawn, heat-rounded, ground facets (IIf)	12
26	Translucent red	Drawn, heat-rounded, ground facets (IIf)	4
27	Opaque white with two red and two green stripes	Drawn, heat-rounded, colored stripes (IIb)	8
28	Colorless on opaque white	Drawn, heat-rounded, multi-layered (IVa)	104
29	Translucent red on opaque white	Drawn, heat-rounded, multi-layered (IVa)	320
30	Opaque red on transparent green	Drawn, heat-rounded, multi-layered (IVa)	18
31	Transparent blue on opaque white	Drawn, heat-rounded, multi-layered (IVa)	2
32	Colorless	Drawn, multi-sided, two rows of ground facets (If)	14
33	Opaque white	Drawn, multi-sided, two rows of ground facets (If)	1
34	Opaque black	Drawn, multi-sided, two rows of ground facets (If)	6
35	Opaque black (dark purple)	Drawn, multi-sided, two rows of ground facets (If)	4
36	Translucent to transparent green	Drawn, multi-sided, two rows of ground facets (If)	17
37	Translucent brown	Drawn, multi-sided, two rows of ground facets (If)	4
38	Transparent amber	Drawn, multi-sided, two rows of ground facets (If)	1

Table 1.2: continued

Variety	Color	Manufacture	Count
39	Translucent blue to dark blue	Drawn, multi-sided, two rows of ground facets (If)	26
40	Transparent light blue	Drawn, multi-sided, two rows of ground facets (If)	4
41	Colorless on translucent to opaque white	Drawn, multi-sided, multi-layered, two rows of ground facets (IIIf)	9
42	Transparent blue on translucent light blue	Drawn, multi-sided, multi-layered, two rows of ground facets (IIIf)	11
43	Opaque dark red	Wound, cylindrical (WIa)	2
44	Colorless	Wound, spherical (WIb)	7
45	Opaque white	Wound, spherical (WIb)	140
46	Opaque black	Wound, spherical (WIb)	2
47	Opaque black	Wound, spherical (WIb)	1
48	Deteriorated blue	Wound, spherical (WIb)	1
49	Transparent to translucent amber	Wound, spherical (WIb)	6
50	Translucent red	Wound, spherical (WIb)	11
51	Opaque blue-green	Wound, spherical (WIb)	24
52	Opaque blue	Wound, spherical (WIb)	24
53	Translucent dark purple-blue	Wound, spherical (WIb)	5
54	Transparent purple-blue	Wound, spherical (WIb)	10
55	Opaque dark purple and light purple	Wound, spherical (WIb)	1
56	Opaque blue	Wound, spherical (WIb)	1
57	Transparent blue green	Wound, spherical (WIb)	11
58	Opaque white	Wound, oval (WIc)	33
59	Opaque black	Wound, oval (WIc)	1
60	Translucent red	Wound, oval (WIc)	3
61	Opaque blue-green	Wound, oval (WIc)	9
62	Opaque blue	Wound, oval (WIc)	1
63	Translucent purple-blue	Wound, oval (WIc)	1
64	Transparent purple blue	Wound, doughnut-shaped (WId)	1
65	Translucent red	Wound, spherical, pressed ridges (WIIg)	1
66	Opaque yellow	Wound, spherical, pressed ridges (WIIg)	4
67	Opaque green	Wound, spherical, pressed ridges (WIIg)	3
68	Opaque white	Wound, oval, marvered facets (WIIq)	3
69	Opaque white with red line and black dots	Wound, polychrome, oval (WIc)	1

Table 1.2: continued

Variety	Color	Manufacture	Count
70	Opaque white with blue floral designs	Wound, polychrome, oval (WIb/c)	2
71	Opaque black	Molded, spherical, faceted (MPIIa)	1
72	Opaque black	Molded, spherical, faceted (MPIIa)	1
73	Transparent pink	Molded, spherical, faceted (MPIIa)	1
74	Transparent red	Molded, spherical, faceted (MPIIa)	1
75	Translucent red	Molded, spherical, faceted (MPIIa)	1
76	Transparent light green	Molded, spherical, faceted (MPIIa)	1
77	Transparent dark blue	Molded, spherical, faceted (MPIIa)	1
78	Translucent red with white stripe	Blown	2
79	Translucent blue	Blown	1
80	Opaque white with black stripes	Blown	1
81	Translucent dark blue	Blown	1
	Dark brown	Metal bead	1
	White and purple	Shell wampum bead	2
	White	Dentalium shell bead	5
Total			8,816

Size

Glass bead sizes fall into five categories in the Kidd and Kidd (1970) bead classification system: very small (< 2 mm), small (2–4 mm), medium (4–6 mm), large (6–10 mm), and very large (>10 mm). The size category is based on the diameter of the bead. The diameter is measured perpendicular to the perforation of the bead. Bead length is measured along the length of the perforation. For each bead variety the average diameter and length was determined and information presented on variation in bead diameter and length.

Color and Diaphaneity

General colors, such as blue, red, green, were described for each bead within a catalog number. Diaphaneity, or the amount of light that passes through the glass, was divided into three classes: opaque, translucent, and transparent.

Munsell color was recorded only for the beads selected for illustration. Color was coded when the bead was moistened with water in natural light

Table 1.3: Bead manufacture methods and Kidd and Kidd (1970) and Karklins (1985) manufacture codes represented at Fort Pierre Chouteau.

Bead Code	Manufacture Method
Ia	Drawn, single layered, not heat-rounded
If	Drawn, single layered, multi-sided, not heat-rounded, ground facets
IIa	Drawn, single layered, heat-rounded
IIb	Drawn, single layered, heat-rounded, straight stripes
IIf	Drawn, single layered, heat-rounded, ground facets
IIIf	Drawn, multi-layered, multi-sided, not heat-rounded, ground facets
IVa	Drawn, multi-layered, heat-rounded
WIa	Wound, cylindrical shape
WIb	Wound, spherical shape
WIc	Wound, oval shape
WId	Wound, doughnut shape
WIIg	Wound, pressed designs
WIIq	Wound, square bi-cone pressed shape
MPIIa	Mold-pressed, monochrome, faceted, spherical
B	Blown

using the glossy collection of The *Munsell Book of Color*. Degraded glass was not color coded. White and black beads were coded using the Munsell neutral color chart. Beads that appear to be black to the eye sometimes can be identified as another color under magnification and strong light. Color groupings for small drawn beads are more difficult to define due to degrading of the glass, amount of variation in glass color and diaphaneity, and variation in glass thickness affecting the perceived color for translucent glass. Very small and small blue drawn beads have the most variation in color and diaphaneity.

Comparisons with Contemporary Bead Assemblages

Two trading posts in the Northern Plains were contemporary with Fort Pierre Chouteau that have well-described glass bead assemblages. The assemblage from Fort Union (1829–1867) has been reported upon by DeVore (1992) and Ross (2000). Fort Clark (1829–1860) has been reported upon by Billeck and Badorek (2003). DeVore described approximately 38,000 beads in 158 varieties from Fort Union; this report is only referred to when a similar bead variety occurs in this report and does not appear in Ross (2000). Ross described 154,102 beads, classified into 345 varieties, from Fort Union. The Fort Clark assemblage consists of 9,160 beads in 66 varieties. The bead varieties at Fort Pierre Chouteau were correlated, when possible, with those defined at Fort Union and Fort Clark.

Glass Bead Variety Descriptions

Drawn, Monochrome, Circular Cross-Section, Not Heat-Rounded

There are two varieties of this grouping of beads at Fort Pierre Chouteau containing a total of 24 beads. Both the white and the black varieties are long tubes. These beads were made by drawing a monochrome tube of glass and cutting the tube into the desired lengths for a bead.

Variety 1
Color: opaque white (N9.5/)
Figure: 1.1a
Description: drawn, long tubular-shaped bead, not heat-rounded
Kidd and Kidd code: Ia
Comparisons: Fort Clark Variety 1, Fort Union Variety 13, 290
n = 20
Average Diameter: 2.61 mm
Average Length: 12.11 mm
Comments: These beads all have long lengths. The count of beads in diameter range 1.0–1.9 mm is eight, 2.0–2.9 mm is two, and 3.0–3.9 mm is ten. The count of beads in length range 6.0–9.9 mm is 12, 10.0–14.9 mm is three, and 20.0–24.9 is four. One length could not be measured.

Variety 2
Color: opaque black (N1.0/)
Figure: 1.1b
Description: drawn, long tubular-shaped bead, not heat-rounded
Kidd and Kidd code: Ia
Comparisons: Fort Union Variety 160
n = 4
Average Diameter: 2.53 mm
Average Length: 13.69 mm
Comments: These beads all have long lengths. The diameters of these four beads are 1.4, 2.4, 2.8, and 3.4 mm. The lengths are 8.8, 9.0, 15.1, and 21.8 mm.

Figure 1.1: Beads from Fort Pierre Chouteau.

Drawn, Monochrome, Circular Cross-Section, Heat-Rounded

These beads were made by drawing a monochrome tube of glass, cutting the tube into the desired lengths for a bead, and subjecting them to heat and tumbling to round the bead edges. Some beads have had minimal heat-rounding and have a tubular shape. There are 7,779 beads assigned to 22 varieties in this grouping.

Variety 3
Color: colorless
Figure: 1.2a
Description: drawn, heat-rounded, disk-shaped bead
Kidd and Kidd code: IIa
Comparisons: Fort Clark Variety 14, Fort Union Variety 17
n = 21
Average Diameter: 1.64 mm
Average Length: 0.97 mm
Comments: The count of beads in diameter range 1.0–1.9 mm is 20, and 2.0–2.9 mm is one. The count of bead in length range 0–0.9 mm is 14 and 1.0–1.9 mm is seven.

Variety 4
Color: opaque white (N9.0/)
Figure: 1.2b
Description: drawn, heat-rounded, disk-shaped bead
Kidd and Kidd code: IIa
Comparisons: Fort Clark Variety 13, Fort Union Variety 6
n = 3,880
Average Diameter: 2.25 mm
Average Length: 1.66 mm
Comments: These beads appear to be homogenous white; most appear to have an opaque layer on an opaque layer. Many of the beads have a brown crust that probably represents glass deterioration. The count of beads in the diameter range 1.0–1.9 mm is 1,866, 2.0–2.9 mm is 1,419, 3.0–3.9 mm is 574, 4.0–4.9 mm is 26, and greater than 5.0 is six. The diameters of three beads could not be measured. The count for beads in the length range 0–0.9 mm is 276, 1.0–1.9 mm is 2,500, 2.0–2.9 mm is 998, 3.0–3.9 mm is 96, and five beads have lengths greater than 4.8 mm. The length of one bead could not be measured.

Variety 5
Color: opaque white (N9.0/)

Figure: 1.2c
Description: drawn, heat-rounded, tubular-shaped bead
Kidd and Kidd code: IIa
Comparisons: These beads probably were included under Fort Clark Variety 13 and Fort Union Variety 6
n = 46
Average Diameter: 2.70 mm
Average Length: 2.89 mm
Comments: These beads appear to have an opaque white layer on an opaque white layer. The count of beads in diameter range 1.0–1.9 mm is one, 2.0–2.9 mm is 40, 3.0–3.9 mm is three and 4.0–4.9 mm is two. The count of beads in length range 1.0–1.9 mm is three, 2.0–2.9 mm is 25, and 3.0–3.9 mm is 18. These beads differ from Variety 5 in that they are tubular in shape.

Variety 6
Color: opaque black (N1.0/)
Figure: 1.2d
Description: drawn, heat-rounded, disk-shaped bead
Kidd and Kidd code: IIa
Comparisons: Fort Clark Variety 30, Fort Union Variety 19
n = 101
Average Diameter: 3.01
Average Length: 2.11
Comments: The count of beads in the diameter range 1.0–1.9 mm is 22, 2.0–2.9 mm is 18, 3.0–3.9 mm is 52, 4.0–4.9 mm is eight and one bead that has a diameter of 7.24 mm. The count of beads in the length range 0–0.9 mm is two; 1.0–1.9 mm is 35, 2.0–2.9 mm is 55, 3.0–3.9 mm is eight, and one bead has a length of 6.50 mm. Most of these beads are very small or small in size. One bead is unusual in that is large-sized.

Variety 7
Color: transparent to translucent red (5R3/10)
Figure: 1.2e
Description: drawn, heat-rounded, disk-shaped bead
Kidd and Kidd code: IIa
Comparisons: Fort Clark Variety 19, Fort Union Variety 26
n = 274
Average Diameter: 1.79 mm
Average Length: 2.05 mm
Comments: The count of beads in the diameter range 0–0.9 mm is one 1.0–

1.9 mm is 234, 2.0–2.9 mm is 31, and 3.0–3.9 mm is six. The diameters of two beads are not measurable. The count of beads in the length range 0–0.9 mm is 124; 1.0–1.9 mm is 139, and 2.0–2.9 mm is four. The lengths of two beads could not be measured.

Variety 8
Color: opaque pink (5RP7/8)
Figure: 1.2f
Description: drawn, heat-rounded, disk-shaped bead
Kidd and Kidd code: IIa
Comparisons: Fort Clark Variety 17, Fort Union Variety 20
n = 183
Average Diameter: 1.62 mm
Average Length: 1.06 mm
Comments: The count of beads in the diameter range 1.0–1.9 mm is 175 and 2.0–2.9 mm is eight. The count of beads in the length range 0–0.9 mm is 75, 1.0–1.9 mm is 105, and 2.0–2.9 mm is three. Some beads are slightly translucent.

Variety 9
Color: opaque light pink (5RP8/4)
Figure: 1.2g
Description: drawn, heat-rounded, disk-shaped bead
Kidd and Kidd code: IIa
Comparisons: Fort Clark Variety 18, Fort Union Variety 20
n = 244
Average Diameter: 1.56 mm
Average Length: 1.06 mm
Comments: The count of beads in the diameter range 1.0–1.9 mm is 242, and 2.0–2.9 is two. The count of beads in the length range 0–0.9 mm is 80, and 1.0–1.9 mm is 164.

Variety 10
Color: opaque orange (7.5R6/10)
Figure: 1.2h
Description: drawn, heat-rounded, disk-shaped bead
Kidd and Kidd code: IIa
Comparisons: Fort Union Variety 57
n = 3
Average Diameter: 1.64 mm
Average Length: 0.92 mm

Comments: All beads fall within the diameter range of 1.0–1.9 mm. The count of beads in the length range 0–0.9 mm is two, and one bead is 1.0–1.9 mm.

Variety 11
Color: transparent to translucent brown (7.5R3/4)
Figure: 1.2i
Description: drawn, heat-rounded, disk-shaped bead
Kidd and Kidd code: IIa
Comparisons: Fort Union Variety 223
n = 17
Average Diameter: 1.70 mm
Average Length: 1.10 mm
Comments: All of the beads fall into the diameter range of 1.0-1.0 mm. The count of beads in the length range 0–0.9 mm is two, and 1.0–1.9 mm is 15.

Variety 12
Color: opaque yellow (2.5Y7/8) to yellow-brown (10YR7/10)
Figure: 1.2j
Description: drawn, heat-rounded, disk-shaped bead
Kidd and Kidd code: IIa
Comparisons: Fort Clark Variety 16, Fort Union Variety 69
n = 103
Average Diameter: 1.98 mm
Average Length: 1.38 mm
Comments: The count of beads in the diameter range 1.0–1.9 mm is 71, 2.0–2.9 mm is 17, 3.0–3.9 mm is four, and one bead is 5.09 mm in diameter. The count of beads in length range 0–0.9 mm is 23; 1.0–1.9 mm is 65, 2.0–2.9 mm is 13, and 3.0–3.9 mm is two. The length of one bead could not be measured.

Variety 13
Color: transparent to translucent green (2.5G3/4)
Figure: 1.2k
Description: drawn, heat-rounded, disk-shaped bead
Kidd and Kidd code: IIa
Comparisons: Fort Clark Variety 21, Fort Union Variety 12
n = 55
Average Diameter: 2.07 mm
Average Length: 1.40 mm

Comments: The count of beads in diameter range 1.0–1.9 mm is 41, 2.0–2.9 mm is five, 3.0–3.9 mm is six, 4.0–4.9 mm is two, and one bead is 5.23 mm in diameter. The count of beads in length range 0–0.9 mm is 18, 1.0–1.9 mm is 31, 2.0–2.9 mm is two, 3.0–3.9 mm is three, and one bead is 4.52 mm in length. The majority of these beads are 2.0 mm or less in diameter, and several larger beads are present.

Variety 14
Color: translucent green (2.5G6/4)
Figure: 1.2l
Description: drawn, heat-rounded, disk-shaped bead
Kidd and Kidd code: IIa
Comparisons: Fort Clark Variety 21, Fort Union Variety 12
n = 23
Average Diameter: 1.92 mm
Average Length: 1.01 mm
Comments: The count of beads in diameter range 1.0–1.9 mm is 19, and 2.0–2.9 mm is four. The count of beads in length range 0–0.9 mm is 10, and 1.0–1.9 mm is 13.

Variety 15
Color: translucent to opaque blue-green (10BG5/4, 2.5B4/8)
Figure: 1.2m
Description: drawn, heat-rounded, disk-shaped bead
Kidd and Kidd code: IIa
Comparisons: Fort Clark Variety 25, Fort Union Variety 3
n = 987
Average Diameter: 2.66 mm
Average Length: 1.90 mm
Comments: The count of beads in diameter range 0–0.9 mm is one, 1.0–1.9 mm is 152, 2.0–2.9 mm is 531, 3.0–3.9 mm is 288, 4.0–4.9 mm is eight. The diameters of seven beads could not be measured. The count of beads in length range 0–0.9 mm is 45; 1.0–1.9 mm is 489, 2.0–2.9 mm is 431, 3.0–3.9 mm is 18, and 4.0–4.9 mm is one. The lengths of three beads could not be measured.

Variety 16
Color: translucent to opaque blue-green (10BG5/4, 2.5B3/8)
Figure: 1.2n
Description: drawn, short tubular-shaped bead, heat-rounded
Kidd and Kidd code: IIa

Comparisons: Fort Clark Variety 25, Fort Union Variety 3
n = 40
Average Diameter: 2.67 mm
Average Length: 1.93 mm
Comments: The count of beads in diameter range 2.0–2.9 mm is 32, and 3.0–3.9 mm is eight. The count of beads in length range 1.0–1.9 mm is 25, and 2.0–2.9 mm is 15. The beads are similar in color to Variety 15, but more tubular in shape.

Variety 17
Color: translucent light blue-green (10BG5/6)
Figure: 1.2o
Description: drawn, heat-rounded, disk-shaped bead
Kidd and Kidd code: IIa
Comparisons: most similar to Fort Clark Variety 25, Fort Union Variety 3
n = 214
Average Diameter: 2.40 mm
Average Length: 1.67 mm
Comments: The count of beads in diameter range 0–0.9 mm is one, 1.0–1.9 mm is 53, 2.0–2.9 mm is 129, and 3.0–3.9 mm is 36. The count of beads in length range 0–0.9 mm is 24; 1.0–1.9 mm is 133, and 2.0–2.9 mm is 62.

Variety 18
Color: translucent to opaque blue (10B4/6)
Figure: 1.2p
Description: drawn, heat-rounded, disk-shaped bead
Kidd and Kidd code: IIa
Comparisons: Fort Clark Variety 25, Fort Union Variety 3
n = 959
Average Diameter: 2.73 mm
Average Length: 1.94 mm
Comments: The count of beads in diameter range 1.0–1.9 mm is 186, 2.0–2.9 mm is 393, and 3.0–3.9 mm is 358, 4.0–4.9 mm is 13, and one bead was 5.97 mm in diameter. The diameters of eight beads could not be measured. The count of beads in length range of 0–0.9 mm is 26; 1.0–1.9 mm is 455, and 2.0–2.9 mm is 446, 3.0–3.9 mm is 27, and two beads have the length of 4.36 mm and 5.71 mm. The length of three beads could not be measured.

Variety 19
Color: opaque light blue (10B7/8)
Figure: 1.2q

Description: drawn, heat-rounded, disk-shaped bead
Kidd and Kidd code: IIa
Comparisons: Fort Clark Variety 24, Fort Union Variety 60
n = 21
Average Diameter: 1.54 mm
Average Length: 0.96 mm
Comments: All of the bead diameters fall in the range of 1.0–1.9 mm. The count of beads in length range 0–0.9 mm is 12, and 1.0–1.9 mm is nine.

Variety 20
Color: translucent to opaque dark blue (2.5PB4/6)
Figure: 1.2r
Description: drawn, heat-rounded, disk-shaped bead
Kidd and Kidd code: IIa
Comparisons: Fort Clark Variety 25, Fort Union Variety 3
n = 559
Average Diameter: 2.98 mm
Average Length: 2.15 mm
Comments: The count of beads in diameter range 1.0–1.9 mm is 77, 2.0–2.9 mm is 176, 3.0–3.9 mm is 292, and 4.0–4.9 is 14. The count of beads in length range 0–0.9 mm is five, 1.0–1.9 mm is 182, 2.0–2.9 mm is 354, 3.0–3.9 is 17, and one bead is 4.02 mm in diameter.

Variety 21
Color: opaque light purple-blue (5PB6/6)
Figure: 1.2s
Description: drawn, heat-rounded, disk-shaped bead
Kidd and Kidd code: IIa
Comparisons: Fort Union Variety 137
n = 18
Average Diameter: 2.17 mm
Average Length: 1.58 mm
Comments: The count for the diameter range of 1.0–1.9 mm is ten, 2.0–2.9 mm is seven, and one bead is 3.2 mm in diameter. The count for the length range of 0–0.9 mm is five, 1.0–1.9 mm is ten, and 2.0–2.9 mm is three.

Variety 22
Color: opaque medium purple-blue (5PB4/8)
Figure: 1.2t
Description: drawn, heat-rounded, disk-shaped bead
Kidd and Kidd code: IIa

Comparisons: Fort Union Variety 110 or 137
n = 36
Average Diameter: 1.93 mm
Average Length: 1.14 mm
Comments: The count of beads in diameter range 1.0–1.9 mm is 27, 2.0–2.9 mm is four, and 3.0–3.9 mm is five. The count of beads in length range 0–0.9 mm is 22; 1.0–1.9 mm is seven, and 2.0–2.9 mm is six.

Variety 23
Color: opaque dark purple-blue (5PB3/6)
Figure: 1.2u
Description: drawn, heat-rounded, disk-shaped bead
Kidd and Kidd code: IIa
Comparisons: Fort Union Variety 110
n = 33
Average Diameter: 2.00 mm
Average Length: 1.35 mm
Comments: The count of beads in diameter range 1.0–1.9 mm is 26, and 3.0–3.9 mm is three, and 4.0–4.9 mm is three. The count of beads in length range 0–0.9 mm is 11, 1.0–1.9 mm is 16, 2.0–2.9 mm is four, and 3.0–3.9 mm is two.

Variety 24
Color: transparent to translucent medium purple (2.5RP4/4)
Figure: 1.2v
Description: drawn, heat-rounded, disk-shaped bead
Kidd and Kidd code: IIa
Comparisons: Fort Clark Variety 27 or 28, Fort Union Variety 305
n = 81
Average Diameter: 1.70 mm
Average Length: 1.08 mm
Comments: The count of beads in diameter range 1.0–1.9 mm is 76, and 2.0–2.9 mm is three. The count of beads in length range 0–0.9 mm is 34, 1.0–1.9 mm is 44, 2.0–2.9 mm is two, and one bead has a diameter of 3.96 mm.

Drawn, Monochrome, Circular Cross-section, Heat-Rounded, Facets

These beads have been drawn and heat-rounded and then one of more randomly placed facets were ground along the circumference of the bead.

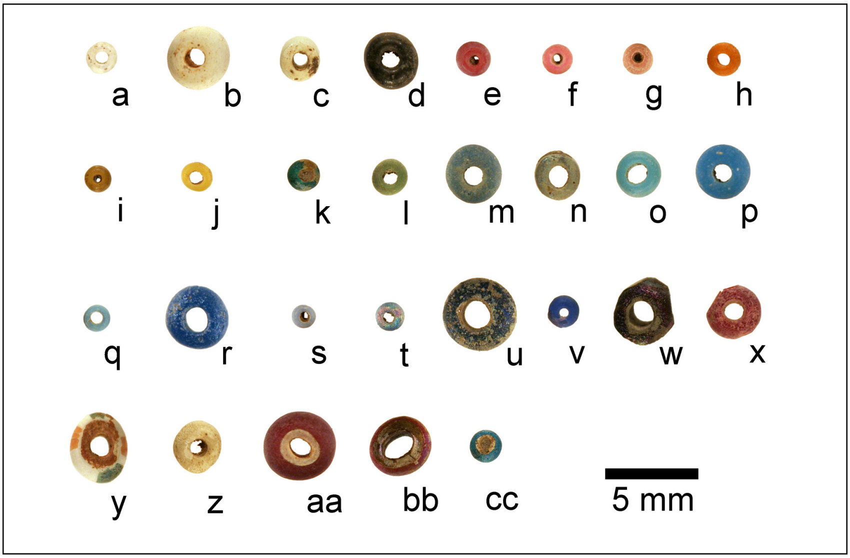

Figure 1.2: Beads from Fort Pierre Chouteau.

There are two varieties with 16 beads.

Variety 25
Color: opaque black (N1.0/)
Figure: 1.2w
Description: drawn, heat-rounded, faceted, disk-shaped bead
Kidd and Kidd code: IIf
Comparison: Fort Clark Variety 31, Fort Union Variety 30
n = 12
Average Diameter: 3.84 mm
Average Length: 2.80 mm
Comments: The bead has one or more randomly ground facets; the facets were ground after the bead had been heat-tumbled. Several of the beads are conjoined, probably when they were heated again after being faceted in order to dull the sharp faceted edges. The conjoined beads were probably reheated when they were strung, as they are conjoined at the perforation ends. The count of beads in diameter range 3.0–3.9 mm is ten, 4.0–4.9 mm is one, and one bead is 5.2 mm in diameter. The count of beads in length range 2.0–2.9 mm is ten, and one bead is 4.98 mm in length. The length of one bead could not be measured.

Variety 26
Color: translucent red (7.5R3/10)
Figure: 1.2x
Description: drawn, heat-rounded, faceted, disk-shaped bead
Kidd and Kidd code: IIf
Comparison: Fort Union Variety 18
n = 4
Average Diameter: 2.83 mm
Average Length: 1.94 mm
Comments: The beads have one or more randomly ground facets; the facets were ground after the bead had been heat-tumbled. Two beads are broken in half. The diameter of two beads is between 2.0 and 2.9 mm, a third is is 3.18 mm, and one could not be measured. Length for three beads falls within the 1.0–1.9 mm range and one bead is 2.13 mm long.

Drawn, Polychrome, Circular Cross-section, Heat-Rounded, Striped

This group consists of drawn beads that have straight colored stripes that parallel the length of the bead. There is one bead variety that is represented by eight beads in this classification group.

Variety 27
Color: Alternating straight red/pink (5R4/10) and straight green (10GY-3/4) stripes on opaque white (N9.5/). There are a total of four stripes.
Figure: 1.2y
Description: drawn, heat-rounded, disk-shaped bead
Kidd and Kidd code: IIb
Comparison: Fort Clark Variety 39, Fort Union Variety 77
n = 8
Average Diameter: 3.72 mm
Average Length: 2.72 mm
Comments: There are six beads with diameters between 3.0–3.9 mm and two beads with diameters between 4.0–4.9 mm. Bead lengths all fall between 2.0–2.9 mm. The beads have two slightly different colors of white, with the outer layer being a brighter white. The interior layer sometimes has a deteriorated brown rind. These beads are sometimes placed under Kidd and Kidd code IVb when the outer and inner layers are more distinct. The same bead variety is present in low numbers at Fort Clark and at Fort Union. One of these beads also occurs on an object (catalog number E386505, National Museum of Natural History, Smithsonian Institution)

collected by George Catlin, probably in the early 1830s for the Northern Plains.

Drawn, Polychrome, Circular Cross-Section, Multi-Layered, Heat-Rounded

These beads have a core color that is a different color than the exterior color of the bead. Bead that have sight changes in color between the core and exterior layer, particularly white beads that have an darker or lighter colored white core were not identified as multi-layered. There are four varieties that are represented by 444 beads.

Variety 28
Color: colorless on opaque white (N9.0/)
Figure: 1.2z
Description: drawn, multilayered, heat-rounded, disk-shaped bead
Kidd and Kidd code: IVa
Comparison: Fort Clark Variety 35, Fort Union Variety 78
n = 104
Average Diameter: 1.99 mm
Average Length: 2.41 mm
Comments: The identification of these beads in the assemblage is probably underrepresented due to glass deterioration on many beads of the outer colorless layer to a white color. The count of beads in diameter range 1.0–1.9 mm is 72, 2.0–2.9 mm is 20, 3.0–3.9 mm is 11, and one bead has a diameter of 4.00 mm. The count of beads in length range 0.0–0.9 mm is 14, 1.0–1.9 mm is 66, 2.0–2.9 mm is 23, and one bead has a length of 3.09 mm.

Variety 29
Color: translucent red (5R3/10) on opaque white (N9.5)
Figure: 1.2aa
Description: drawn, multilayered, heat-rounded, disk-shaped bead
Kidd and Kidd code: IVa
Comparison: Fort Clark Variety 37, Fort Union Variety 7
n = 320
Average Diameter: 2.96 mm
Average Length: 2.05 mm
Comments: The count of beads in diameter range 1.0–1.9 mm is 79, 2.0–2.9 mm is 45, 3.0–3.9 mm is 171, and 4.0–4.9 mm is 22. The diameters of three beads are not measurable. Count of beads in length range 0–0.9 mm is 33; 1.0–1.9 mm is 93, 2.0–2.9 mm is 173, and 3.0–3.9 mm is 18.

The lengths of three beads could not be measured. Beads occur in the very small, small, and medium size ranges. These beads have commonly been called white hearts, red-on-white drawn, cornelian, and *cornaline d'Aleppo* beads (Billeck 2008).

Variety 30
Color: opaque red (7.5R4/8) on transparent green (2.5GY7/4)
Figure: 1.2bb
Description: drawn, multilayered, heat-rounded, disk-shaped bead
Kidd and Kidd code: IVa
Comparison: Fort Clark Variety 38, Fort Union Variety 67
n = 18
Average Diameter: 3.26 mm
Average Length: 2.35 mm
Comments: The count of beads in diameter range 2.0–2.9 mm is five, 3.0–3.9 mm is 11, and 4.0–4.9 mm is two. The count of beads in length range 1.0–1.9 mm is six, 2.0–2.9 mm is ten, and 3.0–3.9 mm is two. Beads occur in the small and medium size ranges. These beads have commonly been called green hearts, and red-on-green drawn. These beads have been sometimes mistakenly referred to as *cornaline d'Aleppo* beads (Billeck 2008).

Variety 31
Color: transparent blue (7.5B4/6) on opaque white (N9.0)
Figure: 1.2cc
Description: drawn, multilayered, heat-rounded, disk-shaped bead
Kidd and Kidd code: IVa
Comparison: Fort Union Variety 65
n = 2
Average Diameter: 1.92 mm
Average Length: 1.32 mm
Comments: The interior core of white glass has deteriorated to brown. One bead is 1.82 mm in diameter with a length of 1.33 mm. The second bead is 2.02 mm in diameter and has a length of 1.32 mm.

Drawn, Monochrome, Multi-sided Cross-section, Two Rows of Ground Facets, Not Heat-Rounded

There are nine varieties of drawn, multi-sided beads with two rows of ground facets. All are six-sided. There are a total of 98 beads in this grouping. The glass was drawn through a six-sided form and a row of six facets were ground on each end of the bead. These beads were made in

Bohemia (Neuwirth 1994) and probably are referred to in the trade ledgers as “cut” beads that were typically sold by the dozen. Most of these varieties are also present at Fort Clark Variety and Fort Union Variety.

Variety 32
Color: colorless
Figure: 1.1c
Description: drawn, multi-sided, faceted, barrel-shaped bead
Kidd and Kidd code: If
Comparisons: Fort Clark Variety 9, Fort Union Variety 40
n = 14
Average Diameter: 6.02 mm
Average Length: 5.30 mm
Comments: six-sided with two rows of ground facets

Variety 33
Color: opaque white (N8.5/)
Figure: 1.1d
Description: drawn, multi-sided, faceted, barrel-shaped bead
Kidd and Kidd code: If
Comparisons: not present at Fort Clark or Fort Union
n = 1
Average Diameter: 6.23 mm
Average Length: 4.33 mm
Comments: six-sided with two rows of ground facets. This is an unusual color for drawn multi-sided bead because it is a uniform opaque white.

Variety 34
Color: opaque black (N1.0/)
Figure: 1.1e
Description: drawn, multi-sided, faceted, barrel-shaped bead
Kidd and Kidd code: If
Comparisons: Fort Clark Variety 8, Fort Union Variety 85
n = 6
Average Diameter: 6.38 mm
Average Length: 5.06 mm
Comments: six-sided with two rows of ground facets

Variety 35
Color: opaque black (N1.0), purple under magnification and strong light
Figure: 1.1f

Description: drawn, multi-sided, faceted, barrel-shaped bead
Kidd and Kidd code: If
Comparisons: Fort Clark Variety 8, Fort Union Variety 85
n = 4
Average Diameter: 5.37 mm
Average Length: 5.29 mm
Comments: six-sided with two rows of ground facets

Variety 36
Color: transparent to translucent green (5BG3/6)
Figure: 1.1g
Description: drawn, multi-sided, faceted, barrel-shaped bead
Kidd and Kidd code: If
Comparisons: Fort Clark Variety 6, Fort Union Variety 66
n = 17
Average Diameter: 5.90 mm
Average Length: 5.59 mm
Comments: six-sided with two rows of ground facets

Variety 37
Color: translucent brown (7.5YR3/4)
Figure: 1.1h
Description: drawn, multi-sided, faceted, barrel-shaped bead
Kidd and Kidd code: If
Comparisons: Fort Union Variety 230 or 258
n = 4
Average Diameter: 6.37 mm
Average Length: 6.16 mm
Comments: six-sided with two rows of ground facets. Color of photographed bead is degraded.

Variety 38
Color: transparent amber (10R3/6)
Figure: 1.1i
Description: drawn, multi-sided, faceted, barrel-shaped bead
Kidd and Kidd code: If
Comparisons: Fort Union 43
n = 1
Average Diameter: 5.05 mm
Average Length: 4.56 mm
Comments: six-sided with two rows of ground facets. The facets edges

have been rounded by heating and tumbling resulting in a glossy surface and soft facet edges.

Variety 39
Color: translucent dark blue (5PB4/8)
Figure: 1.1j
Description: drawn, multi-sided, faceted, barrel-shaped bead
Kidd and Kidd code: If
Comparisons: Fort Clark Variety 5, Fort Union Variety 34 or 236
n = 26
Average Diameter: 6.04 mm
Average Length: 5.49 mm
Comments: six-sided with two rows of ground facets

Variety 40
Color: transparent light blue (5PB4/6)
Figure: 1.1k
Description: drawn, multi-sided, faceted, barrel-shaped bead
Kidd and Kidd code: If
Comparisons: Fort Clark Variety 4, Fort Union Variety 236
n = 4
Average Diameter: 5.49 mm
Average Length: 5.27 mm
Comments: six-sided with two rows of ground facets

Drawn, Polychrome, Multi-sided Cross-section, Multi-layered, Two Rows of Ground Facets, Not Heat-Rounded

These bead varieties differ for the previous group in that they are multi-layered. The outer layer of the beads is generally a transparent glass and the interior color is more opaque. The two varieties in this grouping contain 20 beads.

Variety 41
Color: colorless on translucent to opaque white (N9.0/)
Figure: 1.1l
Description: drawn, multi-sided, multi-layered, faceted, barrel-shaped bead
Kidd and Kidd code: IIIf
Comparisons: Fort Clark Variety 11 and 12, Fort Union Variety 35
n = 9

Average Diameter: 6.48 mm
Average Length: 5.84 mm
Comments: six-sided with two rows of ground facets

Variety 42
Color: transparent blue (5PB3/6) on translucent light blue (5PB5/6)
Figure: 1.1m
Description: drawn, multi-sided, multi-layered, faceted, barrel-shaped bead
Kidd and Kidd code: IIIf
Comparisons: Fort Clark Variety 10, Fort Union Variety 39
n = 11
Average Diameter: 5.56 mm
Average Length: 5.15 mm
Comments: six-sided or seven-sided with two rows of ground facets

Wound, Monochrome, Cylindrical-Shaped, Spherical-Shaped, Oval-Shaped and Doughnut-Shaped

Wound beads were individually made by winding hot glass around a metal wire or mandrel. The glass often displays evidence of the flow of the glass around the wire in glass bubbles or glass trails. The flow structure of the glass is perpendicular to the length of the wire and to the length of the bead perforation. Some of these beads were carefully shaped, while others were made rapidly and show pronounced glass trails. These beads are presented by shape beginning with the cylindrical-shaped variety, and then continuing with the spherical-shaped varieties, the oval-shaped varieties and then the donut-shaped variety. There are two cylindrical-shaped beads. There are 13 varieties of wound spherical beads that are represented by 244 beads. Oval wound beads occur in six varieties and are represented by 48 beads. There is one variety of a wound doughnut-shaped bead and only one bead.

Variety 43
Color: opaque dark red (10RP3/2)
Figure: 1.1n
Description: wound, monochrome, cylindrical
Kidd and Kidd code: WIa
Comparisons: Fort Union Variety 55 and 121
n = 2
Average Diameter: 4.38 mm
Average Length: 3.29 mm

Comments: Both beads are between 4.0–4.9 mm in diameter and between 12 and 15 mm long. The glass has a dull luster.

Variety 44
Color: colorless
Figure: 1.1o
Description: wound, monochrome, spherical
Kidd and Kidd code: WIb
Comparisons: Fort Clark Variety 40, Fort Union Variety 248
n = 7
Average Diameter: 7.39 mm
Average Length: 6.13 mm
Comments: The beads are spherical in shape and range in diameter from 6.8–8.9 mm and in length from 4.7–7.2 mm. The glass has a dull luster.

Variety 45
Color: opaque white (N9.0/)
Figure: 1.1p
Description: wound, monochrome, spherical
Kidd and Kidd code: WIb
Comparisons: Fort Clark Variety 41, Fort Union Variety 1
n = 140
Average Diameter: 7.73 mm
Average Length: 7.84 mm
Comments: A very high number (n = 110) of these beads are broken, often split in half—leading to an overrepresentation of this bead variety. Generally only one-half of the bead is represented. Sometimes two sides of a bead from the same provenience could be matched and these were then counted and measured as one bead. The glass has a dull luster. Bead diameter ranges from 5.2–10.1 mm and length from 5.2–11.0 mm. The count of beads in diameter range 5.0–5.9 mm is two, 6.0–6.9 mm is 15, 7.0–7.9 mm is 76, 8.8-8.9 mm is 40, 9.0–9.9 mm is two, and one bead measures 10.1 mm in diameter. The diameters of four beads could not be measured. The count of beads in length range 5.0–5.9 mm is three, 6.0–6.9 is nine, 7.0–7.9 mm is 74, 8.0–8.9 mm is 48, 9.0–9.9 mm is three, and one bead is 11.0 mm in length. The length of three beads could not be measured.

Variety 46
Color: opaque black (N1.0/)
Figure: 1.1q
Description: wound, monochrome, spherical

Kidd and Kidd code: WIb
Comparisons: Fort Union CII SA T2 Vc (DeVore 1992:Figure 11)
n = 2
Average Diameter: 7.55 mm
Average Length: 6.50 mm
Comments: The surface of these beads have a high gloss luster, both beads are represented by one-half of a bead. One bead measures 6.8 mm in diameter by 5.0 mm in length. The second bead is 8.3 mm in diameter and 8.0 mm in length.

Variety 47
Color: opaque black (N1.0/), slightly translucent purple under magnification
Figure: 1.1r
Description: wound, monochrome, spherical
Kidd and Kidd code: WIb
Comparisons: Fort Union Variety 31 is appears similar but is recorded as green glass
n = 1
Average Diameter: 6.54 mm
Average Length: 5.63 mm
Comments: The bead has a dull surface luster.

Variety 48
Color: highly deteriorated to a opaque brown, probably originally blue
Figure: 1.1s
Description: wound, monochrome, spherical
Kidd and Kidd code: WIb
Temp code: 09w
Comparisons: because of the deteriorated condition of the glass no comparisons could be made with Fort Clark or Fort Union
n = 1
Average Diameter: 6.27 mm
Average Length: 5.71 mm
Comments: The glass is too deteriorated to classify.

Variety 49
Color: transparent to translucent amber (5YR4/6)
Figure: 1.1t
Description: wound, monochrome, spherical
Kidd and Kidd code: WIb

Comparisons: Fort Clark Variety 57, Fort Union Variety 109
n = 6
Average Diameter: 6.92 mm
Average Length: 5.48 mm
Comments: The beads fall into the following diameter ranges: 6.0–6.9 mm has four beads, 7.0–7.9 mm has two beads. The count of beads in length range 4.0–4.9 mm is two, 5.0–5.9 mm is two, and 6.0–6.9 mm is two. The surface has a dull to satin luster.

Variety 50
Color: translucent red (2.5R3/6)
Figure: 1.1u
Description: wound, monochrome, spherical
Kidd and Kidd code: WIb
Comparisons: Fort Clark Variety 52-54, Fort Union Variety 27
n = 11
Average Diameter: 7.40 mm
Average Length: 7.26 mm
Comments: The beads fall into the following diameter ranges: 3.0–3.9 mm has one bead, 6.0–6.9 mm has three beads, 7.0–7.9 mm has five beads, and 8.0–8.9 mm has two beads. The length range of 5.0–5.9 mm has one bead, 6.0–6.9 mm as two beads, 7.0–7.9 mm has seven beads, and 8.0–8.9 has one bead. Four beads are split in half. The surface has a dull-to-satin luster.

Variety 51
Color: opaque blue-green (10BG4/6)
Figure: 1.1v
Description: wound, monochrome, spherical
Kidd and Kidd code: WIb
Comparisons: Fort Union Variety 41
n = 24
Average Diameter: 6.85 mm
Average Length: 6.64 mm
Comments: The glass has deteriorated to a greener color on some of these beads. Eight beads are broken in half. Beads fall into the diameter ranges of 5.0–5.9 mm for seven beads, 6.0–6.9 mm for seven beads, 7.0–7.9 mm for five beads, 8.0–8.9 mm for two beads, 9.0–9.9 mm for two beads, and one bead could not be measured. Beads fall into the length ranges of 4.0–4.9 mm for four beads, 5.0–5.9 mm for four beads, 6.0–6.9 mm for six beads, 7.0–7.9 mm for five beads, 8.0–8.9 mm for three beads, 9.0–9.9 mm for one bead, and one bead could not be measured. Five beads are broken

in half.

Variety 52
Color: opaque blue (5B5/4)
Figure: 1.1w
Description: wound, monochrome, spherical
Kidd and Kidd code: WIb
Comparisons: Fort Clark Variety 46 and 47, Fort Union Variety 50 and 246
n = 24
Average Diameter: 7.22 mm
Average Length: 7.26 mm
Comments: Beads fall into the diameter ranges of 5.0–5.9 mm for six beads, 6.0–6.9 mm for two beads, 7.0–7.9 mm for two beads, 8.0–8.9 mm for one bead, 9.0–9.9 mm for one bead, and 10.0-10.0 for two beads. Beads fall into the length ranges of 5.0–5.9 mm for three beads, 6.0–6.9 mm for five beads, 7.0–7.9 mm for two beads, 8.0–8.9 mm for two beads, 9.0–9.9 mm for one bead, and 10.0–10.9 for one bead. Five beads are broken in half. The glass has a dull luster.

Variety 53
Color: translucent dark purple-blue (PB)
Figure: 1.1x
Description: wound, monochrome, spherical
Kidd and Kidd code: WIb
Comparisons: most similar to Fort Union Variety 80 and 82
n = 5
Average Diameter: 6.94 mm
Average Length: 5.73 mm
Comments: One bead is broken into two pieces. One bead falls into the diameter range of 5.0–5.9 mm, two beads into the range of 6.0–6.9 mm, one bead into the range of 7.0–7.9 mm, and one bead into the range of 8.0–8.9 mm. One bead falls into the length range of 4.0–4.9 mm, one bead into the range of 5.0–5.9 mm, and three beads into the range of 6.0–6.9 mm. The surface glass has deteriorated and the original luster cannot be determined.

Variety 54
Color: transparent purple-blue (2.5PB3/6)
Figure: 1.1y
Description: wound, monochrome, spherical
Kidd and Kidd code: WIb
Comparisons: Fort Clark Variety 49, Fort Union Variety 80 and 82

n = 10
Average Diameter: 6.62 mm
Average Length: 5.22 mm
Comments: These beads were quickly made and have obvious glass winding trails. The bead diameters fall in the range of 5.0–5.9 mm for one bead, 6.0–6.9 mm for seven beads, 7.0–7.9 mm for one bead, and one diameter could not be measured. The lengths fall in the range of 4.0–4.9 mm for four beads, 5.0–5.9 mm for four beads, 6.0–6.9 mm for one bead, and one bead length could not be measured. The glass surface has deteriorated on these beads and presently have has a dull luster.

Variety 55
Color: opaque dark purple-blue (5PB3/10) and opaque light purple-blue (5PB6/8)
Figure: 1.1z
Description: wound, monochrome, spherical
Kidd and Kidd code: WIb
Comparisons: not present at Fort Clark or Fort Union
n = 1
Average Diameter: 8.76 mm
Average Length: 8.06 mm
Comments: The bead has intermixed thin bands of opaque dark purple-blue and opaque light purple-blue glass oriented parallel to the equator of the bead. A brown residue is on two areas of the surface and in the perforation. The glass has a dull luster.

Variety 56
Color: opaque blue (10B4/8)
Figure: 1.1aa
Description: wound, monochrome, spherical
Kidd and Kidd code: WIb
Comparisons: most similar to Fort Union Variety 50
n = 1
Average Diameter: 9.21 mm
Average Length: 8.00 mm
Comments: The glass has a glossy luster. The perforation is very small. These beads commonly referred to today as “Canton” beads, but the name may not be related to the beads’ country of origin.

Variety 57
Color: transparent blue-green (7.5BG3/6)

Figure: 1.1bb
Description: wound, monochrome, spherical
Kidd and Kidd code: WIb
Comparisons: not present at Fort Clark or Fort Union
sn = 11
Average Diameter: 6.93 mm
Average Length: 5.78 mm
Comments: The beads vary in diameter from 5.6 to 10.4 mm. Three beads fall in the diameter range of 5.0–5.9 mm, four beads in the range 6.0–6.9 mm, and three beads in the range 7.0–7.9 mm, and one bead measures 10.4 mm. Lengths vary from 4.8 to 9.0 mm. One bead has a length in the range of 4.0–4.9 mm, eight are in the range of 5.0–5.9 mm, one is in the range of 6.0–6.9 mm, and one bead measures 9.0 mm. The glass has a dull luster and the surface color is degraded.

Variety 58
Color: opaque white (N9.0/)
Figure: 1.1cc
Description: wound, monochrome, oval
Kidd and Kidd code: WIc
Comparisons: Fort Clark Variety 42 and 43, Fort Union Variety 249
n = 33
Average Diameter: 5.67 mm
Average Length: 9.07 mm
Comments: There are 21 beads with diameters between 4.0 and 5.9 mm, ten beads with diameters between 6.0 and 7.9 mm and one bead with a diameter of 8.55 mm. The diameter of one bead could not be measured. There are eight beads with lengths between 6.69 mm and 7.9 mm, seven beads with lengths between 8.0 and 9.9 mm, eight beads with lengths between 10.0 and 11.82 mm. The lengths of ten beads could not be measured. Beads referred to as “pigeon eggs” occur in the Fort Pierre Chouteau trade ledgers, but are much larger than the beads that are represented in this variety. No “pigeon eggs” are represented in the Fort Pierre Chouteau bead assemblage. The beads in Variety 58 have a dull luster.

Variety 59
Color: opaque black (N1.0/)
Figure: 1.1dd
Description: wound, monochrome, oval
Kidd and Kidd code: WIc
Comparisons: Fort Clark Variety 51, Fort Union Variety 196

n = 1
Average Diameter: 5.12 mm
Average Length: 7.99 mm
Comments: The bead has a dull luster.

Variety 60
Color: translucent red (2.5R3/6)
Figure: 1.1ee
Description: wound, monochrome, oval
Kidd and Kidd code: WIc
Comparisons: Fort Clark Variety 56, Fort Union Variety 222
n = 3
Average Diameter: 6.23 mm
Average Length: 6.90 mm
Comments: There are two sizes in this bead variety. The smaller size is represented by one bead and is 3.54 mm in diameter and 6.90 mm long. The two larger size beads are beads are broken. One bead measures 7.42 mm in diameter and it length cannot be measured. The second bead is 7.99 mm in diameter and its length is incomplete, but is a minimum of 13.0 mm. The larger beads average 7.70 mm in diameter. The bead surface is deteriorated on these beads and presently has a dull luster.

Variety 61
Color: opaque blue-green (10BG4/6)
Figure: 1.1ff
Description: wound, monochrome, oval
Kidd and Kidd code: WIc
Comparisons: Fort Union Variety 48
n = 9
Average Diameter: 5.49 mm
Average Length: 7.37 mm
Comments: The beads vary in diameter from 3.51 to 9.00 mm. Bead length varies from 5.11–10.33 mm. There is one bead that falls into the diameter range of 3.0–3.9 mm, three beads are in the diameter range of 4.0–4.9, three beads are in the diameter range of 5.0–5.9 mm, and beads that have diameters of 6.44 and 9.0 mm. Bead length for the range 5.0–5.9 mm is one, 6.0–6.9 mm is two, 7.0–7.9 mm is two, 8.0–8.9 mm is one, and one bead measures 10.33 mm in length. The lengths of two beads could not be measured. The glass has a dull luster.

Variety 62
Color: opaque blue (10BG4/8)
Figure: 1.1gg
Description: wound, monochrome, oval
Kidd and Kidd code: WIc
Comparisons: Fort Union Variety 163
n = 1
Average Diameter: 6.22 mm
Average Length: 9.19 mm
Comments: The bead is broken in half and the glass is deteriorated. The glass appears to have had a glossy luster.

Variety 63
Color: translucent purple-blue
Figure: 1.1hh
Description: wound, monochrome, oval
Kidd and Kidd code: WIc
Comparisons: not present at Fort Clark or Fort Union
n = 1
Average Diameter: 7.80 mm
Average Length: not measurable
Comments: About one-quarter of the bead is represented and the length is only partially represented and cannot be measured. The glass is deteriorated and presently has a dull luster.

Variety 64
Color: transparent purple-blue (2.5PB3/8)
Figure: 1.1ii
Description: wound, monochrome, doughnut-shaped
Kidd and Kidd code: WId
Comparisons: Similar in color to Fort Clark Variety 49, Fort Union Variety 80, 82
n = 1
Average Diameter: 6.60 mm
Average Length: 3.83 mm
Comments: Same color as Variety 54, but the bead is formed into a different shape. The surface glass of the bead has deteriorated to a brownish-white. The bead was very quickly made and has obvious winding trails. This is the only doughnut-shaped bead in the assemblage and it was not the desired shape but was a fortuitous result of quick manufacture of a bead that otherwise would fall into Variety 54.

Wound, Monochrome, Spherical-Shaped, Ridged

These beads have a series of shallow ridges parallel to the equator of the beads that were probably made by rolling a bead on a ridged surface when the glass was malleable. There are three varieties and eight beads in this bead grouping at Fort Pierre Chouteau. Each of these varieties is present at Fort Union. Fort Clark has a bead variety manufactured in the same manner, but in a different color glass (Fort Clark Variety 63).

Variety 65
Color: translucent red (5R4/8)
Figure: 1.1jj
Description: wound, monochrome, spherical, pressed ridges
Kidd and Kidd code: WIIg
Comparisons: Fort Union Variety 113
n = 1
Average Diameter: 3.99 mm
Average Length: 3.97 mm
Comments: The bead has five ridges and the surface is a deteriorated and has a dull luster.

Variety 66
Color: opaque yellow (2.5Y6/6 to 5Y7/6)
Figure: 1.1kk
Description: wound, monochrome, spherical, pressed ridges
Kidd and Kidd code: WIIg
Comparisons: Fort Union Variety 182 and 204
n = 4
Average Diameter: 7.47 mm
Average Length: 7.40 mm
Comments: All four specimens are split in half and have a dull luster. All of the beads are approximately the same size and have eight or nine ridges. The diameter ranges from 7.2–7.6 mm and length from 7.3–7.4 mm.

Variety 67
Color: opaque green (2.5BG5/4)
Figure: 1.1ll
Description: wound, monochrome, spherical, pressed ridges
Kidd and Kidd code: WIIg
Comparisons: Fort Union Variety 210
n = 3
Average Diameter: 6.23 mm

Average Length: 5.85 mm
Comments: All three specimens are complete. One bead measures 3.9 mm in diameter and 3.7 mm in length. This bead has five ridges and has a dull luster. The other two bead measure 7.1 and 7.7 mm in diameter, and in 6.6 and 7.2 mm length, respectively. The larger beads have eight ridges

Wound, Monochrome, Oval, Marvered Facets

There are three beads in one variety in this bead grouping. The beads are wound and have been pressed or rolled against a flat hard surface (marvered) to create a facet when the glass was malleable.

Variety 68
Color: opaque white (N9.0/), some areas degraded to brown
Figure: 1.1mm
Description: wound, monochrome, oval, marvered facets
Kidd and Kidd code: WIIq
Comparisons: Fort Union Variety 11, but noted as having 10 facets
n = 3
Average Diameter: 6.08 mm
Average Length: 8.75 mm
Comments: The beads have eight marvered facets and a square-bicone shape. The facets were pressed into the bead when the glass was malleable. Four facets are on each half of the bead and they slope from the perforation towards the center of the bead. The same bead type occurs at the Leavenworth site (ca. 1803–1832). Two beads fall into the diameter range of 5.0–5.9 mm and one bead into the range of 6.0–6.9 mm. The lengths of two beads can be measured and they fall into the 8.0–8.9 mm range. The glass has a dull luster.

Wound, Polychrome

Polychrome wound beads are uncommon in the Fort Pierre Chouteau assemblage as they are at Fort Clark and Fort Union. There are two varieties of beads containing three beads at Fort Pierre Chouteau.

Variety 69
Color: opaque white (N8.5/) with a transparent red (5R4/8) line and opaque black (N1.0/) dots
Figure: 1.1nn
Description: wound, polychrome, oval

Kidd and Kidd code: WIc
Comparisons: Fort Union CI SC T3 Vb and Vc (DeVore 1992:Figure 15), but in different colors
n = 1
Average Diameter: 9.03 mm
Average Length: 16.80 mm
Comments: The single wavy red line passes around the bead three times. There are four rows of three inset opaque black dots. The black glass under magnification is a dark purple. The bead has a dull luster.

Variety 70
Color: opaque white (N9.5/) with translucent blue (2.5PB3/6) lines looped into four floral designs. Some areas degraded to a brown colored.
Figure: 1.1oo
Description: wound, polychrome, slightly oval
Kidd and Kidd code: WIb/c
Comparisons: Fort Union Variety 169 is most similar in shape but differs in that it consists of two blue floral designs alternating with two red floral designs. Fort Union 96 has four floral designs, but the bead shape is more spherical.
n = 2
Average Diameter: 8.70 mm
Average Length: 9.74 mm
Comments: The complete bead has a diameter of 8.70 mm and a length of 9.74 mm. Most of the surface glass of the complete bead has deteriorated from white to brown. Four floral designs are evenly spaced around the circumference of the bead. One partial bead has a diameter of at least 7.99 mm and its length could not be measured. The design is incomplete and consists of four areas of blue looped lines that probably are floral designs. The beads have a dull luster.

Mold-pressed Beads

There are seven varieties of mold-pressed beads and each is represented by a single bead. Six of the beads were molded and then rows of facets were individually ground onto the bead. The number of rows and the number of facets in a row and color differ for the six beads, but all have a biconical perforations and any mold seam that may have been present has been obliterated by faceting. The seventh mold-pressed bead has molded facets, a zig-zag seam near the equator along facet margins, and a conical perforation. Only three beads in two varieties of mold-pressed beads are present at Fort Clark (Billeck and Badorek 2003:381) in an assemblage of comparable size to that of Fort Pierre Chouteau.

Variety 71
Color: opaque black (N1.0/)
Figure: 1.1pp
Description: molded, monochrome, faceted, spherical
Kidd and Kidd code: MPIIa
Comparisons: Fort Clark Variety 65
n = 1
Average Diameter: 10.24 mm
Average Length: 8.65 mm
Comments: Biconical perforation. The bead has five rows of individually ground facets with eight facets in each row.

Variety 72
Color: opaque black (N1.0/)
Figure: 1.1qq
Description: molded, monochrome, faceted, spherical
Kidd and Kidd code: MPIIa
Comparisons: not present at Fort Clark or Fort Union
n = 1
Average Diameter: 8.38 mm
Average Length: 7.60 mm
Comments: The bead has a uniform diameter perforation, orange rind texture on one end of the perforation, five rows of eight molded facets, and a zig-zag mold seam. The beads was slightly heated rounded after molding and has a high gloss. If this bead from Area Y is associated with the fur trade occupation, it may be the earliest that a molded bead with a zig-zag seam has been reported (Ross 2003).

Variety 73
Color: transparent pink (5R6/6)
Figure: 1.1rr
Description: molded, monochrome, faceted, spherical
Kidd and Kidd code: MPIIa
Temp code: 01ma
Comparisons: Fort Union Variety 292
n = 1
Average Diameter: 10.58 mm
Average Length: 9.12 mm

Comments: The bead is broken in half and has a biconical perforation. The bead has five rows of individually ground facets with an estimated eight facets in each row.

Variety 74
Color: transparent red (2.5R4/6)
Figure: 1.1ss
Description: molded, monochrome, faceted, spherical
Kidd and Kidd code: MPIIa
Comparisons: Fort Union Variety 338
n = 1
Average Diameter: 5.87 mm
Average Length: 5.54 mm
Comments: Biconical perforation. The bead has three rows of individually ground facets with seven facets in each row.

Variety 75
Color: translucent red (2.5R2/6)
Figure: 1.1tt
Description: molded, monochrome, faceted, spherical
Kidd and Kidd code: MPIIa
Comparisons: Fort Clark Variety 64, Fort Union Variety 74 and 299
n = 1
Average Diameter: 10.32 mm
Average Length: 9.66 mm
Comments: The bead has a biconical perforation with four rows of individually ground facets with eight facets in each row. Same color as Variety 74.

Variety 76
Color: transparent light green (10GY7/6)
Figure: 1.1uu
Description: molded, monochrome, faceted, spherical
Kidd and Kidd code: MPIIa
Comparisons: similar to Fort Union Variety 98 in color but not in faceting
n = 1
Average Diameter: 5.75 mm
Average Length: 5.39 mm
Comments: The bead has a biconical perforation with three rows of six individually ground facets.

Variety 77
Color: transparent dark blue (5PB2/8)
Figure: 1.1vv
Description: molded, monochrome, faceted, spherical
Kidd and Kidd code: MPIIa
Comparisons: Fort Union Variety 159
n = 1
Average Diameter: 6.05 mm
Average Length: 5.23 mm
Comments: The bead has a biconical perforation with three rows of six or seven individually ground facets.

Blown or Blown-in-a-Mold Beads

There are four varieties of blown beads that are represented by a total of five beads. Blown beads are hollow and often have fragile, thin walls. Not surprisingly, all but one of these beads is broken. Most of the beads were made in a mold. No blown beads were identified at Fort Clark (Billeck and Badorek 2003), while several are present at Fort Union (Ross 2000).

Variety 78
Color: translucent red (5R4/8) with and an opaque white stripe (N8.5)
Figure: 1.1ww
Description: blown, polychrome, spherical, faceted
Kidd and Kidd code: BIIb
Comparisons: none at Fort Clark or Fort Union
n = 2
Average Diameter: 8.75 mm
Average Length: 8.59 mm
Comments: The opaque white stripe around the equator of the bead that appears to have been applied on top of the translucent red glass. The bead is broken into two pieces that do not conjoin that are from the same provenience these pieces are counted as a single bead. A red residue, possibly a paint to color the bead, is present in the interior of the bead. Four rows of ground facets encircle the bead. Two rows overlap the central white strip, and one row is just above and below the white stripe. Since the bead is incomplete, it is estimated based on the spacing of the facets that each row had seven ground facets. The second bead is from an adjacent excavation unit and is represented by a small fragment of a larger bead than the first bead. The fragment lacks the white stripe, but is the same color and thickness glass, has been faceted, and has the same red residue on the interior

of the bead.

Variety 79
Color: translucent blue
Figure: 1.1xx
Description: blown, monochrome, cylindrical
Kidd and Kidd Code: B
Comparisons: none at Fort Clark or Fort Union
n = 1
Average Diameter: 6.45 mm
Average Length: not measurable
Comments: End segment with the perforation. The segment that is present is cylindrical with a fairly uniform diameter and the end of the bead showing the perforation is flat. The glass is too degraded to determine the Munsell color.

Variety 80
Color: opaque white (N8.5/) with four opaque black (N1.0/) stripes
Figure: 1.1yy
Description: blown, polychrome, ridged, banded
Kidd and Kidd code: B
Comparisons: similar to Fort Union Variety 72
n = 1
Average Diameter: 7.9 mm
Average Length: 16.1 mm
Comments: A hollow bead that has a series of 27 low narrow ridges parallel to the perforation. Two large raised bands are perpendicular to the perforation near the center of the bead length. Ross (2000:34) refers to beads in this variety as lampworked drawn beads in which a drawn bead is placed into a mold and when heated the glass expands in the mold.

Variety 81
Color: translucent dark blue (5PB3/6)
Figure: 1.1zz
Description: blown, monochrome, lobed
Kidd and Kidd code: B
Comparisons: not found at Fort Clark or Fort Union
n = 1
Average Diameter: not measurable
Average Length: not measurable
Comments: This is a small fragment of a large to very large blown-in-a-

mold bead. Part of the perforation opening is present and the specimen fragment has lobes that parallel the length of the perforation. The fragment is too small to determine the overall shape of the bead.

Shell and Metal Beads

The non-glass items consist of one metal and seven shell beads. One cast cupric alloy bead with a hollow center is 6.5 mm in diameter and 7.5 mm long. No seam is evident on this slightly oval bead. Not counted as a bead is a cupric alloy dangle that is 4.2 mm in diameter and 13.1 mm long.

There are two short, tubular-shaped beads in white or purple-white marine shell and commonly referred to as wampum. The white bead measures 3.4 mm in diameter by 4.8 mm long. The second piece is swirled purple and white shell that is 3.7 mm in diameter and 11.4 mm long. The purple is a distinctive characteristic of wampum and was manufactured from Atlantic clam shells. Europeans were manufacturing wampum for fur trade with Native Americans by the seventeenth century and continued into the late nineteenth century (Williams and Flinn 1990). Wampum, hairpipes, and wampum moon sets were commonly produced in Bergen County, New Jersey, in the nineteenth century (Williams and Flinn 1990:40–58) and it is highly likely that the two wampum beads from Fort Pierre Chouteau excavations derive from this source.

The trade ledgers of the Chouteau Company occasionally list wampum as well as hairpipes, wampum moon sets, and mock wampum in the Northern Plains inventories and invoices (see DeVore 1992:Appendix). Hairpipes are marine shell tubes that are several inches long. The moons are circular marine shell disks that often sold in graduated diameter sets. Mock wampum probably refers to glass beads made in short tubular lengths in white and dark purple or black and is listed on the Fort Pierre Chouteau trade ledgers during 1844, 1845 and 1846. The best candidates for mock wampum in the Fort Pierre Chouteau assemblage are within Varieties 1 and 2.

Five pieces of dentalium are also present in the assemblage and they average 3.6 mm in diameter and range in length from 15.0-30.0 mm. This tusk-shaped shell is tubular and slightly curved and derives from the Pacific Ocean. No mention of dentalium has been found in examinations of the fur trade ledges of the Chouteau Company. California shell is sometimes referred to in the ledgers, but more likely refers to abalone. Dentalium shells may represent beads worn at the post by Native Americans and lost during interactions with the post traders.

Fort Pierre Chouteau Trade Ledgers and Comparisons with the Archaeological Assemblage

The fur trade ledgers in the Chouteau Papers at the Missouri Historical Society provide information on the types and amounts of beads that were traded at Fort Pierre Chouteau. A goal of the examination of the trade ledgers is to list the kinds and amounts of beads that were available at the post and, when possible, to compare the beads mentioned in the ledgers with the archaeological assemblage. The Fort Pierre Chouteau ledgers were located with the Missouri Historical Society Guide finder's guide. Bead entries in the ledgers were transcribed and are listed in Table 1.12 at the end of the report. The transcription for each entry provides the type of ledger, the year, name of bead, cost of bead, unit in which the bead was sold, the number of units of the bead, and the total value of the bead units. The ledgers that are available for Fort Pierre Chouteau are an incomplete record with many invoices and inventories missing. Inventories are available for Fort Pierre Chouteau for the following years: 1832, 1844, 1845, 1846 (two), 1847, 1848, and 1850. Invoices, including several steamboat shipment invoices, are available for 1834, 1835, 1837, 1838, 1839, 1840, 1841, 1848, 1849 (two), and 1850 (three).

It is important to distinguish between invoices and inventories in interpreting the bead entries on the ledgers. An invoice lists the beads that were shipped to the post and could represent all of the beads that arrived at the post in a given year, or just some of the beads that arrived that year. A particular shipment might be very biased in it composition and may not be representative of the beads that were sold at the post. An inventory lists what was present in stock or what had not been sold. These ledgers were generally made in the late spring or early summer just before the first steamboats of the year delivered new shipments to the post. An item that was not sold for several years could appear on the inventory for each year. Inventories provide evidence for the names of beads that were available and how they were sold, but because they only list what had not been sold, they should not be used for making comparisons on how common certain types of beads or certain colors where at the post.

There are only a few bead names used on the ledgers: agate, marble, necklace, pigeon egg, barley corn, cut, crystal, mock wampum, snake, pound, Venetian, common, seed, and garnishing. Each bead names could represent a unique type of bead, but some beads may appear in the ledgers under more than one name. The ledgers do not have detailed descriptions of the named beads, but often a systematic comparison of all ledger entries for that bead name reveals patterns that may not be observable in a single inventory or invoice. Occasionally the shape or the size of a bead may be mentioned in a ledger. Some bead names are associated with a series of numbers that probably related to the size of the bead. Beads of same name were generally sold in the same manner. For instance, agate beads were generally sold by the bunch and pound beads were sold by weight. Beads were sold in units by weight (pounds), by the dozen, and by the bunch in the Fort Pierre Chouteau ledgers. Beads sold by the bunch were probably stung and the size of a bunch of beads is not described in the Fort Pierre Chouteau ledgers. The size of a bunch appears to vary by bead name. For instance a dozen cut beads costs the same a bunch of cut beads, suggesting that a bunch of cut beads is the same as dozen. While a bunch of seed beads cost $2.50, they also sold for $0.72/lb, indicating that there were a few pounds of beads in a bunch, and that a bunch of seed beads consisted of thousands of beads.

The ledgers can be used to judge the importance of beads based on how commonly they are mentioned. Agate, barley corn and pound beads are mentioned in nearly every ledger and the total number of these beads that were traded at Fort Pierre Chouteau was enormous (Table 1.12). Agate beads have a total listing of 2,644.75 bunches and 100 lbs on the inventories and invoices (Table 1.4). There are also 1,796 bunches of barley corn beads; and 42,922 lbs of pound or probably pound beads. Less common are pigeon eggs with a total of 1,484.75 lbs and 25 bunches and marble beads with 205.25 bunches. Relatively uncommon are: crystal beads, 35 bunches and 10 lbs; cut beads, 171 dozen and 6 bunches; mock wampum, 93.5 lbs; garnishing beads, 42 bunches and 224 lbs; necklace beads, 15 bunches; snake beads, 13 bunches; common beads, 25 bunches; and seed beads 114.5 lbs and 1 bunch.

A summary of each of the bead names follows with a review of how common it is the price of the bead, the units in which it was sold, the colors available, and any additional descriptive information that is available in the ledgers. A discuss of how the bead name may be identified in archaeological assemblage is presented when the bead name can be identified as a particular type of bead. A guiding principle in matching the bead names in the ledgers with the archaeological assemblage is that beads that are common in the archaeological assemblage should be common in the ledgers. Comparison of between the ledgers and archaeological assemblages is limited because some beads are more likely to be lost at the post then others. Small beads are more likely to be lost than larger beads, resulting in the underrepresentation of larger beads in the archaeological assemblage when compared to the ledgers.

Table 1.4: Summary by bead names of the colors, beads units, and prices on the trade ledger inventories and invoices for Fort Pierre Chouteau.

Bead	Color	Inventory		Invoice	
		Count/Unit	Price/Unit	Count/Unit	Price/Unit
Agate	Blue	376 bunch	.50-2.00	522 bunch	.38-2.50
				100 lbs	1.5
	White or Milk	784 bunch	.43-2.00	709 bunch	.75-2.50
	Red	8 bunch	.38-.50		
	Ruby	167.75 bunch	.48-2.25		
	Red/white	38 bunch	2.5		
	Red/blue	9 bunch	2		
	No color identified	23	.25-3.00		
Unnamed (probably Agate)	Blue #7	4.5 bunch	2.21		
	White #4	2 bunch	0.7		
	White #7	1.5 bunch	2.38		
	White			17 bunch	blank
Marble	Blue	158.25 bunch	.38-2.00		
	Ruby	47 bunch	2.25		
Necklace	Blue	15 bunch	5		
Pigeon Egg	Blue	330.75 lbs	0.93		
		25 bunch	0.34		
	White	1,029.5 lbs	0.75	472 lbs	0.75
	No color named			52.5 lbs	0.75
Barley corn	Blue	135.5 bunch	.38-1.50		
	White	1,159 bunch	.38-1.63	478 bunch	.38-1.63
	Ruby	22.5 bunch	.81-1.50		
	Fancy	1 bunch	1.13		
Cut	Blue	3 dozen	0.19	50 dozen	0.23
	No color identified	6 bunch	0.19	118 dozen	.13-.19
Crystal	Blue	10 lbs	0.38	10 bunch	0.38

Table 1.4: continued

Bead	Color	Inventory		Invoice	
		Count/Unit	Price/Unit	Count/Unit	Price/Unit
	No color identified	25 bunch	0.38		
Mock Wampum	White	60 lbs	0.5		
	Purple	33.5 lbs	0.8		
Snake	No color named	13 bunch	0.38		
Pound	Blue	5,846 lbs	.25-.56	9,968.5 lbs	.25-.90
	White	1,569.25 lbs	.30-.50	6,443 lbs	.28 -.35
	Cornelian	741.25 lbs	.69-.78	1,137 lbs	.60-.65
	Ruby	418 lbs	.25-.88		
	Yellow	479 lbs	.23-.33	419 lbs	.23-.25
	Black	355 lbs	0.25	803 lbs	0.22
	Assorted	170 lbs	0.25		
	No color named			416 lbs	.20-.23
Unnamed (probably Pound)	Blue	708 lbs	.25-.55	1,153 lbs	.33-.65
	Blue, Black			224 lbs	0.5
	White	775 lbs	0.25	7,810 lbs	.28-.38
	Cornelian	776 lbs	.60-.68	99 lbs	0.6
	Ruby	128 lbs	0.25		
	Yellow	185 lbs	.25-.30		
	Black	227 lbs	0.22	161 lbs	0.23
	Assorted			50 lbs	0.72
	Mixed			702 lbs	.10-.13
	No color named	5 lbs	0.25		
Venetians (probably Pound)	Blue			714 lbs	0.25
	White			385 lbs	0.33
	Super, No color named			500 lbs	0.58
Common	No color named			25 bunches	.20-.50
Seed	Blue	32 lbs	0.72		
		1 bunch	2.5		

Table 1.4: continued

Bead	Color	Inventory		Invoice	
		Count/Unit	Price/Unit	Count/Unit	Price/Unit
	Assorted	32 lbs	0.72	50.5 lbs	0.72
Garnishing	Blue	111 lbs	0.75		
	White	16.5 lbs	0.56		
	Assorted	66.5 lbs	.56-.75		
	No color identified	42 bunch	0.72	30 lbs	0.75
No name	No color identified			5 bunch, 1 glass	0.2
	No color identified			5 bunch, 3/4 glass	0.25

Agate beads. Agate beads were generally sold by the bunch and occasional entries in the ledgers describe them as being large or small in size and they are described as round. Sometimes the numbers 3, 4, 9 and 10 occur in the Fort Pierre Chouteau entries in association with agate beads, with the higher number being more expensive, suggesting that the numbering may be related to bead size. Ledgers from other Plains posts also describe them as round and have the additional numbers of 5, 6, 7, 8, 23, 24, 58, 73, 117, and 138. These numbers may derive from a bead sample card that was sent to the post for ordering new beads. Unfortunately, no copy of this sample card is known to exist.

The ledgers list 888 bunches and one entry for 100 lbs of blue agate beads, 1493 bunches of white or milk colored agate beads, 175.75 bunches of red or ruby agate beads (4.5 bunches are identified as fancy red), and 47 bunches that are identified as red and white or red and blue. It is not certain if this refers to multicolored beads or bunches containing beads of two different colors. In additional there are 24 bunches of beads that were not identified by name on the ledgers that probably are agate beads based on the price and units that they were sold in. The high price of some of the agate beads suggests that they are large-sized and in the nineteenth century large round beads were of wound manufacture.

Agate beads should be the most common wound bead in the Fort Pierre Chouteau archaeological assemblage based on their abundance in the ledgers. Agate beads are mostly like the spherical wound beads in varieties 44-57. The varieties contain 140 white, 76 blue, 11 red, 6 amber, 3 black, 1 colorless, and 1 purple bead. The ledgers (Table 1.4) indicate that white is the most common agate bead followed by blue and this relationship is mirrored in the archaeological assemblage. Wound bead varieties 43 and 64 to 70, totaling 17 beads, could fall into the category of agate beads or they may have other bead names.

Marble beads. This name appears on inventories for 158.25 bunches of blue and 47 bunches of ruby beads. A few of the inventories further described these beads as round. The lowest price bunch ($0.38) is described as small beads. The high price of some of these beads suggests that they are large-sized and in the nineteenth century nearly all large round beads were of wound manufacture. The marble beads may be similar or identical to agate beads.

Necklace beads. Necklace beads are not further described in the Fort Pierre Chouteau ledgers and occur on both the 1844 and 1845 inventory as 7.5 bunches of large blue beads that cost the relative high sum of $5.00 a bunch. Nearly all of the large round beads were of wound manufacture in the nineteenth century and it is not understood how these beads might differ from agate beads.

Pigeon egg beads. Pigeon egg beads are very large beads that are oval to bi-conical in shape that are the approximately size of a pigeon egg (Hanson 1984). They were generally sold by weight. The Fort Pierre Chouteau inventories list 330.75 lbs of blue and 1029.5 lbs of white on the inventories. Invoices have 472 lbs of white beads and 52.5 lbs of beads that are not described by color. These beads can be identified in the archaeological assemblage as very large oval-shaped wound beads, but because of their size they are rarely lost, and none are present in the Fort Pierre Chouteau archaeological assemblage.

Barley corn beads. Barley corn beads are common on the ledgers with 1,796 bunches listed. At Fort Pierre Chouteau, the ledgers list the colors as white, blue, and ruby, with white being by far the most common color. Barley corn beads are further described in the ledgers as small or large and one bunch is listed as fancy. The larger beads and the ruby beads are more expensive. Ledgers for other Plains posts sometimes have number designations for barley corn beads: 4, 7, 17, 18, 25, 26, with the higher numbers being more expensive, and therefore probably larger beads. The name of this bead helps to identify its shape because a barley corn is an oval-shaped grain and in the nineteenth century this shape is typically produced with a wound bead. In the Fort Pierre Chouteau archaeological assemblage these are likely wound oval beads (WIc) in Varieties 58–63. The varieties contain 33 white, 11 blue, 3 red, and 1 black bead. White dominates the ledgers and is the most common color in at archaeological assemblage for wound oval beads.

Cut beads. Cut beads are typically priced by the dozen, but occasionally by the bunch. There are 171 dozen and 6 bunches of cut beads in the ledgers. While only the color blue is listed in the Fort Pierre Chouteau ledgers, other ledgers for Plains posts list white, green, yellow, amber, brown, and ruby as available colors. The bead name suggests that they are faceted beads. The beads are relatively cheap, typically cost $0.19 per dozen or per bunch. In the Fort Pierre Chouteau archaeological assemblage cut beads are most likely to be the medium to large drawn faceted beads (If and IIIf) in Varieties 32–42, but could also be mold-pressed faceted beads (MP) in Varieties 71–77.

Crystal beads. There are 10 lbs and 35 bunches of crystal beads listed on the Fort Pierre Chouteau ledgers. The beads are relatively cheap, being only $0.38 a bunch or by pound weight. Only the color blue is recorded on the available ledgers. This bead name has not been found in the other Plains ledgers that have been examined. Crystal beads are probably faceted based on the bead name. Crystal beads are more expensive than cut beads in the ledgers and may be larger beads or beads that were more labor intensive to produce. Beads that they could be crystal beads in the Fort Pierre Chouteau archaeological assemblage are medium-to-large drawn faceted beads (If and IIIf) in Varieties 32–42, and the mold-pressed faceted beads (MP) in Varieties 71–77.

Mock wampum. Mock wampum is imitation shell wampum and occurs in the glass colors of white and purple in the ledgers. The ledger totals for both colors is 93.5 pounds, but the same 15 lbs of white mock wampum appears on four successive inventories and 16.5 lbs of purple mock wampum appears on two successive inventories. White shell wampum also appears on the 1844 inventory for the post under the identification of white grains. Shell wampum occurs as short tubes about 10 mm long and about 3 mm in diameter, and mock wampum should be about the same size. In the Fort Pierre Chouteau archaeological assemblage mock wampum is represented by beads in Varieties 1 and 2 in Kidd and Kidd bead manufacture code Ia.

Snake beads. The bead name appears once in the Fort Pierre Chouteau ledgers in the 1846 inventory for 13 bunches of beads that each cost $0.38. The color and shape of the snake beads is not described in the Ft. Pierre ledgers. Ledgers from other Plains posts occasionally list snake beads, and they are always relatively cheap and occur in the colors blue, green, yellow, red, amber and white. They are typically sold by the bunch, but sometimes by the dozen. Presently there is not enough information to further identify these beads.

Pound beads. Pound bead is a general term in the bead industry in the nineteenth and twentieth century for heat-rounded drawn beads that were sold by weight. A J.F. Sick Company bead sample card from about 1909 contains heat-rounded very small- to medium-sized drawn beads in graduated sizes that are identified as pound beads on the sample card (von Brakel 2006:73). The term pound bead appears to be limited to heat-rounded drawn beads. Often on the Plains ledgers, including those for Fort Pierre Chouteau, beads sold by weight in the approximate values for pound beads are not described by the name of pound beads in the ledgers, perhaps because it is easily interpreted that these entries referred to pound beads. Beads that are identified as pound beads and those likely to be pound beads by color, price and weight are combined in the following summary. Pound and likely pound beads on inventories are listed in the colors: blue (6,654 lbs), white (2,344.5 lbs), cornelian (1,517.25 lbs), black (355 lbs), yellow (479 lbs), and ruby (418 lbs). Cornelian beads refer to red-on-white drawn beads (Billeck 2008). Pound and likely pound beads on invoices are blue (11,835.5 lbs), white (14,638 lbs), cornelian (1,236 lbs), black (964 lbs), and yellow (419 lbs). Pound and likely pound beads total 11,937.5 lbs on

Table 1.5: Total value of beads on Fort Pierre Chouteau invoices.

Bead Name	Total Value on Invoices	Number of Separate Entries on Invoices
Agate	$1,707.08	19
Barley corn	385.25	5
Pigeon Egg	$393.38	6
Crystal	$37.50	1
Cut	$31.05	4
Pound and likely pound beads	11,290.20	68
Common	$8.00	2
Seed	$36.36	1
Garnishing	$22.50	1
Total	$13,911.32	107

the inventories and 30,984.5 lbs on the invoices, making pound beads the most common bead sold at Fort Pierre Chouteau. The importance of pound beads compared to other beads for the trade at Fort Pierre Chouteau is also shown by total value of pound beads on the invoices. The total value of pound beads listed on the invoices is $11,290.20, constituting most of the $13,911.32 value for all of the beads on the invoices (Table 1.5). The next most costly are agate beads at $1,707.08.

The inventories and invoices demonstrate that blue and white are by far the most common small bead colors that were available at the post. The inventories and invoices differ greatly in the importance of different colors. For example, white beads make up 19.6% of the pound beads in the inventories and 47.2% on the invoices. Inventories, as stated earlier, are what is left in stock, and may not be a good indicator of what was available to be sold or of the quantities that were sold at a post. Invoices list what was shipped to a post and can be a very good indicator of what was sold at a post if a complete set of invoices or representative set of invoices is available. Overall, the incomplete set of invoices from Fort Pierre Chouteau should be a better indicator than inventories of the quantities of goods sold at a post. The reliability of the invoices is shown when comparing the colors of pound beads on inventories and invoices to the Fort Pierre Chouteau archaeological assemblage. The percentages of blue, white, and cornelian colored beads in the invoices and in the archaeological assemblage are nearly identical (Table 1.6), while the inventories are substantially different from the archaeological assemblage. Blue beads make up 38.2% of the invoices and 34.3% of the archaeological assemblage. White beads make up 47.2% of the invoices and 48.3% of the archaeological as-

Table 1.6: Pound bead and likely pound bead colors compared between trade ledger inventories and invoices and the Fort Pierre Chouteau archaeological assemblage.

Color	Trade Ledgers				Archaeological Assemblage		
	Inventories		Invoices				
	lbs	%	lbs	%	Varieties	n	%
Blue	6654	55.7	11,835.50	38.2	15–23	2,867	34.3
White	2,344.25	19.6	14,638	47.2	4 5 28	4,030	48.3
Cornelian	1,517.25	12.7	1,236	4	29	320	3.8
Black	355	3	964	3.1	6	101	1.2
Yellow	479	4	419	1.4	12	103	1.2
Ruby	418	3	0	0	7	274	3.3
Other	170	1.4	1,892	6.1	8–11 13 14 24–26 30 31	652	7.8
Total	11,937.50	99.9	30,984.50	100		8,347	99.9

semblage. Cornelian beads make up 4.0% of the invoices and 3.8% of the archaeological assemblage. Black and yellow beads are in similar very low percentages on the invoices and in the archaeological assemblage. The invoices and archaeological assemblage differ in ruby beads, because the beads are not listed on the invoices and compose 3.3% of the archaeological assemblage. The close concordance for the color percentages of pound beads with the archaeological assemblage indicates that several invoices used together are a very good indicator for the types of pound beads sold at the post and are likely to be a reliable indicator for quantities of the more common bead types and other items sold at the post.

Venetian beads. These beads only appear on an 1839 invoice for Fort Pierre Chouteau and based on the colors represented, low prices, price by weight, and amounts, they are certainly the same as pound beads.

Common beads. This bead name only occurs on the 1839–1841 Fort Pierre invoice blotter for 25 bunches of beads that were priced at $0.20 and $0.50 per bunch. There is no further description of these beads on the invoice. Perhaps these are pound beads that are being sold by the bunch rather than by weight.

Seed beads. Seed bead is a rare term in the Fort Pierre Chouteau ledgers, occurring for 32 lbs and one bunch of blue beads and 82.5 lbs of assorted colored beads. The term is not defined in the ledgers, but probably refers to very small heat-rounded drawn beads. Ledgers for other Plains posts also rarely list seed beads. When seed beads are listed at in other Plains ledgers, the color is typically identified as assorted, with blue or white sometimes lists, and red rarely listed.

Seed beads typically commanded a higher price in the ledgers than pound beads. Seed beads are sold by weight typically cost $0.72/lb, several times more expensive than the typical white and blue pound beads in the Fort Pierre Chouteau ledgers. Seed beads are a type of pound bead, and it is possible that some higher cost pound beads in the ledgers are in the size range of seed beads. In the Fort Pierre Chouteau archaeological assemblage these should be the beads less than 2.0 mm in diameter in Kidd and Kidd manufacture codes IIa and IVa in Varieties 3–31. Additional discussion of small beads occurs in the summary of the bead analysis.

Garnishing beads. The name of this bead is not defined in the ledgers, but probably refers to small beads used to sew onto objects. These beads were typically sold by weight and were fairly expensive ($0.56 to $0.75/lb) for small beads. Perhaps garnishing beads are equivalent to seed beads as the price is similar. Garnishing and seed beads are often listed sold in assorted colors in the Plains ledgers, providing further evidence that they may be alternative names for the same type of bead. Garnishing beads are listed in blue, white and assorted colors in the Fort Pierre Chouteau ledgers. If they are equivalent to seed beads, they should be the beads less than 2.0 mm in diameter in Kidd and Kidd manufacture codes IIa and IVa in the Fort Pierre Chouteau archaeological assemblage.

Unidentified beads. The Fort Pierre Chouteau ledgers also contain 5 bunches of beads at $0.20 of unnamed color that are described as "1 glass" that are not identified by bead name. An additional 5 bunches of beads of unnamed color at $0.25 are described as "3/4 glass." The meaning of 1 glass and 3/4 glass is not known.

Summary

The most common bead in the Fort Pierre Chouteau bead assemblage is the very small and small heat-rounded drawn bead that makes up 95% of the assemblage. The larger bead sizes are dominated by white monochrome and blue monochrome spherical-shaped beads. Very few fancy polychrome wound or decorated wound beads are present in the assemblage. Multi-sided drawn beads are uncommon in the assemblage. Blown and mold-pressed bead are rare in the assemblages, as are shell and metal beads.

Large contemporary archaeological bead assemblages are present at the nearby Fort Clark and Fort Union post and almost every bead variety at Fort Pierre Chouteau occurs at one or both of these posts. Similarities and differences between bead assemblages at these posts will be examined later in this summary. In terms of chronology, the bead assemblage from Fort Pierre Chouteau, which dates to 1832–1855, is one of the latest large archaeological collections from the Plains. The other Plains assemblages that have been analyzed are contemporary and there are no well-described late nineteenth century Plains bead assemblages for comparison. The Fort Pierre Chouteau assemblage differs from an earlier assemblage from the Leavenworth (39CO9) Arikara site in South Dakota. Leavenworth dates to approximately 1803 to 1832 and was abandoned just about the time of the establishment of Fort Pierre Chouteau. Leavenworth differs from Fort Pierre Chouteau in having few very small drawn beads, no faceted mold-pressed beads (MP), no pink and red-on-white drawn beads, low numbers of multi-sided drawn beads (If, IIIf), and the presence of different varieties of wound beads (Bass et al. 1972).

The trade beads at Fort Pierre Chouteau primarily arrived by boat from the Chouteau Company in St. Louis, Missouri. While most of the beads recovered during excavations would have come from beads lost after the shipments arrive at the post, a few beads may have been worn at the post by Native Americans and lost during their trading visits. The majority of the very small, small and medium drawn beads and the wound beads undoubtedly derive from Venice, a major manufacture location for glass beads in the nineteenth century. The drawn faceted (If, IIIf, IIf), mold-pressed, some of the blown beads were probably made in Bohemia, another major European manufacture center for beads in the nineteenth century.

Drawn Glass Bead Color

In the Fort Pierre Chouteau collection, drawn beads that fall into the manufacture categories of II and IV dominate the assemblage. The beads are predominately white (48.2 %) followed by blue or purple (35.2 %). Less common are pink (5.1%), red-on-white (3.8%), red (3.3%), black (1.3 %), yellow (1.2%), and green (0.9%). A high percentage of white and blue colors is typical for many Plains bead assemblages and nearby contemporary posts vary in the percentage of the colors. For instance, Fort Clark has 44.7% white and 37.0% blue; Fort Union as 34.1% white and 26.5% blue (Table 1.7). More striking is the differences at the posts between the less common colors. Pink and red are much more common at Fort Pierre Chouteau than at Fort Clark, while black and yellow are much more common at Fort Clark than at Fort Pierre Chouteau. Fort Union has more yellow, red, red-on-white, green, and black than Fort Pierre Chouteau and also has a lower percentage of white and blue beads. Since these posts are contemporary, are located along the Missouri River in the Northern Plains,

Table 1.7: Primary colors of heat-rounded drawn beads in Kidd and Kidd manufacture codes II and IV for Fort Pierre Chouteau, 39ST237; Fort Clark, 32ME2; and Fort Union, 32WI17.

Color	Fort Pierre Chouteau		Fort Clark		Fort Union	
	n	%	n	%	n	%
Colorless	21	0.25	40	0.44	1,815	1.22
White	4,030	48.17	4,021	44.72	50,655	34.11
Yellow	103	1.23	514	5.71	9,396	6.33
Pink	427	5.10	49	0.54	8,611	5.80
Red	278	3.32	121	1.34	7,800	5.25
Red-on-white	320	3.83	388	4.31	9,401	6.33
Red-on- green	18	0.22	3	0.03	453	0.30
Green	78	0.93	81	0.90	10,588	7.13
Blue or purple	2,948	35.23	3,337	37.04	39,295	26.46
Black	113	1.35	447	4.96	9,038	6.09
Other	30	0.36			1473	0.99
Total	8,366	99.99	9,001	99.99	148,525	100.01

and were part of the same trading company, it is most likely that the color differences in the bead assemblages is related to the color preferences of the Native Americans that each post served. Fort Pierre Chouteau primarily served the Sioux. The primary tribes that traded at Fort Clark were the Arikara, Mandan, Hidatsa, Sioux, and Assiniboine. Fort Union primarily traded with the Assiniboine, Blackfoot, Crow, Cree, and Gros Ventre.

Small Glass Beads

The Fort Pierre Chouteau bead assemblage, like other contemporary assemblages from trading posts, is dominated by heat-rounded, drawn beads in Kidd and Kidd manufacture codes II and IV. There are 8,366 beads in this category in an assemblage of 8,808 beads at Fort Pierre Chouteau or 95.0% of the bead collection. In comparison, Fort Clark, a contemporary fur trade post in North Dakota, has 9,001 heat-rounded drawn beads in an assemblage of 9,160 beads or 98.2% of the assemblage (Billeck and Badorek 2003:365–373). Fort Union has 148,525 (96.4%) heat-rounded drawn beads in an assemblage of 154,102 beads (Ross 2000:25–34). The Fort Pierre Chouteau assemblage has a slightly lower percentage of than Fort Clark or Fort Union because of the presence of more wound and non-heat-rounded drawn beads.

As the nineteenth century progressed, very small heat-rounded drawn beads became more common, but exactly when they became common has not yet been established through information obtained from archaeological assemblages, ethnographic collections, and trade records. Trade records in particular are too incomplete and the bead terms too poorly described in the records to establish when very small beads become common. The term "seed bead" is uncommon in trade accounts during the first half of the nineteenth century. Very small beads appear to be present at least by the beginning of the nineteenth century if the presence of the term "seed beads" in the Lewis and Clark 1804–1805 inventories can be used as an indicator. If the term seed bead had a precise meaning in historical records, it is not presently known, because no historical definition of this term has been found. The name itself suggests a small bead, but just how small the beads actually were is not known. The size definition of a seed bead used in descriptions of ethnological and archaeological collections is less than 2.0 mm (Conn 1972:7–8; Hanson 1989:1–2) and about 1/16 of an inch (1.6 mm) in diameter (Ewers 1945:34; Lyford 1940:56; Orchard 1929:120). This size definition is not linked to historical records and may not be the same definition that was used in the trade ledgers.

The most common term for drawn beads in the fur trade ledgers is pound bead. Pound beads are heat-rounded drawn beads that were sold by weight. In the trade ledgers that have been examined by the author, no size indication has been found for either seed beads or pound beads. The term pony bead does not occur in the fur trade ledgers.

Although a specific date for the introduction of small beads is still lacking, the Fort Pierre Chouteau collection does provide some information on when very small beads became common in the Northern Plains. Smaller drawn glass beads are commonly referred to as seed beads, and, for the purposes of this analysis, beads in the very small diameter category (0.5–1.99 mm) will be considered seed beads. A large percentage of very small beads are present at Fort Pierre Chouteau, comprising 42% of the heat-rounded drawn beads. The large number of beads less than 2.0 mm in diameter in the Fort Pierre Chouteau archaeological assemblage indicates that seed beads had become common during the 1832–1855 time span of the post.

Fort Pierre Chouteau has a much higher percentage of beads less than 2.0 mm in diameter than at Fort Clark, where only 20% (1,836 of 9,001) of the heat-rounded drawn beads were in the very small size range (Billeck and Badorek 2003:365–373). The Fort Union study was not summarized in the same manner and it is not possible to compare bead sizes. There are several possible reasons why there are more very small drawn seed beads at Fort Pierre Chouteau. Very small beads may have been more desirable for the trade at Fort Pierre Chouteau than at Fort Clark and they may have comprised more of the post inventory. However, an initial examination the fur trade ledgers for Fort Pierre Chouteau and Fort Clark do not reveal significant difference in the incidence of seed beads in the ledgers. Temporal differences between the two posts are not likely to provide an explanation because both posts overlap substantially in time. Fort Clark (1829–1860) was used for a few years before and a few years after Fort Pierre Chouteau (1832–1855). The differences between the post may result from recovery efforts: it may be that finer screens were used more often during the Fort Pierre Chouteau excavations than were used at Fort Clark, resulting in the greater number of very small beads Fort Pierre Chouteau.

Seed beads are rarely mentioned in the Fort Pierre Chouteau trade ledgers, suggesting that there should be few beads in the archaeological assemblage that are less than 2 mm in diameter. An examination of the diameter measurements for the For Pierre Chouteau archaeological assemblage shows that there are many more beads than expected that have diameters less than 2.0 mm. There are 3,494 beads with diameters less than 2.0 mm and 4,857 beads with diameters more than 2.0 mm of the heat-rounded drawn beads. This is a surprising result given the rarity of seed beads in the ledgers. A likely cause for the unexpectedly high number of beads with small diameters is that the ledgers mask the sizes of the beads that were sold under the name pound beads. Seed beads are a type of pound bead and it is possible that smaller diameter beads are listed in the ledgers as higher priced pound beads. In the trade ledger for Fort Pierre Chouteau, seed beads or garnishing beads have the relatively high price per pound of $0.56–$0.75/lb. Pound beads cost between $0.20–$0.90/lb. About two-thirds of the pound beads cost less than $0.50, and the rest cost more than $0.50/lb. Since seed and garnishing beads are generally more expensive than the average pound beads, it may be that the more expensive pound beads on the ledgers include, at times, very small beads. This would result in a closer correlation between the number of very small beads accounted for in the trade ledgers and the number of very small beads represented in the archaeological assemblage.

The distribution of bead diameters for Kidd and Kidd manufacture codes IIa and IVa in the Fort Pierre Chouteau archaeological assemblage is bimodal, with one peak at 1.70–1.79 mm, corresponding with the previous definitions of the size of a seed bead, and another peak at 2.80–2.89 mm (Figure 1.3). Support for the earlier definition of a seed beads as having a diameter of less than 2.0 mm is supported by the peak centered at 1.70–1.79.

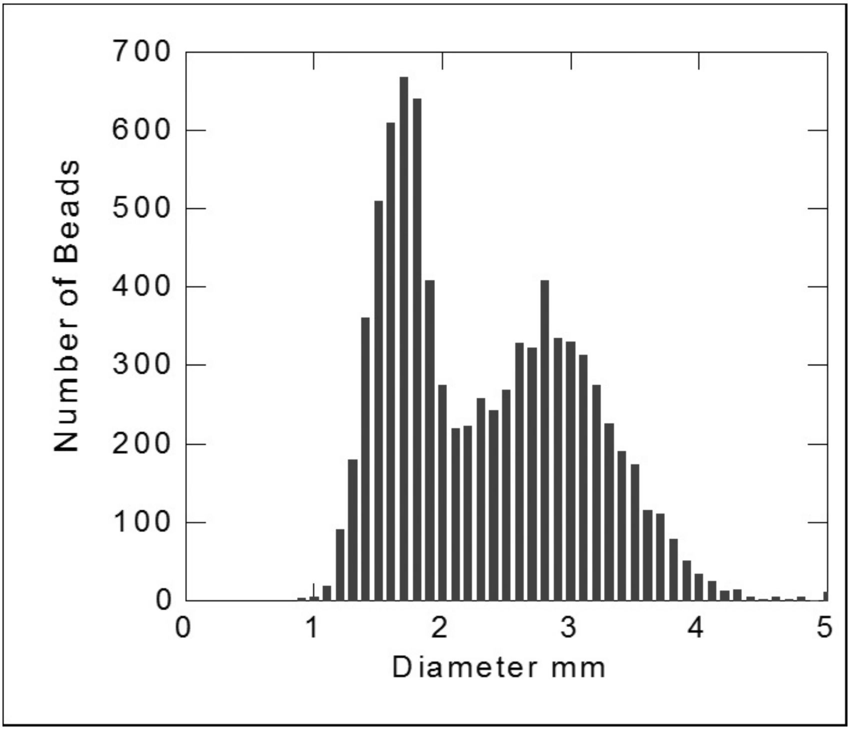

Figure 1.3: Diameter of heat-rounded drawn beads, Kidd and Kidd manufacture codes IIa and IVa, in the Fort Pierre Chouteau archaeological assemblage.

It is revealing to compare the sizes of the heat-rounded drawn beads from the Fort Pierre Chouteau excavations and those on ethnographic objects collected by Lt. Warren from the Northern Plains that are thought to have been collected in 1855 or 1856. The Warren objects at the Smithsonian's National Museum of Natural History are dominated by beads that are in the small (2–4 mm) size range and few in the very small size range. Many of the Warren objects are thought to be Sioux, but not all of the objects can be attributed to this culture group. The low incidence of very small heat-rounded drawn beads may be due to the Sioux preferences for the use of larger heat-rounded drawn beads on objects, but this does not correspond with the large number of very small beads at Fort Pierre Chouteau, a post that primarily traded with the Sioux. Why are the sizes of the beads on the Warren ethnographic objects collected in 1855 or 1856 so

Table 1.8: Comparison of Medium and Larger Bead Manufacture Categories for Fort Pierre Chouteau, 39ST237; Fort Clark, 32ME2; and Fort Union, 32WI17.

Manufacture Group	Fort Pierre Chouteau		Fort Clark		Fort Union	
	n	%	n	%	n	%
Drawn Ic, If, IIIf	118	26.9	57	47.1	1,586	29.0
Wound Monochrome	306	69.9	58	47.9	3,496	64.0
Wound Decorated Polychrome	3	0.7	3	2.5	204	3.7
Mold-pressed	7	1.6	3	2.5	147	2.7
Blown	4	0.9	0	0.0	33	0.6
Total	438	100.0	121	100.0	5,466	100.0

different from the Fort Pierre Chouteau archaeological assemblage (1832–1855)? One possible answer is that perhaps Warren was trying to acquire older objects with larger bead sizes. The difference between the incidence of very small beads at Fort Pierre Chouteau and in the Warren collection indicates that multiple lines of evidence must be examined to determine when very small heat-rounded drawn beads first become prevalent in the Plains. The Fort Pierre Chouteau trade ledgers rarely list seed beads, and objects in the Warren collections of 1856 rarely have seed beads, but the archaeological assemblage at Fort Pierre Chouteau has many beads that fall into the seed bead size range, indicating that by the mid-1850s based on archaeological evidence that seed beads were common in the Plains.

Medium and Larger Beads

Fort Pierre Chouteau is nearly identical to Fort Union in the types of medium and larger sized beads present (Table 1.8). While the percentages of drawn multi-sided beads, wound, mold-pressed, and blown beads are nearly identical, there is a higher incidence of wound polychrome beads at Fort Union. The higher incidence of wound polychrome beads at Fort Union may be related trade with the Crow and the extensive use of wound polychrome beads on cultural items by the Crow. The Fort Clark assemblage differs from both Fort Pierre Chouteau and Fort Union in that it is has a much higher percentage of drawn multi-sided beads (Ic, If, IIIf), and a lower percentage of wound monochrome beads.

Medium and larger beads were probably used for necklaces and represent a higher percentage of the bead assemblage at Fort Pierre Chouteau

Table 1.9: Comparison of the percentage of medium and larger beads for Fort Pierre Chouteau, 39ST237; Fort Clark, 32ME2; and Fort Union, 32WI17.

	Fort Pierre Chouteau	Fort Clark	Fort Union
Count medium and larger beads	438	121	5,466
Total assemblage	8,808	9,160	154,102
Percent medium and larger beads	4.97	1.32	3.55

than at either Fort Clark or Fort Union (Table 1.9). These beads were probably some of the most expensive beads to purchase and were typically sold by the dozen or by the bunch. The bead assemblage at Fort Clark has the lowest percentage (1.32 %) of medium and larger sized beads. Fort Union has a larger percentage at 3.55%, and Fort Pierre Chouteau has the highest percentage at 4.97%. While these percentage differences might not seem very large, the differences result in markedly different total numbers of medium and larger sized beads in an assemblage. For instance, if Fort Pierre Chouteau had the same percentage as Fort Clark, there would only be 116 beads instead of 438.

The comparisons in Table 1.9 do not include heat-rounded drawn beads that are larger than 4.0 mm in diameter at Fort Pierre Chouteau. For the purposes of classification these beads were identified under the same variety as the smaller beads of the same color and manufacture. The larger drawn beads more likely functioned as necklace beads, while those beads smaller than 4.0 mm in diameter were typically used for beadwork and would have been sewn into rows to create fields of colors as decoration on garments and other objects.

The percentage of medium and larger beads in an assemblage is strongly correlated with excavation recovery methods. If fine screen recovery is commonly used more at one excavation than at another excavation, there will be many more very small beads recovered, and the percentage of medium and larger beads in the assemblage will therefore decrease. One might then suspect that Fort Clark, which has the lowest percentage of medium and larger beads, would then have used the finest recovery methods. One way to compare the recovery rates is to look at the number of very small sized beads in the assemblages. As presented earlier, for the drawn beads (manufacture codes II and IV), Fort Clark has 20% very small beads, while Fort Pierre Chouteau has 42% very small beads. This would seem to indicate that the methods for recovering very small glass beads were better at Fort Pierre Chouteau than at Fort Clark, yet the percentage of medium and larger sized glass beads is higher in the Fort Pierre Chouteau assemblage. Something besides differences in recovery methods is responsible for the varying characteristics between the Fort Pierre Chouteau and Fort Clark bead assemblages. Fort Pierre Chouteau also differs in the percentages of colors represented in small and very small beads, and in the presence of more medium and larger sized glass beads than Fort Clark and Fort Union. The variation in the bead assemblages between the trading posts is certainly in part due to the different tribes that traded at each post. Each post probably stocked a bead inventory that attempted to meet the bead preferences of the Native American tribes that typically traded at the post.

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Table 1.10: Glass beads by area and unit, Fort Pierre Chouteau.

Catalog	Area	Provenience	Level	Count
01-73-0589	A	N451 E569	10–20	1
01-73-0052	A	N451 E572	10–20	1
01-73-0137	A	N451 E572	0–10	1
01-73-1959	A	N451 E572	10–12	1
01-73-0421	A	N451 E573	Cleanup	2
01-73-2230	A	N451 E573	0–10	2
01-73-0201	A	N451 E573	10–20	2
01-73-0834	A	N452 E569	2	1
01-73-2268	A	N452 E572	20–30	2
01-73-1534	A	N452 E574	0–10	3
01-73-1804	A	N452 E574	20–30	8
01-73-2489	A	N454 E569	2	1
01-73-1581	A	N454 E571	10–20	1
01-73-0305	A	N454 E573	0–10	2
01-73-0455	A	N454 E573	10–20	1
01-73-1424	A	N454 E574	40–123	2
01-73-1917	A	N454 E574	0–10	4
01-73-0918	A	N454 E575	10–20	3
01-73-0183	A	N455 E569	0–10	1
01-73-0414	A	N455 E573	0–10	1
01-73-1815	A	N456 E570	0–10	1
01-73-0161	A	N456 E572	0–10	1
01-73-1883	A	N457 E572	2	1
01-73-0125	A	N457 E573	10–20	1
01-73-0282	A	N459 E572	0–10	2
01-73-0484	A	N459 E573	0–10	2
01-73-0357	A	N460 E569	0–10	1
01-73-0477	A	N460 E569	10–20	1
01-73-1641	A	N460 E570	20–30	2
01-73-2070	A	N460 E570	10–20	3
01-73-0395	A	N460 E572	0–10	1
01-73-0099	A	N460 E573	0–10	2
99-70-0607	B	N469 E567	20–30	14
99-70-0751	B	N469 E569	1	2
99-70-0865	B	N469 E570	1	5
99-70-0769	B	N469 E571	2	5
99-70-0234	B	N471 E571	1	2
99-70-0788	B	N471 E571	2	38
01-73-2911	B	N474 E568	4	1
01-73-1155	B	N475 E569	4	26
01-73-2346	B	N476 E569	2	33
01-73-2531	B	N476 E569	3	18
01-73-1147	B	N477 E568	3	51
01-73-2746	B	N477 E568	2	33
01-73-2756	B	N477 E568	4	27
01-73-2783	B	N477 E568	5	33
01-73-2798	B	N477 E568	5	4

Table 1.10: continued

Catalog	Area	Provenience	Level	Count
01-73-2804	B	N477 E568	4	50
01-73-2835	B	N477 E568	1	43
01-73-2851	B	N477 E568	5	34
01-73-2892	B	N477 E568	3	99
01-73-2924	B	N477 E568	2	27
01-73-2944	B	N477 E568	1	106
01-73-2971	B	N477 E568	4	163
01-73-2986	B	N477 E568	1	109
01-73-2817	B	N477 E578	2	43
01-73-1238	B	N478 E567	2	4
01-73-1258	B	N478 E567	1	2
01-73-1304	B	N478 E567	3	5
01-73-1498	B	N478 E567	4	4
01-73-2442	B	N478 E567	40–45	1
01-73-2165	B	N478 E569	1	4
99-70-1034	B	N479 E565	3	7
99-70-1252	B	N479 E565	4	2
01-73-0943	B	N479 E567	1	2
01-73-0966	B	N479 E567	2	3
01-73-0978	B	N479 E567	1	1
01-73-1073	B	N479 E567	3	10
01-73-2418	B	N479 E567	4	3
99-70-0485	B	N479 E569	4	2
99-70-0586	B	N479 E569	1	3
01-73-0990	B	N479 E573	2	6
01-73-2308	B	N479 E573	1	1
01-73-1464	B	N480 E568	3	24
01-73-2133	B	N480 E568	10–20	14
01-73-0702	B	N480 E570	1	3
01-73-1172	B	N480 E570	3	1
01-73-1194	B	N480 E570	3	4
01-73-1025	B	N480 E572	3	1
01-73-1896	B	N480 E572	1	1
01-73-2022	B	N480 E572	2	2
99-70-1058	B	N481 E561	3	10
99-70-1288	B	N481 E561	1	6
99-70-1367	B	N481 E561	4	2
99-70-1378	B	N481 E561	2	4
99-70-1416	B	N481 E562	2	29
99-70-1449	B	N481 E562	4	14
99-70-1477	B	N481 E562	3	19
99-70-1688	B	N481 E562	1	10
99-70-1495	B	N481 E563	2	56
99-70-1508	B	N481 E563	1	10
99-70-1541	B	N481 E563	4	26
99-70-1757	B	N481 E563	3	38
99-70-1565	B	N481 E564	3	17

Table 1.10: continued

Catalog	Area	Provenience	Level	Count
99-70-1717	B	N481 E564	4	14
01-73-	B	N481 E567	2	1
01-73-1150	B	N481 E567	2	2
01-73-1152	B	N481 E567	3	3
01-73-1464	B	N481 E567	3	1
01-73-0513	B	N481 E569	1	13
01-73-0622	B	N481 E569	2	1
01-73-1039	B	N481 E569	4	2
01-73-1776	B	N481 E569	20–30	2
01-73-0610	B	N481 E571	1	9
01-73-0864	B	N481 E571	2	6
99-70-1082	B	N482 E565	4	15
99-70-1176	B	N482 E565	1	5
99-70-1238	B	N482 E565	2	29
99-70-1795	B	N482 E565	3	50
01-73-0807	B	N482 E568	2	5
01-73-1337	B	N482 E568	4	5
01-73-1369	B	N482 E568	3	4
01-73-2096	B	N482 E568	1	2
01-73-2394	B	N482 E568	3	1
01-73-0693	B	N482 E569	2	1
01-73-0729	B	N482 E570	20–30	5
01-73-0743	B	N482 E572	10–20	5
01-73-0747	B	N482 E572	2	1
01-73-1012	B	N482 E572	3	2
01-73-1874	B	N482 E572	1	1
99-70-0908	B	N483 E565	3	31
99-70-0932	B	N483 E565	4	12
99-70-1596	B	N483 E565	1	7
01-73-0758	B	N483 E567	2	3
01-73-0902	B	N483 E567	3	5
01-73-0905	B	N483 E567	3	1
01-73-1659	B	N483 E567	1	1
01-73-2530	B	N483 E567	2	1
01-73-1450	B	N483 E569	3	5
01-73-1741	B	N483 E569	2	2
01-73-2213	B	N483 E569	2	1
99-70-1001	B	N483 E570	20–30	3
01-73-1724	B	N483 E571	2	3
99-70-0562	B	N484 E562	3	23
99-70-0148	B	N484 E565	1	5
99-70-0514	B	N484 E565	4	38
99-70-1133	B	N484 E565	2	15
99-70-0083	B	N484 E566	1	2
99-70-0109	B	N484 E566	2	5
99-70-0283	B	N484 E566	2	1
99-70-0437	B	N484 E566	3	14

Table 1.10: continued

Catalog	Area	Provenience	Level	Count
99-70-0630	B	N484 E566	4	38
99-70-1334	B	N484 E566	30–48	12
99-70-1628	B	N484 E566	33–35	12
99-70-0125	B	N484 E567	2	9
99-70-0212	B	N484 E567	30–35	10
99-70-1102	B	N484 E567	4	3
01-73-1221	B	N484 E568	2	7
01-73-2391	B	N484 E568	3	3
99-70-0003	B	N484 E568	2	17
99-70-0032	B	N484 E568	1	2
99-70-1032	B	N484 E568	3	21
99-70-1140	B	N484 E568	30–35	1
01-73-1288	B	N484 E569	3	1
99-70-0061	B	N484 E569	2	10
99-70-0090	B	N484 E569	1	7
99-70-1193	B	N484 E569	3	5
01-73-1061	B	N484 E570	2	8
99-70-0198	B	N484 E570	1	2
01-73-1121	B	N488 E569	4	5
01-73-1180	B	N488 E570	2	14
01-73-0645	B	N489 E567	1	1
99-70-1072	B	N496 E570	2	15
97-66-0629	C	N512 E573	1	6
98-131-1071	C	N513 E564	10–20	5
98-131-1216	C	N513 E564	20–30	1
98-131-1604	C	N513 E564	20–30	25
98-131-1619	C	N513 E564	10–20	21
98-131-0788	C	N513 E565	0–10	1
98-131-1301	C	N513 E565	20–30	2
98-131-1628	C	N513 E565	20–30	4
98-131-1692	C	N513 E565	10–20	15
98-131-0798	C	N513 E566	0–10	2
98-131-0970	C	N513 E566	10–20	2
98-131-1149	C	N513 E566	20–30	1
97-66-0801	C	N513 E573	1	1
98-131-1630	C	N514 E564	20–30	21
98-131-0634	C	N514 E565	10–20	9
98-131-1635	C	N514 E565	20–30	80
98-131-1715	C	N514 E565	20–30	24
98-131-0692	C	N514 E566	20–30	4
98-131-0716	C	N514 E566	10–20	1
98-131-0378	C	N514 E567	0–10	1
98-131-0680	C	N514 E567	20–30	4
98-131-0567	C	N514 E568	0–10	32
98-131-0662	C	N514 E568	10–20	6
98-131-1233	C	N514 E568	20–25	3
98-131-1240	C	N514 E568	20–25	1

Table 1.10: continued

Catalog	Area	Provenience	Level	Count
98-131-0376	C	N514 E569	0–10	7
98-131-0528	C	N514 E569	2	6
98-131-0959	C	N514 E569	20–30	9
98-131-0770	C	N514 E570	10–20	26
98-131-1251	C	N514 E570	20–30	3
98-131-1505	C	N514 E570	20–30	56
98-131-1650	C	N514 E570	20–30	66
98-131-1668	C	N514 E570	20–30	75
98-131-1725	C	N514 E570	18–20	141
98-131-1257	C	N514 E571	30–40	8
98-131-1284	C	N514 E571	20–30	5
98-131-1288	C	N514 E572	10–20	1
98-131-1297	C	N514 E572	10–20	1
97-66-1299	C	N514 E573	1	1
98-131-0033	C	N514 E573	0–10	1
98-131-1219	C	N515 E562	3	6
98-131-1110	C	N515 E565	20–30	3
98-131-1174	C	N515 E565	30–40	4
98-131-1606	C	N515 E565	20–30	123
98-131-1640	C	N515 E565	30–40	84
98-131-0871	C	N515 E566	10–20	2
98-131-1003	C	N515 E566	20–30	6
97-66-0951	C	N517 E573	1	3
97-66-0891	C	N518 E573	0–20	4
97-66-0693	C	N519 E573	1	2
97-66-1101	C	N521 E572	2	2
97-66-0450	C	N523 E573	0–10	2
97-66-0610	C	N523 E573	2	6
97-66-0481	C	N524 E573	0–20	1
99-70-0179	D	N529 E567	3	1
99-70-0902	D	N529 E570	2	2
99-70-0402	D	N530 E568	2	1
99-70-0741	D	N538 E567	3	1
99-70-0682	D	N539 E563	2	1
99-70-0627	D	N539 E569	3	1
99-70-0396	D	N540 E567	2	1
98-131-1419	E	N529 E540	None	1
97-66	E	N531 E540	6	4
97-66	E	N531 E540	7	4
97-66	E	N531 E540	4	15
97-66	E	N531 E540	3	16
97-66	E	N531 E540	2	16
97-66-0589	E	N531 E540	2	5
97-66-0840	E	N531 E540	3	5
97-66-0969	E	N531 E540	4	3
97-66-1042	E	N531 E540	7	1
97-66-1234	E	N531 E540	8	2

Table 1.10: continued

Catalog	Area	Provenience	Level	Count
97-66-1410	E	N531 E540	5	2
98-131-1684	E	N531 E540	5	3
99-70-0709	E	N531 E541	1	1
99-70-0952	E	N531 E541	4	1
98-131-0407	E	N532 E540	1	1
98-131-1124	E	N533 E540		11
98-131-1616	E	N533 E540	Feature	8
99-70-1812	E	N533 E541	9	1
99-70-0246	E	N535 E542	1	1
99-70-0957	E	N535 E542	4	1
97-66	E	N541 E540	1	1
98-131-0915	G	N522 E487	60–63	1
98-131-0784	G	N523 E486	40–50	2
98-131-0990	G	N523 E487	40–50	2
99-70-1225	G	N526 E495	40–60	2
99-70-1266	G	N526 E495	20–40	1
99-70-1662	G	N527 E500	40–60	1
98-131-1380	G	N531 E500	20–30	3
98-131-0118	G	N532 E484	3	1
98-131-0132	G	N532 E484	2	2
98-131-0099	G	N532 E485	2	1
98-131-0107	G	N532 E486	10–20	2
98-131-0162	G	N532 E491	0–10	1
98-131-0318	G	N532 E491	4	1
98-131-1042	G	N532 E500	10–20	2
98-131-1196	G	N532 E500	20–30	2
00-90	General	AREA 2000-1		
99-70-0019	General	Blacksmith Area		
98-131-1503	General	LOT 5	40–50	1
98-131-1504	General	LOT 5	40–50	2
98-131-1512	General	LOT 6	50–60	4
98-131-1523	General	LOT 6	50–60	1
98-131-1533	General	LOT 7	60–70	14
99-70-1351	General	N	1	1
80-303-463	General	N0 E90	4	15
80-303-685	General	N15 E100	2	8
98-131-0467	General	N514 E464	1	5
97-66-0991	General	N554 E500	1	2
97-66-1133	General	N564 E500	2	1
None	General	Nowak		296
81-113-503	General	Rodent		2
98-131-1554	General	SE Quad	Surface	8
00-90-2002	General	Surface		2
80-303-820	General	Surface		120
97-66-1203	General	Surface		7
98-131-0853	General	Surface		1
00-90-1467	General	Trench A F2		1

Table 1.10: continued

Catalog	Area	Provenience	Level	Count
00-90-1867	General	Trench A F2		6
00-90-1917	General	Trench A F2		4
81-113-539	General	Trench A	20–30	
81-113-549	General	Trench A	20–30	
81-113-562	General	Trench A	20–30	
81-113-245	General	Trench C		
81-113-415	General	Trench E		
81-113-491	General	Trench E		
81-113-507	General	Trench E		
81-113-689	General	Trench E		
81-113-696	General	Trench E		
81-113-059	General	Trench F		
81-113-432	General	Trench F		
81-113-443	General	Trench F		
81-113-473	General	Trench F		
81-113-712	General	Trench I		2
01-73-2292	General			
98-131	General			
99-70-1777	General			
97-66-0517	H	N513 E489	3	3
97-66-0643	H	N513 E489	2	1
97-66-0013	H	N513 E490	2	0
None	H	N513 E490	2	0
97-66-0650	H	N513 E491	3	9
97-66-0162	H	N513 E492	1	1
97-66-1290	H	N513 E494	3	1
97-66-0424	H	N513 E495	2	2
97-66-0121	H	N513 E499	4	1
97-66-1317	H	N513 E499	6	3
97-66-0797	H	N514 E499	3	3
97-66-1178	H	N514 E499	5	3
97-66-1356	H	N514 E499	4	1
00-90-0394	I	N490 E494	3	1
00-90-0626	I	N490 E494	4	1
00-90-0852	I	N490 E495	3	1
00-90-0260	I	N490 E496	2	1
00-90-1240	I	N490 E497	5	2
00-90-0280	I	N490 E498	1	1
00-90-1501	I	N490 E499	3	1
00-90-0506	I	N490 E501	2	1
00-90-0199	I	N490 E502	2	20
00-90-0598	I	N490 E502	3	23
00-90-0047	I	N490 E503	1	3
00-90-0217	I	N490 E503	2	77
00-90-1653	I	N490 E503	4	2
00-90-1756	I	N490 E503	3	8
00-90-1826	I	N490 E503	2	4

Table 1.10: continued

Catalog	Area	Provenience	Level	Count
00-90-1837	I	N490 E503	2	372
00-90-1947	I	N490 E503	2	208
00-90-0014	I	N490 E504	2	6
00-90-0143	I	N490 E504	2	40
00-90-0344	I	N490 E504	3	4
00-90-1275	I	N490 E505	1	25
00-90-1296	I	N490 E505	2	5
00-90-1351	I	N490 E508	3	4
00-90-1383	I	N490 E508	3	1
00-90-1482	I	Trench A F1		4
00-90-1856	I	Trench A F1	5	0
00-90-1857	I	Trench A F1	5	30
00-90-1964	I	Trench A F1	5	7
00-90-2307	I	Trench A F1	5	4
00-90-1170	I	Trench A		
00-90-0714	J	N465 E500	4	2
00-90-0895	J	N465 E501	5	2
00-90-1453	J	N465 E501	6	3
00-90-1783	J	N465 E501	4	3
00-90-1206	J	N465 E502	6	1
00-90-0438	J	N465 E503	4	1
00-90-1258	J	N465 E503	6	2
00-90-0039	J	N465 E504	1	5
00-90-0329	J	N465 E504	2	4
00-90-0938	J	N465 E504	3	1
00-90-1356	J	N465 E504	7	1
00-90-0373	J	N465 E505	1	5
00-90-1667	J	N465 E505	2	7
00-90-1984	J	N465 E505	4	4
00-90-0677	J	N465 E506	1	3
00-90-1192	J	N465 E506	4	2
00-90-1213	J	N465 E506	5	2
00-90-2025	J	N465 E506	3	6
00-90-2031	J	N465 E506	4	15
00-90-1432	J	N465 E509	3	7
97-66-0870	K	N442 E500	4	1
98-131-0083	K	N442 E504	3	4
98-131-0338	K	N442 E504	5	20
98-131-0125	K	N442 E505	4	2
98-131-0202	K	N442 E505	5	2
98-131-1394	K	N442 E505	50–60	1
97-66-0458	K	N442 E509	5	1
97-66-0666	K	N442 E509	4	3
97-66-0832	K	N443 E504	4	1
97-66-1252	K	N443 E504	5	10
98-131-0189	K	N443 E505	5	1
98-131-0263	K	N443 E505	6	3

Table 1.10: continued

Catalog	Area	Provenience	Level	Count
97-66-0200	K	N443 E509	4	4
97-66-0509 (also 0968)	K	N443 E509	5	3
98-131-1190	K	N443–445 E504–505	6 to base	7
00-90-1647	K	N443.5 E506	55	7
00-90-1734	K	N443.5 E506	40–50	2
00-90-0763	K	N443.5 E507	50–55	2
00-90-0820	K	N443.5 E507	40–50	12
00-90-1082	K	N443.5 E508	40–50	1
00-90-1508	K	N443.5 E508	55	2
00-90-0427	K	N443.5 E510	4	1
00-90-1057	K	N443.5 E510	40–50	1
00-90-1062	K	N443.5 E510	40–50	4
97-66-1212	K	N444 E502	4	2
97-66-1226	K	N444 E504	5	13
97-66-1134	K	N444 E504	4	3
97-66-1079	K	N444 E505	3	2
98-131-0135	K	N444 E505	4	4
00-90-1603	K	N444 E506	40–50	7
97-66-1023	K	N444 E506	4	6
00-90-0551	K	N444 E507	4	7
00-90-0961	K	N444 E507	40–50	6
00-90-0865	K	N444 E508	40–50	5
00-90-1026	K	N444 E508	30–40	0
00-90-0087	K	N444 E509	5	9
97-66-0216	K	N444 E509	4	3
97-66-0386	K	N444 E509	5	3
00-90-0405	K	N444 E510	40–50	4
00-90-1175	K	N444 E510	50–55	3
98-131-0480	K	N445 E504–505	4	1
98-131-0441	K	N445 E505	4	1
98-131-1412	K	N445 E505	40–50	1
98-131-1413	K	N445 E505	40–50	1
97-66-0273	K	N445 E509	3	1
00-90-1310	K	N446 E505	105	4
97-66-0939	K	N446 E511	6	1
97-66-1268	K	N446 E511	60–70	1
97-66-1403	K	N446 E511	4	6
97-66-1451	K	N446 E511		1
97-66-0530	K	N447 E509	3	2
97-66-0598	K	N447 E509	4	4
97-66-0312	K	N448–442 E509	3	2
97-66-1174	L	N545 E540	6	1
97-66-1394	L	N547 E540	5	1
97-66-1417	L	N547 E540	F11	1
97-66-1422	L	N547 E540	F3	1
97-66-	L	N548 E540	3	2
97-66-1118	L	N548 E540	4	1

Table 1.10: continued

Catalog	Area	Provenience	Level	Count
97-66-0677	L	N550 E540		1
97-66-1089	L	N551 E540	2	1
98-131-0325	L	N551 E565	2	1
98-131-0290	L	N551 E573	1	1
97-66-0569	L	N552 E540	2	1
97-66-0575	L	N552 E540	4	1
00-90-0024	M	N449 E554	20–30	3
00-90-0058	M	N449 E554	1	1
00-90-0079	M	N450 E554	0–20	1
00-90-1074	M	N450 E554	30–40	0
01-73-1856	M	N454 E545	20–30	1
80-303-690	W	N515 E100	2	1
81-113-086	W	N525 E105	1	1
80-303-648	W	N535 E100	1	3
80-303-655	W	N535 E100	2	11
80-303-364	X	S25 E94	1	88
80-303-526	X	S33 E100	1	3
80-303-550	X	S33 E100	2	70
80-303-560	X	S33 E100	3	10
80-303-715	X	S33 E120	1	21
80-303-370	X	S33 E95	1	56
80-303-392	X	S33 E95	2	61
80-303-734	X	S34 E100	1	61
81-113-195	X	S34 E112	1	11
80-303-464	X	S35 E100	1	12
80-303-493	X	S35 E100	2	60
80-303-505	X	S35 E100	3	32
80-303-700	X	S35 E95	1	227
80-303-750	X	S36 E91	1	105
80-303-195	X	S36 E94	1	0
80-303-196	X	S36 E94	1	109
80-303-228	X	S36 E94	15–30	1990
80-303-328	X	S36 E95	1	89
80-303-339	X	S36 E95	2	1
80-303-310	X	S37 E100	1	12
80-303-318	X	S37 E100	2	10
81-113-175	X	S37 E104	1	3
81-113-292	X	S37 E104	2	12
81-113-296	X	S37 E104	2	18
81-113-322	X	S37 E104	2	3
81-113-119	X	S37 E105	1	8
81-113-120	X	S37 E105	1	2
81-113-277	X	S37 E105	2	7
80-303-236	X	S38 E100	1	26
80-303-248	X	S38 E100	2	107
80-303-278	X	S38 E100	3	9
80-303-286	X	S38 E100	4	3

Table 1.10: continued

Catalog	Area	Provenience	Level	Count
80-303-013	X	S39 E100	10–20	108
80-303-017	X	S39 E100	10–20	0
80-303-031	X	S39 E100	1	9
80-303-620	X	S39 E100	3	40
80-303-630	X	S39 E100	4	161
80-303-640	X	S39 E100	5	6
80-303-092	X	S40 E100	3	7
80-303-099	X	S40 E100	2	21
80-303-102	X	S40 E100	4	153
81-113-077	X	S41 E103	1	2
80-303-590	X	S42 E100	2	14
80-303-600	X	S42 E100	3	11
80-303-609	X	S42 E100	4	0
81-113-040	X	S43 E100	3	5
81-113-186	X	S43 E100	2	1
81-113-016	X	S43 E102	2	1
81-113-153	X	S43 E102	1	1
81-113-211	X	S43 E103	1	2
81-113-030	X	S43 E106	2	3
81-113-093	X	S43 E110		1
81-113-338	X	S43 E116	2	3
80-303-399	X	S45 E100	1	14
80-303-416	X	S45 E100	4	6
80-303-427	X	S45 E100	5	13
80-303-130	Y	S12 E36	4	3
80-303-149	Y	S12 E38	3	1
80-303-042	Y	S12 E40	10–38	1
80-303-045	Y	S12 E40	43–46	2
80-303-058	Y	S12 E49	4	179
80-303-065	Y	S12 E49	1	39
80-303-188	Y	S12 E49	3	12
80-303-803	Y	S12 E49		3
80-303-814	Y	S12 E49	5	1
80-303-755	Y	S13 E36	1	23
80-303-763	Y	S13 E41	2	3
80-303-434	Z	N0 E49	1	1

Table 1.11: Glass beads by catalog number, Fort Pierre Chouteau.

Catalog	Area	Provenience	Level	Count
00-90	General	Area 2000-1		1
00-90-0014	I	N490 E504	2	6
00-90-0024	M	N449 E554	20–30	3
00-90-0039	J	N465 E504	1	5
00-90-0047	I	N490 E503	1	3

Table 1.11: continued

Catalog	Area	Provenience	Level	Count
00-90-0058	M	N449 E554	1	1
00-90-0079	M	N450 E554	0–20	1
00-90-0087	K	N444 E509	5	9
00-90-0143	I	N490 E504	2	40
00-90-0199	I	N490 E502	2	20
00-90-0217	I	N490 E503	2	77
00-90-0260	I	N490 E496	2	1
00-90-0280	I	N490 E498	1	1
00-90-0329	J	N465 E504	2	4
00-90-0344	I	N490 E504	3	4
00-90-0373	J	N465 E505	1	5
00-90-0394	I	N490 E494	3	1
00-90-0405	K	N444 E510	40–50	4
00-90-0427	K	N443.5 E510	4	1
00-90-0438	J	N465 E503	4	1
00-90-0506	I	N490 E501	2	1
00-90-0551	K	N444 E507	4	7
00-90-0598	I	N490 E502	3	23
00-90-0626	I	N490 E494	4	1
00-90-0677	J	N465 E506	1	3
00-90-0714	J	N465 E500	4	2
00-90-0763	K	N443.5 E507	50–55	2
00-90-0820	K	N443.5 E507	40–50	12
00-90-0852	I	N490 E495	3	1
00-90-0865	K	N444 E508	40–50	5
00-90-0895	J	N465 E501	5	2
00-90-0938	J	N465 E504	3	1
00-90-0961	K	N444 E507	40–50	6
00-90-1026	K	N444 E508	30–40	0
00-90-1057	K	N443.5 E510	40–50	1
00-90-1062	K	N443.5 E510	40–50	4
00-90-1074	M	N450 E554	30–40	0
00-90-1082	K	N443.5 E508	40–50	1
00-90-1170	I	Trench A		1
00-90-1175	K	N444 E510	50–55	3
00-90-1192	J	N465 E506	4	2
00-90-1206	J	N465 E502	6	1
00-90-1213	J	N465 E506	5	2
00-90-1240	I	N490 E497	5	2
00-90-1258	J	N465 E503	6	2
00-90-1275	I	N490 E505	1	25
00-90-1296	I	N490 E505	2	5
00-90-1310	K	N446 E505	105	4
00-90-1351	I	N490 E508	3	4
00-90-1356	J	N465 E504	7	1
00-90-1383	I	N490 E508	3	1
00-90-1432	J	N465 E509	3	7

Table 1.11: continued

Catalog	Area	Provenience	Level	Count
00-90-1453	J	N465 E501	6	3
00-90-1467	General	Trench A F2		1
00-90-1482	I	Trench A F1		4
00-90-1501	I	N490 E499	3	1
00-90-1508	K	N443.5 E508	55	2
00-90-1603	K	N444 E506	40–50	7
00-90-1647	K	N443.5 E506	55	7
00-90-1653	I	N490 E503	4	2
00-90-1667	J	N465 E505	2	7
00-90-1734	K	N443.5 E506	40–50	2
00-90-1756	I	N490 E503	3	8
00-90-1783	J	N465 E501	4	3
00-90-1826	I	N490 E503	2	4
00-90-1837	I	N490 E503	2	372
00-90-1856	I	Trench A F1	5	0
00-90-1857	I	Trench A F1	5	30
00-90-1867	General	Trench A F2		6
00-90-1917	General	Trench A F2		4
00-90-1947	I	N490 E503	2	208
00-90-1964	I	Trench A F1	5	7
00-90-1984	J	N465 E505	4	4
00-90-2002	General	Surface		2
00-90-2025	J	N465 E506	3	6
00-90-2031	J	N465 E506	4	15
00-90-2307	I	Trench A F1	5	4
01-73-	B	N481 E567	2	1
01-73-0052	A	N451 E572	10–20	1
01-73-0099	A	N460 E573	0–10	2
01-73-0125	A	N457 E573	10–20	1
01-73-0137	A	N451 E572	0–10	1
01-73-0161	A	N456 E572	0–10	1
01-73-0183	A	N455 E569	0–10	1
01-73-0201	A	N451 E573	10–20	2
01-73-0282	A	N459 E572	0–10	2
01-73-0305	A	N454 E573	0–10	2
01-73-0357	A	N460 E569	0–10	1
01-73-0395	A	N460 E572	0–10	1
01-73-0414	A	N455 E573	0–10	1
01-73-0421	A	N451 E573	Cleanup	2
01-73-0455	A	N454 E573	10–20	1
01-73-0477	A	N460 E569	10–20	1
01-73-0484	A	N459 E573	0–10	2
01-73-0513	B	N481 E569	1	13
01-73-0589	A	N451 E569	10–20	1
01-73-0610	B	N481 E571	1	9
01-73-0622	B	N481 E569	2	1
01-73-0645	B	N489 E567	1	1

Table 1.11: continued

Catalog	Area	Provenience	Level	Count
01-73-0693	B	N482 E569	2	1
01-73-0702	B	N480 E570	1	3
01-73-0729	B	N482 E570	20–30	5
01-73-0743	B	N482 E572	10–20	5
01-73-0747	B	N482 E572	2	1
01-73-0758	B	N483 E567	2	3
01-73-0807	B	N482 E568	2	5
01-73-0834	A	N452 E569	2	1
01-73-0864	B	N481 E571	2	6
01-73-0902	B	N483 E567	3	5
01-73-0905	B	N483 E567	3	1
01-73-0918	A	N454 E575	10–20	3
01-73-0943	B	N479 E567	1	2
01-73-0966	B	N479 E567	2	3
01-73-0978	B	N479 E567	1	1
01-73-0990	B	N479 E573	2	6
01-73-1012	B	N482 E572	3	2
01-73-1025	B	N480 E572	3	1
01-73-1039	B	N481 E569	4	2
01-73-1061	B	N484 E570	2	8
01-73-1073	B	N479 E567	3	10
01-73-1121	B	N488 E569	4	5
01-73-1147	B	N477 E568	3	51
01-73-1150	B	N481 E567	2	2
01-73-1152	B	N481 E567	3	3
01-73-1155	B	N475 E569	4	26
01-73-1172	B	N480 E570	3	1
01-73-1180	B	N488 E570	2	14
01-73-1194	B	N480 E570	3	4
01-73-1221	B	N484 E568	2	7
01-73-1238	B	N478 E567	2	4
01-73-1258	B	N478 E567	1	2
01-73-1288	B	N484 E569	3	1
01-73-1304	B	N478 E567	3	5
01-73-1337	B	N482 E568	4	5
01-73-1369	B	N482 E568	3	4
01-73-1424	A	N454 E574	40–123	2
01-73-1450	B	N483 E569	3	5
01-73-1464	B	N480 E568	3	24
01-73-1464	B	N481 E567	3	1
01-73-1498	B	N478 E567	4	4
01-73-1534	A	N452 E574	0–10	3
01-73-1581	A	N454 E571	10–20	1
01-73-1641	A	N460 E570	20–30	2
01-73-1659	B	N483 E567	1	1
01-73-1724	B	N483 E571	2	3
01-73-1741	B	N483 E569	2	2

Table 1.11: continued

Catalog	Area	Provenience	Level	Count
01-73-1776	B	N481 E569	20–30	2
01-73-1804	A	N452 E574	20–30	8
01-73-1815	A	N456 E570	0–10	1
01-73-1856	M	N454 E545	20–30	1
01-73-1874	B	N482 E572	1	1
01-73-1883	A	N457 E572	2	1
01-73-1896	B	N480 E572	1	1
01-73-1917	A	N454 E574	0–10	4
01-73-1959	A	N451 E572	10–12	1
01-73-2022	B	N480 E572	2	2
01-73-2070	A	N460 E570	10–20	3
01-73-2096	B	N482 E568	1	2
01-73-2133	B	N480 E568	10–20	14
01-73-2165	B	N478 E569	1	4
01-73-2213	B	N483 E569	2	1
01-73-2230	A	N451 E573	0–10	2
01-73-2268	A	N452 E572	20–30	2
01-73-2292		General		1
01-73-2308	B	N479 E573	1	1
01-73-2346	B	N476 E569	2	33
01-73-2391	B	N484 E568	3	3
01-73-2394	B	N482 E568	3	1
01-73-2418	B	N479 E567	4	3
01-73-2442	B	N478 E567	40–45	1
01-73-2489	A	N454 E569	2	1
01-73-2530	B	N483 E567	2	1
01-73-2531	B	N476 E569	3	18
01-73-2746	B	N477 E568	2	33
01-73-2756	B	N477 E568	4	27
01-73-2783	B	N477 E568	5	33
01-73-2798	B	N477 E568	5	4
01-73-2804	B	N477 E568	4	50
01-73-2817	B	N477 E578	2	43
01-73-2835	B	N477 E568	1	43
01-73-2851	B	N477 E568	5	34
01-73-2892	B	N477 E568	3	99
01-73-2911	B	N474 E568	4	1
01-73-2924	B	N477 E568	2	27
01-73-2944	B	N477 E568	1	106
01-73-2971	B	N477 E568	4	163
01-73-2986	B	N477 E568	1	109
80-303-013	X	S39 E100	10–20	108
80-303-017	X	S39 E100	10–20	0
80-303-031	X	S39 E100	1	9
80-303-042	Y	S12 E40	10–38	1
80-303-045	Y	S12 E40	43–46	2
80-303-058	Y	S12 E49	4	179

Table 1.11: continued

Catalog	Area	Provenience	Level	Count
80-303-065	Y	S12 E49	1	39
80-303-092	X	S40 E100	3	7
80-303-099	X	S40 E100	2	21
80-303-102	X	S40 E100	4	153
80-303-130	Y	S12 E36	4	3
80-303-149	Y	S12 E38	3	1
80-303-188	Y	S12 E49	3	12
80-303-195	X	S36 E94	1	0
80-303-196	X	S36 E94	1	109
80-303-228	X	S36 E94	15–30	1990
80-303-236	X	S38 E100	1	26
80-303-248	X	S38 E100	2	107
80-303-278	X	S38 E100	3	9
80-303-286	X	S38 E100	4	3
80-303-310	X	S37 E100	1	12
80-303-318	X	S37 E100	2	10
80-303-328	X	S36 E95	1	89
80-303-339	X	S36 E95	2	1
80-303-364	X	S25 E94	1	88
80-303-370	X	S33 E95	1	56
80-303-392	X	S33 E95	2	61
80-303-399	X	S45 E100	1	14
80-303-416	X	S45 E100	4	6
80-303-427	X	S45 E100	5	13
80-303-434	Z	N0 E49	1	1
80-303-463	General	N0 E90	4	15
80-303-464	X	S35 E100	1	12
80-303-493	X	S35 E100	2	60
80-303-505	X	S35 E100	3	32
80-303-526	X	S33 E100	1	3
80-303-550	X	S33 E100	2	70
80-303-560	X	S33 E100	3	10
80-303-590	X	S42 E100	2	14
80-303-600	X	S42 E100	3	11
80-303-609	X	S42 E100	4	0
80-303-620	X	S39 E100	3	40
80-303-630	X	S39 E100	4	161
80-303-640	X	S39 E100	5	6
80-303-648	W	N535 E100	1	3
80-303-655	W	N535 E100	2	11
80-303-685	General	N15 E100	2	8
80-303-690	W	N515 E100	2	1
80-303-700	X	S35 E95	1	227
80-303-715	X	S33 E120	1	21
80-303-734	X	S34 E100	1	61
80-303-750	X	S36 E91	1	105
80-303-755	Y	S13 E36	1	23

Table 1.11: continued

Catalog	Area	Provenience	Level	Count
80-303-763	Y	S13 E41	2	3
80-303-803	Y	S12 E49		3
80-303-814	Y	S12 E49	5	1
80-303-820	General	Surface		120
81-113-016	X	S43 E102	2	1
81-113-030	X	S43 E106	2	3
81-113-040	X	S43 E100	3	5
81-113-059	General	Trench F		4
81-113-077	X	S41 E103	1	2
81-113-086	W	N525 E105	1	1
81-113-093	X	S43 E110		1
81-113-119	X	S37 E105	1	8
81-113-120	X	S37 E105	1	2
81-113-153	X	S43 E102	1	1
81-113-175	X	S37 E104	1	3
81-113-186	X	S43 E100	2	1
81-113-195	X	S34 E112	1	11
81-113-211	X	S43 E103	1	2
81-113-245	General	Trench C		9
81-113-277	X	S37 E105	2	7
81-113-292	X	S37 E104	2	12
81-113-296	X	S37 E104	2	18
81-113-322	X	S37 E104	2	3
81-113-338	X	S43 E116	2	3
81-113-415	General	Trench E		1
81-113-432	General	Trench F		2
81-113-443	General	Trench F		12
81-113-473	General	Trench F		1
81-113-491	General	Trench E		4
81-113-503	General	Rodent		2
81-113-507	General	Trench E		1
81-113-539	General	Trench A	20–30	3
81-113-549	General	Trench A	20–30	2
81-113-562	General	Trench A	20–30	1
81-113-689	General	Trench E		1
81-113-696	General	Trench E		2
81-113-712	General	Trench I		2
97-66	E	N531 E540	6	4
97-66	E	N531 E540	7	4
97-66	E	N531 E540	4	15
97-66	E	N531 E540	3	16
97-66	E	N531 E540	2	16
97-66	E	N541 E540	1	1
97-66-	L	N548 E540	3	2
97-66-0013	H	N513 E490	2	0
97-66-0121	H	N513 E499	4	1
97-66-0162	H	N513 E492	1	1

Table 1.11: continued

Catalog	Area	Provenience	Level	Count
97-66-0200	K	N443 E509	4	4
97-66-0216	K	N444 E509	4	3
97-66-0273	K	N445 E509	3	1
97-66-0312	K	N448,442 E509	3	2
97-66-0386	K	N444 E509	5	3
97-66-0424	H	N513 E495	2	2
97-66-0450	C	N523 E573	0–10	2
97-66-0458	K	N442 E509	5	1
97-66-0481	C	N524 E573	0–20	1
97-66-0509 (also 0968)	K	N443 E509	5	3
97-66-0517	H	N513 E489	3	3
97-66-0530	K	N447 E509	3	2
97-66-0569	L	N552 E540	2	1
97-66-0575	L	N552 E540	4	1
97-66-0589	E	N531 E540	2	5
97-66-0598	K	N447 E509	4	4
97-66-0610	C	N523 E573	2	6
97-66-0629	C	N512 E573	1	6
97-66-0643	H	N513 E489	2	1
97-66-0650	H	N513 E491	3	9
97-66-0666	K	N442 E509	4	3
97-66-0677	L	N550 E540		1
97-66-0693	C	N519 E573	1	2
97-66-0797	H	N514 E499	3	3
97-66-0801	C	N513 E573	1	1
97-66-0832	K	N443 E504	4	1
97-66-0840	E	N531 E540	3	5
97-66-0870	K	N442 E500	4	1
97-66-0891	C	N518 E573	0–20	4
97-66-0939	K	N446 E511	6	1
97-66-0951	C	N517 E573	1	3
97-66-0969	E	N531 E540	4	3
97-66-0991	General	N554 E500	1	2
97-66-1023	K	N444 E506	4	6
97-66-1042	E	N531 E540	7	1
97-66-1079	K	N444 E505	3	2
97-66-1089	L	N551 E540	2	1
97-66-1101	C	N521 E572	2	2
97-66-1118	L	N548 E540	4	1
97-66-1133	General	N564 E500	2	1
97-66-1134	K	N444 E504	4	3
97-66-1174	L	N545 E540	6	1
97-66-1178	H	N514 E499	5	3
97-66-1203	General	Surface		7
97-66-1212	K	N444 E502	4	2
97-66-1226	K	N444 E504	5	13
97-66-1234	E	N531 E540	8	2

Table 1.11: continued

Catalog	Area	Provenience	Level	Count
97-66-1252	K	N443 E504	5	10
97-66-1268	K	N446 E511	60–70	1
97-66-1290	H	N513 E494	3	1
97-66-1299	C	N514 E573	1	1
97-66-1317	H	N513 E499	6	3
97-66-1356	H	N514 E499	4	1
97-66-1394	L	N547 E540	5	1
97-66-1403	K	N446 E511	4	6
97-66-1410	E	N531 E540	5	2
97-66-1417	L	N547 E540	F11	1
97-66-1422	L	N547 E540	F 3	1
97-66-1451	K	N446 E511		1
98-131		General		2
98-131-0033	C	N514 E573	0–10	1
98-131-0083	K	N442 E504	3	4
98-131-0099	G	N532 E485	2	1
98-131-0107	G	N532 E486	10–20	2
98-131-0118	G	N532 E484	3	1
98-131-0125	K	N442 E505	4	2
98-131-0132	G	N532 E484	2	2
98-131-0135	K	N444 E505	4	4
98-131-0162	G	N532 E491	0–10	1
98-131-0189	K	N443 E505	5	1
98-131-0202	K	N442 E505	5	2
98-131-0263	K	N443 E505	6	3
98-131-0290	L	N551 E573	1	1
98-131-0318	G	N532 E491	4	1
98-131-0325	L	N551 E565	2	1
98-131-0338	K	N442 E504	5	20
98-131-0376	C	N514 E569	0–10	7
98-131-0378	C	N514 E567	0–10	1
98-131-0407	E	N532 E540	1	1
98-131-0441	K	N445 E505	4	1
98-131-0467	General	N514 E464	1	5
98-131-0480	K	N445 E504,505	4	1
98-131-0528	C	N514 E569	2	6
98-131-0567	C	N514 E568	0–10	32
98-131-0634	C	N514 E565	10–20	9
98-131-0662	C	N514 E568	10–20	6
98-131-0680	C	N514 E567	20–30	4
98-131-0692	C	N514 E566	20–30	4
98-131-0716	C	N514 E566	10–20	1
98-131-0770	C	N514 E570	10–20	26
98-131-0784	G	N523 E486	40–50	2
98-131-0788	C	N513 E565	0–10	1
98-131-0798	C	N513 E566	0–10	2
98-131-0853	General	Surface		1

Table 1.11: continued

Catalog	Area	Provenience	Level	Count
98-131-0871	C	N515 E566	10–20	2
98-131-0915	G	N522 E487	60–63	1
98-131-0959	C	N514 E569	20–30	9
98-131-0970	C	N513 E566	10–20	2
98-131-0990	G	N523 E487	40–50	2
98-131-1003	C	N515 E566	20–30	6
98-131-1042	G	N532 E500	10–20	2
98-131-1071	C	N513 E564	10–20	5
98-131-1110	C	N515 E565	20–30	3
98-131-1124	E	N533 E540		11
98-131-1149	C	N513 E566	20–30	1
98-131-1174	C	N515 E565	30–40	4
98-131-1190	K	N443,444,445 E504,505	6 to base	7
98-131-1196	G	N532 E500	20–30	2
98-131-1216	C	N513 E564	20–30	1
98-131-1219	C	N515 E562	3	6
98-131-1233	C	N514 E568	20–25	3
98-131-1240	C	N514 E568	20–25	1
98-131-1251	C	N514 E570	20–30	3
98-131-1257	C	N514 E571	30–40	8
98-131-1284	C	N514 E571	20–30	5
98-131-1288	C	N514 E572	10–20	1
98-131-1297	C	N514 E572	10–20	1
98-131-1301	C	N513 E565	20–30	2
98-131-1380	G	N531 E500	20–30	3
98-131-1394	K	N442 E505	50–60	1
98-131-1412	K	N445 E505	40–50	1
98-131-1413	K	N445 E505	40–50	1
98-131-1419	E	N529 E540	None	1
98-131-1503	General	LOT 5	40–50	1
98-131-1504	General	LOT 5	40–50	2
98-131-1505	C	N514 E570	20–30	56
98-131-1512	General	LOT 6	50–60	4
98-131-1523	General	LOT 6	50–60	1
98-131-1533	General	LOT 7	60–70	14
98-131-1554	General	SE Quad	Surface	8
98-131-1604	C	N513 E564	20–30	25
98-131-1606	C	N515 E565	20–30	123
98-131-1616	E	N533 E540	Feature	8
98-131-1619	C	N513 E564	10–20	21
98-131-1628	C	N513 E565	20–30	4
98-131-1630	C	N514 E564	20–30	21
98-131-1635	C	N514 E565	20–30	80
98-131-1640	C	N515 E565	30–40	84
98-131-1650	C	N514 E570	20–30	66
98-131-1668	C	N514 E570	20–30	75
98-131-1684	E	N531 E540	5	3

Table 1.11: continued

Catalog	Area	Provenience	Level	Count
98-131-1692	C	N513 E565	10–20	15
98-131-1715	C	N514 E565	20–30	24
98-131-1725	C	N514 E570	18–20	141
99-70-0003	B	N484 E568	2	17
99-70-0019	General	Blacksmith Area		1
99-70-0032	B	N484 E568	1	2
99-70-0061	B	N484 E569	2	10
99-70-0083	B	N484 E566	1	2
99-70-0090	B	N484 E569	1	7
99-70-0109	B	N484 E566	2	5
99-70-0125	B	N484 E567	2	9
99-70-0148	B	N484 E565	1	5
99-70-0179	D	N529 E567	3	1
99-70-0198	B	N484 E570	1	2
99-70-0212	B	N484 E567	30–35	10
99-70-0234	B	N471 E571	1	2
99-70-0246	E	N535 E542	1	1
99-70-0283	B	N484 E566	2	1
99-70-0396	D	N540 E567	2	1
99-70-0402	D	N530 E568	2	1
99-70-0437	B	N484 E566	3	14
99-70-0485	B	N479 E569	4	2
99-70-0514	B	N484 E565	4	38
99-70-0562	B	N484 E562	3	23
99-70-0586	B	N479 E569	1	3
99-70-0607	B	N469 E567	20–30	14
99-70-0627	D	N539 E569	3	1
99-70-0630	B	N484 E566	4	38
99-70-0682	D	N539 E563	2	1
99-70-0709	E	N531 E541	1	1
99-70-0741	D	N538 E567	3	1
99-70-0751	B	N469 E569	1	2
99-70-0769	B	N469 E571	2	5
99-70-0788	B	N471 E571	2	38
99-70-0865	B	N469 E570	1	5
99-70-0902	D	N529 E570	2	2
99-70-0908	B	N483 E565	3	31
99-70-0932	B	N483 E565	4	12
99-70-0952	E	N531 E541	4	1
99-70-0957	E	N535 E542	4	1
99-70-1001	B	N483 E570	20–30	3
99-70-1032	B	N484 E568	3	21
99-70-1034	B	N479 E565	3	7
99-70-1058	B	N481 E561	3	10
99-70-1072	B	N496 E570	2	15
99-70-1082	B	N482 E565	4	15
99-70-1102	B	N484 E567	4	3

Table 1.11: continued

Catalog	Area	Provenience	Level	Count
99-70-1133	B	N484 E565	2	15
99-70-1140	B	N484 E568	30–35	1
99-70-1176	B	N482 E565	1	5
99-70-1193	B	N484 E569	3	5
99-70-1225	G	N526 E495	40–60	2
99-70-1238	B	N482 E565	2	29
99-70-1252	B	N479 E565	4	2
99-70-1266	G	N526 E495	20–40	1
99-70-1288	B	N481 E561	1	6
99-70-1334	B	N484 E566	30–48	12
99-70-1351	General	N	1	1
99-70-1367	B	N481 E561	4	2
99-70-1378	B	N481 E561	2	4
99-70-1416	B	N481 E562	2	29
99-70-1449	B	N481 E562	4	14
99-70-1477	B	N481 E562	3	19
99-70-1495	B	N481 E563	2	56
99-70-1508	B	N481 E563	1	10
99-70-1541	B	N481 E563	4	26
99-70-1565	B	N481 E564	3	17
99-70-1596	B	N483 E565	1	7
99-70-1628	B	N484 E566	33–35	12
99-70-1662	G	N527 E500	40–60	1
99-70-1688	B	N481 E562	1	10
99-70-1717	B	N481 E564	4	14
99-70-1757	B	N481 E563	3	38
99-70-1777		General		2
99-70-1795	B	N482 E565	3	50
99-70-1812	E	N533 E541	9	1
None	General	Nowak		296
None	H	N513 E490	2	0

Table 1.12: Fort Pierre Chouteau Trade Ledgers.

Year	Description	Units	Meas. Unit	Bead Name	Bead Modifier	Color	Unit Cost	Total Cost
1832	Goods on Hand Supplement	3	bunch	barley corn	4	white	$0.47	$1.40
		2	pounds	pound	common	blue	$0.36	$0.72
		2	pounds	pound		white, chalk	$0.50	$1.00
		1.5	pounds	pound		white, milk	$0.36	$0.54
		4.5	bunch		7 round	blue	$2.21	$9.95
		1.5	bunch		7 round	white	$2.38	$3.57
		2	bunch		4 round	white	$0.70	$1.40
1834	Invoice Steamboat Assiniboine	1478	pounds	pound		blue	$0.31	$458.18
		715	pounds	pound		white, chalk	$0.35	$250.25
		17	bunch		large	white	$0.00	$12.11
1835	Invoice Steamboat Diana	415	pounds	pound		white, chalk	$0.35	$145.25
1837	Invoice Sioux Outfit	78	bunch	agate	10	blue	$1.63	$126.75
		25	bunch	agate		blue	$1.50	$37.50
		142	bunch	agate		white	$1.50	$213.00
		144	bunch	barley corn		white	$0.75	$108.00
		52.5	pounds	pigeon egg			$0.75	$39.38
		288	pounds	pound		blue	$0.30	$86.40
		5	bunch		1 glass		$0.25	$1.25
		5	bunch		3/4 glass		$0.20	$1.00
		670	pounds			white, chalk	$0.38	$251.25
		856	pounds			white, chalk	$0.34	$291.40
1838	Invoice Steamboat Antelope for Sioux Outfit	42	bunch	agate		blue	$1.63	$68.46
		26	bunch	agate		white	$1.25	$32.50
		56	bunch	barley corn		white	$0.75	$32.50
		9	pounds	pigeon egg		white	$0.75	$6.75

Table 1.12: continued

Year	Description	Units	Meas. Unit	Bead Name	Bead Modifier	Color	Unit Cost	Total Cost
		753	pounds			blue	$0.33	$251.00
		843	pounds			white	$0.33	$281.00
1839	Invoice Upper Missouri C Antelope	186	bunch	agate		white	$1.50	$279.00
		100	pounds	agate		blue	$1.50	$150.00
		208	bunch	barley corn		white	$0.75	$156.00
		50	dozen	cut		blue	$0.23	$11.25
		30	pounds	garnishing			$0.75	$22.50
		100	pounds	pigeon egg		white	$0.75	$75.00
		1295	pounds	pound		blue	$0.33	$427.33
		75	pounds	pound		blue, super	$0.58	$43.50
		714	pounds	venetians		blue	$0.25	$178.50
		385	pounds	venetians		white	$0.33	$127.05
		500	pounds	venetians, super			$0.58	$287.50
1840	Invoice Blotter #1 1839-1841 purchased by Frances Dorion	12	bunch	agate	round	blue	$2.50	$30.00
		75	bunch	agate	round, 3& 4	blue	$0.63	$46.87
		80	bunch	agate	round	blue	$0.38	$30.00
		50	bunch	agate	round	white	$2.50	$125.00
		10	bunch	agate	large, round	white	$2.00	$20.00
		38	bunch	agate	small, round	white	$0.75	$28.50
		50	bunch	barley corn	large	white	$1.63	$81.25
		20	bunch	barley corn	small	white	$0.38	$7.50
		10	bunch	common			$0.50	$5.00
		15	bunch	common			$0.20	$3.00
		10	bunch	crystal		blue	$0.38	$37.50
		20	pounds	pound		Blue	$0.25	$5.00

Table 1.12: continued

Year	Description	Units	Meas. Unit	Bead Name	Bead Modifier	Color	Unit Cost	Total Cost
		153	pounds			blue	$0.56	$85.68
		259	pounds			white, chalk	$0.56	$115.04
1841	Steam Boat Trapper	50	bunch	agate	10	blue	$1.50	$75.00
		60	bunch	agate	9	blue	$1.25	$50.00
		100	bunch	agate		blue, lt	$0.75	$75.00
		162	bunch	agate	10	white	$1.50	$213.00
		46	bunch	agate		white	$1.25	$57.50
		49	bunch	agate	4	white	$1.00	$49.00
1844	Inventory of stock remaining on hand	2	bunch	agate		milk	$0.71	$1.42
		38	bunch	agate	round	white	$2.50	$95.00
		10	bunch	agate	round	white	$2.00	$20.00
		186	bunch	agate	round	white	$1.50	$279.00
		38	bunch	agate	small	white	$0.75	$28.50
		17	bunch	barley corn	small	blue	$0.75	$12.75
		20.75	bunch	barley corn	small	blue	$0.50	$10.38
		5	bunch	barley corn	small	blue	$0.38	$1.87
		5.75	bunch	barley corn	small	ruby	$0.81	$4.67
		50	bunch	barley corn	large	white	$1.63	$81.25
		281	bunch	barley corn	large	white	$0.75	$210.75
		43	bunch	barley corn	small	white	$0.75	$32.25
		112	bunch	barley corn	small	white	$0.47	$52.36
		50	bunch	barley corn	small	white	$0.38	$18.75
		80	bunch	barley corn	small	white	$0.38	$30.00
		1	bunch	barley corn	fancy		$1.13	$1.13
		10	bunch	crystal			$0.38	$3.75
		3	dozen	cut		blue	$0.19	$0.56
		5	pounds	garnishing		assorted	$0.75	$3.75

Table 1.12: continued

Year	Description	Units	Meas. Unit	Bead Name	Bead Modifier	Color	Unit Cost	Total Cost
		29	pounds	garnishing		blue	$0.75	$21.75
		1	pounds	garnishing		white	$0.56	$0.56
		9	bunch	marble	round	blue	$2.00	$18.00
		1	bunch	marble		blue	$1.75	$1.75
		6.5	bunch	marble	round	blue	$1.50	$9.75
		59	bunch	marble		blue	$1.50	$88.50
		2	bunch	marble		blue	$1.25	$2.50
		30	bunch	marble		blue	$0.75	$22.50
		50	bunch	marble		blue	$0.75	$37.50
		0.75	bunch	marble	small	blue	$0.38	$28.00
		47	bunch	marble		ruby	$2.25	$105.75
		7.5	bunch	necklace	large	blue	$5.00	$37.50
		86	pounds	pigeon egg		blue	$0.93	$78.98
		90	pounds	pigeon egg		white	$0.75	$67.50
		110	pounds	pound		assorted	$0.25	$27.50
		15	pounds	pound		black	$0.25	$3.75
		434	pounds	pound		blue	$0.31	$134.54
		343	pounds	pound		blue	$0.25	$85.75
		1050	pounds	pound		blue, deep	$0.56	$592.48
		75	pounds	pound		blue, deep	$0.33	$25.00
		125	pounds	pound		blue, light	$0.33	$44.25
		235	pounds	pound		cornelian	$0.78	$183.30
		137	pounds	pound		ruby	$0.25	$34.25
		411	pounds	pound		white, chalk	$0.34	$139.74
		37	pounds	pound		white, chalk	$0.33	$12.21
		334	pounds	pound		white, chalk	$0.32	$106.88
		28	pounds	pound		yellow	$0.30	$8.40
		75	pounds	pound		yellow	$0.25	$18.75

Table 1.12: continued

Year	Description	Units	Meas. Unit	Bead Name	Bead Modifier	Color	Unit Cost	Total Cost
		1	bunch	seed		blue	$2.50	$2.50
		15	pounds	wampum, mock		white	$0.50	$7.50
		5	pounds		round		$0.25	$1.25
1845	Inventory of stock remaining on hand	1	bunch	agate		blue	$1.75	$1.75
		64	bunch	agate		blue	$1.50	$96.00
		2	bunch	agate		blue	$1.25	$2.50
		55	bunch	agate		blue	$0.75	$41.25
		17	bunch	agate		blue	$0.75	$12.75
		0.75	bunch	agate		red	$0.38	$28.00
		9	bunch	agate		red, blue	$2.00	$18.00
		38	bunch	agate		red, white	$2.50	$95.00
		46	bunch	agate		ruby	$2.25	$103.50
		10	bunch	agate	large	white	$2.00	$20.00
		156	bunch	agate	large	white	$1.50	$234.00
		38	bunch	agate	small	white	$0.75	$28.50
		2	bunch	agate		white, milk	$0.71	$1.42
		17	bunch	barley corn	small	blue	$0.75	$12.70
		20.75	bunch	barley corn	small	blue	$0.50	$10.37
		5	bunch	barley corn	small	blue	$0.38	$1.88
		5.75	bunch	barley corn	small	ruby	$0.81	$4.67
		224.75	bunch	barley corn	large	white	$0.75	$168.56
		43	bunch	barley corn	small	white	$0.75	$32.25
		34	bunch	barley corn	small	white	$0.38	$12.75
		80	bunch	barley corn	small	white	$0.38	$30.00
		10	pounds	crystal		blue	$0.38	$3.75
		6.5	pounds	garnishing		assorted	$0.75	$4.87
		30	pounds	garnishing		blue	$0.75	$22.50

Table 1.12: continued

Year	Description	Units	Meas. Unit	Bead Name	Bead Modifier	Color	Unit Cost	Total Cost
		9	pounds	garnishing		white	$0.56	$5.06
		7.5	bunch	necklace	large	blue	$5.00	$37.50
		81	pounds	pigeon egg		blue	$0.93	$75.33
		401	pounds	pigeon egg		white	$0.75	$300.75
		50	pounds	pound	loose	assorted	$0.25	$12.50
		197	pounds	pound		black	$0.25	$49.25
		406	pounds	pound		blue	$0.31	$125.86
		100	pounds	pound		blue, dark	$0.25	$25.00
		110	pounds	pound		blue, light	$0.33	$36.30
		195	pounds	pound		blue, light	$0.25	$48.75
		628	pounds	pound		blue, super	$0.56	$351.68
		306.25	pounds	pound		cornelian	$0.69	$210.54
		136	pounds	pound		ruby	$0.25	$34.00
		108	pounds	pound		white, chalk	$0.34	$36.72
		81	pounds	pound		white, chalk	$0.32	$25.92
		24	pounds	pound		white, super	$0.33	$7.92
		33	pounds	pound		yellow	$0.30	$9.90
		116	pounds	pound		yellow	$0.25	$29.00
		16.75	pounds	wampum, mock		purple	$0.80	$13.40
		15	pounds	wampum, mock		white	$0.50	$7.50
1846	Inventory of stock remaining on hand	9	bunch	agate		blue	$2.00	$18.00
		47	bunch	agate		blue	$1.50	$70.50
		2.5	bunch	agate		blue	$1.25	$3.12
		58	bunch	agate		blue	$0.75	$43.50
		20	bunch	agate		blue	$0.75	$15.00
		2.75	bunch	agate		red	$0.38	$1.03
		45	bunch	agate		ruby	$2.25	$101.25

Table 1.12: continued

Year	Description	Units	Meas. Unit	Bead Name	Bead Modifier	Color	Unit Cost	Total Cost
		107	bunch	agate		white	$1.50	$160.50
		38	bunch	agate		white	$0.75	$28.50
		6	bunch	barley corn		blue	$1.50	$9.50
		30	bunch	barley corn		blue	$0.50	$15.00
		5.75	bunch	barley corn		ruby	$0.81	$4.67
		5	bunch	barley corn		white	$1.50	$7.50
		72	bunch	barley corn		white	$0.75	$54.00
		53.75	bunch	barley corn		white	$0.38	$20.15
		15	bunch	crystal			$0.38	$5.63
		31	pounds	garnishing		blue	$0.75	$23.25
		6.5	pounds	garnishing		white	$0.56	$3.64
		81.25	pounds	pigeon egg		blue	$0.93	$75.57
		317.5	pounds	pigeon egg		white	$0.75	$238.13
		10	pounds	pound	loose	assorted	$0.25	$2.50
		143	pounds	pound		black	$0.25	$35.75
		495	pounds	pound		blue	$0.56	$277.20
		436	pounds	pound		blue	$0.31	$135.16
		200	pounds	pound		cornelian	$0.69	$137.50
		136	pounds	pound		ruby	$0.25	$34.00
		123	pounds	pound		white	$0.34	$41.82
		251	pounds	pound		white	$0.30	$75.30
		28	pounds	pound		yellow	$0.30	$8.40
		75	pounds	pound		yellow	$0.25	$18.75
		16.75	pounds	wampum, mock		purple	$0.80	$13.40
		15	pounds	wampum, mock		white	$0.50	$7.50
		5	pounds			blue	$0.25	$1.25

Table 1.12: continued

Year	Description	Units	Meas. Unit	Bead Name	Bead Modifier	Color	Unit Cost	Total Cost
1846	Inventory of stock, property of P. Chouteau, Upper Missouri Outfit	24	bunch	agate	large	blue	$1.50	$36.00
		9	bunch	agate	large	blue	$1.50	$13.50
		15	bunch	agate	large	blue	$1.00	$15.00
		20	bunch	agate	large	ruby	$2.25	$45.00
		27.75	bunch	agate		ruby	$2.25	$62.44
		20	bunch	agate	large	white	$1.50	$30.00
		5	bunch	agate	large	white	$1.50	$7.50
		30	bunch	agate	large	white	$1.50	$45.00
		5	bunch	agate	large	white	$1.50	$7.50
		15.5	bunch	agate	small		$0.75	$11.62
		4.5	bunch	agate	round		$0.25	$1.12
		82.5	pounds	pigeon egg		blue	$0.93	$76.49
		276	pounds	pound		blue, sky	$0.31	$85.56
		13	bunch	snake			$0.38	$4.88
		15	pounds	wampum, mock		white	$0.50	$7.50
		13	pounds			blue	$0.52	$6.76
		86	pounds			blue	$0.41	$35.26
		80	pounds			blue, sky	$0.31	$24.80
		46	pounds			ruby	$0.25	$11.50
		82	pounds			ruby	$0.25	$20.50
		29	pounds		small	yellow	$0.30	$8.70
1847	Inventory of stock, property of P. Chouteau, Upper Missouri Outfit	13	bunch	agate	large	blue	$1.50	$19.50
		17	bunch	agate		blue	$0.50	$8.50
		29	bunch	agate		ruby	$0.48	$13.92

Table 1.12: continued

Year	Description	Units	Meas. Unit	Bead Name	Bead Modifier	Color	Unit Cost	Total Cost
		19	bunch	agate	large	white	$1.50	$28.50
		36	bunch	agate		white	$0.43	$15.48
		2	bunch	agate	marble		$0.75	$1.50
		12	bunch	barley corn	small	blue	$0.50	$6.00
		5.25	bunch	barley corn		ruby	$1.50	$7.88
		10.5	bunch	barley corn	large	white	$1.50	$15.75
		8	pounds	garnishing		assorted	$0.56	$4.48
		21	pounds	garnishing		blue	$0.75	$15.25
		25	bunch	pigeon egg		blue	$0.34	$8.00
		149	bunch	pigeon egg		white	$0.75	$111.75
		34	pounds	pound	common	blue	$0.40	$13.00
		94	pounds	pound		blue, sky	$0.56	$52.64
		9	pounds	pound		ruby	$0.88	$7.92
		98	pounds	pound		white, chalk	$0.34	$33.32
		30	pounds	pound		white, chalk	$0.30	$9.00
		71	pounds	pound		yellow	$0.31	$22.18
1848	Inventory of stock, property of P. Chouteau, Upper Missouri Outfit	4	bunch	agate	large	blue	$1.50	$6.00
		12	bunch	agate	large	blue	$1.50	$18.00
		2.5	bunch	agate	small	blue	$1.00	$2.50
		4	bunch	agate		blue	$0.50	$2.00
		4.5	bunch	agate	fancy	red	$0.50	$3.75
		16	bunch	agate	large	white	$1.50	$24.00
		28	bunch	agate		white	$0.50	$14.00
		1	grains	agate			$3.00	$3.00
		2	bunch	barley corn	small	blue	$0.75	$1.50
		12	bunch	barley corn	large	white	$1.50	$18.00

Table 1.12: continued

Year	Description	Units	Meas. Unit	Bead Name	Bead Modifier	Color	Unit Cost	Total Cost
		5	bunch	barley corn	small	white	$0.75	$3.75
		36	pounds	pigeon egg		white	$0.75	$27.00
		8.75	pounds	pound		white	$0.31	$2.71
		32	pounds	seed		assorted	$0.72	$23.04
		10.5	pounds	seed		blue	$0.72	$7.56
		52	pounds			cornelian	$0.68	$35.36
1848	Invoice Blotter "Shipped on the S.B. Martha"	50	dozen	cut			$0.19	$9.37
		101	pounds	pigeon egg		white	$0.75	$75.75
		803	pounds	pound		black	$0.22	$176.66
		2001	pounds	pound	fine	blue	$0.55	$1,100.55
		857	pounds	pound		cornelian	$0.65	$553.15
		2268	pounds	pound		white	$0.30	$680.40
		300	pounds	pound		yellow	$0.25	$75.00
		50	pounds			assorted	$0.72	$36.00
1849	Inventory of stock, property of P. Chouteau, Upper Missouri Outfit	6	bunch	cut			$0.19	$1.13
		42	bunch	garnishing			$0.72	$30.24
		36	pounds	pigeon egg		white	$0.75	$27.00
		277	pounds			black	$0.22	$60.96
		524	pounds		round	blue	$0.55	$288.20
		523	pounds			cornelian	$0.65	$339.95
		775	pounds			white, chalk	$0.25	$193.75
		156	pounds			yellow	$0.25	$39.00
1849	Invoice Blotter Upper Miss. Outfit	55	dozen	cut			$0.16	$8.80
		131	pounds	pigeon egg		white	$0.75	$98.25

Table 1.12: continued

Year	Description	Units	Meas. Unit	Bead Name	Bead Modifier	Color	Unit Cost	Total Cost
		131	pounds	pigeon egg		white	$0.75	$98.25
		662	pounds	pound	fine	blue	$0.50	$331.00
		405	pounds	pound	fine	blue	$0.55	$222.75
		1565	pounds	pound		blue	$0.50	$782.50
		234	pounds	pound		blue	$0.30	$70.20
		280	pounds	pound		cornelian	$0.60	$168.00
		1002	pounds	pound	fine	white, chalk	$0.32	$320.64
		165	pounds	pound	fine	white, chalk	$0.30	$49.50
		385	pounds	pound	fine	white, chalk	$0.28	$107.80
		165	pounds	pound	fine	white, chalk	$0.30	$49.50
		119	pounds	pound		yellow	$0.23	$27.37
		50.5	pounds	seed		assorted	$0.72	$36.36
		224	pounds			black, blue	$0.50	$112.00
		1002	pounds			white, chalk	$0.32	$320.64
		587	pounds			white, chalk	$0.28	$164.36
1849	Invoice Blotter Upper Miss. Outfit Shipped via S.B. Largo	190	pounds	pound	fine	blue	$0.33	$62.70
		49	pounds	pound		blue, super	$0.50	$24.50
		178	pounds	pound		white, chalk	$0.28	$49.84
1850	Inventory of stock, property of P. Chouteau, Upper Missouri Outfit	47	pounds	garnishing		assorted	$0.72	$33.84
		409	pounds	pound		blue	$0.55	$224.95
		410	pounds	pound		blue	$0.50	$200.00
		224	pounds	pound		blue	$0.30	$67.20
		60	pounds	pound		white	$0.32	$19.20
		53	pounds	pound		yellow	$0.23	$12.19

Table 1.12: continued

Year	Description	Units	Meas. Unit	Bead Name	Bead Modifier	Color	Unit Cost	Total Cost
		201	pounds			cornelian	$0.60	$120.60
1850	Invoice Blotter Upper Miss Outfit "Shipped via S.B. El Passo"	13	dozen	cut			$0.13	$1.63
		30	pounds	pound		blue	$0.90	$27.00
		130	pounds	pound		blue	$0.50	$65.00
		216	pounds	pound			$0.23	$49.68
		206	pounds	pound			$0.20	$41.20
		161	pounds			black	$0.23	$37.03
		247	pounds			blue, sky	$0.65	$160.55
		99	pounds			cornelian	$0.60	$59.40
		228	pounds			mixed	$0.13	$28.50
		474	pounds			mixed	$0.10	$47.40
1850	Invoice Blotter Upper Miss. Outfit	553.5	pounds	pound		blue	$0.33	$182.65
		808	pounds	pound		blue, super	$0.50	$404.00
		750	pounds	pound	fine	white	$0.30	$225.00
		400	pounds	pound	fine	white	$0.30	$120.00
		600	pounds		fine	white	$0.30	$180.00
1850	Invoice Blotter Upper Miss. Outfit Shipped via Pocahontas and Sacramento for Fort Pierre	185	pounds	pound	fine	blue	$0.50	$92.50
		203	pounds			white, chalk	$0.30	$60.90
		201	pounds			white, chalk	$0.30	$60.30
		200	pounds			white, chalk	$0.30	$60.00
		212	pounds			white, chalk	$0.30	$63.60

Table 1.12: continued

Year	Description	Units	Meas. Unit	Bead Name	Bead Modifier	Color	Unit Cost	Total Cost
		208	pounds			white, chalk	$0.30	$62.40
		195	pounds			white, chalk	$0.30	$58.50
		197	pounds			white, chalk	$0.30	$59.10
		197	pounds			white, chalk	$0.30	$59.10
		196	pounds			white, chalk	$0.30	$58.80
		200	pounds			white, chalk	$0.30	$60.00
		197	pounds			white, chalk	$0.30	$59.10
		198	pounds			white, chalk	$0.30	$59.40
		198	pounds			white, chalk	$0.30	$59.40
		203	pounds			white, chalk	$0.30	$60.90
		198	pounds			white, chalk	$0.30	$59.40

Chapter 2

Button Assemblage from Fort Pierre Chouteau

Patrick J. Collison[1]

Introduction

Historical and Archaeological Background

The archaeological field work that produced the buttons discussed in this report took place during two distinct episodes, separated by a 26-year interval. The first excavations were carried out in 1980–81 by Steven Ruple of the State Historic Preservation Office, assisted by the Middle Missouri Chapter of the South Dakota Archaeological Society. The more recent endeavor, between 1997 and 2001, was conducted under the direction of the South Dakota State Historical Society with the assistance of the U.S. Army Corps of Engineers.

Materials, Methods, and Definitions

Of the 423 buttons recovered from Fort Pierre, 28 relate exclusively to the military occupation in 1855–56, 13 were likely deposited during the ranch period beginning around 1890, and the rest may be associated with the fur trade era. Some overlap seems certain, especially for the unmarked utilitarian buttons. The collection is divided into six classes according to raw

[1]Department of Anthropology, University of South Dakota

material (bone/horn, shell, metal, ceramic, glass, and rubber), and types according to method of manufacture and means of attachment. Varieties and patterns are distinguished by decorative characteristics and proprietary markings. With few exceptions, the buttons are categorized by the typology used in Hunt's report on buttons excavated at Fort Union (Hunt 1986:7–31). Descriptive terminology follows Luscomb (1967) and Albert (1969). Provenience, size, weight, *terminus post quem* dates, and brief remarks are provided for each button at the end of this report, where they are grouped according to their class. Button size groupings for all buttons, as well as the larger individual classes (bone/horn, shell, metal, and ceramic) are displayed on charts plotting diameter distributions at the end of this report (Figures 2.11–2.15).

Buttons have traditionally been measured by the *line* or *ligne* scale, which was adopted by manufacturers and retailers, and by the late 1800s came to mean $^1/_{40}$ (.025) of an inch, at least for Anglo-Americans. The metric system is used to describe the buttons in this report, but these units may be converted as follows: 1 inch = 2.54 cm, 1 line = 0.025 inch = 0.635 mm = 0.0635 cm One, two, and three-piece construction refers to the body of the button only; the shank is not counted as a separate piece.

The basic parts of a button include the anterior surface or *face*, the posterior surface or *back*, and the lateral surface or *edge* (Figure 2.1). The face and the back of metal buttons especially may display decorative, manufacturer's, or quality marks. Features on the face are more varied morphologically and include:

- well: recessed area in the center, usually where the holes are located.
- rim: space between edge and well.
- ring: concentric circular ridges located on the rim.

The buttons in this collection are attached by sew-through holes (one to five in number) or shanks (fixed or flexible loops made of metal or fabric). Backs of two-piece buttons may be made of the same or different material than the face, usually brass or ferrous metal. A soft core is found in many of the two-piece buttons which served to support the thin metal shell, as well as help hold the face and back together. These were made from wood, fabric, clay, or a softer metal. Terms applied to shank variations (following Peacock 1972:124, Luscomb 1967:17) are as follows:

- alpha: hand-drawn wire brazed end-to-back to cast or hand wrought one-piece eighteenth century buttons. This provided a tenuous point of attachment.

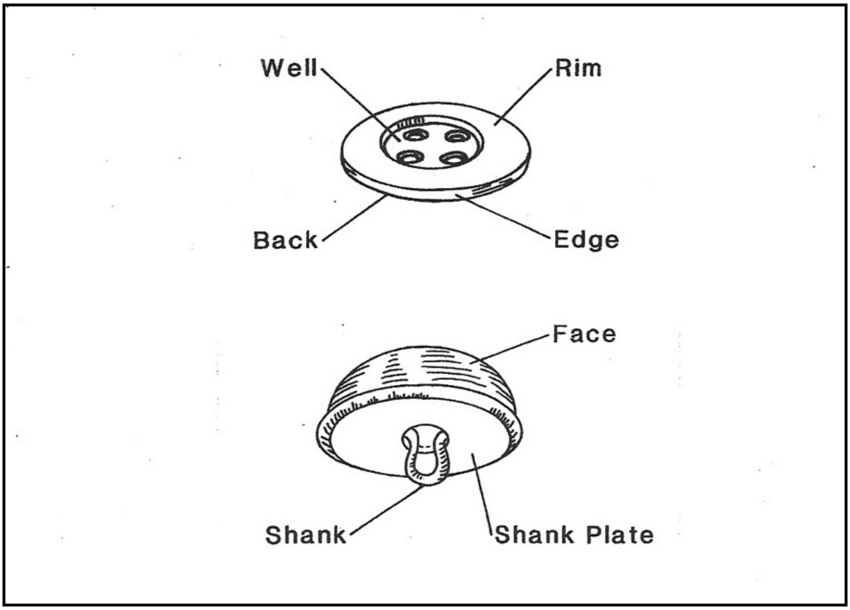

Figure 2.1: Common features of sew-through and shank buttons.

- omega: ends of wire loop bent to make footings (in the shape of Greek letter omega), providing a more secure attachment for one-piece early nineteenth century buttons.

- flexible: metal loop fitting loosely through a back hole (uniform type) or piece of fabric protruding through a similar hole, through which thread could be passed from any direction (fabric type or pad-back).

- self-shank: shank constructed of the same material as, and in continuity with, the button body.

- Sanders: Two-piece buttons in which thin metal discs were locked together by turning the front piece over the back piece. Invented by B. Sanders and Son of Birmingham, England in 1823. Shank brazed on and compressed through a hole in the back of shank plate.

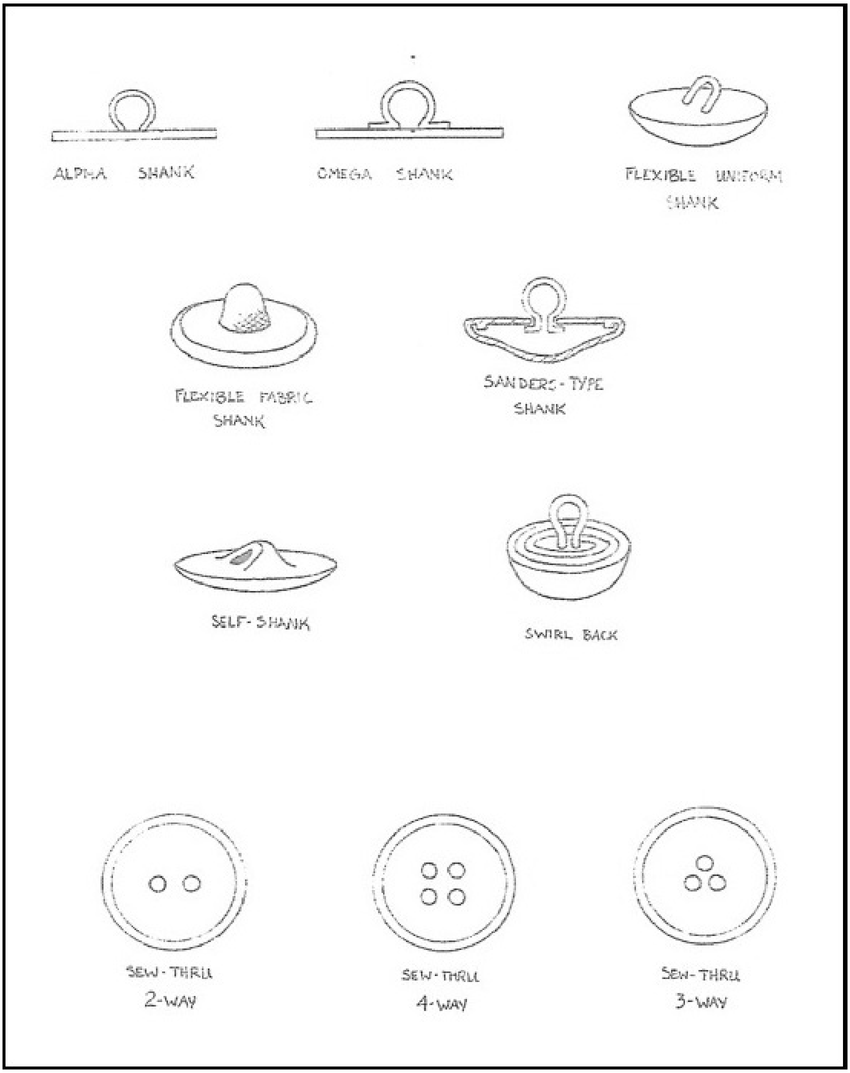

Figure 2.2: Methods of attachment and button backs in this collection.

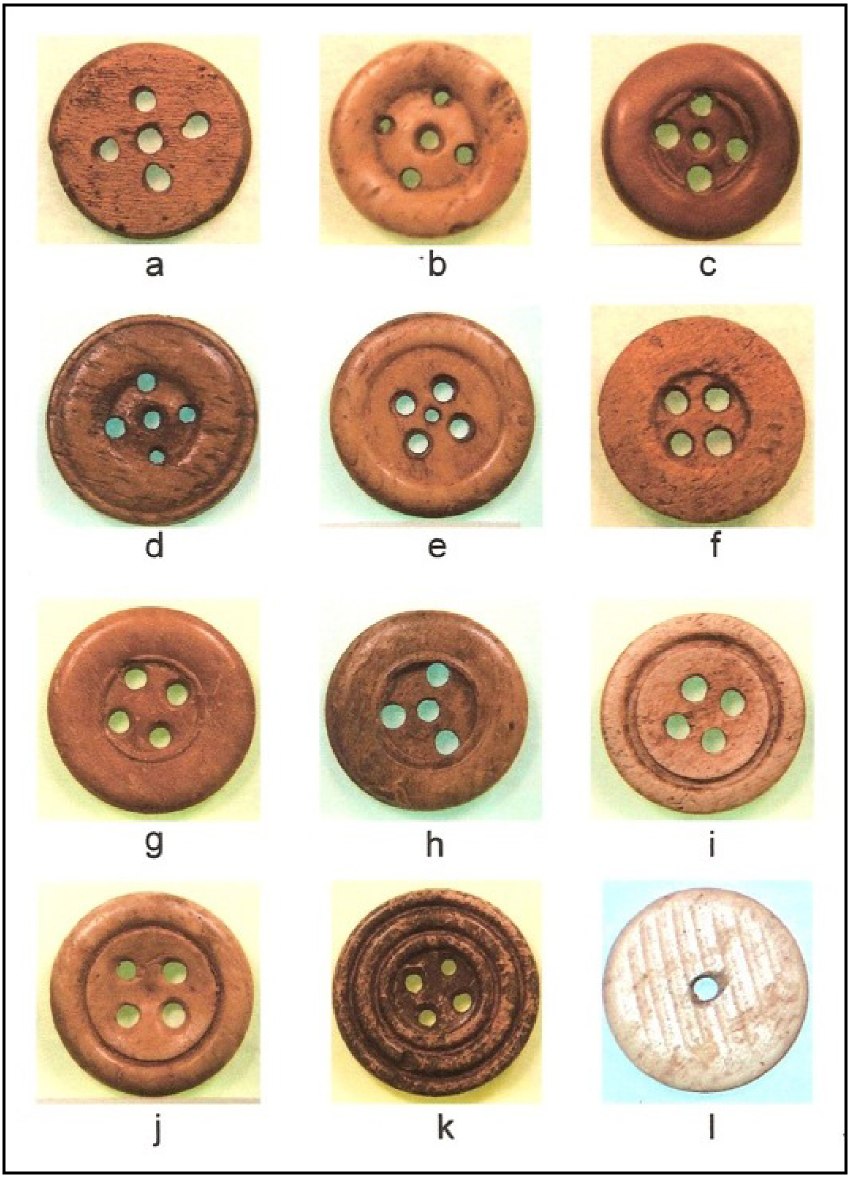

Figure 2.3: Class I (bone) buttons. Type A (five-hole): a-e; Type B (four-hole): f–k; Type C (one-hole): l. Illustrations are not to scale.

Class I. Bone/Horn (118 specimens)

Utilitarian bone buttons have been found in seventeenth century American settlements, although they appear more frequently in eighteenth and nineteenth century contexts. In this report, bone buttons are categorized with similar artifacts made from other bovine faunal material, horn and hoof, although the latter are composed of a different material, keratin, a protein that comprises hair and nails. Bone, on the other hand, consists of the fibrous protein collagen and hydroxyapatite, a calcium crystal complex, and is permeated by blood vessels in channels known as Haversian canals (MacGregor 1985:2–9). The lamellar structure of bone, along with its trabecular architecture near the marrow cavity and the black punctate marks left by the blood vessels, help the investigator distinguish this material from horn, which is smoother, more homogeneous, and translucent. Horn is said to emit a pungent "burnt feathers" odor when touched by a red-hot needle, whereas bone produces no odor when heated. (Hughes and Lester 1984:8).

It is not surprising that bone and horn buttons make up a significant proportion (28%) of this artifact class at Fort Pierre. Albert and Kent (1949:401–409) list seventeen bone and horn button manufacturing companies in business between 1830 and 1860, concentrated in the industrial centers of New England. Precise dating of bone buttons is difficult. None of them displays the back marks of the brass or gilded buttons, or patent dates like the early hard rubber buttons, and construction techniques persisted throughout the eighteenth and most of the nineteenth centuries. Bovine flat bones such as rib and scapula, and long bones such as the tibia were most useful. After being cleaned, boiled, sawed open, flattened, and scraped of their spongy marrow cavity, they were pressed between metal sheets, producing thin slabs from which discs could be cut with a lathe or carpenter's brace and bit. The sawing produced parallel cut or *kerf* marks on one or both surfaces, which could be ground away leaving circular striations, or polished to a smooth finish. When buttons were cut from both directions, the lateral bit spurs created a lip or burr around the button edge, which might also be abraded away. Probably the most well known, but still imprecise, temporal attribute in bone/horn button-making technology is the presence or absence of a center hole, found in all five-hole buttons, and some four-holers with three peripheral holes. The center hole was probably a manufacturing artifact that assured centering of the object as it was cut out. In 1790, Heaton invented a machine that simultaneously drilled four holes in bone buttons, eliminating the need for a center hole, and although the earlier five-hole buttons were made well into the nineteenth century, four-hole buttons are more common at late nineteenth century sites (Hinks

1995:67). Button finishing techniques such as automated grinding and polishing machines, patented in the 1860s, made the removal of edge burrs and kerf marks easier and more thorough, such that more smoothly finished bone buttons may be expected from late nineteenth century contexts.

Horn buttons were available in England as early as 1750; Enoch Noyes made the first horn buttons in the American colonies in 1759. Peacock (1972:36) notes that before 1873 all horn buttons were made of processed (boiled and molded) horn and hoof scraps, a method referred to as *die-stamped reconstituted horn* (MacGregor 1985:102). Some of these buttons display a small pick mark on the back, evidence that the item was levered out of its mold as it congealed from its heated plastic state. At least one of the horn buttons in this collection exhibits this *pickback* feature, although Luscomb (1967:150) cautions that many horn buttons do not have pickbacks, and some other materials, such as celluloid, do.

All of the Fort Pierre bone/horn buttons use sew-through attachment, and range in color from beige to black, with most appearing to have a natural or acquired pigmentation of blonde, tan, brown, or gray. Few, if any, of these buttons appear to have been dyed, since the exposed areas of the 28 broken specimens (25%) are the same color as their surfaces. Types are defined, following Hunt (1986), by mode of attachment, and varieties by surface treatment. Nearly all specimens are sufficiently intact to permit categorization, but the investigator must admit that bone can be difficult to differentiate from horn macroscopically and by non-destructive methods. Both types were produced by the same manufacturers and display similar surface designs. Based on visual inspection using 10x magnification, nearly all of the Fort Pierre buttons in this class are considered to be composed of bone, as evidenced by the presence of bony trabeculae, Haversian canals, blood vessels, or lamellar structure. The few horn or hoof specimens (5%) lack these features and display a “fibrous streaky structure” (Howells 2006:76).

Type A. Five-hole (54 specimens)

The defining characteristic of this type is the presence of a central hole, surrounded by four peripheral holes. The shafts of these holes tend to be straight-sided (95%), rather than beveled at the ends, in contrast to the majority of four-hole buttons, 70% of which have beveled holes. The backs are often flat with prominent parallel saw or kerf marks (60%)—although some are convex and smooth (28%) or display circular striations (12%). A minority of the five-hole bone/horn buttons have a distinct lip or burr around the edge; most (79%) appear to have been processed so that the edge is rounded or the lip is at least smoothed. Some of this could have resulted from wear. Varieties are defined by the presence, size, and form of the well, and by the presence or absence of concentric rings around the face. Rims tend to be rounded rather than flat.

Variety 1. A single specimen with no well, irregularly spaced sew-through holes, and a flat rim face. (Figure 2.3a)

Variety 2. A simple well. Size ranges from 0.96 to 1.77 cm (Figure 2.3b)

Variety 3. A simple raised ring at the well/rim juncture. Subvariety 3a has a narrow ring (0.03 cm) and Subvariety 3b has a wide ring (>0.2 cm). (Figure 2.3c)

Variety 4. Six buttons with a narrow raised ring at the outside rim. (Figure 2.3d)

Variety 5. The well diameter is nearly as large as the diameter of the button. (Figure 2.3e)

Type B. Four-hole (59 specimens)

The hole placement pattern for the four-hole buttons is similar to that for the five-hole, deleting the well center hole. A single anomalous specimen, with three peripheral holes around a center hole, would be better classified with the former type based on mode of manufacture. Hole shafts, as noted above, tend to be beveled at the ends (70%) rather than straight-sided (30%). Parallel kerf marks on the backs are rare (4%). Most backs are convex with a smooth polished surface (79%) or circular striations (17%). Edge attributes are similar to that of the five-hole buttons, the majority displaying a rounded surface (27%) or at least some smoothing of the lip (56%). Diameters range from 1.02 to 3.40 cm, with the mean diameter 1.45 cm, compared to the Type A button mean diameter of 1.51 cm Three of these buttons appear to have been made of horn (6%), the same as the five-hole buttons.

Variety 1. Small simple wells, wide flat rims, and rounded backs. (Figure 2.3f)

Variety 2. Raised ring at the well margin. Rounded rim faces. (Figure 2.3g)

Variety 3. A single specimen with a narrow raised ring at the rim edge, central hole surrounded by three peripheral sew-through holes. (Figure 2.3h)

Variety 4. Wells nearly as wide as button faces. Pattern a has a flat rim face. (Figure 5i) Pattern b has a rounded rim face. (Figure 2.3j)

Variety 5. Three concentric rings on rim. (Figure 2.3k)

Type C. One-hole (5 specimens)

These bone discs have a single straight-sided central hole, and are generally smaller in diameter (mean = 1.29 cm) and thickness than the other bone buttons. (Figure 2.3l) Most have parallel kerf marks on both sides, so that the face and back are indistinguishable.

There are several possible functions for these unadorned bone discs, which are found at historic sites from colonial times through the nineteenth century. They are not the bone backs of embossed metal buttons, South's (1964:128) Type 4, since they lack an offset rim back. In another report, South (1974:189) concludes that they may have functioned as fasteners for undergarments and other clothing worn under waistcoats and uniforms. Hicks (1995:89) notes that they may have served as a core for thread or fabric buttons.

Table 2.1 contrasts surface attributes of the Fort Pierre five-hole and four-hole buttons with regard to shaft profile, back finish, and edge treatment. The most striking differences are the much higher frequency of beveled or *countersunk* holes and smoothed backs on the four-hole buttons. These surface details may represent technological refinements adopted to make the buttons wear longer, since the beveled hole edges would be less likely to cut the thread. The removal of kerf marks from the Type B button backs also reflect the introduction of automated finishing tools in the latter half of the nineteenth century.

Class II. Shell (65 specimens)

Shell or *pearl* buttons were cut, using foot-driven tubular saws, from the nacreous iridescent lining of bivalved and sometimes univalved marine and freshwater shellfish. The first shell buttons made in America were fashioned after Native American shell money (wampum), in the form of brass-shanked cylindrical shell beads. The technique was devised by Baron Steuben in 1788, and George Washington once ordered these conch buttons for his coat (Ford 1943:155). The most common shell button type found

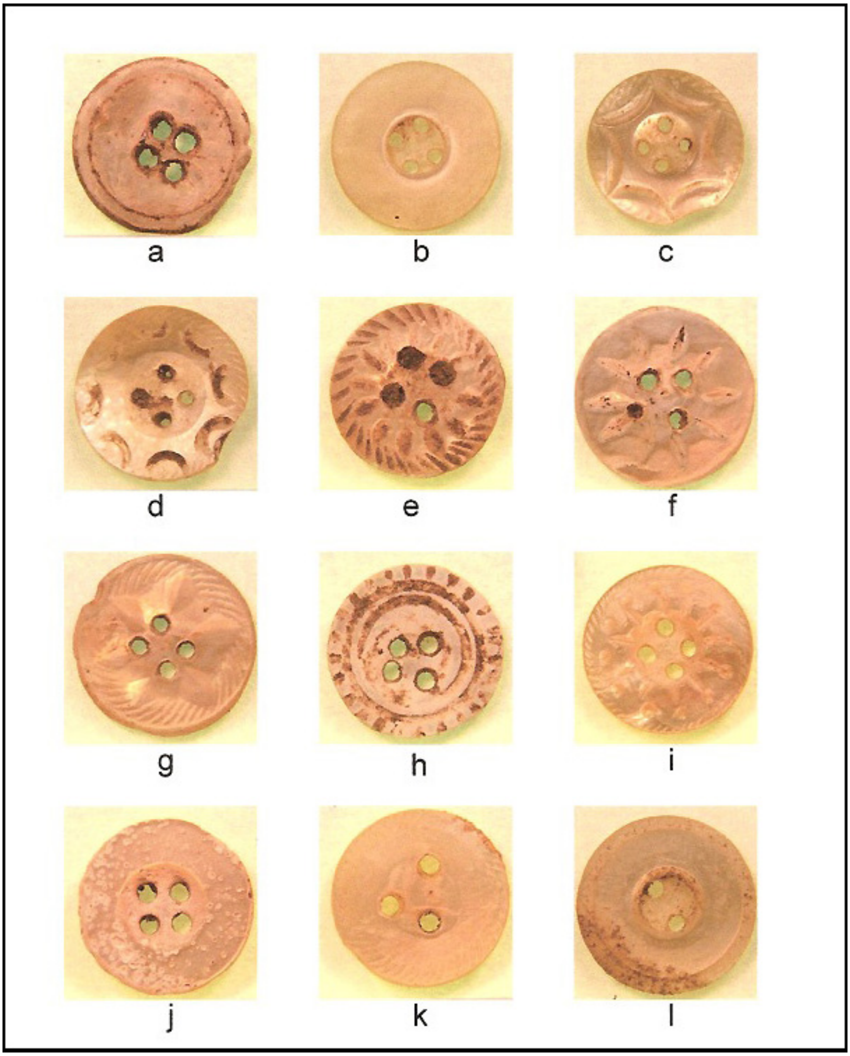

Figure 2.4: Class II (shell) buttons. Type A (four-hole): a, Variety 1; b, Variety 2; c–i, Variety 3; j, Variety 4. Type B (three-hole): k. Type C (two-hole): l. Illustrations are not to scale.

Table 2.1: Bone/Horn Button Surface Treatment.

	Five-Hole		
Shaft	Straight	Beveled	
	95%	5%	
Back	Parallel Kerf	Circular	Smooth
	60%	12%	28%
Edge	Rounded	Smooth Lip	Sharp Lip
	29%	50%	21%
	Four-Hole		
Shaft		Straight	Beveled
		30%	70%
Back	Parallel Kerf	Circular	Smooth
	4%	17%	79%
Edge	Rounded	Smooth Lip	Sharp Lip
	27%	56%	16%

by archaeologists is a simple disc-shaped, two to four-hole, lathe-turned utilitarian fastener, as are all those excavated at Fort Pierre.

In 1802 Dr. F.A. Michaux (Haefner 1932:475) observed the nascent American button industry, probably conducted by individual artisans, along the river valleys east of the Mississippi. Albert and Kent (1949:401–409) list 27 shell button makers during the nineteenth century, seven operating during Fort Pierre's fur trade occupancy. During the 1880s and 1890s a number of firms were concentrated in Newark, New Jersey. The heyday for shell button manufacturing, especially for the fresh-water variety, was around the turn of the century along the Mississippi River. In 1905, 43 button factories employing 3,500 people in Muscatine, Iowa produced one-third of all the world's buttons (Alexander n.d.). Although machine-driven tubular saws and other mass-production devices began to replace hand and foot power in 1850, the actual process remained very hands-on and labor intensive. Ford (1943:154) urges us to "Think of the work in making even the simplest of carved pearl buttons! Each separate button, placed by hand in the chuck; each line cut, a separate operation…" This is because of the physical properties of the shell itself, as Ford again explains: "…pearl-shell, built up layer by layer, with flaws and differences in grain and structure, must be worked by hand." This particularistic quality is easily appreciated in the Fort Pierre shell buttons: although there are discernable categories and patterns, the design on each individual artifact is unique in its execution.

Button authorities (Albert and Kent 1949:58, Ford 1943:159, Green 1991:147) often differentiate marine from freshwater shell buttons on the basis of iridescence. This has been described as a play of changing colors produced by the overlapping and prism-like layers of lime secreted by the creature's mantle, also known as its *nacre* (Kelso 1971: 22). Hughes and Lester (1981:231) make this distinction quite clearly: "The nacreous layer of the freshwater mussel shell is almost pure white, but it is not iridescent, and lacks the rippled, satin-like figuring found in the best ocean pearl…" However, Kelso (1971:24) cautions that some fresh water species (*Unio* mussels) are iridescent, while some salt-water species are non-iridescent (conch, pinna, helment, and cowrie). Thus this attribute may not be as reliable an indicator of the source of shell buttons as some researchers have assumed.

The Fort Pierre shell buttons have a flat, or sometimes conical face, flat back and squared smooth edges. Colors are predominantly a silvery white, with a striking variety of translucent hues, including pink, purple, turquoise, green gray, brown, blue, yellow, and black, on the iridescent specimens. Their size is remarkably uniform; with the exception of a single large (2.56 cm) button, the rest are clustered around 1 cm in diameter (mean 0.94 cm). Assessment of the degree of iridescence is subjective; it appears that 51% are iridescent, 28% slightly iridescent and 22% non-iridescent. The holes are evenly spaced in 21% and unevenly spaced in 76%; the balance being fragments that can't be assessed. This supports the idea that these buttons were generally cut, drilled, engraved, and polished one at a time by hand, using simple rotating tools.

Hinks (1995:70) notes that dating of shell buttons is difficult, if not impossible, because there has been little stylistic change over time. Decorative patterns were achieved by machine engraving of geometric designs, called eccentric lathe work. Variations among the Fort Pierre buttons, such as the six and eight-pointed stars executed using a series of semicircular lines (see Variety IIA3al and IIA3a2 below), or stars rendered by rectilinear lines and wedges (IIA3b3), and several incorporating a *rope* design around the outer rim are also found in the Fort Union collection (Hunt 1986:13). This is not surprising since the forts were contemporaneous and supplied by the same companies. These same designs, moreover, are found on "Pearl Shirt Buttons" advertised in several Sears, Roebuck, and Company catalogs (1897:320, 1902:940, 1908:1004). Identical designs are also seen on buttons displayed in a catalog from the Hawkeye Button Company of Muscatine, Iowa (1911:25). The shell buttons were determined to have the same spatial distribution within the confines of the fort as buttons known to have been deposited during the fur trade/military occupations. It seems likely, therefore, that these popular designs were employed on shell buttons for many decades. An alternative explanation is that they were deposited by Scotty Philips' family sometime between 1890 and 1920.

Type A. Four-hole (58 specimens)

This type is characterized by four sew-through holes—usually spaced unevenly. Rims and backs tend to be flat and edges ground smooth.

Variety 1. No well and square to beveled facial edges. (Figure 2.4a)

Variety 2. Small simple wells with flat or often conical faces. The conical faces are a dull white color from being "spun" smooth. Wells vary from roughly circular indentations to deep depressions with rectilinear sides. The backs are flat and edges square. (Figure 2.4b)

Variety 3. Engraved buttons displaying geometric designs. These buttons resemble those mentioned above from Sears and Roebuck catalog and Hawkeye Button Company catalogs.

Pattern 3a. The major element of the design is a star shape executed using a series of semicircular lines.

Variation 3a1. Six-pointed stars (Figure 2.4c)

Variation 3a2. Eight-pointed stars arranged within a border of small, straight lines (Figure 2.4d)

Pattern 3b. Star rendered by rectilinear lines radiating from the center of the button (Figure 2.4e)

Variation 3bl. Seven buttons have broad wells and twelve short broad lines.

Variation 3b2. Ten-line star (Figure 2.4f)

Variation 3b3. Star pattern of six lines and no well. Some add a rope design consisting of short curved lines oriented at an angle around the outer rim (Figure 2.4g)

Pattern 3c. Shallow well, two concentric bands around the face, 24 short notches around rim (Figure 2.4h)

Pattern 3d. Eight to twelve indented dots around rim, spiral curvilinear designs radiating from well, and other unique designs (Figure 2.4i)

Variety 4. A single shell button with an offset well (Figure 2.4j)

Type B. Three-hole (4 specimens)

Variety 1. Simple well, conical face, flat back (Figure 2.4k)

Variety 2. Engraved with design elements.

Type C. Two-hole (2 specimens)

Engraved, *fish eye* well, recessed rim edge with *rope* border. (Figure 2.4l) Exactly like Hunt's (1986:13) Example g and No. 191 in The Hawkeye Pearl Button Company Catalogue (1911:25).

Class III. Metal (186 specimens)

Metal button classification again follows Hunt (1986:17–26). Type is determined by the number of body components, exclusive of the shank. Varieties are distinguished by the means of attachment (sew-through or shank), and patterns vary according to presence or absence of decorative or promotional elements. Several rivet shank varieties, not found at Fort Union, are included in this collection. Conversely, *Bullet* and *Tally-Ho* buttons (Hunt's III B2a and b) were not excavated from Fort Pierre.

Type A. One-piece (72)

Variety 1. Four sew-through holes. (Figure 2.5a–c) Specimens are made from molded white metal (50%), stamped brass (48%), and pressed steel (2%), and range in size from 1.12 cm to 2.48 cm in diameter (mean = 1.54 cm). The white metal buttons are grey in color, with a concave face, round or elliptical holes, and a flat back with a mold seam across its center. The edge is thickened around the rim. One third of the brass buttons have a black *japanned* surface, and all have a flat rim and back with an offset well. A circle of raised dots is visible around some of the wells. A single corroded ferrous specimen has a similar design. Several of the brass varieties display datable maker's marks on the face or back: "SJ HOLMES & COMPANY/EXTRA" identifying a firm owned by Samuel Judd Holmes from 1830 to 1840 (Albert and Kent 1949:404), and "HOLMES PRITCHARD & CO", a short-lived Waterbury, Connecticut partnership producing buttons around 1845 (McGuinn and Bazelon 1996:-47). Origins of two trademarks, "J. BOULANGE(R)/MONTREAL" and "BARBARIN & HILL*" could not be identified, but the first

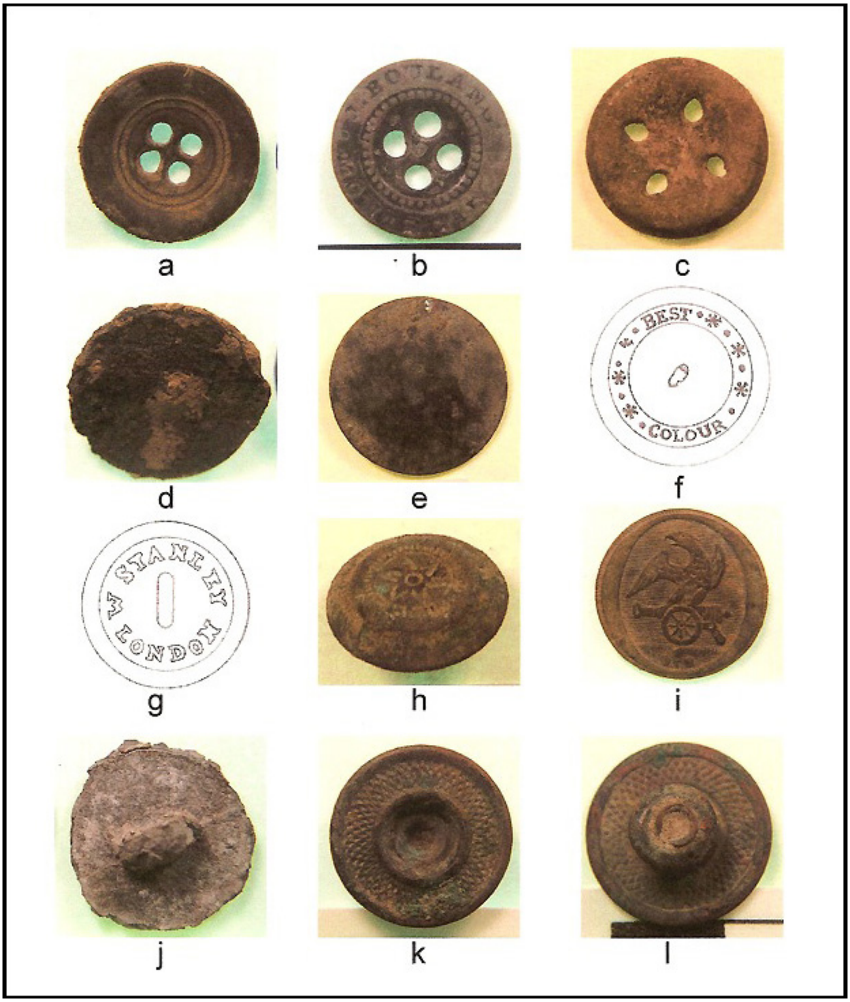

Figure 2.5: Class III (metal) buttons. Type A (one-piece): a-c, Variety 1; d, Variety 2a; e-g, Variety 2b; h-i, Variety 2c; j, Variety 3; k-l, Variety 4. Illustrations are not to scale.

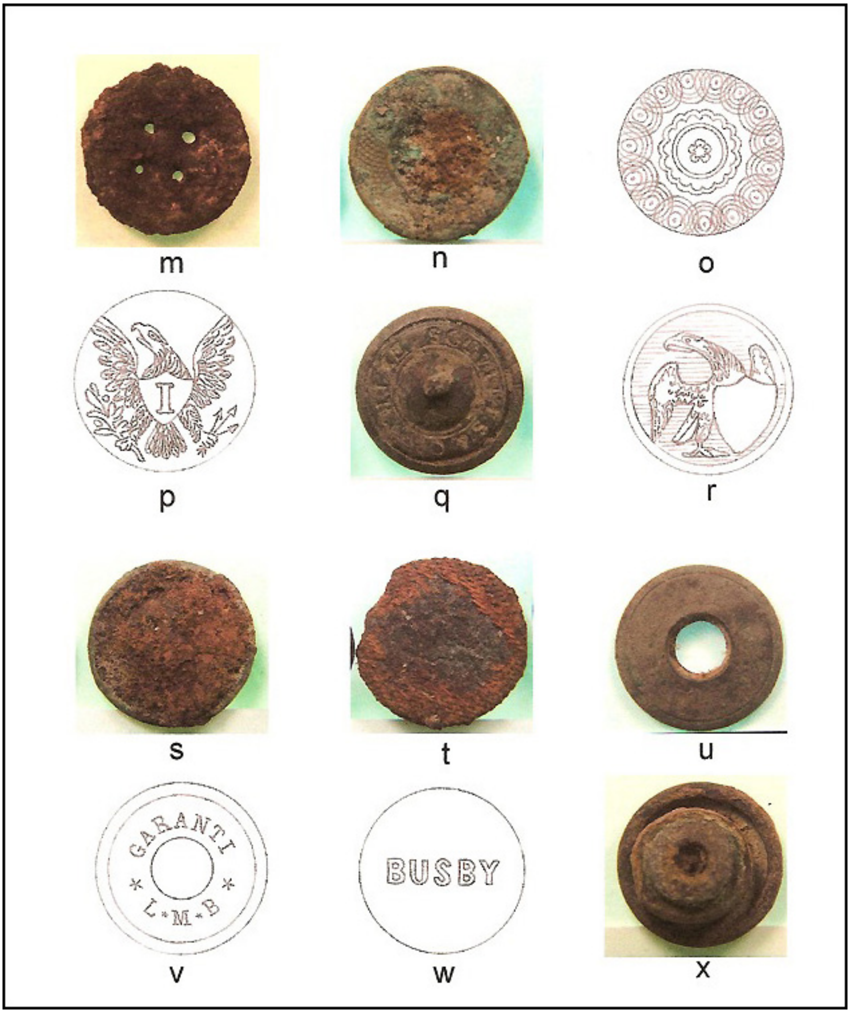

Figure 2.6: Class III (metal) buttons. Type B (two-piece): m, Variety 1a; n, Variety 1b; o, Variety 2b1; p-r, Variety 2b2; s, Variety 2c; t, Variety 2d; u-v, Variety 2f; w-x, Variety 3. Illustrations are not to scale.

is probably a fur trade era button. Another quality mark, "WARRANTED NOT TO CUT" is unusual in that it touts a practical attribute of the product: the prolonged wear assured by its smoothly beveled holes. An identical button was recovered from the cargo aboard the *Maple Leaf*, a Union transport vessel sunk in the St. John River in Florida in 1864 (Anonymous n.d.b). A button collector who has helped research and identify buttons from the Fort Vancouver National Historical Site felt this was probably from a man's pants (Dorothy and Cyril Krugner, personal communication). These utilitarian closures were ubiquitous on both civilian and military trousers from the War of 1812 until the end of the Civil War (Olsen 1963:552). A good illustration of these buttons in situ is displayed on a wool *drop-front trouser* in *The Museum of the Fur Trade Quarterly* ("The Engages" 1982:10).

Variety 2. Alpha or Omega Loop Shanks. The two varieties of shank are combined because the solder used to secure them often obscures the shank foot. Since alpha shanks were made in the eighteenth century, these brass buttons are probably all the omega variety. Three patterns are described: 2a having a blank face and back (Figure 2.5 d), 2b with back stamps only (Figure 2.5 e-g), and 2c with decorated faces often accompanied by back stamps (Figure 2.5h-i).

The two undecorated one-piece omega shank buttons are larger than those with imprinted design on the back or face (mean diameter 1.89 cm for IIIA2a, vs. 1.73 cm for variety 2b and 1.52 cm for variety 2c). It is possible that corrosion or wear has obscured lightly impressed marks on these buttons.

The plain-faced, back-stamped varieties are among the most interesting historically, and rich in cultural significance. Faces and backs are flat, with slightly rounded edges. Diameter varies from 1.12 to 2.48 cm, but the body thickness and shank diameter are remarkably uniform (0.07 cm for both). Shanks are intact on nine of the 14 specimens. Back marks may be found in Table 2.8 at the end of this chapter, but generally tout the quality and workmanship of the gilded surface, which imparted a characteristic deep orange color. Only traces of the gold finish remain on a few of these buttons, mainly within the impressed back marks. Collectors refer to these as *Golden Age* gilded buttons, and they were very popular on men's coats, especially between 1820 and 1830. A good date of origin for a typical specimen, displaying a back mark "+WARRANTED•/RICH ORANGE+", is found in Tice (2002:68). Here, an identical example appears in a salesman's sample book, marked "SCOVILLS MANUFACTORY", dated 1830.

The importance of these items as trade articles at Fort Pierre and other posts is well documented. The first order sent to St. Louis by Bourgeois William Laidlaw in 1832 contained a request for "50 gross (7200) orange coat buttons." Head trader William McKenzie wrote the following to his suppliers in 1834: "Chief coats can be made here in sufficient quantity if you can bring a little more lace. The large round buttons add much to the appearance of the coat and costs little more than the other" (McKenzie 1834). Chief coats are quasi-military garments, still valued by favored Native American trade partners in the mid-eighteen hundreds, although they began to lose their appeal after the Civil War (Chronister 1996:2). Augustus Meyers, a 15-year-old recruit with Harney's troops at Fort Pierre in 1855–56, recalls seeing a mummified Indian corpse exposed on a collapsing burial scaffold in the cemetery south of the fort: "I noticed one among them that wore a British officer's red uniform coat, with epaulets and gilded buttons" (Meyers 1920:145). Several famous portraits by George Catlin and Karl Bodmer identify these buttons as items of personal adornment and status, associated with specific individuals, places and times. These include Catlin's painting of Sand Bar, wife of trader Francis Chardon at Fort Pierre in 1832, (Truettner 1979:168) and Bodmer's portrait of Mandan chief Four Bears at Fort Clark in 1833 (Moore:263). A number of the other examples could be cited. (Figure 14-page v) Three identical Pattern 2b buttons are atypical in that they display promotional back marks, and are somewhat smaller (mean diameter = 1.19 cm) than the other Golden Age buttons. Their back marks read "•Wm.STANLEY/LONDON", but the exact origin of this trademark is uncertain. A list of "Common Button Back Marks and probable dates of manufacture" includes an entry for "W Stanley London (Britain) 1800?" (Yates n.d.). Akpan (2000:57) provides a detailed account of a William Ford Stanley (1829–1909), British inventor and manufacturer of brass scientific, surveying, and drawing instruments. This biographer found no evidence that he ever marketed buttons, but his manufacturing plants were active continuously from 1852 to 1999. These buttons could have been produced with the Stanley trademark and used to secure or enclose equipment sent to the Fort Pierre site during any of its occupancies.

Six Pattern 2c buttons are identified, ranging in size from 1.14 to 2.16 cm (mean = 1.52). Applying decorative stamping to the face apparently became common after 1830 (Hunt 1986:20), although the three military buttons, at least, may have been made earlier than that. The designs on the three civilian buttons are geometric, with a *basketweave* pattern on one high concave button, a six-pointed star surrounded by circles and radial lines on a second, and a stylized six-petaled flower on a third. These latter two buttons are relatively small (mean diameter = 1.15 cm) and may represent what Luscomb (1967:79) calls "Rimed Omega Type" gilt vest buttons, a unique style made around 1830. The three military buttons—two artillery and one infantry—seem temporally anomalous for Harney's 1855 campaign. The first displays an asymmetric spread eagle on its domed face, and a raised mark back mark "•WATE" (probably "WATERBURY") on its concave back. It also appears to have been restruck, as evidenced by the anvil seam on the back, similar to a specimen from Fort Union. Hunt (1986:21) notes that this button was worn by the U.S. Army Corps of Artillery between 1821 and 1830. Wyckoff (1984:25) assigns this button to the 1821–1836 period, but admits that "the terminal date is more difficult to determine." The second military button, similarly designed, was produced during the same time period (Tice 1997:117), and an even earlier provenience (1808–1821) is assigned to the third button. Its flat face bears a standing eagle device, perched on a cannon, with a depressed-channel, raised-mark back mark "•*•IMPERIAL/STANDARD•*•", suggesting a British point of origin (Albert 1997:55).

Variety A3. Simultaneously Molded Shank (Figure 2.5j). A single unmarked cast white metal button, fitting Hunt's description of *cone shank*: one-piece buttons in which "metal used in shanks conforms to that used in the bodies" (Hunt 1986:21). These buttons date from the late eighteenth well into the nineteenth centuries (South 1964:15, 118).

Variety A4. One-piece Rivet-Shank (Figure 2.5k–l). Two identical rivet-shank brass buttons display a crosshatch pattern on the rim, with flat faces and backs, and slightly thickened edges. Opposite the shallow well is a cone-shaped post extending from the back, containing a rivet-like tubular stud. An identical button is displayed in the 1895 Montgomery Ward catalog as Item "10342 Chapman's Button and Drawers Supporter; can replace a button at a moment's notice…" (Montgomery Ward and Co. 1895:86). These self-securing button substitutes were referred to as *bachelors' buttons*, and although the herringbone pattern was common on many brass button faces, it is the mode of attachment that places these specimens in the correct temporal context, decades after the fur trade era. The rivet-shank attachment, also found on a number of two-piece buttons in this collection, was patented in 1890. They had to be attached to the garment at the factory, and are usually associated with heavy materials such as denim or canvas work clothes.

Type B. Two-piece (111 specimens)

Most nineteenth century two-piece metal buttons were constructed by machine stamping, a process first introduced in England in the 1770s, and adopted by American button makers beginning in the 1820s (Albert and Kent 1949:30). Initially thin discs of metal were stamped to form domed shells, often with intricate designs, and crimped over bone, wood, or sometimes metal backs. In the early 1800s these were generally replaced by more durable stamped brass or steel backs (Hicks 1995:63). Thus in many instances, the form and design of the button were produced simultaneously. Often a fibrous filler between the two metal discs helped secure the attachment by providing tension. At Fort Pierre, faces were decorated by stamped designs, gilded, japanned, covered with fabric, and sometimes unadorned. Shanked varieties, both fixed and flexible, outnumber sew-throughs by a ratio of three to two. The ferrous components of these buttons are badly preserved or missing. Sizes for this heterogeneous group range from 0.86 to 3.04 cm

Variety 1. Four Sew-through Holes. These were made using a stamped metal front crimped over a smaller back, often with wood or fiber filler between. They are similar to specimens recovered from early to mid-nineteenth century contexts (South 1964:115, 121). Pattern 1a (Figure 2.6m) is made of ferrous metal, with 60% consisting of a face and wood filler only, the backs having been lost. Faces are convex with slightly thickened rims; backs, when present, are flat to convex. Size varies from 1.34 to 2.02 cm in diameter (mean = 1.67cm). Pattern 1b (Figure 2.6n) consists of three specimens, two of which display a stamped crosshatched pattern on the rim face and a ferrous back, and the third has a plain white metal face.

Variety 2. Loop Shanks with two subpatterns distinguished by type of decoration. Subpattern b1 (Figure 2.6o) includes two domed and two flat brass buttons with geometric designs stamped on their faces. These designs consist of stylized plants, ornate concentric circles, squares, Xs, scallops, and crosshatching. Traces of gilding remain, but loop shanks are missing from corroded ferrous backs. These correspond to South's (1964:15, 122–123) Type 26, dated between 1837 and 1856. He describes these as "civilian buttons, counterparts to the military buttons of Type 27" (South:122).

Pictorial representations of various eagle devices occur exclusively on military buttons , Subpattern 2b2 (Figure 2.6p–r), probably deposited during Harney's occupation from 1855 to 1856.

The majority of these buttons (14 of 18) are convex faced, flat backed, and gilded, displaying some variation of a spread eagle device bearing a shield in its center. All but two of the eagles face right, and each holds a laurel branch in the right claw and three arrows in the left. Three of the shields bear impressed parallel lines, indicating a General Service button, which in order to simplify button procurement, became the standard for enlisted men in all branches of the army in 1854. (Wyckoff 1984:88). Eight of the shields display an "I" for Infantry, two an "A" for Artillery, and one a "D" for Dragoons, approximating the relative proportion of the various Army divisions deployed at Fort Pierre under Harney (Robinson 1902:26). Back marks also provide useful temporal information, with certain caveats. Ten of the eighteen military buttons were manufactured by the Waterbury, Connecticut firm of Scovills and Company. This was the trade name used on buttons manufactured between 1840 and 1850, although the die-stamped pattern may have been employed after that (Luscomb 1967:174). An Infantry button carries the back mark "...H.SMITH & Co/NEW YORK", probably William H. Smith and Company of 4 Maiden Lane, New York City, one of many Scovills customers who used custom back marks on merchandise sold at their establishments. The firm was in business under this name from 1830 to 1858 (Tice 1997:38,68). Seven of these buttons have no back mark, and four of these have a distinctive low convex face, displaying a right facing standing eagle with a spade-shaped blank shield at its lower left, on a horizontally-lined background. These items were used to secure the band on the 1839 pattern forage cap, widely distributed during the Mexican-American War and into the late 1850s (Brinkerhopf 1972:3). This popular style of cap was replaced with a decidedly more foppish design, issued in 1855. The uniform size of these four buttons (1.38 cm), which have not been reported in coat sizes, indicated a specialized use (Wyckoff 1984:23). In fact, most (14 of 18) of the military uniform buttons excavated at Fort Pierre were cuff, cap, or vest sizes (<1.5 cm).

Pattern 2c. (Figure 2.6s) These disc-shaped plain metal buttons were manufactured using brass, ferrous lead, and white metal faces, and ferrous or brass backs. A wooden core remains attached to one iron back, and a fabric filler adheres to a lead face. Only four of the specimens are complete buttons, and the rest evenly divided between face and back remnants. Size varies from 0.86 to 3.04 cm (mean = 1.68 cm).

Pattern 2d (Figure 2.6t) is similar in appearance to 2c ferrous buttons, except that the faces are cloth covered. Most consist of fine woven material adherent to a flat face, the edges of which are crimped around a fibrous core to engage a flat or slightly excurved back. A few corroded ferrous shanks protrude loosely through an oval back hole. A Mr. B. Sanders began producing cloth-covered two-piece metal buttons with iron shanks in England in 1823. This technology was developed in the United States by Mr. and Mrs. Samuel Williston beginning in 1827. Their enterprise grew to become very successful throughout the rest of the nineteenth century (Newberger 1998:13–16). As with other ferrous two-piece buttons, specimens often consist of only face and body fragments (11 of 24). Size varies from 1.00 to 2.51 cm (mean = 1.61 cm), and some of the missing shanks may have been made of cloth.

Pattern 2e. A single 1.7-centimeter stamped brass button with a circle of dots around its raised circular center.

Pattern 2f. (Figure 2.6u–v) These two identical gray brass buttons were not found at Fort Union, or any of the other fur trade sites reviewed. Each has a plain, donut-shaped face with a slightly domed rim, which curves around to engage a similar convex back bearing the back mark "*GARANT/LMB*." Threads of fabric protrude through the edges of a central hole, probably the remnants of a soft shank referred to by collectors as a *pad back*. A technological advance over the previous *threadbacks*, most of these buttons were produced between 1820 and 1900 (Dorothy Krugner, personal communication).

Variety 3. Rivet Shank (Figure 2.6w–x). These eleven buttons, mainly constructed of stamped ferrous bodies and brass rivet shanks, are the two-piece counterparts of Type IIIA4. Neither type was found at Fort Union. They are almost surely associated with the late nineteenth–early twentieth century occupation of the fort area by the Scotty Philip family. These types of fasteners are usually characterized as work clothing or overall buttons. The faces are flat or donut shaped, with embossed lettering around the rim. The distinctive shank construction, preserved on most of these buttons, provides us with a fairly firm *terminus post quem* date of 1890. U.S. Patent No. 17,721, credited to H.H. Lake of Scovills Manufacturing Company, illustrates a cut-away view of the locking mechanism that secures the shank, identical to that seen on these buttons (Adams 1971:37). Only a few letters are visible on the faces, because the ferrous rims are so corroded. Six of these buttons were found together at "shallow surface" in the same unit. The three larger ones are the same size (1.7 cm) as are the three smaller ones (1.5 cm), and the letters "SONS" or "& SONS" are visible on two of them, and possibly the letter "E" on another. The faces of riveted work-clothing buttons were often embossed with the company's name or logo touting the garment's durability ("CAN'T BUST EM", "STRONG HOLD") or the wearer's maleness ("BOSS OF THE ROAD", "BREAD WINNER"). These buttons became prevalent in the late 1800s and were found at work-camp archaeological sites such as Alabama Gates Work Camp at Owens Valley, California (Psota 2002:117–119). The lone brass-faced rivet shank button displays "BUSBY" on a stamped mark. An identical specimen was found at a rural habitation in the Black Hills dating from about 1890 to 1910. In his report, Fox (1996:85) notes that "one Fred H. Busby" patented a glove in 1888, which may have used this type of fastener. Good circumstantial evidence that this artifact is, in fact, a *glove button* or riveted snap from a workman's glove is found in this account of pioneer bill paying practices around Fort Pierre. It is attributed to Carl T. Fischer, partner in a regional store that provisioned miners, ranchers, and homesteaders in the town of Fort Pierre from 1889 to 1968: "The usual way was for cattle people to pay their bills once a year when they sold and Fischer Brothers carried most of these outfits. When the bill was paid in full they received a Stetson hat or Busby gloves and always candy for the children" (Robinson 1974:15). This button likely came from a glove belonging to Scotty Philip or one of his employees.

Class IV. Ceramic (48 specimens)

These high-fired clay buttons, while glass-like in appearance, are in fact composed of a ceramic substance, and referred to as *chinas* by collectors. The Prosser or *dust* process of ceramic button manufacture was perfected by English civil engineer and industrialist Richard Prosser in 1840.

Figure 2.7: Classes IV–VI (ceramic, glass, rubber) buttons. Class IV Type A (four-hole): a–f; Type B (three-hole): g–j; Type C (two-hole): h; Class V:i–j; Class VI: k-l. Illustrations are not to scale.

This revolutionized the technique of porcelain button making, producing utility closures that were attractive, durable, and inexpensive. Sprague (2002:111–127) provides a detailed analysis of Prosser buttons, noting that they can be distinguished from glass by their pitted or *peau-d'orange* back surface, and the fine crystalline structure of their broken edges, as opposed to the absolute smoothness of broken glass. All eight of the broken specimens from Fort Pierre (17%) have a granular, rather than glassy, exposed surface. Thus all are assumed to have manufactured from ceramic raw materials.

While the patent date for Prosser's invention (June 17, 1840) makes the introduction of these buttons one of the most precisely datable events in the field of common personal items, they are otherwise difficult to categorize with respect to age. They were manufactured by various companies in Europe and America, including the Mintons of Stoke-on-Trent from 1840 to 1846, Prosser's brother Thomas (who took out a patent in the U.S. in 1841), Charles Cartilidge and Company of Greenpoint, Long Island from 1844 to 1856, and most notably Jean-Felix Bapterosses of Briare, France, whose company produced buttons from 1844 to 1956. Bapterosses improved the process by adding milk as a binder to the high quality of clay and feldspar found locally, as well as increasing efficiency through a series of mechanical innovations to speed up button production. This, combined with cheap French labor, soon drove the English firms out of business. Such extreme efficiency is documented in an 1866 issue of *The Working Man*, a London trade weekly: "In the extensive establishment of M. Bapterosses, at Briare, the division of labor, the excellency of the machinery, the skill of the workmen are such that a single hand can place daily the shanks of 800,000 buttons. . . " (Smith and Ford 1970:10).

Most of the ceramic buttons found at Fort Pierre were of the plain white four-hole variety, with a beveled convex rim and dish-shaped well (73%). Sprague (2002:120) notes that this design accounts for "98% of the reported archaeological specimens" in the literature. The Fort Union collection, in contrast, not only has a much higher proportion of ceramic buttons (35% vs. 11% at Fort Pierre), but also contains a number of colorful transfer-printed varieties known as *calicoes*. These buttons were designed to match the patterns on popular cloth apparel of the time, along with gingham and stencil designs. All required a different application process, but in each case the pigment was baked into the ceramic *biscuit* during multiple firings, making the complete loss of the colored pattern from wear or chemical effects after deposition unlikely. A few calico varieties were found among the solid white buttons discovered under the floorboards at Minton's dating to 1842, suggesting that these were among the first produced (Albert and Adams 1970:5). It is not clear why no patterned ceramic buttons were found at Fort Pierre, other than the fact that men tended to wear the plain white buttons.

The introduction of Prosser buttons was a significant event in the history of American frontier dress and commercial activity. While some degree of mechanization was involved in manufacturing earlier utilitarian bone, shell, and metal buttons, as Sprague (2002:24) points out, "The mass production of buttons in lots of 500 at a time in 30 muffles, all day long, day after day, would and did bring the price down so low that everyone could afford to use them." Their relatively high frequency in both the Fort Pierre and Fort Union collections, despite the fact that they probably became available toward the end of the occupation, indicates that they must have been a popular personal item. What they lack in ornateness is made up for in simple visual appeal and durability. In fact, these buttons wouldn't look out of place sewn on a dress shirt today.

Type A. Four-hole Sew-through (n = 42 specimens)

This type as a whole is remarkably homogeneous with regard to size, color, and surface texture. All are white with a smooth, glasslike surface, and most show stippling around the back holes. This is thought to represent an artifact of the firing process. Size ranges from 0.77 to 1.55 cm, but most are close to the mean diameter of 1.06 cm.

Variety 1 (Figure 2.7a-c). Plain white buttons with convex faces and backs and square edges. All possess simple wells that are described as *dish-shaped*, and 91% have a peau-d'orange appearance around the back holes. The largest specimen is atypical in that its well sides are rectilinear, and there is a large circular knob in the well center. Three specimens have a diffusely stippled surface, one with tiny black inclusions. 15% of these buttons have a tiny knob in the center of the well, which was said to have been used by Bapterosses to prevent patent infringement (Sprague 2002:123).

Variety 2. Mold decorated buttons

Pattern 2a. *Saw Tooth*. White with a border of radially-oriented indented lines which run from the well to the rim edge (Figure 2.7d).

Pattern 2b. *Hobnail*. A single button with a raised ring at the well margin and a border of raised dots on the edge (Figure 2.7e).

Pattern 2c. Four white buttons with a concave face and a rounded ring around the outer edge (Figure 2.7f). Probably a *rolled rim* type, also designated *tire* by collectors (Sprague 2002:212).

Type B. Three-hole Sew-through (4 specimens)

Similar to Type A, varying only in the number of holes and a tendency to be smaller (0.79 to 0.89 cm). One has a diffusely stippled surface. Three-hole buttons were often used for dolls' or babies' clothing. (Figure 2.7g)

Type C. Two-hole (2 specimens)

Both of these buttons have a round-ended, groove-like well around the holes. The backs are stippled, and the face and back convex, with a squared edge. (Figure 2.7h)

Class V. Glass (2 specimens)

Only two buttons in the Fort Pierre collection may be classified as glass, and collectors would likely place one of them in a separate category, "glass mounted in metal" (Adams 2002:1). The first is a one-piece cone-shaped octagonal loop-shank, 1.07 cm in diameter. (Figure 2.7i) A broken facet reveals that the white floral pattern on the face is fused to the underlying black glass body. A bent round brass shank is embedded in the back, surrounded by swirls created when the shank was twisted into the still soft glass. Hunt (1986:30) describes several similar glass buttons from Fort Union, with a floral pattern of contrasting color fused to the face. Luscomb (1967:83,101) calls this design dot trim overlay glass buttons or *hylas* and notes that they were popular during the nineteenth century. Jocelynn Howell (personal communication) states that these buttons were collected as *charm string glass* mementos by young girls, especially between 1840 and 1860.

The other specimen is a large (2.78 cm diameter) four-piece composite loop shank button. (Figure 2.7j) The back and presumed brass shank are missing, but fragments of the brass rim, including an outer rim band, remain, displaying an ornate floral pattern. The most striking part is a domed white glass insert which fits into the brass setting from behind. Its ground glass front surface consists of a smooth central dome surrounded by circles of raised crescents and dots. This composite construction conforms to a popular nineteenth century design Luscomb (1967:111-112) refers to as Jewel Buttons or Victorian Jewels, most of which were made between

1850 and 1900. Johnson (1948:14-15) considers this type a civilian version of the four-piece staff-type brass military button that originated in the 1830s. This glass-mounted-in-metal specimen is probably a lady's coat button, and could have been worn by one of the wives of General Harney's officers, known to have accompanied their husbands in 1855-56, or perhaps by Scotty Philip's wife or daughters.

Class VI. Rubber (4 specimens)

Both sew-through (VIA) and loop shank (VIB) types of hard rubber buttons were found at Fort Pierre. Charles Goodyear patented his process for vulcanizing natural rubber in 1844, and his brother Nelson extended the patent to the late 1870s when it expired (Hughes and Lester 1981:48). One specimen, a solid black two-hole sew-through with a molded *rope* design around the edge, displays the back mark "NOVELTY RUBBER COMPANY" (Figure 2.7k). This firm, located in New Brunswick, New Jersey, was the largest manufacturer of hard rubber buttons between 1855 and 1870 (Luscomb 1967:140). Lacking the requisite Goodyear patent information and dates, this button was probably made after the patent expired in the 1870s, and thus after the fort was abandoned. The other three rubber buttons have molded geometric designs on their faces. (Figure 2.7l) Size ranges from 1.07 to 2.00 cm in diameter.

Discussion

Buttons have been referred to as index artifacts, objects intrinsically identifiable as to time and place of origin as well as specific purpose, much like coins or stamps. The precise function of buttons excavated from an archaeological site, no longer associated with the garments to which they were originally attached, can be inferred from a number of parameters. Diameter is the single most useful measurement, and to a lesser extent, mode of attachment, raw material, and surface markings are helpful in assigning function. In general, smaller, undecorated, sew-through buttons secured more light-weight garments worn closer to the skin; larger, loop-shank, multicomponent, and more ornate buttons are used as closures on heavier outerwear. In the archaeological record, the date of origin of the first button is hard to determine because beads, which are purely decorative, are difficult to differentiate from true buttons, used as closures in the modern sense. It was at this functional transition that buttons, as we understand them, came into existence. Their meaning to the individuals who wore them at Fort Pierre was multivalent: they served as utilitarian closures, objects of personal adornment, indicators of ascribed and attained status, and even advertising media.

Clothing worn by Fort Pierre's fur trade occupants varied by cultural background, social rank, and specific duties. In 1833, early in his career as a long term American Fur Company employee, Charles Larpenteur described the outfit he was issued and expected to maintain for eighteen months. It consisted of cowskin pants and coat, buckskin shirt, red flannel undershirt, and blue checked shirt (Schuler 1990:73–75). In 1851 visitor Rudolph Kurz noted that most employees wore the manufactured cloth items the company kept in stock, such as woolen and corduroy trousers, and cotton or red flannel shirts (Kurz n.d.:134). He also observed that for trips back to St. Louis, some of the men actually affected a *retro* look by wearing leather outfits that were made at the fort.

Eighty-eight percent of the buttons in the Fort Pierre Collection could be classified by collectors as *diminutive* (<0.375" or 0.3 cm) or *small* (0.375" – 0.75" or 1–1.9 cm). The rest would be classified as *medium* in size (0.75"–1.25" or 1.9 – 3.18 cm) and only one would be classified as *large*. Luscomb (1971:129) offers suggested sizes for buttons on various types of men's clothing as follows:

Shirt buttons	18 lines (1.1 cm)
Pajama buttons	30 lines (1.9 cm)
Trouser fly	23 lines (1.5 cm)
Trouser brace	27 lines (1.7 cm)
Jacket front	30 lines (1.9 cm)
Jacket sleeve	22 lines (1.4 cm)
Waistcoat	22 lines (1.4 cm)
Overcoat	45 lines (2.9 cm)
Overalls	30 lines (1.9 cm)

A particular time period is not specified for these figures, but they correspond well with the range of sizes offered by Hicks (1995:9) for late eighteenth and early nineteenth century buttons:

Utilitarian Buttons (shirt, underwear)	Small 1.05–1.4 cm Large 1.60–1.8 cm
Waistcoat Buttons (includes jackets)	Bone 1.75–2.2 cm Metal 1.40–1.95 cm
Coat Buttons	Bone 1.75–2.2 cm Metal 1.85–3.5 cm

The range of button sizes and relative frequencies of the Fort Pierre buttons compares closely with those from Fort Union. Hunt reports a diameter range of 0.69 to 3.12 cm, with three major modal peaks: 0.91 to 1.17 cm, 1.63 to 1.80 cm , and 1.32 to 1.47 cm in order of frequency (Hunt 1986:45). This is nearly identical to the frequency distribution for the Fort Pierre buttons shown in Figure 2.11. Hunt concludes that button wear would correlate directly with the number of archaeologically recovered buttons (presumably discarded or lost at random), whereas inventories (those items left unsold at the end of each year) would be inversely related to the frequency of usage.

Function

By applying information from a variety of sources, including fort inventories and supply orders, late nineteenth century retail catalogs, contemporary paintings and photographs, and modern button specimens, it is possible to assign function to nearly all of the Fort Pierre buttons with at least some degree of specificity. Three general categories are apparent, based on the available sources of information: 1) buttons whose purpose may be inferred but not known precisely, mainly various utilitarian buttons; 2) buttons for which a specific function can be determined, such as military buttons; and 3) buttons of ambiguous function, in that they may have served a dual purpose such as the *Golden Age* brass trade buttons.

Based on their small size and modest surface treatment, nearly all of the bone buttons were utilized as closures on everyday work clothing such as trousers, shirts, and underwear. Harney's soldiers may have worn some of these items on their pull-over *issue shirts*, which were fastened at the collar with two or three bone buttons and one on each cuff. Closely following civilian styles, these were made of muslin, flannel, or wool and were referred to as *undershirts* in the 1840s (Anonymous n.d.a). With a single exception, all of the shell buttons are diminutive or small. During the fur trade and military occupations, these individually crafted items were probably used to fasten underwear, men's shirts, women's shirtwaists, and children's clothing. Many of the one and two-piece metal buttons also served as work-a-day closures for men's apparel, especially trousers and coats. Numerous molded white metal, stamped brass, and pressed steel one-piece buttons (IIIA1) are found in the collection. Their customary arrangement on nineteenth century *drop-front trousers* is well illustrated in a photo from the National Museum of Man in Canada ("The Engages" 1982:10). Each garment required at least eleven buttons: four brace buttons across the top for the suspenders, a lower row of four buttons to hold the drop front, and three vertical buttons to close the waist band. Army issue trousers were also fitted with a fall front and equipped with suspender (brace) buttons, although a fly front began to appear after 1842 (Anonymous n.d.a). Using Luscomb's (1971:129) button size scheme for various types of clothing, nearly all of the ceramic buttons would have been used on shirts, shirtwaists, underwear, or children's clothing. Collectors report that small three-hole ceramic buttons, of which there are four in this collection, were often associated with doll or baby garments (Sprague 2002:120).

Evidence of the rapidly growing popularity of Prosser buttons during the second half of the nineteenth century, at least for civilian clothing, is found in the collection recovered from the Steamboat *Arabia*, which sank near Kansas City in 1856. The boat journeyed from St. Louis upriver as far as Fort Pierre that summer, transporting Harney's troops and supplies on at least one voyage. On her final trip, the *Arabia* carried 140 settlers and their supplies, including over 30,000 buttons, intended for the settlement of Logan, Nebraska. Many plain white, calico, gingham, and transfer printed buttons were recovered from the large tubs in the ship's hold. These outnumbered all the other button types (bone, metal, glass, wood, and hard rubber) by a ratio of six to one (Conor Carey, curator, Steamboat Arabia Museum, Kansas City, Missouri, personal communication).

It is difficult to assign a specific function to the four hard rubber buttons, but they were all probably made in America. The largest, a 2-centimeter molded two-hole sew-through, has an undated back mark "NOVELTY RUBBER CO." It could have been used to secure a rubber coat worn by one of Harney's men, or perhaps an outer garment from the late 1800s. The larger of the two glass buttons, a composite Victorian Jewel, was probably lost from a woman's dress coat. The smaller one, a hat shaped swirlback, must have been worn on a woman's outerwear, possibly as a cuff, collar, or gaiter button.

A more specific function may be posited for a number of the Fort Pierre buttons, particularly some of the metal varieties with distinctive designs and back marks. Four identical 1.4-centimeter, two-piece brass buttons can be identified by their characteristic standing eagle device, blank shield, and lined background as band holders on 1839 pattern forage caps. This cap, which featured a lanyard-secured neck cape, was replaced by a notably less practical design in 1855. Assuming the newly issued headgear reached these soldiers that winter, they probably were reluctant to relinquish what little protection the neck cape provided. The other two-piece brass military buttons were used to fasten the vests, jackets, and cuffs of Harney's troops quartered at the fort. Several of the one-piece loop shank brass buttons (IIIA2c) have a distinctive geometric or floral design on the face, and angled rim. These were probably worn early in the fort's occupancy by clerks or higher ranking officers as vest buttons (Luscomb 1967:79). A specific purpose may also be inferred for the two-piece rivet shank buttons (IIIB3), particularly the workman's glove button bearing the "BUSBY" trademark, and the six iron-faced rivet shanks excavated from the same unit. These probably came from one garment, likely a ranch hand's discarded overalls.

A number of the one-piece loop shank buttons in this collection appear to have served a separate purpose for the two cultural groups that interacted at Fort Pierre. This ambiguity heightens their functional significance but tends to blur their specificity as chronological markers. Three of these are clearly military buttons (IIIA2b), but their one-piece construction and surface markings put them in a time frame 30 years before Harney's occupation, quite a gap even allowing for the depositional delay and the military's known penchant for recycling outdated stock. They may have been used as trade items, as were many of the Golden Age one-piece plain-faced gilded buttons. Catlin and Bodmer's famous portraits show how Indian men and women integrated gilded buttons with traditional items of adornment such as shell, feathers, and beads (Figure 2.8). Various cultural meanings may have been intended, depending on the context in which the buttons were displayed, from personal decoration on women's dresses to individual accomplishment when worn on a warrior's shirt, to achieved and ascribed social status when attached to a leader's headdress (Moore 1997:159, 263; Orr et al. 1984:260). Gilded brass buttons were also used on chief's coats, manufactured not only at St. Louis and other eastern centers, but also assembled at the forts themselves specifically for the purpose of rewarding cooperative Native American trade partners. Some coats were more elaborate than others, intended to affirm a hierarchy of imposed status and to facilitate the traders' control over Indian economic activities. American Fur Company records for 1827 specified the materials needed, including "1 dozen gilt buttons" for each chief's coat. Five sets of hooks and eyes were also included, meaning that the buttons were probably not functional, a feature that would minimize construction costs (Chronister 1996:1–5). The three one-piece military buttons with *terminus post quem* dates in the first two decades of the 1800s may have served this purpose, since the first chief's coats, which were in fact British officers' uniform coats, were later imitated as pseudo-military facsimiles. A tailor to do this work is not listed among the employee positions during the fort's early years (DeLand 1918:234–239), nor is a tailor shop specifically mentioned among the other tradesmen's shops (blacksmith, carpenter, tinsmith, saddler) located on either side of the front gate (Wilson 1902:288). We may assume that such a position was eventually filled, since Fort Union had its own tailor shop where chief's coats were made (Chronister 1996:1). In 1840 Honore Picotte wrote to Chouteau expressing his disappointment at not having a tailor "to make innumerable articles for trade according to the fashion of the country" (Schuler 1990:58).

Table 2.2: Bone button functional assignment by type.

Function	Type	No.	Size (cm) Type	% of Class	% of Buttons	% of Total
Utilitarian	A2	5	0.96-1.06	29.4	4.2	1.20
(Small)	A3	6	1.09-1.23	25.0	5.1	1.40
	A4	2	1.06-1.13	33.0	1.7	0.47
	B1	7	1.02-1.27	24.1	5.9	1.70
	B2	2	1.06-1.10	40.0	1.7	0.47
	B4	5	1.03-1.23	21.7	4.2	1.20
	C	3	0.93-1.20	60.0	2.5	0.71
Subtotal		30				7.10
Utilitarian	A2	2	1.49	11.8	1.7	0.47
(Large)	A3	2	1.39-1.40	8.3	1.7	0.47
	B1	13	1.29-1.38	44.8	11.0	3.10
Subtotal		17				4.00
Suspenders	A1	1	1.5	100.0	0.85	0.24
	A2	9	1.51-1.77	0.52	7.6	2.10
	A3	15	1.58-1.83	62.5	12.7	3.50
	A4	4	1.59-1.71	66.0	3.4	0.95
	A5	4	1.58-1.61	80.0	3.4	0.95
	B1	10	1.58-1.81	34.5	8.5	2.40
	B2	3	1.64-1.69	60.0	2.5	0.71
	B3	1	1.50	100.0	0.85	0.24
	B4	17	1.50-1.95	73.9	14.4	4.00
	C	2	1.60-1.68	40.0	1.7	0.48
Subtotal		66				15.60
Coat	A5	1	2.86	20.0	0.85	0.24
	B4	1	3.40	4.3	0.85	0.24
	B5	1	2.59	100.0	0.85	0.24
Subtotal		3				0.71

Table 2.3: Shell button functional assignment by type.

Function	Type	No.	Size (cm) Type	% of Class	% of Buttons	% of Total
Shirt	A1	2	0.98–0.99	100.0	3.1	0.47
Shirtwaist	A2	27	0.69–0.98	100.0	41.5	6.40

Table 2.3: continued

Function	Type	No.	Size (cm) Type	% of Class	% of Buttons	% of Total
	A3	28	0.74–1.02	0.97	43.1	6.60
	B	4	0.82–0.98	100.0	6.2	0.95
	C	2	0.99–1.01	100.0	3.1	0.47
Subtotal		63				14.90
Shirtwaist/Dress	A4	1	1.12	100.0	1.5	0.24
Coat	A3	1	2.56	3.5	1.5	0.24

Table 2.4: Metal button functional assignment by type.

Function	Type	No.	Size (cm) Type	% of Class	% of Buttons	% of Total
Pants (Fly)	A1	3	1.40–1.46	6.3	1.6	0.71
	A2b	1	1.45	7.1	0.54	0.24
	B1a	5	1.40–1.45	2.9	2.7	1.20
	B2d	2	1.43–1.44	9.1	1.1	0.47
Subtotal		12				2.80
Pants (Suspender)	A1	10	1.65–1.84	20.8	5.4	2.40
	A2a	1	1.78	50.0	0.54	0.24
	A2b	2	1.73–1.85	14.3	1.1	0.47
	B1a	21	1.66–1.84	60.0	11.3	5.00
	B2b1	1	1.70	25.0	0.54	0.24
Subtotal		35				8.30
Shirt/ Shirtwaist, Civilian	A1	21	1.23–1.39	43.8	11.3	5.00
	A2b	5	1.12–1.36	35.7	2.7	1.20
	A2c	3	1.14–1.16	50.0	1.6	0.71
	B1a	5	1.34–.138	13.2	2.7	1.20
	B2b1	3	1.18–1.37	75.0	1.6	0.71
	B2c	4	1.12–1.32	26.7	2.2	0.95
	B2d	8	1.12–1.36	133.3	4.3	1.90
Subtotal		49				11.60
Military	B2b2	5	1.31–1.38			
Vest	A1	14	1.46–1.63	29.2	7.5	3.30
	A2b	1	1.45	7.1	0.54	0.24
	A2c	1	1.51	16.7	0.54	0.24
	B1a	1	1.45	2.9	0.54	0.24
	B2c	2	1.48–1.62	13.3	1.1	0.47
	B2d	2	0.56–1.60	8.3	1.1	0.47
Subtotal		21				5.00

Table 2.4: continued

Function	Type	No.	Size (cm) Type	% of Class	% of Buttons	% of Total
Dress	A1	22	1.7–1.39	45.8	11.8	5.20
Coat						
Civilian	B2d	2	2.08–2.20	8.3	1.1	0.47
Military	A2c	1	2.00	11.7	0.54	2.40
Coat Sleeve						
Military	A2c	1	1.51	16.7	0.54	0.24
	B2b2	10	1.45–1.58	55.6	5.4	2.40
Subtotal		11				2.60
Cap, military	B2b2	4	1.37–1.40	22.2	2.2	0.95
Overall	A4	2	1.71	100.0	1.1	0.47
	B3	10	1.48–2.51	90.9	5.4	2.40
Subtotal		12				2.80
Glove, Civilian	B3	1	1.44	9.1	0.54	0.24

Table 2.5: Ceramic button functional assignment by type.

Function	Type	No.	Size (cm) Type	% of Class	% of Buttons	% of Total
Shirt/	A1	34	0.85–1.14	97.1	70.8	8.00
Shirtwaist	A2	7	0.71–1.11	100.0	14.6	1.70
	B	4	0.79–0.89	100.0	8.3	0.95
	C	2	1.12–1.19	100.0	4.2	0.47
Subtotal		47				11.10
Shirtwaist/Dress	A1	1	1.55	2.9	2.1	0.24

Table 2.6: Glass and rubber button functional assignment by type.

Function	Type	No.	Size (cm) Type	% of Class	% of Buttons	% of Total
Glass Buttons						
Cuff (?)	B	1	1.07	50.0	50.0	0.24
Coat	B	1	2.78	50.0	50.0	0.24
Rubber Buttons						
Boot(?)	B	1	1.07	50.0	25.0	0.24
Coat	B	1	1.56	50.0	25.0	0.24

Table 2.6: continued

Function	Type	No.	Size (cm) Type	% of Class	% of Buttons	% of Total
	A	2	1.76–2.00	100.0	50.0	0.47
Subtotal		4				0.95

Chronology

The materials, mode of construction, styles, and sizes of the Fort Pierre buttons are—as expected—similar to those from Fort Union, a contemporaneous post supplied from the same sources and managed by many of the same individuals. Hunt (1986:31–33) adapts South's (1972) Mean Ceramic Formula to the dated buttons from Fort Union and arrives at a mean date very near the centerpoint (1848) of the site's known occupation. The same exercise applied to the Fort Pierre buttons would yield similar results. Minor variations would be expected due to the fact that Fort Union's terminal fur trade and military occupations took place ten years after similar events occurred at Fort Pierre (1865 vs. 1856). More significant differences, mainly manifested by the rivet-shank buttons found only at Fort Pierre, reflect the pioneer ranch occupation near the turn of the century.

Many of the buttons in this collection, because of known dates of material modification, manufacturing innovations, proprietary information, or military records, may be considered intrinsically dated objects. Reliable *terminus post quem* dates can be tied to the ceramic buttons, first manufactured using Prosser's technique in 1840 (Sprague 2002:11); the hard rubber buttons, patented by Goodyear in 1851 (Luscomb 1967:140); and to the rivet-shank buttons, patented in 1890 (Adams 1971:37). The two-piece military buttons can be related to the narrow time frame when Harney's troops occupied the fort in 1855–56, although their earliest date of manufacture was 1840, based on the "SCOVILLS&CO" back mark that many of them bear. The same can be said of the forage cap buttons (Luscomb 1967:174). In the interests of economy, the U.S. military followed a policy of using up outdated uniforms before issuing new ones. This is documented in a report by Captain Oscar F. Winship, who inspected eight government forts of the Department of the West during the summer of 1854, about the time the events leading to Harney's expedition were taking place. He specifically notes that infantrymen's clothing was of "the old pattern," which was mandated to be worn out before current issue could be requested (Paul 2004:4).

Figure 2.8: Bodmer portrait of Blackfoot chief (Library of Congress, Washington, D.C.)

A few of the utilitarian metal buttons bear manufacturers' marks that can be related to the establishment of specific business interests: for instance, "SJ HOLMES & CO" (1830), and "HOLMES PRITCHARD & CO" (1845) (McGuinn and Bazelon 1996:47). A less exact but still useful provenience can be assigned to the plain-faced gilded brass buttons with promotional back marks. They were most popular between 1820 and 1830. Still other button types, especially the bone, shell, and ferrous metal buttons were manufactured using similar methods and materials before, during, and after the fort's occupations, and thus their chronology is much less certain. Even the most precisely dated buttons in this collection, those with back marks identified with known commercial interests (Scovills and Company) or patent dates (Prosser buttons), must be viewed with circumspection when assigning dates of use. Adams (2003:38–64) stresses the importance of considering *time lag*, defined as the difference between the date of manufacture and the date of deposition, when analyzing historical artifacts. He argues that especially in the nineteenth century, roughly a generation separates the manufacturing and disposal of certain items such as ceramics and even glass bottles. We know that buttons were often saved for reuse when a garment was discarded, so a similar time range may be appropriate for many button types.

Some general trends are apparent, considering all the information available. The gilded one-piece brass buttons were present at the fort from its inception, based on their method of manufacture, use as trade items, and documented appearance on portraits of known time and place. The two-piece brass military buttons were deposited during a brief time interval, 1855–56. Rivet-shank buttons appeared much later, only after 1890. Ceramic buttons became common after the mid-point in the fur trade period (1840), and hard rubber buttons a little later than that.

Spatial Distribution

Complete provenience data, recorded as one-square-meter excavation units and vertical levels in ten-centimeter increments below surface are available for 237 of the 423 buttons. An additional 139 buttons had vertical provenience data only, so that a total of 376 could be analyzed for the spatial distribution by depth. An attribute table was constructed using Microsoft Excel, to include a catalog number for each button, coded button classification, x, y, and z coordinates in meters, and *terminus post quem* dates. This attribute table, along with a DRG map and a basemap outlining the dimensions of the fort and selected internal historic structures, were added as data layers in Arc Map 9.1. Positional data was analyzed by posing attribute queries based on classification, *terminus post quem* dates, and horizontal and vertical provenience in order to display concentrations of artifacts within the fort. Clusters of buttons, segregated by time periods during which the site was occupied by various groups, fell into discernible patterns. The reliability of the results is limited, especially by sampling bias. The entire button assemblage and particularly that portion associated with the fur trade era (*terminus post quem* $<$ 1850) is clustered near the front gate of the fort, where trade rooms, storage areas, and artisans shops were located, and near the west wall, the sector that housed the higher ranking clerks and officers. (Figures 2.9 and 2.10) Those associated exclusively with Harney's military occupation in 1855–56 are of course much less common, and not particularly related to locations where trading or maintenance of the domestic needs of the fort were carried out. The few ranch-era (*terminus post quem* $>$ 1880) buttons, as expected, bear no spatial relationship to the outline of the fort, since the structure had long since been removed by that time. Vertical provenience data is shown in Table 2.7. With a few exceptions, button distribution by depth appears to show that there is no simple stratigraphic *layering* of these intrinsically dated artifacts: there is no clear pattern with the more recently utilized buttons at the top and the earliest buttons at the bottom. Most of the vertical distribution seems fairly even; for instance, buttons of late temporal provenience (rivet shanks) are found equally at the top and the bottom levels, and military buttons, presumably deposited only in 1855–56, are also found equally at all levels.

Historical records indicate that site 39ST237 underwent a complex site formation process, and this is perhaps the best explanation for these findings. The palisade walls and some internal structures that were erected in 1832 were partially reconstructed in 1842 (Schuler 1990:32–40), and in order to compensate for inadequate quarters, other structural changes were undertaken during the military occupation (Myers 1920:154–56). Ruple (1990a:19), in his description of the fieldwork carried out in 1980–81, noted these site disturbances as well as others such as the filling of fur trade era cellars during the Philip family's ownership at the end of the last century. A hired hand recalls plowing the area near the site in 1920 (Robinson 1974:157), but the plow zone of that period would probably have extended to a depth of only about 8 to 10 centimeters (Dr. Robert Kohl, Plant Science Department, South Dakota State University, personal communication). The site was in pasture until 1930 when it was given to the state. Ruple (1990b:13, 18) also cites evidence of altered stratigraphy from natural events such as "periodic floods (which) have laid deep deposits on western portions of the site, and may have ablated eastern portions…" At

Table 2.7: Button distribution by level.

Level	I. Bone	II. Shell	III. Metal				IV. Ceramic	V. Glass	VI. Rubber
			Gilt	Military	Rivet	Other			
1	21%	19%	0%	23%	50%	31%	30%	100%	0%
2	35%	32%	46%	23%	8%	27%	26%	0%	25%
3	29%	30%	0%	23%	0%	26%	26%	0%	0%
4	13%	18%	27%	23%	0%	15%	15%	100%	25%
5	1.9%	2%	27%	8%	42%	2%	2%	0%	50%
# Buttons	108	63	13	11	12	121	43	1	4
									Total
									376

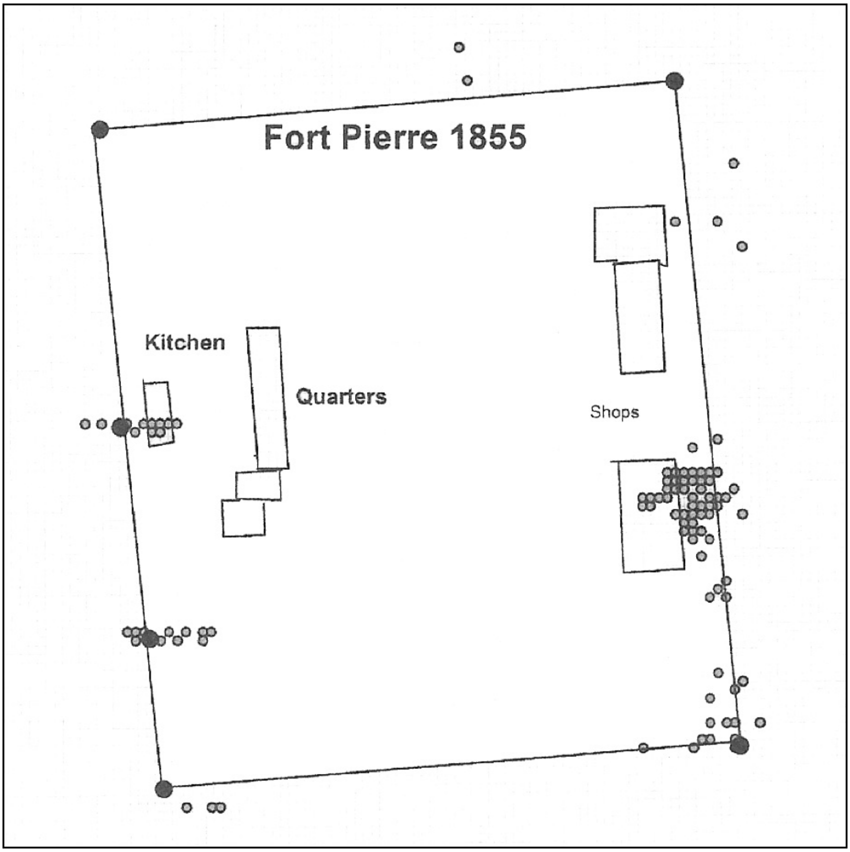

Figure 2.9: Distribution of all buttons at Fort Pierre.

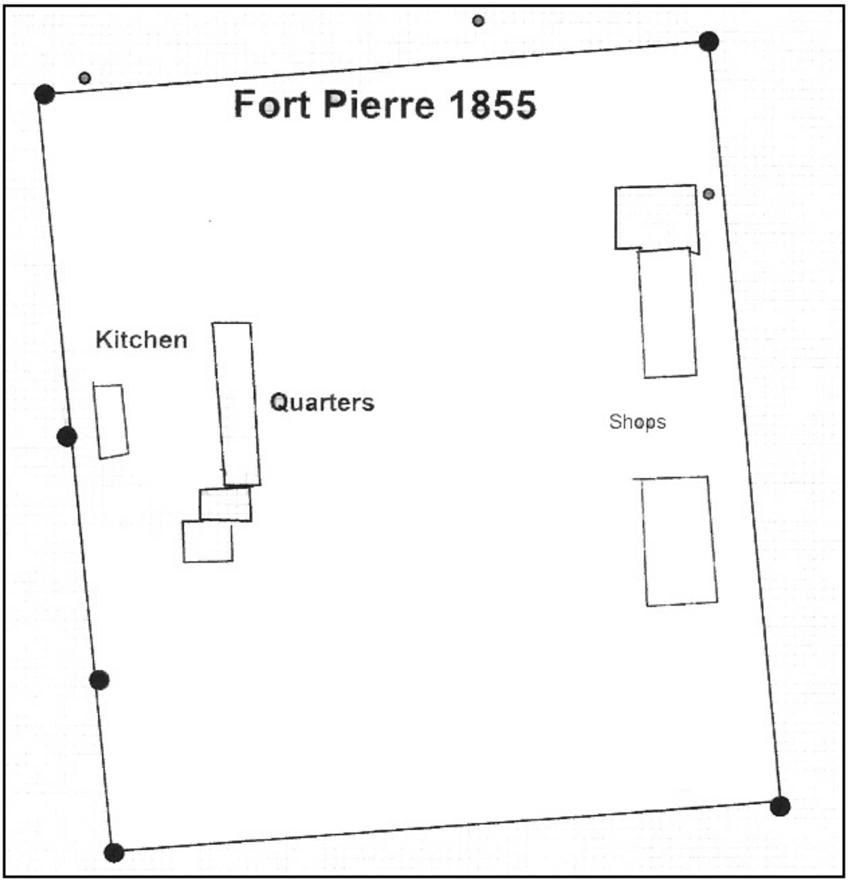

Figure 2.10: Distribution of post-fur trade buttons at Fort Pierre.

least for this historic site, a straightforward application of the Law of Superposition does not seem tenable, and this finding should be considered in investigating other artifact types at Fort Pierre Chouteau.

Conclusion

In historical archaeology, buttons may be regarded as one of a number of culture-laden artifacts, in that they convey functional, temporal, and even spatial information beyond their prosaic role as utilitarian garment closures. Several of the button types in this collection are particularly emblematic of significant cultural events that played out during the nineteenth century.

The gilded Golden Age brass buttons, heavily relied upon as an incentive for economic activity by the early fur traders, serve as an ironic metaphor for the exploitative interaction between Euro-american mercantile interests and Indians (Figure 1). The gold application process, promoted on back marks (“RICH COLOUR”, TREBLE GILT”) to intrigue prospective buyers and users, is significant. Early mechanical foil application and mercury amalgam coating techniques were replaced by electrolytic methods in order to produce inexpensive buttons with a gold layer so thin it was referred to as *dandelion water* (Luscomb 1967:78). Plains tribes, like other indigenous peoples, had traditionally shown a relative indifference to the yellow metal, at least in comparison to European adventurers. They were induced to adopt a need for a commodity they previously hadn’t required, and whose primary attribute, its gold surface treatment, was by design ephemeral. None of the gilt buttons from Fort Pierre retain more than a trace of gold on their surface, and most of this attrition took place soon after the item was purchased.

The military occupation of Fort Pierre under General Harney was relatively brief, but like any martial presence, left a heavy footprint. Except for the four forage cap buttons, the rest of the two-piece Sanders type brass buttons display some variation of the Spread Eagle device, bearing a shield signifying the wearer’s branch of service. This had become the standard design for all enlisted soldiers in 1855, and continued without change until 1872, when the form of the eagle was altered (Campbell 1965:5). The unmistakable message for Little Thunder’s Brulé band of Lakota, or any other group targeted for punitive action by the government, is contained in the embossed symbols held in the eagle’s claws. On the right a laurel branch offers peace, and on the left a clutch of arrows threatens war. The choice is clear and explicitly coercive: submit or be destroyed.

The cultural changes that accompanied the last extended occupation of the Fort Pierre site, Scotty Philip's ranch, were exemplified in the dozen or so rivet shank buttons. These could be classified as *work-clothes* buttons, and except for the single Busby glove snap, all would have been used to secure overalls. The overall in various forms had become the unofficial uniform of the working man by the late 1800s. Although the embossed logos on these fasteners are mostly illegible, similarly constructed buttons from historic work sites display trademarks stressing the product's durability and toughness. This advertising tactic was aimed at assuring brand name recognition and loyalty among the wearers by appealing to their sense of social identity, personal pride, and even virility. Levi Strauss and Company's *Two Horse Brand* was among the most successful of the enterprises, and displayed the image of two strong animals unable to tear the product apart (Psota 2002:118). Unlike most of the other buttons in this collection, these items were mass produced by a highly automated process, requiring that the button be secured to the garment at the factory. The consumers to whom these logos' assurances were addressed were often anonymous members of large work crews performing strenuous jobs for low pay. These same individuals, however, became progressively more empowered to choose among competing shopping options, prompting manufacturers to strive for a sense of affiliation with their customers. One collector reads this subliminal message into the overall buttons' trademarks: "I, the maker of this garment am a fine fellow and you, the wearer are a fine fellow too" (Adams and Albert 1965:2). These logos express an advertising strategy of gentle persuasion, intended to conform to the wearer's self image. This message contrasts with that of the appearance-touting back marks on the gilded trade buttons. The target of their advertising was the retailing fur trader, who used the product to satisfy an induced demand among Native peoples. The faces of the military buttons present a distinctly different message of overt coercion, directed at anyone resisting government authority.

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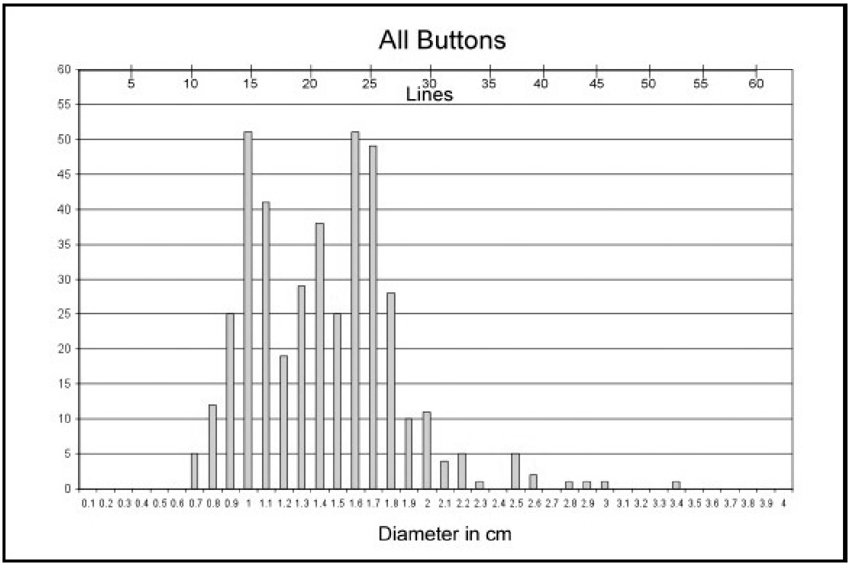

Figure 2.11: Size distribution of all buttons.

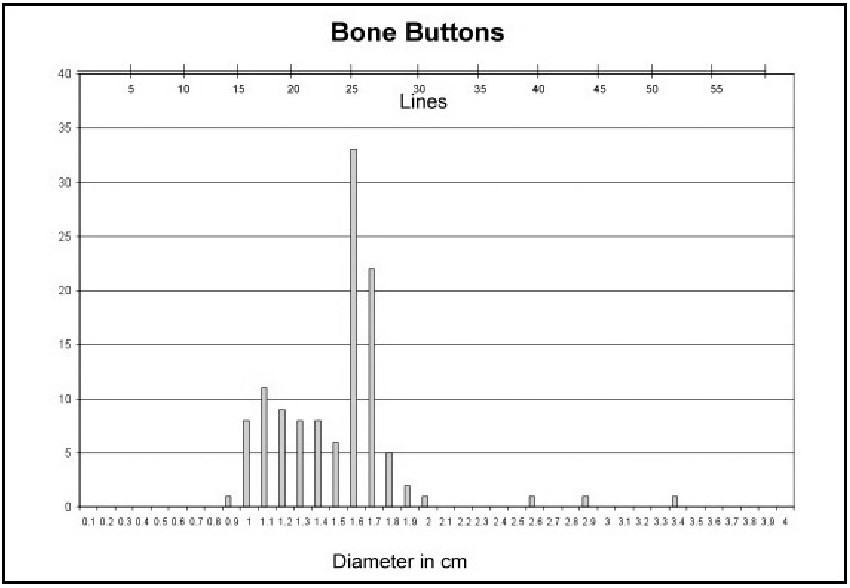

Figure 2.12: Size distribution of bone buttons.

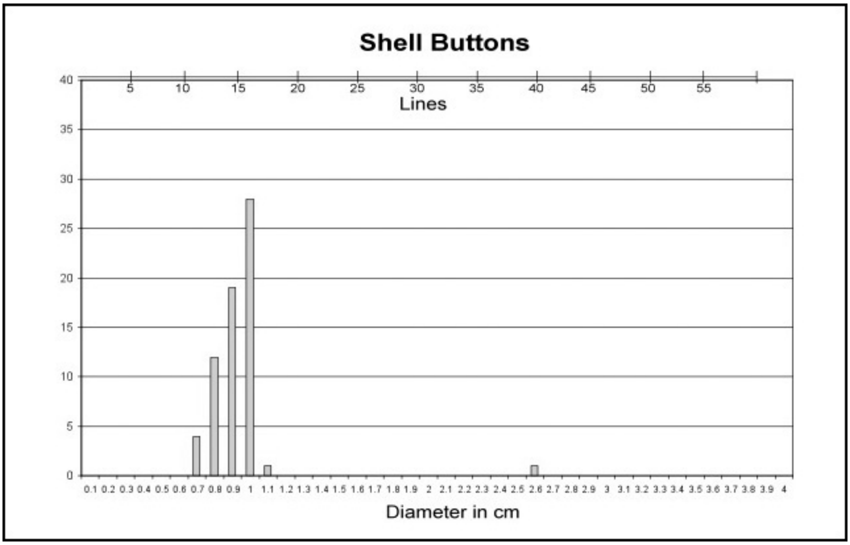

Figure 2.13: Size distribution of shell buttons.

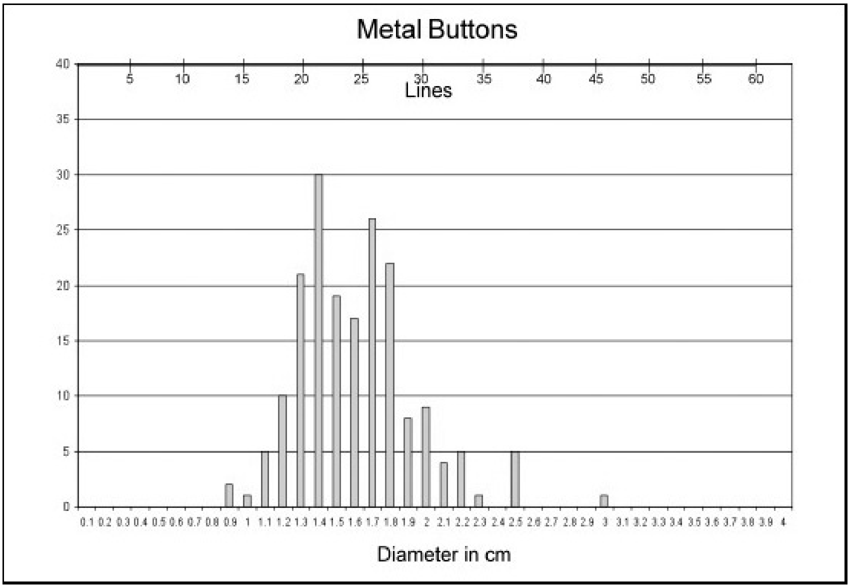

Figure 2.14: Size distribution of metal buttons.

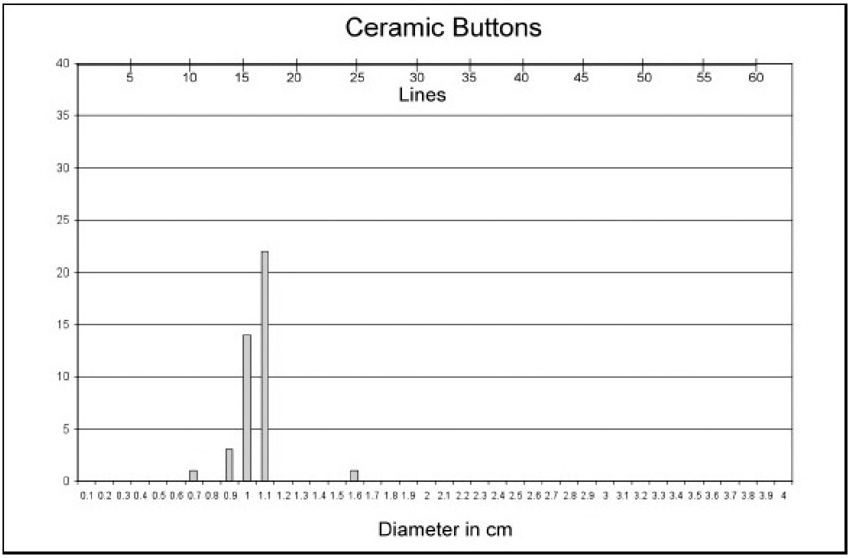

Figure 2.15: Size distribution of ceramic buttons.

Table 2.8: Fort Pierre Chouteau button measurements.

Cat. No.	Class	Provenience			Diam.	Wt.	*Terminus Post Quem* Date	Remarks
		X	Y	Z				
c01-73-940	1a1	567	479	10–20	1.51	0.50	–	
a97-0066-253	1a2	549	552	10–20	1.72	0.70	–	Well center broken
a99-70-1542	1a2	563	481	30–40	0.99	0.10	–	
b01-73-1181	1a2	570	480	20–30	1.08	0.30	–	
a99-70-1145	1a2	570	484	30–40	1.64	0.70	–	
c00-90-219	1a2	503	490	10–20	0.96	0.20	–	
f00-90-219	1a2	503	490	10–20	1.63	1.00	–	
b99-70-1769	1a2	563	481	20–30	1.49	0.50	–	
b01-73-2392	1a2	568	452	20–30	1.05	0.40	–	
b01-73-940	1a2	567	479	10–20	1.49	0.30	–	
l81-113-294	1a2	104	37	20–30	1.62	0.60	–	
m81-113-294	1a2	104	37	20–30	1.58	0.70	–	
n81-113-294	1a2	104	37	20–30	1.58	0.60	–	
a98-0131-683	1a2	–	–	–	1.63	0.30	–	1/2 fragment
b98-0131-1260	1a2	–	–	–	1.51	0.20	–	1/3 fragment, 1/10 fragment
a99-70-1355	1a2	–	–	10–20	1.06	0.30	–	
a80-303-725	1a2	100	34	0–10	1.59	0.80	–	
b80-303-234	1a2	100	38	0–10	1.77	0.90	–	
a99-70-646	1a3a	566	484	30–40	1.20	0.30	–	
a99-70-795	1a3a	571	471	10–20	1.64	0.90	–	
c00-90-006	1a3a	504	490	0–10	1.67	0.80	–	
a01-73-676	1a3a	569	481	10–20	1.58	0.50	–	
a99-70-1804	1a3a	565	482	20–30	1.70	0.90	–	
a01-73-722	1a3a	561	481	20–30	1.60	0.30	–	1/2 fragment
a01-73-2441	1a3a	567	487	40–50	1.63	0.50	–	
a97-0066-230	1a3a	509	444	30–40	1.67	0.40	–	1/2 fragment
a00-90-258	1a3a	496	490	10–20	1.39	0.10	–	1/2 fragment
a01-73-2963	1a3a	568	477	30–40	1.12	0.30	–	

Table 2.8: continued

Cat. No.	Class	Provenience			Diam.	Wt.	*Terminus Post Quem* Date	Remarks
		X	Y	Z				
a01-73-1017	1a3a	572	482	20–30	1.40	0.50	–	
b01-73-1017	1a3a	572	482	20–30	1.09	0.20	–	
a01-73-746	1a3a	571	480	10–20	1.68	0.90	–	Horn?
a99-70-1769	1a3a	563	481	20–30	1.70	0.70	–	3/4 fragment
a00-90-146	1a3a	504	490	10–20	1.59	0.60	–	
a99-70-646	1a3a	566	484	30–40	1.20	0.30	–	2/3 fragment
a98-0131-534	1a3a	–	–	–	1.09	0.20	–	
a80-303-251	1a3a	100	38	10–20	1.72	1.00	–	Molded Horn?
a80-303-11	1a3a	100	37	10–20	1.23	0.40	–	
a80-303-91	1a3a	100	40	20–30	1.83	0.90	–	2 fragments
a81-113-279	1a3a	105	37	20–30	1.68	0.80	–	
a81-113-176	1a3a	–	–	10–20	1.61	0.80	–	
a00-90-1292	1a3b	505	490	20–30	1.55	0.40	–	1/2 fragment
a99-70-1064	1a3b	561	481	20–30	1.31	0.70	–	
a01-73-826	1a4	567	481	10–20	1.59	0.70	–	
a01-73-573	1a4	570	460	0–10	1.68	0.70	–	
a01-73-119	1a4	569	480	30–40	1.13	0.30	–	
a00-90-201	1a4	502	490	10–20	1.06	0.20	–	
a01-73-940	1a4	567	479	10–20	1.62	0.90	–	
b81-113-287	1a4	104	37	10–20	1.71	0.90	–	
a01-73-900	1a5	567	483	20–30	2.86	3.50	–	
a99-70-535	1a5	565	484	30–40	1.60	0.70	–	
b01-73-1444	1a5	569	483	20–30	1.58	0.40	–	2/3 fragment
a01-73-2392	1a5	568	452	20–30	1.61	0.60	–	Molded horn?
b00-90-146	1a5	504	490	10–20	1.59	0.30	–	1/2 fragment
a01-73-696	1b1	569	479	0–10	1.02	0.20	–	2 fragments
a99-70-48	1b1	567	484	0–10	1.36	0.20	–	2/3 fragment
a01-73-1151	1b1	567	481	10–20	1.73	0.80	–	

Table 2.8: continued

Cat. No.	Class	Provenience			Diam.	Wt.	*Terminus Post Quem* Date	Remarks
		X	Y	Z				
c99-70-1237	1b1	565	482	10–20	1.71	0.60	–	Horn?
a01-73-1656	1b1	567	483	0–10	1.38	0.50	–	
b01-73-1656	1b1	567	483	0–10	1.10	0.20	–	
a00-90-593	1b1	502	490	20–30	1.78	0.70	–	2/3 fragment
a00-90-1634	1b1	504	465	0	1.20	0.20	–	
b00-90-1634	1b1	504	465	0	1.22	0.30	–	
a99-70-1597	1b1	565	483	0–10	1.34	0.30	–	
g00-90-219	1b1	503	490	10–20	1.09	0.30	–	
f80-303-330	1b1	95	36	0–10	1.80	0.80	–	1/4 fragment
k81-113-294	1b1	104	37	20–30	1.74	0.90	–	
c81-113-112	1b1	105	37	0–10	1.63	0.80	–	
a98-0131-456	1b1	–	–	–	1.31	0.30	–	
a80-303-29	1b1	100	39	0–10	1.38	0.50	–	
b80-303-29	1b1	100	39	0–10	1.70	0.60	–	2 fragments
a98-0131-355	1b1	–	–	–	1.73	0.80	–	
a98-0131-972	1b1	–	–	–	1.75	0.80	–	
b80-303-251	1b1	100	38	10–20	1.36	0.40	–	
c80-303-251	1b1	100	38	10–20	1.33	0.40	–	
d80-303-251	1b1	100	38	10–20	1.32	0.40	–	
e80-303-251	1b1	100	38	10–20	1.23	0.40	–	
f80-303-251	1b1	100	38	10–20	1.37	0.30	–	Horn? 2 fragments
a81-113-250	1b1	–	–	–	1.29	0.40	–	
c81-113-287	1b1	104	37	10–20	1.29	0.40	–	
c80-303-226	1b1	94	36	20–30	1.38	0.30	–	1/2 fragment
a80-303-501	1b1	100	35	30–40	1.58	0.40	–	2/3 fragment
a98-0131-1307	1b1	–	–	–	1.27	0.30	–	
a00-90-050	1b2	503	490	0–10	1.64	0.80	–	
e80-303-330	1b2	95	36	0–10	1.06	0.20	–	

Table 2.8: continued

Cat. No.	Class	Provenience			Diam.	Wt.	*Terminus Post Quem* Date	Remarks
		X	Y	Z				
j81-113-294	1b2	104	37	20–30	1.68	0.70	–	
a98-0131-1072	1b2	–	–	–	1.69	0.90	–	
b80-303-226	1b2	94	36	20–30	1.10	0.30	–	
a99-70-1191	1b3	569	484	20–30	1.50	0.60	–	
a80-303-825	1b4a	–	–	0	1.61	0.30	–	
a80-303-226	1b4a	94	36	20–30	1.58	0.60	–	1/2 fragment
a81-113-541	1b4a	–	–	–	1.58	0.80	–	2 fragments
a99-70-91	1b4a	565	482	30–40	1.59	0.80	–	
b01-73-490	1b4a	573	459	0–10	1.95	0.80	–	2/3 fragment
a97-0066-262	1b4a	509	444	40–50	1.88	1.30	–	
b01-73-2963	1b4a	568	477	30–40	1.50	0.30	–	1/2 fragment
a01-73-1054	1b4a	569	483	30–40	1.23	0.40	–	
b01-73-1054	1b4a	569	483	30–40	1.04	0.20	–	
a01-73-765	1b4a	567	483	10–20	1.66	0.70	–	
a99-70-309	1b4a	565	484	10–20	1.57	0.60	–	
b01-73-608	1b4a	571	481	20–30	1.64	0.60	–	
c01-73-608	1b4a	571	481	20–30	1.57	0.60	–	
a01-73-829	1b4b	569	452	10–20	3.40	2.20	–	1/2 fragment, largest bone button
a00-90-277	1b4b	498	490	10–20	1.72	0.70	–	
e00-90-219	1b4b	503	490	10–20	1.71	0.80	–	
a01-73-941	1b4b	567	479	0–10	1.68	0.80	–	2 fragments
a99-70-1053	1b4b	565	479	20–30	1.21	0.30	–	Horn?
a01-73-1336	1b4b	568	482	30–40	1.03	0.20	–	
b01-73-1072	1b4b	567	479	20–30	1.03	0.20	–	
i81-113-294	1b4b	104	37	20–30	1.56	0.50	–	
a98-0131-1260	1b4b	–	–	–	1.63	0.40	–	1/2 fragment
a80-303-234	1b4b	100	38	0–10	1.93	1.20	–	

Table 2.8: continued

Cat. No.	Class	Provenience			Diam.	Wt.	*Terminus Post Quem* Date	Remarks
		X	Y	Z				
a01-73-843	1b5	571	481	10–20	2.59	3.10	–	3 concentric rounded ridges on rim
a99-70-1387	1c	561	451	10–20	1.60	0.10	–	1/3 fragment
a98-0131-1652	1c	570	514	20–30	1.20	0.10	–	1/2 fragment
b00-90-1942	1c	503	490	10–20	1.68	0.60	–	
b99-70-1191	1c	569	484	20–30	1.05	0.30	–	
c01-73-1072	1c	567	479	20–30	0.93	0.20	–	
b01-73-119	2a1	569	480	30–40	0.99	0.20	–	
g80-303-226	2a1	94	36	20–30	0.98	0.30	–	
b00-90-913	2a2	501	490	40–50	0.83	0.20	–	
b00-90-1828	2a2	503	490	10–20	0.69	0.10	–	
b01-73-1151	2a2	567	481	10–20	0.87	0.10	–	
a10-73-46	2a2	572	451	10–20	0.86	0.10	–	
c01-73-1306	2a2	567	478	20–30	0.88	0.20	–	
a01-73-576	2a2	527	452	10–20	0.85	0.10	–	Well center broken
a01-73-793	2a2	567	481	0–10	0.98	0.30	–	
a97-0066-1026	2a2	573	511	0–10	0.92	0.10	–	
c99-701804	2a2	565	482	20–30	0.74	0.10	–	
c00-90-1942	2a2	503	490	20–30	0.96	0.30	–	
d00-90-1942	2a2	503	490	10–20	0.97	0.30	–	
a99-70-442	2a2	566	484	20–30	0.98	0.30	–	
b99-70-442	2a2	566	484	20–30	0.88	0.10	–	
a01-73-1072	2a2	567	479	20–30	0.98	0.30	–	
a01-73-608	2a2	571	481	0–10	0.94	0.20	–	
a99-70-646	2a2	566	484	30–40	0.98	0.40	–	
a01-73-2793	2a2	568	477	30–40	0.89	0.20	–	
a01-73-2823	2a2	568	477	10–20	0.86	0.10	–	Well center broken
a98-0131-190	2a2	–	–	–	0.94	0.20	–	

Table 2.8: continued

Cat. No.	Class	Provenience			Diam.	Wt.	*Terminus Post Quem* Date	Remarks
		X	Y	Z				
b80-303-485	2a2	100	35	10–20	0.76	0.10	–	
a80-303-365	2a2	94	25	0–10	0.96	0.20	–	
a80-303-542	2a2	100	33	10–20	0.98	0.20	–	
b80-303-542	2a2	100	33	10–20	0.83	0.10	–	
c80-303-740	2a2	91	36	0–10	0.89	0.20	–	
b81-113-320	2a2	104	37	20–30	0.85	0.20	–	
c80-303-234	2a2	100	38	0–10	0.80	0.10	–	
b81-113-279	2a2	105	37	20–30	0.73	0.10	–	
a00-90-2027	2a3a1	506	465	20–30	0.84	0.10	–	
a00-90-1709	2a3a2	506	444	30–40	0.94	0.10	–	
d80-303-468	2a3a2	100	35	0–10	0.74	0.10	–	
b80-303-501	2a3b1	100	35	30–40	0.93	0.40	–	
b00-90-678	2a3b1	506	465	0–10	0.96	0.30	–	
c00-90-1433	2a3b1	509	465	30–40	0.98	0.20	–	
d00-90-1433	2a3b1	509	465	30–40	0.98	0.20	–	
f01-73-1486	2a3b1	567	478	30–40	0.99	0.40	–	
c00-90-146	2a3b1	504	490	10–20	1.02	0.30	–	
b80-303-740	2a3b1	91	36	0–10	0.81	0.20	–	
a00-90-1412	2a3b2	509	465	20–30	0.97	0.20	–	
d00-90-146	2a3b2	504	490	10–20	1.01	0.20	–	Well center broken
a80-303-615	2a3b2	100	39	20–30	0.96	0.20	–	
a00-90-486	2a3b3	500	465	20–30	0.82	0.10	–	
a98-0131-1271	2a3b3	–	–	–	0.95	0.10	–	
d01-73-1410	2a3c	568	480	20–30	0.83	0.20	–	
a98-131-1633	2a3c	565	514	20–30	0.95	0.20	–	
b80-303-294	2a3c	100	38	30–40	0.86	0.10	–	
d81-113-112	2a3c	105	37	0–10	0.91	0.10	–	
a00-90-1828	2a3d	503	490	10–20	0.99	0.30	–	

Table 2.8: continued

Cat. No.	Class	Provenience			Diam.	Wt.	*Terminus Post Quem* Date	Remarks
		X	Y	Z				
c00-90-1828	2a3d	503	490	10–20	1.00	0.40	–	
a99-70-1414	2a3d	562	481	10–20	0.93	1.00	–	$^{1}/_{2}$ fragment
e00-90-1942	2a3d	503	490	10–20	0.91	0.20	–	
b01-73-746	2a3d	571	481	10–20	0.96	0.20	–	$^{2}/_{3}$ fragment
d01-73-940	2a3d	567	479	10–20	0.82	0.10	–	
a01-73-714	2a3d	569	456	10–20	0.98	0.20	–	
e80-303-468	2a3d	100	35	0–10	0.84	0.10	–	
a80-303-282	2a3d	100	38	30–40	2.56	3.50	–	Dark iridescent face, concentric incised circles
b00-90-219	2a3d	503	490	10–20	1.00	0.20	–	
b99-70-349	2a4	565	484	20–30	1.12	0.30	–	
a00—1196	2b1	506	465	30–40	0.98	0.20	–	
e01-73-940	2b1	567	479	10–20	0.82	0.20	–	
b80-303-11	2b1	100	37	10–20	0.82	0.10	–	
a00-90-1161	2b2	499	465	20–30	0.98	0.30	–	
a00-90-1433	2c	509	465	30–40	1.01	0.40	–	
b00-90-1433	2c	509	465	30–40	0.99	0.20	–	
a01-73-2532	3a1	569	476	20–30	1.60	1.10	–	Circle of dots around well
a01-73-2628	3a1	569	457	0–10	1.39	0.60	–	White metal, offset well
a00-90-1786	3a1	501	465	30–40	1.64	1.10	–	Japanned brass, circle of dots around offset well
b00-90-1786	3a1	501	465	30–40	1.64	1.00	–	Japanned brass, circle of dots around offset well
c00-90-1786	3a1	501	465	30–40	1.36	0.70	–	Japanned brass, circle of dots around offset well
d00-90-1786	3a1	501	465	30–40	1.78	2.80	–	White metal
d00-90-1828	3a1	503	490	10–20	1.39	1.00	–	“.J.BOULANGER/MONTREAL”
g00-90-1828	3a1	503	490	10–20	1.34	1.00	–	Brass, offset well

Table 2.8: continued

Cat. No.	Class	Provenience X	Provenience Y	Provenience Z	Diam.	Wt.	*Terminus Post Quem* Date	Remarks
a99-70-113	3a1	566	484	10–20	1.40	0.70	–	
a99-70-349	3a1	565	484	20–30	1.29	1.20	–	
a01-73-1586	3a1	571	454	0–10	1.28	1.50	–	Cast white metal
a01-73-989	3a1	573	479	10–20	1.52	0.30	–	Brass, 3 fragments, offset well
d01-73-1486	3a1	567	478	30–40	1.23	0.50	1830	"SJ HOLMES&CO/EXTRA"
a01-73-508	3a1	569	481	0–10	1.57	0.55	–	Brass, offset well
a01-73-2100	3a1	568	482	0–10	1.30	1.40	–	Cast white metal
a01-73-825	3a1	568	482	10–20	1.82	2.70	–	White metal
a00-90–7	3a1	510	444	30–40	1.75	2.70	–	White metal
c01-73-948	3a1	567	479	0–10	1.84	3.20	–	White metal
c01-73-2124	3a1	568	480	10–20	1.31	0.70	–	Brass, offset well
a01-73-1602	3a1	568	484	0–10	1.78	2.80	–	White metal
b01-73-1234	3a1	567	478	10–20	1.63	1.00	–	Brass, circle of dots around offset well
a01-73-490	3a1	573	459	0–10	1.44	1.00	–	White metal
b99-70-1597	3a1	565	483	0–10	1.26	1.40	–	White metal
a01-73-2766	3a1	568	477	0–10	1.56	0.70	1845	"HOLMES PRITCHARD&CO." bm
a00-90-2046	3a1	501	465	40–50	1.38	0.70	–	Japanned brass, circle of dots around offset well
a98-0131-825	3a1	–	–	–	1.33	1.30	–	White metal
a98-0131-824	3a1	–	–	–	1.77	2.60	–	Cast white metal
a98-0131-844	3a1	–	–	–	1.26	1.30	–	White metal
a80-303-337	3a1	95	36	10–20	1.63	2.00	–	Braded circle in groove; "WARRANTED NOT TO CUT." bm
b80-303-337	3a1	95	36	10–20	1.71	1.70	–	Iron, offset well
b80-303-468	3a1	100	35	0–10	1.35	0.80	–	Brass, circle of dots around offset well

Table 2.8: continued

Cat. No.	Class	Provenience			Diam.	Wt.	*Terminus Post Quem* Date	Remarks
		X	Y	Z				
a80-030-390	3a1	95	33	10–20	1.57	0.80	–	Brass, 0ffset well, 2 impressed circles on back
b80-303-330	3a1	95	36	0–10	1.65	1.00	–	Brass, circle of dots around offset well
h80-303-55	3a1	49	12	40–50	1.31	1.00	–	Cast white metal
i80-303-55	3a1	49	12	40–50	1.27	1.00	–	Cast white metal
a80-303-308	3a1	100	37	0–10	1.53	0.50	–	Brass, offset well
b80-303-615	3a1	100	39	20–30	1.95	3.20	–	Cast white metal
a80-303-276	3a1	100	38	20–30	1.38	0.80	–	White metal, circle of dots around offset well
a80-303-740	3a1	91	36	0–10	1.66	1.90	–	White metal, offset well
b81-113-579	3a1	–	–	-0.2	1.60	2.70	–	Cast white metal
a81-113-320	3a1	104	37	20–30	1.38	0.80	–	Japanned brass, circle of dots around offset well
d81-113-294	3a1	104	37	20–30	1.39	1.50	–	"*BARBARIN&HILL."; no bm
a98-0131-837	3a1	–	–	–	1.78	2.70	–	Cast white metal
a98-0131-461	3a1	–	–	–	1.46	0.90	–	White metal, offset well
g80-303-251	3a1	100	38	10–20	1.58	0.60	–	". . . .EXTRA./QUALITY" bm
h80-303-251	3a1	100	38	10–20	1.57	0.80	–	Brass, offset well
b80-303-725	3a1	100	34	0–10	1.28	1.50	–	Cast white metal
a81-113-287	3a1	104	37	10–20	1.36	0.60	–	White metal, offset well
a01-73-738	3a2a	572	482	10–20	2.00	2.30	–	
b99-70-1237	3a2a	565	482	10–20	1.78	2.00	1810	
f00-90-1828	3a2b	503	490	10–20	1.19	1.60	1820	"*ORANGE/COLOUR*" bm
a99-70-130	3a2b	567	484	10–20	1.20	1.40	1852	".W STANLEY/LONDON." bm
a99-70-930	3a2b	565	483	30–40	1.12	1.30	1852	".Wm. STANLEY/LONDON." bm

Table 2.8: continued

Cat. No.	Class	Provenience			Diam.	Wt.	*Terminus Post Quem* Date	Remarks
		X	Y	Z				
a01-73-1265	3a2b	569	481	20–30	2.23	2.60	1820	".*.*.*.BEST/COLOUR.*.*.*." bm
a01-73-2124	3a2b	568	480	10–20	2.48	6.80	1820	"'+'WARRANTED/RICH ORANGE'+" bm
a99-70-1237	3a2b	565	482	10–20	1.36	2.00	1820	".DOUBLE GILT" bm
a01-73-2918	3a2b	568	474	30–40	1.24	1.40	1852	"Wm STANLEY/LONDON" bm
c80-303-55	3a2b	49	12	40–50	1.86	4.00	1820	".EXTRA FINE/STANDARD" bm
e80-303-11	3a2b	100	37	10–20	1.73	3.70	1820	"+WARRANTED/ORANGE+" bm
b81-113-250	3a2b	–	–	–	1.45	2.20	1820	"T ILT" (TREBLE GILT?) bm
a99-70-420	3a2b	571	469	0–10	2.12	5.20	1820	".*.FINE GOLD/SURFACE.*." bm
a01-73-546	3a2b	572	458	10–20	1.95	4.50	1820	"TREBLE GILT/STANDARD.COLOUR." bm
b99-70-535	3a2b	565	484	30–40	2.45	7.80	1820	"RICH ORANGE COLOUR", laurel branches bm
c99-70-535	3a2b	565	484	30–40	1.85	3.40	1820	"IMPERIAL STANDARD" bm
b00-090-1332	3a2c	508	409	20–30	1.14	1.20	–	Basketweave face, gilt
a99-70-1716	3a2c	564	481	30–40	2.00	4.40	1821	Infantry, asymetrical eagle; ".WATE" bm, split anvil seam
b01-73-2124	3a2c	568	480	10–20	1.51	2.30	1821	Artillery; ".*.*.*.*.*.*.*.*" between 2 circles bm
a98-0131-1081	3a2c	–	–	–	1.15	0.90	1830	6-pointed star, 2 short radial line circles; no bm
a81-113-251	3a2c	–	–	–	1.16	0.80	1830	Stylized 6-petal flower, gilt

Table 2.8: continued

Cat. No.	Class	Provenience			Diam.	Wt.	*Terminus Post Quem* Date	Remarks
		X	Y	Z				
f80-303-11	3a2c	100	37	10–20	2.16	3.80	1814	Standing Eagle on cannon; “.*.IMPERIAL/STANDARD.*.” bm
b99-70-1149	3a3	570	484	30–40	1.94	3.10	1810	Cast white metal
e80-303-55	3a4	49	12	40–50	1.71	1.00	1890	Stamped brass, crosshatch pattern
a98-0131-1432	3a4	–	–	–	1.71	1.10	1890	Stamped brass, crosshatch pattern
a01-73-1989	3b1a	575	454	30–40	1.74	1.50	–	
a00-90-913	3b1a	501	490	40–50	1.91	1.80	–	
a00-90-1818	3b1a	499	490	20–30	1.87	2.80	–	Face
a00-90-1769	3b1a	503	490	20–30	1.71	2.20	–	
a00-90-678	3b1a	506	465	0–10	1.72	1.50	–	
e00-90-1828	3b1a	503	490	10–20	1.43	0.60	–	Face, wood filler
a99-70-1030	3b1a	568	484	20–30	1.86	2.00	–	
a99-70-1009	3b1a	565	483	10–20	1.42	0.90	–	Face, wood filler
a01-73-913	3b1a	567	483	20–30	1.84	1.20	–	Face, wood filler
a01-73-1178	3b1a	570	488	20–30	1.84	1.00	–	Face, wood filler
c01-73-1486	3b1a	567	478	30–40	1.37	0.80	–	
a01-73-1410	3b1a	568	480	20–30	2.02	3.30	–	
b01-73-1410	3b1a	568	480	20–30	1.75	1.10	–	Face
a01-73-765	3b1a	567	483	10–20	1.81	1.40	–	Face
d01-73-2124	3b1a	568	480	10–20	1.75	1.30	–	Face, wood filler
a97-0066-1237	3b1a	540	531	40–50	1.81	2.00	–	
a99-70-1211	3b1a	567	484	30–40	1.40	1.30	–	Face
b01-73-1336	3b1a	568	482	30–40	1.37	1.20	–	
b99-70-646	3b1a	566	484	30–40	1.34	0.80	–	Face
a00-90-2024	3b1a	506	465	0–10	1.40	0.60	–	Iron face, wood filler
a01-73-1633	3b1a	575	454	0–10	1.76	1.60	–	
d80-303-330	3b1a	95	36	0–10	1.72	1.00	–	

Table 2.8: continued

Cat. No.	Class	Provenience			Diam.	Wt.	*Terminus Post Quem* Date	Remarks
		X	Y	Z				
b80-303-194	3b1a	94	36	0–10	1.75	1.10	–	Face, wood filler
b80-303-701	3b1a	95	35	0–10	1.69	2.00	–	
a80-303-294	3b1a	100	38	30–40	1.88	1.40	–	Face, wood filler
a81-113-201	3b1a	112	34	0–10	1.70	1.10	–	Face, wood filler
a81-113-228	3b1a	104	37	0–10	1.45	1.00	–	
e81-113-294	3b1a	104	37	20–30	1.66	1.20	–	Face, wood filler
f81-113-294	3b1a	104	37	20–30	1.77	1.30	–	Face, wood filler
a81-113-112	3b1a	105	37	0–10	1.83	1.20	–	Face, wood filler
b81-113-112	3b1a	105	37	0–10	1.79	1.20	–	Face, wood filler
a98-0131-624	3b1a	–	–	–	1.38	0.60	–	Face, wood filler
a80-303-105	3b1a	100	40	30–40	1.78	1.70	–	
d80-303-226	3b1a	94	36	20–30	1.70	1.20	–	Face, wood filler
e80-303-226	3b1a	94	36	20–30	1.36	0.60	–	Face, wood filler
f80-303-55	3b1b	49	12	40–50	1.70	1.00	–	Brass face, crosshatch pattern, ferrous back
g80-303-55	3b1b	49	12	40–50	1.39	1.00	–	Brass face, crosshatch pattern, ferrous back
h81-113-294	3b1b	104	37	20–30	1.73	0.90	–	Whitemetal face
a01-73-1181	3b2b1	570	480	20–30	1.18	0.80	–	High-domed brass face, intricate cross design
a00-90-006	3b2b1	504	490	0–10	1.70	1.80	–	Crosshatch pattern 0n face
b00-90-006	3b2b1	504	490	0–10	1.37	0.60	–	Gilded brass, intricate impressed 3-arm design on face
a80-303-468	3b2b1	100	35	0–10	1.26	1.50	1830	High-domed brass face, ornate floral & circle design
a00-90-1730	3b2b2	495	490	30–40	1.45	1.30	1840	General Service; “.SCOVILLS&Co./EXTRA.”

Table 2.8: continued

Cat. No.	Class	Provenience			Diam.	Wt.	*Terminus Post Quem* Date	Remarks
		X	Y	Z				
a99-70-1739	3b2b2	500	527	30–40	1.48	1.40	1840	Infantry; “.SCOVILLS&Co./EXTRA.”
a00-90-437	3b2b2	503	465	30–40	1.54	1.50	1840	General Service; “.SCOVILLS&Co./EXTRA.”
a99-70-1746	3b2b2	563	481	20–30	1.37	2.00	1839	Standing Eagle, blank shield; no bm
a01-73-1426	3b2b2	574	454	0–10	1.47	1.40	1840	Infantry; “.SCOVILLS&Co./EXTRA.”
b01-73-765	3b2b2	567	483	10–20	1.33	1.00	1840	Artillery; no bm
a01-73-1902	3b2b2	572	480	0–10	1.46	1.50	1840	Infantry; “.SCOVILLS&Co./EXTRA.”
a01-73-1234	3b2b2	567	478	10–20	1.38	2.00	1839	Standing Eagle, blank shield; no bm
a80-303-500	3b2b2	100	35	20–30	1.45	1.50	1840	General Service; “.SCOVILLS&Co./EXTRA.”
a98-0131-827	3b2b2	–	–	–	1.48	0.80	1840	Infantry; “.SCOVILLS&Co./EXTRA.”
a98-0131-829	3b2b2	–	–	–	1.48	1.50	1840	Infantry; “.SCOVILLS&Co./EXTRA.”
a80-303-330	3b2b2	95	36	0–10	1.31	0.80	1840	Artillery, eagle faces left; no bm
d80-303-55	3b2b2	49	12	40–50	1.95	3.00	1851	Infantry; “.SCOVILLS&Co/SUPERFINE..” bm
c81-113-294	3b2b2	104	37	20–30	1.47	1.70	1840	Dragoons; “SCOVILLS&CO***” bm
a98-0131-856	3b2b2	–	–	–	1.58	1.80	1845	Infantry; “.H.SMITH&Co/NEW YORK”
a98-0131-855	3b2b2	–	–	–	2.01	3.10	1840	Infantry; no bm

Table 2.8: continued

Cat. No.	Class	Provenience			Diam.	Wt.	*Terminus Post Quem* Date	Remarks
		X	Y	Z				
a98.0131-849	3b2b2	–	–	–	1.40	2.00	1839	Standing Eagle, blank shield; no bm
b81-113-446	3b2b2	–	–	-0.2	1.38	2.10	1839	Standing Eagle, blank shield; no bm
a00-90-790	3b2c	494	490	0–10	1.28	1.50	–	Lead face, fabric filler
a99-70-370	3b2c	539	535	10–20	1.48	3.40	–	
a01-73–	3b2c	572	454	0–10	2.45	1.90	–	Brass back
a01-73-963	3b2c	567	479	10–20	0.89	0.10	–	Brass face
c01-73-1410	3b2c	568	480	20–30	0.86	0.10	–	Iron face
a97-0066-903	3b2c	572	521	0–10	1.29	1.50	–	Lead face
c99-70-646	3b2c	566	484	30–40	1.12	0.30	–	Iron back
a98-0131-740	3b2c	–	–	–	2.31	1.80	–	Iron face
a81-113-518	3b2c	–	–	–	1.73	1.00	–	Iron back
a81-113-704	3b2c	–	–	–	2.12	1.20	–	Iron back, wood core
g81-113-294	3b2c	104	37	20–30	1.77	1.60	–	
a81-113-163	3b2c	–	–	-0.05	1.96	1.50	–	White metal face
i80-303-251	3b2c	100	38	10–20	1.62	1.10	–	Brass back
j80-303-251	3b2c	100	38	10–20	1.32	0.60	–	
a81-113-446	3b2c	–	–	10–20	3.04	6.00	–	
a00-90-601	3b2d	502	490	20–30	1.14	0.40	–	Iron face, fabric filler
a01-23-2566	3b2d	571	454	20–30	1.17	0.30	–	Iron face, fibrous filler
a99-70-840	3b2d	569	469	10–20	1.00	0.70	–	Brass face, fibrous filler
a99-70-1415	3b2d	562	481	10–20	1.28	1.00	–	
a99-70-796	3b2d	571	471	10–20	1.99	3.30	–	
a01-73-973	3b2d	567	479	0–10	1.83	2.40	–	
b01-73-973	3b2d	567	479	0–10	1.12	0.80	–	
a01-73-1486	3b2d	567	478	30–40	2.10	1.90	–	
b01-73-1486	3b2d	567	478	30–40	2.16	1.80	–	

Table 2.8: continued

Cat. No.	Class	Provenience			Diam.	Wt.	*Terminus Post Quem* Date	Remarks
		X	Y	Z				
a01-73-2487	3b2d	569	454	10–20	1.19	0.40	–	Face
a97-0066-246	3b2d	549	554	20–30	1.36	0.70	–	Iron face, fibrous filler
b99-70-1804	3b2d	565	482	20–30	1.43	0.60	–	Iron back
a00-90-1942	3b2d	503	490	10–20	1.92	2.90	–	
a01-73-2838	3b2d	568	477	0–10	1.44	1.60	–	Iron face
a98-0131-1481	3b2d	–	–	–	1.68	0.90	–	
a98-0131-251	3b2d	–	–	–	1.60	1.00	–	Iron Face
a98-0131-768	3b2d	–	–	–	1.29	0.50	–	Iron back
c80-303-468	3b2d	100	35	0–10	1.33	1.30	–	
a81-113-579	3b2d	–	–	-0.2	1.56	1.10	–	
a98-0131-685	3b2d	–	–	–	2.51	4.80	–	
c80-303-11	3b2d	100	37	10–20	1.15	0.50	–	
f80-303-226	3b2d	94	36	20–30	2.17	1.60	–	Iron face
a98-0131-948	3b2d	–	–	–	2.20	2.50	–	Iron back
c80-303-330	3b2d	95	36	0–10	2.08	2.00	–	
d80-303-11	3b2e	100	37	10–20	1.70	1.40	–	Circle of dots around well
a00-090-1332	3b2f	508	409	20–30	1.66	0.70	–	"*GARANT/LMB*" bm
a00-90-219	3b2f	503	490	10–20	1.65	0.70	–	"*GARANT/LMB*" bm
a99-70-544	3b3	541	533	10–20	2.51	5.50	1890	Leather between shank and back
a99-70-851	3b3	541	533	30–40	1.44	1.90	1888	"BUSBY"; no bm
a80-303-815	3b3	49	12	40–50	1.60	2.30	1890	Iron button, rivet shank
b80-303-815	3b3	49	12	40–50	1.58	2.30	1890	Iron button, rivet shank
a81-113-050	3b3	–	–	–	1.71	2.80	1890	"SK & SONS"(?) on iron button face, brass rivet shank
a81-113-323	3b3	116	45	0–10	1.70	2.60	1890	"S SONS"(?) on iron button face, brass rivet shank
b81-113-323	3b3	116	45	0–10	1.67	2.10	1890	"E"(?) on iron button face, brass rivet shank

Table 2.8: continued

Cat. No.	Class	Provenience			Diam.	Wt.	*Terminus Post Quem* Date	Remarks
		X	Y	Z				
c81-113-323	3b3	116	45	0–10	1.72	1.50	1890	Iron button, rivet shank
d81-113-323	3b3	116	45	0–10	1.49	1.80	1890	Iron button, brass rivet shank, tan fabric
e81-113-323	3b3	116	45	0–10	1.48	1.80	1890	Iron button, brass rivet shank, tan fabric
f81-113-323	3b3	116	45	0–10	1.49	1.90	1890	Iron button, brass rivet shank, tan fabric
a01-73-1881	4a1	572	457	10–20	1.09	0.30	1840	Stippled around back holes, tiny knob in well center
a00-90-1157	4a1	494	490	40–50	0.99	0.30	1840	Stippled around back holes
b00-90-1157	4a1	494	490	40–50	0.99	0.30	1840	Stippled around back holes
a99-70-78	4a1	566	484	0–10	1.04	0.40	1840	Stippled around back holes
a99-70-1413	4a1	562	481	10–20	1.09	0.30	1840	Stippled around back holes
a99-70-478	4a1	569	479	10–20	1.11	0.25	1840	Stippled around back holes
b01-73-1178	4a1	570	488	20–30	1.03	0.30	1840	Stippled around back holes
a01-73-1764	4a1	569	481	20–30	1.14	0.50	1840	Stippled around back holes
e01-73-1486	4a1	567	478	30–40	1.02	0.30	1840	Stippled around back holes
a01-73-476	4a1	569	460	10–20	1.13	0.40	1840	Stippled around back holes
a01-73-1306	4a1	567	478	20–30	1.55	1.10	1840	Rectilinear well sides, large knob, stippled back
b01-73-1306	4a1	567	478	20–30	1.11	0.30	1840	Stippled back
a01-73-1823	4a1	571	451	0–10	1.03	0.30	1840	2 fragments
c01-73-119	4a1	569	480	30–40	1.11	0.40	1840	Stippled around back holes, tiny knob in well center
c01-73-1336	4a1	568	482	30–40	0.89	0.10	1840	Stippled around back holes
a01-73-2883	4a1	568	477	20–30	1.12	0.30	1840	$^2/_3$ fragment, stippled around back holes

Table 2.8: continued

Cat. No.	Class	Provenience			Diam.	Wt.	*Terminus Post Quem* Date	Remarks
		X	Y	Z				
a98-0131-369	4a1	–	–	–	1.11	0.40	1840	Stippled around back holes, tiny knob in well center
a98-0131-866	4a1	–	–	–	1.07	0.30	1840	Diffusely stippled surface, tiny black inclusions
a80-303-485	4a1	100	35	10–20	1.04	0.40	1840	Stippled around back holes
a80-303-194	4a1	94	36	0–10	1.11	0.40	1840	Stippled around back holes
a80-303-688	4a1	100	51	0–10	1.12	0.40	1840	Stippled around back holes
b80-303-308	4a1	100	37	0–10	0.85	0.20	1840	Stippled around back holes
a80-303-369	4a1	95	33	0–10	1.13	0.45	1840	Stippled around back holes
b80-303-369	4a1	95	33	0–10	1.13	0.45	1840	Stippled around back holes
a81-113-468	4a1	103	41	10–20	1.08	0.10	1840	1/2 fragment, diffusely stippled surface
k80-303-251	4a1	100	38	10–20	1.11	0.10	1840	1/2 fragment, stippled around back holes
b99-70-1064	4a1	561	481	20–30	1.08	0.30	1840	Stippled around back holes
c80-303-725	4a1	100	34	0–10	1.14	0.50	1840	Stippled around back holes
d80-303-725	4a1	100	34	0–10	0.98	0.30	1840	Stippled around back holes
c80-303-501	4a1	100	35	30–40	1.01	0.30	1840	Diffusely stippled surface
d80-303-234	4a1	100	38	0–10	1.11	0.40	1840	Stippled around back holes
e80-303-234	4a1	100	38	0–10	1.12	0.40	1840	Stippled around back holes
c81-113-279	4a1	105	37	20–30	1.12	0.40	1840	Stippled around back holes, tiny knob in well center
h80-303-226	4a1	94	36	20–30	1.07	0.20	1840	3/4 fragment, stippled around back holes, tiny well center knob
c81-113-446	4a1	–	–	20–30	1.13	0.40	1840	Stippled around back holes
e00-90-1433	4a2a	509	465	30–40	0.92	0.20	1840	“Sawtooth”
a80-303-561	4a2a	100	33	20–30	1.11	0.40	1840	“Sawtooth”
a99-70-1505	4a2b	563	481	10–20	1.07	0.40	1840	“Hobnail”

Table 2.8: continued

Cat. No.	Class	Provenience			Diam.	Wt.	*Terminus Post Quem* Date	Remarks
		X	Y	Z				
b98-0131-369	4a2c	–	–	–	1.10	0.40	1840	1/4 fragment
a98-0131-911	4a2c	–	–	–	0.71	0.01	1840	1/4 fragment
l80-303-55	4a2c	49	12	40–50	1.11	0.40	1840	2/3 fragment, stippled around back holes
b81-113-163	4a2c	–	–	0–10	1.01	0.30	1840	Diffusely stippled back
b01-73-2532	4b	569	476	20–30	0.87	0.20	1840	
d00-90-219	4b	503	490	10–20	0.79	0.10	1840	
d-80-303-501	4b	100	35	30–40	0.89	0.20	1840	Diffusely stippled surface
i80-303-226	4b	94	36	20–30	0.85	0.20	1840	
a01-73-429	4c	573	451	0	1.12	0.40	1840	Groove well, stippled back
b01-73-825	4c	568	482	10–20	1.19	0.60	1840	Groove well, stippled back
b81-113-228	5b	104	37	0–10	1.07	1.30	–	Octagonal slag overlay black glass; swirlback
a81-113-702	5b	–	–	–	2.78	3.10	–	Domed white glass insert; 3-piece brass frame; Victorian Jewel
j80-303-55	6a	49	12	40–50	2.00	1.00	1851	"NOVELTY RUBBER COMPANY" bm
a80-303-765	6a	41	13	10–20	1.76	0.80	1851	Molded crosshatch design on face
a98-0131-1649	6b	565	515	30–40	1.07	0.30	1851	
k80-303-55	6b	49	12	40–50	1.56	1.00	1851	Molded 9 square design on face

Chapter 3

Firearms and Related Artifacts from Fort Pierre Chouteau

Richard A. Fox[1]

with substantial research contributions
by Patrick J. Collison[2]

Reported here are gun parts, cartridge cases, shotshells, bullets, gunflints, primers, lead balls, shot, sprue and two items in an Other category. The artifacts discussed herein represent three major occupation periods at the site—fur post, military fort, and the subsequent ranching period. The assemblage spans three technological eras in firearms history—from flintlock to percussion arms, smooth-bore and rifled, and beyond to arms that chambered self-contained, metallic ammunition.

Specimens reported are from seven years of field work at Fort Pierre Chouteau—beginning in 1980 and ending in 2001. All artifacts are summarized by field year, provenance and State Archaeological Research Center accession number in tables at the end of the report—1980 is summarized in Table 3.8, 1981 in Table 3.9, 1997 (Table 3.10), 1998 (Table 3.11), 1999 (Table 3.12), 2000 (Table 3.13) and the year 2001 in Table 3.14. In the text that follows, many artifacts are identified by a truncated accession number—for example, 99-382 is actually 99-70-382. The tables list the

[1]Department of Anthropology, University of South Dakota
[2]Department of Anthropology, University of South Dakota

full number.

Gun Parts

Gun parts include a flintlock lock (99-382), a frizzen (99-566), a pan (98-1430), both obviously from flintlocks, and a powder measure (01-609). Identifications of two other artifacts are equivocal; they may be pieces broken from firearm sideplates (97-1269, 99-77).

The steel lock (Figure 3.1) is probably from a Belgian trade gun, and it likely dates to the fur period at Fort Pierre Chouteau. The specimen has a pointed tail and two sidescrew holes that Hanson (1973:6–7) describes as typical of Belgian flintlocks made "...for the Chouteaus of St. Louis." Elsewhere Hanson (1982:113) reports Belgian guns were the second most common firearms sold by the Chouteaus, and that Fort Union inventories for 1850 list 40 Belgian guns, new and used.

The lock is virtually identical to that (also steel) on an antique flintlock identified by Lea (n.d.) as manufactured by a Leige (also Liege) gun works of Belgium probably between 1830 and 1840. Lea identified the antique as a Belgian copy of a 1777 French military musket. His specimen, however, does not have a flash guard (an extension of the flash plan).

The inventory's rusted lock is missing the hammer and frizzen, but internal mechanisms remain—main spring, pan, sear, sear spring, tumbler and bridle. The tumbler, bridle, sear, and sear spring rest in the uncocked position (in the Lea antique they are cocked). Rust obscures manufacture year and maker's mark, if present. However, they do not appear on Lea's antique lock either.

The flash pan (Figure 3.2) is made of cast brass (98-1430). It is 1″ long, 1³/4″ wide, and weighs 27.4 g. This specimen's type has not been identified.

Two fragments from what may be firearm sideplates are illustrated in Figure 3.3 with a similar reproduction flintlock sideplate. Caldwell (1982a:22) pictures an English pattern trade rifle that sports a sideplate configuration similar to the one with the center hole. The Fort Pierre Choteau specimens are of plate brass that is 0.104″ thick; there is no engraving on either piece. Both ends of one (99-77) are fractured, one fracture (left in plate) apparently at a bolt hole. The remaining hole is not countersunk on either side; it is 0.247″ in diameter. The second specimen (97-1269), which may be one end of a sideplate, does have a counter sunk hole; hole diameter is 0.2145″. This specimen is fractured at the end opposite the hole.

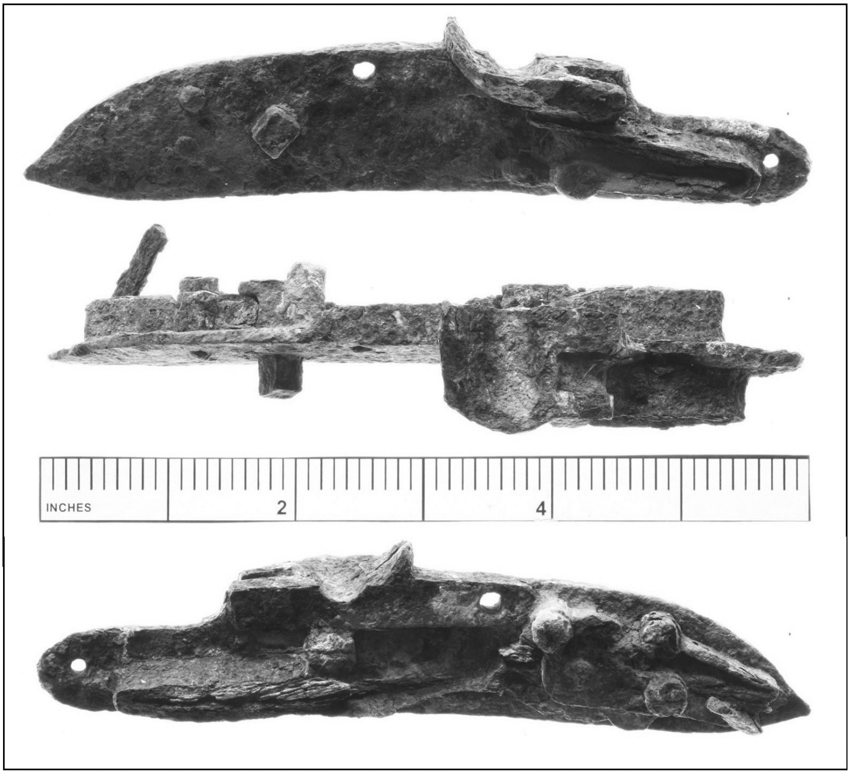

Figure 3.1: Lock (99-382); obverse (above), top view (center) and reverse. Fort Pierre Chouteau.

Two artifacts are currently on museum display and unavailable at the time this report was written. One is a steel frizzen, the other an antler/horn powder measure.

Cartridge Cases

The inventory contains 26 cartridge cases (examples in Figure 3.4). The earliest *terminus post quem* date for these artifacts is 1860, and most are later. Therefore they post-date the fur and military eras at Fort Pierre Chouteau. Ammunition represented by casings ranging from .22 caliber to .50 caliber, or perhaps .56 caliber.

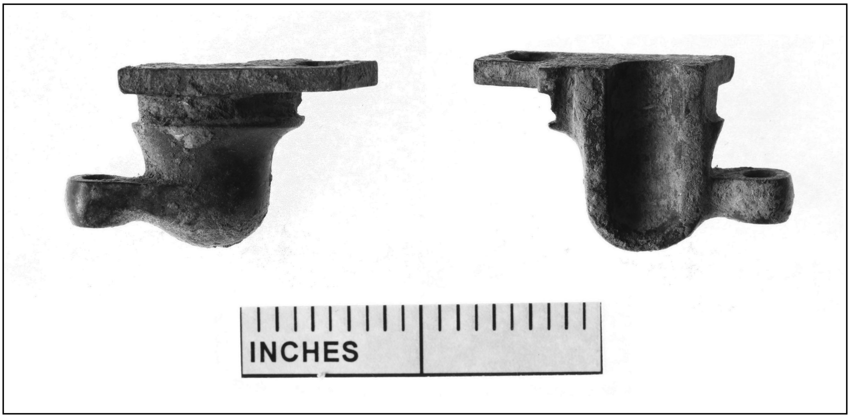

Figure 3.2: Brass flash pan, obverse (left) and reverse. Fort Pierre Chouteau.

.22 Caliber

The assemblage contains at least two types of .22 caliber cartridge cases—.22 Short, and .22 Long/Long Rifle, all rimfire. Caliber .22 Short cartridges, developed in 1857 by Smith and Wesson for their Model No. 1 revolver, are the oldest self-contained metallic ammunition produced (Barnes 1993:368, Kinard 2004:114).

The .22 Short specimens (n = 7) in the assemblage are younger, however. Two of them (98-1486, 99-24) exhibit an impressed "H" headstamp, a mark denoting the Winchester Repeating Arms Co. (White and Munhall 1977:23), which began its corporate life in 1867 (Barber 1987:11).

Another .22 Short (99-16) also dates to after 1867. It exhibits an impressed "U" headstamp. The "U" headstamp has been used from 1867 to date by the Union Metallic Cartridge Co. (1867–1911), the Remington Arms-Union Metallic Cartridge Co. (1911–1927), and the Remington Arms Co., Inc. (1927–present) (White and Munhall 1977:31). The Union Metallic Cartridge Co. began impressing "U" headstamp (replacing the raised "U") in 1885 (Barber 1987:48), dating the Fort Pierre Chouteau specimen to no earlier than that year.

The .22 Short with an impressed "P" (98-550) was manufactured by the Peters Cartridge Co., located near Cincinnati, Ohio (Suydam 1960:167). The Peters company began in 1887, and was purchased by Remington Arms Company in 1934 (Barber 1987:64, 83). Both iterations of the Peters company used this headstamp (White and Munhall 1977:28), which

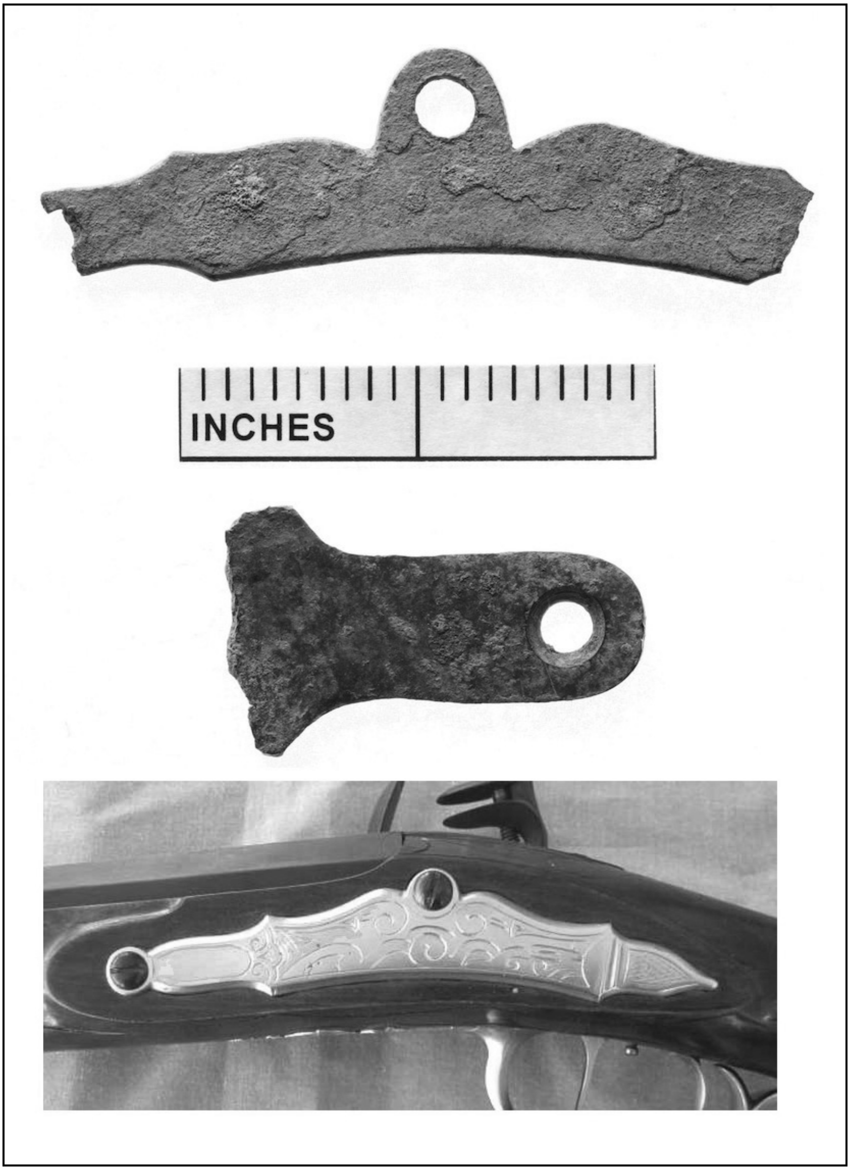

Figure 3.3: Firearm sideplate fragments (top and middle), Fort Pierre Chouteau. Below—sideplate, reproduction flintlock (from www.-whitemuzzleloading.com/archives.htm).

Figure 3.4: Cartridge cases, L to R: top—.30 Short, .32 Smith & Wesson, .44 Evans Short, .38 Short Colt, .45 Colt. Bottom—torn necked case, .50 Remington pistol or .56-56 Spencer, .44-90 Sharps, .50-70 Government, .50-90 Sharps; right of scale—.22 Short, .22 Long. Fort Pierre Chouteau.

was registered as a trademark (#26,139) in 1895 (Barber 1987:64).

Two .22 Short cases (99-204, 01-1903) do not have headstamps. Possibly they are early, but more commonly non-headstamped .22 Shorts are recent (1900s) and are usually attributed to contract purchasers that used house labels (Suydam 1960:48).

One .22 Short (98-924) is headstamped "U HI SPEED" (impressed). "Hi Speed" encircles the rim, and "U" is in the center of the base. The headstamp is shown in Barber (1987:195). This ammunition was made by Remington Arms Co., incorporated in Delaware on May 24, 1920 (Barber 1987:48).

Two of the seven .22 Long/Long Rifle cases in the assemblage are also impressed with "U HI SPEED." One (80-90) is silver in color (nickel-plated brass), and the other is brass (98-905). The brass specimen dates from 1920. The silver case is a bit later. Remington began making cartridge cases in nickel-plated brass (as well as in steel and blackened nickel-plated brass) in 1927, and continues to do so today (Barber 1987:82). So this specimen dates from 1927 to the present.

The Peters Cartridge Co. is also represented in this version of the .22 cartridge case (81-142). As above, this case dates to after 1887, and probably 1895. Two other long rifle cases exhibit the "U" headstamp (98-none, 98-838). Although the "U" headstamp dates from 1867 (see .22 Short), this specimen is younger—the .22 Long came along ca. 1871 and the long rifle cartridge was not introduced until 1887 (Barnes 1993:368).

Another specimen (00-22) is headstamped "SUPER X." Long and long rifle case lengths are the same, which means absent the bullet, the distinction must be made on other criteria, and in this case, Super X is a long rifle ammunition. This headstamp—SUPER in rectangle over an X—is shown in Herskovitz (1978:48, Figure 16). The Western Cartridge Co. (founded 1898) introduced Super X ammunition—still available today—early in the post-World War I years (Winchester 2009). This particular headstamp variety was not identified, but it could be a mark used by Winchester, which Western absorbed in 1931 (Barber 1987:86).

Only one of the .22 Long cases lacks a headstamp (98-1586). Case length is 0.68″, which is slightly longer than a long/long rifle case (ca. 0.60″). Based on length, then, this could be a .22 Stinger (0.694″), which is a very late ammunition dating from 1977 (Barnes 1993:368). Another possibility is an Extra Long dating from about 1880 (Barnes 1993:369), but its case length is three-quarters of an inch (0.75″) (Barnes 2003:505).

Larger Calibers

Cartridges cases in larger calibers are also present. One (97-1027) is an internally primed .30 Short without headstamp. The identification is based on case length and rim diameter for the .30 Short (Barnes 2003:509). This ammunition was introduced in the 1860s, and is found listed in catalogs as late as 1919 (Barnes 2003:441).

A slightly larger caliber is found in an external primed specimen (98-1586), headstamped "U. M. C. 32 S & W," a .32 caliber ammunition made by the Union Metallic Cartridge Co. The Smith and Wesson Model 1 revolver, introduced in 1878 (Barnes 2003:275), was the original weapon to chamber this ammunition (Barnes 2003:275). The Union Metallic Cartridge and Cap Company, Bridgeport, Connecticut, was organized in 1866, and reorganized as the Union Metallic Cartridge Co. (UMC) in 1867 (Barber 1987:36, 38). The UMC Company merged with Remington Arms Company in 1911 (Iverson 1988:119, 120, 147). The reorganized company used the "REMINGTON-UMC" headstamp first, and soon changed to "REM-UMC" (Moos 1968:41), both reflecting the company name—

Remington Arms-Union Metallic Cartridge company. The company name was shortened to Remington Arms in 1921 (White and Munhall 1977:31). So this specimen dates between 1878 and 1911.

A flattened casing (no headstamp, internal prime) may be a .38 caliber handgun ammunition (80-823). As near as can be determined, case length is about 0.75″ and rim diameter is in the 0.5″ to 0.6″ vicinity. These two measurements are very close to the .38 Short Colt and the .38 Smith and Wesson dimensions (Barnes 2003:321, 322), but the base/body junction of the Colt (as illustrated in Barnes 2003:283) is unlike the Fort Pierre Chouteau specimen. It more closely fits the .38 Smith and Wesson. According to Barnes (2003:286), this ammunition, introduced in 1877, is one of the most widely adopted American revolver cartridges.

Two identifiable cases are in .44 caliber. Both lack headstamps. Based on case length and rim diameter (Barnes 2003:166), one is a .44 Evans Short (98-1586). This cartridge was in production between 1875 and the early 1920s (Barnes 2003:144). The internally primed specimen exhibits an extractor tear where the body meets the rim.

The other .44 caliber case (98-840) is a .44-90 Sharps, a necked ammunition. The neck area is missing on this specimen. Identification is based on rim diameter, which conforms with Barnes (2003:166). The internally primed .44-90 Sharps first appeared in 1873 (Barnes 2003:150).

The assemblage contains one specimen in .45 caliber (98-845). It is a non-headstamped, internally primed .45 Colt (Government)—based on case length and rim diameter listed in Barnes (2003:517). This ammunition was introduced in 1873 for the Colt single action revolver (aka Peacemaker) adopted by the U.S. military (Barnes 2003:294, 322). Like the .50 Government, this cartridge enjoyed popularity well into the twentieth century.

There are at least two .50 caliber specimens in the assemblage (no headstamps, internally primed). They also are identified on the basis of case length and rim diameter. One (98-840) is a .50-90 Sharps, which was introduced in 1872 ostensibly as the “buffalo cartridge” (Barnes 2003:158, 167).

The other case (98-845) in .50 caliber is a .50-70 Government (aka .50-70 Musket, .50 Musket, .50 Government)). This was the U.S. military’s rifle cartridge from 1866 to 1873, a popular civilian ammunition through the 1880s, and an ammunitions that was sold well into the first half of the twentieth century (Barnes 2003:161, 167).

Another specimen (80-848) may be a .50 caliber cartridge case—an ammunition for a .50 Remington pistol. The casing however is crushed, making length and rim diameter measurements difficult. Another option is a .56-56 Spencer. In either case, it is likely the specimen postdates 1860. Ammunition for the .56 Spencer carbine appeared in 1860, and it was produced by manufacturers until 1920 (Barnes 2003:447). Remington pistol rounds date from 1865 (Barnes 2003:446).

Identifications of two partial specimens are difficult to determine. One (01-570), an externally primed ammunition, was probably necked, since the upper half of the case is missing. Rim diameter is 0.51″, while rim thickness is 0.06″. Perhaps a dozen cartridges fit these dimensions per Barnes (2003:504-520). The most likely candidate is something in the .30 caliber range. This might be true for another damaged case (98-840)—only the torn, deformed body remains.

Shotshells

Four shotshells complete the shotgun assemblage (Figure 3.5). They postdate the fur and military periods at Fort Pierre Chouteau. All are low brass, and each has remnants of the paper wad. No plastic is present on any of the four, indicating all were produced before the advent of plastic body shotshells ca. 1960 (Labisky 1973:154), and after ca. 1855 when cardboard bodies first began to appear (Suydam 1982:116).

One of the items (99-332), a 10 gauge ammunition, is headstamped "PETERS 10 G QUICK SHOT." Another (12 gauge) is a "№ 12 QUICK SHOT;" the area where PETERS should appear is badly corroded (98-622). Both shotshells were made by the Peters Cartridge Co., which began in 1897. The Quickshot brand is among the oldest of several produced by Peters between that year and 1935 (Vinson 1968:91).

Another specimen (80-805) is headstamped "W. R. A. C° N° 10 RIVAL." This brand is attributed to the Winchester Repeating Arms Company, which made the Rival from 1884 to 1897 (Stadt 1984:18). One shotshell lacks a headstamp (99-154), or at least such cannot be discerned on the somewhat corroded base. Base diameter indicates it is a 10 gauge shotshell.

Bullets

The assemblage contains 15 bullets or parts thereof (see Figure 3.6). A handful could be from the short-lived military period at Fort Pierre Chouteau. The main units stationed at the post were from the 2nd U.S. Infantry and the 2nd U.S. Dragoons (Wilson 1902:282, 288–289). The U.S. infantry adopted the Model 1855 caliber .58 Springfield rifled musket in

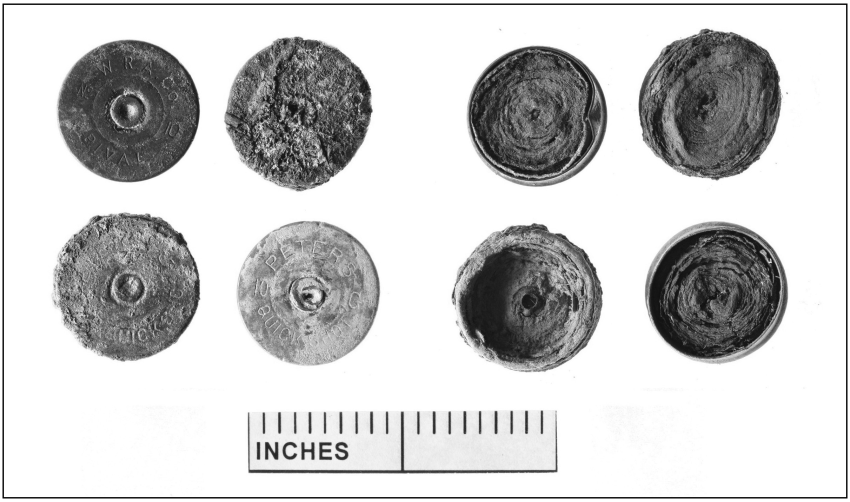

Figure 3.5: Shotshells, obverse (left) and reverse (right), L to R: top—WRA Co. No. 10 Rival, unknown. Bottom—(Peters) Quickshot, Peters Quickshot 10 gauge. Fort Pierre Chouteau.

1855, about the time that the military took over the fort. The typical shoulder arm for dragoons at the time was the .52 caliber Model 1843 Hall carbine. The dragoon sidearm in 1855 could have been the U.S. Model 1842 percussion pistol, or the Model 1855, both in .54 caliber. These weapons were smoothbore, and fired balls, not the Minié balls used to load both the rifled Springfields and Halls (Fort Scott n.d.).

The Minié ball, developed in the 1840s, was designed to be used in rifled arms like the Springfield and Hall. It is characterized by a deeply concave base. The concavity trapped energy when the charge fired, causing the lower part of the ball (or skirt) to swell, in turn pressing it into the barrel rifling to minimize blow-by and impart a stabilizing spin to the projectile.

A few Minié balls are present in the assemblage; none approach in weight the 500-grain bullet used in Model 1855 Springfield ammunition. Two complete Minié balls do approximate the Hall carbine caliber. They are in the .52 to .54 caliber range. Both are about 0.97″ long, and each weighs 373.5 grains (gr). However, both exhibit tool marks, which would not be expected for the breech-loading Hall carbine. One specimen (98-854) was removed from the firearm barrel with a screw-type ball puller (as evidenced by the hole at the bullet's tip). Another (98-823) was removed by a worm; the "threads" left on the bullet tip are quite evident. These

Figure 3.6: Bullets, L to R: top—Picket bullet ca. .44/.45 caliber (00-784), two Picket bullets ca. .30 caliber (80-245, 99-112), two bullets in ca. .30 caliber (00-999, 97-020). Bottom—fired Minié ball ca. .50 caliber (00-672), .52/.54 caliber Minié ball removed with worm (98-823), .52/.54 caliber Minié ball removed with screw/worm (98-854), ca. .58 caliber Minié ball (00-2001). Fort Pierre Chouteau.

two specimens each exhibit three grease cannelures indicating they were contained in paper cartridges.

There is one .58 caliber (approximately) Minié ball in the assemblage (00-2001). The artifact is 1.7″ high, has a slightly raised button on the base, weighs 354.9 gr, and exhibits a single cannelure. Weight rules out a Springfield bullet; otherwise it has not been identified. This specimen is deformed due to imperfect casting.

Another bullet (00-672) is a fired (deformed) Minié ball, also with three cannelures. Probably it too was a .50 plus caliber bullet (395-gr). One artifact (98-161) is probably a Minié ball tip. It exhibits worm marks. In this case the worm may have cut the bullet tip from the body.

The inventory also contains three Picket bullets (aka Pickett, sugar-loaf); these are conical bullets that taper slightly near the base (others lack tapering). This type first appeared in the mid-1830s (Jones 2000). Technically the Picket is a ball, but with a bullet shape. It was used in muzzle loading firearms; compared to a ball, it provided somewhat better range (Jones 2000).

Two of three Pickets (80-245, 99-1112) are in about .32 caliber. Essentially they are the same size. Diameters are 0.33″; one is 0.45″ in height, the other 0.43″. Both weigh 69.4-gr. McKee and Mason (1980:30-31, #165) illustrate a nearly identical specimen (in size, shape and weight). The remaining Pickett (00-784) approximates .44 or .45 caliber. It is 0.54″ in height and weighs 138.9-gr. The base is irregularly convex, suggesting that during casting the lead incompletely filled the mold.

Two bullets are in approximately .30 caliber (97-20; 00-999). One has a slightly hollow base and exhibits a single cannelure. Weight is 84.9-gr; length is 0.55″. It resembles the projectile from a 30 Short patented by G.R. Stetson in 1871 (Logan 1959:64). The other in .30 caliber is plain, 0.475″ long, weighs 78.7-gr, and has been fired (the bullet grazed something). It has not been identified.

Three of the 15 bullets are .22 caliber. One (01-174) is a long rifle projectile with two cannelures, a slightly constricted nose, and a shallow conical base. It exhibits crimping marks. Another (98-373) is a long rifle bullet with three cannelures. Both of these are about 0.45″ long. The shortest specimen is a snub nosed bullet about 0.3″ in length (97-29). It is typical of .22 Short ammunition. The .22 Short is the oldest self-contained metallic cartridge, dating to 1857 (Barnes 1993:368), although there is no indication the snub nose bullet in the assemblage dates this early. The .22 Long Rifle ammunitions did not make its debut until 1887 (Barnes 2003:437).

Two spent bullets round out the assemblage. One may be a .22 caliber bullet, but it is badly smashed (01-294). The other is from a larger, unknown caliber (00-491). Only part of the base remains, but it exhibits lubrication cannelures. The specimen originally had a hollow base.

Gun Flints

The inventory contains 30 gun flints. They are itemized in Table 3.1, and a sample is shown in Figure 3.7. Typically various shades of brown and gray flint are assigned to English manufacture, while honey or blonde stone is attributed to French origin (cf. Caldwell 1982b:121). On this basis, the assemblage is overwhelming English (n = 24), and the American Fur Company is known to have purchased British flints. One 1839 order placed with Hiram Cutler, an English gun flint maker, was for 20,000 "fine black Horse pistol flints in papers of 500 each" (Phillips 1980:5).

Table 3.1: Fort Pierre Chouteau gunflints by year/catalog number. Measurements are in inches.

Catalog No.	Length	Width	Thickness	Origin	Remarks
80-303-xxx					
003	0.92	0.85	0.32	Dk Br/Eng	Used working edge
217	0.95	0.80	0.25	Md Br/Eng	Used working Edge
265	0.78	0.74	0.30	Blonde/Fre	Used working edge
510	n/a	0.92	0.32	Dk Br/Eng	Broken latitudinally
697	1.02	0.82	0.25	Md Br/Eng	Spalling renders working edge unusable
CN81-113-xxx					
517	n/a	0.67	0.29	Bk Br/Eng	Heel broken; used working edge
CN98-131-xxx					
536	0.87	0.89	0.28	Dk Br/Eng	Used working edge
570	0.87	0.74	0.34	Dk Br/Eng	Used working edge
729	0.90	0.68	0.23	Md Gray/Eng	Used working edge
CN99-70-xxxx					
0309	0.88	0.67	0.18	Dk Br/Eng	Used working edge
1411	1.05	0.80	0.24	Dk Br/Eng	Used working edge
1411	0.89	0.63	0.24	Dk Br/Eng	Used working edge
1456	0.82	0.73	0.21	Dk Br/Eng	Used working edge
CN00-90-xxxx					
0202	1.15	0.89	0.25	Dk Br/Eng	Spalled working edge
0406	1.01	0.80	0.26	Blonde/Fre	Unused
1001	1.11	1.04	0.38	Blonde/Fre	Unused
1437	1.01	0.90	0.26	Dk Br/Eng	Used working edge
1596	0.97	0.69	0.26	Dk Br/Eng	Used working edge
CN01-73-xxxx					
0106	0.87	0.65	0.18	Dk Br/Eng	Used working edge
0358	0.74	0.68	0.25	White/Unk	Reduced in size from musket/rifle
0711	0.72	0.97	0.30	Blonde/Fre	Reduced in size from musket
0803	n/a	n/a	n/a	Dk Br/Eng	Small fragment ($0.51 \times 0.46 \times 0.12''$)
1187	1.02	0.87	0.29	Dk Br/Eng	Used working edge; one side fractured longitudinally

Table 3.1: continued

Catalog No.	Length	Width	Thickness	Origin	Remarks
1237	0.86	0.70	0.21	Lt Br/Eng	Spalled working edge; unusable
1442	0.66	0.70	0.16	Dk Br/Eng	Spalled working edge; unusable
2342	0.78	0.71	0.23	Dk Br/Eng	Used working edge; spalled side
2516	0.95	n/a	0.32	Lt Gray/Eng	Used working edge; spalled side
2548	0.86	0.70	0.30	White/Unk	Crude; used working edge; spalled heel
2962	0.81	0.74	0.24	Dk Br/Eng	Used working edge

Of the remaining flints, four are of blonde stone; they are attributed to French manufacture. Two are of a whitish stone of unknown origin (perhaps they were made locally).

All but several specimens exhibit light to heavy use wear on the working edges. A few were rendered unusable by severe spalling at the working edge. A handful exhibit longitudinal or latitudinal fractures, which also rendered them ineffective. A few flints have probably been recycled by reducing them in size. Since virtually every flint in the assemblage exhibits use wear, these specimens cannot be tied directly to trade with natives in gun flints and flintlocks.

The smallest intact flints (there are some fragments and broken specimens in the assemblage) measure on the average 0.64″ high, 0.68″ wide and 0.18″ thick. Flints around this size are thought to be for pistols. The largest flint exhibits dimensions of 1.1″ (height) by 1.04″ (max width) by 0.38″ (thickness). Flints this large (especially in thickness) are thought to have typically been used in muskets. There are, however, few specimens near this size. Most are between approximately 0.85″ and 0.97″ in height, 0.65″ and 0.85″ in width, and 0.20″ and 0.30″ thick. This variation makes it tricky to identify a flint by weapon type (shoulder arm or side arm).

No doubt the gun flint assemblage dates to the fort's fur trading period. The post was established (1832) during the worldwide transition from flintlock to percussion ignition systems. The all-metal percussion primer was invented in the early 1800s (there are several claims to the honor, none beyond 1814), and the U.S. military adopted a percussion rifle in 1819 (Model 1819 Hall), but for some 30 years flintlocks remained the simplest and cheapest weapons, and thus the most popular. Not until the U.S. military's (and British) full transition in the 1840s to percussion weapons (Ki-

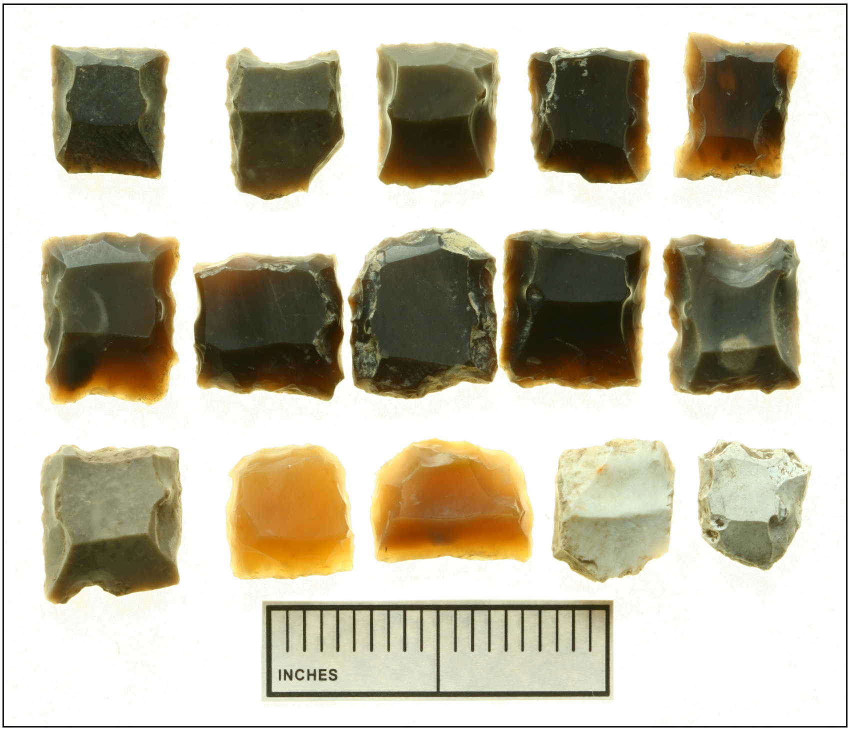

Figure 3.7: Gunflints—top and middle, English flints; bottom, L to R—English(?), 2 French flints, 2 unknown flints, possibly homemade. Fort Pierre Chouteau.

nard 2004:54) did flintlocks begin to fall out of favor (a steadily dwindling market disappeared in the early 1870s).

Primers

Primers for percussion firearms date to the fur and military eras at Fort Pierre Chouteau. They likely represent coexistence during the fur trade occupation between flintlocks (as indicated by gun flints) and percussion firearms. The military years likely saw only percussion weapons (since the U.S. military transitioned fully to percussion weapons in the 1840s), save perhaps for the odd civilian weapon here and there.

Primers (all copper) include musket caps (n = 25) and percussion caps (or cups; n = 51). They are itemized in Tables 3.2, 3.3, and 3.4, and samples are pictured in Figure 3.8. Musket caps are also called "top hat" percussion caps. Some of both types have been fired, while a few of each are unused. Percussion caps or parts thereof come in two varieties, smooth (n = 10) and ribbed, or fluted (n = 41). Apparently ribbing began early (ca. 1820s) during the development of percussion caps (Kinard 2005:53).

Table 3.2: Fort Pierre Chouteau musket caps by year/catalog number.

Catalog No.	Unit	Level	Count	Size (OD in.)	Remarks
80-303-xxx					
246	S38 E100	L1/0–10 cm	1	0.2345	Slightly crushed
484	S35 E100	L2/10–20 cm	1	?	Crushed, fired
97-66-xxxx					
0811	N513 E57	L1/0–12 cm	1	0.255	Fired, pristine condition
1060	N544 E540 E1/2	L2/20–30 cm	1	0.25	Fired, flattened
98-131-xxxx					
0828	Metal detector		1	0.20	Used, deformed
0832	Metal detector		1	0.20	Used, deformed
99-70-xxxx					
0174	N484 E568	n/a	1	0.17	
0228	N471 E571	L1/0–10 cm	1	0.25	Fired
0472	N479 E569	L2/10–20 cm	1	0.25	Fired, crushed
0519	N484 E565	L4/30–40 cm	2	0.24	
				0.18	
00-90-xxxx					
0374	N465 E506	L1/0–10 cm	1	0.20	
01-73-xxxx					
0651	N480 E568	0–10 cm	1	0.25	
0822	N482 E568	10–20 cm	1	0.25	
0968	N479 E567 SW1/4	10–20 cm	1	0.23	
1116	N480 E569	30–40 cm	1	0.25	
1142	N481 E567	L2/10–20 cm	2	0.25	
1220	N484 E568	10–20 cm	2	0.25	

Table 3.2: continued

Catalog No.	Unit	Level	Count	Size (OD in.)	Remarks
1370	N482 E568	L3/20–30 cm	1	0.24	
1403	N480 E568	n/a	1	0.25	
1485	N478 E567	30–40 cm	1	0.23	
1606	N483 E567	L1/0–10 cm	1	0.24	
1769	N487 E569	20–30 cm	1	0.25	
2126	N480 E568	L2/10–20 cm	2	0.24	

Table 3.3: Fort Pierre Chouteau smooth percussion caps by year/catalog number.

Catalog No.	Unit	Level	Count	Size (OD in.)	Remarks
80-303-xxx					
104	S40 E100	L4/30–40 cm	1	0.17	Unused
264	S38 E100	L2/10–23 cm		0.18	Fragments of 4 caps
324	S36 E95	L1/0–10 cm	2	0.17	Fired
537	S33 E100	L2/10–20 cm	2	0.17	Fragments of 2 caps
569	S33 E100	L4/30–40 cm	1	0.17	Used
98-131-xxxx					
141	n/a	n/a	1	0.19	Fired
01-73-xxxx					
1943	N490 E503	L2/15–20 cm	1	0.20	
2990	N477 E568	L1/0–10 cm	1	0.17	Fragmentary, probably used

Table 3.4: Fort Pierre Chouteau ribbed percussion caps by year/catalog number.

Catalog No.	Unit	Level	Count	Size (OD in.)	Remarks
80-303-xxx					

Table 3.4: continued

Catalog No.	Unit	Level	Count	Size (OD in.)	Remarks
010	S39 E100	10–20 cm	1	0.17	Unused
199	S36 E94	L1/0–10 cm	1	0.17	Unfired
219	S36 E94	L2/15–30 cm	4	0.19, 0.18, 0.17	
324	S36 E95	L1/0–10 cm	2	0.17	Fragments
345	S36 E95	L2/10–20 cm	1	0.17	Unused
380	S33 E95	L1/0–10 cm	2	0.18, 0.19	
459	ON 90E	L4/28–32 cm	1	n/a	Used, unmeasurable
471	S35 E100	L1/0–10 cm	1	0.17	Crushed
515	S35 E100	L3	1	0.17	Unused, fragment of 1 cap
81-113-xxx					
165	n/a	L1	1	0.17	Fired
299	S37 E104	L2/20–30 cm	1	0.19	
97-66-xxxx					
0199	N443 E509	L4/30–40 cm	1	0.20	Fired, near pristine
0602	N523 E573	L2/10–20 cm	1	0.17	Fired
1137	N444 E504	L4/30–40 cm	1	0.17	Fired
1251	N443 E504	L5/40–50 cm	1	0.17	Fired
98-131-xxxx					
0574	n/a	n/a	2	0.17	1 nearly complete, 1 fragmentary
1643	N515 E565	n/a	2	0.17	
1657	N514 E570	20–30 cm	1	0.20	Partial specimen
1695	N513 E565	L2/10–20 cm	1	0.18	Fragmented
99-70-xxxx					
0395	N540 E567.2	L2/15–24 cm	1	0.20	
0739	N538 E567.6	L3/30–40 cm	1	0.18	
1090	N482 E565	30–40 cm	1	0.18	
1162	N484 E567	30 cm	2	0.18, 0.20	
00-90-xxxx					
1432	N465 E509	L3/20–30 cm	1	0.20	

Table 3.4: continued

Catalog No.	Unit	Level	Count	Size (OD in.)	Remarks
1457	N465 E501	L6/50–70 cm	3	0.18	2 pieces, 1 cap
1604	N444 E506	40–50 cm	1	0.20	
1768	N490 E503	L3/20–30 cm	2	0.23	
1972	N465 E505	L4/30–40 cm	1	0.36	
01-73-xxxx					
2126	N480 E568	L2/10–20 cm	2	0.19	
2829	N477 E568	L2/10–20 cm	2	0.17	1 fired, 1 unused
2789	N477 E568	L4/30–40 cm	1	0.17	Used (fired)
2972	N477 E568	L4/30–40 cm	1	0.17	Fired

According to Kinard (2004:53), ribbed caps, as opposed to smooth, helped caps split when struck (by the hammer), making them easier to remove from the nipple, and lessening the tendency to dangerously disintegrate into small particles. This could explain why ribbed specimens in the assemblage outnumber smooth by 4 to 1. In any case, their co-occurrence at Fort Pierre Chouteau indicates that whatever advantages of the ribbed variety, they did not send smooth caps into extinction.

All but one musket cap in the assemblage—those that can be measured or estimated—fall in two sizes, namely 0.20″ and 0.24″ outside diameter (OD). The odd cap is quite small, only 0.18″ OD and but 0.21″ in height. The other musket caps range in height from 0.26″ to 0.38″. Generally, the larger the OD the taller the cap. The unfired caps exhibit split flanges (which caused the cap to split when fired, lessening chances of disintegration, and facilitating removal from the nipple). Caldwell (1982b:121–122) found a few musket caps (n = 5) at Fort Pierre II. He identified them as "typical military issue", but noted they were widely used by civilians carrying surplus arms. (He also found 15 ribbed percussion caps).

With one exception, percussion caps are in six OD sizes—0.16″, 0.17″, 0.18″, 0.19″, 0.20″ and 0.23″ (these vary in height between 0.17″ and 0.21″). The exception is a monster-size ribbed cap that measures 0.36″ OD, and is 0.24″ high. This and the larger musket caps (compared to the percussion type) contained a charge sufficient to ignite (at least reliably)

Figure 3.8: Primers, L to R: top—smooth percussion caps; middle—musket caps (tophat); bottom—ribbed percussion caps. Fort Pierre Chouteau.

the large powder loads common to big smooth-bore and rifled muskets.

Lead Balls

A total of 113 lead balls were found at Fort Pierre Chouteau (Table 3.5). A few lead balls are evidently dropped (shot tower-made), for they are very nicely spherical, plus they lack cuts and seams (such as specimen 81-198). These would have been shipped to Fort Pierre Chouteau. Most in the assemblage, however, are cast (molded) as evidenced by out-of-round specimens, specimens with mold seams, those with sprue cuts, and many with some or all of these attributes. Two are for some reason cut in half, and a handful of others are misshaped because of incompletely filling the mold. What is clear from all this is that most of the assemblage was cast, probably on the spot, and that the assemblage largely results from rejects. There are also a few spent balls in the assemblage.

Seventy-eight of the 113 balls are spherical, or nearly so. Not surprisingly, most of them are the "half-ounce balls" meant for the famous Northwest trade guns (.50 or .52 caliber). Some 42 balls (almost 40% of the 113 total) measuring from approximately 0.50″ to 0.54″ in diameter meet this description. Nine balls measure 0.54″ and 0.55″ in diameter. Calibers in the .60s are represented by eight balls varying in diameter from .060″ to 0.65″. There are only six balls in the .40s calibers, these with 0.44″, 0.45″ and 0.48″ diameters. Calibers in the .30s are represented by 25 balls with diameters of 0.30″, 0.31″, 0.32″, 0.34″, and 0.36″ through 0.39″.

Table 3.5: Fort Pierre Chouteau lead balls by year/catalog number. Key: OOR = out of round, IFM = incompletely filled mold, SC = sprue cut, R = reject.

Catalog No.	Unit	Depth	Count	Diameter (in.)
80-303-xxxx				
245	S38 E100	0–10 cm	1	0.52
342	S36 E95	10–20 cm	1	0.30 (sinker)
360	S25 E94	n/a	1	0.39
492	S35 E100	10–20 cm	2	0.39, 0.52 (R)
512	S35 E100	n/a	3	0.48, 0.42, 0.28 (R)
563	S33 E100	20–30 cm	2	0.52, 0.36
822	n/a	Surface	1	0.34
81-113-xxx				
128	S43 E112	0–25 cm	1	0.60
161	n/a	0–10 cm	1	0.52; SC
200	S43 E112	0–10 cm	1	0.51; SC
244	n/a	n/a	1	0.52; SC
628	S43 E106	30–40 cm	1	0.51; SC
98-131-xxxx				
0631	n/a	n/a	2	0.52, 0.45, 0.30
0631	n/a	n/a	3	0.50, 0.435
0763	n/a	n/a	1	0.49 to 0.51; OOR
0956	n/a	n/a	1	0.45
1311	n/a	n/a	1	0.52
1499	N514 E570	20–30 cm	1	0.48 to 0.56; OOR
1632	N514 E565	20–30 cm	1	0.53
99-70-xxxx				
0010	N484 E568	10–20 cm	1	0.51 to 0.62; OOR
0103	N484 E566	10–20 cm	1	0.44 to 0.47; IFM
0144	N484 E565	0–10 cm	1	0.52 to 0.54; IFM
0197	N484 E570	0–20 cm	1	0.47 to 0.50; OOR
0755	N469 E569	0–10 cm	1	0.51; SC
0934	N483 E565	30–40 cm	1	0.52
1024	N484 E568	10–20 cm	1	0.52; SC
1089	N482 E565	30–40 cm	1	0.53
1331	N484 E566	30–48 cm	1	0.42 to 0.44; OOR
1486	N481 E562	20–30 cm	1	0.42 to 0.51; OOR
1545	N481 E563	30–40 cm	2	0.52–0.61, 0.43–0.53; OOR; SC

Table 3.5: continued

Catalog No.	Unit	Depth	Count	Diameter (in.)
1632	N514 E565	20–30 cm	1	0.52
1722	N481 E564	30–40 cm	1	0.48
1756	N481 E563	20–30 cm	2	0.53; SC
1798	N482 E565	20–30 cm	3	0.52, 0.44; SC
00-90-xxxx				
0292	N490 E501		1	0.52
0460	N465 E504	30–40 cm	1	0.64
0469	N465 E504	30–40 cm	1	0.42; IFM
0687	N490 E499	40–50 cm	1	0.53
1250	N465 E503	50–60 cm	1	0.65
1372	N565 E504	50–60 cm	1	0.65
1859	Tr. A	n/a	1	0.38
1916	Tr. A	n/a	5	0.63 spent
1983	N465 E505	30+ cm	2	0.58 spent
01-73-xxxx				
0388	N452 E573	10–20 cm	1	0.59 to 0.72; OOR
0630	N481 E569 SW$frac14$	10–20 cm	1	0.53; SC
0700	N480 E570	0–10 cm	2	0.65, 0.52; SC
0737	N482 E570	20–30 cm	2	0.55; SC
0757	N483 E567	10–20 cm	1	0.43 to 0.53; IFM
0787	N481 E 567	0–10 cm	1	0.53 to 0.61, spent
0814	N482 E568	10–20 cm	1	0.54
0897	N483 E567	20–30 cm	2	0.54, 0.50 (cut)
0976	N479 E567 SW$frac14$	n/a	2	0.54 (SC), 0.42 to 0.63; OOR
1002	N479 E573 SW$frac14$	10–20 cm	1	0.52 to 0.57; OOR; SC
1006	N482 E572	20–30 cm	1	0.53; SC
1036	N481 E569	30–40 cm	1	0.57 to 0.61; OOR; SC
1069	N479 E567	20–30 cm	1	0.53 to 0.55; IFM
1108	N480 E569	n/a	2	0.48 to 0.55; OOR; SC
1160	N475 E569	30–40 cm	1	0.53
1345	N482 E568	30–40 cm	1	0.50
1377	N483 E569	10–20 cm	1	0.37
1379	N483 E569	10–20 cm	2	0.55 to 0.58; OOR
1445	N483 E569	20–30 cm	1	0.40 to 0.48; OOR
1462	N480 E568	20–30 cm	1	0.44 to 0.48; OOR
1494	N478 E567	30–40 cm	7	0.53 to 0.57; OOR; SC
1665	N483 E567	0–10 cm	1	0.54
1721	N481 E569 SW$frac14$	20–30 cm	1	0.55
1753	N483 E569		1	0.52 to 0.60
2130	N479 E576 NE$frac14$	10–20 cm	1	0.52
2156	N478 E569	0–10 cm	1	0.53 to 0.61; OOR; SC
2186	N478 E569	0–10 cm	1	0.535
2375	N481 E567	10–20 cm	1	0.53; cut in 1/2
2454	N483 E571 SW$frac14$	10–20 cm	1	0.52 to 0.56; spent
2802	N477 E568	40–50 cm	1	0.54; mold gouge
2803	N477 E568	30–40 cm	1	0.53; rough surface

Table 3.5: continued

Catalog No.	Unit	Depth	Count	Diameter (in.)
2855	N477/9 E568	40–50 cm	1	0.51
2914	N474 E568	30–40 cm	1	0.50; OOR; screw hole

One caveat: diameters of the 78 spherical (or nearly so) balls were obtained with a single measurement. Multiple measurements per ball would yield endless variations in the 10ths and 100ths, but it is fair to say the single measurements at least signal calibers .30s through .60s. The other 20 specimens are so misshaped (principally from poor molding) that reporting specific measurements here is fruitless, except to say they too probably represent similar calibers.

Figure 3.9 shows a sampling of the more spherical lead balls in the assemblage, from calibers in the .30s through those in the .60s. Figure 7 (shown with cut sprue) gives an idea of the imperfect casting of most balls in the assemblage, showing mold seams and sprue cuts. Hanson (1978:9) comments on the practice of manufacturing trade goods in the field; Fort Pierre Chouteau lead balls, most of them anyway, and abundant sprue (see below) support his observation.

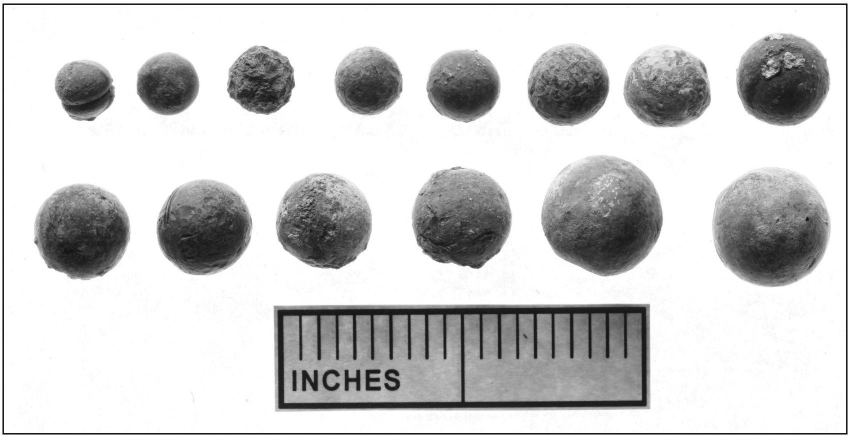

Figure 3.9: Lead balls, L to R, top row through bottom row: various examples of lead ball calibers from ca. .30 caliber to ca. .65 caliber. The first ball (top left) may have been modified into a fishing sinker (note cut groove). Fort Pierre Chouteau.

Patrick Collison performed density calculations on a few balls, learning that their specific gravities approximated 10.5, a figure somewhat less than pure lead (SG11.34). If this is true for all or most, then Fort Pierre Choteau received lead alloyed most likely with zinc, antimony or tin (called chilled lead, or hard lead). We do know that fort orders included "pig lead"—20 pieces in one shipment (ca. 1834–1838) according to Schuler (1990:103). Pig lead came cast in blocks, or pigs, each weighing 65 to 70 pounds (Hanson 1978:8). That would amount to a shipment of some 1,400 pounds. Incidentally, there is no evidence in the assemblage for bar lead, although undoubtedly such made its way to the fort from time to time.

Shot

Shot are summarized in Table 3.6, and a sample is pictured in Figure 3.10. Up to a dozen shot are of steel (e.g. 01-2754), which is a twentieth century phenomenon. The rest of the 139 shot are lead. Based on the chart in Anonymous (2001:10), which lists comparative shot sizes of nineteenth century manufacturers, lead shot sizes, from (0.09″ to 0.24″ diameter) are No. 8 (n = 1), No. 7 (n = 4), No. 6 (n = 5), No. 5 (n = 7), No. 4 (n = 12), No. 3 (n = 25), No. 2 (n = 17), No. 1 (n = 13), B. (n = 11), B.B. (n = 18), B.B.B. (n = 5), T. or O. (n = 8), T.T. or O.O. (n = 2), T.T.T., O.O.O. or F. (n = 1), and F.F. (n = 1).

Table 3.6: Fort Pierre Chouteau lead/steel shot by year/catalog number.

Catalog No.	Unit	Depth	Count	Diameter (in)
80-303-xxx				
010	S39 E100	10–20 cm	2	0.14, 0.16
027	S39 E100	0–10 cm	1	0.15
063	S39 E100	30–40 cm	3	0.15, 0.16, 0.11
104	S40 E100	30–40 cm	1	0.20
201	S36 E94	0–10 cm	4	0.17, 0.16, 0.14, 0.12
218	S36 E94	15–30 cm	30	0.28, 0.24, 0.21, 0.20, 0.18, 0.17, 0.15, 0.14, 0.13, 0.11
245	S38 E100	0–10 cm	2	0.18, 0.15
313	S37 E100	3–6 cm	1	0.18
323	S36 E95	0–10 cm	2	0.18, 0.13
344	S36 E95	10–20 cm	5	0.30, 0.21, 0.10, 0.14
360	S25 E94	n/a	1	0.16
381	S33 E95	0–10 cm	2	0.13
387	S33 E95	10–21 cm	1	0.16
631	S39 E100	30–40 cm	3	0.16, 0.11
645	S55 E100	10–20 cm	1	0.14

Table 3.6: continued

Catalog No.	Unit	Depth	Count	Diameter (in)
695	S35 E95	0–10 cm	1	0.14
726	S34 E100	0–10 cm	2	0.18, 0.14
738	S36 E91	0–10 cm	1	0.14
822	n/a	Surface	3	0.18, 0.14, 0.12
81-113-xxx				
138	S43 E116	n/a	1	0.18
219	S43 E116	0–10 cm	1	0.19
336	S43 E 116	10–20 cm	1	0.18
98-131-xxxx				
0558	n/a	n/a	1	0.18
0836	Metal	Detect	1	0.30
0883	n/a	n/a	1	0.14
1125	n/a	n/a	1	0.32
1603	N513 E564	20–30 cm	1	0.18
1608	N515 E565	20–30 cm	5	0.30, 0.15, 0.16, 0.12
1624	N513 E565	20–30 cm	1	0.17
1634	N514 E565	20–30 cm	4	0.15, 0.12, 0.14
1647	N515 E565	30–40 cm	4	0.19, 0.15, 0.14
1651	N514 E570	20–30 cm	1	0.15
1672	N514 E570	20–30 cm	1	0.17
99-70-xxxx				
0918	N483 E565	20–30 cm	2	0.34, 0.30
1136	N484 E565	10–20 cm	2	0.19
1170	N484 E567	30 cm	1	0.17
1239	N482 E565	10–20 cm	2	0.15, 0.16
1279	N479 E569	30–40 cm	1	0.22
1546	N481 E563	n/a	1	0.16
1602	N483 E565	0–10 cm	2	0.13, 0.30
1665	N527 E500	40–60 cm	1	0.32
1761	N481 E563	20–30 cm	3	0.34, 0.20, 0.37, 0.14
00-90-xxxx				
0489	N465 E500	20–30 cm	2	0.23, 0.15
0784	0	40–50 cm	2	0.22
1841	N490 E503	10–20 cm	5	0.17, 0.14, 0.16, 0.12, 0.09
1918	Tr. A Feat. 2 Fill	n/a	2	0.13, 0.11
1948	N490 E503	15–20 cm	5	0.16, 0.14, 0.12, 0.10, 0.11
2020	N465 E500	20–30 cm	2	?
2026	N465 E506	20–30 cm	2	0.14
01-73-xxxx				
0515	N481 E567 SW$frac$14	0–10 cm	2	0.31
0992	N479 E567 SW$frac$14	10–20 cm	1	0.17
0704	N480 E570	0–10 cm	1	0.27
0788	N481 E567 SW$frac$14	0–10 cm	2	0.29, 0.30
1068	N479 E567	20–30 cm	1	0.30
1217	N484 E568	10–20 cm	1	0.31

Table 3.6: continued

Catalog No.	Unit	Depth	Count	Diameter (in)
1330	N482 E568	30–40 cm	1	0.30
2754	N477 E568	10–20 cm	8	0.30, 0.15,.09
2755	N477 E568	30–40 cm	2	0.17, 0.14
2774	N477 E568	40–50 cm	2	0.10, 0.13
2807	N472/477 E568	30–40 cm	1	0.19
2824	N477 E568	10–20 cm	1	0.26
2881	N477 E568	20–30 cm	2	0.12, 0.13
2931	N477 E568	10–20 cm	1	0.15
2967	N477 E568	30–40 cm	1	0.20
2968	N477 E568	30–40	1	0.20
2985	N477 E568	0–10 cm	7	0.10, 0.13, 0.17, 0.14
2950	N477 E568	20–30 cm	1	0.16

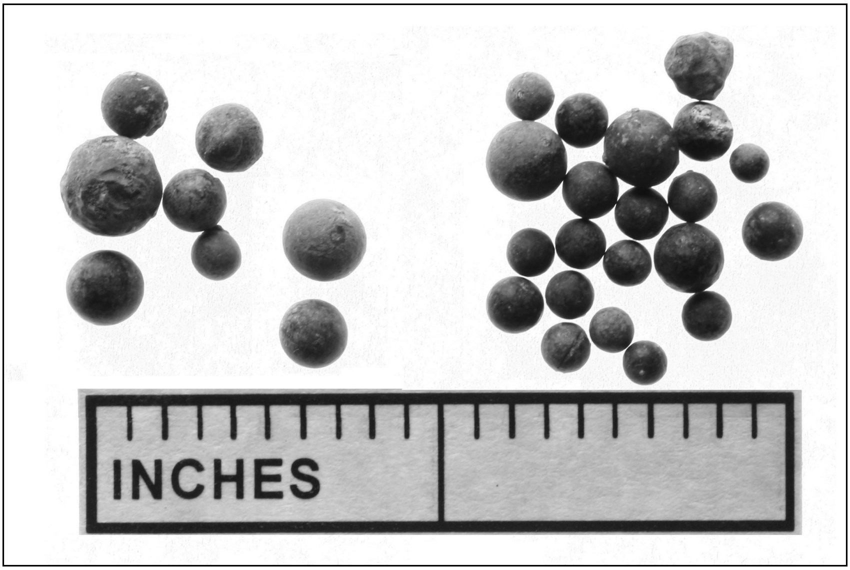

Figure 3.10: Shot, left and right; various examples of lead shot. Fort Pierre Chouteau.

Larger specimens (above 0.24″ diameter) can either be classed as shot or balls. They are included under shot here. There are only a few (n = 6), and depending on the manufacturer they are Buck 2, 3, 6, 7 or 8 (0.26″ through 0.29″ diameter). A few buckshot are cast (sprue cuts are evident). Otherwise, lead shot in the assemblage appears to be dropped.

Figure 3.11: Lead balls and sprue: Top—lead balls with mold seams, sprue cuts, and/or slices. Bottom—sprue examples showing mold cuts. Fort Pierre Chouteau.

Sprue

Most sprue appears to be casting spillage, although some specimens are cut sprue. Others may be residual lead scraped from molds after casting. Sprue is summarized in Table 3.7. Several cut sprue specimens are shown in Figure 3.11 with lead balls. The balls exhibit sprue cuts and/or mold seams, and are obviously rejects. The sprue pictured appears to be from gang molds.

Table 3.7: Fort Pierre Chouteau sprue by year/catalog number.

Catalog No.	Unit	Depth	Count	Wt. (gr)
80-303-xxx				
010	S39 E100	10–20 cm	1	0.8
079	S12 E49	n/a	1	8.9
266	S38 E100	10–23 cm	6	19.1
400	S45 E100	0–10 cm	1	2.1
513	S35 E100	n/a	4	4.2
564	S33 E100	20–30 cm	2	18.5
824	n/a	Surface	4	3.1

Table 3.7: continued

Catalog No.	Unit	Depth	Count	Wt. (gr)
81-113-xxx				
174	n/a	0–10 cm	5	4
332	S37 E104	n/a	4	94.7
364	S43 E100	n/a	3	14.6
410	n/a	n/a	1	9.1
546	F S121	n/a	3	105.2
582	n/a	15–25 cm	1	1.5
98-131-xxxx				
1654	N514 E570	20–30 cm	2	< 0.1
1671	N514 E570	20–30 cm	1	0.7
1685	N531 E540	n/a	2	1
1697	N513 E565	10–20 cm	1	0.7
99-70-xxxx				
0015	N484 E568	10–20 cm	2	38.5
0076	N484 E566	0–10 cm	1	1.3
0131	N484 E567	10–20 cm	2	6
0141	N484 E565	0–10 cm	2	6
0207	N484 E570	n/a	2	4.3
0328	N529 E567	30–40 cm	1	0.7
0526	N484 E565	30–40 cm	3	2.3
0559	N484 E567	20–30 cm	1	1.3
0594	N479 E569	0–10 cm	1	3.6
0650	N484 E566	30–40 cm	1	4.1
0921	N483 E565	20–30 cm	2	74.4
1086	N482 E566	30–40 cm	2	7.2
1104	N484 E567	30–35 cm	1	3.5
1117	N481 E564	0–10 cm	4	19.3
1131	N484 E565	10–20 cm	2	8.5
1293	N481 E561	0–10 cm	1	5
1430	N481 E562	10–20 cm	3	6.3
1488	N481 E562	20–30 cm	1	0.6
1517	N481 E563	0–10 cm	3	11.5
1551	N481 E563	30–40 cm	5	19.1
1570	N481 E564	20–30 cm	2	1.9
1636	N484 E566	33–35 cm	2	7.2
1729	N481 E564	30–40 cm	1	2.5
1745	N481 E563	20–30 cm	1	2.6
1750	N481 E563	20–30 cm	3	58.5
1761	N481 E563	20–30 cm	3	5.5
1776	n/a	n/a	1	0.2
1807	N482 E565	20–30 cm	3	0.16
00-90-xxxx				
0090	N444 E509	40–50 cm	1	103.7
0194	N490 E502	10–20 cm	3	1.7
0365	N444 E509	40–50 cm	1	4.2
0413	N444 E570	40–50 cm	1	0.8
0606	N490 E502	20–30 cm	1	4.1

Table 3.7: continued

Catalog No.	Unit	Depth	Count	Wt. (gr)
0664	N465 E502	30–40 cm	1	0.8
0777	N465 E504	40–50 cm	3	5.5
0792	N490 E494–504	0–10 cm	1	9.3
0980	N465 E503	40–50 cm	1	1.9
0990	N490 E501	3–10 cm	1	8.3
1061	N443.5 E510	40–50 cm	1	3
1195	N465 E506	30–40 cm	2	6.8
1285	N490 E505	10–20 cm	1	4
1445	N465 E501	50–60 cm	2	2.2
1535	N465 E502	40–50 cm	1	1.2
1602	N444 E506	40–50 cm	3	0.8
1668	N465 E505	10–20 cm	1	2.6
1916	Tr. A	n/a	5	18.9
1936	N490 E503	15–20 cm	2	4.9
1956	Tr. A	n/a	1	6.6
01-73-xxxx				
0073	N481 E569 SW$frac$14	20–30 cm	5	36.5
0082	N460 E571	10–20 cm	1	1.7
0240	N452 E569	0–10 cm	1	3.6
0254	N458 E571	0–10 cm	2	18
0401	N460 E572	0–10 cm	1	5.8
0516	N481 E569 SW$frac$14	0–10 cm	1	10.4
0620	N481 E569 SW$frac$14	10–20 cm	2	7
0650	N480 E568	0–10 cm	1	1.8
0715	N481 E567	0–10 cm	2	2.4
0728	N482 E570	20–30 cm	3	6.4
0739	n/a	n/a	1	4.9
0766	N483 E567	10–20 cm	3	13.6
0824	N482 E568	10–20 cm	3	11.9
0899	N483 E567	20–30 cm	22	81.5
0960	N479 E567 SW$frac$14	10–20 cm	3	7.8
0982	N479 E567 SW$frac$14	0–10 cm	1	5.8
1003	N479 E573 SW$frac$14	10–20 cm	3	11.7
1007	N482 E572	20–30 cm	1	1.2
1032	N480 E572	20–30 cm	1	6.7
1043	N481 E569	30–40 cm	2	5.2
1861	N482 E572	0–10 cm	2	4.5
1900	N480 E572	0–10 cm	1	11.3
1993	N454 E575	30–40 cm	1	2.6
2009	N480 E572	10–20 cm	2	10.8
2044	N460 E572	10–20 cm	2	3.5
2086	N482 E568	0–10 cm	2	1.8
2136	N480 E568	10–20 cm	7	27.7
2250	N458 E573	0–10 cm	2	7.5
2328	N483 E569	20–30 cm	1	5.5
2357	N483 E567	30–40 cm	3	4.3
2385	N484 E570	30–40 cm	1	7.1

Table 3.7: continued

Catalog No.	Unit	Depth	Count	Wt. (gr)
2415	N479 E567	30–40 cm	2	4.1
2500	N583 E569	30–35 cm	1	2.7
2529	N484 E568	10–20 cm	3	26.6
2646	N483 E570	30–40 cm	2	51.3
2676	N454 E570	0–10 cm	1	6.6
2698	N482 E570	20–30 cm	4	10.8
2731	N477 E568	20–30 cm	2	2.8
2778	N477 E568	40–50 cm	1	0.7
2795	N477 E568	40–50 cm	3	1.5
2810	N477 E568	30–40 cm	1	1.6
2812	N477 E568	10–20 cm	1	3.7
2815	N477 E568	10–20 cm	1	1.1
2832	N477 E568	0–10 cm	3	12.5
2846	N477 E568	0–10 cm	2	6.1
2862	N477 E568	40–50 cm	1	0.7
2896	N477 E568	20–30 cm	4	8.3
2917	N474 E568	30–40 cm	6	24.5
2932	N477 E568	10–20 cm	2	2
2945	N477 E568	20–30 cm	3	0.3
2961	N477 E568	30–40 cm	24	11.4
2996	N477 E568	0–10 cm	1	0.9
1057	N483 E569	30–40 cm	1	11.2
1113	N480 E569	30–40 cm	10	18.8
1149	N481 E567	10–20 cm	6	14.6
1161	N475 E569	30–40 cm	1	2.5
1184	N480 E570	20–30 cm	1	0.8
1213	N484 E568	10–20 cm	2	4
1232	N478 E567	10–20 cm	1	2
1261	N478 E567	0–10 cm	2	4.9
1282	N484 E568	20–30 cm	10	34.3
1298	N478 E567	20–30 cm	3	2.9
1315	N454 E574	n/a	1	1.5
1346	N482 E568	30–40 cm	4	4.4
1360	N482 E568	30–40 cm	9	37.9
1379	N483 E569	10–20 cm	2	10.4
1412	N480 E568	20–30 cm	7	8.5
1439	N454 E574	(Fill?)	1	10.7
1455	N483 E569	20–30 cm	9	56.2
1472	N481 E567	20–30 cm	10	62.9
1494	N478 E567	30–40 cm	7	22.5
1520	N453 E572	0–10 cm	1	1.2
1562	N453 E571	40–50 cm	1	3.6
1607	N484 E568	0–10 cm	5	19.1
1617	N483 E567	30–40 cm	5	32.7
1647	N483 E567	0–10 cm	2	12.6
1683	N453 E571	20–30 cm	1	1.9
1851	N454 E545	20–30 cm	1	3

Other

A folded lead sheet (01-1472) is folded roughly into a tubular shaped. It weighs 49.3 g. Measurements are 1.18″ long, and 1.82″ and 0.64″ for the widths. The sheet is roughly 0.13″ thick. Gunmen used sheet lead (in place of hide, leather) in cock vices to pad flints. As is, this specimen seems a bit too large for that function, but pieces like this could be cut when a flint pad was needed. It could also be the product of fiddling around during idle time, or simply a scrap lead that never got used.

Part of a broken brass spring (99-1766) weighs a scant half gram. Outside diameter is 0.39″. Wire diameter is 0.058″. Function is unknown, but gun and clock are likely among many possibilities. The lead sheet and spring fragment are shown in Figure 3.12.

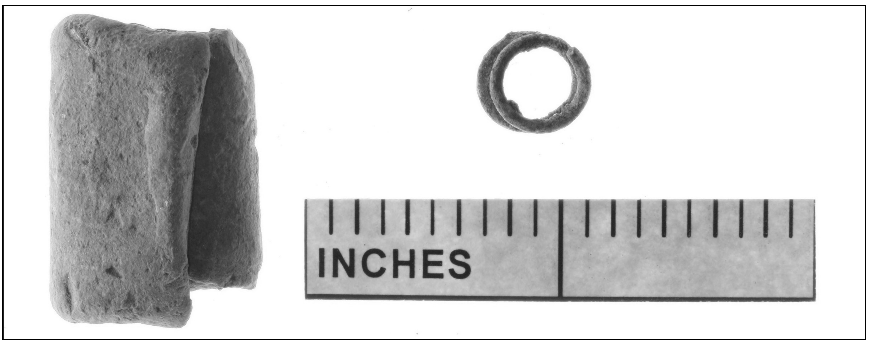

Figure 3.12: Other items, L to R—folded lead sheet, brass spring fragment. Fort Pierre Chouteau.

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Table 3.8: Fort Pierre Chouteau firearms-related artifacts by 1980 catalog number (accession number 80-303-xxx).

Catalog No.	Description	Unit	Level	Count	Wt. (g)	Remarks
003	Gun Flint	S39 E100	10–20 cm	1		Dark Brown, English
010	Lead Sprue	S39 E100	10–20 cm	1	0.8	
010	Percussion Cap	S39 E100	10–20 cm	1		Ribbed, unused
010	Lead Shot	S39 E100	10–20 cm	2		
027	Lead Shot	S39 E100	0–10 cm	1		
063	Lead Shot	S39 E100	L 4/30–40 cm	3	0.8	
079	Lead Sprue	S12 E49	L4	1	8.9	With sprue cuts
090	Cartridge Case	S40 E100	L1&L2/0–20 cm	1		Nickel plate
104	Lead Shot	S40 E100	L4/30–40 cm	1		
104	Percussion Cap	S40 E100	L4/30–40 cm	1		Smooth, unused
199	Percussion Cap	S36 E94	L1/0–10 cm	1		Ribbed, unfired
201	Lead Shot	S36 E94	0–10 cm	4		
217	Gun Flint	S36 E94	L2/15–30 cm	1		Medium brown, English
218	Lead Shot	S36 E94	L2/15–30 cm	30		
219	Percussion Caps	S36 E94	L2/15–30cm	4	0.5	All ribbed
245	Lead Bullet	S38 E100	L1/0–10 cm	1		Picket bullet; ca. .33 caliber
245	Lead Ball	S38 E100	L1/0–10 cm	1		.52 caliber
245	Lead Shot	S38 E100	L1/0–10 cm	2		
246	Musket Cap	S38 E100	L1/0–10 cm	1		Smooth, slightly crushed
264	Percussion Caps	S38 E100	L2/10–23 cm			Fragments of 4 caps, all smooth
265	Gun Flint	S38 E100	L2/10–25 cm	1		Blonde, French

Table 3.8: continued

Catalog No.	Description	Unit	Level	Count	Wt. (g)	Remarks
266	Lead Sprue	S38 E100	L2/10–23 cm	6	19.1	With sprue cuts
313	Lead Shot	S37 E100	L2/3–6 cm	1		
323	Lead Shot	S36 E95	L1/0–10 cm	2		
324	Percussion Caps	S36 E95	L1/0–10 cm	2		Ribbed and smooth
342	Lead Ball	S36 E95	L2/10–20 cm	1		Malformed shot w/ sprue cut; made into sinker (grooved)
344	Lead Shot	S36 E95	L2/10–20 cm	5		
345	Percussion Cap	S36 E95	L2/10–20 cm	1		Ribbed, unused
360	Lead Ball	S25 E94	L1	1		Ca. .38 caliber
360	Lead Shot	S25 E94	L1	1		
380	Percussion Caps	S33 E95	L1/0–10 cm	2	0.3	Ribbed type; one is fired
381	Lead Shot	S33 E95	L1/0–10 cm	2		
387	Lead Shot	S33 E95	L2/10–21 cm	1		Shiny- possibly modern
400	Lead Sprue	S45 E100	L1/0–10 cm	1	2.1	
459	Percussion Cap	N0 E90	L4/28–32 cm	1		Ribbed, used
471	Percussion Cap	S35 E100	L1/0–10 cm	1		Ribbed, crushed
484	Musket Cap	S35 E100	L2/10–20 cm	1		Crushed, fired
492	Lead Balls	S35 E100	L2/10–20 cm	2		.50 cal; malformed during manufacture; .38 cal
510	Gun Flint	S35 E100	L3	1		Dark brown, English
512	Lead Balls	S35 E100	L3	3		Malformed during manufacture
513	Lead Sprue	S35 E100	L3	4	4.2	

Table 3.8: continued

Catalog No.	Description	Unit	Level	Count	Wt. (g)	Remarks
515	Percussion Cap	S35 E100	L3	1		Ribbed, unused
537	Percussion Caps	S33 E100	L2/10–20 cm	2		Smooth; fragmented
563	Lead Balls	S33 E100	L3/20–30 cm	2		.50 cal; .34 cal
564	Lead Sprue	S33 E100	L3/20–30 cm	2	18.5	
569	Percussion Cap	S33 E100	L4/30–40 cm	1		Smooth, used
631	Lead Shot	S39 E100	L4/30–40 cm	3		
645	Lead Shot	S55 E100	L2/10–20 cm	1		
695	Lead Shot	S35 E95	L1/0–10 cm	1		
697	Gun Flint	S35 E95	L1/0–10 cm	1		Medium brown, English
726	Lead Shot	S34 E100	L1/0–10 cm	2		
738	Lead Shot	S36 E91	L1/0–10 cm	1		
805	Shot Shell Base	S12 E49	Hist. Zone 1	1		Paper wad remains; WRACO Rival 10 gauge
822	Lead Ball	n/a	Surface	1		.32 cal
822	Lead Shot	n/a	Surface	3		
823	Cartridge Case	n/a	Surface	1		Probably .38 Smith and Wesson
824	Lead Sprue	n/a	Surface	4	3.1	One is a sprue cut button

Table 3.9: Fort Pierre Chouteau firearms-related artifacts by 1981 catalog number (accession number 81-113-xxx).

Catalog No.	Description	Unit	Level	Count	Wt. (g)	Remarks
none	Gunflint	F S156	n/a	1	4.2	

Table 3.9: continued

Catalog No.	Description	Unit	Level	Count	Wt. (g)	Remarks
128	Lead Ball	S43 E112	0-25 cm	1	20	.60 cal, nearly spherical, no visible seam or sprue hole
138	Lead Shot	S43 E116	n/a	1		
142	Cartridge Case	S41 E103	L1/0–10 cm	1	0.6	.22 Long Rifle; P headstamp
161	Lead Ball	n/a	L1/0–10 cm	1		With sprue cut
165	Percussion Cap	n/a	L1/0–10 cm	1		Ribbed, fired
174	Lead Sprue	n/a	L1/0–10 cm	5	4	
200	Lead Ball	S43 E112	L1/0–10 cm	1		With sprue cut
219	Lead Shot	S43 E116	L1/0–10 cm	1	0.7	Type “BBB”
244	Lead Ball	N of Tr. A	n/a	1		With sprue cut
299	Percussion Cap	S37 E104	L2/20–30 cm	1	<.1	Ribbed type
332	Lead Sprue	S37 E104	n/a	4	94.7	
336	Lead Shot	S43 E116 Tr. A	L2/10–20 cm	1	0.5	
364	Lead Sprue	S43 E100 Tr. H	n/a	3	14.6	
410	Lead Sprue	Tr. E North	n/a	1	9.1	
497	Lead Disc	F S158		1	12.3	
517	Gunflint	F S156	n/a	1	4.2	Dark brown, English
546	Lead Sprue	F S121	n/a	3	105.2	
582	Lead Sprue	F S175; Feat. 6	15–25 cm	1	1.5	
628	Lead Ball	S43 E106	L4/30–40 cm	1	12.5	With sprue cut

Table 3.10: Fort Pierre Chouteau firearms-related artifacts by 1997 catalog number (accession number 97-0066-xxxx).

Catalog No.	Description	Unit	Level	Count	Wt. (g)	Remarks
0020	Lead Bullet	N447 E540	L1/0–10 cm	1	5.1	Fired, grazed something; ca. .30 cal
0029	Lead Bullet	N549 E540	L1/0–10 cm	1	1.8	.22 caliber; snub nose
0199	Percussion Cap	N443 E509	L4/30–40 cm	1		Ribbed, fired, near pristine
0602	Percussion Cap	N523 E573	L2/10–20 cm	1		Ribbed, fired
0811	Musket Cap	N513 E57	L1/0-12 cm	1		Pristine condition, fired
1027	Cartridge Case	N511 E573	L1/0-20	1		.30 Short
1060	Musket Cap	N544 E540 1/2	L2/20–30 cm	1		Fired, flattened
1137	Percussion Cap	N444 E504	L4/30–40 cm	1		Ribbed, fired
1251	Percussion Cap	N443 E504	L5/40–50 cm	1		Ribbed, fired
1269	Gun Part	N446 E511	10–20 cm	1		Brass

Table 3.11: Fort Pierre Chouteau firearms-related artifacts by 1998 catalog number (accession number 98-131-xxx).

Catalog No.	Description	Unit	Level	Count	Wt. (g)	Remarks
none	Cartridge Case	n/a	n/a	1		No provenience data
0141	Percussion Cap	n/a	n/a	1		Smooth, fired; no provenience data

Table 3.11: continued

Catalog No.	Description	Unit	Level	Count	Wt. (g)	Remarks
0373	Lead Bullet	n/a	n/a	1	2.5	.22 cal; no provenience data
0536	Gun Flint	n/a	n/a	1		Dark brown, English; no provenience data
0550	Cartridge Case	n/a	n/a	1		No provenience data
0558	Lead Shot	n/a	n/a	1		No provenience data
0570	Gun Flint	n/a	n/a	1		Dark Brown, English; no provenience data
0574	Percussion Caps	n/a	n/a	2		1 nearly complete, 1 fragmentary; no provenience data
0622	Shotshell Case	n/a	n/a	1		No provenience data; Peters Quickshot 12 gauge
0631	Lead Balls	n/a	n/a	2	24.2	No provenience data
0631	Lead Balls	n/a	n/a	3		No provenience data
0729	Gun Flint	n/a	n/a	1		Medium gray, English
0763	Lead Ball	n/a	n/a	1		Slightly deformed; no provenience data
0823	Minié Ball	Metal Detection	n/a	1		Removed from barrel w/ a worm; .54 cal
0828	Musket Cap	Metal Detection	n/a	1		Used, deformed
0832	Musket Cap	Metal Detection	n/a	1		Used, deformed
0836	Lead Shot	Metal Detection	n/a	1		Deformed (out of round)
0838	Cartridge Case	Metal Detection	n/a	1		

Table 3.11: continued

Catalog No.	Description	Unit	Level	Count	Wt. (g)	Remarks
0840	Cartridge Case	Metal Detection	n/a	3		44-90 Sharps; 50-90 Sharps; unknown
0845	Cartridge Case	Metal Detection	n/a	2		.45 Colt; 50-70 Government
0848	Cartridge Case	Metal Detection	n/a	1		50 Remington Pistol or 56-56 Spencer
0854	Minié Ball	Metal Detection	n/a	1	24.2	Removed from the barrel w/ a ball puller (screw)
0883	Lead Shot	n/a	n/a	1		No provenience data
0905	Cartridge Case	n/a	n/a	1		.22 Long; U Hi Speed; no provenience data
0924	Cartridge Case	n/a	n/a	1		.22 Short; U Hi Speed; no provenience data
0956	Lead Ball	n/a	n/a	1		No provenience data
0961	Minié Ball	Metal Detection	n/a	1	1.7	Tip of a Minié ball removed by a worm?
1125	Lead Shot	n/a	n/a	1		No provenience data
1311	Lead Ball	n/a	n/a	1		No provenience data
1430	Flintlock, Pan	n/a	n/a	1	27.4	No provenience data
1486	Cartridge Case	n/a	n/a	1		H headstamp; .22 Short; no provenience data
1499	Lead Ball	N 514 E 570	L3/ 20–30 cm	1	13	
1586	Cartridge Case	n/a	n/a	3		.22 Long; UMC 32 S&W; .44 Evans Short
1603	Lead Shot	N513 E564	20–30 cm	1	0.5	
1608	Lead Shot	N515 E565	L3/20–30 cm	5	3.5	
1624	Lead Shot	N513 E565	20–30 cm	1	0.5	
1632	Lead Ball	N514 E565	20–30 cm	1	12.8	

Table 3.11: continued

Catalog No.	Description	Unit	Level	Count	Wt. (g)	Remarks
1634	Lead Shot	N514 E565	20–30 cm	4	1	
1643	Percussion Caps	N515 E565	n/a	2	0.3	Ribbed
1647	Lead Shot	N515 E565	30–40 cm	4	1.5	
1651	Lead Shot	N514 E570	20–30 cm	1	0.3	
1654	Lead Sprue	N514 E570	20–30 cm	2	< .1	
1657	Percussion Cap	N514 E570	20–30 cm	1	< .1	Smooth
1671	Lead Sprue	N514 E570	L3/20–30 cm	1	0.7	
1672	Lead Shot	N514 E570	L3/20–30 cm	1	0.3	
1685	Lead Sprue	N531 E540	Level 5	2	1	
1695	Percussion Cap	N513 E565	L2/10–20 cm	1	< .1	Ribbed; fragmented
1697	Lead Sprue	N513 E565	L2/10–20 cm	1	0.7	

Table 3.12: Fort Pierre Chouteau firearms-related artifacts by 1999 catalog number (accession number 99-70-xxxx).

Catalog No.	Description	Unit	Level	Count	Wt. (g)	Remarks
0010	Lead Ball	N484 E568	L2/10–20 cm	1	17.9	Slightly flattened
0015	Lead Sprue	N484 E568	L2/10–20 cm	2	38.5	
0016	Cartridge Case	N484 E568	L2/10–20 cm	1	0.5	Impressed "U" head-stamp; .22 Short
0024	Cartridge Case	N529 E567	L1/0–10 cm	1	0.5	Impressed "H" head-stamp; .22 Short
0076	Lead Sprue	N484 E566	L1/0–10 cm	1	1.3	

Table 3.12: continued

Catalog No.	Description	Unit	Level	Count	Wt. (g)	Remarks
0077	Gun Part	N484 E566	L1/0–10 cm	1		Brass
0103	Lead Ball	N484 E566	L2/10–20 cm	1	4.9	Defective
0131	Lead Sprue	N484 E567	L2/10–20 cm	2	6	
0141	Lead Sprue	N484 E565	L1/0–10 cm	2	6	
0144	Lead Ball	N484 E565	L1/0–10 cm	1	12.8	Defective, seamed, edges formed by incompletely filled mold, .54 cal
0154	Shotshell	N535 E541	L1/0-7/13 cm	1	5.7	No discernable headstamp; 10 gauge?
0174	Musket Cap	N484 E568	n/a	1	0.5	"Top Hat" type
0197	Lead Ball	N484 E570	L1/0–20 cm	1	10.1	.47 cal?
0204	Cartridge Case	N484 E570	L1/0–20 cm	1	0.5	.22 Short rimfire
0207	Lead Sprue	N484 E570	n/a	2	4.3	
0228	Musket Cap	N471 E571	L1/0–10 cm	1		Fired
0309	Gunflint	n/a	n/a	1	2.4	Dark brown; English
0328	Lead Sprue	N529 E567	L4/30–40 cm	1	0.7	
0332	Shotgun Shell Cup	N540 E567.2	L 1/0-15 cm	1	3.4	Peters Quickshot 10 gauge
0382	Flintlock Lock Plate	N540 E567.2	L2/15–24 cm	1	196.6	Ferrous; rusted
0395	Percussion Cap	N540 E567.2	L2/15–24 cm	1	0.01	"Ribbed" type
0472	Musket Cap	N479 E569	L2/10–20 cm	1		Fired, crushed
0519	Musket Caps	N484 E565	L4/30–40 cm	2	0.7	"Top Hat" type
0526	Lead Sprue	N484 E565	L4/30–40 cm	3	2.3	
0559	Lead Sprue	N484 E567	L3/20–30 cm	1	1.3	
0566	Frizzen	N484 E567	L3/20–30 cm	1	37.5	Curved profile

Table 3.12: continued

Catalog No.	Description	Unit	Level	Count	Wt. (g)	Remarks
0594	Lead Sprue	N479 E569	L1/0–10 cm	1	3.6	
0650	Lead Sprue	N484 E566	L4/30–40 cm	1	4.1	Sand and clay imbedded throughout
0739	Percussion Cap	N538 E67.6	L3/30–40 cm	1	$< .1$	"Fluted" or "ribbed" type
0755	Lead Ball	N469 E569	L1/0–10 cm	1		
0918	Lead Shot	N483 E565	L3/20–30 cm	2	6.2	
0921	Lead Sprue	N483 E565	L3/20–30 cm	2	74.4	
0934	Lead Ball	N483 E565	L4/30–40 cm	1		
1024	Lead Ball	N484 E568	10–20 cm	1		Imperfect reject; molded
1086	Lead Sprue	N482 E566	30–40 cm	2	7.2	
1089	Lead Ball	N482 E565	30–40 cm	1	7.15	.53 cal
1090	Percussion Cap	N482 E565	30–40 cm	1	¡.01	"Ribbed" type
1104	Lead Sprue	N484 E567	L4/30–35 cm	1	3.5	
1112	Lead Bullet	N481 E564	L1/0–10 cm	1	4.5	Picket bullet; ca. .33 cal
1117	Lead Sprue	N481 E564	L1/0–10 cm	4	19.3	
1131	Lead Sprue	N484 E565	10–20 cm	2	8.5	
1136	Lead Shot	N484 E565	10–20 cm	2	1.3	
1162	Percussion Cap	N484 E567	30 cm	2	$< .1$	"Ribbed" type
1170	Lead Shot	N484 E567	30 cm	1	0.5	
1239	Lead Shot	N482 E565	10–20 cm	2	0.7	
1279	Lead Shot	N479 E569	30–40 cm	1	0.9	
1293	Lead Sprue	N481 E561	0–10 cm	1	5	
1331	Lead Ball	N484 E566	30–48 cm	1	5	.44 cal
1411	Gunflints	N481 E562	L2/10–20 cm	2	7.8	Black (English)
1430	Lead Sprue	N481 E562	L2/10–20 cm	3	6.3	

Table 3.12: continued

Catalog No.	Description	Unit	Level	Count	Wt. (g)	Remarks
1456	Gunflint	N481 E562	n/a	1	3.4	Black color, British pistol flint, used
1486	Spent Lead Ball	N481 E562	L3/20–30 cm	1	9.3	
1488	Lead Sprue	N481 E562	L3/20–30 cm	1	0.6	
1517	Lead Sprue	N481 E563	L1/0–10 cm	3	11.5	
1545	Lead Balls	N481 E563	L4/30–40 cm	2	26.5	Seams; .52 cal/ .53 cal?
1546	Lead Shot	N481 E563	n/a	1	0.4	“1” shot
1551	Lead Sprue	N481 E563	L4/30–40 cm	5	19.1	
1570	Lead Sprue	N481 E564	L3/20–30 cm	2	1.9	
1602	Lead Shot, Buckshot	N483 E565	L1/0–10 cm	2	2.6	
1632	Lead Ball	N514 E565	20–30 cm	1		.50 cal
1636	Lead Sprue	N484 E566	33–35 cm	2	7.2	
1665	Lead Shot	N527 E500	40–60 cm	1	3.4	
1722	Lead Ball	N481 E564	L4/30–40 cm	1	9.7	Seam; .48 cal
1729	Lead Sprue	N481 E564	L4/30–40 cm	1	2.5	
1745	Lead Sprue	N481 E563	L3/20–30 cm	1	2.6	
1750	Lead Sprue	N481 E563	L3/20–30 cm	3	58.5	
1756	Lead Ball	N481 E563	L3/20–30 cm	2	14.2	Seam, sprue, .53 cal
1761	Lead Shot, Sprue	N481 E563	L3/20–30 cm	3	5.5	Lead ball w/ seam
1766	Spring	N481 E563	L3/20–30 cm	1	0.5	brass coil fragment
1776	Lead Sprue	n/a	n/a	1	0.2	
1798	Lead Balls	N482 E565	L3/20–30 cm	3	35	Seam; .52 cal/ .52 cal/ .44 cal
1807	Lead Sprue	N482 E565	L3/20–30 cm	3	0.16	

Table 3.13: Fort Pierre Chouteau firearms-related artifacts by 2000 catalog number (accession number 00-90-xxxx).

Catalog No.	Description	Unit	Level	Count	Wt. (g)	Remarks
?	Lead Bullet	n/a	Surface	1	23	Appx 58 Caliber, imperfectly cast, reject
0022	Cartridge Case	N449 E554	20–30 cm	1	0.6	Impressed "Super X" headstamp, rimfire, .22 cal long/ long rifle
0090	Lead Sprue	N444 E509	L5/40–50 cm	1	103.7	
0194	Lead Sprue	N490 E502	L2/10–20 cm	3	1.7	
0202	Gun Flint	N490 E502	L2/10–20 cm	1	6.8	Black color, English
0292	Lead Ball	N490 E501	n/a	1	14	.52 cal
0365	Lead Sprue	N444 E509	L5/40–50 cm	1	4.2	
0374	Musket Cap	N465 E505	L1/0–10 cm	1	< 0.1	"Top Hat" type
0406	Gun Flint	N444 E510	40–50 cm	1	5.1	Blond color, French rifle or pistol flint
0413	Lead Sprue	N444 E570	40–50 cm	1	0.8	
0460	Lead Ball	N465 E504	L4/30–40 cm	1	24.8	.64 cal
0469	Lead Ball	N465 E504	L4/30–40 cm	1	2.95	Defective
0489	Lead Shot	N465 E500	L3/20–30 cm	2	1.4	
0491	Spent Bullet	N465 E500	L3/20–30 cm	1	6.8	Lubricating grooves
0606	Lead Sprue	N490 E502	L3/20–30 cm	1	4.1	
0664	Lead Sprue	N465 E502	L4/30–40 cm	1	0.8	
0672	Spent Bullet	N45 E506	L1/0–10 cm	1	25.6	Deformed or "spent"; Minié Ball
0687	Lead Ball	N490 E499	L5/40–50 cm	1	13.7	.53 cal appx
0777	Lead Sprue	N465 E504	L5/40–50 cm	3	5.5	
0784	Lead Bullet, Shot	n/a	L5/40–50 cm	2	9	Approx .45 caliber
0792	Lead Sprue	N490 E494-504	0–10 cm	1	9.3	

Table 3.13: continued

Catalog No.	Description	Unit	Level	Count	Wt. (g)	Remarks
0980	Lead Sprue	N465 E503	L5/40–50 cm	1	1.9	
0990	Lead Sprue	N490 E501	L1/3-10 cm	1	8.3	
0999	Lead Bullet	N444 E510	L4/30–40 cm	1	5.5	.31 cal, cylindro-conoidal shape, hollow base
1001	Gun Flint	N444 E510	L4/30–40 cm	1	10.7	Blond to light brown; French
1061	Lead Sprue	N443.5 E510	40–50 cm	1	3	
1187	Gun Flint	N480 E570	L3/20–30 cm	1	5.3	Uniform dark brown; English
1195	Lead Sprue	N465 E506	L4/30–40 cm	2	6.8	
1250	Lead Ball	N465 E503	L6/50–60 cm	1	25	.65 cal
1285	Lead Sprue	N490 E505	L2/10–20 cm	1	4	
1372	Lead Ball	N565 E504	L6/50–60 cm	1	25.5	.65 cal
1436	Percussion Cap	N465 E509	L3/20–30 cm	1	< 0.1	“Ribbed” type
1437	Gun Flint	N465 E509	L3/20–30 cm	1	5.9	Black color; English
1445	Lead Sprue	N465 E501	L6/50–60 cm	2	2.2	
1457	Percussion Cap	N465 E501	L6/50–60 cm	1	< 0.1	“Ribbed” type, 2 pc. from 1 cap
1535	Lead Sprue	N465 E502	L5/40–50 cm	1	1.2	
1596	Gun Flint	N490 E495	L1/3-10 cm	1	4	Black color, English rifle flint
1602	Lead Sprue	N444 E506	40–50 cm	3	0.8	
1604	Percussion Cap	N444 E506	40–50 cm	1	0.1	“Ribbed” type
1668	Lead Sprue	N465 E505	L2/10–20 cm	1	2.6	
1768	Percussion Cap	N490 E503	L3/20–30 cm	2	0.2	“Ribbed” type

Table 3.13: continued

Catalog No.	Description	Unit	Level	Count	Wt. (g)	Remarks
1841	Lead Shot	N490 E503	L2/10–20 cm	5	1.1	
1859	Lead Ball	Tr. A	Level 5	1	4.4	.38 cal
1916	Lead Ball, Sprue	Tr. A		5	18.9	Ball is spent
1918	Lead Shot	Tr. A Feat. 2 Fill		2	0.4	
1936	Lead Sprue	N490 E503	L2/15–20 cm	2	4.9	
1943	Percussion Cap	N490 E503	L2/15–20 cm	1	0.1	Smooth
1948	Lead Shot	N490 E503	L2/15–20 cm	5	1	
1956	Lead Sprue	Tr. A	Level 5	1	6.6	
1972	Percussion Cap	N465 E505	L4/30–40 cm	1	0.4	“Ribbed” type
1983	Lead Ball	N465 E505	L4/30+ cm	2	10.2	Spent/blackened
2020	Lead Shot	N465 E500	L3/20–30 cm	2		
2026	Lead Shot	N465 E506	L3/20–30 cm	2		One speciman is half of true shot

Table 3.14: Fort Pierre Chouteau firearms-related artifacts by 2001 catalog number (accession number 01-73-xxxx).

Catalog No.	Description	Unit	Level	Count	Wt. (g)	Remarks
0073	Lead Sprue	N481 E569	20–30 cm	5	36.5	SW 1/4 of unit
0082	Lead Sprue	N460 E571	10–20 cm	1	1.7	
0106	Gun Flint	N460 E573	0–10 cm	1	2.7	Dark brown, English
0174	Bullet	N455 E569	0–10 cm	1	2.5	.22 Long Rifle
0240	Lead Sprue	N452 E569	0–10 cm	1	3.6	

Table 3.14: continued

Catalog No.	Description	Unit	Level	Count	Wt. (g)	Remarks
0254	Lead Sprue	N458 E571	0–10 cm	2	18	
0294	Spent Bullet	N457 E572	0–10 cm	1	3	
0358	Gun Flint	N460 E569	0–10 cm	1	2.3	White stone
0388	Lead Ball	N452 E573	10–20 cm	1	13.5	Fired?
0401	Lead Sprue	N460 E572	L1/0–10 cm	1	5.8	
0515	Lead Buckshot	N481 E569	L1/0–10 cm	2	5.2	SW 1/4 of unit
0516	Lead Sprue	N481 E569	L1/0–10 cm	1	10.4	SW 1/4 of unit
0570	Cartidge Case	N460 E570	0–10 cm	1	6.6	Center fire, no headstamp; ca. .30 caliber
0609	Powder Measurer	N481 E571	0–10 cm	1	12.6	Color- brown with black mottling, broken at perforation for lanyard, possibly made from antler; SW 1/4 of unit
0620	Lead Sprue	N481 E569	10–20 cm	2	7	SW 1/4 of unit
0630	Lead Ball	N481 E569	10–20 cm	1	14.8	SW 1/4 of unit
0650	Lead Sprue	N480 E568	0–10 cm	1	1.8	
0651	Musket Cap	N480 E568	0–10 cm	1	0.5	“Top Hat” type
0700	Lead Balls	N480 E570	0–10 cm	2	38.1	
0704	Lead Buckshot	N480 E570	0–10 cm	1	2.1	
0711	Gun Flint	N455 E569	10–20 cm	1	5	Blonde; French
0715	Lead Sprue	N481 E567	0–10 cm	2	2.4	
0728	Lead Sprue	N482 E570	20–30 cm	3	6.4	
0737	Lead Balls	N482 E570	20–30 cm	2	29.4	
0739	Lead Sprue	n/a	n/a	1	4.9	
0757	Lead Ball	N483 E567	10–20 cm	1	10	Defective

Table 3.14: continued

Catalog No.	Description	Unit	Level	Count	Wt. (g)	Remarks
0766	Lead Sprue	N483 E567	10–20 cm	3	13.6	
0787	Spent Lead Ball	N481 E 567	0–10 cm	1	12.5	
0788	Lead Buck-shot	N481 E567	0–10 cm	2	4.6	SW 1/4 of unit
0803	Gun Flint Frag	N482 E568	10–20 cm	1	0.5	
0814	Lead Ball	N482 E568	10–20 cm	1	13.8	
0822	Musket Cap	N482 E568	10–20 cm	1		“Top Hat” type
0824	Lead Sprue	N482 E568	10–20 cm	3	11.9	
0897	Lead Balls	N483 E567	20–30 cm	2	22.4	
0899	Lead Sprue	N483 E567	20–30 cm	22	81.5	
0960	Lead Sprue	N479 E567	10–20 cm	3	7.8	SW 1/4 of unit
0968	Musket Cap	N479 E567	10–20 cm	1	0.5	“Top Hat” Type; SW 1/4 of unit
0976	Lead Ball Spent Lead Ball	N479 E567	n/a	2	26.3	SW 1/4 of unit
0982	Lead Sprue	N479 E567	0–10 cm	1	5.8	SW 1/4 of unit
0992	Lead Shot	N479 E567	10–20 cm	1	0.5	SW 1/4 of unit
1002	Lead Ball	N479 E573	10–20 cm	1	13.8	SW 1/4 of unit
1003	Lead Wire, Lead Sprue	N479 E573	10–20 cm	3	11.7	SW 1/4 of unit
1006	Lead Ball	N482 E572	L3/20–30 cm	1	14.6	
1007	Lead Sprue	N482 E572	L3/20–30 cm	1	1.2	
1032	Lead Sprue	N480 E572	L3/20–30 cm	1	6.7	
1036	Lead Ball	N481 E569	L4/30–40 cm	1	19	
1043	Lead Sprue	N481 E569	L4/30–40 cm	2	5.2	
1057	Lead Sprue	N483 E569	L4/30–40 cm	1	11.2	

Table 3.14: continued

Catalog No.	Description	Unit	Level	Count	Wt. (g)	Remarks
1068	Buckshot	N479 E567	L3/20–30 cm	1	2.6	
1069	Lead Ball	N479 E567	L3/20–30 cm	1	11.2	Imperfectly molded
1108	Lead Ball Buckshot	N480 E569	n/a	2	13.6	
1113	Lead Sprue	N480 E569	30–40 cm	10	18.8	
1116	Musket Cap	N480 E569	30–40 cm	1	0.7	"Top Hat" type
1142	Musket Cap	N481 E567	L2/10–20 cm	2	6	"Top Hat" type
1149	Lead Sprue	N481 E567	L2/10–20 cm	6	14.6	
1160	Lead Ball	N475 E569	L4/30–40 cm	1	14.4	
1161	Lead Sprue	N475 E569	L4/30–40 cm	1	2.5	
1184	Lead Sprue	N480 E570	L3/20–30 cm	1	0.8	
1213	Lead Sprue	N484 E568	L2/10–20 cm	2	4	
1217	Lead Shot	N484 E568	L2/10–20 cm	1	2.7	Western size 5 Buckshot
1220	Musket Cap	N484 E568	10–20 cm	2	1.2	"Top Hat" type
1232	Lead Sprue	N478 E567	10–20 cm	1	2	
1237	Gunflints	N478 E567	10–20 cm	2	4.9	1 light brown, English; 1 dark brown, English
1261	Lead Sprue	N478 E567	0–10 cm	2	4.9	
1282	Lead Sprue	N484 E568	L3/20–30 cm	10	34.3	
1298	Lead Sprue	N478 E567	20–30 cm	3	2.9	
1315	Lead Sprue	N454 E574	n/a	1	1.5	Soft malleable metal coated and tan granular material
1330	Lead Shot	N482 E568	L4/30–40 cm	1	2.6	5 western size; molded
1345	Lead Ball	N482 E568	L4/30–40 cm	1	12.1	.50 caliber
1346	Lead Sprue	N482 E568	L4/30–40 cm	4	4.4	
1360	Lead Sprue	N482 E568	L4/30–40 cm	9	37.9	
1370	Musket Cap	N482 E568	L3/20–30 cm	1	0.5	"Top Hat" type

Table 3.14: continued

Catalog No.	Description	Unit	Level	Count	Wt. (g)	Remarks
1377	Lead Ball	N483 E569	10–20 cm	1	4.7	
1379	Lead Ball; Lead Sprue	N483 E569	10–20 cm	2	10.4	Defective (lead ball)
1403	Musket Cap	N480 E568	n/a	1	0.5	"Top Hat" type
1412	Lead Sprue	N480 E568	L3/20–30 cm	7	8.5	
1439	Lead Sprue	N454 E574	(Fill?)	1	10.7	
1442	Gunflint	N483 E569	L3/20–30 cm	1	1.7	Dark brown color, British
1445	Lead Ball	N483 E569	L3/20–30 cm	1	7.2	
1455	Lead Sprue	N483 E569	L3/20–30 cm	9	56.2	
1462	Lead Ball	N480 E568	L3/20–30 cm	1	9	
1472	Lead Sheet	N481 E567	L3/20–30 cm	10	49.3	thick folded or rolled piece; also 10 sprue (13.7g)
1485	Musket Cap	N478 E567	30–40 cm	1	0.5	"Top Hat" type
1494	Lead Ball, Lead Sprue	N478 E567	30–40 cm	7	22.5	Lead ball with sprue attached
1520	Lead Sprue	N453 E572	0–10 cm	1	1.2	
1562	Lead Sprue	N453 E571	40–50 cm	1	3.6	Imbedded in clay
1606	Percussion Cap	N483 E567	L1/0–10 cm	1	0.5	"Top Hat" type
1607	Lead Sprue	N484 E568	L1/0–10 cm	5	19.1	
1617	Lead Sprue	N483 E567	30–40 cm	5	32.7	
1647	Lead Sprue	N483 E567	0–10 cm	2	12.6	
1665	Lead Ball	N483 E567	0–10 cm	1	14	
1683	Lead Sprue	N453 E571	20–30 cm	1	1.9	Gray soft heavy metal
1721	Lead Ball	N481 E569	20–30 cm	1	14.9	SW 1/4 of unit
1753	Lead Ball	N483 E569		1	14.4	
1769	Musket Cap	N487 E569	20–30 cm	1	0.5	"Top Hat" type

Table 3.14: continued

Catalog No.	Description	Unit	Level	Count	Wt. (g)	Remarks
1851	Lead Sprue	N454 E545	20–30 cm	1	3	
1861	Lead Sprue, Iron Fragment	N482 E572	0–10 cm	2	4.5	
1900	Lead Sprue	N480 E572	0–10 cm	1	11.3	
1903	Cartridge Case	N480 E572	0–10 cm	1	0.5	No headstamp, rimfire, firing pin impression, .22 cal Short
1993	Lead Sprue	N454 E575	30–40 cm	1	2.6	
2009	Lead Sprue	N480 E572	10–20 cm	2	10.8	
2044	Lead Sprue	N460 E572	L2/10–20 cm	2	3.5	
2086	Lead Sprue	N482 E568	0–10 cm	2	1.8	
2126	Musket and Percussion Caps	N480 E568	L2/10–20 cm	2	0.6	“Ribbed” type
2130	Lead Ball	N479 E576	10–20 cm	1	13.4	NE 1/4 of unit
2136	Lead Sprue	N480 E568	10–20 cm	7	27.7	
2156	Lead Ball	N478 E569	L1/0–10 cm	1	14.9	
2186	Lead Ball	N478 E569	L1/0–10 cm	1		Prominent mold seam
2250	Lead Sprue	N458 E573	0–10 cm	2	7.5	
2328	Lead Sprue	N483 E569	L3/20–30 cm	1	5.5	
2342	Gun Flint	N476 E569	L2/10–20 cm	1	3.2	Black color, English
2357	Lead Sprue	N483 E567	30–40 cm	3	4.3	
2375	Lead Ball	N481 E567	L2/ 10–20 cm	1	8.9	Cut
2385	Lead Sprue	N484 E570	L4/30–40 cm	1	7.1	Embedded in clay?
2415	Lead Sprue	N479 E567	L4/30–40 cm	2	4.1	
2454	Lead Ball	N483 E571	10–20 cm	1	12.7	Spent; SW 1/4 of unit
2500	Lead Sprue	N583 E569	30–35 cm	1	2.7	

Table 3.14: continued

Catalog No.	Description	Unit	Level	Count	Wt. (g)	Remarks
2516	Gun Flint	N484 E570	L2/10–20 cm	1	6.2	Light gray-tan color, English
2529	Lead Sprue	N484 E568	L2/10–20 cm	3	26.6	
2548	Gun Flint	N476 E569	L3/20–30 cm	1	4.1	Atypical-white color, crude design; locally made?
2646	Lead Sprue	N483 E570	30–40 cm	2	51.3	Soil adhering
2676	Lead Sprue	N454 E570	0–10 cm	1	6.6	
2698	Lead Sprue	N482 E570	L3/20–30 cm	4	10.8	
2731	Lead Sprue	N477 E568	L3/20–30 cm	2	2.8	
2754	Shot, Lead, Steel	N477 E568	L2/10–20 cm	8		
2755	Lead Shot	N477 E568	L4/30–40 cm	2		
2774	Lead Shot	N477 E568	L5/40–50 cm	2		
2778	Lead Sprue	N477 E568	L5/40–50 cm	1	0.7	
2789	Percussion Cap	N477 E568	L4/30–40 cm	1		"Ribbed" type, fired
2795	Lead Sprue	N477 E568	L5/40–50 cm	3	1.5	
2802	Lead Ball	N477 E568	L5/40–50 cm	1		With mold seam around circumference, and a gouge left by mold
2803	Lead Ball	N477 E568	L4/30–40 cm	1		
2807	Lead Shot	N472/477 E568	L4/30–40 cm	1		
2810	Lead Sprue	N477 E568	L4/30–40 cm	1	1.6	
2812	Lead Sprue	N477 E568	L2/10–20 cm	1	3.7	
2815	Lead Sprue	N477 E568	L2/10–20 cm	1	1.1	
2824	Lead Shot	N477 E568	L2/ 10–20 cm	1		
2829	Percussion Caps	N477 E568	L2/ 10–20 cm	2		One fired, one unused, both "Ribbed" type

Table 3.14: continued

Catalog No.	Description	Unit	Level	Count	Wt. (g)	Remarks
2832	Lead Sprue	N477 E568	L1/0–10 cm	3	12.5	With soil adhering
2846	Lead Sprue	N477 E568	L1/0–10 cm	2	6.1	
2855	Lead Ball	N477/9 E568	L5/40–50 cm	1		
2862	Lead Sprue	N477 E568	L5/40–50 cm	1	0.7	
2881	Lead Shot	N477 E568	L3/20–30 cm	2		
2896	Lead Sprue	N477 E568	L3/20–30 cm	4	8.3	
2914	Lead Ball	N474 E568	L4/30–40 cm	1		Out of round, imperfectly molded, removed by a screw
2917	Lead Sprue	N474 E568	L4/30–40 cm	6	24.5	With soil adhering
2931	Lead Shot	N477 E568	L2/10–20 cm	1		
2932	Lead Sprue	N477 E568	L2/10–20 cm	2	2	
2945	Lead Sprue	N477 E568	L3/20–30 cm	3	0.3	
2961	Lead Sprue	N477 E568	L4/30–40 cm	24	11.4	-
2962	Gun Flint	N477 E568	L4/30–40 cm	1		Dark brown, English
2967	Lead Shot	N477 E568	L4/30–40 cm	1		
2968	Steel Shot	N477 E568	L4/30–40 cm	1		
2971	Percussion Cap	N477 E568	L4/30–40 cm	1		
2972	Percussion Cap	N477 E568	L4/30–40 cm	1		“Ribbed” type, fired
2985	Lead Shot	N477 E568	L1/0–10 cm	7		
2950	Lead Shot	N477 E568	L3/20–30 cm	1		
2990	Percussion Cap	N477 E568	L1/0–10 cm	1		Smooth
2996	Lead Sprue	N477 E568	L1/0–10 cm	1	0.9	

Chapter 4

Fort Pierre Chouteau Glass Assemblage

Gregory Brothers, Hilary G. Dutcher, Brandy Feaster, Rebecca Magee, and Melissa E. VanOtterloo[1]

Edited by Richard A. Fox[2]

Methodology

The analysis of the glass assemblage from Fort Pierre Chouteau was a multistep process. The assemblage contained artifacts from excavations that were undertaken 1980–1982 and 1997–2001. The first step taken to analyze the assemblage was to sort through the all the artifacts to determine which sherds would be the most informative. Determining which sherds would be informative was based upon the distinctive features that the sherd possessed. Many bags contained sherds that were not analyzed due to a lack of analytical features, and a box of flat (window) glass was not analyzed.

For each informative sherd in the assemblage an artifact record form was completed. On this form, information such as the catalog number, excavation unit, and depth were noted. The sherd was also described, including the color of the glass, dimensions, and distinctive features (i.e.

[1]Department of Anthropology, University of South Dakota. The authors are students at the University of South Dakota and are listed in alphabetical order.

[2]Department of Anthropology, University of South Dakota. Dr. Fox also acted as principal investigator for the analysis and write up.

embossing, mold markings, pontil scars). The analyst then identified what part of the bottle the sherd had come from (i.e. finish, base, etc.) and attempted to determine what type of bottle it was. In all cases sketches of the artifact were drawn.

Based upon the analysis of the diagnostic features of the sherd, a possible date range was determined for the artifact. For example, by examining pontil scars on the base of the bottle or mold seams one could determine if the bottle was machine or hand blown. Depending on the technique used, the analysts were able to determine an approximate date of manufacture. Many of the finishes could also be assigned date ranges, during which the finish was most commonly used. Complete bottles and sherds with embossing—both text and decorative—were researched, with the intent of determining a date of manufacture. All these dates were used to reasonably determine if the artifact was deposited during the Army occupation period (1855–1857). Those that did not fit comfortably were considered non-period and are not included within this report.

After analysis, the assemblage was at first categorized according to bottle nomenclature—finish, neck/shoulder, body, and bases—as well as other diagnostic features, such as embossing, decorative glassware, decorative flasks, and miscellaneous. In order to write this report, the assemblage was reorganized according to use: alcohol, medicine, food, complete bottles, glassware, and other. These categories were then further divided into finishes, bases, panels, embossed, and other. Summaries of the data are presented in Tables 4.1–4.10.

Descriptions

Alcohol

Sherds determined to be alcohol bottles made up a sizeable part of the assemblage (n = 60). The identifiable sherds were categorized according to presumed contents.

Whiskey Flasks

Scroll (Violin) Flasks

The scroll was a popular design for whiskey flasks from about 1830 through at least the 1850s (McKearin and Wilson 1978:423). Only a few glass manufacturers have been identified, and those manufacturers that have been identified were Midwestern glassmakers, which "suggests exclusive manufacture in the Midwest" (McKearin and Wilson 1978:423).

Scroll flasks were produced in many sizes, the most common of which are the half pint, pint, and quart. The 2 1/2 quart size is rare for scroll flasks and only found in a few other flask designs, while the miniature ($2^1/_2''$ high) and gallon sizes are rare but unique to scroll flasks (McKearin and Wilson 1978:423).

Nineteen scroll flask sherds (80-303-315, 81-113-474, 97-0066-777, 98-0131-509, 00-90-653, 00-90-813, 00-90-2004, 01-73-107-1, 01-73--129-1, 01-73-129-2, 01-73-129-3, 01-73-129-4, 01-73-301, 01-73-458, 01-73-510-1, 01-73-510-2, 01-73-623, 01-73-820, 01-73-1631) are present in this assemblage, all of which are aqua in color. The sherds range in size from $0.7 \times 0.7''$ to a $3.5 \times 2.5''$ sherd with a nearly complete base. Most sherds appear to be fragments of the medial scrolls, while some are indicative of the lateral ribs. Medial scrolls and lateral ribs are common to all scroll flask designs; therefore no other information could be obtained.

The largest scroll flask sherd in the assemblage (00-90-653) contained most of the inferior scroll and base (Figure 4.1). The large blowpipe pontil scar in the center of the base, coupled with an "end-to-end bisecting mold seam" (McKearin and Wilson 1978:517) indicates that the flask was manufactured prior to 1850 (Lindsey 2007). There is no one specific scroll design with which this sherd could be identified, as the inferior scroll was a common feature on all scroll flasks.

Two sherds have a star, which was common in the upper and mid spaces of scroll flask designs. The first of these sherds (01-73-820) is aqua and contains a four-pointed star, as well as part of the medial scroll. The only scroll flask design recorded by McKearin and Wilson with a four-pointed star is GIX-23, which has two four-pointed stars in the lower space (McKearin and Wilson 1978:622–623). It was manufactured in green, emerald-green, and aquamarine by an unknown manufacturer (McKearin and Wilson 1978:622). The other sherd (80-303-315) contained an eight-pointed star, which was a common sized star for scroll flasks. The sherd also possessed evidence of the medial scrolls and lateral ribs, leading to the conclusion that the sherd was the mid space of a scroll flask. There are twelve flasks recorded by McKearin and Wilson with an eight-pointed star in the mid space and having been produced in aquamarine (McKearin and Wilson 1978:618–623). This sherd is most likely from any one of those particular designs.

Pictoral Flasks

One flask sherd (01-73-1446-1) was identified as a light aqua George Washington flask panel, measuring $3.7 \times 2.25''$ A portion of the American eagle design, which would have been on the reverse of the portrait

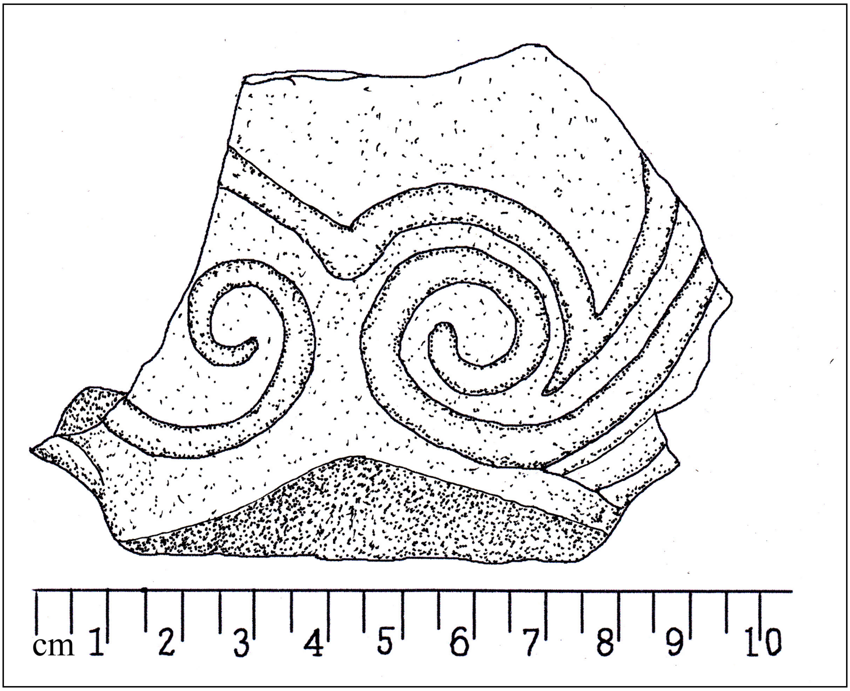

Figure 4.1: Scroll flask, inferior scroll and base. CN 00-90-653.

of Washington, was visible (Figure 4.2). Part of the horizontal beading found on the edges of the flask was also identified. Based on the visible design and color, the flask was determined to be the style GI-9 identified by McKearin and Wilson, which was produced by an unknown glasshouse (McKearin and Wilson 1978:524–525). While there are no distinguishing marks from which to determine a specific manufacturer or date, many glasshouses throughout the United States produced Washington pictorial flasks from the 1820s through the 1850s (McKearin and Wilson 1978:696–697).

Other Flask Sherds

There are fourteen flask sherds for which a specific design could not be determined. Some raised design is visible on all of the sherds, but the exact design is impossible to detect. Of the fourteen, eight (80-303-535-1, 80-303-535-2, 00-90-035, 01-73-969, 01-73-1280, 01-73-1334-1, 01-73-1334-2) were colorless and six (97-0066-1002, 00-90-1234, 01-73-1201, 01-73-1446-2, 01-73-1446-3, 01-73-1446-4) were aqua. The sherds ranged

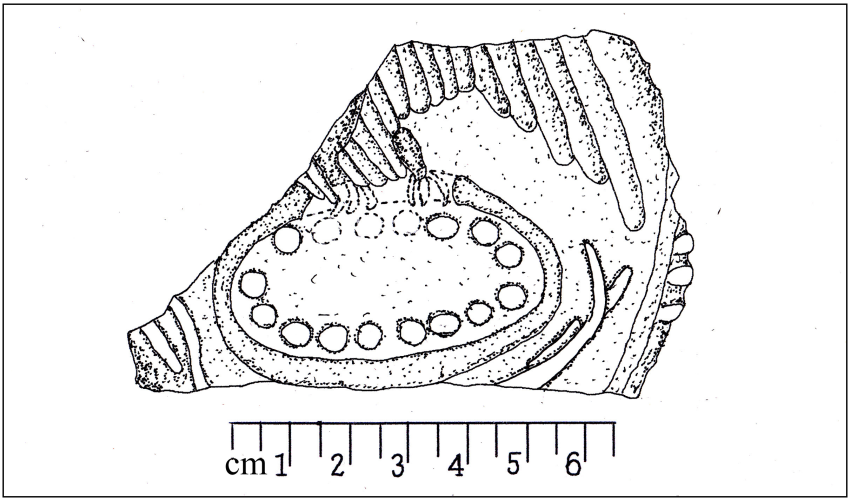

Figure 4.2: George Washington flask, American Eagle panel. CN 01-73-1446.

in size from $0.3 \times 0.6''$ to $1.2 \times 1.9''$

One aqua sherd (97-0066-1002) was a fragment of a shoulder, neck, and finish. The finish is a plain lip, with evidence of fire polishing. Fire polishing was common practice in flask manufacture (McKearin and Wilson 1978:517). Another, colorless sherd (00-90-035) shows evidence of tool marks on what would have been the inside of the flask, creating a raised space on the outside.

Beer and Ale

There were four fragments that were identified as beer or ale bottles in the assemblage. Of the four, two (80-303-723, 81-113-595) were bases and two (01-73-2830-1, 01-73-2830-2) were neck and shoulder fragments.

The first base (81-113-595) was a nearly complete, heavy olive colored base that measured $2.5 \times 2.7''$, with a shallow kick-up. There were no mold seams, indicating that the bottle was most likely free blown and therefore manufactured before the 1850s (Lindsey 2007). The other base fragment (80-303-723) was amber brown with a shallow kick-up. The base is nearly complete, with a sand pontil, which is commonly found on bottles manufactured from the eighteenth century to the first half of the nineteenth century (Lindsey 2007).

The neck and shoulder fragments (01-73-2830-1, 01-73-2830-2) were refit and showed mold markings, two vertical markings on the neck and one horizontal marking on the shoulder. These markings match the type of markings made by the three part dip mold method, which was adapted into the United States in the 1830s (Lindsey 2007). The neck was broken at the top and there was no finish. However, on the inside of the neck there was a drip of glass, created when the finish was applied. The presence of an applied finish dates the bottle from 1840 to 1885 (Lindsey 2007).

Wine and Champagne

Wine and champagne bottle base fragments in the assemblage were identified by the color of the glass, evidence of a kick-up, and the relative thickness of the base (Lindsey 2007).

Twenty-two wine and champagne bottle fragments were identified in the assemblage. All the sherds were various shades of olive green. Fourteen of these fragments (No CN 1-1, No CN 1-2, No CN 1-3, 80-303-487, 80-303-659, 81-113-429, 81-113-474-1, 81-113-512, 81-113-612, 81-113-679, 97-0066-81-1, 97-0066-81-2, 97-0066-95, 97-0066-822, 98-0131--1327 (Items 1-5), 98-0131-1576-1, 01-73-1308) are bases and ranged in size from $1.2 \times 1''$ to $2.0 \times 6.0''$ (Lindsey 2007).

Five fragments (98-0131-1327-1, 98-0131-1327-2, 98-0131-1327-3, 98-0131-1327-4, 98-0131-1327-5) refit to form a champagne bottle $3.5''$ in diameter (Figure 4.3). One fragment formed the kick-up and contained a large mamelon. A mamelon was formed by a turn mold; a method used as early as 1850, and is often found on champagne bottles (Lindsey 2007). Another sherd (81-113-429-1) was also a large mamelon, evidence of a turn molded champagne bottle.

One fragment (97-0066-81) was identified as a wine or champagne bottle neck. The concentric rings on the neck are another indicator of turn the mold method of production (Lindsey 2007).

Medicine

Three sherds (n = 3) were positively identified as being patent medicine containers based on the embossing on the sherds and the shape of the bottle.

The Davis Vegetable Painkiller medicinal panel sherd (80-303-807) was one of those positively identified. This panel is curved and aqua with a "DAVIS" and embellishments embossed at the top (Figure 4.4). While the company Perry Davis & Son was established in 1840, it did not begin embossing bottles until 1854. Since the company changed hands and names in

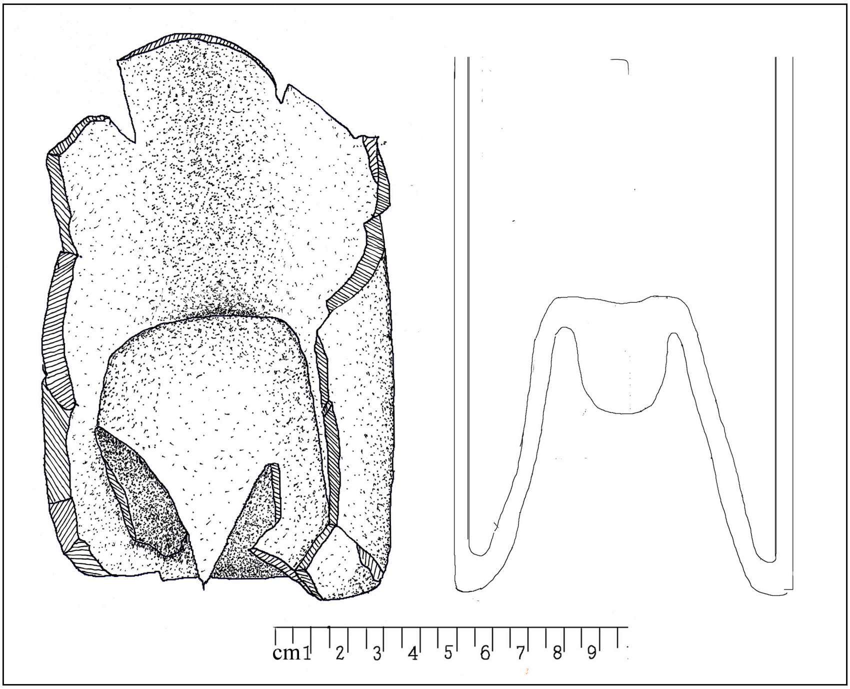

Figure 4.3: Turn molded champagne bottle with mamelon. CN 98-0131-1327.

1895, to Davis and Lawrence Co., the range of dates for this bottle would be 1854 to 1895 (Fike 1987; p 130).

Four more sherds were identified as belonging to patent medicines. Two of these sherds are an aqua base (81-113-100-1) and corner piece (81-113-100-2) of a square or rectangular bottle. One sherd (81-113-099) is a portion of an aqua panel with "V..." embossed on it, while another (81-113-098) is also a portion of an aqua panel embossed with "...AMENT [sic]" (Figure 4.5). All four sherds were found in the same excavation unit and level. Due to the spelling of "linament" [sic] and the "V", the sherds most likely once belonged to a bottle of McLean's Volcanic Oil Liniment. James Henry McLean, the maker of the Volcanic Liniment Oil, was also involved in the making of Mexican Mustang Liniment which was also sometimes spelled "liniment" with an "A" rather than an "I". McLean began manufacturing the Volcanic liniment in 1841 (Fike 1987; p 194; Anonymous n.d.a).

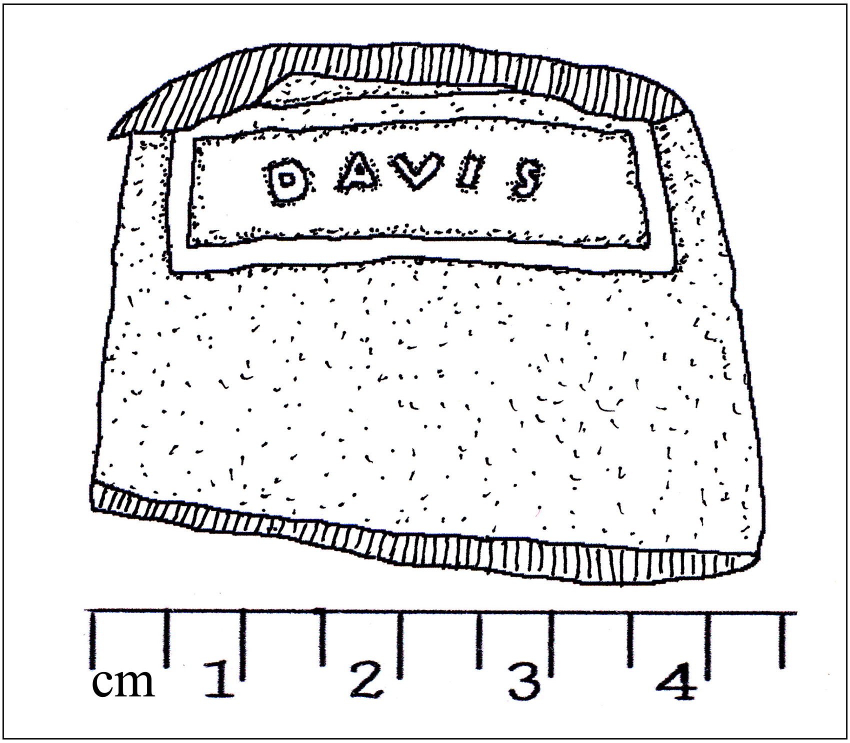

Figure 4.4: Davis' Vegetable Painkiller, embossed panel. CN 80-303-807.

Food

Food containers (n = 6) have been identified by the shape and size of the base and finishes, and embellishments on the base and body of the bottles.

Food and Sauce Containers

Three fragments have been identified as being food storage containers. Although the exact contents of the bottles remains unknown, they have all been determined to be gothic-style bottles which were most commonly produced from the 1840's through the 1880's and used for preserves, pickles, and sauces (McKearin and Wilson 1978). Gothic bottles ranged from square to hexagonal in shape, with distinctive "church window" like panels which are indented at the base and usually peaked at the top (Lindsey

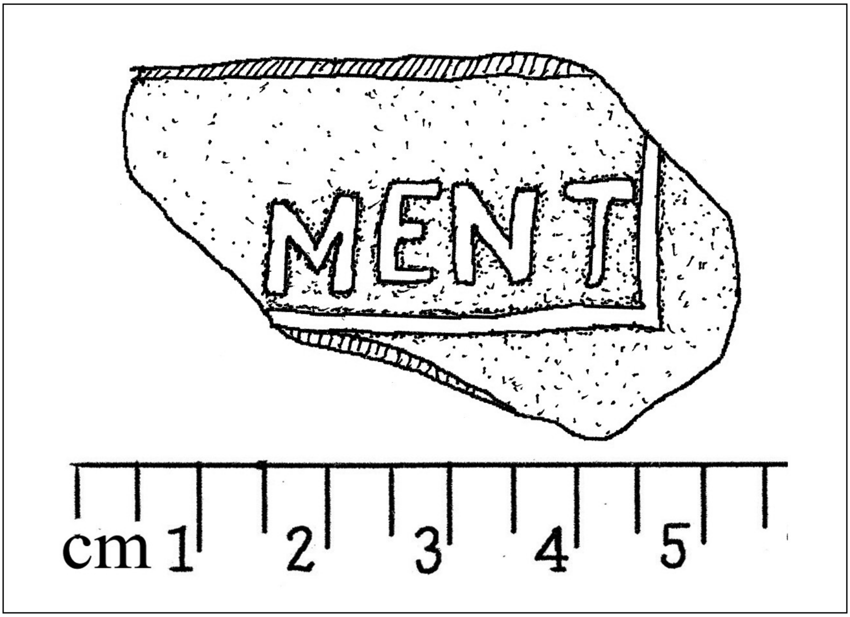

Figure 4.5: McLean's Volcanic Oil Liniment, embossed panels. Left, CN 81-113-099 and right, CN 81-113-098.

2007).

One fragment (00-90-1101) is a partial base. It is a dark green-aqua and appears to be a hexagonal shape. Parts of the panel attached to the base exhibit the decorative indention commonly found on gothic-style bottles.

Another fragment (98-0131-801) is a partial body of an aqua-colored gothic-style bottle (Figure 4.6). It appears to be hexagonal in shape, with four definite sides that do not meet. Each side displays the same decorative pattern: a hexagon shape with the triangles in between each corner slightly raised. The decoration is bordered above and below the hexagon shape with a protruding horizontal line that encircles the entire body.

The third fragment (81-113-474-2) is a piece of a gothic-style bottle panel. The piece is aqua and flat with the peak of the "church widow" element impressed.

Unknown

Three fragments are presumed to be from the same condiment or sauce container. All three are pale aqua in color and exhibit a ribbing pattern.

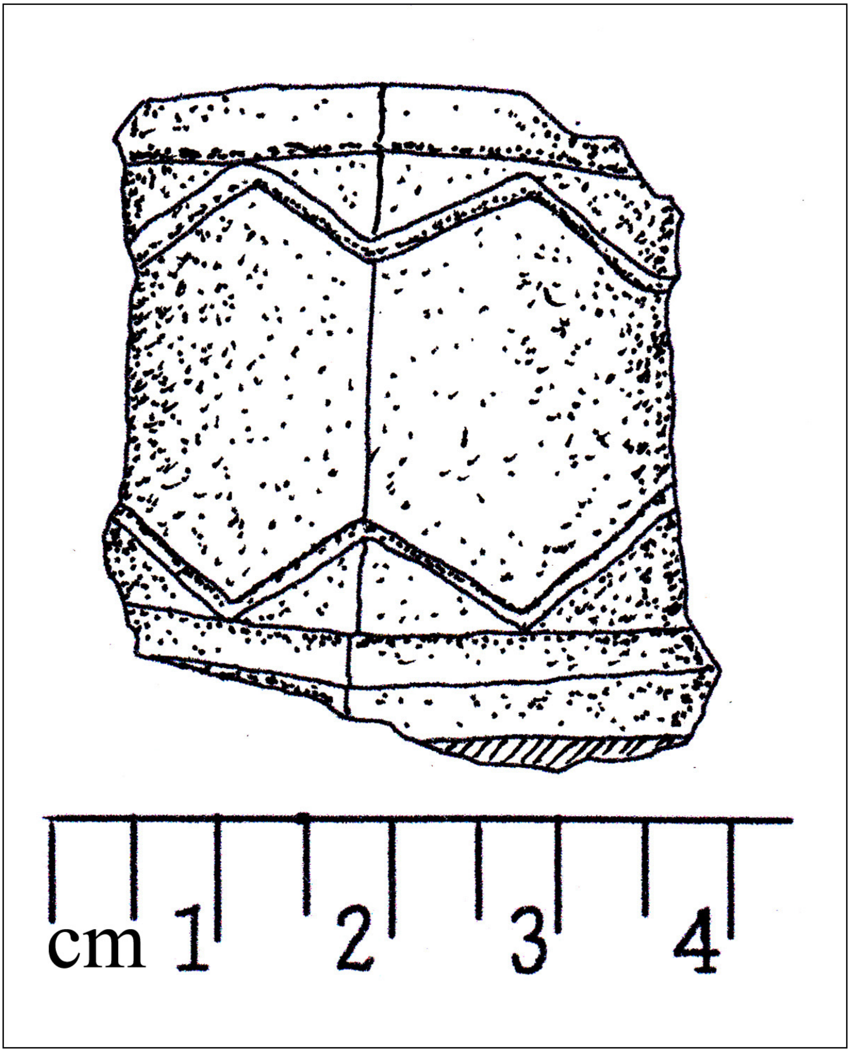

Figure 4.6: Gothic style food bottle. CN 98-0131-801.

One fragment (00-90-396) has vertical ribbing, with one of the ribs having a rounded edge. Another horizontal rib runs perpendicular to the vertical ones. The broken edge on this sherd makes it unclear if this is the base or another element of the bottles embellishment pattern. The other two pieces also have the vertical ribbing pattern. One of the sherds (00-90-634-1) also shows the rounded edge on one rib. The other (00-90-634-2) also has one vertical rib and three horizontal. This sherd has been subject to fire.

Glassware

Glassware pieces (n = 20) were identified on the basis of decorative embellishments, color and shape.

Identified Decorative Glass

One fragment (97-0066-516) has been identified as a decanter stopper. It is colorless and octagon shaped (Figure 4.7). With the lower portion of the stopper broken, it measures 1.8″ wide by 1.8″ high. No mold seams are visible on this fragment.

Another fragment (No CN 2-1, No CN 2-2, No CN 2-3) is made up of three fragments that fit together and form the conical foot of a piece of stemware. The piece is clear, and the foot is smooth (Figure 4.8). Directly above the foot is beaded design ring, above the beaded design is a ball knop which is decorated with small ribs. Mold seams on the fragment indicate that it is a piece of pressed glass and produced no earlier than 1825 (Jones and Sullivan 1989; McCain 1994).

A third fragment (98-0131-1575) is an amethyst handle fragment with diamond pattern molding and a mold seam along the back side (Figure 4.9) (Lindsey 2007).

Unidentified Patterned Glass

Four fragments of colorless glass with decorative patterns were found in the assemblage. One (98-0131-1026) is most likely a flared glassware rim, frosted, with a panels and mitres decorative motive. It is a possible example of flint glass, which was common by the early nineteenth century (Jones and Sullivan 1989; Husfloen 1992). The second fragment (No CN 3) is curved and has a fine cut pattern with panels, a popular motif during the 1890s (McCain 1994; Husfloen 1992). The third (No CN 4) is a curved fragment with a sunburst decorative motif (Jones and Sullivan 1989). The final fragment is made up of three sherds that fit together (81-113-207-1, 81-113-207-2, 81-113-207-3). The pattern on the glass is unknown.

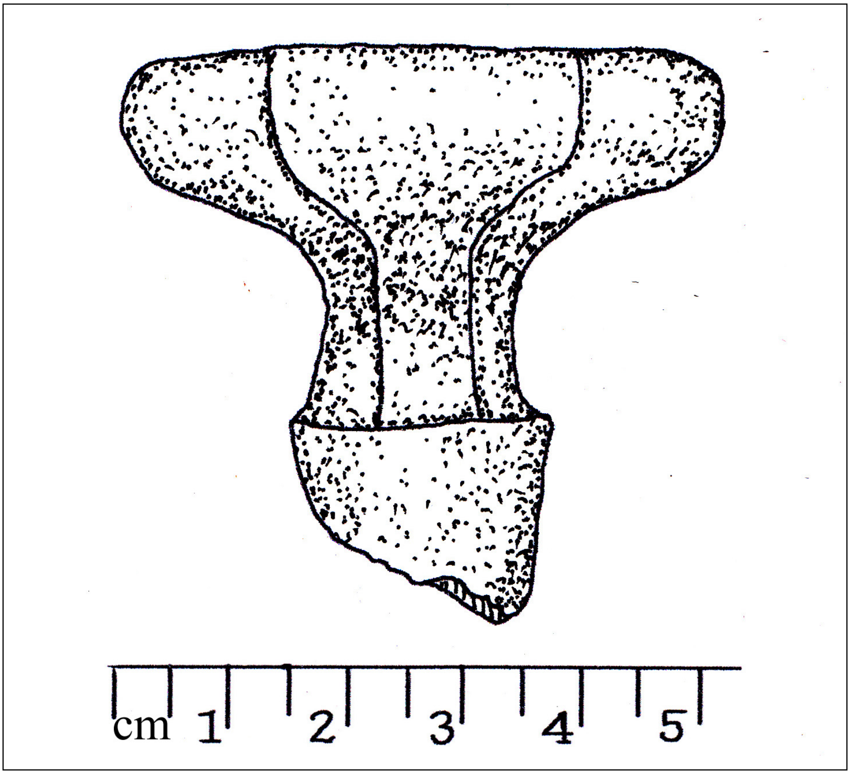

Figure 4.7: Octagonal decanter stopper. CN 97-0066-516.

Two more fragments with decorative patterns were also found in the assemblage; both of these fragments were colored. The first (80-303-869) is yellow with a diamond decorative design. The second is five pieces (No CN 5-1, No CN 5-2, No CN 5-3, No CN 5-4, No CN 5-5); two of which refit to form a curved, vivid blue, non-opalescent fragment with a hobnail design which was popular during the 1880s and 1890s.

Other Decorative Glass

Three glass sherds from the assemblage were determined to be decorative glass based upon their color. One fragment (80-303-37) is colorless and frosted. The second (00-90-873) is vivid blue. The final (98-0131-386) is a curved, periwinkle shard.

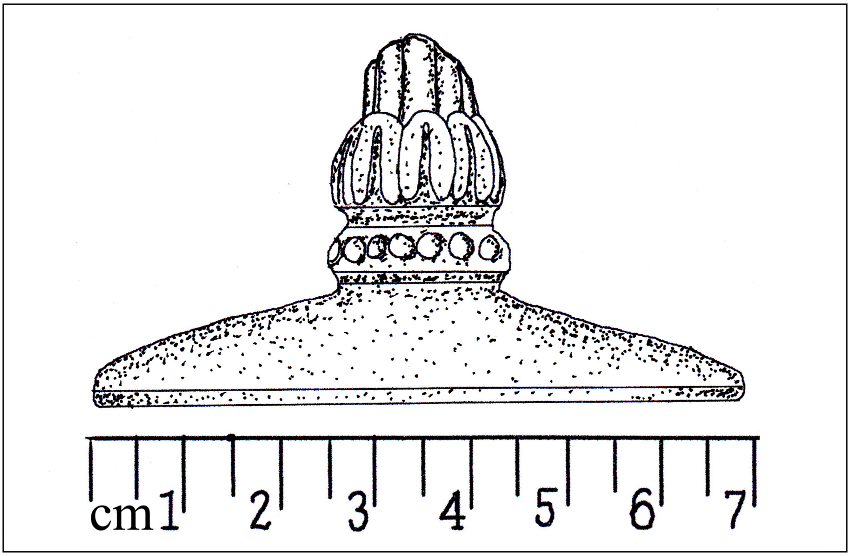

Figure 4.8: Goblet foot, pressed glass. No CN.

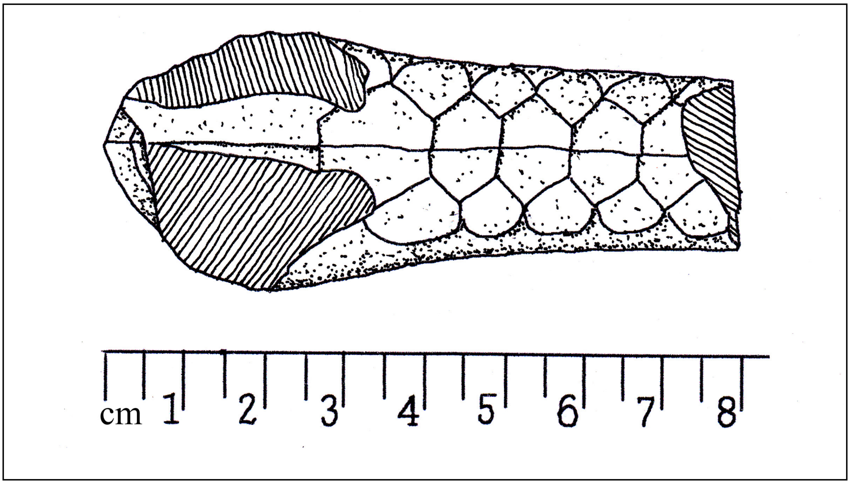

Figure 4.9: Decorative handle with diamond mold pattern. CN 98-0131-1575.

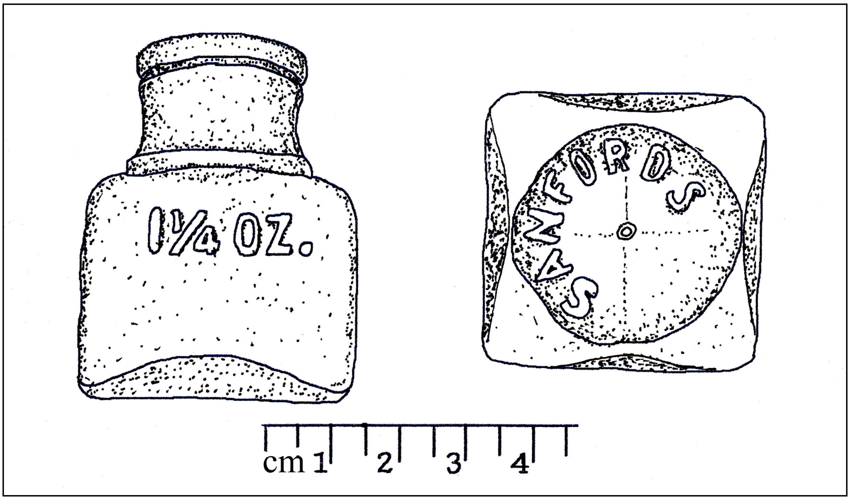

Figure 4.10: Sanford ink bottle—L side view, R bottom. CN 00-90-2008.

Complete Bottles

Ink

The only ink bottle in the collection is complete (00-90-2008). This is a clear glass, square bottle; "SANFORD / 8" is embossed on the base. One side is embossed with "$1^1/_4$ oz.", indicating the volume of contents (Figure 4.10). Although the Sanford Ink Company began in 1857, the presence of a mold seam indicates that the bottle was produced no earlier than 1903 by an automatic bottle machine (Anonymous 2005).

Unknown

One other complete bottle (00-90-586) was found in the assemblage. It is a colorless, twelve-sided polygon, with a tooled finish and a portion of the cork still in the closure (Figure 4.11). It is approximately 2″ tall, has a base diameter of 1.25″, and two vertical mold seams that run from the base to just below the finish on opposite sides.

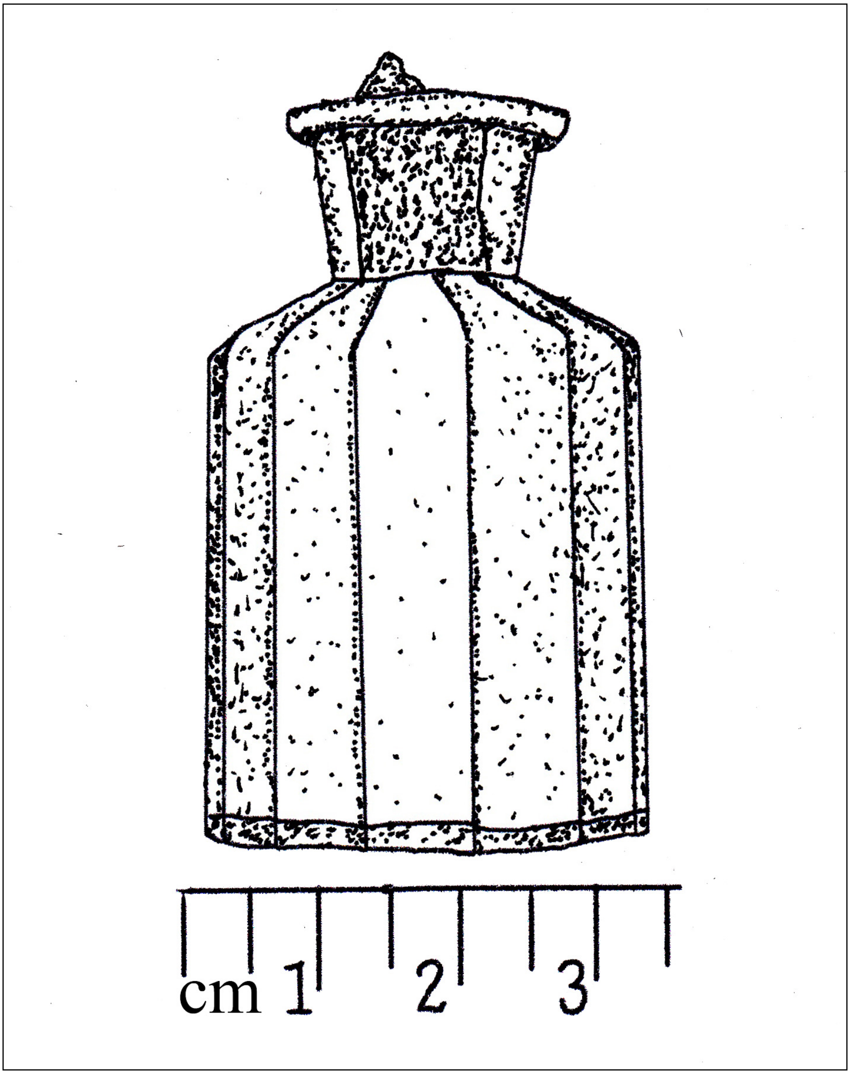

Figure 4.11: Complete bottle with remnants of cork. CN 00-90-586.

Other

Finishes

Many finish fragments were found in the Fort Pierre Chouteau bottle glass assemblage (n = 92). While many of these were not found in association with the body of the bottle they belong to, some information can still be ascertained by certain features such as mold seams, tool marks, and finish styles.

Rolled/Folded

Rolled or Folded finishes were a common method of finishing bottles prior to 1870. Between 1815 and the 1860s these types of finishes were common on flasks, and between 1830 and 1870 they were also common on a wide variety of bottles including, food and sauce bottles, medicinal, ink, snuff and utilitarian bottles (Lindsey 2007).

Nineteen Rolled/Folded finishes were found in the assemblage. Nine of these (97-0066-642, 97-0066-1195(1222), 99-70-1512, 01-73-88, 01-73-129-5, 01-73-1246, 01-73-1673, 01-73-1864, 01-73-2224-1) range from blue-green to aqua in color. Nine more (80-303-406, 81-113-513, 98-0131-203, 00-90-065, 00-90-525-1, 00-90-875, 00-90-1209, 01-73-268, 01-73-1639, 01-73-1960) are colorless. The remaining fragment (00-90-525) is also colorless and has two embossed lines that run horizontal below the finish.

Prescription

Prescription finishes were common from the mid 1870s through the early 1920s. This finish style is most commonly found on druggist or prescription bottles but is also found on ink, perfume, proprietary medicine, poison, and toiletry bottles. Rarely, it has been found on liquor bottles, flasks, and food bottles (Lindsey 2007).

A total of eleven prescription finishes were found in the assemblage. Of these eleven, ten (80-303-62-1, 80-303-841, 97-0066-142, 98-0131-975, 98-0131-1094, 98-0131-1573-1, 98-0131-1573-2, 99-70-1049, 00-90-325-1, 00-90-974) are colorless. The remaining fragment (00-90-1475) is pale aqua.

Bead

Variations of bead finishes were found on a wide variety of bottles from 1790-1910. They were commonly found on medicinal bottles and occasionally used for other purposes including liquor, sauces, foods, condiments, and utilitarian bottles (Lindsey 2007).

Ten total bead finishes were found in the assemblage. Eight (99-70-42, 00-90-325-2, 00-90-525-3, 00-90-1278, 01-73-210, 01-73-596, 01-73-1409, 01-73-1884) are aqua, and the remaining two (97-0066-945, 00-90-436) are colorless.

Oil/Ring

The Oil/Ring finish was commonly applied to many bottles produced from the 1830s to 1920. One of the most widely used finishes, it was used on patent medicines, sauces, large ink bottles, as well as liquor bottles and flasks (Lindsey 2007).

Eight total Ring/Oil finishes were found in the assemblage. Two finishes are applied finishes, giving them a date range of 1830 to 1880. Of the applied finishes one (80-303-842-1) is aqua, and the other (98-0131-1573-3) is pale green.

One brown finish (98-0131-7) is tooled, giving it the date range of 1870 to 1920.

The method of finishing could not be determined for the remaining five fragments. Of these five, four (90-70-1567-1, 00-90-1529, 01-73-210, 01-73-1200) are aqua, while the final fragment (80-303-800) is olive.

Double Oil/Mineral

The Double Oil/Mineral finish was used earliest in the 1820, but was most widely used from the 1840s to 1880s. This finish type was commonly found on patent medicine, mineral water, soda, wine, and liquor bottles (Fike 1987:8; Lindsey 2007).

Eight total Double Oil/Mineral finishes were found in the assemblage. Five of these (80-303-868, 81-113-612, 98-0131-713, 01-73-1146, 01-73-1690) are olive in color. One is colorless (01-73-523-1), and another is amber (98-131-237).

The final Double Oil/Mineral finish (99-70-1065) is aqua and applied, giving it a more specific date range of 1840 to 1885.

Champagne

Five total champagne finishes were found in the assemblage. Of these five, four (81-113-429-2, 01-73-523-2, 01-73-1808, 01-73-2463) are olive, and one (99-70-1767) is aqua in color.

Wide Prescription

Wide Prescription bottles were produced for druggist containers, decanters, utilitarian, ink, and cologne bottles from 1800 through the 1870s. They continued to be used through the early twentieth century for chemical reagent bottles (Lindsey 2007).

Seven Wide Prescription fragments were found. Four of these (80-303-508, 00-90-381, 00-90-478, 00-90-479) are colorless. The remaining three (99-70-1049, 01-73-2224-2, 01-73-2428) are aqua.

Flat

The Flat (also known as Patent) finish was commonly used on patent medicinal bottles from about 1850 to the early twentieth century. It was also used on other bottles including ink, hair tonic, and liquor bottles (Lindsey 2007).

Three fragments were found in the assemblage—all of them colorless (80-303-62-2, 97-0066-624, 01-73-2159).

Double Ring

The Double Ring finish was utilized from 1840 to the 1920s, though it was most popularly used between 1850 and 1910. This finish type is more commonly found on mouth-blown bottles rather than machine made. It can be found on patent medicines, liquor and pictorial flasks, sauce and food bottles, and some ink bottles (Fike 1987; Lindsey 2007).

Six finish fragments were found in the assemblage. Five of these (00-90-875, 81-113-207-4, 81-113-207-5, 81-113-207-6, 98-0131-1573-4) are colorless. The remaining fragment (80-303-863) is sun-colored amethyst.

Straight

Straight finish styles began to be used during the late eighteenth century and continued to be used into the 1870s. This finish is commonly found on patent medicines, ink, perfume, condiment and liquor bottles and flasks (Lindsey 2007).

Three Straight finishes were found in the assemblage (81-113-700, 00-90-193, 00-90-1424), and all three are colorless.

Stacked Ring

The stacked ring finish, a variation of the double ring finish, was most common from 1850-1910. It is uncommonly used on American made bottles, but often used for patent medicines, liquor flasks, sauce and food bottles, and pictorial flasks (Lindsey 2007).

Two stacked ring finishes were found in the assemblage, and both are colorless (98-0131-340, 01-73-2587).

Brandy/Straight Brandy

The Brandy and Straight Brandy finish styles are very similar morphologically, were produced around the same time, and used for similar purposes. They were commonly used from 1860 through the 1920s on liquor, beer, medicinal, and druggist bottles (Lindsey 2007).

Two finishes may be either straight brandy or brandy style. One (98-0131-242) is olive, and the other (98-0131-1573-5) is amber.

One Brandy finish fragment (00-90-1698) was found. It is aqua in color and applied, giving it a range of dates from 1860 to 1885.

Three straight brandy finishes were found in the assemblage. Two of these are applied; one (99-70-1740) is colorless, and the other is three pieces refit (00-90-869-1, 00-90-869-2, 00-90-869-3) and is sun-colored amethyst. The remaining finish is four fragments refit (00-90-325-3, 00-90-325-4, 00-90-325-5, 00-90-325-6). It is mouth blown and amber.

Packer

The Packer finish was used on any bottle that held liquid from about 1850 through the 1920s (Lindsey 2007)

One (80-303-862) clear packer finish fragment was found in the assemblage. The mold seam on the fragment extends to the very top of the finish, indicating that it was produced by an automatic bottle machine, and giving it a range of dates from 1905 through the 1920s.

Other

Three other similar finishes (00-90-478-2, 00-90-782, 00-90-1529) are considered to be tooled finishes (no dating available), but the type of finish was unidentifiable. All thee finishes are clear but yellowed with age. The interiors of the finishes were indented to follow the exterior (looks something like a ledge) and seem to be similar to the bead finish. Finishes made by hand-held tools were used to include external features such as one- and two-part finishes, helical threads, and internal bore features like threads and ledges (Jones and Sullivan 1989:40).

Body

Many unknown body fragments (n = 27)that were found exhibited shapes and colors that may give clues as to their bottle's former contents.

Ribbed

Ribbing was a common design on glassware, and was also common on many types of food and sauce containers (McCain 1994; Lindsey 2007).

Thirteen bottle body fragments were found with a ribbing pattern. Nine of these fragments found in the assemblage are aqua (81-113-123, 81-113-474-3, 81-113-474-4, 98-131-1411, 99-70-318, 01-73-170-1, 01-73-221, 01-73-492, 01-73-547), three (98-0131-1171, 98-0131-1567-2, 00-90-355) are colorless, and one (80-303-760) is green.

Unknown

One fragment (80-303-179) is the corner of an unknown glass item. It is clear, cracked, and 0.5″ thick. Another fragment (00-90-893) is colorless, and polygonal in shape with a curved interior. A third fragment (00-90-2012-1) may either be the finish of a wide-mouthed bottle or the lip of a piece of glassware. It is colorless and frosted with a rounded, finished edge. Another fragment (00-90-381) could also be a finish or a lip and is colorless.

Two body fragments of unknown origin are aqua in color. One (81-113-663) is a corner piece with two shallow ridges on one side that run parallel with the corner. The other (80-303-333) is a corner piece with a curved interior.

Panels

Eleven sherds from the assemblage were identified as side panels. All of the sherds possessed some morphological characteristics such as evidence of an indented panel and the relative flatness of the glass that indicated that they were part of a paneled body. They ranged in size from $1.0 \times 1.1''$ to $2.0 \times 2.9''$

Two of the sherds (00-90-1492, 01-73-1639) are colorless shoulder fragments. The presence of panels was indicated by the shape of the shoulder, specifically the angles that would have delineated the panels. Both of these pieces would have been part of fairly sizeable bottles. The absence of mold seams, embossing, or any other specifying diagnostic feature prevented the positive identification of either of these sherds with a particular product or date.

Five of the sherds contained an angle or ridge, which are direct evidence of indented panels. One shard (81-113-679) is aqua, three (80-303-62-3, 80-303-62-4, 01-73-2411) are colorless, and one (80-303-842-2) is sun-colored amethyst. The sun-colored amethyst sherd was part of a small square or rectangular bottle, measured $0.8 \times 1.2''$, with at least two indented panels. The amethyst color was caused by the addition of manganese dioxide to the glass during production as a decolorizing agent (Lindsey 2007). This method of creating colorless glass was most widely used from the 1880s to WWI, although manganese decolorized bottles can date anywhere from 1820-1930s (Lindsey 2007).

Five sherds, instead of being indicative of indented panels, were a raised panel with raised ribbing along the edge. Three were aqua (98-0131-203-1, 98-0131-203-2, 98-0131-203-3) and two (00-90-525-3, 00-90-525-4) were colorless, and all the sherds ranged in size from 0.9 × 1.3″ to 1.9 × 3.2″ The raised panel indicates some sort of decorative bottle, though without more information it is impossible to determine what type of bottle or the date of manufacture.

Unembossed Bases

Bases were common in the glass assemblage (n = 61), though many were unidentifiable. Various characteristics about a bottle base can give insight into the date of its production, the presence and type of pontil scar, placement of mold seams, color, and shape.

Pontil Scars

Pontil scars are marks left on the base of the bottle as a result of its detachment from the pontil rod during production. Pontil rods began to be replaced by snap tools, which left no mark on the bottle, beginning as early as 1850. The use of snap tools did not become commonly used till the mid 1860s, so most bottles with pontil scars were produced before this date (Lindsey 2007).

Blowpipe Pontil Scar

Blowpipe pontil scars are formed when the molten glass tipped end of a traditional pontil rod is separated from the bottle. After the removal of the pontil rod, a ring-shaped mark is left on the base of the bottle (Lindsey 2007).

Sixteen small bottle bases with blowpipe pontil scars were found in the assemblage. These ranged in size from .85″ (30-808-840-1) to 1.8″ (80-303-742), and were most likely homeopathic or druggist vials, though this cannot be stated for sure due to the size of the fragment and the lack of the rest of the body. Thirteen of these (80-303-222, 80-303-583, 80-303-742, 80-303-840-1, 80-303-840-2, 81-113-124, 81-113-394, 81-113-598-1, 99-70-64-1, 99-70-64-2, 99-70-1765, 01-73-1284, 01-73-2010) are aqua in color. The remaining three (98-0131-674, 00-90-691, 01-73-733) are colorless.

Seven larger bottle base fragments also have blowpipe pontil scars. These ranged in size from 1.49″ (98-0131-1576-2) to 2.9″ (81-113-048) and are significantly thicker glass than those previously mentioned. Four of these fragments (81-113-048, 81-113-598-2, 98-0131-1576-2, 01-73-2627) are round and aqua. One (01-73-435) is colorless. The remaining two sherds are polygon shaped. One (01-73-569) is aqua, and the other (01-73-2039) is colorless.

Bare Iron Pontil Scar

Bare iron pontil scars are created when the glass blower uses a pontil rod with no molten glass on the tip. The result is a slight ring formed on the base of the bottle (Lindsey 2007).

Three fragments from the assemblage have bare iron pontil scars. One (00-90-355) is made up of thirteen sherds that were fit back together. It has a deep kick up and is aqua. A second (00-90-981) is a portion of the kickup from a colorless bottle. The third fragment (80-303-812) is olive.

Glass Tipped Pontil Scar

Glass tipped pontil scars are formed when a solid iron rod, tipped in molten glass, is used as the pontil rod. When the bottle is broken off of the rod small bits of glass are left behind on the bottle in a spotty, but generally circular pattern (Lindsey 2007).

One fragment (00-90-478-3) from the assemblage was found to have a glass tipped pontil scar. It has a shallow kickup and is colorless.

Mold Markings

General Three fragments from the assemblage have mold seams on the base. The exact mold is unidentifiable because of the size of the fragments, but mold seams on the base of the bottle could either be from an automatic bottle machine, post bottom mold, or three part mold. The first fragment (80-303-444) is colorless, the second (80-303-842-3) is aqua, and the third (98-131-1576-3) is amber.

Turn Molds Turn molds were used to form bottles with no mold seams and a glossy sheen. While they began to be used during the mid 1860s, they were most widely used from about 1890 to the mid 1910s; usually for liquor, wine, beer, and mineral water bottles (Lindsey 2007).

Three fragments were produced in turn molds. The first (81-113-445) is aqua with a shallow domed base, with a very small mamelon in the center. The final two fragments (01-73-107-2, 80-303-62-5) do not have a mamelon present. Both are colorless with concentric rings around the base.

Cup Bottom Molds Cup bottom molds were used as early as 1850 and continued to be used through the 1910s when automatic bottle machines began to be widely used. Cup bottom molds were three part molds with one part being solely for the base, leaving a mold seam on the outside edge of the heel (Lindsey 2007).

Three base fragments were produced in cup bottom molds. One (80-303-62-6) is clear with a shallow dome. The second (99-70-20) also has a shallow dome and is aqua. The third (98-0131-1576-4) is amber with not enough of the dome present to mention its size.

Dip Mold/Three Part Dip Mold One olive kickup base (98-0131-1576-5) has no apparent mold seams and was most likely produced by a dip mold or a three part dip mold, as these leave no mold seam on the base.

Other

Many fragments have no distinguishing features other than their shape, color, and evidence of a kickup.

Round

Twenty-four bottles with round bases and no other distinguishing features were found. Of these, ten (97-0066-878, 97-0066-921, 98-0131-1576-6, 00-90-267, 00-90-2004, 01-73-129-6, 01-73-170-2, 01-73-1308, 01-73-1789-1, 01-73-1789-2, 01-73-1789-3, 01-73-2287) are olive, six (99-70-588-1, 99-70-588-2, 99-70-588-3, 99-70-588-4, 99-70-588-5, 99-70-588-6, 99-70-927, 99-70-1758, 00-90-193, 00-90-876-1, 00-90-876-2, 00-90-876-3, 00-90-876-4, 00-90-996) are colorless, four (80-303-771, 97-0066-321, 00-90-381, 01-0073-2801) are aqua, three (98-0131-1576-7, 98-0131-1576-8, 98-0131-1576-9) are amber, and one is sun-colored amethyst (98-0131-1576-10).

Five bottles in the assemblage with round bases also show evidence of a kickup. Two of these (01-73-334, 01-73-1081) are olive, two (00-90-1187, 97-0066-651) are aqua, and one (80-303-698) is colorless.

Non-Round

Two bottle bases (80-303-842-4, 99-70-81) are square or rectangular in shape and colorless.

Two base fragments (81-113-523, 00-090-1475) are polygon in shape and colorless.

One base (80-303-473) is very small–0.7″ in diameter, and aqua.

One base (80-303-62-7, 80-303-62-8, 80-303-62-9) is elixir shaped, most likely, and colorless.

Embossing

Embossing on bottles is often produced for design or as a label for the bottle's contents. The earliest embossed bottle in the United States was produced in 1809, and became increasingly popular after that (Lindsey 2007). Several (n = 42) embossed fragments were found in the assemblage.

Unknown

Many of the bottle fragments that have embossing on them do not contain enough information to derive an identification of its former contents. Twenty-two fragments are embossed with either unidentifiable letters and numbers or decorations. Of these eighteen, eleven (80-303-62-8, 80-303-842-5, 80-303-842-6, 80-303-842-7, 80-303-842-8, 81-113-374, 98-0131-86, 98-0131-879, 98-0131-1315, 00-90-470, 00-90-1424-1, 00-90-1424-2, 00-90-2012-2, 01-73-2267) are colorless, eight (80-303-842-9, 80-303-842-10, 99-70-528, 00-90-1414, 01-73-763, 01-73-982, 01-73-1246, 01-73-1322) are aqua, one (80-303-375) is amethyst, and one (80-303-121) is olive.

Lettering

Thirteen fragments show full letters in the embossing, but these letters are not enough to positively identify the bottle's contents. "...W..." or "...M..." is found on a colorless fragment (81-113-679). A colorless fragment (99-70-1052) is embossed with v: "M. M." "N..." is embossed on a colorless fragment (80-303-444). One fragment (98-0131-1315-1) is thin, polygonal in shape, colorless, and embossed with "...AS//M." "...D//U..." is embossed on a clear, thin fragment (98-0131-1315-2). "CUR..." is embossed on a clear fragment (98-0131-1572). Two pale aqua fragments (99-70-1178, 1-113-445) are embossed with "...E...." The letters "...(T)A..." are embossed on an aqua bottle (00-90-1631). "...(E)NT..." is found on an aqua fragment (99-70-341-1). One aqua fragment (81-113-207-7) is embossed with "...OR/...AN_...." The aqua fragment (99-70-341-2) is embossed with "...NC...." "SCH..." is embossed on an olive-colored fragment (00-90-981).

One colorless, curved shard (98-0131-867) is embossed with "...R. R...." This could possibly be part of "DR. R...," making it a good candidate for "DR. RUSSELL'S/BALSAM OF HOREHOUND/AND//SARSAPARILLA." If so, this specimen would not fit the fort period because the Dr. Russell Medicine Co. is known only from 1890 (Fike 1987; Hunt 1997). This, however, is speculation; for now, the temporal aspects and contents are not known.

Embossed Bases

Many bottles produced after 1885 have embossing on the base, and very few before that date do (Lindsey 2007).

Two bases have embossing on them, and one has embossing very near the base. One base (98-0131-1576-11) is sun-colored amethyst with an embossed “USA…” Another (00-90-1278) is olive colored, has a mold seam that runs parallel with the outside of the base, and embossing that reads “…_D_….” The final embossed base (81-113-164) has a definite blowpipe pontil scar, is aqua in color, and rectangular or square shaped; the embossing is on the side, just above the base, and reads “…Co.”

Other Embossing

Four colorless glass fragments (00-90-325-7, 00-90-621, 00-90-782-2, 00-90-2012-3) were identified as belonging to the same bottle. This was determined based upon the similar decorative ridge that is on all four shards. Three of the four shards (00-90-325-7, 00-90-782-2, 00-90-2012-3) had French lettering embossed on them, while one (00-90-621) did not. One shard (00-90-2012-3) reads “VERR…,” another (00-90-325-7) reads “…ERIE DE FOUGE…,” and the third shard (00-90-782-2) reads “VILAINE.” When translated, “VERR(E)” is the French word for glass, “DE” means of, and “FOUGE(RES)” is a city within the region of “(ILLE ET) VILAINE.” The city of Fougères has a history of glassmaking that dates to the arrival of Italian master glassmakers in the 16th century (Anonymous 2008). When pieced together, the bottle could read “VERR …ERIE DE FOUGE(RES)…(ILLE ET) VILAINE.” This would translate to “glass-(works? makers?) ? of Fougères ? Ille et Vilaine” (Anonymous n.d.b).

There is another sherd (01-73-1129) that is similar to the unembossed sherd associated with the sherds with French embossing. It is olive green in color, and possesses the same decorative ridge as the other sherds.

Melted Glass

Two small pieces of melted glass were found in the assemblage (01-73-478-4, 01-73-2068). Both are clear and irregularly teardrop shaped. The original size, shape, and usage are unknown.

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Table 4.1: Alcohol bottles by type and catalog number.

Catalog Number	Excavation Year	Provenience
Flasks		
Scroll/Violin		
80-303-315	1980	S37 E100 (Level 2: 3–6 cm)
81-113-474	1981	Trench F
97-0066-777	1997	N551 E540 (Level 1: 0–10 cm)
98-0131-509	1998	N514 E567 (10–20 cm)
00-90-653	2000	N465 E502 (40 cm)
00-90-813	2000	N465 E501 (Level 2: 10–20 cm)
00-90-2004	2000	Surface
01-73-107-1	2001	N457 E573 (0–10 cm)
01-73-129-1	2001	N457 E573 (10–20 cm)
01-73-129-2	2001	N457 E573 (10–20 cm)
01-73-129-3	2001	N457 E573 (10–20 cm)
01-73-129-4	2001	N457 E573 (10–20 cm)
01-73-301	2001	N454 E573 (0–10 cm)
01-73-458	2001	N454 E573 (10–20 cm)
01-73-510-1	2001	N481 E569 (Level 1: 0–10 cm)
01-73-510-2	2001	N481 E569 (Level 1: 0–10 cm)
01-73-623	2001	N481 E569 (2x2) (10–20 cm)
01-73-820	2001	N482 E568 (10–20 cm)
01-73-1631	2001	N454 E575 (0–10 cm, 8–10 cm)
Pictoral		
01-73-1446-1	2001	N483 E569 (Level 3: 20–30 cm)
Other		
80-303-535-1	1980	S33 E100 (Level 2: 10–20 cm)
80-303-535-2	1980	S33 E100 (Level 2: 10–20 cm)
97-0066-1002	1997	N445 E509 (Level 5: 40–50 cm)
99-70-450	1999	N484 E566 (Level 3: 20–30 cm)
00-90-035	2000	N465 E504 (Level 1: 0–10 cm)
00-90-1234	2000	N490 E501, Trench A (Level 4: 30–40 cm)
01-73-969	2001	N479 E567 (10–20 cm)

Table 4.1: continued

Catalog Number	Excavation Year	Provenience
01-73-1201	2001	N484 E568 (Level 2: 10–20 cm)
01-73-1280	2001	N484 E569 (Level 3: 20–30 cm)
01-73-1334-1	2001	N482 E568 (Level 4: 30–40 cm)
01-73-1334-2	2001	N482 E568 (Level 4: 30–40 cm)
01-73-1446-2	2001	N483 E569 (Level 3: 20–30 cm)
01-73-1446-3	2001	N483 E569 (Level 3: 20–30 cm)
01-73-1446-4	2001	N483 E569 (Level 3: 20–30 cm)
Beer/Ale		
80-303-723	1980	S34 E100 (Level 1: 0–10 cm)
81-113-595	1981	Trench E (20 cm B.S.)
01-73-2830-1	2001	N477 E 568 (Level 2: 10–20 cm)
01-73-2830-2	2001	N477 E 568 (Level 2: 10–20 cm)
Wine/Champagne		
No CN 1-1		N457 E573 (0–10 cm)
No CN 1-2		N457 E573 (0–10 cm)
No CN 1-3		N457 E573 (0–10 cm)
80-303-487	1980	S35 E100 (Level 2: 10–20 cm)
80-303-659	1980	S53 E100 (Level 2: 7–19 cm)
81-113-429-1	1981	Trench F
81-113-474-1	1981	Trench F
81-113-512	1981	Trench E
81-113-612	1981	Trench G (All Levels)
81-113-679	1981	Trench E – North
97-0066-81-1	1997	N513 E494 (Level 1: 0–20 cm)
97-0066-81-2	1997	N513 E494 (Level 1: 0–20 cm)
97-0066-95	1997	N513 E494 (Level 2: 20–30 cm)
97-0066-822	1997	N512 E494 (Level 2: 10–20 cm)
98-0131-1327-1	1998	N513 E566 (10–20 cm)
98-0131-1327-2	1998	N513 E566 (10–20 cm)
98-0131-1327-3	1998	N513 E566 (10–20 cm)

Table 4.1: continued

Catalog Number	Excavation Year	Provenience
98-0131-1327-4	1998	N513 E566 (10–20 cm)
98-0131-1327-5	1998	N513 E566 (10–20 cm)
98-0131-1576-1	1998	Surface
01-73-1308	2001	N478 E569 (20–30 cm)

Table 4.2: Medicinal bottles by catalog number.

Catalog Number	Excavation Year	Provenience
80-303-807	1980	S12 E49 (HistŻone I)
81-113-098	1981	S43 E104 (0–20 cm)
81-113-099	1981	S43 E104 (0–20 cm)
81-113-100-1	1981	S43 E104 (0–20 cm)
81-113-100-2	1981	S43 E104 (0–20 cm)

Table 4.3: Food bottles by type and catalog number.

Catalog Number	Excavation Year	Provenience
Food and Sauce Containers		
81-113-474-2	1981	Trench F
98-0131-801	1998	N513 E566 (0–10 cm)
00-90-1101	2000	N490 E500, Trench A (Level 4: 30–40 cm)
Unknown		
00-90-396	2000	N490 E494, Trench A (Level 3: 20–30 cm)
00-90-634-1	2000	N490 E494 (Level 4: 30–40 cm)
00-90-634-2	2000	N490 E494 (Level 4: 30–40 cm)

Table 4.4: Glassware by catalog number.

Catalog Number	Excavation Year	Provenience
Identified		
No CN 2-1		S12 E49 (Level 4)

Table 4.4: continued

Catalog Number	Excavation Year	Provenience
No CN 2-2		S12 E49 (Level 4)
No CN 2-3		S12 E49 (Level 4)
97-0066-516	1997	N513 E489 (Level 3: 20–30 cm)
98-0131-1575	1982	Surface
Unidentified		
No CN 3		S12 E49 (Level 4)
No CN 4		S12 E49 (Level 4)
No CN 5-1		S12 E49 (Level 4)
No CN 5-2		S12 E49 (Level 4)
No CN 5-3		S12 E49 (Level 4)
No CN 5-4		S12 E49 (Level 4)
No CN 5-5		S12 E49 (Level 4)
80-303-869	1980	S12 E49
81-113-207-1	1981	S34 E112 (Level 1)
81-113-207-2	1981	S34 E112 (Level 1)
81-113-207-3	1981	S34 E112 (Level 1)
98-0131-1026	1998	N536/535 E540 (11–45.5 cm)
Other		
80-303-37	1980	S12 E40 (0–10 cm)
98-0131-386	1998	
00-90-873	2000	N444 E508 (40–50 cm)

Table 4.5: Glassware by catalog number.

Catalog Number	Excavation Year	Provenience
00-90-586	2000	N465 E502 (43 cm)
00-90-2008	2000	Surface

Table 4.6: Finishes by type and catalog number.

Catalog Number	Excavation Year	Provenience
Rolled/Folded		
80-303-406	1980	S45 E100 (Level 2: 10–20 cm)
81-113-513	1981	Trench E
97-0066-642	1997	N513 E489 (Level 2: 10–20 cm)

Table 4.6: continued

Catalog Number	Excavation Year	Provenience
97-0066-1195 (1222)	1997	N444 E504 (Level 5: 40–50 cm)
98-0131-203	1998	N442 E505
99-70-1512	1999	N481 E563 (Level 1: 0–10 cm)
00-90-065	2000	N450 E554 (NW 0–20 cm)
00-90-525-1	2000	N465 E506 (Level 2: 10–20 cm)
00-90-875	2000	N465 E509 (Level 1: 0–20 cm)
00-90-1209	2000	N465 E502 (Level 6: 50–60 cm)
01-73-88	2001	N460 E573 (0–10 cm)
01-73-129-5	2001	N457 E573 (10–20 cm)
01-73-268	2001	N457 E571 (0–10 cm)
01-73-1246	2001	N478 E567 (10–20 cm)
01-73-1639	2001	N460 E570 (20–30 cm)
01-73-1673	2001	N456 E569 (0–10 cm)
01-73-1864	2001	N456 E570 (0–10 cm)
01-73-1960	2001	N451 E572 (10–12 cm)
01-73-2224-1	2001	N452 E573 (0–10 cm)
Prescription		
80-303-62-1	1980	S12 E49 (Level 4)
80-303-841	1980	Surface
97-66-142	1997	N444 E509 (Level 3: 20–30 cm)
98-0131-975	1998	N513 E566 (10–20 cm)
98-0131-1094	1998	N515 E565 (20–30 cm)
98-0131-1573-1	1982	Surface
98-0131-1573-2	1982	Surface
99-70-1049	1999	N479 E565 (Level 3: 20–30 cm)
00-90-325-1	2000	N465 E504 (Level 2: 10–20 cm)
00-90-974	2000	N490 E500, Trench A (Level 5: 40–50 cm)
00-90-1475	2000	Trench A (Level 5: 40–50 cm)
Bead		
97-0066-945	1997	N514 E499 (Level 2: 20–30 cm)
99-70-42	1999	N484 E567 (Level 1: 0–10 cm)
00-90-325-2	2000	N465 E504 (Level 2: 10–20 cm)

Table 4.6: continued

Catalog Number	Excavation Year	Provenience
00-90-436	2000	N465 E503 (Level 4: 30–40 cm)
00-90-525-2	2000	N465 E506 (Level 2: 10–20 cm)
00-90-1278	2000	N490 E505, Trench A (Level 1: 0–20 cm)
01-73-210	2001	N453 E571 (0–10 cm)
01-73-596	2001	N451 E569 (10–20 cm)
01-73-1409	2001	N480 E568 (Level 3: 20–30 cm)
01-73-1884	2001	N457 E572 (Level 2: 10–20 cm)
Oil/Ring		
80-303-800	1980	S13 E42 (Level 3)
80-303-842-1	1980	Surface
98-0131-7	1998	N520 E573 (0–10 cm)
98-0131-1573-3	1982	Surface
99-70-1567-1	1999	N481 E564 (Level 3: 20–30 cm)
00-90-1529	2000	N465 E502 (Level 5: 40–50 cm)
01-73-210	2001	N453 E571 (0–10 cm)
01-73-1200	2001	N480 E570 (Level 3: 20–30 cm)
Double Oil/Mineral		
80-303-868	1980	Surface
81-113-612	1981	Trench G (All Levels)
98-0131-237	1998	N551 E565 (0–10 cm)
98-0131-713	1998	N514 E566 (10–20 cm)
99-70-1065	1999	N481 E561 (20–30 cm)
01-73-523-1	2001	N459 E569 (Level 2: 10–20 cm)
01-73-1146	2001	N481 E567 (Level 2: 10–20 cm)
01-73-1690	2001	N459 E570 (0–10 cm)
Champagne		
81-113-429-2	1981	Trench F –East
99-70-1767	1999	N481 E563 (20–30 cm)
01-73-523-2	2001	N459 E569 (Level 2: 10–20 cm)
01-73-1808	2001	N456 E570 (0–10 cm)
01-73-2463	2001	N456 E571 (0–10 cm)
Wide Prescription		
80-303-508	1980	S35 E100 (Level 3)
99-70-1049	1999	N479 E565 (20–30 cm)

Table 4.6: continued

Catalog Number	Excavation Year	Provenience
00-90-381	2000	N465 E505 (Level 1: 0–10 cm)
00-90-478-1	2000	N465 E500 (Level 3: 20–30 cm)
00-90-479	2000	N465 E500 (Level 3: 20–30 cm)
01-73-2224-2	2001	N452 E573 (0–10 cm)
01-73-2428	2001	N480 E570 (Level 2: 10–20 cm)
Flat		
80-303-62-2	1980	S12 E49 (Level 4)
97-66-624	1997	N512 E573 (Level 1: 0–10 cm)
01-73-2159	2001	N478 E569 (Level 1: 0–10 cm)
Double Ring		
80-303-863	1980	Surface
81-113-207-4	1981	S34 E112 (Level 1)
81-113-207-5	1981	S34 E112 (Level 1)
81-113-207-6	1981	S34 E112 (Level 1)
98-0131-1573-4	1982	Surface
00-90-875	2000	N465 E509 (Level 1: 0–20 cm)
Straight		
81-113-700	1981	Trench E–North (45° diag to level of char cone)
00-90-193	2000	N490 E502 (Level 2: 10–20 cm)
00-90-1424	2000	N465 E509 (Level 3: 20–30 cm)
Stacked Ring		
98-0131-340	1998	N442 E504 (40–50 cm)
01-73-2587	2001	N451 E573 (10–20 cm)
Brandy/Straight Brandy		
80-303-869-1	1980	S12 E49
80-303-869-2	1980	S12 E49
80-303-869-3	1980	S12 E49
98-0131-242	1998	N551 E565 (0–10 cm)
98-0131-1573-5	1982	Surface
99-70-1740	1999	N527.5 E500 (Level 2: 20–40 cm)
00-90-325-3	2000	N465 E504 (Level 2: 10–20 cm)
00-90-325-4	2000	N465 E504 (Level 2: 10–20 cm)

Table 4.6: continued

Catalog Number	Excavation Year	Provenience
00-90-325-5	2000	N465 E504 (Level 2: 10–20 cm)
00-90-325-6	2000	N465 E504 (Level 2: 10–20 cm)
00-90-1698	2000	N490 E495 (Level 2: 10–20 cm)
Packer		
80-303-862	1980	Surface
Other		
00-90-478-2	2000	N465 E500 (Level 3: 20–30 cm)
00-90-782-1	2000	N465 E504 (Level 5: 40–50 cm)
00-90-1529	2000	N465 E502 (Level 5: 40–50 cm)

Table 4.7: Bodies by catalog number.

Catalog Number	Excavation Year	Provenience
Ribbed		
80-303-760	1980	S13 E41 (Level 1: 0–10 cm)
81-113-123	1981	S37 E105 (Level 1: (0–10 cm)
81-113-474-3	1981	Trench F
81-113-474-4	1981	Trench F
98-0131-1171	1998	N515 E565 (30–40 cm)
98-0131-1411	1998	N445 E505 (40–50 cm)
98-0131-1567-2	1982	Surface
99-70-318	1999	N484 E565 (Level 2: 10–20 cm)
00-90-355	2000	N443.5 E506 (Level 4: 30–40 cm)
01-73-170-1	2001	N456 E572 (0–10 cm)
01-73-221	2001	N454 E570 (0–10 cm)
01-73-492	2001	N459 E573 (Level 1: 0–10 cm)
01-73-547	2001	N458 E572 (10–20 cm)
Unknown		
80-303-179	1980	S12 E49 (Level 3: 72–95 cm)
80-303-333	1980	S36 E95 (Level 1: 0–10 cm)

Table 4.7: continued

Catalog Number	Excavation Year	Provenience
81-113-663	1981	Trench C – South (Below Ash Lens)
00-90-381	2000	N465 E505 (Level 1: 0–10 cm)
00-90-893	2000	N465 E501 (Level 5: 40–50 cm)
00-90-2012-1	2000	N465 E506 (Level 3: 20–30 cm)
Panels		
80-303-62-3	1980	S12 E49 (Level 4)
80-303-62-4	1980	S12 E49 (Level 4)
80-303-842-2	1980	Surface
81-113-679	1981	Trench E – North
98-0131-203-1	1998	N442 E505 (40–50 cm)
98-0131-203-2	1998	N442 E505 (40–50 cm)
98-0131-203-3	1998	N442 E505 (40–50 cm)
00-90-525-3	2000	N465 E506 (Level 2: 10–20 cm)
00-90-525-4	2000	N465 E506 (Level 2: 10–20 cm)
00-90-1492	2000	N465 E509 (Level 3: 20–30 cm)
01-73-1639	2001	N460 E570 (20–30 cm)
01-73-2411	2001	N479 E567 (Level 4: 40–40 cm)

Table 4.8: Unembossed bases by catalog number.

Catalog Number	Excavation Year	Provenience
Pontil Scars		
Blowpipe		
80-303-222	1980	S36 E94 (Level 2: 15–30 cm)
80-303-583	1980	S42 E100 (Level 2: 10–20 cm)
80-303-742	1980	S36 E91 (Level 1: 0–10 cm)
80-303-840-1	1980	Surface
80-303-840-2	1980	Surface
81-113-048	1981	Trench D (E of Feature 5)
81-113-124	1981	S37 E105 (Level 1: 0–10 cm)

Table 4.8: continued

Catalog Number	Excavation Year	Provenience
81-113-394	1981	Trench E – South (No Levels)
81-113-598-1	1981	Trench F (No Levels)
81-113-598-2	1981	Trench F
98-0131-674	1998	N514 E567 (20–30 cm)
98-0131-1576-2	1998	Surface
99-70-64-1	1999	N484 E569 (Level 2: 10–20 cm)
99-70-64-2	1999	N484 E569 (Level 2: 10–20 cm)
99-70-1765	1999	N481 E563 (Level 3: 20–30 cm)
00-90-691	2000	N490 E499, Trench A (Level 5: 40–50 cm)
01-73-435	2001	N453 E569 (Level 2: 10–20 cm)
01-73-569	2001	N460 E570 (0–10 cm)
01-73-733	2001	N482 E570 (20–30 cm)
01-73-1284	2001	N484 E569 (Level 3: 20–30 cm)
01-73-2010	2001	N480 E572 (10–20 cm)
01-73-2039	2001	N460 E572 (Level 2: 10–20 cm)
01-73-2627	2001	N457 E569 (Level 1: 0–10 cm)
Bare Iron		
80-303-812	1980	S12 E49 (Level 5: Below HIST ZONE I)
00-90-355	2000	N443 E506 (Level 4: 30–40 cm)
00-90-981	2000	N465 E503
Glass-tipped		
00-90-478-3	2000	N465 E500 (Level 3: 20–30 cm)
Mold Markings		
General		
80-303-444	1980	N0 E90 (Level 1: 0–10 cm)
80-303-842-3	1980	Surface
98-0131-1576-3	1998	Surface
Turn		
80-303-62-5	1980	S12 E49 (Level 4)
81-113-445	1981	Trench F (0–35 cm)
01-73-107-2	2001	N457 E573 (0–10 cm)
Cup Bottom		
80-303-62-6	1980	S12 E49 (Level 4)

Table 4.8: continued

Catalog Number	Excavation Year	Provenience
98-0131-1576-4	1998	Surface
99-70-20	1999	N529 E567 (Level 1: 0–10 cm)
Dip/Three-Part Dip		
98-0131-1576-5	1982	Surface
Other		
Round		
80-303-698	1980	S35 E95 (Level 1: 0–10 cm)
80-303-771	1980	S13 E41 (Level 2: Sloping)
97-0066-651	1997	N513 E491 (Level 3: 20–30 cm)
97-0066-321	1997	N448 E509/N442 E509 (Level 3: 20–30 cm)
97-0066-878	1997	N512 E573 (Level 2: 10–20 cm)
97-0066-921	1997	Surface
98-0131-1576-6	1998	Surface
98-0131-1576-7	1998	Surface
98-0131-1576-8	1998	Surface
98-0131-1576-9	1998	Surface
98-0131-1576-10	1998	Surface
99-70-588-1	1999	N479 E569 (Level 1: 0–10 cm)
99-70-588-2	1999	N479 E569 (Level 1: 0–10 cm)
99-70-588-3	1999	N479 E569 (Level 1: 0–10 cm)
99-70-588-4	1999	N479 E569 (Level 1: 0–10 cm)
99-70-588-5	1999	N479 E569 (Level 1: 0–10 cm)
99-70-588-6	1999	N479 E569 (Level 1: 0–10 cm)
99-70-927	1999	N483 E565 (Level 4: 30–40 cm)
99-70-1758	1999	N481 E563 (Level 3: 20–30 cm)
00-90-193	2000	N490 E502 (Level 2: 10–20 cm)
00-90-267	2000	N490 E498 (Level 2: 10–20 cm)
00-90-381	2000	N465 E505 (Level 1: 0–10 cm)

Table 4.8: continued

Catalog Number	Excavation Year	Provenience
00-90-876-1	2000	N465 E509 (Level 1: 0–20 cm)
00-90-876-2	2000	N465 E509 (Level 1: 0–20 cm)
00-90-876-3	2000	N465 E509 (Level 1: 0–20 cm)
00-90-876-4	2000	N465 E509 (Level 1: 0–20 cm)
00-90-996	2000	N490 E501 (Level 1: 3–10 cm)
00-90-1187	2000	N465 E506 (Level 4: 30–40 cm)
00-90-2004	2000	Surface
01-73-129-6	2001	N457 E573 (10–20 cm)
01-73-170-2	2001	N456 E572 (0–10 cm)
01-73-334	2001	N458 E570 (0–10 cm)
01-73-1081	2001	N479 E567 (Level 3: 20–30 cm)
01-73-1308	2001	N478 E569 (20–30 cm)
01-73-1789-1	2001	N457 E570 (10–20 cm)
01-73-1789-2	2001	N457 E570 (10–20 cm)
01-73-1789-3	2001	N457 E570 (10–20 cm)
01-73-2287	2001	N456 E573 (0–10 cm)
01-73-2801	2001	N477 E568 (Level 5: 40–50 cm)
Non-Round		
80-303-62-7	1980	S12 E49 (Level 4)
80-303-473	1980	S35 E100 (Level 1: 0–10 cm)
80-303-842-4	1980	Surface
99-70-81	1999	N484 E566 (Level 0–10 cm)
00-90-1475	2000	Trench A (40–50 cm)

Table 4.9: Embossed glass by catalog number.

Catalog Number	Excavation Year	Provenience
Unknown		
80-303-62-8	1980	S12 E49 (Level 4)
80-303-121	1980	S12 E36 (Level 2: 16–33 cm)
80-303-375	1980	S33 E95 (Level 1: 0–10 cm)

Table 4.9: continued

Catalog Number	Excavation Year	Provenience
80-303-842-5	1980	Surface
80-303-842-6	1980	Surface
80-303-842-7	1980	Surface
80-303-842-8	1980	Surface
80-303-842-9	1980	Surface
80-303-842-10	1980	Surface
81-113-374	1981	Trench X (45° SE from Trench E)
98-131-86	1998	N520 E573 (10–20 cm)
98-131-879	1998	N515 E566 (10–20 cm)
98-131-1315	1998	N513 E566 (10–20 cm)
99-70-528	1999	N484 E565 (Level 4: 30–40 cm)
00-90-470	2000	N465 E504 (Level 4: 30–40 cm)
00-90-1414	2000	N465 E509 (Level 2: 20–30 cm)
00-90-1424-1	2000	N465 E509 (Level 3: 20–30 cm)
00-90-1424-2	2000	N465 E509 (Level 3: 20–30 cm)
00-90-2012-2	2000	N465 E506 (Level 3: 20–30 cm)
01-73-763	2001	N483 E567 (Level 2: 10–20 cm)
01-73-982	2001	N479 E567 (0–10 cm)
01-73-1246	2001	N478 E567 (10–20 cm)
01-73-1322	2001	N454 E574 (40–123 cm)
01-73-2267	2001	N483 E571 (Level 1: 0–10 cm)
Lettering		
80-303-444	1980	N0 E90 (Level 1: 0–10 cm)
81-113-207-7	1981	S34 E112 (Level 1)
81-113-445	1981	Trench F (0–35 cm)
81-113-679	1981	Trench E – North
98-0131-867	1998	N445 E504 (30–40 cm)
98-131-1315-1	1998	N513 E566 (10–20 cm)
98-131-1315-2	1998	N513 E566 (10–20 cm)
98-131-1572	1998	Surface
99-70-341	1999	N484 E565 (Level 3: 20–30 cm)
99-70-1052	1999	N479 E565 (Level 3: 20–30 cm)
99-70-1178	1999	N482 E565 (0–10 cm)
00-90-981	2000	N465 E503 (Level 5: 40–50 cm)

Table 4.9: continued

Catalog Number	Excavation Year	Provenience
00-90-1631	2000	N465 E504
Embossed Bases		
81-113-164	1981	S37 E104 (Level 1: 0–10 cm)
98-131-1576-11	1998	Surface
00-90-1278	2000	N490 E505 (Level 1: 0–20 cm)
Other		
00-90-325-7	2000	N465 E504 (Level 2: 10–20 cm)
00-90-621	2000	N465 E503 (Level 3: 20–30 cm)
00-90-782-2	2000	N465 E504 (Level 5: 40–50 cm)
00-90-2012-3	2000	N465 E506 (Level 3: 20–30 cm)
01-73-1129	2001	N480 E569 (30–40 cm)

Table 4.10: Melted glass by catalog number.

Catalog Number	Excavation Year	Provenience
01-73-478-4	2001	N460 E569 (Level 2: 10–20 cm)
01-73-2068	2001	N460 E570 (10–20 cm)

Chapter 5

Forging the Fur Trade: Metal Artifacts at Fort Pierre Chouteau

Patrick J. Collison[1]

Introduction

Historical Background

Fort Pierre Chouteau was built on the west bank of the Missouri River by agents of the American Fur Company in 1832, and served as a dominant fur trading emporium for more than a quarter century. Construction was directed by William Laidlaw, the fort's first bourgeois, and deemed necessary when its predecessor, Fort Tecumseh, was undermined by the wandering Missouri three miles downstream. Trees for the twenty-foot palisade walls were felled at a heavily wooded area near the mouth of Chantier Creek, fifteen miles upstream. Descriptions of the fort's appearance and dimensions by visitors such as Prince Maximilian (1843:319), John Palliser (1969:103), Thaddeus Culbertson (1981:75–75), and de Girardin (1936:56) are variable and sometimes misleading, but its outline could be described as an irregular rectangle. The east and west walls were about 90 m in length and oriented slightly west of true north. The north and south walls were about 75 m long, and there was a large double gate

[1]Department of Anthropology, University of South Dakota

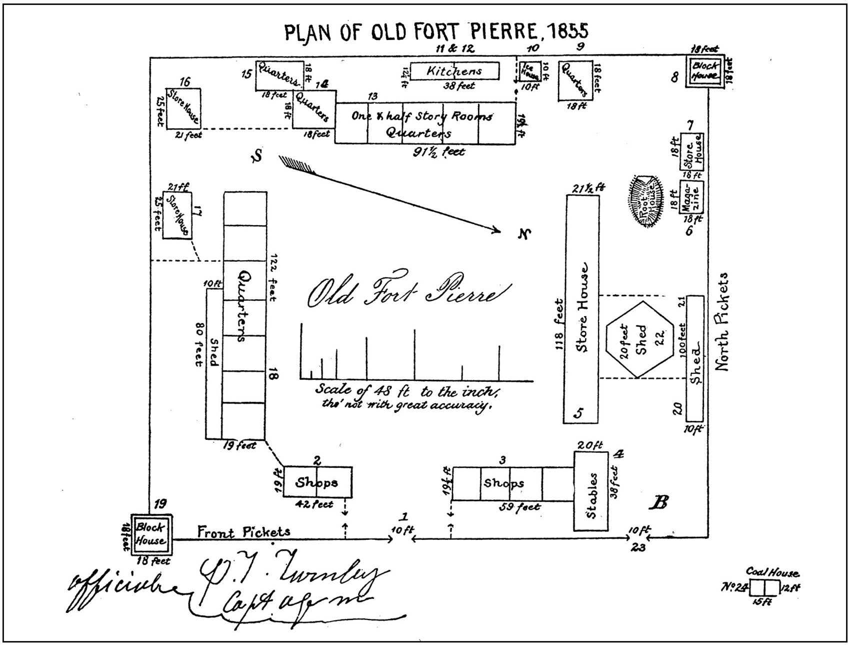


Figure 5.1: Turnley's map of Fort Pierre.

in the center of the east wall, facing the river. Bastions protected the northwest and southeast corners, and a number of buildings, including the bourgeois' house, employees' quarters, workshops, trade rooms, a grain mill, and storage facilities were constructed around the periphery of the inside of the fort. Fort Pierre served as the principal trade site for several bands of Lakota, Yankton, and Yanktonai Sioux, as well as Omaha and Ponca Tribes from the south, and Dakota groups then residing to the east (Figure 5.1).

Until changes in men's fashions and depletion of the resource reduced demand for beaver skins, this furbearer was the main item of exchange. About the time the fort was built, buffalo hides, referred to as "robes", replaced the beaver as the top commodity. A variety of other animals such as fox, rabbit, lynx, mountain lion, badger, muskrat, and skunk were harvested. The pelts of these animals, in the aggregate, contributed less to the company's bottom line than bison robes or beaver skins during their heyday. In exchange, a variety of trade items were shipped upriver from St. Louis, at first in keelboats, but after 1831 on large steamships such as the *Yellowstone*. This 120-foot sidewheeler was build for the company at Kenneth McKenzie's insistence, and made her maiden voyage to Fort Tecumseh that year with Pierre Chouteau Jr. himself on board (Schuler 1990:29). The Native American trade partners had long since become exacting about the type of merchandise they considered acceptable. This included not only ornamental items such as beads, buttons, tinklers, and gorgets, but also cloth in bulk, cooking utensils, tobacco, horticultural tools, and implements for trapping, hunting, and fishing. Despite government proscriptions against the shipment and sale of alcohol to the Indians after 1832, liquor, mainly in the form of diluted whiskey, was always part of the exchange. It is significant that in 1819, before the establishment of most of the early fur trade posts such as Fort Pierre, a blacksmith shop was built near the Great Bend of the Missouri to manufacture axes, hatchets, spear points, and knives for the Indian trade (Wilson 1902:268). This demonstrates the role of the skilled blacksmith; not just in maintaining the infrastructure of the fur trade facilities, but in creating what served at the time as the coin of the realm.

In 1855, Chouteau and Company sold the aging fort, including walls, buildings, and contents to the U.S. Army for what was considered a handsome price of $45,000. General William S. Harney intended to use the site as a supply depot and winter quarters for 950 troops engaged in a punitive expedition against the Brule' Lakota in 1855. Never deemed adequate for the army's purposes, it was abandoned in 1857, and its intact lumber scavenged to construct Fort Randall (Wilson 1902:270–292). After 1890, a pioneer ranching operation owned by Scotty Philip and his family occupied the site, and in 1930 the property was donated to the State of South Dakota (Ruple 1990a:20–21).

Fur Trade Society

Historians have often noted the hierarchical nature of the fur trade business fraternity. The corporate organization had a quasi-military structure, with limited opportunity for advancement for those exhibiting industry, loyalty, and useful skills. Shareholders at the top of the pyramid, such as John Jacob Astor in New York, and Pierre Chouteau Jr. in St. Louis, were the only participants positioned to amass significant wealth. This was accomplished by exercising shrewd and aggressive business tactics. Chittenden (1986:382) sums up Chouteau's approach to mercantile ethics with a laconic aside: "He made no attempt to introduce a higher standard of business morality in the trade than it was accustomed to." At its zenith, Chouteau's company thrived by out-competing its rivals, and when the opportunity arose, absorbing them.

Individual fort managers such as Kenneth McKenzie, William Laidlaw, and Alexander Culbertson earned about $2000 per year plus company stock in 1854 (Schuler 1990:47). Most of these men were of Scots-Irish descent, and while some retired wealthy, many died penniless (Halfen 1972:21,29,65). The middle management at Fort Pierre included clerks, traders, and interpreters, whose literacy and multilingual background were essential for conducting and recording commercial activity. Jacob Halsey served as clerk during the fort's early years, and recorded the "Fort Tecumseh and Fort Pierre Journal" (DeLand 1918:93–202). Numerous mixed-blood translators rose in the company's ranks over time by bridging the gap between indigenous and Euro-american cultures. The third tier included trained artisans (carpenters, blacksmiths, tailors, tinsmiths) and hunters. Their unique skills sustained the day-to-day well being of the entire enterprise, enabling them to secure steady year-round employment. Nevertheless, the "General Roster", a list of the early fort managers and employees fails to list this group of workers specifically; they appear to have been subsumed under the title "voyageurs" (DeLand 1918:234–39). Finally, the common laborers, variously termed *engagées*, boatmen, and "winterers", made up the largest and lowest class of fur trade worker. Most were of French-Canadian ancestry, regarded by the elite traders as submissive individuals whose "strength, endurance and tractability" made them uniquely suited for strenuous, repetitive work (Barbour 2001:113). Despite being derided as*mangeurs de lard* (pork-eaters), they are most closely identified with the *coureurs de bois*, icons of Canadian folk culture. In the *General Roster*, Clerk Halsey was blunt in his assessment of some individual workers' performance: "not wanted", "sent back", "deserted"; or "good man" and "excellent man" (Deland 1918:234–239). Wages for most laborers ranged from $150 to $200 per year.

Pay differential alone doesn't expose the fur trade hierarchy as being particularly exploitative toward workers. Consider the fact that today's average corporate CEO enjoys a reimbursement ratio 200 to 400 times that of the average wage-earner. The relative wage discrepancy between fur trade executives and *engagées* was less than half that (United for a Fair Economy 2005).

Other social differentiators were much more apparent at Fort Pierre. Mealtime protocol dictated that the manager, clerks, traders, and valued guests dined at well set tables, said to have "…groaned under the luxuries of the country…"(Catlin 1857:21). Skilled workers such as mechanics and tradesmen, ate at a separate table, but still in the presence of the elite (Larpenteur 1933:57). *Engagées*, on the other hand, took their meals in another area, and typically subsisted on "the poorest or third-class diet"

(Sunder 1965: 134). Living quarters were likewise segregated, with the manager's house and clerks' quarters along the west wall, and a "dwelling range" for other employees running the length of the east palisade.

Several other indices support the perception that life was not easy for low-status workers at Fort Pierre. The average length of employment was only 2.7 years for Upper Missouri Outfit (U.M.O.) workers, compared to 15 years for officers, and 18.9 years for the British Hudson Bay Company's (H.B.C.) laborers. Vertical mobility was less for American Fur Company (A.F.C.) employees: 62% of H.B.C. workers advanced in pay, compared to 25% of U.M.O. workers. Desertion rates were correspondingly higher for the American Fur Company: between 1825 and 1835, 12% of Chouteau's men abandoned their posts, four times the rate in Canada (Swagerty and Wilson 1994:257). On August 24, 1834 thirteen "pork eaters" deserted from Fort Pierre, duly noted by Halsey in his journal. Like the other fur trading posts, Fort Pierre presaged the "company town", where workers were encouraged to purchase goods from the company store on credit, deducted from their yearly wages. This made it difficult to complete a term of engagement without ending up in debt. As Chittenden observed, "they were compelled to remain and keep at work or resort to the dangerous enterprise of desertion (Chittenden 1902:59).

Descriptions of domestic life at the posts often emphasize the negative aspects: boredom, drunkenness, and sporadic violence (Larpenteur 1989:-80–84, Chardon 1997:58–59, Schuler 1990:75–76). This image should be balanced by other accounts portraying a fur trade society that was ethnically diverse, family focused, and mutually advantageous for both genders. Nearly all fur traders took Native American women as wives, according to the custom of the country. Certainly these unions facilitated trade relationships with local tribes, and have been regarded as expedient liaisons at best. Many, however, resulted in lifelong commitments, producing beloved offspring who thrived in social circumstances marked by extreme adversity, but unique opportunity. Specific examples include Edmund Denig and Deer Little Woman, Alexander Culbertson and Natoyist-Siksina', and James Kipp and Mandan Woman (Wischmann 2000, Van Kirk 1983). Some of these couples retired to the Red River Settlement in Canada to avoid the prejudices of white society.

Archaeological Investigations

This report examines more than 3000 ferrous and non-ferrous metal artifacts excavated at the Fort Pierre Chouteau site (39ST237). Analysis focuses on various types of iron objects thought to represent blacksmithing activities: tools, scrap metal from worked stock, and objects related to other industries, such as logging, trapping, or transportation, that were repaired by the blacksmith. These artifacts were excavated during two separate fieldwork projects, separated by a twenty six year interval.

The first excavations were carried out by the Middle Missouri Chapter of the South Dakota Historical Society in 1980 and 1981. This volunteer program was developed by Dr. Junius Fishburne, Dr. Robert Alex, and Steven Ruple, and continued as a full time project thanks to a grant from the Archaeological Research Center in Rapid City. More recently, fieldwork carried out from 1997 to the present was directed by the South Dakota State Historical Society with help from the U.S. Army Corps of Engineers. The artifacts have been stored and catalogued at the University of South Dakota in Vermillion and the State Archaeological Research Center in Rapid City. Ruple (1990a, 1990b) presents a concise review of the history of Fort Pierre Chouteau and the 1980–81 excavations at the site, and Nowak (1998) provides a useful summary of historic descriptions of the fort and its dimensions.

Blacksmithing at Fort Pierre Chouteau

Nearly all the ferrous and non-ferrous artifacts presented in this section of the Fort Pierre report relate to the work of the blacksmith—either directly as tools, worked stock fragments and other byproducts of the forging process such as clinker and slag, or indirectly in the form of repaired implements, construction materials, and trade items necessary for the economic viability of the fort and its inhabitants. In nineteenth century America, smiths were valued members of communities of any size. Their tools, the products of their labor, and the layout of the shop would have been familiar to nearly all adults, and even many children. Today, traditional blacksmithing is practiced by hobbyists, re-enactors, and craftsmen producing primarily ornamental objects. Nevertheless, we have reliable information on many aspects of nineteenth century blacksmithing, particularly the physical arrangement and dimensions of the workspace, essential tools, fuel, raw materials, and even technical details regarding proper execution of common tasks. The physico-chemical structure of the iron itself dictates how, when, and where the blacksmith "works" the metal.

Several archaeological reports provide us with the standard footprint of a smithy, which at minimum included a forge, bellows connected by a side or bottom tuyere to sustain a steady flame, an anvil with associated tools, a quenching tub, and in a more well-lit part of the shop, a bench and vise for repairing small metal parts (Light and Unglik 1987; Light 1984, 1986;

DeVore 1990). Instruction manuals are particularly helpful in visualizing and understanding the blacksmith's instruments, their application, and the thought processes behind them (Selvidge and Allton 1925, Harcourt 1917, Almeida 1976, Lasansky 1980).

It is not surprising that few tools were found at the site, since these valued items would have been transported along with the salvaged timber to Fort Randall, or possibly secreted away by the fur company agents charged with transferring the property to the Army (Wilson 1902:290). We may, however, assume that a full assemblage of blacksmithing tools was available at the fort. This would have included an anvil, bellows, and a smith's vise, all listed in Bills of Lading of goods destined for the fort on the Steamboat Assiniboine in March and April of 1833 (Swagerty 1991). Two "Mouse Hole Anvils" appear on an invoice of goods from Birmingham, England January 14, 1833. These are forged steel anvils with a tapered horn at one end, square hardy hole and round pritchel hole at the other, and a hardened carbon steel table and cutting shelf on the intervening top surface. Four massive "feet" were secured to a round wooden base, usually an oak stump sunk several feet into the dirt floor, by wrought iron bands (Swagerty 1991). The M. and H. Armitage Mouse Hole Company produced high quality anvils in England from 1700 to 1933 (McDaniel 2004:3).

For ergonomic efficiency, the top of the anvil was positioned about two and a half feet off the floor, at the level of the smith's clenched hand resting at his side. For a right-handed smith, it stood four to five feet in front of the forge, and the tuyere pipe, connected to the bellows, entered the base of the forge from the opposite side. The quenching basin was placed between the anvil and the forge. The most time and temperature-sensitive maneuvers in the forging process—hardening, tempering, and annealing of steel—required that the smith recognize subtle color gradations in the heated metal; thus this part of the shop had to be located away from direct sunlight. The workbench, with its leg vise and smaller tools for shaping more delicate metal objects, was positioned near a window and probably the door at the front of the shop (Bealer 1995:150–151, Selvidge and Allton 1925:52–59). Tools would have been stored within reach around the anvil and next to the forge. Schuler (1990:57) lists the Fort Pierre blacksmith's tools from an 1845–46 inventory: "tongs, sledge hammers, files, hammer, puncher, chisels, mandrils, nail moulds, iron shovels and pokers, drills, braces and bits, pincers, hand vise, anvil, a large shear for cutting tin and iron, and a branding iron". Supplies included "10 spikes and rings, 1000 feet of iron, and 48 large spikes and rings. He also had on hand 60 pair of horse shoes and horse-shoeing tools."

In addition to the tools specifically mentioned in the inventory, several others would have been found in a well supplied nineteenth century shop. These include top and bottom fullers, blunt ended anvil tools used to "draw out" or compress iron stock; various cutting tools such as hardies, sets, and hot and cold chisels with edges ground to specified angles for dividing bar and round stock; swages and flatters, to compress stock in predetermined dimensions; and holdfasts to secure stock against the anvil face (Bealer 1995:76–102). Finally "8 grind stones" or emery wheels are listed among the goods shipped upriver from St. Louis on March 21, 1833 (Swagerty 1991). These were used to sharpen ax bits and knife blades, as well as for testing ferrous metals to assess their workability.

Company records indicate that the Fort Pierre blacksmith was kept well supplied with all three standard types of iron stock: wrought iron, steel, and cast iron. At least annually, and more often in later years when increasingly efficient and powerful steamboats were pressed into service, shipments arrived from St. Louis containing wire-bound bundles of "$^9/_{16}$ Inch Round American Iron, $1^3/_4$ Inch Hoop American Iron, German Steel", various sizes of bar stock ("500 lbs $2 \times 1^1/_2$, 200 lbs $1^1/_2 \times {}^3/_8$"), and "1000 lb Pig Iron", probably ingots of cast iron (Swaggerty 1991). Iron stock intended for forging can be categorized by thickness as "bar stock" ($> {}^1/_8''$ thick and round, square, rectangular, oval, or half-round in cross section), or "sheet iron" ($< {}^1/_8''$ thick). A third category, "strap iron", is sometimes identified as being a little thicker than sheet iron, and used for things such as barrel hoops. The remnants of this worked stock makes up the bulk of the ferrous metal scrap in the Fort Pierre collection.

Clerk Jacob Halsey's matter-of-fact entries in the *Journal* give us a candid view of daily life at the fort, including that of the blacksmith. Most of his comments are terse and focused on commercial activity but sufficiently detailed to encourage reading between the lines. Individual names are common, not just the elite and famous visitors, but traders, interpreters, workers, and even some of the Indian trading partners. He never mentions a blacksmith by name, although the Fort Pierre Letterbooks contain a note addressed to D.D. Papin on December 2, 1847: "sent you Jos. Boudein, said to be a blacksmith" (DeLand 1918:216). An October 1837 letter gives us some idea of the wages paid for these services: "By Treaty... $1400 due for a blacksmith and striker and $440 for iron and steel... for Yankton Indians" (DeLand 1918:207). Assuming the striker (an apprentice), was paid like an *engagé*, the smith himself commanded an annual salary higher than that of the clerks or traders (Swagerty and Wilson 1994:250). Other entries allude to the type of work the blacksmith performed: 7/5/30- "Repairing beaver traps, etc"; 3/1/31- "Prudhomme arrived from Navy Yard with a saw to be repaired"; and 1/28/31- "5 broken axes from Navy Yard". Preparation of the fuel needed for the forge was an essential activity: 7/7/30- "Men employed cutting wood to make charcoal", and "all the wood necessary for the blacksmith shop is ready and will be put up in a few days. The coal is finished (500 bbls) and in the coal house" (DeLand 1918:145–148,207).

The importance of the blacksmith's shop and work product, and its approximate position within the fort can be inferred from a brief entry on June 17, 1830, written when the trading post was still located at Fort Tecumseh: "Bank opposite front gate fell in river and obliged to relocate blacksmith's shop" (DeLand 1918:92). This tells us two things: the smithy was located near the front gate, along the east palisade wall; and the enterprise couldn't run properly without an enclosed workspace for forging iron. The clerk makes it clear that the shop had to be rebuilt quickly, rather than waiting for the whole fort to be moved upriver, even though this meant rebuilding it twice.

Thus a significant amount of information exists regarding the manual labor carried on at Fort Pierre Chouteau, from eyewitness accounts, archival materials, and analysis through analogy. To this we can incorporate archaeological data obtained from artifacts excavated at the site and their spatial location. This endeavor presents us with three goals: 1) To identify the metal objects in the collection; 2) To determine the type of iron of which each ferrous artifact is comprised- wrought iron, steel, or cast iron; and 3) To ascertain the position and approximate dimensions of the shop within the fort.

Glossary

Terms Applied to Metals (Almeida 1976:3,4)

- *Brittleness*: tendency of a metal to break with little deformation and under low stress.

- *Ductility*: property that enables a metal to withstand mechanical deformation without cracking, particularly when being stretched.

- *Malleability*: property enabling a metal to be hammered or rolled into thin sheets.

- *Tensile Strength*: the maximum pulling strength a metal can withstand before breaking.

- *Toughness*: a condition intermediate between brittleness and softness. A combination of strength and ductility. A property exhibited especially by wrought iron.

Forging Processes and Tools

- *Drawing down*: process of thinning metal at one end by increasing its width or reducing it on all sides and making it longer. A large diameter round bar must first be made square, then octagonal, and finally round again by steady hammering along all edges, or the internal structure of the iron will break down. The hammer and anvil, the fuller or the flatter may be used in this process (Almeida 1976:98–100; Blanford 1988:61–65; Watson 1977:39–41).

- *Upsetting*: the reverse of drawing down, intended to thicken or bulge iron in certain places before forging the work on the anvil. The ends of both pieces to be welded were first upset to gain extra mass where needed so that the finished weld would be the same dimension as the rest of the work. This could be done by bouncing the heated rod on an iron block ("jumping up"), hammering the cold end while holding the hot end against the anvil, or striking the hot end with the hammer (Blanford 1988:64–68).

- *Cutting*: incising hot or cold iron with a variety of tools, including hardies- stubby cutting tools that fit into the hardy hole in the anvil. Some had a straight cutting edge, others were angled or round, and the iron work was laid on top of the hardy so the hammer blow fell on the work itself. Other cutting tools included hot sets, handled hatchet-like implements held on top of the work and struck with the hammer, and cold sets, similar tools used to cut cold iron. Long hand-held cutting tools were also used: cold chisels had a cutting edge of 60° and cut part way through cold stock which was then broken off with the hammer or against the anvil, and hot chisels (30° cutting edge) which must cut nearly all the way through the hot stock because it is too soft to break off cleanly. This required skill, since the tip would be damaged if driven against the anvil surface (Almeida 1976:107–108; Watson 1977:39; Blanford 1988:56–57).

- *Welding*: iron parts to be joined are brought to near melting point and quickly hammered together (Blanford 1998:68).

- *Faggot weld*: the end of a piece to be made thicker is folded back on itself and welded together. An alternative to upsetting (Blanford

1988:97–100).

- *Lap weld*: upsetting ends first to make allowance for iron lost by scaling, burning, and drawing out caused by hammering (Andrews 1994:69).

- *Scarfing*: shaping end of stock so a smooth joint will be obtained when welded together (parts in contact should be convex so molten oxide can escape) (Watson 1977:45).

- *Fullering*: thinning down the metal by making grooves or hollows in it. The tapered blunt-ended top and bottom fullers are used like sets and hardies (Almeida 1976:106).

- *Swaging*: finishing the cross section of the work to size and shape. Top and bottom swages were used like sets and hardies (Almeida 1976:106).

- *Punching*: round, square, and rectangular holes driven through hot flat stock, partly through one side and then completing through the opposite, so a pellet or "billet" drops out (Almeida 1976:108,110).

- *Drifts*: similar to punches, used to open up, smooth, and shape punched holes to a specific diameter (Almeida 1976:109–110).

- *Riveting*: heated iron rod inserted into pre-punched hole and ends hammered to form heads, holding metal pieces together (Watson 1977:49).

- *Clinker (slag)*: hard glassy residue of iron, sulfur, silicates and other impurities which sink to the bottom of the hearth. Weakly magnetic (Blanford 1988:55).

Materials and Methods

The 1300+ identifiable artifacts in this collection were analyzed by gross and microscopic (10X) visual inspection, weighed in grams, and measured in three dimensions in inches. Horizontal spatial provenience was recorded for each artifact within a 1 x 1 meter grid, measured from a datum south and west of the site. Vertical provenience was recorded in 10 centimeter increments below surface. The type of metal (ferrous/non-ferrous; wrought iron, steel, cast iron, brass, tin, lead, copper, unknown) was tentatively determined by magnetic properties and visual inspection, with particular

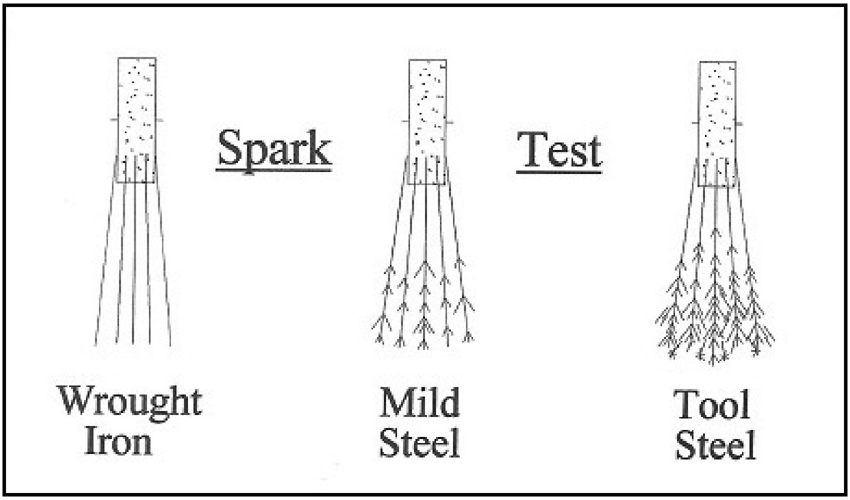


Figure 5.2: Spark test.

attention to cut or broken interfaces, surface corrosion or patina, and malleability. The likely function of the artifacts was also taken into consideration in deciding the type of iron used in its manufacture. For example, chisels, files, and punches would function as intended only if constructed of hardened steel, rather than wrought or cast iron.

A number of "Workshop Distinguishing Tests" are available for objectively differentiating between different types of ferrous metal (Almeida 1976:19). One that is convincing, but still inexpensive and minimally destructive, is the Emery Wheel or Spark Test. The length and pattern of sparks produced by holding the sample against a medium grain grey type (alumina) grinding stone at a circumferential speed of 20 m/s reliably distinguishes between wrought iron, steel, and cast iron. The results of the test are a function of carbon content, and it can be performed by any competent blacksmith (Figures 5.2 and 5.3). A small number (12) of representative artifacts from the collection were selected for this test, and the results recorded with digital photography. Known controls were used to validate the results. Other properties of various types of ferrous metal are shown in Table 5.1.

Figure 5.3: Result of spark test on wrought iron chain link.

Results

Categories

The artifacts are classified in seven categories, based primarily on functional identity. Several items could be placed in one of two or three different categories, as will be discussed in the text. Category VI, Miscellaneous, consists of objects that can be identified as to material, but whose specific function cannot be determined (eg. sheet metal fragments). A separate Category VII was included for Unknown Objects, which the investigators were unable to identify, but are considered to be identifiable (see below).

Metal Artifact Categories

I. Blacksmithing (n = 346)
   A. Tools
   B. Scrap
II. Other Industries (n = 181)
   A. Logging
   B. Hunting
   C. Fishing
   D. Trapping

E. Sewing
F. Carpentry
G. Other
III. Construction (n = 242)
A. Materials
B. Hardware
IV. Transportation (n = 28)
A. Vehicles
B. Husbandry
V. Domestic Items (n = 461)
A. Culinary
B. Decorative
C. Clothing
VI. Miscellaneous (n $>$ 2000)
VII. Unknown (n = 41)

The Artifacts

I. Blacksmithing

A. Tools (n = 14)

1. Fuller (n = 1) This hefty iron object is one of the anvil tools used to compact and strengthen stock by compressing it into a smaller dimension. The shaft and bottom fuller fits tightly in the hardy hole, and its blunt upper surface elongates and flattens bar stock, held beneath a top fuller of similar shape. The striker hammered the top fuller while the smith held it and the stock in alignment. This process was also used to converting round stock to longer segments of narrower diameter, as in making chain links (Watson 1977:40) the shaft is nearly square in cross section ($0.85'' \times 0.82''$). It's length is $5.26''$, maximum thickness $1.13''$, and the width of the working surface is $1.89''$ (Figure 5.4a).

Because such a tool had to be tough enough to withstand impact without breaking, yet hard enough not to deform under the hammer blows, it was probably made from wrought iron which was then case-hardened to create a steel outer surface. This process could have been performed at the fort, and the slight asymmetry visible at the junction of the shaft and body of the tool supports this notion. Also, none of the bills of lading mention a fuller among the suppliers shipped to Fort Pierre. An emery wheel test, performed on the proximal shaft, displayed a spark pattern consistent with tool steel (0.8–1.3% carbon), affirming that its ferrous composition is as expected by appearance and function.

Table 5.1: Properties of various types of iron.

Types	Date	%Carbon	Appearance	Workability	Spark Test	Uses
Wrought Iron	<1700	<.04%	black, fibrous	works, welds easily, cuts hot or cold	long smooth arcs	chain links, axes, hinges
Cast Iron	<1700	>2.2%	gray, granular	breaks under hammer	short branching arcs, dull red sparks	stove parts, grates, making wrought iron
Mild Steel	1856	0.1–0.33%	black, granular	works easily, welds with flux	long branching arcs, few star-like sparks	like wrought iron
Tool Steel		0.8–1.3%	gray, crystalline	hard to weld, brittle with quenching	long branching arcs, star-like sparks	small tools
High-Speed Steel	1900	0.65% (16% tungsten)	fine crystalline	hard to work, brittle	dull red sparks, cling to wheel	springs, razors

2. Punch (n = 1) this hand-held anvil tool is cylindrical in shape, tapering to a rectangular, slightly blunted tip. It measures $4.18'' by 0.79''$, and would have punched a $0.34'' \times 0.50''$ hole in strap or thin bar stock. This was done by driving the tip into but not all the way through the iron, then turning the piece over a hardy hole or bolster and completing the perforation from the opposite side, so that the "hole", a discoid plug of iron, fell through onto the floor. Following this process results in a smoother surface than driving the punch straight through. Care had to be taken to avoid blunting the punch tip by striking against a hard anvil surface, as appears to have happened here. The proximal shaft of this tool may have connected to a handle which has broken off. A small punch hole could then be enlarged to a precise size and shape using a drift, similar to the punch but with a smooth rounded tip (Watson 1977:48). This punch was one of the four anvil tools excavated from the area of the blacksmith shop (Figure 5.4b).

3. Cold chisel (n = 1) The cutting edge of this cylindrical tool measures approximately 60°, the angle required to withstand the impact of cutting through unheated iron. A hot chisel edge angle is more acute, usually about 30° (Blanford 1988: 150). The proximal end of this tool also appears to have been broken or cut- most chisels are about $8''$ long to allow a good grip for the hand. This artifact measures $5.21'' \times 0.73''$ at the tip, with a 0.59-inch diameter round shaft (Figure 5.4c). It is slightly angulated near the point where the taper begins, and whether this was intentional or accidental is unknown. A cold chisel would have been used for cutting relatively narrow round or bar stock or for nipping the heads off bolts so the shafts could be used for other purposes. There are several cut bolt heads in the collection, probably indicating that while there was an ample supply of wrought iron stock, higher carbon steel rods were at a premium. This would be the expected pattern for a shop in use before 1856. After that time the Bessemer Process made uniform quality steel stock more readily available. This tool was also found within the confines of the blacksmith shop.

4. Tong fragment (n = 1) This heavily corroded artifact appears to be a broken segment of the bit end of a blacksmith's tong, used to hold stock while it is heated or worked. It measures $2.87'' \times 0.69'' \times 0.57''$, and is also one of the tools that the smith could have manufactured himself (Harcourt 1917:93). It was found within the blacksmith shop area as well (Figure 5.4d).

5. Bolster (n = 1) While a variety of uses could be postulated for this large ($7.05'' \times 2.66'' \times 0.31''$) perforated steel plate, it would have served perfectly well as a bolster. For the smith, this tool functions in the same manner as a cutting board does in the kitchen: a moveable hard flat surface that protects an underlying permanent facing (the anvil). The square hole was specifically designed to prevent damage to punch and drift tips. Its horizontal provenience is unknown, but it was collected from the surface (Figure 5.4e).

6. File fragments (n = 3) Two segments of a broken file were excavated from the same unit but at different levels, near the southeast corner of the fort. Both are approximately $0.83'' \times 0.43'' \times 0.14''$, and could have broken from the same tool (Figure 5.4f). The single-cut grooves appear on all four surfaces, and this type of file is categorized as follows: Shape-flat, Class-single cut, Coarseness- bastard (Selvedge and Allton 1925: 149). Although the smith may have scavenged these broken pieces for another purpose, he could have used the tool for sharpening blades, smoothing out "burrs", and shaping iron into more intricate forms (Bealer 1995:171). A file tip and tang was also recovered.

7. Smith's shovel fragments? (n = 3) This forged iron object has a thickened edge projecting above a thinner concave upper surface (Figure 5.4g). Its exact function is uncertain, but the appearance is that of the scoop end of a small shovel, such as the smith would have used to transfer coals to the forge and clinker away from the tuyere pipe. It measures $3.50'' \times 1.89''$ and is $0.17''$ thick for most of its surface, except one edge, which is $0.52''$ thick. It is broken on two sides, and probably represents about one third of the intact implement. It was found near the southeast corner of the fort.

8. Utensil handles? (n = 2) These two metal objects, one ferrous and the other brass, are thought to be the handles of a small utensils, from which the distal end has broken off. They are likely small spoons, and at $1.58'' \times 0.50'' \times 0.06''$ and $1.89'' \times 0.50°x0.10''$ respectively—too small to have been used as eating utensils. Each has a hole at the proximal end from which it could be suspended when not in use. The brass handle is slightly curved, the iron one is flat and nearly rectangular. While objects such as this would not normally be included among blacksmith's tools in the strictest sense, we know that small spoons were used in the shop to sprinkle granular or powdered substances like salt, borax, sand, or even crushed animal bone on the heated metal to act as a "flux" during welding (Bealer 1995:174). Both were found within the confines of the blacksmith area.

9. Tuyere pipe fragments? (n = 6) Concave fragments of wrought iron, varying in size from 1.87″ × 1.89″ × 0.31″ and smaller were found in a unit near the south end of the blacksmith shop. A tubular object reconstructed from these fragments would be an inch or two in diameter, that described for tuyere pipes (Andrews 1994:17). The inner surface of some of these fragments have a shiny or "glassy" appearance, similar to the siliceous residue that makes up the slag and clinker deposited near the tuyere nozzle (Figure 5.4h). S

10. Drift punch tip? (n = 1) This is a conical, blunt-ended piece of hardened steel that has been cut from the end of a larger object (Figure 5.4i). The cut is perfectly straight, perpendicular to the long axis of the object, and may have been executed to convert a drift punch into a different tool, such as a chisel or round punch (Watson 1977:60). A drift is used to open a hole, usually started with a punch, and form it to a particular shape, such as in shaping the eye for a hammer (Andrews 1994:27). It measures 0.69″ × 0.34″, and was also found in the area of the blacksmith shop.

B. Scrap (n =332)

1. Worked stock As in prehistoric archeology, identifiable tools attract our attention preferentially when we examine artifacts from an historic site. Yet these nondescript fragments of cut iron stock, analogous to "debitage" flaked from cores, may be especially informative archaeologically. They represent the work byproduct, and provide unequivocal evidence of the "what", "where", and even the "how" of the blacksmith's activities at Fort Pierre. The majority of these items (n = 104) are clearly identifiable as fragments of worked (cut, welded, bent, or punched) bar or round stock. A single billet or punch hole center was found (Figure 5.5a–d). An emery wheel test shows that all are composed of wrought iron, or very low-carbon steel.

2. Cut objects (n = 3) Trap parts latch eyes, and bolts constitute another type of blacksmithing scrap (Figure 5.5e).

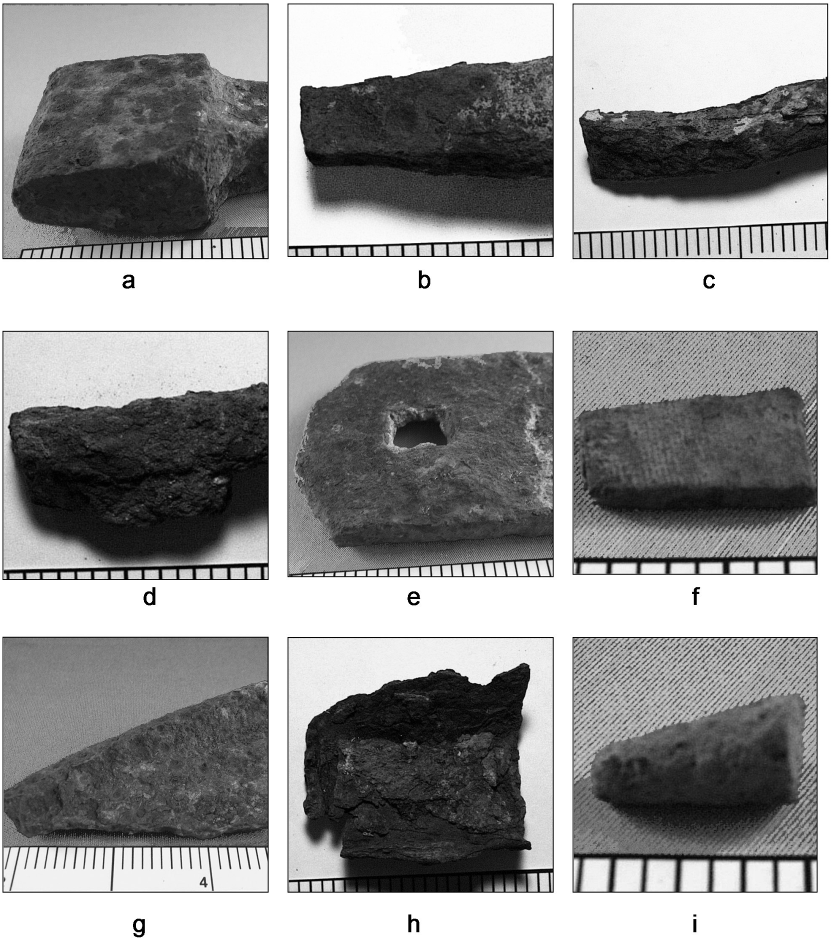


Figure 5.4: Blacksmith tools.

3. Clinker and slag (n = 213) Forge byproducts, including clinker that adheres to the tuyere pipe nozzle, make up a third type (5.5f). The bulk of this material appears as irregular lumps of incombustible residue, waste generated in the forging process. It is non-magnetic, with a cavitated surface, globular and vitrified in some areas (Bachmann 1982:20–31). This amalgam of silica, lime, reduced metal, and burned charcoal could have been produced by fires other than the smith's forge, and would have been periodically removed and discarded. The distinction between slag produced by forging and non-metallurgical slag (vitrified brick, mud, etc.) is difficult. Limited provenience data indicates that this material was scattered within and around the fort.

For purposes of measurement and analysis, bar stock is generally rectangular in shape (like a candy bar) and round stock is of course cylindrical (like a tootsie roll). Each artifact may be considered to have two ends, two sides, and arbitrarily, a top and bottom surface, although round stock has two ends and its "sides" are of equal diameter. The number, location, length, width, and angle of the cuts made in the stock were measured, and these results are summarized below. Although the size of these stock fragments vary considerably, they tend to be between one and three inches in greatest dimension and weigh between ten and sixty grams. The smith's cutting tools (hardies, chisels, sets) routinely made clean incisions through hot iron up to 0.70" thick. Sometimes several cuts were made through the same end, from different directions, to section the piece with a jagged break evident between the cuts in cold stock. There are up to 9 cuts in each artifact (mean = 2.6), and since nearly all cuts extend across the entire width of the stock (0.38″ to 2.85″), we know the smith used cutting tools with a blade width up to nearly three inches.

Worked Iron Fragments (n = 96)
    Weight 1–442.7 g, Mean = 43.5 g, Total=4174.8 g

Hardie/Chisel Cuts (n = 130)
    Thickness 0.15″–0.70″, Mean = 0.42″
    Width 0.38″–2.85″, Mean = 1.27″
    1–9 cuts/artifact, Mean = 2.6
    One End 24
    One Side 15
    Both Ends 14
    Both Sides 1

Cut Angles
    14°–86°, Mean = 54°

Cut angles are especially useful in determining that type of cutting instrument the blacksmith used. Figure 5.6 shows the relationship between the tool's cutting edge angle and the angle of the cut left on the discarded stock. As noted above, hot cutting tools had an edge angle of about 30°, and cold cutting tools around 60°. This means that ideally, the angles measured in the worked bar stock should cluster around 60° to 75° ($90^\circ - 60^\circ/2$ or $90^\circ - 30^\circ/2$). Figure 5.7 shows that the cut angle distribution is about as

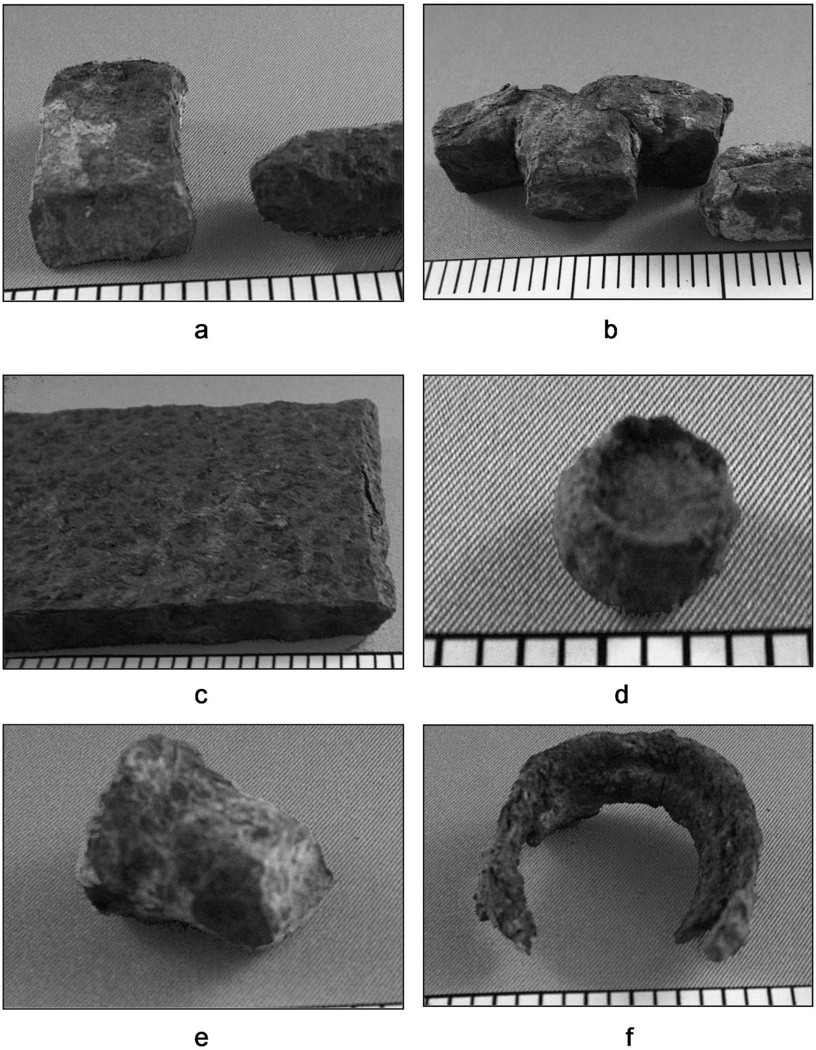


Figure 5.5: Worked stock and scrap.

expected. We can also see that when multiple (> 2) cuts were used to section one end of a piece of stock, all the cuts tended to be made at exactly the same angle (86%), whereas if only two cuts were made, they tended to be at different angles (87%). In the first instance, we might conclude that the smith was working alone, "twirling" the stock with one hand as he struck it with a cutting tool in the other. In the second instance, a striker would have been needed, since more than two hands are required to hold the stock and cut it simultaneously from two directions with different cutting edges. Careful analysis of this type of data might allow us to infer not only how the work was done, but even how well it was done.

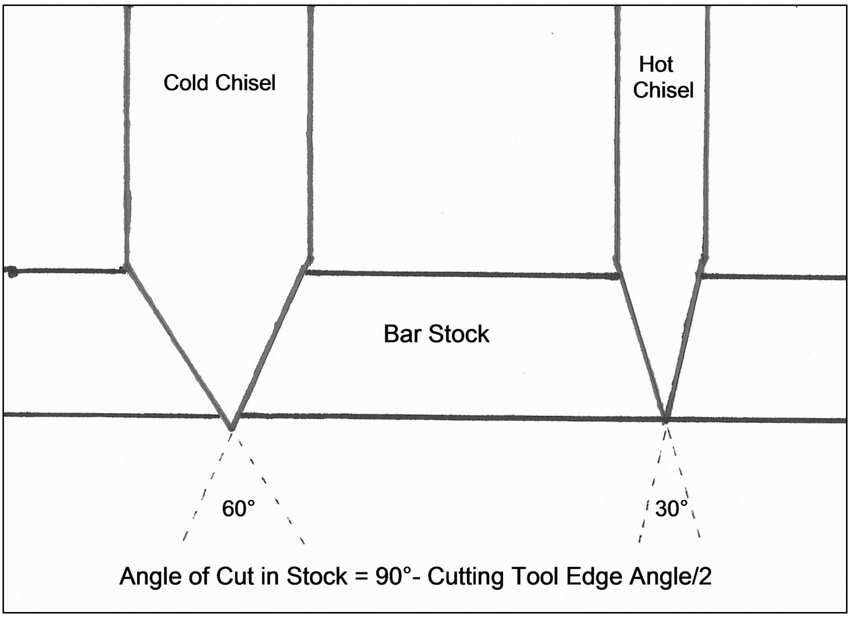


Figure 5.6: Hot and cold cut angles in stock.

The presence of formed objects such as construction materials and hardware, clearly modified using tools within the blacksmith shop, indicates that these items were scavenged for other purposes, perhaps because they were made of steel.

Several artifacts made of weakly magnetic amorphous material, and displaying the "glassy" appearance of molten silicates were found in the area of the blacksmith shop. Light and Unglik (1987:6) provide photos of a "side tuyere clinker" from a fur trade smithy in Canada, nearly identical to these circular objects.

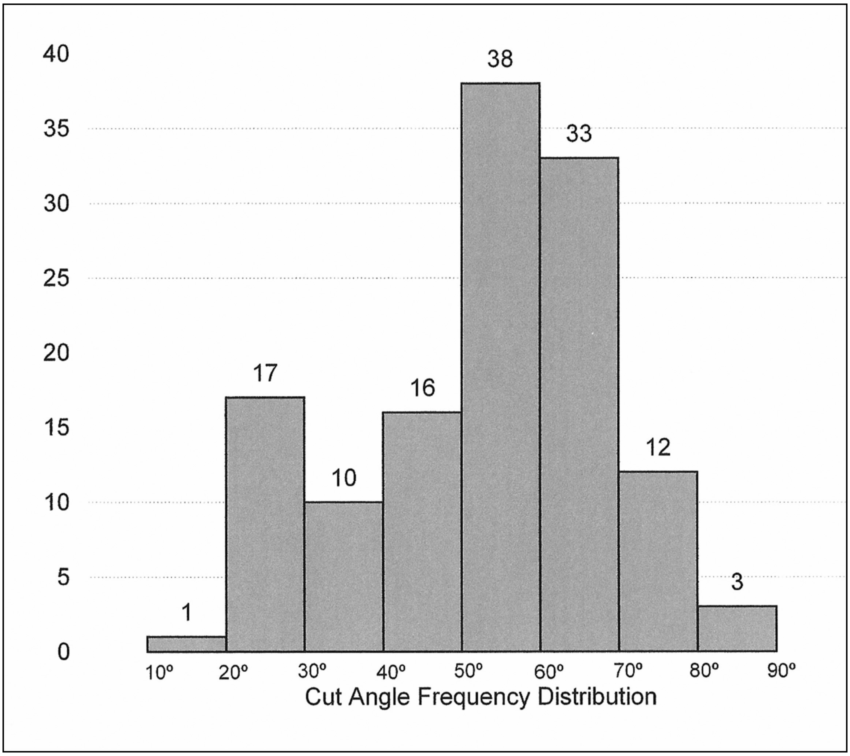


Figure 5.7: Cut angle distribution.

The large number of worked stock fragments found at Fort Pierre ($\sim$ 100) is useful to us for several reasons. By plotting the position of these artifacts on a grid of the fort, a clustering of objects is immediately apparent, providing clear evidence of the location of the blacksmith shop (Figure 5.8). Even the identifiable tools (shown as lightning bolts) prove less conclusive as spatial markers indicating where the smith's work was actually performed.

Comparing the large number of scrap iron fragments at Fort Pierre with the excavation results at other fur trade posts may also be enlightening. Light and Unglik (1987) conducted a very sophisticated analysis of the blacksmith shop and related artifacts at Fort St. Joseph, a pre-War of 1812 site in Ontario. They examined particularly the metallurgy of the slag, clinker, and repaired axes found at the site, but report only six remnants of wrought iron stock excavated near the anvil base. They found other

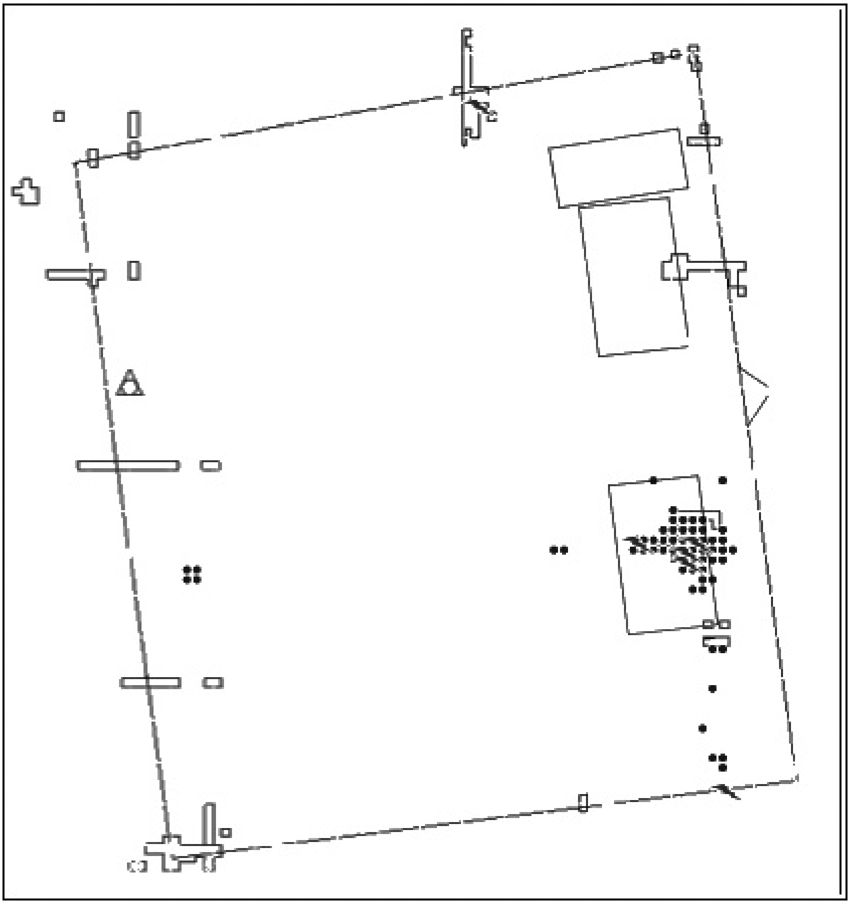


Figure 5.8: Location of scrap and tools on map of fort.

evidence of extreme frugality on the part of this early fur trade blacksmith, and characterized him as "a jack-of-all-trades who suffered from a lack of material, especially steel." (Light and Unglik 1987:32). Half a century later, the amount of scrap left behind by the Fort Pierre smith may be an indication of improved transportation and supply sources of iron stock, rather than simple wastefulness.

II. Other Industries

A. Logging (n = 29) The artifacts in this part of the collection were used in the acquisition, transportation, and initial processing of timber. This was needed almost constantly not only for construction, repair, and fuel, but to produce charcoal for the smith's forge.

1. Ax head (n = 1) Fort Pierre employees frequently brought broken axe heads such as this one to the smith for repair (DeLand 1918:145,146). Before 1870, most axes were made by folding the wrought iron body around a steel bit or blade, and then forging the two together (Selvidge and Allton 1925:181). Before it was broken, this was probably a double head "Western" or "Pennsylvania" pattern ax head, based on its shape and weight. The junction between the lighter colored bit and the darker body, and the seam where the body was folded together are both visible on close inspection (Figure 5.9a).

2. Chain links (n = 15) A number of chain links were found at the site, of various sizes. Links strong enough to pull down and drag trees, such as Weissenfel's Alloy Logging Choker Chain, are sold today in a diameter of 0.393″ (Peerless Chain Company n.d.). "Trace chains" such as the two halter chains found at the fort, are generally about 0.25-inch in diameter, and smaller chain links, less than 0.20″ were used for securing beaver traps, latches, etc. There were twelve chain links excavated at Fort Pierre, nearly all near the area of the blacksmith shop, and none of them an intact "link". Diameters range from 0.30″ to 0.62″, and the flattened ends of the round stock show that they had been "scarfed" in preparation for hammer welding, a common maneuver smiths use to ensure that the weld holds against stress (Harcourt 1917:50–53). Two identical "replacement links" are worth noting. They were forged as incomplete rings, with flattened ends overlapping but discontinuous (Figure 5.10a). This permitted temporary insertion between intact end links to lengthen or repair a chain in the field. The diameter (0.60″) is much greater than any complete link, to compensate for the loss of ductile strength inherent in the design (Emmet 1895:406).

3. Grapple hooks (n = 2) Two curved pointed objects, broken at the proximal end, are thought to be logging hooks or horse-drawn ice tongs (Mercer 1975:36,42; Watson 1990:61) the larger of the two measures $4.65'' \times 1.02'' \times 0.64''$ (Figure 5.10b).

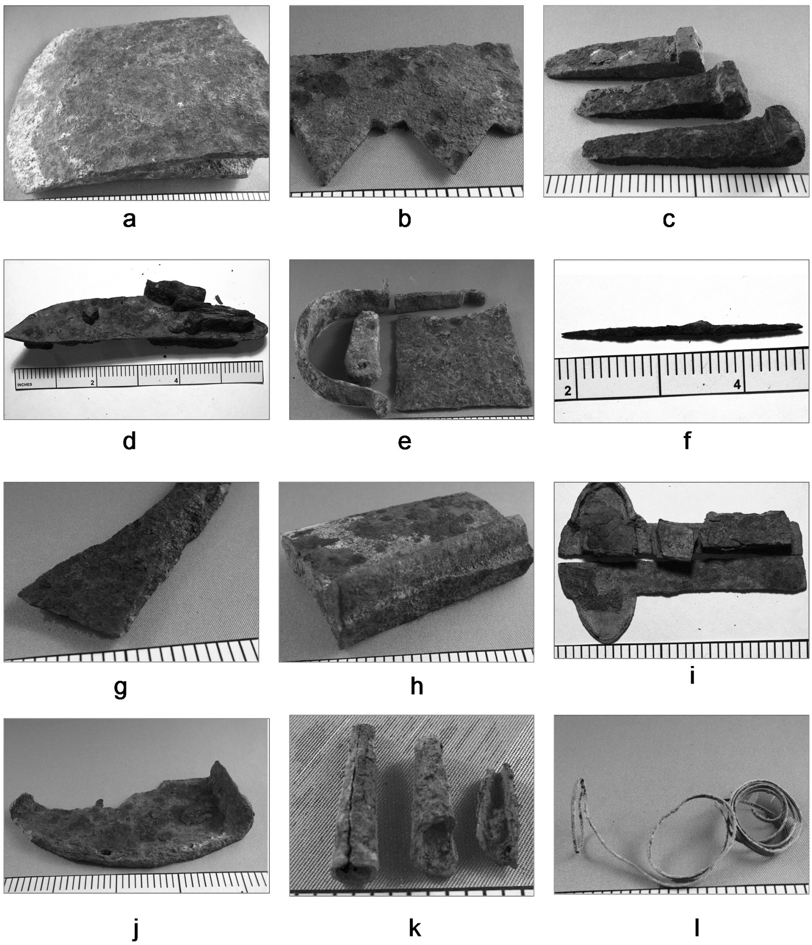
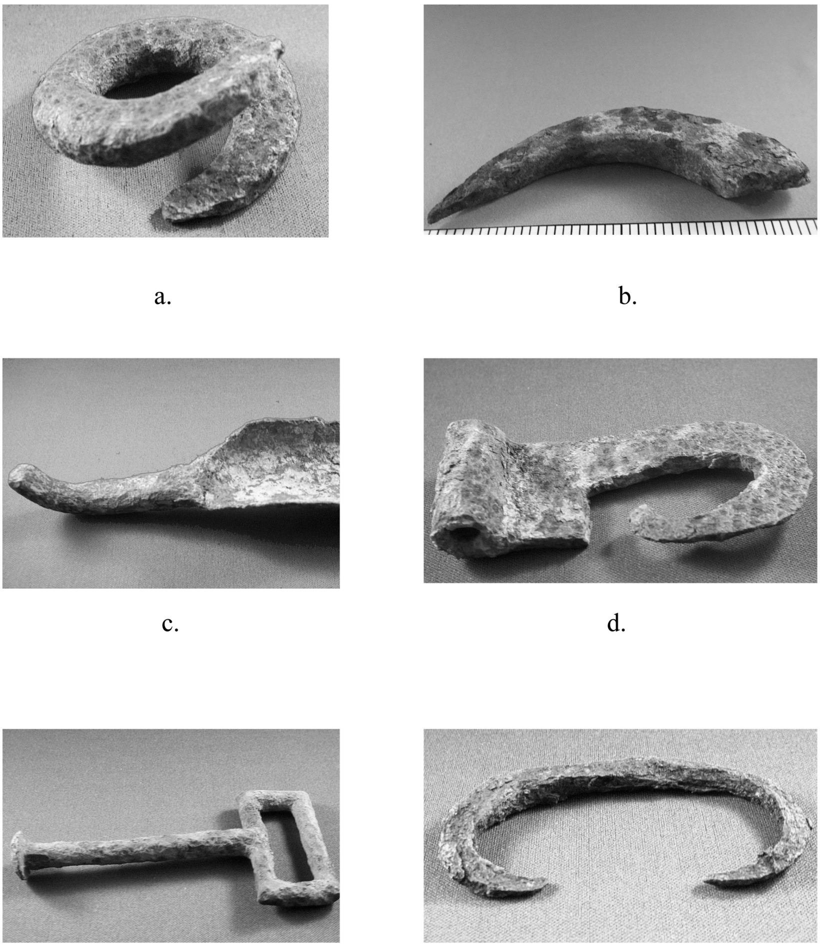


Figure 5.9: Artifacts: Other Industries.



a. b. c. d. e. f.

Figure 5.10: Artifacts: Other Industries.

4. Crosscut saw blade fragments (n = 2) Two saw blade segments measure 3.78″ × 1.79″ × 1″ and 3.91″ × 1.99″ × 0.12″. Each displays three triangular teeth, alternately beveled in opposite directions (Figure 5.9b). This arrangement allows the blade to cut straight through the log, rather than drifting off to one side (Watson 1977:66).

5. Splitting wedges (n = 4) Three complete artifacts and the tip of a fourth are thought to be wedges used to split small logs or planks. They have the appearance of spikes, with an eccentric head and a shaft that tapers to a sharp point, but the width of the shaft is such that they would appear to split rather than secure any board into which they are driven. They could have easily been forged by the blacksmith himself. Palisades and other structures were often made from split logs, and the military used a similar construction method during their occupation: "The roofs we formed of split logs, laid with the spilt side down or a pitch, and reaching from one wall to the other in a single span" (Meyers 1920:155). The complete ones all measure about 2.75″ × 0.65″ × 0.55″ (Figure 5.9c).

6. Ax Bits (n = 2) Damaged steel cutting edges that the blacksmith removed and replaced (Light and Unglik 1987:23).

B. Hunting (n = 20) The Fort Pierre Collection contains a large number of ammunition-related artifacts, including muzzle-loading gun parts and lead balls, percussion caps, minnie balls, and modern rim and center-fire cartridges. This report only includes items that may have been repaired or refurbished by the blacksmith.

1. Flintlock mechanism (n = 1) A single flintlock mechanism was recovered from the site. It is severely corroded but a number of the parts are visible, including the pan, frizzen spring, and cock screw on the exterior surface, and the mainspring, bridle, and sear spring on the interior surface. The cock top jaw, and frizzen are missing (Figure 5.9d). The artifact measures 5.96″ × 1.32″ × 1.37″, and probably came from a Northwest Gun. It resembles others manufactured in the eighteenth and nineteenth centuries (Hamilton 1982:208). Although caplocks became popular after 1825, and later self-contained cartridges were manufactured commercially, this type of gun was still in use at the end of the fur trade era. The Steamship *Arabia*, which carried two companies of Harney's Second Infantry to Fort Pierre in 1855, sank later that year with a number of these guns on board (Hawley 1995).

2. Side plate (n = 1) This is a simply designed English trade gun side plate, mounted on the left side of the stock opposite the lock plate to prevent the screws securing the firing mechanism from sinking into the wood. The front part of this brass plate, which would have provided the second screw hole, has broken away. Many trade guns had side plates that resembled serpents, and were ornamental in the extreme, and others were a simple washer (Hamilton 1982:89) It measures $3.25'' \times 0.88'' \times 0.10''$.

3. Sear (n = 2) L- shaped steel flintlock part that fit between the sear spring and the tumbler. Both measure about $1.5'' \times 1.0'' \times 0.32''$ and the ends that engaged the tumbler are broken (Bealer 1995:399).

4. Trigger parts (n = 2) These two complex steel objects are parts of the trigger mechanism from a flintlock gun (*Missouri River Fur Traders*' owner, Crofton, Nebraska, personal communication).

5. Sling holder (n = 1) This broken iron object appears to be a loop for a gun strap (Jensen 1988:100).

6. Gun worm (n = 1) This iron artifact is severely corroded, but could be a gun worm, used to retrieve an unfired or impacted lead ball from a muzzleloader.

7. Arrowhead? (n = 1) This triangular piece of sheet iron, $1.78'' \times 0.88'' \times 0.11''$ in size may have been made into a projectile point.

8. Lead sprue (n = 2) When the molten lead that was poured into a mold to make lead balls cooled, this excess or "sprue" remained and had to be cut away when the mold was opened.

9. Melted lead (n = 9) Amorphous lead, mixed with sand and debris, was found in areas where lead balls were made.

10. Knife blade fragments (n = 3)

C. Fishing (n = 2) A single lead sinker, conical in shape, with a constriction at the narrow end where a hole is placed, is included in the collection. It measures $1.55'' \times 0.30''$ and may have been used on fishing line or on a net. A single wrought iron fish hook fragment was also identified.

D. Trapping (n = 23) A number of trap parts were excavated at Fort Pierre, nearly enough to assemble a single trap, although they probably came from several different traps that the blacksmith was repairing or scavenging for their steel. Russell (1967:45) provides a very helpful diagram of the standard steel trap used to catch fur-bearing animals, illustrating its individual parts (Figure 5.9e).

1. Trap jaws (n = 2) these two artifacts clearly came from different traps, since one is rounded in profile and the other is rectangular. One "foot" of each trap jaw, serving to secure the device under the lower "bow" or spring eye, is missing. Their size (4.08″ and 3.12″ in length) is about half that of a standard beaver trap—7 3/4″ long (Russell 1967: 139), and thus inadequate to hold an animal of that bulk (40–60 lbs average adult weight). They may have been used to catch muskrats or even brown rats.

2. Trap spring eye (n = 2) Rings at the upper and lower end of the trap spring or bow encircled the jaws and brought them together forcefully when the pan was depressed. Light and Unglik (1984:29) provide a means for us to infer the size of the trap (small, medium, or large) from the inner diameter of the trap eye: "...spring eyes with an interior diameter of 2–3 cm...should be from traps for medium-sized fur bearing animals. Anything smaller than this should be a rat trap, and anything larger a bear trap." The interior diameters of these eyes are greater then 2.5 cm, which suggests they used on medium-sized animals such as beaver. Trap eyes can be distinguished from latches and other circular steel objects by the ratio of the inner to the outer diameter, which is 0.73 to 0.80 for trap eyes, and less than 0.50 for these other common objects.

Attention to detail in the trap manufacturing process was vital for the economic well-being of the trapper, since the devices were purchased in bulk by the fur trade company. Purchasing agents specified that all traps be tested according to a strict protocol: "set for one week, and then rejected if the springs do not come up fair or are broken." (Young 1899:107) *En masse* trap failures were reported in American Fur Company correspondence, prompting Indian trappers to return all the beaver traps sold to them the year before. The defect was generally found to be in the size or the trap spring eye (too large) or the jaws (too small) to secure the animal's leg tightly. In 1837, Chouteau's firm in St. Louis rectified this problem by demanding that trapmaker Miles Standish of New York provide exact copies of the model submitted to him. This trap, referred to as the "St. Louis pattern" beaver trap is illustrated in Figure 31 of Russell's (1967:139) work.

3. Pan post (n = 2) These key-shaped objects were seated vertically in the cross near the base and supported the dog as part of the trap's release mechanism (Russell 1967:102).

4. Trap pan (n = 3) Large rectangular pieces of sheet iron, with small perforations on one side, representing trap pans from beaver traps. They measure about $2.5'' \times 2.25'' \times 0.15''$.

5. Trap dog (n = 1) The "dog" is an iron rod which pivots on the dog post, and attaches to the pan at its other end.

6. Trap chain link (n = 8) These small diameter ($0.16''$) chain links are the right size for small to medium size traps.

7. Trap base (n = 1) A large, centrally perforated rectangular steel bar fits the description and appropriate size of a trap base. It measures $4.49'' \times 1.12'' \times 0.29''$.

8. Trap cross (n = 1) The cross is a rectangular steel bar positioned perpendicular to the center of the base, in which the dog and pan posts are inserted. It measures $3.80'' \times 1.17'' \times 0.16''$ and has a square perforation at one end.

9. Trap parts ? (n = 3) Three rectangular flat iron objects which are probably sections of trap bow.

E. Sewing (n = 2)

1. Iron awl (n = 1) The sharp offset at the center of this pointed implement (Figure 5.9f) identifies it as an awl of the type traded to the Indians as early as the 1760s. The offset was a safety feature that helped prevent splitting of the wooden haft in which it was embedded. American Fur Company records from the early 1830s indicate that these "Indian awls" were ordered up to 76 gross at a time. By then they had long since replaced the traditional bone awls used by Native American women (Sundstrom 2004:85).

2. Needle (n = 1)

F. Carpentry (n = 7)

1. Chisel tips (n = 5) Three wedge-shaped steel objects are broken at the proximal end, and tapered on only one side of the tip. The flat side of a wood chisel tip has to be ground flat with a whetstone to function properly (Blanford 1988:152–155). The complete chisel tip was obviously hand-wrought and then hardened and tempered. It has a broad cutting edge, and the opposite end is sharpened to drive into a wooden handle (Figure 5.9g). What appears to be a delicate brass chisel tip is also included.

2. Bow saw blade (n = 1) A single segment ($1.47'' \times 0.25'' \times 0.03''$) of bow saw blade is slightly convex along its serrated edge. It would have been stretched across a wooden frame.

3. Gouge (n = 1) A concave-bladed implement with a broken "crank neck" tang may represent a round chisel, or a fragment of a wheelwright's reamer, both woodworking tools (Sloan 1964: 75) (Figure 5.10c).

G. Other These are fragmentary parts of objects that may have been used in a variety of activities. They include bucket bails (n = 2), bucket rim and side fragments (n = 65), chain saw links (n = 7), barrel strapping (n = 22), a broken whetstone, and a lead seal. The last item would have been affixed to merchandise or correspondence shipped to or from the fort, and bears no identifying marks other than the imprint of linen fabric.

III. Construction

A. Materials (n = 204)

1. Barbed wire (n = 3) Loops of double-stranded barbed wire, the longest approximately 10? in length, with three barbs. The barbs are twisted in such a way that they loop first between the two strands, and then around both strands. This two-point, double strand design was patented by Jacob Brotherton of Ames, Iowa on September 3, 1878, and samples have been found in most of the prairie-plains states, including South Dakota (McCallum 1979:255). This wire may have been used help confine Scotty Philip's buffalo.

2. Staples (n = 17) Hand-wrought iron staples occur in a variety of sizes from $0.65''$ to $3.61''$ in length.

3. Bolts (n = 15) Various sized threaded bolts, nearly all with square heads, except for two described as "eye bolts". Three have square nuts attached to them, and four consist of the shaft portion only. Most have a square proximal shaft ending in a round threaded end, which helped secure the bolt into the wood as it was tightened. One is much larger than the rest, 10.9" in length.

4. Nuts (n = 13) Eleven threaded square nuts, none exactly the same diameter, one six-sided nut, and one butterfly nut were found. This variability underscores the fact that much of the construction material was made by hand.

5. Tacks, tack heads (n = 15) All but two of the tacks are made of brass, the other two being iron. Their shafts are square (cut), and the size is rather uniform, between 0.40″ and 0.50″ in length.

6. Washers (n = 8) A variety of washers were found.

7. Tie rods (n = 4) These U-shaped iron fasteners look like rectangular staples, with the pointed ends each measuring less than one fourth the length of the intermediate segment. They were used to strengthen framing joints (Watson 1977:55).

8. Nails and nail heads (n>100) These artifacts are analyzed in another section of the Fort Pierre report.

9. Spikes and spike shafts (n = 11) Several different spike types are included here, including cabinet brads and a tenterhook. These also will be covered in more detail in a separate report.

10. Nail fastener (n = 2) These flat rectangular devices held nails in wood more securely by providing tension.

11. Rivets and rivet head (n = 7) Four of these fasteners were hand-wrought iron and had square shafts.

12. Screw and screw head (n = 7)

13. Steel bracket (n = 1)

B. Hardware (n = 38)

1. Pintles (n = 4) One compete and three broken pintles were found. These objects have a spatulate point at one end and a loop at the other, and were driven into gateposts or door frames to hold hinges (Watson 1977:56).

2. Hinges (n = 5) Partial and complete butt hinges of various sizes may have been made or repaired by the blacksmith using this bar stock or “strap iron”, although they were also shipped to the fort. All are the two-hole variety.

3. Gutter fragments (n = 6) Pieces of a complex ferrous object consist of C-shaped bands riveted to semicircular sheet iron, which when reassembled appears to be part of a gutter. A June 1833 Bill of Lading lists “2 Bundles Tin Gutters” among the merchandise sent to the fort.

4. Key fragments (n = 6) Four fragments from two complete keys are identified. An entry, “2 Gross Strong Padlocks” is included in a Spring 1833 merchandise order for Fort Pierre.

5. Lock frame (n = 2) These are fragments of a cast iron rectangular metal latch frame, as illustrated in the 1865 Russell and Erwin Catalogue (Jandl 1856).

6. Hook-to-drive (n = 3) One large and two small J-shaped wrought iron hook. The smaller one appears to have been cut from strap iron (0.15″ thick), and the large one is hand-wrought. Both would have been driven into a roof beam to suspend objects vertically.

7. Latch eyes (n = 2) These circular iron objects can be differentiated from trap eyes by their the hole/total diameter ratio. For trap bow eyes this ratio is between 0.73 and 0.80, and for latch eyes such as these two, < 0.50.

8. Drawer pulls (n = 3) One steel U-shaped handle attached by tabs, and a brass pull attached by screws.

9. Hasp (n = 1) Hand-forged iron hasp with loop at one end and a round shaft ($4.52'' \times 0.83'' \times 0.40''$).

10. Door jam (n = 1) Rectangular flat steel object with rectangular central perforation and two beveled screw holes.

11. Hinge pin (n = 3) Hand-made rods with a loop at one end, the largest $5.91'' \times 0.30''$.

12. Keeper (n = 2) These U-shaped brass items for securing straps to a trunk.

13. Various sized hand-made latches and hooks (n = 9)

14. Strap hinge and fragment (n = 2) A large intact strap hinge with three wrought iron spikes in place, probably from a door or gate.

15. Pull guard (n = 2) A metal disk with two holes near the edge.

16. Close Spring (n = 1) Manufactured steel spring, probably to secure gate or door, or possibly farm equipment.

IV. Transportation

A. Vehicles (n = 13)

1. Stake pockets (n = 2) Two rectangular ferrous metal bands, probably stake pockets to hold side boards on a wagon (Watson 1977:83).

2. Skein fragments (n = 3) Three large (271–396 gram) cast iron fragments. Parts of circular object into which axle spindle inserted, and which in turn fit into the mortise of a wagon wheel (Comer 1985:365).

3. Wagon springs (n = 3) Two large ($13.57'' \times 1.53'' \times 0.59''$ and $11.40'' \times 1.36'' \times 0.40''$) curved iron bars that fit the description of a wagon box spring, and a third fragment from the end of a similar device.

4. Wagon Hitch (n = 1)

5. Axle clip tie (n = 1) The axle clip, a U-shaped rod threaded at both ends inserted into the rectangular axle clip tie to secure the axle to the frame (Herskovitz 1978:89–90).

6. Hame hook (n = 1) Harness gear used to connect draft animal to a wagon (Figure 5.10d). Herskovitz (1978:87–88) shows an identical item from Fort Bowie in Figure 39j.

7. Lynch pin (n = 1) The "spring loaded" lynch pin, in which an over-the-center ring loop attached to the head snaps down to hold a fastener, identical to this one, in place. It probably came from a mower or other implement used within the past 50 years, since the manufacturer claims it was invented by Chambers in 1943 (Wilson Manufacturing Company n.d.).

8. Heel chain (n = 1) Hand-wrought rectangular loop and shaft used to connect horse halter to a conveyance (Watson 1979:65) (Figure 5.10e).

9. Wagon box rod collar (n = 1) This item is a rectangular nut (Emmet 1895:597).

B. Husbandry (n = 15)

1. Horse shoes (n = 2) A large horseshoe with toe clip, calking, and four nail holes on each side, as well as a single nail still in place, and a slightly smaller shoe, without nails. Both resemble many late nineteenth century horseshoes.

2. Oxen shoes (n = 2) Two oxen shoes of slightly different design, one representing the outer half of the shoe for a right hoof, and the other from the outer half for a left hoof (Figure 5.9j). Oxen of course have cloven hoofs, and also differ from horses in that they are unable to tolerate standing on three legs. Shoeing an oxen must have been a difficult and dangerous job for the blacksmith, requiring that the one ton-plus animal be suspended by straps attached to a winch. Much of the overland transportation of equipment and merchandise in the nineteenth century was done by teams of oxen, driven by men called "bullwhackers."

3. Mule shoe (n = 1) A mule's hoof is narrower than that of a horse, and the length/width ratio of a mule shoe is 1:5, as is this item (4.92″ × 3.27″); by comparison the length/width ratio of a horseshoe ranges from 1:1 to 1:2 (Manger 1980:396–398).

4. Horseshoe nail (n = 1)

5. Halter chain (n = 2) Two complete iron chains with toggles at each end. Chain link diameter averages 0.25″.

6. Chain toggle (n = 1) Iron rod, flattened on each end, with broken loop in center portion. Used to temporarily fasten chain to a wagon or another chain.

7. Chain links (n = 4) Diameter 0.24″ to 0.30″.

8. Iron ring (n = 1) Possibly part of harness or saddle strap.

9. Fleam (n = 1) Two halves of a brass fleam case with fragments of its triangular steel blades were found in close association (Figure 5.9i). It is classified with the Husbandry artifacts because it is considered a veterinary fleam, based on its size and shape. Horses in particular were bled therapeutically until the late nineteenth century. Instruments such as this was placed over a prominent neck vein and struck with a "fleam stick" to perform the venisection. Three fleams identical to this one are on display at the Steamship *Arabia* museum in Kansas City (Hawley 1995).

10. Farrier's chisel? (n = 1) This artifact resembles a broken blade segment of a farrier's long chisel, used to trim hoofs (Sloane 1964:91).

V. Domestic Items

A. Culinary (n = 451)

1. Hole-in-cap can and fragments (n = 133) One complete but flattened, rust-incrusted ferrous metal can displays the main characteristics of a sealed food container (*post quem* 1820): lap seam, flanged can end, and cap at one end with a "match-stick" filler hole (Rock 1984: 100–101). Multiple fragments consist of top and bottom lids and sides.

2. Cannister fragments (n = 248) These are thin flat iron fragments, some with a rolled edges, probably came from large food containers, referred to as "Cannisters." Their onset of manufacture was 1810 (Rock 1984:97–111).

3. Utensil handles (n = 5) Broken iron kitchen utensil handles.

4. Stove parts (n = 11) Large cast iron objects, including a complete, ornately decorated stove door, the largest single item in the collection (6500 g). These may have come from heating or cooking stoves. The blacksmith shop would have had at least one stove, since the head generated by the forge would not have been adequate in the winter.

5. Pot and kettle fragments (n = 37) These items consist of rims, lugs, handles, and side fragment.

6. Bottle seals (n = 12) Thin lead strips used to seal bottle caps.

7. Strike-a-light (n = 1) Oval "firesteel" used to start a flame by striking against a flint over a bed of flammable tinder Figure 5.10f). Used by trappers and Indians alike (Russell 1977:350).

8. Metal shaker top (n = 1) This item may have been used for culinary purposes, but blacksmiths used "watering cans" such as this to control their fire.

9. Stove lid lift (n = 1)

10. Fireplace accessories (n = 2) Two embossed cast iron items appear to be broken "feet" from devices used to hold logs or cooking utensils in a fireplace. The larger one resembles the inner support of a "firedog," and the smaller one may be a trivet or andiron foot.

B. Decorative items

1. Tinklers (n = 5) Five conical rolled sheet iron objects, all about one inch long. They would have been attached to the fringe of Native American women's dresses, and created a rhythmic sound during dances (Figure 5.9k).

2. Decorative item (n = 2) Unknown function.

C. Clothing (n = 3) One brass and one steel suspender slide, and an iron buckle.

VI. Miscellaneous (n > 3000)

A. Sheet iron (n > 2000) These thin, fragile pieces of corroding iron constitute the largest (and ever growing) number of artifacts in the collection. They vary from 0.06″ to 0.12″ in thickness, and may have been used for roofing, containers, chimneys, barrel strapping, or a variety of other purposes.

B. Wire (n = 33) Short sections of iron, tin, copper, and lead wire were found.

The assemblage includes three long strands of copper wire, rectangular in cross-section (0.03″ × 0.05″). Selvidge and Allton (1925:18–19) explain that this type of bendable material is ideal for measuring the linear dimensions of irregular objects. For example, blacksmiths used it for this purpose in measuring the length of round stock to cut in fashioning a specified size of chain link. It was also used to bind together round stock (Figure 5.91).

C. Springs (n = 9) Two types of springs were found at the site. The first is a steel coil spring in seven fragments. Compression springs of this type were used in animal traps, but not until about 1896 (Russell 1967:106). They were also used in hinges, but none of the hinges recovered from the fort are of this type. They probably came from locks. Two very fine diameter (0.02″) brass extension springs were also identified; their function is unknown.

D. Non-ferrous sheet metal fragments (n = 20) Triangular pieces of copper and tin are probably the remnants of the whitesmith's work.

E. Cast iron plate fragments (n = 15) Broken pieces of cast iron, generally about 0.20″ thick, may have been remnants of heating stoves.

F. Tubular brass objects (n = 4)

G. Lead Rods, bands, tubular object (n = 5) May have been used for soldering.

H. Disk-shaped metal objects (n = 2)

I. Iron rings (n = 8) Sizes range from 10.03″ to 0.46″ diameter.

J. Iron rod (n = 1)

K. Disk-shaped objects (n = 2) One lead and one iron.

L. Iron fragments, not sheet iron (n $>$ 1000)

M. Amorphous non-ferrous metal (n = 1)

N. Brass rod (n = 3)

VII. Unknown (n = 41)

These objects are listed but their identity could not be determined.

A. Machine parts? (n = 4) Three cast iron and one tool steel item. Possibly parts of farm implements or the grain mill at the fort (Figure 5.11a,b,d).

B. Grooved object (n = 1) Flat concave shovel-like brass item (Figure 5.11c).

C. Shaft housing? (n = 1)

D. Spatulate rod? (n = 1)

E. U-shaped silver strip (n = 1)

F. Iron rings (n = 3)

G. Perforated steel disk (n = 1)

H. Brass object (n = 4)

I. Unknown iron (n = 24)

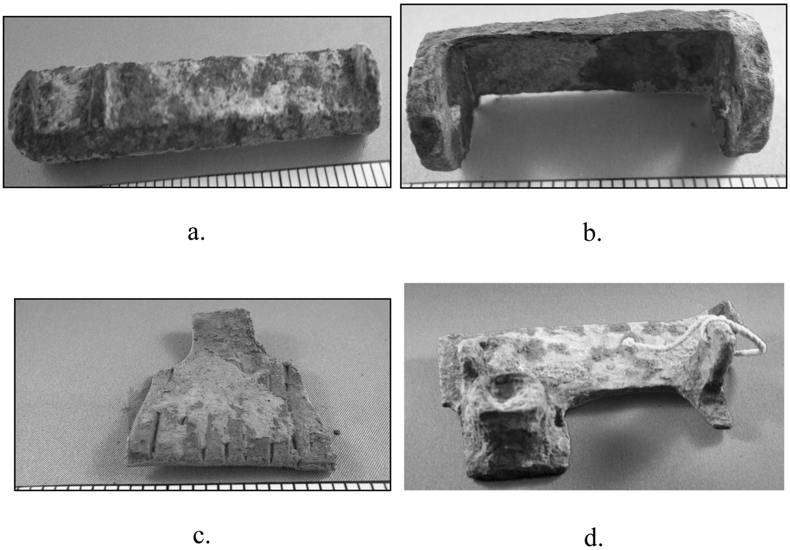


Figure 5.11: Unidentified artifacts.

J. Wire handle (n = 1)

K. Non-ferrous metal hose segment (n = 1)

Discussion

> Under the spreading chestnut tree the village *smithy stands*.
> The smith, a mighty man is he, with large and sinewy hands.
>
> "The Village Blacksmith"
> Henry Wadsworth Longfellow, 1841

Location

In seeking to understand blacksmithing, or any other industry that has long since faded in popular memory, we need all the help we can get. Even a poem, such as Longfellow's beloved but sometimes parodied work provides unexpected clues that can bridge gaps in our apprehension of function and spatial context. To nearly all contemporary readers, the poem's first line conjures up the image of a stolid fellow standing outdoors, much like a shade-tree mechanic. Of course the term smithy refers to the blacksmith's shop; the man himself would not have been standing in open daylight, unless he was taking a break, perhaps enjoying a smoke from his clay pipe. While he was working, he needed to be in an enclosed area that provided both reduced light, so he could discern subtle color changes in the heated iron, and a well-lit area for the workbench, under a window. Here he could craft delicate gun and trap parts. Writing his poem in 1841, when smiths and their shops were as commonplace as computer programmers are today, Longfellow would have known this. "The Village Blacksmith" presents a very positive image of the smith, one that persists even now: hardworking, skillful, pious, and muscular, if not downright buff. Longfellow was a romantic poet, portraying an idealized view of the world. But he was also perceptive, and his lines contain more than mawkish phrases strung together; they mirror reality, even if we no longer understand (or never knew) the terminology.

Halsey's journal entries provide frequent references to the blacksmith's work, his importance to the activities at Fort Pierre, and indirectly even his shop's location. The fact that Fort Tecumseh's front gate (facing the Missouri, or east) fell into the river on June 17, 1830, and the blacksmith shop along with it, tells us something about the relative location of the smithy. The structure was rebuilt almost immediately: "6/29/30 Finished blacksmith shop" (Deland 1902:127), a task not deferred until the entire post was reassembled as Fort Pierre. This shows that the smith's work was indispensable to the day-to-day enterprise. The blacksmith shop's position within the fort was a matter of practicality dictated by function, not the idiosyncratic work habits of a few American Fur Company employees. Other posts (Fort Union, Fort Vancouver, Fort Benton) all placed their smithy near the main gate, as far from the elite quarters as possible. This provided ready access to supplies, fuel that needed to be stored separately to avoid fires, and livestock requiring the smith's attention.

Historic accounts and maps are precise regarding the dimensions of the Fort Pierre smithy ("59*x*19 feet, 7½ feet high") but positional information is either vague or contradictory. Culbertson's account and Turnley's sketch place it to the right of the front gate. Wilson, relying on LaBarge's memory twenty years hence, claims it is to the left. Catlin, Maximilian, and deGirardin mention the shop, but don't specify its location (Ruple 1990:5–10). It seems likely that nineteenth century artists, adventurers, and military men would not have paid much attention to something so prosaic as a blacksmith shop. As shown above, this ambiguity vanishes once we are able to reconstruct the archaeological record. It was to the left of the front gate as one entered the fort from the east.

Artifacts

The three types of ferrous artifacts in this part of the Fort Pierre collection are nearly equally divided by weight. Large cast iron fragments (n = 75), primarily stove parts, have a total weight of 13.2 kg. Other than some tools, hunting and trapping implements, and a few machine parts, the bulk of the steel artifacts consist of fragile pieces of corroding sheet iron, weighing over 20 kg. The 244 wrought iron objects weigh 12.9 kg. These items comprise only part of the ferrous material excavated at Fort Pierre. The fasteners, including nails, spikes, screws, bolts, and staples will be analyzed in another report, but a preliminary estimate indicates that the aggregate weight is about 40 kg, mainly wrought iron. Thus, when the three types of ferrous metals are compared as components of a single entity, two patterns emerge. In terms of weight, Wrought Iron > Cast Iron = Steel. In terms of numbers of fragments, Steel > Wrought Iron > Cast Iron. Surprisingly, meaning can be derived from what might appear to be a pointless laboratory exercise: attempting to quantify crumbling pieces of rusty sheet iron. During the proto-Industrial Revolution period that Fort Pierre spanned, the older types of iron (wrought and cast) continued to predominate just as carbon steel was becoming more available. This is attributable to improved transportation, rather than technological advances, which were yet to be perfected in the pre-Bessemer era. In terms of durability, a pattern is also apparent. Cast iron is brittle but relatively corrosion-resistant. Wrought iron is tough, and persists as an identifiable object with moderate surface corrosion. Most of the wrought iron fragments were intentionally cut; most of the cast iron fragments were broken while in use. Steel, the form of iron associated with modernity, is also the most ephemeral, oxidizing away to nothingness within a few hundred years.

Conclusion

What can these artifacts tell us about the nature of the work carried out at Fort Pierre? The number, angle, and conformation of the cuts made in remnants of discarded iron stock provide insight into the processes used to work the metal, the fact that an assistant was needed to perform many of the tasks, and by inference, the tools required in addition to the few that were excavated. Clearly, the blacksmith had to apply prescribed methods, learned through careful observation during his tutelage, and honed with experience. A good result, required for the productivity and safety of his co-workers, depended also on his organizational skills, precision, and alacrity. This was not assembly-line work; the smith was an innovator and an improviser, often making tools that had no name, for *ad hoc* applications, never duplicated in a factory.

The archaeological record shows that the blacksmith's work was central to the economic life of the fort, through the production of trade goods, the repair and maintenance of structural materials, as well as transportation, subsistence, and domestic items. At the same time, careful consideration of the archival sources, (journal entries, A.F.C. records, employee accounts) in conjunction with the material evidence, reveals a tangential role for the blacksmith. In fact, the entire fur trade enterprise, as conducted at Fort Pierre, has a peculiar circularity to it, like interlocking gears, or a mouse on a rotating wheel. We see the blacksmith engaged in the maintenance of logging implements, used to acquire and process timber, much of which was converted to charcoal, which in turn was burned at the forge to repair more broken logging tools. Throughout the entire process, the consumption of resources progressed unabated: trees, fur-bearing animals, and Indians' lives and culture were all subjected to ongoing attrition. Some of these resources are readily renewable, while others are not. A few entrepreneurs became wealthy captains of industry; steady employment was provided for the skilled and many of the unskilled workers; a significant number from all social strata died in debt. Meanwhile, the acquisition of Native American land and the expansion of the American frontier continued apace.

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Table 5.2: Fort Pierre Chouteau metal measurements.

Cat. No.	Code	Material	X	Y	Z	Size (in)	Weight (g)	Remarks
a01-73-355	I.A	fw	569	460	-0.05	$1.87 \times 1.89 \times 0.31$	28.7	Tuyere Pipe Frag?
b01-73-355	I.A	fw	569	460	-0.05	$1.33 \times 0.95 \times 0.19$	6.3	Tuyere Pipe Frag?
c01-73-355	I.A	fw	569	460	-0.05	$1.19 \times 0.94 \times 0.15$	4.7	Tuyere Pipe Frag?
d01-73-355	I.A	fw	569	461	-0.05	$0.93 \times 0.88 \times 0.18$	4.9	Tuyere Pipe Frag?
e01-73-355	I.A	fw	569	461	-0.05	$1.54 \times 0.58 \times 0.19$	4.2	Tuyere Pipe Frag?
a01-73-1647	I.A	fs	573	453	-0.05	$0.83 \times 0.43 \times 0.14$	4.4	Broken File
a99-70-460	I.A	fs	542	534	-0.25	$5.26 \times 1.89 \times 1.13$	648.0	Fuller
a99-70-1233	I.A	fs	563	482	-0.05	$4.18 \times 0.79 \times 0.78$	189.0	Punch
a01-73-2240	I.A	fs	-99	-99	0	$7.05 \times 2.66 \times 0.31$	688.0	Bolster?
a-01-73-1747	I.A	fs	572	452	-0.05	$0.82 \times 0.46 \times 0.15$	4.0	Broken File
a01-73-2694	I.A	fc	571	454	-0.15	$3.50 \times 1.89 \times 0.17$	98.0	Smith's Shovel Frag
l01-73-1262	I.A	fs	568	478	-0.05	$1.94 \times 0.72 \times 0.12$	11.6	Tuyere Pipe Frag?
p01-73-1262	I.A	fs	567	478	-0.05	0.69×0.34	3.8	Drift Punch Tip?
i01-73-2421	I.A	fs	570	481	-0.15	5.21×0.73	141.1	Cold Chisel
b01-73-1415	I.A	fs	568	480	-0.25	$2.87 \times 0.69 \times 0.57$	61.6	Broken Tong Frag
c99-70-1751	I.A	fs	563	481	-0.25	$1.58 \times 0.50 \times 0.06$	1.7	Utensil Handle?
a99-70-108	I.A	b	566	484	-0.15	$1.89 \times 0.50 \times 0.1$	8.0	Utensil Handle?
a98-0131-1581	I.A	fs	-99	-99	-99	$2.78 \times 0.64 \times 0.13$	13.8	File Tip
a00-90-1390	I.A	fw	508	490	-0.1	$2.84 \times 1.69 \times 0.54$	68.6	Shovel Frag
b00-90-1390	I.A	fw	508	490	-0.1	$2.21 \times 1.20 \times 0.20$	22.9	Shovel Frag
a81-113-613	I.B	fs	-99	-99	-99	$7.61 \times 1.81 \times 0.25$	365.0	Perforated Bar Stock
f01-73-1262	I.B	fs	567	479	-0.05	$2.15 \times 0.45 \times 0.14$	13.1	Thin Bar Stock
b01-73-970	I.B	fw	567	479	-0.15	$0.69 \times 0.66 \times 0.41$	4.0	Worked Iron
b01-73-869	I.B	fw	571	481	-0.15	$1.06 \times 0.52 \times 0.22$	3.0	Bar Stock Frag
c01-73-869	I.B	fw	571	482	-0.15	$1.03 \times 0.92 \times 0.68$	5.0	Bar Stock Frag
a99-70-1572	I.B	fw	565	482	-0.25	$0.57 \times 0.54 \times 0.51$	9.0	Worked Round Stock
a01-73-881	I.B	fs	572	455	-0.05	$1.58 \times 0.27 \times 0.25$	8.6	Cut Iron Rod
d01-73-1208	I.B	fw	568	485	-0.15	$1.32 \times 1.26 \times 0.45$	8.3	Tuyere Clinker
a01-73-2546	I.B	fw	570	477	-0.25	$2.68 \times 0.92 \times 0.21$	47.0	Bar Stock

Table 5.2: continued

Cat. No.	Code	Material	X	Y	Z	Size (in)	Weight (g)	Remarks
b01-73-2546	I.B	fw	569	476	-0.25	$1.37 \times 0.58 \times 0.34$	18.7	Worked Bar Stock
c01-73-2546	I.B	fw	569	477	-0.25	0.79×0.57	15.1	Worked Round Stock
a01-73-1708	I.B	fw	570	460	-0.05	$1.60 \times 0.62 \times 0.41$	35.0	Worked Bar Stock
a01-73-1872	I.B	fw	573	483	-0.05	$1.28 \times 0.70 \times 0.54$	27.0	Worked Bar Stock
a01-23-2692	I.B	fw	571	465	-0.15	0.93×0.45	15.0	Worked Round Stock
a01-73-2691	I.B	fw	573	483	-0.25	$2.70 \times 0.55 \times 0.27$	21.0	Worked Iron
a99-70-1407	I.B	fw	552	481	-0.15	$1.11 \times 0.87 \times 0.24$	7.0	Iron Fragment
a01-73-2348	I.B	fw	570	477	-0.15	0.80×0.68	24.0	Cut Round Stock
a01-73-2016	I.B	fw	573	490	-0.15	$2.10 \times 0.82 \times 0.27$	26.0	Worked Bar Stock
a01-73-2693	I.B	fw	572	484	-0.05	1.07×0.71	13.0	Worked Iron
a01-73-2714	I.B	fw	573	456	-0.05	$0.63 \times 0.53 \times 0.33$	2.0	Clinker
a01-70-1453	I.B	fw	563	482	-0.35	$0.90 \times 0.55 \times 0.68$	26.0	Worked Bar Stock
a99-70-524	I.B	fw	566	485	-0.35	$1.61 \times 1.17 \times 0.39$	52.0	Worked Bar Stock
a99-70-1606	I.B	fw	565	484	-0.05	$3.41 \times 2.60 \times 0.29$	114.0	Worked Bar Stock
a81-113-335	I.B	fw	117	44	-0.15	$1.10 \times 0.81 \times 0.28$	15.0	Worked Bar Stock
a81-113-36-182	I.B	fw	101	44	-0.15	$1.22 \times 0.84 \times 0.30$	9.0	Bar Stock Frag
a01-73-1107	I.B	fw	569	480	-0.35	$1.20 \times 0.98 \times 0.17$	6.0	Worked Bar Stock
c01-73-1262	I.B	fw	567	479	-0.05	$2.68 \times 1.66 \times 0.24$	85.4	Broken Bar Stock
d01-73-1262	I.B	fw	567	478	-0.05	$2.66 \times 1.25 \times 0.26$	69.7	Broken Bar Stock
e01-73-1262	I.B	fw	567	478	-0.05	3.18×0.66	117.6	Worked Round Stock
i01-73-1262	I.B	fw	568	478	-0.05	$2.85 \times 0.63 \times 0.21$	47.3	Worked Bar Stock
j01-73-1262	I.B	fw	568	479	-0.05	$2.59 \times 0.72 \times 0.59$	43.1	Worked Bar Stock
k01-73-1262	I.B	fw	568	478	-0.05	$2.54 \times 0.85 \times 0.44$	31.8	Worked Bar Stock
a01-73-1898	I.B	fw	573	481	-0.05	$1.63 \times 0.68 \times 0.16$	16.4	Worked Bar Stock
b01-73-1898	I.B	fw	572	480	-0.05	$2.58 \times 0.70 \times 0.45$	29.8	Clipped Ax Bit?
e01-73-1286	I.B	fw	568	485	-0.25	$3.90 \times 1.01 \times 0.22$	38.0	Worked Bar Stock
f01-73-2421	I.B	fw	570	480	-0.15	$1.33 \times 0.53 \times 0.19$	8.2	Worked Bar Stock
g01-73-2421	I.B	fw	570	480	-0.15	$1.07 \times 0.40 \times 0.22$	9.8	Worked Bar Stock
k01-73-2421	I.B	fw	571	480	-0.15	$2.12 \times 1.18 \times 0.40$	47.1	Worked Bar Stock

Table 5.2: continued

Cat. No.	Code	Material	X	Y	Z	Size (in)	Weight (g)	Remarks
a01-73-985	I.B	fw	567	479	-0.05	$2.69 \times 0.90 \times 0.43$	37.0	Worked Bar Stock
c01-73-985	I.B	fw	567	480	-0.05	$2.95 \times 0.55 \times 0.20$	23.9	Worked Bar Stock
d01-73-985	I.B	fw	567	480	-0.05	0.47×0.32	3.9	Punch Hole Center
a01-73-1651	I.B	fw	567	483	-0.05	$1.48 \times 1.47 \times 0.61$	100.6	Worked Bar Stock
d01-73-1651	I.B	fw	567	484	-0.05	1.08×0.23	1.8	Worked Bar Stock
a01-23-2709	I.B	fw	573	459	-0.15	$0.70 \times 0.42 \times 0.28$	2.0	3 Slag Frags
a01-73-1110	I.B	fw	572	456	-0.05	$1.27 \times 0.74 \times 0.33$	4.2	Tuyere Pipe Clinker
b01-73-581	I.B	fw	572	452	-0.15	$2.29 \times 0.40 \times 0.31$	5.5	Worked Iron
a01-73-604	I.B	fw	572	482	-0.05	$1.68 \times 0.83 \times 0.25$	33.5	Worked Bar Stock
b01-73-604	I.B	fw	571	482	-0.05	$1.58 \times 0.83 \times 0.38$	23.9	Worked Bar Stock
b99-70-1702	I.B	fw	562	482	-0.05	$2.84 \times 0.70 \times 0.15$	20.5	Worked Bar Stock
b81-113-479	I.B	fw	-99	-99	-99	5.98×0.47	129.4	Worked Round Stock
c81-113-479	I.B	fw	-99	-99	-99	1.93×0.70	57.1	Worked Round Stock
f99-70-301	I.B	fw	565	484	-0.15	$1.17 \times 0.73 \times 0.39$	43.5	Worked Bar Stock
a99-70-363	I.B	fw	566	485	-0.25	$2.04 \times 0.87 \times 0.69$	90.5	Worked Bar Stock
b99-70-363	I.B	fw	565	484	-0.25	$3.37 \times 0.57 \times 0.53$	87.9	Worked Bar Stock
c99-70-363	I.B	fw	565	484	-0.25	1.87×0.57	51.2	Worked Round Stock
d99-70-363	I.B	fw	565	485	-0.25	$1.37 \times 0.47 \times 0.52$	34.1	Faggot Welded Bar
a01-73-1748	I.B	fw	572	452	-0.05	1.15×0.39	15.5	Worked Bar Stock
b01-73-1748	I.B	fw	572	453	-0.05	0.55×0.26	1.0	Worked Bar Stock
a99-70-1751	I.B	fw	564	482	-0.25	$1.17 \times 0.79 \times 0.37$	31.7	Worked Bar Stock
b99-70-1751	I.B	fw	563	481	-0.25	3.16×0.55	72.9	Worked Round Stock
a01-73-1312	I.B	fw	508	479	-0.25	$2.28 \times 1.58 \times 0.19$	66.4	Worked Bar Stock
b01-73-1312	I.B	fw	507	478	-0.25	4.79×0.43	93.0	Worked Round Stock
c01-73-1312	I.B	fw	507	478	-0.25	1.09×0.46	14.7	Worked Round Stock
d01-73-1312	I.B	fw	507	479	-0.25	$2.59 \times 0.41 \times 0.16$	10.8	Worked Bar Stock
h01-73-1312	I.B	fw	507	479	-0.25	$1.48 \times 0.98 \times 0.19$	18.6	Worked Bar Stock
k01-73-1312	I.B	fw	508	478	-0.25	$1.47 \times 1.06 \times 0.20$	15.0	Worked Bar Stock
a99-70-1571	I.B	fw	564	481	-0.25	$1.96 \times 1.22 \times 0.55$	106.6	Worked Bar Stock

Table 5.2: continued

Cat. No.	Code	Material	X	Y	Z	Size (in)	Weight (g)	Remarks
b99-70-1571	I.B	fw	564	481	-0.25	$1.73 \times 0.76 \times 0.58$	66.8	Worked Bar Stock
d99-70-1571	I.B	fw	564	482	-0.25	$0.78 \times 0.30 \times 0.24$	2.9	Worked Bar Stock
e99-70-1571	I.B	fw	564	481	-0.25	0.99×0.42	3.8	Slag
a99-70-638	I.B	fw	567	485	-0.35	$2.87 \times 0.57 \times 0.46$	76.4	Worked Bar Stock
b99-70-638	I.B	fw	566	484	-0.35	$1.72 \times 0.67 \times 0.43$	30.9	Worked Bar Stock
c99-70-638	I.B	fw	566	484	-0.35	$2.85 \times 0.55 \times 0.50$	53.7	Worked Bar Stock
d99-70-638	I.B	fw	566	485	-0.35	$1.15 \times 0.79 \times 0.49$	35.4	Worked Bar Stock
e99-70-638	I.B	fs	566	485	-0.35	$2.2 \times 1x0.15$	16.2	Cut Latch Eye
b99-70-861	I.B	fw	570	469	-0.05	$0.44 \times 0.41 \times 0.35$	8.8	17 Slag Frags
a99-70-1610	I.B	fw	565	483	-0.05	$1.52 \times 0.73 \times 0.48$	44.1	Worked Bar Stock
b99-70-1610	I.B	fw	565	483	-0.05	$1.20 \times 1.20 \times 0.34$	41.3	Worked Bar Stock
c99-70-1610	I.B	fw	565	484	-0.05	$2.35 \times 0.67 \times 0.29$	22.8	Worked Bar Stock
d99-70-1610	I.B	fw	565	484	-0.05	$1.46 \times 0.44 \times 0.31$	12.8	Worked Bar Stock
a99-70-293	I.B	fw	566	484	-0.15	$2.64 \times 1.69 \times 0.47$	175.0	Worked Bar Stock
b99-70-293	I.B	fw	566	485	-0.15	$2.21 \times 1.31 \times 0.26$	60.9	Worked Bar Stock
c99-70-293	I.B	fw	566	485	-0.15	$1.94 \times 1.67 \times 0.17$	37.4	Worked Bar Stock
d99-70-293	I.B	fw	566	484	-0.15	$2.53 \times 2.07 \times 0.54$	253.4	Worked Bar Stock
f99-70-293	I.B	fw	566	485	-0.15	5.06×0.5	124.6	Worked Round Stock
h99-70-293	I.B	fw	567	484	-0.15	$5.22 \times 0.57 \times 0.29$	53.6	Worked Bar Stock
a99-70-1640	I.B	fw	566	484	-0.35	$2.52 \times 0.65 \times 0.39$	17.1	Worked Bar Stock
b99-70-1640	I.B	fw	566	485	-0.35	$2.01 \times 0.40 \times 0.36$	11.9	Worked Bar Stock
c99-70-1640	I.B	fw	566	485	-0.35	$1.66 \times 0.48 \times 0.28$	11.9	Worked Bar Stock
d99-70-1640	I.B	fw	567	484	-0.35	$0.65 \times 0.60 \times 0.62$	16.7	Worked Bar Stock
e99-70-1640	I.B	fw	567	485	-0.35	$0.61 \times 0.40 \times 0.27$	3.8	Worked Bar Stock
a99-70-1521	I.B	fw	563	482	-0.05	$1.40 \times 0.60 \times 0.32$	21.5	Worked Bar Stock
b99-70-1521	I.B	fw	563	481	-0.05	$1.48 \times 0.54 \times 0.32$	19.3	Worked Bar Stock
c99-70-1521	I.B	fw	563	481	-0.05	$0.77 \times 0.65 \times 0.40$	14.5	Worked Bar Stock
d99-70-1521	I.B	fw	563	482	-0.05	$0.95 \times 0.47 \times 0.32$	6.9	Worked Bar Stock
e99-70-1521	I.B	fw	563	482	-0.05	$0.73 \times 0.47 \times 0.24$	4.5	Worked Bar Stock

Table 5.2: continued

Cat. No.	Code	Material	X	Y	Z	Size (in)	Weight (g)	Remarks
a99-70-1611	I.B	fw	565	484	-0.05	$2.06 \times 0.89 \times 0.42$	33.5	Worked Bar Stock
b99-70-1611	I.B	fw	565	484	-0.05	$1.16 \times 0.43 \times 0.24$	4.9	Worked Bar Stock
b99-70-439	I.B	fw	566	484	-0.25	$5.02 \times 2.36 \times 0.35$	442.7	Worked Bar Stock
a01-73-987	I.B	fs	568	480	-0.05	$0.78 \times 0.76 \times 0.52$	20.0	Cut Bolt Head
b99-70-1402	I.B	fs	562	481	-0.15	$0.85 \times 0.70 \times 0.53$	22.3	Cut Bolt Head
a99-70-439	I.B	fs	566	484	-0.25	1.75×0.70	56.9	Cut Threaded Bolt
a99-70-1702	I.B	fs	562	481	-0.05	$2.16 \times 1.30 \times 0.38$	80.2	Cut Latch Eye
a98-0131-366	I.B	fw	-99	-99	-99	1.37×0.92	94.3	Cut Round Stock
a98-0131-1299	I.B	fw	-99	-99	-99	$1.62 \times 0.89 \times 0.44$	37.1	Cut Bar Stock
a01-0073-2732	I.B	fw	568	472	-0.25	1.84×0.78	76.2	Cut Round Stock
a01-0073-2898	I.B	fw	568	477	-0.25	1.81×1.11	155.9	Cut Round Stock
b80-303-68	I.B	fw	49	12	-0.35	1.84×0.51	16.4	Round Stock
d80-303-68	I.B	fw	49	12	-0.35	12.20×0.71	465.8	Bent Round Stock
e80-303-68	I.B	fw	49	12	-0.35	18.75×0.61	552.7	Bent Round Stock
a99-70-101	I.B	fw	566	484	-0.15	$1.5 \times 0.92 \times 0.23$	119.2	Cut Bar Stock
a99-70-1714	I.B	fw	564	481	-0.35	$1.48 \times 1.16 \times 0.37$	43.2	Cut Bar Stock
a99-70-302	I.B	fw	565	484	-0.15	$1.70 \times 1.12 \times 0.52$	144.5	Cut Bar Stock
a81-113-561	I.B	nf	-99	-99	-99	$0.84 \times 0.58 \times 0.48$	4.0	Clinker
a81-113-543	I.B	fw	-99	-99	-99	1.67×0.45	17.0	Round Stock
a99-70-446	I.B	fw	566	484	-0.25	$1.89 \times 0.55 \times 0.50$	67.0	2 Cut Bar Stock
a00-90-1801	I.B	nf	498	490	-0.35	$0.79 \times 0.65 \times 0.29$	28.5	18 Clinkers
a00-90-787	I.B	fw	494	490	-0.05	1.63×0.40	17.7	Round Stock
a00-90-448	I.B	fw	496	490	-0.25	$1.95 \times 0.88 \times 0.26$	8.8	Cut Flat Stock
a80-303-368	I.B	fw	95	33	-0.05	0.92×0.49	14.0	Cut Round Stock
a01-73-1366	I.B	nf	574	454	-0.8	$0.87 \times 0.77 \times 0.52$	12.3	18 Clinkers
a01-73-1947	I.B	nf	572	455	-0.15	$0.67 \times 0.54 \times 0.28$	4.8	7 Clinkers
a99-0066-1076	I.B	fw	505	444	-0.25	$1.93 \times 1.44 \times 0.28$	64.3	Cut Bar Stock
a97-0066-688	I.B	fw	573	519	-0.1	$1.52 \times 0.87 \times 0.49$	39.5	Bar Stock
a97-0066-607	I.B	nf	573	523	-0.15	$1.62 \times 1.37 \times 0.39$	31.6	Clinker

Table 5.2: continued

Cat. No.	Code	Material	X	Y	Z	Size (in)	Weight (g)	Remarks
a97-0066-608	I.B	nf	573	523	-0.15	1.17 × 0.96 × 0.92	38.8	Clinker
a97-0066-476	I.B	nf	549	548	-0.35	1.28 × 1.12 × 0.71	13.0	Clinker
a97-0066-1123	I.B	nf	540	548	-0.35	1.13 × 0.95 × 0.70	9.5	Clinker
a97-0066-99	I.B	nf	549	547	-0.05	0.91 × 0.77 × 0.65	5.0	Clinker
a97-0066-1312	I.B	nf	499	513	-0.55	0.83 × 0.75 × 0.62	1.9	Clinker
a97-0066-882	I.B	nf	573	522	-0.15	1.02 × 0.89 × 0.60	18.0	3 Clinkers
a97-0066-1103	I.B	nf	572	521	-0.15	0.71 × 0.58 × 0.47	2.3	3 Clinkers
a97-0066-224	I.B	nf	509	444	-0.35	0.87 × 0.58 × 0.47	13.8	19 Clinkers
a97-0066-1341	I.B	nf	540	544	-0.1	0.76 × 0.61 × 0.46	8.3	5 Clinkers
a97-0066-550	I.B	nf	573	521	-0.1	0.63 × 0.57 × 0.28	1.0	2 Clinkers
a97-0066-245	I.B	nf	549	554	-0.25	0.47 × 0.42 × 0.40	1.7	Clinker
a97-0066-802	I.B	nf	573	513	-0.05	0.59 × 0.50 × 0.40	1.5	Clinker
a97-0066-1035	I.B	nf	573	511	-0.05	0.87 × 0.58 × 0.43	2.6	Clinker
a98-0131-178	I.B	nf	-99	-99	-99	0.64 × 0.34 × 0.34	0.5	Clinker
a98-0131-333	I.B	nf	-99	-99	-99	0.98 × 0.74 × 0.51	8.0	Clinker
a98-0131-619	I.B	nf	-99	-99	-99	1.41 × 1.24 × 1.09	13.0	Clinker
a98-0131-1426	I.B	nf	-99	-99	-99	2.29 × 1.69 × 1.53	39.0	Clinker
a98-0131-306	I.B	nf	-99	-99	-99	0.48 × 0.42 × 0.33	0.5	Clinker
a98-0131-245	I.B	nf	-99	-99	-99	0.73 × 0.58 × 0.40	1.0	Clinker
a98-0131-414	I.B	nf	-99	-99	-99	1.21 × 0.81 × 0.78	5.4	Clinker
a98-0131-710	I.B	nf	-99	-99	-99	0.70 × 0.66 × 0.46	1.0	Clinker
a98-0131-520	I.B	nf	-99	-99	-99	0.66 × 0.53 × 0.35	1.0	Clinker
a98-0131-682	I.B	nf	-99	-99	-99	0.40 × 0.27 × 0.25	0.3	Clinker
a98-0131-401	I.B	nf	-99	-99	-99	0.55 × 0.34 × 0.31	0.4	Clinker
a98-0131-1543	I.B	nf	-99	-99	-99	0.93 × 0.80 × 0.62	1.0	5 Clinkers
a98-0131-1202	I.B	nf	-99	-99	-99	0.63 × 0.42 × 0.31	2.0	2 Clinkers
a98-0131-969	I.B	nf	-99	-99	-99	3.47 × 3.35 × 1.18	217.0	5 Clinkers
a98-0131-769	I.B	nf	-99	-99	-99	0.48 × 0.36 × 0.29	0.2	Clinker
a98-0131-904	I.B	nf	-99	-99	-99	1.51 × 1.22 × 0.87	29.0	6 Clinkers

Table 5.2: continued

Cat. No.	Code	Material	X	Y	Z	Size (in)	Weight (g)	Remarks
a98-0131-463	I.B	nf	-99	-99	-99	$1.16 \times 0.85 \times 0.78$	13.1	7 Clinkers
a98-0131-1278	I.B	nf	-99	-99	-99	$0.99 \times 0.81 \times 0.71$	6.0	5 Clinkers
a98-0131-941	I.B	nf	-99	-99	-99	$1.31 \times 0.92 \times 0.79$	15.0	5 Clinkers
a98-0131-640	I.B	nf	-99	-99	-99	$1.00 \times 0.85 \times 0.83$	5.0	3 Clinkers
a98-0131-699	I.B	nf	-99	-99	-99	$0.72 \times 0.65 \times 0.37$	5.7	3 Clinkers
a98-0131-1293	I.B	nf	-99	-99	-99	$0.84 \times 0.62 \times 0.61$	5.0	3 Clinkers
a98-0131-663	I.B	nf	-99	-99	-99	$0.83 \times 0.63 \times 0.40$	3.0	4 Clinkers
a98-0131-1074	I.B	nf	-99	-99	-99	$0.87 \times 0.72 \times 0.61$	8.0	3 Clinkers
a98-0131-1227	I.B	nf	-99	-99	-99	$0.69 \times 0.47 \times 0.41$	4.0	5 Clinkers
a98-0131-578	I.B	nf	-99	-99	-99	$0.49 \times 0.33 \times 0.23$	1.0	3 Clinkers
a98-0131-1211	I.B	nf	-99	-99	-99	$1.85 \times 0.85 \times 0.79$	8.0	7 Clinkers
a98-0131-1182	I.B	nf	-99	-99	-99	$1.12 \times 0.63 \times 0.38$	18.0	7 Clinkers
a98-0131-781	I.B	nf	-99	-99	-99	$0.84 \times 0.52 \times 0.51$	4.0	2 Clinkers
a98-0131-806	I.B	nf	-99	-99	-99	$0.66 \times 0.41 \times 0.35$	2.0	2 Clinkers
a98-0131-286	I.B	nf	-99	-99	-99	$1.47 \times 0.99 \times 0.80$	10.0	2 Clinkers
a98-0131-939	I.B	nf	-99	-99	-99	$0.66 \times 0.44 \times 0.36$	2.0	Clinker
a98-0131-547	I.B	nf	-99	-99	-99	$0.88 \times 0.61 \times 0.55$	7.0	14 Clinkers
a98-0131-1334	I.B	nf	-99	-99	-99	$0.95 \times 0.78 \times 0.65$	5.0	Clinker
a98-0131-475	I.B	nf	-99	-99	-99	$0.80 \times 0.60 \times 0.36$	5.0	2 Clinkers
a98-0131-361	I.B	nf	-99	-99	-99	$1.66 \times 1.39 \times 0.97$	39.0	3 Clinkers
d98-0131-1508	I.B	fw	-99	-99	-99	$1.70 \times 0.90 \times 0.65$	70.3	Cut Bar Stock
e98-0131-1580	I.B	fw	-99	-99	-99	$1.97 \times 1.81 \times 0.35$	98.3	Cut Bar Stock
j01-73-2421	I.B	fw	571	480	-0.15	$2.63 \times 0.59 \times 0.44$	29.9	Worked Bar Stock
c99-70-1571	II.A	fw	564	482	-0.25	$1.53 \times 0.50 \times 0.26$	13.0	Worked Bar Stock
a99-70-383	II.A	fw	567	541	-0.15	$3.09 \times 1.31 \times 0.29$	28.0	Chain Link
a99-70-1371	II.A	fw	562	482	-0.15	$3.42 \times 1.79 \times 0.37$	59.0	Chain Link
a99-70-290	II.A	fs	567	485	-0.15	$4.65 \times 2.03 \times 0.64$	176.0	Logging Hook
a99-70-1480	II.A	fw	563	482	-0.25	$3.25 \times 1.48 \times 0.31$	33.0	Chain Link
a99-70-1603	II.A	fs	566	484	-0.05	$3.91 \times 1.99 \times 0.12$	59.0	Crosscut Saw Blade

Table 5.2: continued

Cat. No.	Code	Material	X	Y	Z	Size (in)	Weight (g)	Remarks
a01-73-500	II.A	fw	570	482	-0.05	$1.48 \times 0.86 \times 0.30$	8.0	Chain Link
a81-113-710	II.A	fw	-99	-99	-99	$3.06 \times 2.16 \times 0.46$	96.0	Chain Link
a81-113-0351	II.A	fc	-99	-99	-99	$4.45 \times 0.90 \times 0.74$	139.0	Logging Hook
b01-73-1473	II.A	fw fs	-99	-99	0	$5.65 \times 4.05 \times 1.28$	1288.0	Ax Head
k01-73-1248	II.A	fs	568	478	-99	$3.78 \times 1.79 \times 0.1$	41.4	Saw Blade Segment
m01-73-1248	II.A	fw	568	478	-99	$7.22 \times 1.31 \times 0.43$	223.7	2 Chain Links
b01-73-1262	II.A	fw	567	479	-0.05	$2.53 \times 1.83 \times 0.38$	42.2	Chain Link
a01-73-2422	II.A	fw	571	481	-0.15	2.07×0.31	34.3	Chain Link
a01-73-984	II.A	fw	576	480	-0.05	$3.64 \times 1.75 \times 0.43$	118.2	Chain Link
b01-73-984	II.A	fw	575	479	-0.05	$3.09 \times 1.96 \times 0.62$	162.6	Chain Link
e99-70-293	II.A	fw	566	484	-0.15	$2.04 \times 1.88 \times 0.49$	88.5	Chain Link
a01-73-1208	II.A	fw	568	484	-0.15	$2.59 \times 0.65 \times 0.56$	44.9	Wedge
a81-113-435	II.A	fw	-99	-99	-99	$2.53 \times 0.68 \times 0.59$	39.0	Wedge
a81-113-515	II.A	fs	-99	-99	-99	$2.81 \times 0.63 \times 0.53$	39.0	Wedge
c99-70-1571	II.A	fw	564	482	-0.25	$1.53 \times 0.50 \times 0.26$	13.0	Broken Wedge
a01-0073-2899	II.A	fs	508	477	-0.25	$2.23 \times 1.43 \times 0.40$	67.1	Chain Link
a97-0066-1051	II.A	fw	540	531	-0.45	$2.69 \times 2.64 \times 0.60$	214.9	Repair Link
a97-0066-1435	II.A	fw	540	531	-99	$2.69 \times 2.59 \times 0.59$	188.6	Repair Link
a99-70-1605	II.A	fw	565	483	-0.05	1.87×0.34	18.2	Chain Link Frag
a98-0131-1580	II.A	fs	-99	-99	-99	$2.87 \times 1.67 \times 0.41$	66.8	Ax Bit
b98-0131-1580	II.A	fs	-99	-99	-99	$2.86 \times 1.31 \times 0.47$	48.3	Ax Bit
a99-70-382	II.B	fs	567	541	-0.2	$5.96 \times 1.32 \times 1.37$	197.0	Flintlock Mechanism
a99-70-77	II.B	b	567	485	-0.05	$3.25 \times 0.88 \times 0.10$	20.0	Side Plate
a99-70-185	II.B	fs	568	530	-0.25	$2.13 \times 1.56 \times 0.38$	11.0	Sling Swivel
a01-73-2164	II.B	l	569	478	-0.05	0.68×0.29	1.0	Lead Sprue
c01-73-1416	II.B	fs	569	483	-0.25	$1.78 \times 0.88 \times 0.11$	3.1	Arrowhead?
a01-73-1415	II.B	fw	569	481	-0.25	1.03×0.49	6.0	Gun Worm?
a01-73-735	II.B	fs	521	483	-0.25	$1.29 \times 1.20 \times 0.32$	8.1	Gun Sear
c01-73-735	II.B	fs	520	482	-0.25	$0.92 \times 0.37 \times 0.08$	1.7	Trigger Mechanism

Table 5.2: continued

Cat. No.	Code	Material	X	Y	Z	Size (in)	Weight (g)	Remarks
d01-73-735	II.B	fs	520	482	-0.25	$1.11 \times 0.80 \times 0.17$	4.2	Trigger Mechanism
a81-113-305	II.B	l	104	37	-0.25	$1.96 \times 0.29 \times 0.24$	8.0	Lead Sprue
a81-113-303	II.B	l	105	38	-0.25	$2.61 \times 1.61 \times 0.42$	91.0	8 Melted Lead Frags
a81-113-519	II.B	l	-99	-99	-99	$0.94 \times 0.28 \times 0.23$	4.0	Melted Lead
a98-0131-1150	II.B	fs	-99	-99	-99	$4.16 \times 1.02 \times 0.23$	16.1	Knife Blade
b98-0131-1722	II.B	b	562	565	-0.25	0.27×0.09	0.1	Percussion Cap
a00-90-1015	II.B	fs	500	465	-0.15	$1.75 \times 0.80 \times 0.32$	17.5	Gun Sear
a00-90-149	II.C	l	505	491	-0.15	1.55×0.30	13.8	Sinker
a99-70-260	II.C	fw	541	530	-0.25	$0.80 \times 0.74 \times 0.23$	3.0	Fish Hook Frag
a80-303-208	II.D	fs	94	37	-0.05	$1.34 \times 0.73 \times 0.16$	5.0	Trap Chain Link
d01-73-1740	II.D	fs	569	484	-0.15	$2.54 \times 1.02 \times 0.12$	29.8	Trap Bow Frag
a01-73-1502	II.D	fs	568	479	-0.35	$1.58 \times 1.47 \times 0.29$	27.0	Trap Spring Eye
a81-113-656	II.D	fs	-99	-99	-99	$4.08 \times 1.59 \times 0.07$	34.0	Trap Jaw
a81-113-688	II.D	fs	-99	-99	-99	$1.92 \times 0.99 \times 0.34$	27.0	Trap Pan Post
a01-73-1263	II.D	fs	568	479	-0.05	$4.50 \times 1.05 \times 0.17$	55.5	Trap Spring Eye
a01-73-1248	II.D	fs	568	479	-99	$3.12 \times 1.66 \times 0.96$	46.4	Trap Jaw
b01-73-1248	II.D	fs	567	478	-99	$1.99 \times 0.38 \times 0.20$	11.6	Trap Dog
c01-73-1248	II.D	fs	567	478	-99	$2.38 \times 2.32 \times 0.13$	39.1	Trap Pan
d01-73-1248	II.D	fs	567	479	-99	$3.80 \times 1.17 \times 0.16$	82.8	Trap Cross
f01-73-1248	II.D	fs	567	478	-99	$4.49 \times 1.12 \times 0.29$	152.5	Trap Base
c01-73-2421	II.D	fw	570	480	-0.15	$1.88 \times 0.65 \times 0.41$	28.1	Trap Pan Post
b99-70-301	II.D	fs	565	484	-0.15	$2.52 \times 1.53 \times 0.19$	67.1	Trap Part?
a81-113-449	II.D	fs	-99	-99	-0.35	$1.98 \times 0.69 \times 0.22$	21.6	Trap Part?
a97-0066-436	II.D	fs	540	552	-0.1	$2.52 \times 2.24 \times 0.05$	12.2	Trap Pan
a97-0066-50	II.D	fw	490	513	-0.25	$3.12 \times 1.32 \times 0.25$	33.6	Trap Chain Link
a98-0131-620	II.D	fw	-99	-99	-99	$2.51 \times 1.60 \times 0.20$	46.7	Trap Pan
a98-0131-1095	II.D	fw	-99	-99	-99	$1.24 \times 0.79 \times 0.26$	6.3	Trap Chain Link
a98-0131-643	II.D	fs	-99	-99	-99	$4.20 \times 0.75 \times 0.16$	15.8	Trap Chain
a81-113-306	II.E	fs	104	37	-0.25	$2.87 \times 0.19 \times 0.11$	2.0	Awl

Table 5.2: continued

Cat. No.	Code	Material	X	Y	Z	Size (in)	Weight (g)	Remarks
a81-113-284	II.E	fs	104	37	-0.15	0.73 × 0.11	1.0	Needle
b99-70-1516	II.F	b	563	481	-0.05	1.47 × 0.25 × 0.03	1.0	Bow Saw Blade
a81-113-442	II.F	fs	-99	-99	-99	6.01 × 1.15 × 0.30	55.0	Wood Chisel
b01-73-985	II.F	fs	567	479	-0.05	1.57 × 0.52 × 0.18	11.4	Wood Chisel Tip
i99-70-293	II.F	fs	567	484	-0.15	2.51 × 0.60 × 0.06	22.1	Wood Chisel Tip
a98-0131-1600	II.F	fs	-99	-99	-99	9.22 × 1.80 × 0.20	250.3	Reamer
a98-0131-1004	II.F	fs	-99	-99	-99	1.65 × 0.52 × 0.44	25.4	Chisel Tip
a98-0131-1103	II.F	b	-99	-99	-99	0.59 × 0.12 × 0.04	0.5	Chisel Tip
b81-113-596	II.G	fs	-99	-99	-99	3.51 × 0.84 × 0.06	10.4	Barrel Strapping
c81-113-596	II.G	fs	-99	-99	-99	1.38 × 0.82 × 0.08	2.7	Barrel Strapping
a01-73-15	II.G	fs	573	459	-0.05	29 × 0.13	17.0	Bail
a01-73-536	II.G	fs	572	455	-0.35	10.21 × 0.27	115.0	Bail
a99-70-1177	II.G	m	566	483	-0.05	2.64 × 1.45 × 0.32	46.0	Whetstone
a81-113-271	II.G	l	106	38	-0.25	0.62 × 0.58 × 0.02	0.4	Lead Seal Frag
e01-73-1248	II.G	fs	567	479	-99	4.05 × 1.91 × 0.05	20.2	Bucket Frag
h01-73-1248	II.G	fs	567	479	-99	2.83 × 0.76 × 0.37	17.3	Bucket Rim
a90-70-138	II.G	fs	542	537	-0.05	0.77 × 0.40 × 0.57	12.0	Chain Saw Links
b90-70-138	II.G	fs	542	537	-0.05	0.78 × 0.64 × 0.62	13.4	Chain Saw Links
c90-70-138	II.G	fs	542	537	-0.05	0.81 × 0.35 × 0.58	12.7	Chain Saw Links
d90-70-138	II.G	fs	542	537	-0.05	1.30 × 1.12 × 0.63	33.2	Chain Saw Links
e90-70-138	II.G	fs	542	537	-0.05	0.75 × 0.46 × 0.23	1.3	Chain Saw Links
a97-0066-1343	II.G	fs	540	544	-0.1	2.38 × 1.11 × 0.69	44.0	Chain Saw Links
a98-0131-1598	II.G	fs	-99	-99	-99	2.08 × 0.98 × 0.11	41.5	Barrel Strapping
a99-70-140	II.G	fs	565	484	-0.05	3.33 × 0.91 × 0.06	11.7	Barrel Strapping
a99-70-707	II.G	fs	541	531	-0.1	0.82 × 0.59 × 0.39	13.0	Chain Link
-99	II.G	fs	541	531	-0.35	4.57 × 0.54 × 0.06	65.9	17 Barrel Strap Frags
a00-90-1444	II.G	fs	501	465	-0.65	3.10 × 1.79 × 0.09	197.3	60 Bucket Frags
a80-303-686	II.G	fs	100	51	-0.05	3.90 × 2.86 × 0.05	57.0	3 Bucket Frags
a97-0066-1019	II.G	fs	506	444	-0.35	2.54 × 0.53 × 0.15	17.8	Barrel Strapping

Table 5.2: continued

Cat. No.	Code	Material	X	Y	Z	Size (in)	Weight (g)	Remarks
a97-0066-367	II.G	fs	540	545	-0.05	$0.88 \times 0.66 \times 0.38$	12.1	Chain Link
g98-0131-1598	II.G	fs	-99	-99	-99	$2.60 \times 0.96 \times 0.04$	17.3	3 Barrel Strapping
a00-90-1222	III.A	c	507	457	-0.45	0.50×0.44	2.3	Rivet
a01-73-1575	III.A	fs	573	454	-0.05	$4.95 \times 2.62 \times 0.11$	25.0	Barbed Wire
a00-90-619	III.A	b	503	465	-0.25	0.32×0.06	0.3	Tack Head
a00-90-1805	III.A	fw	499	491	-0.35	0.47×0.21	0.5	Tack
b-00-90-619	III.A	fw	503	465	-0.25	0.54×0.22	0.3	Iron Tack
a00-90-1301	III.A	b	506	491	-0.3	0.37×0.11	0.2	Tack Head
a00-90-535	III.A	b	507	466	-0.15	$0.63 \times 0.44 \times 0.09$	0.0	Tack
a00-90-472	III.A	b	505	466	-0.35	0.48×0.31	0.3	Brass Tack
a00-90-341	III.A	fs	505	491	-0.25	0.50×0.28	0.1	Rivet Head
a99-70-935	III.A	fs	501	528	-0.1	$0.88 \times 0.43 \times 0.29$	5.0	Nut
a80-303-207	III.A	fw	95	37	-0.05	$1.56 \times 1.53 \times 0.21$	31.0	Washer
a99-70-445	III.A	fs	567	485	-0.25	$1.03 \times 1.02 \times 0.51$	44.0	Nut
a99-70-1291	III.A	fw	562	482	-0.05	$2.85 \times 0.92 \times 0.32$	22.0	Bolt
a00-90-1000	III.A	b	511	445	-0.35	0.41×0.38	1.0	Tack
a99-70-1038	III.A	fs	565	479	-0.25	$2.91 \times 0.85 \times 0.40$	59.0	Bolt
a01-73-1125	III.A	fs	570	481	-0.35	$3.15 \times 1.17 \times 0.23$	14.2	Tie Rod
a99-70-545	III.A	fw	542	534	-0.15	1.20×0.56	4.0	Staple
b01-73-1125	III.A	fs	569	480	-0.35	$1.41 \times 0.86 \times 0.25$	10.3	Bolt
a81-113-107	III.A	fw	106	38	-0.05	1.21×0.59	4.0	Staple
a99-70-14	III.A	fs	569	485	-0.15	$0.70 \times 0.67 \times 0.14$	1.0	Nail Fastener
a99-70-1698	III.A	fs	562	481	-0.05	1.57×0.43	20.0	Bolt Shaft
a99-70-1604	III.A	fs	565	483	-0.05	$4.19 \times 1.15 \times 1.10$	156.0	Bolt Shaft and Nut
a99-70-378	III.A	fw	565	540	-0.05	$1.43 \times 0.94 \times 0.16$	5.0	Staple
a99-70-832	III.A	fw	570	470	-0.15	$0.66 \times 0.71 \times 0.17$	2.0	Staple Frag
a99-70-915	III.A	c	566	434	-0.25	0.43×0.1	1.2	Washer
a00-90-1687	III.A	fw	496	491	-0.15	$1.87 \times 0.60 \times 0.27$	16.0	Bolt
h01-73-1740	III.A	fs	569	484	-0.15	$0.61 \times 0.32 \times 0.35$	3.6	Screw Frag

Table 5.2: continued

Cat. No.	Code	Material	X	Y	Z	Size (in)	Weight (g)	Remarks
a00-90-743	III.A	fs	491	490	-100	$1.28 \times 1.28 \times 0.74$	102.4	Square Nut
a00-90-1449	III.A	b	502	466	-60	0.49×0.36	0.5	Tack
b00-90-1449	III.A	b	501	465	-60	0.41×0.37	0.4	Tack
a00-90-008	III.A	fw	505	491	-0.05	$2.65 \times 1.47 \times 0.29$	28.9	Staple
a00-090-1343	III.A	b	509	490	-0.3	0.48×0.35	0.7	Tack
b01-73-1208	III.A	fw	568	484	-0.15	$2.20 \times 1.53 \times 0.40$	28.2	Staple
a99-70-713	III.A	fs	542	530	-0.1	$4.14 \times 0.67 \times 0.22$	19.0	Bolt and Washers
a99-70-1549	III.A	fw	564	482	-0.35	$0.65 \times 0.31 \times 0.13$	0.6	Staple
a99-70-599	III.A	fw	568	538	-0.05	$1.86 \times 1.80 \times 0.42$	33.0	Staple
a01-73-1350	III.A	fw	569	483	-0.35	1.48×0.61	6.0	Hand Forged Rivet
a01-73-1197	III.A	fw	571	489	-0.25	$1.82 \times 0.75 \times 0.29$	16.0	Hand Forged Rivet
a01-73-1118	III.A	fw	569	480	-0.35	$1.46 \times 0.84 \times 0.82$	29.0	Bolt with Square Nut
a01-73-1357	III.A	fw	568	482	-0.25	1.79×0.84	8.0	Fastener
a01-73-241	III.A	fw	570	543	-0.05	$1.38 \times 0.60 \times 0.16$	4.0	Staple
a01-73-2690	III.A	fs	568	480	-0.4	$3.32 \times 1.11 \times 0.21$	9.0	Tie Rod
a01-73-1193	III.A	fs	571	481	-0.25	$1.15 \times 1.08 \times 0.14$	14.0	Washer
a01-73-1390	III.A	fw	569	483	-0.15	$2.82 \times 0.66 \times 0.30$	17.0	Spike
a01-73-2210	III.A	fs	570	484	-99	$3.24 \times 0.69 \times 0.29$	29.0	Spike Shaft
a99-70-1496	III.A	fs	563	481	-0.15	$10.9 \times 1.07 \times 0.45$	419.0	Large Bolt
a99-70-1403	III.A	fs	562	482	-0.15	$1.08 \times 0.68 \times 0.13$	3.0	Eye Bolt
a99-70-194	III.A	fs	571	485	-0.05	$1.62 \times 0.57 \times 0.32$	10.9	Rectangular Nut
a81-113-440	III.A	fw	-99	-99	-0.15	$1.87 \times 1.15 \times 0.35$	24.0	Rivet
a81-113-333	III.A	fs	116	43	-0.15	$1.31 \times 0.76 \times 0.54$	15.0	Butterfly Nut
a81-113-400	III.A	fs	-99	-99	-99	$0.71 \times 0.70.x0.37$	13.0	Square Nut
a81-113-334	III.A	fs	116	43	-0.15	$0.96 \times 0.86 \times 0.08$	2.0	Nail Fastener
a01-73-777	III.A	fw	568	482	-0.05	$2.95 \times 1.04 \times 0.31$	41.0	Eye Bolt
a01-73-1973	III.A	fw	570	452	-0.05	$1.47 \times 0.82 \times 0.17$	5.3	Staple
b01-73-1973	III.A	fw	569	451	-0.05	$1.45 \times 0.97 \times 0.17$	5.5	Staple
a01-73-1416	III.A	fw	570	484	-0.25	$3.23 \times 1.36 \times 0.30$	36.5	Staple

Table 5.2: continued

Cat. No.	Code	Material	X	Y	Z	Size (in)	Weight (g)	Remarks
i01-73-1248	III.A	fw	567	479	-99	1.88 × 0.45 × 0.42	13.8	Spike
j01-73-1248	III.A	fw	568	478	-99	0.47 × 0.46	3.4	Screw Head
l01-730-1248	III.A	fs	568	479	-99	3.45 × 1.08 × 0.24	11.9	Tie Rod
c01-73-1898	III.A	fw	572	480	-0.05	2.98 × 0.48 × 0.40	31.4	Spike Shaft
a01-73-2421	III.A	fw	571	481	-0.15	3.34 × 1.45 × 0.35	52.6	Staple
b01-73-2421	III.A	fw	570	480	-0.15	2.30 × 1.19 × 0.16	3.5	Tie Rod
d01-73-2421	III.A	fw	570	481	-0.15	1.79 × 0.60 × 0.28	4.3	Tenterhook
l01-73-2421	III.A	fw	571	481	-0.15	0.61 × 0.60	4.5	Nail Head
m01-73-2421	III.A	fw	571	480	-0.15	0.71 × 0.29	0.9	Nail Head
b01-73-1651	III.A	fw	567	483	-0.05	0.57 × 0.31 × 0.21	0.7	Nail Head
a01-73-581	III.A	fw	573	453	-0.15	3.25 × 0.46 × 0.38	33.5	Spike Shaft
c99-70-301	III.A	fs	565	484	-0.15	2.46 × 0.77 × 0.52	89.6	Threaded Rod
d99-70-301	III.A	fs	565	485	-0.15	1.17 × 1.09 × 0.43	46.1	Square Nut
g01-73-1312	III.A	fw	507	478	-0.25	0.74 × 0.23	3.7	Rivet Head
a81-113-438	III.A	fs	-99	-99	-0.35	1.32 × 1.14 × 0.50	66.2	Square Nut
b81-113-438	III.A	fs	-99	-99	-0.35	1.06 × 1.04 × 0.34	34.0	Square Nut
a81-113-596	III.A	fs	-99	-99	-99	0.65 × 0.61 × 0.20	4.7	Square Washer
g99-70-293	III.A	fw	566	485	-0.15	3.80 × 0.73 × 0.29	36.4	Spike Shaft
a99-70-1520	III.A	fs	563	482	-0.05	1.55 × 0.45	21.2	Threaded Bolt Shaft
b99-70-1520	III.A	fs	563	481	-0.05	1.56 × 0.47	22.4	Threaded Bolt Shaft
e99-70-203	III.A	fw	570	484	-0.05	0.71 × 0.26	1.0	Nail Head
a99-70-1402	III.A	fs	562	482	-0.15	3.71 × 0.72 × 0.32	44.1	Threaded Square Bolt
c99-70-1402	III.A	fs	562	481	-0.15	1.71 × 0.46 × 0.40	25.4	Threaded Bolt Shaft
a00-90-1431	III.A	b	510	466	-0.35	0.48 × 0.40 × 0.06	0.8	Tack
b00-90-1431	III.A	b	509	465	-0.35	0.40 × 0.10	0.6	Tack Head
c00-90-1431	III.A	b	509	465	-0.35	0.40 × 0.10	0.6	Tack Head
a97-0066-617	III.A	fs	573	512	-0.05	0.47 × 0.45 × 0.08	0.5	Washer
a01-73-2039	III.A	fw	568	480	-0.15	3.12 × 1.23 × 0.26	42.0	Staple
a00-0090-1994	III.A	fw	-99	-99	-99	4.49 × 0.55 × 0.28	29.1	Spike

Table 5.2: continued

Cat. No.	Code	Material	X	Y	Z	Size (in)	Weight (g)	Remarks
a01-1073-2719	III.A	fw	568	484	-0.35	5.30 × 0.58 × 0.34	40.1	Spike
-99	III.A	fs	-99	-99	-99	0.41 × 0.13	1.2	Rivet Head
a98-0131-1722	III.A	b	562	565	-0.25	0.42 × 0.14	0.9	Tack Head
a97-0066-640	III.A	fs	489	513	-0.15	0.74 × 0.66 × 0.22	5.5	Nut
a97-0066-373	III.A	fs	540	545	-0.05	2.32 × 1.28 × 0.63	30.2	Bracket
a98-1031-1080	III.A	b	-99	-99	-99	0.46 × 0.05	0.7	Washer
a98-0131-792	III.A	b	-99	-99	-99	0.43 × 0.04	0.6	Washer
a98-0131-1596	III.A	fw	-99	-99	-99	3.61 × 1.69 × 0.50	91.4	Staple
b99-70-446	III.A	fw	566	484	-0.25	2.79 × 0.45 × 0.31	22.0	Spike Tip
a01-73-1195	III.A	fw	570	488	-0.25	1.06 × 0.16	6.2	Spike Head
a01-73-2764	III.A	fw	568	477	-0.05	0.94 × 0.59	24.7	Nut
a81-113-217	III.A	fs	16	43	-0.05	5.30 × 0.11	55.0	Barbed Wire
a99-70-1613	III.A	fw	565	483	-0.05	1.03 × 0.15	1.7	Barbed Wire
a97-0066-209	III.A	fw	509	444	-0.35	2.38 × 0.96 × 0.24	12.5	Staple
a00-90-151	III.B	c	504	490	-0.15	0.86 × 0.38 × 0.16	1.0	Copper Fastener
a01-73-1335	III.B	fs	568	482	-0.25	1.82 × 1.28 × 0.23	14.9	Key Frag
a00-90-301	III.B	fs	495	491	-0.15	1.52 × 1.44 × 0.28	38.2	Latch Eye
a99-70-1063	III.B	fw	567	429	-0.25	2.26 × 1.38 × 0.47	48.0	Butt Hinge
a99-70-1039	III.B	fw	566	480	-0.25	2.25 × 1.38 × 0.45	43.0	Butt Hinge
a97-0066-625	III.B	fs	574	513	-0.05	5.05 × 1.76 × 0.40	71.0	Drawer Pull
a99-70-1401	III.B	fw	563	482	-0.15	1.78 × 1.47 × 0.42	33.0	Butt Hinge
a99-70-277	III.B	fw	542	536	-0.25	4.99 × 2.69 × 0.47	235.0	Pintle
a99-70-300	III.B	fs	569	531	-0.05	3.35 × 1.18	31.1	Gutter Fragment?
b99-70-300	III.B	fs	569	531	-0.05	3.57 × 2.03	40.1	Gutter Fragment?
c99-70-300	III.B	fs	569	531	-0.05	1.16 × 0.54	1.5	Gutter Fragment?
d99-70-300	III.B	fs	569	531	-0.05	1.08 × 0.61	0.8	Gutter Fragment?
e99-70-300	III.B	fs	569	531	-0.05	0.65 × 0.41	0.4	Gutter Fragment?
f99-70-300	III.B	fs	569	531	-0.05	2.18 × 1.47	7.3	Gutter Fragment?
a80-303-227	III.B	fs	95	37	-0.15	0.93 × 0.71 × 0.22	3.0	Latch Eye

Table 5.2: continued

Cat. No.	Code	Material	X	Y	Z	Size (in)	Weight (g)	Remarks
a01-73-1772	III.B	fs	570	482	-0.25	$4.52 \times 0.83 \times 0.40$	68.0	Hasp
a00-90-481	III.B	b	500	465	-0.25	$1.86 \times 0.52 \times 0.03$	3.5	Keeper
e01-73-1208	III.B	fw	568	484	-0.15	$1.25 \times 0.90 \times 0.33$	12.7	Butt Hinge
a01-73-2689	III.B	fw	571	453	-0.35	$2.86 \times 0.55 \times 0.30$	29.0	Broken Pintle
a99-70-502	III.B	fs	564	540	-0.05	$1.63 \times 0.91 \times 0.21$	4.0	Hook-to-Drive
a99-70-452	III.B	fs	542	534	-0.25	$2.15 \times 0.86 \times 0.06$	6.0	Door Jam
a99-70-703	III.B	fw	541	531	-0.1	$2.06 \times 1.48 \times 0.32$	48.0	Butt Hinge
a01-73-418	III.B	fw	574	456	-0.05	$2.18 \times 1.42 \times 0.49$	38.0	Butt Hinge
a01-73-503	III.B	fc	570	482	-0.05	$3.68 \times 1.68 \times 0.73$	84.0	Broken Lock Frame
a01-73-1276	III.B	fw	570	485	-0.25	$2.30 \times 1.44 \times 0.49$	47.0	Butt Hinge
a01-73-655	III.B	fs	569	481	-0.05	$5.91 \times 0.64 \times 0.30$	38.0	Hinge Pin
a01-73-1512	III.B	fw	572	463	-0.05	$4.03 \times 1.86 \times 0.26$	39.0	Eye Hook Chain Link
a00-90-161	III.B	c	504	490	-0.15	$3.74 \times 0.94 \times 0.62$	86.8	Drawer Pull
a81-113-651	III.B	fw	-99	-99	-99	$2.31 \times 2.29 \times 0.47$	96.0	Butt Hinge
a01-73-2687	III.B	fw	569	478	-0.05	$2.15 \times 0.83 \times 0.36$	24.0	Broken Pintle
a01-73-970	III.B	fw	568	480	-0.15	$3.23 \times 1.39 \times 0.30$	52.0	Eye Bolt
a81-113-479	III.B	fw	-99	-99	-99	$4.43 \times 2.03 \times 0.45$	103.6	Drive Hook
e99-70-301	III.B	fs	565	485	-0.15	$1.83 \times 1.28 \times 0.11$	10.5	Broken Latch
b01-73-735	III.B	fw	520	482	-0.25	$3.11 \times 1.48 \times 0.19$	10.5	Wire Latch
a01-73-2079	III.B	fs	572	458	-0.15	$2.09 \times 1.03 \times 0.35$	9.4	Key Frag
b01-73-2079	III.B	fs	572	458	-0.15	1.41×0.54	4.4	Key Frag
c01-73-2079	III.B	fs	572	458	-0.15	0.70×0.21	0.4	Key Frag
a80-303-13	III.B	fs	-99	-99	-99	$13.90 \times 1.20 \times 0.42$	678.8	Latch
a80-303-854	III.B	fw	100	35	-99	$18.05 \times 1.29 \times 0.21$	452.0	Strap Hinge
a98-0131-1595	III.B	fs	-99	-99	-99	$2.34 \times 1.71 \times 0.14$	33.1	Unknown Hardware
b98-0131-1592	III.B	fw	-99	-99	-99	$5.05 \times 1.27 \times 0.33$	62.0	Hinge Pin
a98-0131-448	III.B	fs	-99	-99	-99	$1.93 \times 1.37 \times 0.24$	43.1	Latch Frag
a98-0131-197	III.B	fw	-99	-99	-99	$4.06 \times 0.61 \times 0.59$	70.1	Latch
a98-0131-900	III.B	fs	571	514	-0.05	$9.80 \times 1.27 \times 0.14$	133.5	Latch

Table 5.2: continued

Cat. No.	Code	Material	X	Y	Z	Size (in)	Weight (g)	Remarks
a98-0131-1584	III.B	fs	-99	-99	-99	$2.29 \times 1.40 \times 0.46$	44.8	Butt Hinge
a98-0131-544	III.B	fs	-99	-99	-99	$3.39 \times 1.18 \times 0.31$	39.8	Drawer Handle
a97-0066-925	III.B	fs	-99	-99	-99	$1.29 \times 0.66 \times 0.22$	3.7	Drive Hook
a81-113-450	III.B	fs	-99	-99	-0.35	$2.53 \times 1.16 \times 0.38$	16.0	Key
a97-0066-1	III.B	fs	-99	-99	-99	$7.58 \times 0.94 \times 0.12$	195.5	Close Spring
a00-0090-2009	III.B	fc	-99	-99	-99	$2.13 \times 1.91 \times 0.44$	26.5	Lock Frame Frag
a99-70-79	III.B	fs	566	484	-0.05	$1.75 \times 1.37 \times 0.12$	20.3	Pull Guard
a81-113-426	III.B	fw	-99	-99	-99	$2.28 \times 1.33 \times 0.74$	29.1	Butt Hinge
a99-70-274	III.B	fw	570	529	-0.05	$1.83 \times 0.54 \times 0.18$	7.0	Strap Hinge Frag
a01-73-938	III.B	fs	574	454	-0.35	$1.42 \times 0.89 \times 0.36$	8.7	Key Frag
a00-90-1096	III.B	fw	500	490	-0.35	$2.07 \times 0.66 \times 0.03$	11.1	Hinge Pin
a00-90-069	III.B	fw	554	450	-0.1	1.15×0.63	27.8	Coupling
a97-0066-1331	IV.A	fw	540	531	-0.4	$3.93 \times 1.69 \times 0.27$	109.9	Hame Hook
a01-73-2127	IV.A	fc	569	481	-0.15	$2.62 \times 2.00 \times 1.04$	271.0	Skein Fragment
a01-73-1755	IV.A	fc	570	484	-0.05	$2.58 \times 2.45 \times 0.70$	339.0	Skein Fragment
a99-70-276	IV.A	fw	541	535	-0.25	$13.57 \times 1.53 \times 0.59$	639.0	Large Perforated Bar
c01-73-984	IV.A	fc	575	479	-0.05	$2.96 \times 2.62 \times 0.97$	396.8	Skein Fragment
a99-70-1608	IV.A	fs	565	483	-0.05	1.86×0.43	8.1	Stake Pocket?
b99-70-1608	IV.A	fs	565	483	-0.05	2.00×0.40	9.4	Stake Pocket?
a98-0131-1462	IV.A	fw	-99	-99	-99	$3.99 \times 1.96 \times 0.58$	299.6	Hitch
a98-0131-1583	IV.A	fs	-99	-99	-99	$3.84 \times 2.11 \times 0.38$	55.1	Lynch Pin
-99	IV.A	fs	-99	-99	-99	$11.40 \times 1.36 \times 0.40$	274.6	Wagon Spring
a98-0131-1582	IV.A	fw	-99	-99	-99	$2.76 \times 0.97 \times 0.38$	77.3	Axle Clip Tie
a98-0131-240	IV.A	fs	-99	-99	-99	$1.50 \times 1.14 \times 0.96$	76.7	Wagon Spring Frag
a97-0066-926	IV.A	fs	-99	-99	-99	$4.83 \times 2.41 \times 0.39$	101.7	Heel Chain?
a01-73-954	IV.B	fs	568	480	-0.15	$4.12 \times 1.28 \times 0.41$	66.0	Chain Toggle
g01-73-1248	IV.B	fw	567	478	-99	$2.96 \times 1.44 \times 0.25$	35.6	Chain Link
a01-73-66	IV.B	fw	574	454	-0.05	$1.74 \times 1.41 \times 0.24$	14.5	Chain Link
a99-70-397	IV.B	b	587	531	-0.2	$3.05 \times 1.01 \times 0.21$	10.0	Fleam Case

Table 5.2: continued

Cat. No.	Code	Material	X	Y	Z	Size (in)	Weight (g)	Remarks
b99-70-397	IV.B	b	587	531	-0.2	$3.08 \times 1.04 \times 0.08$	10.0	Fleam Case
c99-70-397	IV.B	fs	587	531	-0.2	$1.13 \times 0.47 \times 0.20$	4.0	Fleam Blade
d99-70-397	IV.B	fs	587	531	-0.2	$1.14 \times 0.67 \times 0.21$	2.0	Fleam Blade
e99-70-397	IV.B	fs	587	531	-0.2	$0.60 \times 0.48 \times 0.21$	1.0	Fleam Blade
f99-70-397	IV.B	fs	587	531	-0.2	$0.61 \times 0.47 \times 0.11$	1.0	Fleam Blade
g99-70-397	IV.B	fs	587	531	-0.2	$0.56 \times 0.23 \times 0.13$	1.0	Fleam Blade
h99-70-397	IV.B	fs	587	531	-0.2	$0.32 \times 0.30 \times 0.06$	1.0	Fleam Blade
b80-303-207	IV.B	fw	94	36	-0.05	$1.33 \times 0.41 \times 0.25$	3.9	Horseshoe Nail
a99-70-1518	IV.B	fs	564	482	-0.05	$4.27 \times 1.99 \times 0.61$	703.0	Oxen Shoe
a00-90-475	IV.B	fw	501	466	-0.25	$5.5 \times 4.83 \times 0.93$	365.2	Horseshoe
a99-70-1788	IV.B	fs	566	480	-0.15	1.93×0.17	19.0	Iron Ring
a97-0066-1434	IV.B	fw	541	532	-99	$19 \times 4.83 \times 0.28$	403.5	Halter Chain
a81-113-674	IV.B	fw	-99	-99	-99	$4.92 \times 3.27 \times 0.27$	130.0	Mule Shoe
a81-113-471	IV.B	fw	-99	-99	-99	$5.80 \times 1.38 \times 0.50$	142.0	Oxen Shoe
b97-0066-1434	IV.B	fw	540	531	-99	$8 \times 5.2 \times 0.25$	538.5	Halter Chain
a98-0131-1579	IV.B	fc	-99	-99	-99	$3.12 \times 1.71 \times 1.38$	358.1	Farrier's Chisel?
a97-0066-927	IV.B	fw	540	544	-0.35	$4.39 \times 3.73 \times 0.31$	225.6	Horseshoe
a97-0066-1050	IV.B	fw	540	531	-0.45	$4.31 \times 2.04 \times 0.34$	66.3	2 Chain Links
a98-0131-227	V.A	fc	-99	-99	-99	$3.79 \times 0.58 \times 0.31$	35.1	Stove Lid Lift
a99-70-175	V.A	fs	528	530	-0.25	$5.99 \times 3.43 \times 2.46$	165.0	Can
a00-90-610	V.A	fs	503	465	-0.25	$1.22 \times 1.12 \times 0.07$	2.6	Can Lid
a00-90-610	V.A	fs	503	465	-0.25	$0.54 \times 0.32 \times 0.11$	0.3	4 Can Fragments
a99-70-1319	V.A	fs	541	533	-0.3	$4.30 \times 1.15 \times 0.22$	21.0	Utensil Handle
a01-73-1570	V.A	fs	572	454	-0.45	$1.61 \times 1.53 \times 0.11$	6.7	Cannister Fragment
b01-73-1570	V.A	fs	572	454	-0.45	$3.91 \times 3.47 \times 0.09$	26.7	Cannister Fragment
c01-73-1570	V.A	fs	572	454	-0.45	$1.99 \times 0.95 \times 0.08$	5.5	Cannister Fragment
d01-73-1570	V.A	fs	572	454	-0.45	$4.28 \times 2.80 \times 0.13$	30.6	Cannister Fragment
e01-73-1570	V.A	fs	572	454	-0.45	$2.77 \times 2.27 \times 0.1$	14.2	Cannister Fragment
f01-73-1570	V.A	fs	572	454	-0.45	$3.41 \times 3.38 \times 0.11$	41.0	Cannister Fragment

Table 5.2: continued

Cat. No.	Code	Material	X	Y	Z	Size (in)	Weight (g)	Remarks
g01-73-1570	V.A	fs	572	454	-0.45	$1.57 \times 1.40 \times 0.1$	5.8	Cannister Fragment
h01-73-1570	V.A	fs	572	454	-0.45	$2.29 \times 1.86 \times 0.1$	4.8	Cannister Fragment
i01-73-1570	V.A	fs	572	454	-0.45	$1.83 \times 1.57 \times 0.13$	9.6	Cannister Fragment
j01-73-1570	V.A	fs	572	454	-0.45	$2.42 \times 1.80 \times 0.1$	9.7	Cannister Fragment
k01-73-1570	V.A	fs	572	454	-0.45	$2 \times 1x0.1$	36.4	Cannister Frags
a01-73-2612	V.A	fs	572	454	-0.35	$1.09 \times 0.90 \times 0.08$	3.3	Cannister Fragment
b01-73-2612	V.A	fs	572	454	-0.35	$2.31 \times 1.25 \times 0.08$	10.7	Cannister Fragment
a00-90-642	V.A	fs	502	465	-0.25	$1.69 \times 1.69 \times 0.17$	12.4	Can Top
b00-90-642	V.A	fs	502	465	-0.25	$1.73 \times 0.86 \times 0.21$	7.6	Can Bottom
c00-90-642	V.A	fs	502	465	-0.25	$0.83 \times 0.50 \times 0.08$	0.5	Can Frag
d00-90-642	V.A	fs	502	465	-0.25	$0.56 \times 0.23 \times 0.07$	0.2	Can Frag
e00-90-642	V.A	fs	502	465	-0.25	$0.83 \times 0.59 \times 0.08$	0.8	Can Frag
f00-90-642	V.A	fs	502	465	-0.25	$0.54 \times 0.24 \times 0.1$	0.4	Can Frag
a01-73-1523	V.A	fs	572	453	-0.05	$0.81 \times 0.74 \times 0.09$	2.0	Broken Utensil Handle
a97-0068-1436	V.A	fc	574	523	-0.15	$8.24 \times 7.94 \times 0.19$	1037.0	Stove Fragment
a97-0066-696	V.A	fc	512	407	-0.35	$18.93 \times 10.49 \times 0.56$	6500.0	Stove Door
a81-113-485	V.A	fc	-99	-99	-99	$4.93 \times 4.71 \times 0.14$	193.0	Stove Front Frag?
a81-113-441	V.A	fc	-99	-99	-0.35	$4.52 \times 3.95 \times 0.88$	177.0	Stove Door Frag
a80-303-724	V.A	fs	101	35	-0.05	$2.80 \times 2.16 \times 0.07$	19.6	Can Lid
b80-303-724	V.A	fs	101	35	-0.05	$1.39 \times 1.38 \times 0.31$	7.1	Can Frag
e01-73-985	V.A	fs	567	479	-0.05	$1.73 \times 0.93 \times 0.08$	7.8	Utensil Handle
f99-70-638	V.A	fc	566	484	-0.35	$1.74 \times 0.84 \times 0.62$	32.4	Pot Rim Frag
a81-113-511	V.A	fs	-99	-99	-99	$2.32 \times 1.46 \times 0.06$	25.7	18 Can End Frags
a98-0131-1589	V.A	fs	-99	-99	-99	$1.88 \times 1.58 \times 0.06$	9.9	Pot Lug
b98-0131-1589	V.A	fs	-99	-99	-99	$1.65 \times 1.64 \times 0.06$	15.4	Pot Rim Frag
c98-0131-1589	V.A	fs	-99	-99	-99	$2.82 \times 1.98 \times 0.06$	17.4	Pot Side Frag
a98-0131-70	V.A	fc	-99	-99	-99	$3.55 \times 1.20 \times 0.24$	63.7	Stove Part
b98-0131-70	V.A	fc	-99	-99	-99	$1.07 \times 0.47 \times 0.17$	3.7	Stove Part
c98-0131-70	V.A	fc	-99	-99	-99	$3.19 \times 2.42 \times 0.14$	62.8	Stove Part

Table 5.2: continued

Cat. No.	Code	Material	X	Y	Z	Size (in)	Weight (g)	Remarks
a98-0131-843	V.A	fc	-99	-99	-99	$2.51 \times 0.81 \times 0.42$	64.6	Andiron Foot
a98-0131-1591	V.A	fc	-99	-99	-99	$3.49 \times 2.88 \times 0.10$	108.6	Pot Rim Frag
a97-0066-1164	V.A	l	540	531	-0.65	$0.86 \times 0.58 \times 0.04$	4.2	Bottle Seal
a97-0066-1091	V.A	fs	572	521	-0.15	$4.94 \times 0.96 \times 0.07$	11.7	Flatware Handle
a97-0066-902	V.A	fs	572	521	-0.05	$2.87 \times 0.97 \times 0.39$	12.9	Shaker Top
a97-0066-1367	V.A	fs	499	514	-0.45	$3.07 \times 0.66 \times 0.15$	18.0	Utensil Handle
a97-0066-480	V.A	fc	548	549	-0.35	$6.25 \times 2.65 \times 0.32$	203.5	Stove Part
a98-0131-1589	V.A	fs	-99	-99	-99	$1.88 \times 1.58 \times 0.06$	9.9	Pot Lug
b98-0131-1589	V.A	fs	-99	-99	-99	$1.65 \times 1.64 \times 0.06$	15.4	Pot Rim Frag
c98-0131-1589	V.A	fs	-99	-99	-99	$2.82 \times 1.98 \times 0.06$	17.4	Pot Side Frag
a81-113-711	V.A	fw	-99	-99	-99	$3.47 \times 1.45 \times 0.30$	28.8	Firesteel
a01-73-2730	V.A	l	568	477	-0.25	$0.89 \times 0.42 \times 0.09$	1.6	Bottle Seal
b01-73-2730	V.A	l	568	477	-0.25	$0.61 \times 0.41 \times 0.05$	1.3	Bottle Seal
a98-0131-4	V.A	t	-99	-99	-99	$1.06 \times 0.66 \times 0.05$	4.0	4 Can Lid Frags
a98-0131-1	V.A	fc	-99	-99	-99	$5.90 \times 4.28 \times 0.10$	152.6	Stove Part
b98-0131-761	V.A	l	-99	-99	-99	$0.73 \times 0.45 \times 0.02$	1.5	Bottle Seal
a98-0131-839	V.A	fs	-99	-99	-99	$2.05 \times 0.37 \times 0.25$	7.0	Utensil Handle?
a81-113-404	V.A	fs	-99	-99	-99	$3.93 \times 3.51 \times 0.72$	121.6	31 Cannister Frags
a81-113-325	V.A	fs	116	45	-0.05	$2.20 \times 1.20 \times 0.04$	10.0	6 Cannister Frags
a81-113-375	V.A	fs	-99	-99	-99	$5.50 \times 1.00 \times 0.04$	26.5	5 Cannister Frags
a81-113-455	V.A	fs	-99	-99	-0.15	$2.93 \times 0.49 \times 0.33$	11.0	Cannister Rim
a81-113-283	V.A	fs	104	37	-0.15	$1.55 \times 0.83 \times 0.08$	16.0	17 Cannister Frags
a81-113-417	V.A	fs	-99	-99	-99	$1.48 \times 1.29 \times 0.07$	5.3	3 Cannister Frags
a81-113-307	V.A	fs	104	37	-99	$1.46 \times 0.97 \times 0.06$	22.0	12 Cannister Frags
a81-113-619	V.A	fs	-99	-99	-0.3	$2.31 \times 1.48 \times 0.05$	26.0	10 Cannister Frags
a01-73-1915	V.A	fs	574	452	-0.15	$1.94 \times 1.66 \times 0.06$	10.1	Cannister Frag
a00-90-887	V.A	fs	501	465	-0.45	$1.49 \times 0.91 \times 0.05$	27.7	34 Can Frags
a00-090-1330	V.A	fs	508	490	-0.3	$1.50 \times 1.47 \times 0.06$	41.5	50 Can Frags
a00-090-1485	V.A	fs	-99	-99	-0.45	$1.69 \times 1.04 \times 0.06$	2.9	Hole-in-Cap Can Top

Table 5.2: continued

Cat. No.	Code	Material	X	Y	Z	Size (in)	Weight (g)	Remarks
a00-090-1945	V.A	l	503	490	-0.15	$1.31 \times 0.36 \times 0.03$	3.8	Bottle Seal
a00-90-655	V.A	fs	502	465	-0.35	$1.87 \times 1.56 \times 0.06$	29.6	34 Cannister Frags
a00-90-722	V.A	fs	496	490	-0.45	$2.83 \times 2.54 \times 0.07$	42.6	23 Cannister Frags
a00-90-1249	V.A	fs	501	465	-0.45	$2.51 \times 1.38 \times 0.07$	23.0	9 Can Frags
a00-90-641	V.A	fs	502	465	-0.25	$1.88 \times 1.31 \times 0.07$	148.3	31 Cannister Frags
a00-90-1201	V.A	fs	502	465	-0.55	$2.82 \times 0.73 \times 0.05$	16.8	17 Cannister Frags
a00-90-271	V.A	fs	498	490	-0.15	$3.07 \times 2.20 \times 0.05$	17.0	3 Cannister Frags
a00-90-1313	V.A	fc	505	446	-1.05	$4.70 \times 3.21 \times 0.21$	214.8	Kettle Rim Frag
a00-90-1280	V.A	fc	505	490	-0.1	$3.89 \times 0.86 \times 0.10$	104.1	32 Kettle Frags
a80-303-747	V.A	fs	91	36	-0.05	$1.17 \times 1.13 \times 0.19$	11.0	2 Can Lid Frags
a80-303-175	V.A	fs	49	12	-0.5	$2.30 \times 1.70 \times 0.08$	16.0	9 Cannister Frags
a80-303-253	V.A	fs	100	38	-0.15	$2.04 \times 1.11 \times 0.09$	27.0	7 Cannister Frags
a80-303-504	V.A	fs	100	35	-0.25	$1.43 \times 1.25 \times 0.26$	11.0	Can Cap
a01-73-405	V.A	fs	573	455	-0.05	$1.66 \times 1.24 \times 0.04$	3.4	Cannister Frag
a97-0066-1038	V.A	fs	513	511	-0.1	$3.61 \times 1.54 \times 0.03$	9.0	Cannister Frag
a98-0131-82	V.A	fs	-99	-99	-99	$1.86 \times 0.80 \times 0.04$	12.0	8 Can Frags
a98-0131-1224	V.A	fs	-99	-99	-99	$1.44 \times 1.01 \times 0.08$	36.0	36 Can Frags
f98-0131-1580	V.A	fc	-99	-99	-99	$3.11 \times 2.35 \times 0.13$	106.7	2 Stove Part Frags
	V.A	fc						Fire Dog Frag?
c98-0131-1580	V.A	fs	-99	-99	-99	$1.72 \times 1.17 \times 0.04$	5.3	2 Cannister Frags
a00-90-651	V.B	fs	503	466	-0.25	$1.29 \times 0.76 \times 0.24$	7.0	Decorative Item
a99-70-1637	V.B	fs	567	485	-0.35	$0.87 \times 0.30 \times 0.05$	0.8	Tinkler
a99-70-1498	V.B	fs	564	482	-0.15	$1.04 \times 0.26 \times 0.05$	0.9	Tinkler
a81-113-275	V.B	fw	105	37	-0.15	$0.84 \times 0.39 \times 0.10$	1.0	Tinkler
a01-73-1576	V.B	fs	572	455	-0.15	$0.94 \times 0.35 \times 0.08$	1.0	Tinkler
a81-113-246	V.B	fs	-99	-99	-99	0.88×0.34	2.0	Tinkler
a99-70-1404	V.C	fs	562	481	-0.15	$2.07 \times 0.76 \times 0.12$	3.0	Suspender Slide
a81-113-532	V.C	b	-99	-99	-99	$0.70 \times 0.33 \times 0.08$	0.6	Suspender Slide
a01-0073-2897	V.C	fs	568	477	-0.25	$2.05 \times 1.21 \times 0.21$	13.9	Buckle

Table 5.2: continued

Cat. No.	Code	Material	X	Y	Z	Size (in)	Weight (g)	Remarks
a01-73-2241	VI	fc	-99	-99	0	$5.51 \times 2.56 \times 0.31$	219.0	Cast Iron Plate
a00-90-623	VI	fs	504	466	-0.25	2.45×0.16	4.5	Wire
a01-73-298	VI	b	573	458	-0.05	0.61×0.02	0.1	Brass Spring
a00-090-1326	VI	fs	509	491	-0.3	$0.50 \times 0.46 \times 0.1$	0.7	Coil Spring Frag
b00-090-1326	VI	fs	509	491	-0.3	0.47×0.09	0.4	Coil Spring Frag
c00-090-1326	VI	fs	509	491	-0.3	0.47×0.11	0.8	Coil Spring Frag
d00-090-1326	VI	fs	509	491	-0.3	0.50×0.11	0.3	Coil Spring Frag
e00-090-1326	VI	fs	509	491	-0.3	0.49×0.11	0.3	Coil Spring Frag
a80-303-511	VI	fs	101	36	-0.15	$0.46 \times 0.35 \times 0.1$	1.0	Coil Spring Frag
b80-303-511	VI	fs	101	36	-0.15	$0.54 \times 0.42 \times 0.1$	0.8	Coil Spring Frag
a00-090-1337	VI	fc	509	490	-0.3	$3.03 \times 1.50 \times 0.21$	54.3	Cast Iron Plate
b00-090-1337	VI	fc	509	490	-0.3	$1.14 \times 0.62 \times 0.11$	6.5	Cast Iron Fragment
a99-70-299	VI	fs	569	531	-0.1	4.14×0.17	6.1	Wire
b99-70-299	VI	fs	569	531	-0.1	10×0.18	14.9	Wire
a00-090-1345	VI	fs	509	491	-0.3	1.19×0.12	0.4	Wire Frag
b00-090-1345	VI	fs	509	491	-0.3	0.63×0.12	0.4	Wire Frag
c00-090-1345	VI	fs	509	491	-0.3	0.47×0.08	0.3	Wire Frag
a01-73-255	VI	b	572	459	-0.05	2.02×0.02	0.6	Spring
a01-73-2207	VI	c	570	484	-0.15	$1.72 \times 0.49 \times 0.04$	5.0	Pinched Seam Tube
a01-23-2688	VI	fs	573	461	-0.15	1.48×0.06	3.0	Broken Disc
a01-73-2393	VI	l	569	483	-0.25	0.89×0.15	11.0	Incised Lead Disk
a01-73-1740	VI	t	569	483	-0.15	1.23×0.11	1.3	Tin Wire
b01-73-1740	VI	t	569	483	-0.15	1.00×0.12	0.9	Tin Wire
c01-73-1740	VI	u	569	484	-0.15	$0.48 \times 0.37 \times 0.30$	0.3	Amorphous Metal
e01-73-1740	VI	fs	569	483	-0.15	$1.22 \times 0.33 \times 0.07$	1.6	Sheet Iron Frag
f01-73-1740	VI	fw	569	483	-0.15	$0.78 \times 0.33 \times 0.25$	2.8	Iron Frag
g01-73-1740	VI	fw	569	484	-0.15	$0.73 \times 0.23 \times 0.17$	0.7	Iron Frag
i01-73-1740	VI	fw	570	483	-0.15	$0.58 \times 0.26 \times 0.25$	1.0	Iron Frag
j01-73-1740	VI	fs	570	483	-0.15	$0.83 \times 0.21 \times 0.1$	0.4	Sheet Iron Frag

Table 5.2: continued

Cat. No.	Code	Material	X	Y	Z	Size (in)	Weight (g)	Remarks
k01-73-1740	VI	fs	570	484	-0.15	$0.78 \times 0.14 \times 0.11$	0.3	Sheet Iron Frag
l01-73-1740	VI	fw	570	483	-0.15	$0.55 \times 0.19 \times 0.13$	0.4	Iron Frag
m01-73-1740	VI	fw	570	483	-0.15	$0.62 \times 0.14 \times 0.15$	0.4	Iron Frag
n01-73-1740	VI	fw	570	484	-0.15	$0.42 \times 0.29 \times 0.17$	0.9	Iron Frag
o01-73-1740	VI	fw	570	484	-0.15	0.46×0.31	0.3	Iron Frag
p01-73-1740	VI	fs	569	483	-0.15	$0.93 \times 0.57 \times 0.04$	0.6	Sheet Iron Frag
q01-73-1740	VI	fs	569	483	-0.15	$0.55 \times 0.49 \times 0.03$	0.3	Sheet Iron Frag
b00-90-008	VI	fs	504	490	-0.05	2.05×0.16	6.3	Wire
a00-90-1373	VI	c	505	566	-0.55	$2.42 \times 1.55 \times 0.03$	6.2	Cut Copper Sheet
f01-73-1208	VI	fs	568	484	-0.15	$1.05 \times 0.97 \times 0.06$	4.9	Sheet Iron Frag
g01-73-1208	VI	fs	568	485	-0.15	$1.39 \times 1.36 \times 0.09$	3.9	Sheet Iron Frag
h01-73-1208	VI	t	568	485	-0.15	$1.32 \times 1.06 \times 0.04$	2.2	Sheet Metal Frag
i01-73-1208	VI	fs	569	484	-0.15	0.39×0.35	0.4	4 Sheet Iron Frags
d01-73-2546	VI	fc	569	477	-0.25	$1.54 \times 0.43 \times 0.29$	10.4	Cast Iron Fragment
e01-73-2546	VI	fs	569	477	-0.25	$1.19 \times 0.1.04 \times 0.9$	6.8	Sheet Iron Frag
f01-73-2546	VI	fs	569	476	-0.25	$2.01 \times 1.13 \times 0.06$	3.6	Sheet Iron Frag
g01-73-2546	VI	fs	569	476	-0.25	0.66×0.53	1.4	Sheet Iron Frag
h01-73-2546	VI	fs	569	477	-0.25	1.24×1.1	7.9	20 Sheet Iron Frags
a99-70-708	VI	fs	541	531	0.1	$2.36 \times 1.16 \times 0.09$	4.0	Wire
a01-73-2158	VI	l	570	479	-0.05	4.60×0.18	16.0	Lead Rod
a01-73-2140	VI	b	568	478	-0.15	$0.83 \times 0.27 \times 0.02$	0.5	Brass Fragment
b01-73-1390	VI	fs	569	484	-0.15	$0.71 \times 0.18 \times 0.04$	4.0	Sheet Iron Fragments
a99-70-619	VI	fs	565	540	-0.25	$10.03 \times 1.56 \times 0.30$	1300.0	Large Steel Ring
a99-70-607	VI	fs	565	483	-0.05	$2.54 \times 1.03 \times 0.09$	31.0	Folded Sheet Iron
a81-113-263	VI	fs	-99	-99	-99	3.83×0.17	6.0	Wire
b01-73-1416	VI	fs	569	483	-0.25	$1.13 \times 0.47 \times 0.07$	1.6	Sheet Iron Frag
a01-73-1768	VI	b	569	481	-0.25	$0.69 \times 0.49 \times 0.05$	3.5	Tubular Object
b01-73-1768	VI	b	569	481	-0.25	$0.47 \times 0.26 \times 0.01$	0.2	Tubular Object
n01-73-1248	VI	fs	568	478	-99	1.99×0.1	90.0	100 Sheet Iron Frags

Table 5.2: continued

Cat. No.	Code	Material	X	Y	Z	Size (in)	Weight (g)	Remarks
a99-70-949	VI	fs	543	536	-0.35	$0.82 \times 0.35 \times 0.19$	1.4	Sheet Iron Frag
b99-70-949	VI	fs	542	535	-0.35	$0.41 \times 0.32 \times 0.11$	0.3	Sheet Iron Frag
c99-70-949	VI	fs	542	535	-0.35	$1.07 \times 0.63 \times 0.29$	0.5	Sheet Iron Frag
d99-70-949	VI	fs	542	536	-0.35	$0.65 \times 0.24 \times 0.07$	0.2	Sheet Iron Frag
e99-70-949	VI	fs	542	536	-0.35	$0.46 \times 0.12 \times 0.09$	0.2	Sheet Iron Frag
f99-70-949	VI	fs	542	535	-0.35	$0.73 \times 0.35 \times 0.11$	0.7	Sheet Iron Frag
b99-70-464	VI	fs	568	538	-0.15	$0.85 \times 0.38 \times 0.05$	5.9	11 Sheet Iron Frags
a01-73-1262	VI	nm	567	478	-0.05	$1.03 \times 0.87 \times 0.23$	2.4	Burnt Bone
g01-73-1262	VI	fs	567	479	-0.05	$1.76 \times 0.38 \times 0.07$	1.3	Sheet Iron Frag
h01-73-1262	VI	fs	568	478	-0.05	$2.69 \times 0.61 \times 0.12$	10.2	Sheet Iron Frag
m01-73-1262	VI	fs	568	479	-0.05	$1.29 \times 0.1.20 \times 0.17$	15.6	Sheet Iron Frag
n01-73-1262	VI	fs	568	479	-0.05	$1.26 \times 0.53 \times 0.20$	11.2	Sheet Iron Frag
o01-73-1262	VI	fs	567	478	-0.05	$1.53 \times 0.62 \times 0.20$	13.0	Sheet Iron Frag
q01-73-1262	VI	fs	567	479	-0.05	$1.69 \times 0.46 \times 0.12$	5.0	Sheet Iron Frag
r01-73-1262	VI	fs	567	479	-0.05	$1.01 \times 0.92 \times 0.12$	80.0	100 Sheet Iron Frags
d01-73-1898	VI	fs	572	481	-0.05	$2.44 \times 0.42 \times 0.07$	3.0	Sheet Iron Frag
e01-73-1898	VI	fs	572	481	-0.05	$0.54 \times 0.53 \times 0.06$	3.1	15 Sheet Iron Frags
a01-73-1286	VI	fs	569	485	-0.25	$1.70 \times 1.44 \times 0.07$	6.4	Sheet Iron Frag
b01-73-1286	VI	fs	568	484	-0.25	$1.05 \times 0.89 \times 0.10$	2.7	Sheet Iron Frag
c01-73-1286	VI	fs	568	484	-0.25	$0.92 \times 0.81 \times 0.10$	2.2	Sheet Iron Frag
d01-73-1286	VI	fs	568	485	-0.25	$0.72 \times 0.46 \times 0.12$	0.8	Sheet Iron Frag
e01-73-2421	VI	fs	570	481	-0.15	$1.67 \times 0.33 \times 0.06$	1.3	Sheet Iron Strip
h01-73-2421	VI	fs	570	481	-0.15	$1.42 \times 0.70 \times 0.1$	4.0	Sheet Iron Frag
n01-73-2421	VI	fs	571	480	-0.15	$0.90 \times 0.50 \times 0.1$	33.5	100 Sheet Iron Frags
c01-73-1651	VI	fs	567	484	-0.05	$1.05 \times 0.94 \times 0.09$	2.2	Sheet Iron Frag
e01-73-1651	VI	fs	567	483	-0.05	$1 \times 0.9 \times 0.1$	20.0	100 Sheet Iron Frags
b01-73-1110	VI	fc	571	455	-0.05	$0.81 \times 0.57 \times 0.18$	2.5	Cast Iron Fragment
c01-73-1110	VI	fc	571	455	-0.05	$0.55 \times 0.41 \times 0.17$	1.5	Cast Iron Fragment
a01-73-67	VI	fs	574	454	-0.05	$1.65 \times 1.22 \times 0.04$	3.0	Sheet Iron Frag

Table 5.2: continued

Cat. No.	Code	Material	X	Y	Z	Size (in)	Weight (g)	Remarks
b01-73-67	VI	fs	573	453	-0.05	0.98 × 0.77 × 0.06	1.0	Sheet Iron Frag
c01-73-1415	VI	fs	568	480	-0.25	0.54 × 0.54 × 0.07	0.5	Sheet Iron Frag
c01-73-1748	VI	fs	572	453	-0.05	0.74 × 0.58 × 0.06	2.1	4 Sheet Iron Frags
c99-70-1751	VI	fs	563	482	-0.25	2.98 × 0.50 × 0.12	9.3	Sheet Iron
e01-73-1312	VI	fs	507	479	-0.25	2.87 × 0.76 × 0.07	8.4	Sheet Iron
f01-73-1312	VI	fw	507	478	-0.25	2.04 × 0.57 × 0.13	3.6	Wire
i01-73-1312	VI	fs	507	479	-0.25	1.82 × 1.36 × 0.08	7.3	Sheet Iron
j01-73-1312	VI	fs	508	478	-0.25	0.90 × 0.78 × 0.06	1.7	Sheet Iron
l01-73-1312	VI	fs	508	479	-0.25	1.32 × 0.74 × 0.06	55.0	100 Sheet Iron Frags
a99-70-861	VI	fs	571	470	-0.05	1.27 × 1.13 × 0.06	2.3	11 Sheet Iron Frags
b81-113-449	VI	fs	-99	-99	-0.35	1.55 × 1.16 × 0.06	11.4	7 Sheet Iron Frags
b00-90-007	VI	fs	504	491	-0.05	4.15 × 0.64 × 0.12	20.6	Sheet Iron
c00-90-007	VI	fs	504	491	-0.05	0.99 × 0.18 × 0.05	10.6	11 Sheet Iron Frags
a01-73-659	VI	fs	568	480	-0.05	6.14 × 0.12	5.1	Wire
b01-73-659	VI	fs	568	480	-0.05	2.80 × 0.09	4.3	Wire
b01-73-2422	VI	fs	571	481	-0.15	1.77 × 0.43 × 0.06	1.7	Sheet Iron
b01-73-1335	VI	fs	568	483	-0.25	0.98 × 0.76 × 0.05	4.0	4 Sheet Iron Frags
a01-73-1587	VI	l	569	485	-99	1.10 × 0.14 × 0.12	2.4	Lead Rod
b01-73-1587	VI	t	568	484	-99	0.76 × 0.47 × 0.05	0.8	Tin Sheet
c01-73-1587	VI	t	568	484	-99	0.63 × 0.45 × 0.04	0.6	Tin Sheet
a99-70-203	VI	fs	570	484	-0.05	2.85 × 1.03 × 0.09	13.8	Sheet Iron Frag
b99-70-203	VI	fs	570	484	-0.05	2.71 × 0.77 × 0.08	11.0	Sheet Iron Frag
c99-70-203	VI	fs	570	485	-0.05	2.35 × 0.64 × 0.10	3.8	Sheet Iron Frag
d99-70-203	VI	fs	570	485	-0.05	1.30 × 0.27	0.7	Sheet Iron Frag
f99-70-203	VI	fs	570	484	-0.05	0.94 × 0.82	25.0	45 Sheet Iron Frags
a01-73-869	VI	fs	571	481	-0.15	1.66 × 1.24 × 0.12	1.5	Sheet Iron Frag
d01-73-869	VI	fs	571	482	-0.15	0.49 × 0.36 × 0.10	16.9	30 Sheet Iron Frags
b97-0066-617	VI	fs	573	512	-0.05	0.41 × 0.21 × 0.03	0.1	Iron Frag
b01-73-66	VI	l	573	453	-0.05	1.56 × 0.12	4.9	Lead Wire

Table 5.2: continued

Cat. No.	Code	Material	X	Y	Z	Size (in)	Weight (g)	Remarks
a01-73-1645	VI	b	568	484	-0.05	$2.86 \times 0.48 \times 0.02$	9.0	Brass Strip
a00-90-1621	VI	c	507	445	-0.45	$0.90 \times 0.67 \times 0.04$	3.0	Cuprous Strip
a00-90-1299	VI	c	505	490	-0.3	$0.79 \times 0.33 \times 0.04$	0.5	Cuprous Strip
a99-70-1516	VI	c	563	481	-0.05	$1.09 \times 0.22 \times 0.01$	0.2	Cut Cuprous Strip
b01-73-881	VI	fs	571	454	-0.05	$1.25 \times 1.14 \times 0.07$	4.6	Sheet Iron
a98-0131-1694	VI	c	566	516	-0.15	$1.13 \times 0.34 \times 0.04$	0.3	Cut Copper Sheet
a98-0131-1639	VI	c	565	515	-0.15	$0.80 \times 0.22 \times 0.05$	0.3	Cut Copper Sheet
a81-113-493	VI	c	-99	-99	-99	$0.31 \times 0.25 \times 0.01$	0.1	Copper Strip
a99-70-558	VI	fs	568	485	-0.25	6.45×0.43	94.0	Iron Rod
c01-73-1208	VI	fs	568	485	-0.15	$1.10 \times 0.54 \times 0.19$	3.5	Iron Loop
a81-113-652	VI	c	-99	-99	-99	1.88×0.10	2.0	Worked Cuprous Strip
a97-0066-1037	VI	fc	574	512	-0.05	$3.71 \times 3.27 \times 0.15$	161.5	Rimmed Iron Plate Frag
b97-0066-1037	VI	fc	573	511	-0.05	$3.49 \times 2.42 \times 0.16$	101.1	Rimmed Iron Plate Frag
c97-0066-1037	VI	fc	573	511	-0.05	$4.51 \times 2.7 \times 0.15$	101.6	Rimmed Iron Plate Frag
a00-90-1369	VI	c	505	466	-0.55	$2.11 \times 0.04 \times 0.02$	0.4	Wire Strand
b00-90-1369	VI	c	505	466	-0.55	$1.53 \times 0.03 \times 0.03$	0.5	Wire Strand
a00-90-773	VI	c	505	466	-0.45	2.93×0.05	3.2	Wire Strand
b98-0131-240	VI	b	-99	-99	-99	$0.58 \times 0.57 \times 0.02$	1.0	Brass Strip
a98-0131-1170	VI	fs	-99	-99	-99	$1.04 \times 0.48 \times 0.06$	0.8	Sheet Iron
a98-0131-1599	VI	fs	-99	-99	-99	1.53×0.27	15.3	Broken Iron Ring
a98-0131-1077	VI	fs	-99	-99	-99	0.46×0.15	0.4	O Ring
b98-0131-1077	VI	fs	-99	-99	-99	0.65×0.19	1.1	O Ring
c98-0131-1077	VI	fs	-99	-99	-99	1.08×0.30	4.2	O Ring
a97-0066-1135	VI	b	504	444	-0.35	$0.69 \times 0.19 \times 0.03$	0.3	Brass Strip
b97-0066-1135	VI	b	504	444	-0.35	1.08×0.21	5.2	Brass Rod
a97-0066-1192	VI	b	504	444	-0.45	$3.09 \times 0.42 \times 0.03$	3.1	Brass Strip
a97-0066-694	VI	fs	573	519	-0.1	$8.60 \times 1.76 \times 0.15$	228.6	Perforated Strap Iron
a97-0073-2827	VI	l	568	477	-0.15	4.4×0.13	9.9	Lead Strip
a01-73-2884	VI	fw	568	477	-0.25	6.75×0.21	8.5	Wire

Table 5.2: continued

Cat. No.	Code	Material	X	Y	Z	Size (in)	Weight (g)	Remarks
a98-0131-834	VI	fs	-99	-99	-99	$1.37 \times 0.56 \times 0.08$	8.4	Pipe Fragments?
a98-0131-830	VI	b	-99	-99	-99	$1.67 \times 0.24 \times 0.02$	1.5	Brass Strip
a98-0131-761	VI	l	-99	-99	-99	$1.36 \times 0.90 \times 0.07$	21.6	Tubular Object
a98-0131-895	VI	fs	-99	-99	-99	$1.98 \times 1.61 \times 0.07$	9.7	3 Sheet Iron Frags
a98-0131-511	VI	c	-99	-99	-99	$2.13 \times 0.73 \times 0.03$	2.8	Copper Strip
a98-0131-175	VI	fc	-99	-99	-99	$1.69 \times 1.58 \times 0.11$	14.4	Cast Iron Fragment
a98-0131-1597	VI	b	-99	-99	-99	$1.56 \times 0.98 \times 0.04$	8.7	2 Brass Strips
a98-0131-273	VI	fs	-99	-99	-99	$2.71 \times 1.12 \times 0.30$	19.7	Steel Fragment
b98-0131-273	VI	fs	-99	-99	-99	$1.63 \times 0.76 \times 0.09$	11.3	16 Sheet Iron Frags
a98-0131-001	VI	l	-99	-99	-99	$0.89 \times 0.85 \times 0.38$	31.4	Lead Band
a98-0131-794	VI	fs	-99	-99	-99	0.82×0.31	2.1	O Ring
a98-0131-1590	VI	b	-99	-99	-99	3.93×0.21	17.2	Brass Rod
f80-303-68	VI	fw	49	12	-0.35	7.14×0.19	14.9	Wire
g80-303-68	VI	fs	49	12	-0.35	9.00×0.73	33.0	Perforated Strap Iron
a99-70-697	VI	fw	569	479	-0.25	3.66×0.15	1.0	Wire
a99-70-1720	VI	fw	564	481	-0.35	2.11×0.09	1.0	Wire
a81-113-68	VI	fw	-99	-99	-99	3.04×0.10	4.0	Wire
a81-113-686	VI	fs	-99	-99	-99	6.40×0.09	2.0	Wire
a99-70-1577	VI	fw	564	481	-0.25	7.3×0.17	14.0	Wire
a01-73-816	VI	b	568	482	-0.15	$0.44 \times 0.29 \times 0.03$	0.4	Brass Strip
a00-90-333	VI	fc	504	465	-0.15	$1.88 \times 1.78 \times 0.78$	57.3	Cast Iron Fragment
a00-90-799	VI	fc	494	490	-0.05	$2.27 \times 1.07 \times 0.20$	22.0	3 Cast Iron Frags
b00-90-799	VI	t	494	490	-0.05	$1.36 \times 1.03 \times 0.03$	2.6	Tin Strip
a00-90-092	VI	fs	509	444	-0.45	$1.41 \times 0.90 \times 0.15$	11.7	Coiled Wire
a80-303-113	VI	fs	36	12	-0.05	4.50×0.14	17.0	Wire
a80-303-367	VI	fw	95	33	-0.05	3.82×0.19	6.0	Wire
a80-303-708	VI	fw	95	35	-0.05	4.23×0.11	3.0	Wire
a99-70-1704	VI	b	562	481	-0.05	2.02×0.08	1.2	Wire
a97-0066-748	VI	fc	509	442	-0.25	$1.21 \times 0.90 \times 0.19$	11.1	Cast Iron Fragment

Table 5.2: continued

Cat. No.	Code	Material	X	Y	Z	Size (in)	Weight (g)	Remarks
a99-70-1794	VII	fs	566	483	-0.25	0.72×0.16	1.0	O Ring
c80-303-207	VII	fs	94	36	-0.05	$2.03 \times 0.24 \times 0.16$	2.5	Spatulate Rod
a01-73-750	VII	b	572	482	-0.15	$2.17 \times 1.75 \times 0.15$	32.0	Grooved Object
a01-73-626	VII	u	570	482	-0.15	$0.74 \times 0.41 \times 0.02$	0.6	U Shaped Silver Strip
b00-90-481	VII	b	500	465	-0.25	$0.83 \times 0.79 \times 0.05$	2.1	Flat Brass Object
a00-90-279	VII	fs	499	491	-0.15	$1.32 \times 0.15 \times 0.05$	3.7	Iron Cap?
a00-90-399	VII	fs	511	445	-0.45	$4.42 \times 3.63 \times 0.22$	204.3	Shaft Housing
a00-90-272	VII	fc	498	490	-0.15	$4.19 \times 0.79 \times 0.69$	121.1	Machine Part?
a00-90-099	VII	fc	499	491	-0.05	3.93×0.37	47.0	Machine Part?
a99-70-1519	VII	fc	563	482	-0.05	$2.78 \times 1.23 \times 0.71$	94.0	Broken Circular Item
b01-73-1263	VII	fs	567	478	-0.05	1.75×0.07	9.9	Perforated Disc
a01-73-1473	VII	fs	-99	-99	0	2.72×0.16	37.4	Iron Ring
a99-70-464	VII	fw	568	539	-0.15	$1.90 \times 0.34 \times 0.20$	10.1	Unknown Iron
a99-70-301	VII	fs	566	484	-0.15	$2.72 \times 1.15 \times 0.25$	107.5	Machine Part?
a00-90-007	VII	fc	504	490	-0.05	$2.80 \times 1.20 \times 0.23$	38.7	Machine Part?
a80-303-14	VII	fc	-99	-99	-99	$8.00 \times 7.10 \times 0.23$	981.2	Machine Part?
a98-0131-1592	VII	fw	-99	-99	-99	$3.83 \times 0.67 \times 0.42$	67.2	Unknown Iron
a80-303-68	VII	fc	49	12	-0.35	$5.50 \times 3.76 \times 1.57$	438.8	Unknown Machine Part
c80-303-68	VII	t	49	12	-0.35	$3.85 \times 1.37 \times 0.12$	35.3	Flattened Pipe Seg
h80-303-68	VII	fc	49	12	-0.35	$3.33 \times 2.20 \times 0.13$	63.3	Cast Iron Fragment
i80-303-68	VII	fs	49	12	-0.35	$1.83 \times 1.56 \times 0.38$	49.7	Steel Fragment
j80-303-68	VII	o	49	12	-0.35	$2.95 \times 1.79 \times 0.33$	57.1	Hide Frag?
k80-303-68	VII	o	49	12	-0.35	$2.65 \times 1.60 \times 0.55$	29.3	Hide Frag?
a98-0131-169	VII	fw	-99	-99	-99	$6.21 \times 4.50 \times 0.14$	56.2	Wire Handle?
a97-0066-1332	VII	fw	540	531	-0.4	2.38×0.50	144.1	Large Ring
a97-0066-111	VII	b	493	513	-0.05	$1.57 \times 0.20 \times 0.07$	1.3	Crimped Brass Sheet
a81-113-401	VII	b	-99	-99	-99	$2.85 \times 0.53 \times 0.19$	12.1	Unknown Brass Object
a01-73-2973	VII	b	568	477	-0.35	$0.88 \times 0.22 \times 0.01$	0.3	Caster?
a01-73-2729	VII	fs	568	477	-0.25	$2.01 \times 0.59 \times 0.40$	11.6	Unknown Tool Part

Table 5.2: continued

Cat. No.	Code	Material	X	Y	Z	Size (in)	Weight (g)	Remarks
a99-70-75	VII	b	566	484	-0.05	$0.73 \times 0.29 \times 0.18$	3.0	Perforated Brass Rod
a00-90-983	VII	fw	503	465	-0.45	$6.02 \times 0.64 \times 0.59$	47.3	Iron Rod
a00-90-200	VII	fc	502	490	-0.15	$1.06 \times 0.87 \times 0.20$	6.8	Cast Iron Fragment

Chapter 6

Nails and Other Fasteners Assemblage from Fort Pierre Chouteau

Melissa E. Adams, Hilary G. Dutcher, Mandy M. Klein, and David Thomas Williams[1]
Edited by Richard A. Fox[2]

Introduction

The State Archaeological Research Center (SARC) contracted with the University of South Dakota (USD) to analyze and report on the Fort Pierre Chouteau (39ST237) nails and other fasteners assemblage. The assemblage resulted from SARC excavations at Fort Pierre Chouteau in various years, namely 1980–1982 and 1997–2001. Some specimens in the assemblage (e.g. tinklers, hardware, wire fragments, iron stock fragments, etc.) received at USD are not fasteners. They are therefore not reported here.

The contract, an undergraduate research grant, specified that USD undergraduates perform the work. They did just that in 2006 and 2007. The undergraduate laboratory researchers included Melissa Adams, Hilary Dutcher, Amanda Fehlner, Mandy Klein and David Williams. Richard A.

[1]Department of Anthropology, University of South Dakota. The authors are students at the University of South Dakota and are listed in alphabetical order.

[2]Department of Anthropology, University of South Dakota. Dr. Fox also acted as principal investigator for the analysis and write up.

Fox served as the principal investigator. The research goals were to identify and describe the nails and other fasteners, and to see what distributions (particularly nail distributions) might indicate regarding structural characteristics present at the site

This report is organized as follows. First a historical outline of Fort Pierre Chouteau is presented. This is followed by the methodology statement, and a statement on analysis limitations. The descriptive analysis follows. The descriptive section reports on wrought, cut and wire nails, horseshoe nails, bolts, screws, tacks and other specimen types. Lastly, two appendices contain plates and nail type data by excavation unit.

Historical Outline

Fort Pierre Chouteau was located about three miles north of the Bad River, along the western bank of the Missouri River in present-day South Dakota (Schuler 1990:1). Construction of Fort Pierre Chouteau was completed in 1832. From that date until 1855 the fort was owned and used by the American Fur Company. In 1855 the company sold the fort to the United States Army, who occupied the fort for only two years before abandoning it in 1857. The site remained relatively undisturbed before it was used by a local rancher during the late nineteenth and early twentieth centuries.

Construction of Fort Pierre Chouteau was ordered by the American Fur Company after their original fort, Fort Tecumseh, was threatened by flood waters in 1831. The new site was chosen because of its higher elevation, its close proximity to the Missouri River, and its access to amenities such as grazing land and timber (Schuler 1990:29–32).

Fort Pierre Chouteau was an important asset to the American Fur Company. It was located in "Sioux Country" during a period in which fur trade was at its height, and was used to conduct trade with as many as nine different Lakota and Nakota bands. Its location near the Missouri River provided easy access to barges traveling back and forth to the east with trade goods. The size of the fort provided storage for up to $35,000 worth of merchandise, allowing it to administer several trading posts throughout the region (Schuler 1990:8).

In May of 1832, the fort was named after the head of the American Fur Company's western department, Pierre Chouteau Jr. From 1843–1850 the interior of the fort experienced some alterations. A detailed description of the newly remodeled fort was given by Thaddeus A. Culbertson, who visited the fort in May of 1850. According to Culbertson, the fort contained twelve buildings, including rooms for traders and laborers, separate buildings each for the boss and clerk, a warehouse, blacksmith's shop, carpenter's shop, milk house, powder house, and a stable. These buildings were all located along the perimeter, about twenty-five feet away from the fort's palisades, leaving a large open area in the center of the fort. The fort employed as many as 50 to 100 men at one time. Many of these men were general laborers and traders, but there was also many craftsmen including carpenters, cooks, blacksmiths, coopers, tinsmiths, and tailors (Schuler 1990:38–56).

By the 1850s trade was becoming less profitable as the population of the plains buffalo began to rapidly decline. Tensions between the federal government and Native Americans in the Great Plains region began to escalate, prompting the Army to seek a permanent presence in the area in order to protect settlers against attacks. Fort Pierre Chouteau seemed an ideal location because of its central location in "Sioux Country" and its access to the Missouri River. These circumstances led to the purchase of the fort by the Army in 1855 for the price of $45,000. By that time, however, upkeep of the fort had been seriously ignored by the American Fur Company, and the government found it cheaper to build a new fort rather than to see to its restoration (Schuler, 1990:131–140). In May of 1857 the last remaining members of the Army abandoned the fort, taking with them any materials that may have been utilized at Forts Randall and Sully (Mattison 1962:281–282).

After the abandonment of Fort Pierre Chouteau, the area seems to have continued its importance as a meeting place for trappers and traders, though these meetings were unofficial and undocumented (DeLand and Claymore 1922:354). Ray H. Mattison states that the property was converted to the uses of Charles Galpin, who was contracted by the army to dismantle and move parts of the old fort to Fort Randall, but these conversions were also undocumented (Mattison 1962:281–282).

In 1901 rancher James "Scotty" Philip erected a fence in the area and brought in a herd of buffalo to graze. In 1906 the government set aside 3,500 acres of land, including the area already in use, exclusively for the grazing of buffalo and rented it to Philip for $50 dollars a month. After the rancher died in 1911, the land remained the property of the government, and a monument was erected to commemorate Fort Pierre Chouteau in September of 1930 (Mattison 1962:281–283).

Methodology

Several steps were followed for complete analysis of the fastener assemblage from the years 1980–1982 and 1997–2001 excavations at Fort Pierre Chouteau. Procedures of sorting, analyzing, classifying, and cataloging each fastener within the assemblage were undertaken to arrive at an understanding of where specific buildings or activities took place on the grounds of Fort Pierre Chouteau.

The first step in preparation for analysis of the fasteners was to separate the nails from all other fasteners. The other fastener groups (i.e. screws and bolts) were set aside for separate analysis. The nail assemblage was then sorted into two categories:11) complete or nearly complete specimens and 2) fragmentary specimens (nails represented by shanks only, heads only, or heads with little remaining shank). Only nails in the first category were analyzed. This decision (per contract) was based on the reasonable assumption that complete/nearly complete nails contained useful information, while fragmentary nails for the most part did not. Thus, sorting was the best way to allocate resources. Sorting resulted in approximately 41 lbs of complete/nearly complete, or analyzed nails, and about 30 lbs of fragmentary, or unanalyzed nails (both figures are in-bag weights). It is reasonable to assume, given this weight distribution, that the analyzed nails are representative of what might have been expected had the other nails been similarly complete. Finally, the term “nail assemblage”, when used in the following text, refers to that portion of the assemblage actually analyzed.

To start the nail analysis, a data sheet was created containing spaces to identify nail type, nail size, provenience, year collected, excavation level, and catalog number, among other information. For each year of excavations all bags of nails were organized by northing and easting (i.e. N5xx E5xx) by lowest northing first, then lowest easting. As each of these bags was analyzed, all information about each nail from every level of excavation was catalogued. Nails or spikes that were larger than sizes listed on the data sheet were written down in an “other” category, where size and type of nail or spike were listed. Any other unique characteristics, such as the nail being bent or clinched would be listed as well, if deemed necessary. In certain cases, a sketch of the artifact was made.

All data sheets were kept in order by northing and easting. Certain years contained artifacts that did not have a northing or easting. The 1980 artifacts had southing and easting coordinates, and the artifacts from 1981 had only catalog numbers or trench letters with no northing or easting. In cataloguing these, the catalog numbers were placed in numerical order while the trench letters were placed in alphabetical order.

Following analysis of nails and spikes, all “other” categories were examined. These included screws, tacks, bolts, etc. As it would have been difficult to create datasheets for each specific category of fastener, these groups were analyzed and simply written down in legal pads. All information on the artifact bag (i.e. excavation level, catalog number) was written down and each specimen in the bag was individually examined and written about.

The final step in the analysis of the fasteners was entry into a Microsoft Excel spreadsheet. A spreadsheet was created so that all of the important information pertaining to each bag of artifacts could be entered easily. Much like the datasheet used for cataloging, nail type, nail size, nail count, excavation unit, etc. were entered to facilitate the creation of tables showing the number of nails of a certain type and size.

An analysis of the fastener assemblage from Fort Pierre Chouteau did not simply end at determining the nail type and size. The aforementioned steps were undertaken to gain the most information out of all identifiable fasteners at the site. After this information was received from analysis, it was entered into a spreadsheet to assist in determining where larger amounts of certain types of nails were recovered in excavations. This information will help determine the locations of specific activities or building locations at the site.

Limitations

The ability to analyze nails and other types of fasteners in this assemblage was restricted by different types of limitations. Methodology and the preservation of the materials placed confines on our analysis. Most of the specimens analyzed were nails, though there were other types of fasteners present, such as screws, staples, and bolts. The limits placed on analysis, however, apply to all types of fasteners present in this assemblage. There were also amorphous metal fragments that were impossible to even categorize as a fastener.

There were also limitations placed on our analysis due to the preservation of the materials. The condition of the samples was affected by fragmentation, deformation, oxidation and exfoliation. These limitations allowed for only one type of analysis, that of size and type. The imperfect condition of materials did not allow analysis of blacksmithing techniques.

As aforementioned, there were many specimens that were merely fragments. These fragments limited the number of specimens that were analyzed. Even though only complete and nearly complete specimens were analyzed, there were instances in which deformation made it difficult to positively identify the size and type. This was prevalent mostly in the nail portion of the assemblage.

A problem with all the specimens was oxidation. At times, the oxidation had caused growths, so that it was difficult to tell the type of the sample—for example a cut nail vs. a wrought nail or a Phillips vs. a flat head screw. It was also sometimes difficult to identify the original size of the specimen due to oxidation, even if the type could be positively identified. Oxidation also caused, especially in the case of nails, the exfoliation of the metal. In the case of exfoliation, it was sometimes difficult to determine size and type as well.

Descriptions

The Fort Pierre Chouteau site excavations yielded a variety of fastener types. Most frequent are cut nails, with wrought and wire nails being less numerous. Other common fasteners present include screws, staples, horseshoe nails, tacks, bolts, and washers.

Nails

Nails, by far, make up the majority of the fastener assemblage (n = 3652). They are judged to be common nails. The large quantity of cut nails (n = 2484) suggests that most construction occurred after cut nails became prevalent in the 1830s (Nelson 1968:14) but prior to the common use of wire nails in the late 1880s (Edwards and Wells 1993:113). Wrought nails are the second most common (n = 1093), while the number of wire nails is minimal (n = 75). Some cut and wrought nails have been clinched (covered in the Discussions section).

Cut Nails

Cut nails represent over two-thirds (68%) of the nail assemblage. Distribution of cut nails by excavation unit and size can be seen in Table 6.6. Sizes vary from 2d nails to 60d spikes, with most specimens falling in the 3d–6d and 8d–20d ranges (as shown in Table 6.1). Size distribution reflects estimated measurements, which is partly due to the lack of standardization in production during the nineteenth century (Fox 2001:1141), and also poor preservation (i.e. oxidation and exfoliation). A sample of cut nails can be seen in Figures 6.1 and 6.2.

A few anomalies are present in the cut nail assemblage and are illustrated in Figure 6.3. There is a cut nail specimen that the head appears to have been enlarged using a square piece of metal, perhaps a washer (Catalog No. 97-0066-1321). Also, a small cut nail that appears to have been driven through a piece of metal and broken off or clinched (80-303-209).

Table 6.1: Distribution of cut nails by size.

Type	Count	Type	Count
2d	20	12d	410
3d	169	16d	6
4d	280	20d	313
5d	357	30d	89
6d	188	40d	2
7d	5	50d	3
8d	217	60d	14
10d	411		

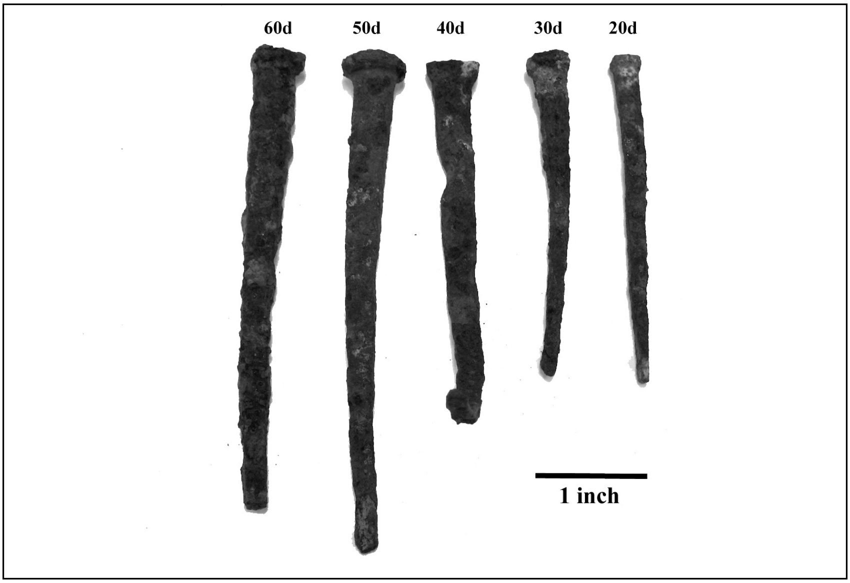

Figure 6.1: Examples of cut nails, sized 60d to 20d.

Wrought Nails

Thirty percent (n = 1093) of the nail assemblage is comprised of wrought nails (common). Table 6.7 illustrates the distribution of wrought nails by excavation unit and size. As with the cut nails in this assemblage, sizes range from 2d to 60d. Each size is estimated, as wrought nails were hand-crafted, leading to an irregularity in sizing (Edwards and Wells 1993:18). The most frequent sizes are 5d, 10d, 12d, 20d, and 30d, as shown below

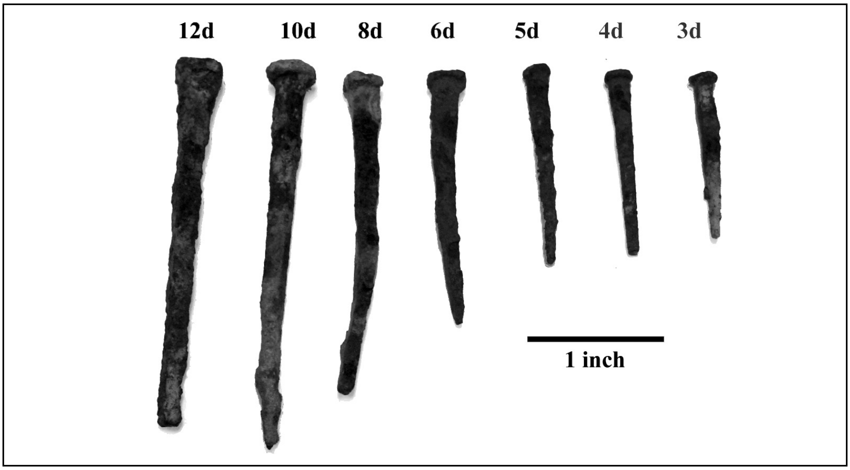

Figure 6.2: Examples of cut nails, sized 12d to 3d.

in Table 6.2. Examples of wrought nails are illustrated in Figures 6.4 and Figure 6.5.

Two wrought nail specimens exhibit unique characteristics. One example is a pair of nails that are joined head-to-head, most likely as a result of oxidization (01-73-2979). Another is a specimen (97-0066-1424) that appears to be two nails whose shanks were oxidized together. These anomalies are shown in Figure 6.6.

Five specimens not listed in Table 6.2 appear to be nail blanks or incomplete nails that have never had a head formed or applied. If so, these

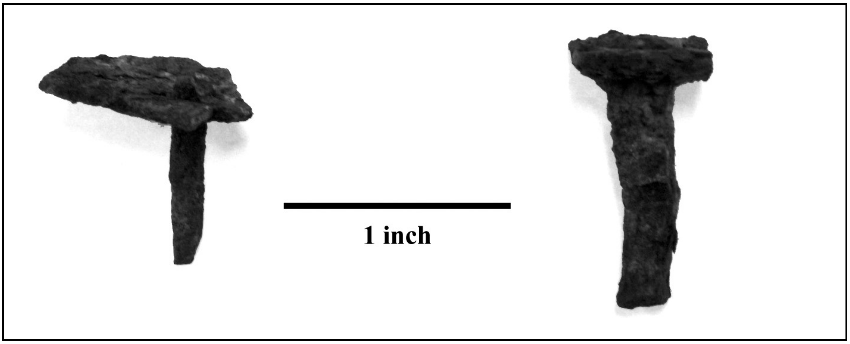

Figure 6.3: Cut nail anomalies. Left, 80-303-209; right, 97-0066-1321.

Table 6.2: Distribution of wrought nails by size.

Type	Count	Type	Count
2d	5	12d	160
3d	21	16d	1
4d	71	20d	177
5d	102	30d	142
6d	58	40d	27
7d	5	50d	32
8d	70	60d	88
10d	134		

Table 6.3: Distribution of common wire nails by size.

Type	Count	Type	Count
2d	1	12d	3
3d	5	16d	0
4d	7	20d	5
5d	3	30d	0
6d	16	40d	0
7d	3	50d	0
8d	13	60d	1
10d	18		

would have resulted in rather small wrought nails—from about 4d to 6d. Other specimens of this sort may be included in the unanalyzed portion of the nail assemblage. Thus, the five specimens identified here probably do not represent an accurate quantification. These specimens are illustrated in Figure 6.7.

Wire Nails

Very few wire nails (n = 75), were recovered, making up only 2% of the entire assemblage. Not all sizes are represented, unlike both the cut and wrought nails from this site. The distribution of wire nails by excavation unite and size is shown in Table 6.8. The wire nails, all common, are indicative of a post-military occupation of the Fort, as wire nails were not commonly used until about 1887 (Edwards and Wells 1993:113).

One wire nail (6d) is of the ring-shank (concentric rings) type. The head exhibits raised cross-hatching. This ferrous specimen (slightly bent)

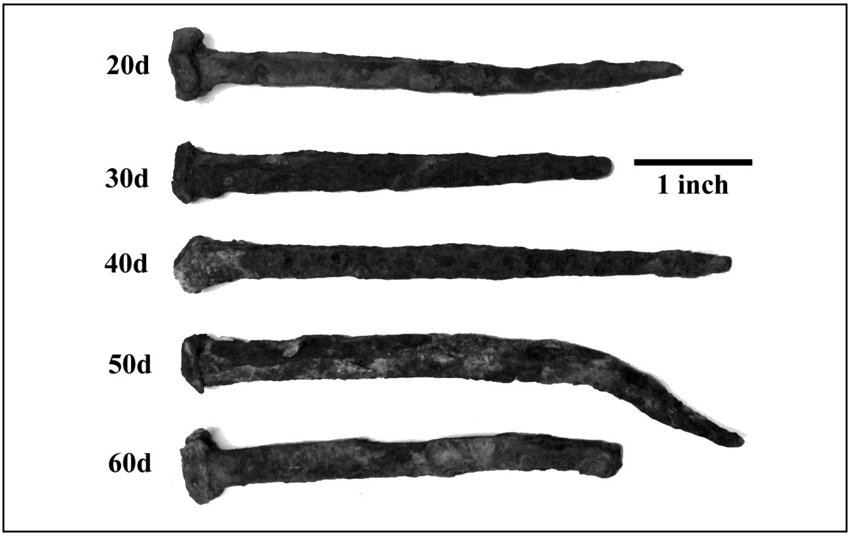

Figure 6.4: Examples of wrought nails, size 60d to 20d.

was probably galvanized originally.

Horseshoe Nails

The horseshoe nails (n = 44) are for the most part heavily oxidized and fragmented. All were found unattached to shoes, and many consist of a head and part of the shank only. The fragmentary nature of the horseshoe nails made it difficult to determine the size, so most sizes are estimated. There were some complete specimens, including two at #5, four at #7, four at #8, and seven #9 nails. Complete and fragmentary horseshoe nails are shown in Figure 6.8, and a list of horseshoe nails by catalog number can be found in Table 6.9.

Screws

All screws (n = 69) are of the flathead, slotted type (where head is present), and all are machine-made. Examples can be found in Figure 6.9, and a complete list by catalog number is shown in Table 6.10. Variation in the type is represented in sizes (diameter), lengths (tip to head), tip configuration, and shank configuration In many cases, corrosion or rust buildup was so great that head, slot, or tip type could only be assumed. In all these

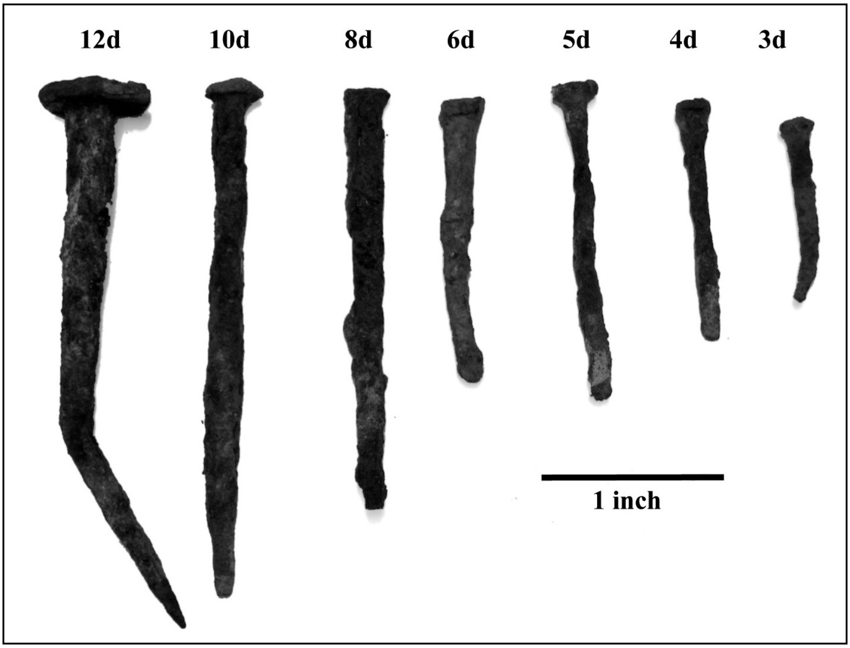

Figure 6.5: Examples of wrought nails, size 12d to 3d.

cases, corroded artifacts were very similar in all other aspects to screws in which type could be determined.

Sizes range from size 4 to over size 14. Size fourteen diameter was the most common (n = 41). Screws range in length from $1/2''$ to just over $2''$ (see Table 6.4). Most common lengths are $1''$ to $1\,1/4''$. In all but two cases (99-70-1236 and 01-73-688), the slot type is a one-way slot. The gimlet point is found on all screws having a complete point. Almost one-third (29.4%) of the screws contain all three characteristics. On one specimen (01-73-1294) a felloe shank is present.

Four anomalies were found among the screw assemblage and are illustrated in Figure 6.10. Two artifacts (99-70-1236 and 01-73-688) were similar in style. Both are cuprous flathead screws with side slots. In each case there is evidence of machine clinching directly under the head. The heads on both specimens are very close to a countersunk fillister head. Both screws had a size 8 diameter. Another specimen (01-73-1099) had traces of wood with the screw. One screw (00-90-558) is contained in a rectangular box-shaped piece of metal.

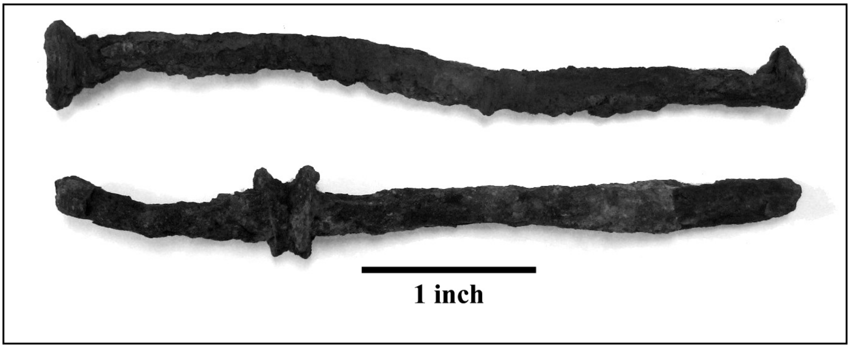

Figure 6.6: Wrought nail anomalies. Top, 97-0066-1424; bottom, 01-73-2979.

The screw assemblage is evidence for carpentry work at the fort, as most of the screws can be defined as wood screws. The head type allowed for a flat surface once the artifact would have been drilled into a board or other piece of wood. Various sizes of screws indicate different thicknesses of wood needing to be held together, as well as different strengths of holding power to keep two pieces of lumber from coming apart.

Wrought Pins

Wrought pins fall into two types, drive pins and other pins. Most pins in the other category are generally similar to hinge pins, although whether or not the specimens served this function is unknown. All pins are listed in Table 6.11.

Drive Pins

One broken pin (ferrous) consists of a square head and a small segment of the square shank. The specimen bag (99-70-536) also contains part of a separate, squarish shank fragment which presumably was originally part of the pin. The shank fragment (about 2.25″ long) appears to be tapered at one end, suggesting this was a drive pin. The pin head is roughly $1^{1}/_{8}$-inch square. Maximum shank width (measured at the part still attached to the head) is about a half-inch square. The irregularly shaped head indicates the specimen was wrought by hand.

A smaller drive pin (99-70-441) is sharply beveled on half the shank's $1^{13}/_{16}$-inch length. It too is wrought and ferrous. The thin head is only

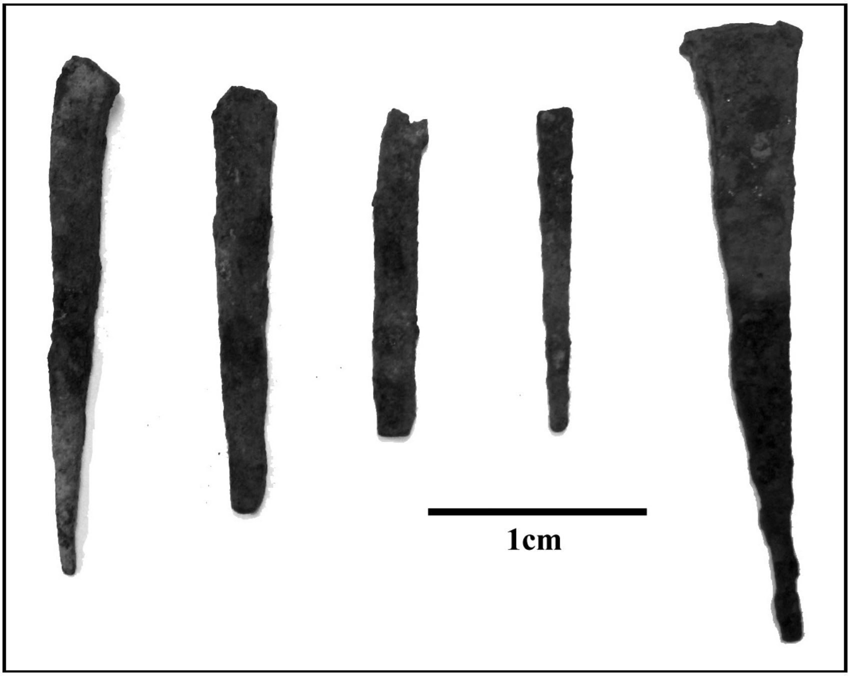

Figure 6.7: Unfinished wrought nails (left) and blank (far right).

slightly domed, and is roughly circular (3/4″ maximum diameter). Both drive pins are illustrated in Figure 6.11.

Other Pins

One specimen (97-0066-1231) consists of a massive round (roughly) head and part of the round broken shank. This heavy-duty ferrous pin is also clearly hand wrought; tool marks are evident on the head which is roughly an 1″ in diameter and a 1/2″ thick. What remains of the shank is about 2″ long; shank diameter is 9/16″. This specimen is shown in Figure 6.12.

Four other wrought ferrous pins are more diminutive than the heavy-duty pin; they are the ones reminiscent of hinge pins. Shank diameters are about a 1/4″; all shanks appear to be snapped (lengths vary from 1 1/8 to just under 2″). Pin heads are irregular and very slightly domed. Three have roughly circular heads; diameters (maximum) are 1/2″, 3/4″, and 1″. The head on the fourth specimen is badly exfoliated; probably it was originally oval (roughly 1/2″ × 3/4″). These pins are illustrated in Figure 6.13.

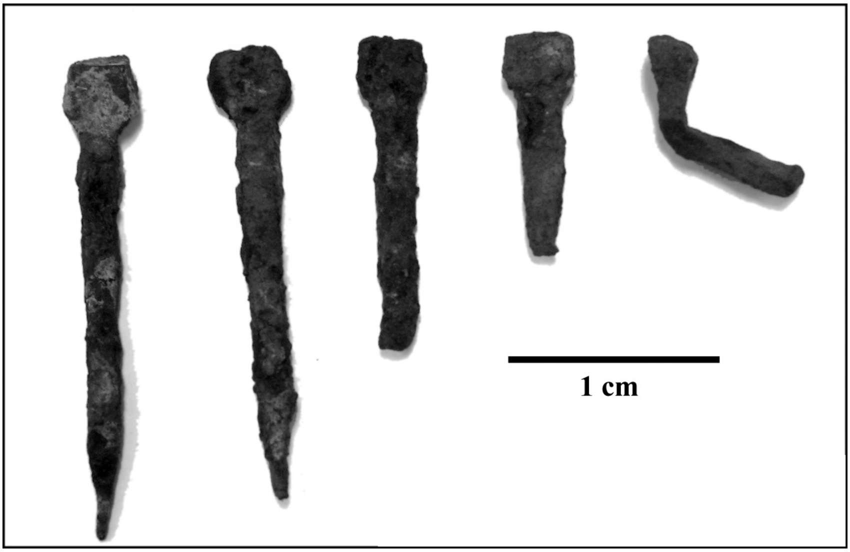

Figure 6.8: Examples of horseshoe nails.

Rivets

The assemblage contains three rivets—two ferrous and one cuprous, which are listed in Table 6.12. The ferrous rivets are badly oxidized; one is $1^{3}/_{4}''$ long (probably originally a $^{1}/_{4}$-inch diameter shank), the other $1^{5}/_{16}''$ in length (originally $^{5}/_{16}$-inch shank diameter?). Both retain the rivet heads on each end. These appear to be wrought rivets, as the heads, so far as can be determined in lieu of oxidization, are irregularly shaped. They are shown in Figure 6.14.

The otherwise complete cuprous rivet lacks a bur (Figure 6.17). This machine-made rivet (head diameter $^{7}/_{8}''$; shank length $^{3}/_{8}''$) appears to have never been used. Embossed (raised) in the center of the sunk-style head is a five-point star, the origin of which has not been determined.

Bolts

There are few bolts present in the fasteners assemblage (n = 5). All of these bolts are fragmented, either a head and partial shank or solely a threaded shank. They are illustrated in Figure 6.15, and listed in Table 6.13.

There is a single carriage bolt (98-131-912). The head is $1^{1}/_{16}''$ in diameter and the shank diameter is $^{1}/_{2}''$. The entire fragment is $4''$ in length

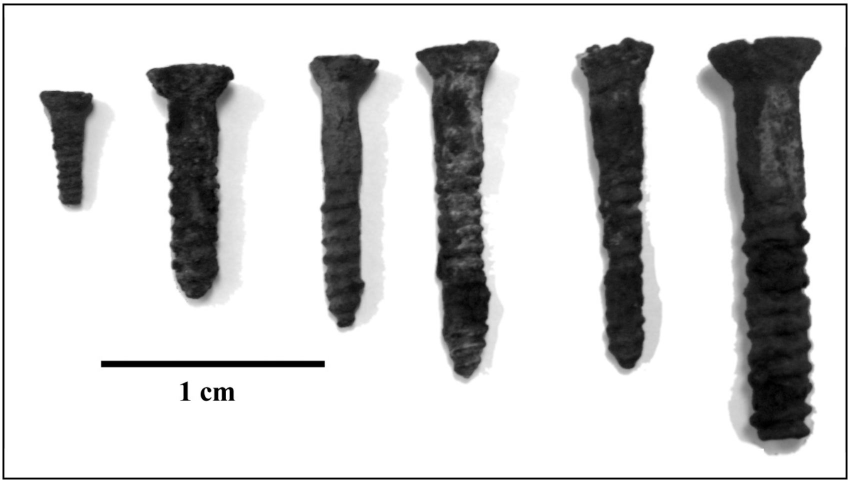

Figure 6.9: Examples of wood screws showing the range of sizes.

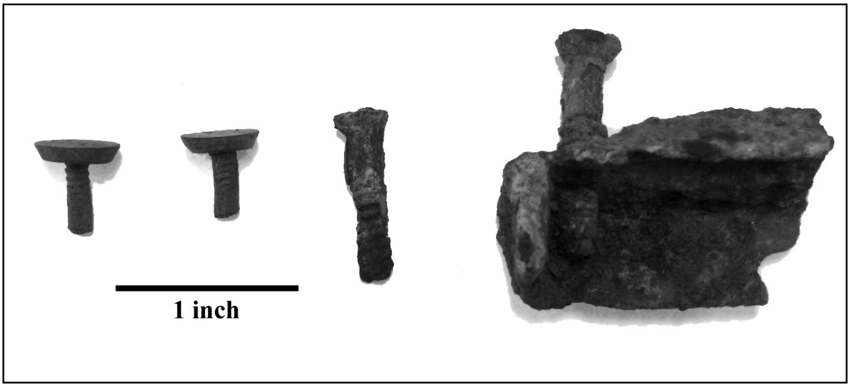

Figure 6.10: Screw anomalies. Left to right: two cuprous specimens; screw with traces of wood; screw with attached metal.

from head to tip of shank. There is no threading present.

There are two other bolts with heads in the assemblage, one wrought and the other with a square-shaped head. The square-head bolt fragment (99-70-346) is absent the threading. The area of the head measures $1\frac{3}{16}''$. The diameter of the shank is $\frac{5}{16}''$, and the total (broken) length is $1\frac{3}{4}''$.

The broken wrought bolt (80-303-449) is also lacking threads. It appears to have been cleanly sheared at the break point. The head, rather

Table 6.4: Slotted flathead wood crews by size and length.

Size	#4	#8	#10	#12	#14	#6
1/2″	1	0	0	0	0	0
3/4″	0	1	0	0	0	0
7/8″	0	0	2	1	0	0
1″	0	0	0	3	1	0
1 1/8″	0	0	0	1	11	0
1 1/4″	0	0	0	5	7	1
1 1/2″	0	0	1	0	4	0
1 3/4″	0	0	0	0	4	2
2 1/8″	0	0	0	0	0	2
2 1/4″	0	0	0	0	0	1
2 1/2″	0	0	0	0	0	1

irregular in shape and off-center (from the shank), is approximately 3/8″ in diameter. Shank diameter is 1/8″. Length (broken) is 7/8″.

Two specimens are shank fragments. One (01-73-898) is extremely degraded; it is broken at both ends and somewhat exfoliated on two sides. It is a 1/4″ bolt. The small piece is about 1/4″ long. The other shank fragment (98-131-1593) comes from a 5/8″ bolt; broken length is 1 3/8″.

Staples

The assemblage yielded few staples (n = 19), of which there were three different types: 1-wire fence, U-shaped, and rectangular. All staples are listed in Table 6.14, and examples of each type can be seen in Figure 6.16. Fence staples make up the majority of the staple assemblage (n = 13). The U-shaped staples (n = 4) are large in size and are all slightly bent at half their length; there is one fragment among these. There is also a large rectangular-shaped staple and a small rectangular-shaped one.

The fence staples, which range in size from 1″ to 1 5/8″, are mostly all in relatively good shape with the exception of a few which are heavily oxidized. Wire fence staples indicate a post-military occupation, since wire fencing did not become prevalent in the west until between 1868 and 1877 (McCallum and McCallum 1965:1233).

The four U-shaped staples are each of differing sizes. One of them is merely a fragment of the bent end, measuring 1″ in length. All of these are of 1/4-inch diameter. The lengths are as follows: 2 1/4″, 2 3/4″, and 3″.

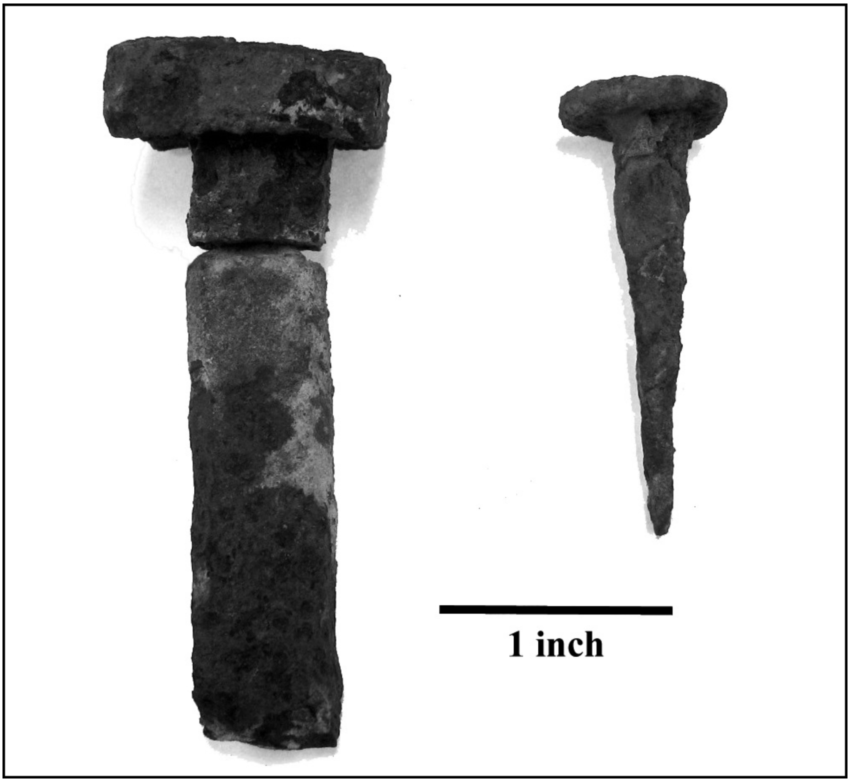

Figure 6.11: Drive pins. Left, fragmented square-headed specimen; right, smaller beveled pin.

The rectangular staples (n = 2) are both at extreme ends of the size spectrum. The small one is in almost pristine condition; it measures $3/4''$ long and $3/8''$ wide (measured from outside of one shank to the other). Both shanks of the large staple are broken at the tips (broken lengths are $2''$ and $1''$). This is a 2-inch wide staple ($2''$between shanks). Both of these are definitely not wrought, as each is very uniform in shape and width.

Tacks

There are 80 tacks in the fastener assemblage (Figure 6.17), which are shown in Table 6.15. The tacks include 51 cuprous dome-headed tacks, 28 ferrous carpet tacks, and one anomaly. Thirty-four of the domed tacks could not be accurately measured because they either have a broken shaft,

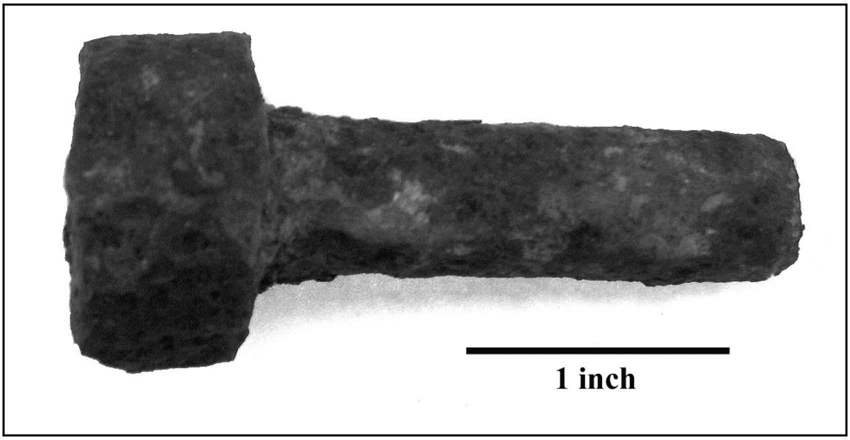

Figure 6.12: Heavy-duty wrought pin with rounded head.

Figure 6.13: Four smaller pins. Mostly dome-headed, with oval-headed exfoliated specimen second from right.

or no shaft at all. Each of the remaining seventeen domed tacks measures $1/2''$ in length. Eight of the carpet tacks are a size 8; the other twenty are a size 10. The anomaly (01-73-1447) is cuprous, $9/16''$ long, and has the appearance of an incomplete, hand-made tack.

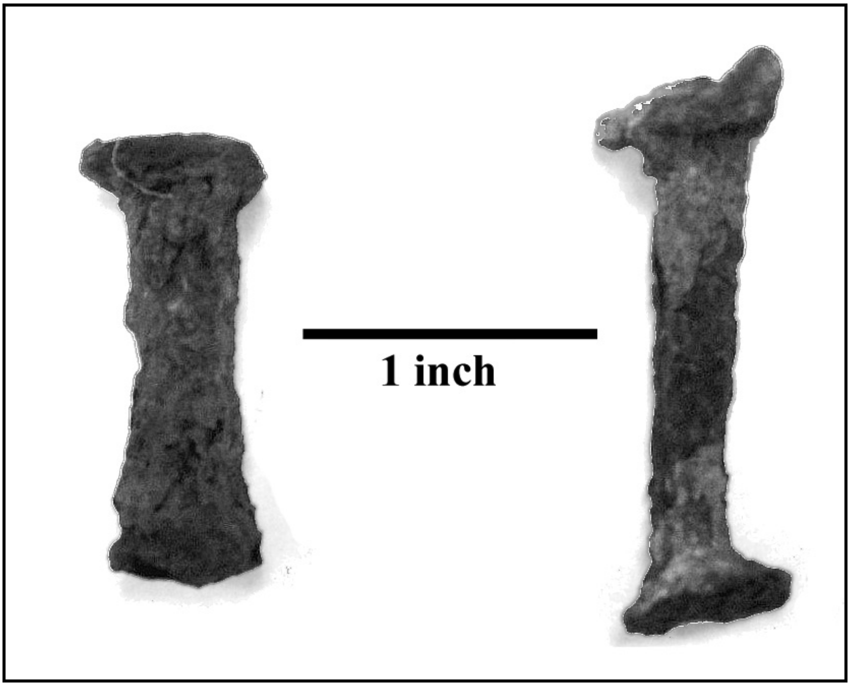

Figure 6.14: Wrought rivets with heads intact.

Discussion

Discussion is presented under two headings, one that deals with period nails and another that briefly covers other fastener types. In both cases, discussion focuses, where possible, on temporal, functional and distributional characteristics of the fastener assemblage.

Table 6.5: Distribution of wire fence staples by size.

Size	1”	1 1/8”	1 1/4”	1 1/2”	1 5/8”
Number	1	1	3	6	2

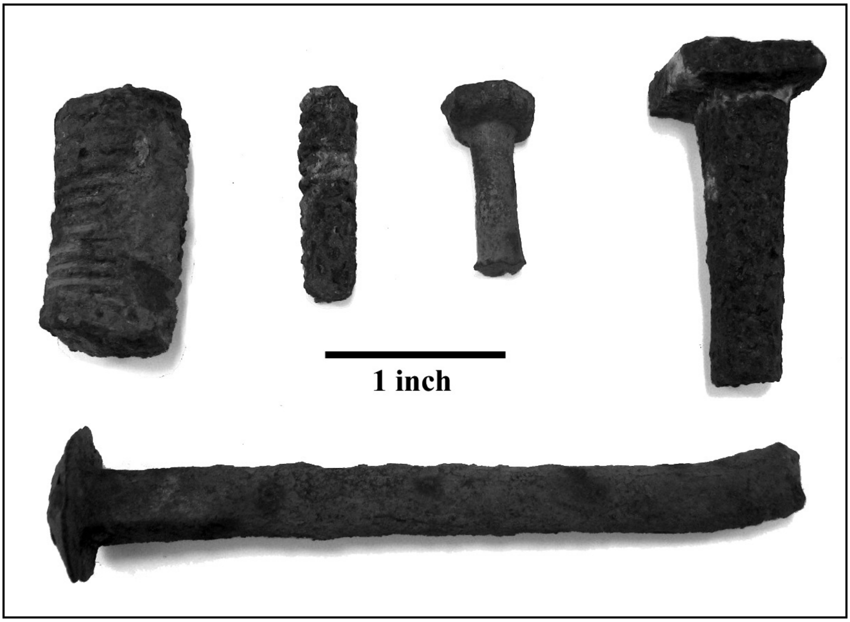

Figure 6.15: Bolts. Top, from left: two shank fragments, threadless wrought fragment, square-headed fragment. Bottom: carriage bolt.

Wrought and Cut Nails

Wire nails post-date Fort Pierre Chouteau's fur trade and military occupations. They are therefore not discussed further in this report. Cut and wrought nails are period artifacts. The analyzed cut nail total exceeds that of wrought nails by a nearly 2.3:1 ratio (n = 2484 to n = 1093).[3] One explanation for this ratio is based on availability. Since cut nails came into common use after the 1830s (i.e., during the fort's lifespan), and since mass production dramatically enhances availability, one might expect them to occur more regularly at Fort Pierre Chouteau than wrought nails.

Another explanation, which does not necessarily exclude availability, is chronological. Possibly many wrought nails represent early years at the fort, when, due to a young technology, cut nail acquisition was less regular. As cut availability increased, on-site nail manufacture dwindled, perhaps

[3]Ruple excavated select locations at Fort Pierre Chouteau in 1980 and 1981. His cut/wrought nail ratio is close to 7:1 (Ruple 1990:24). A ratio higher than that reported here might be due to the limited areal extent of his excavation. The nails reported here are from all excavations, including Ruple's early 1980s work.

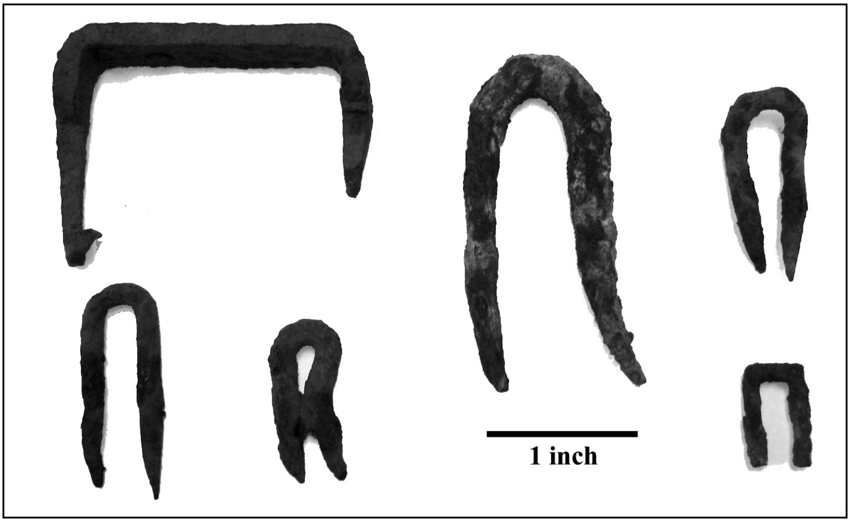

Figure 6.16: Examples of square, U-shaped, and fence staples.

occurring from time to time mostly on an expedient basis.

It is also possible that the ratio reflects differences between the private and military occupations. Perhaps the military had better access (budgets, transportation, etc.) to modern nails than the American Fur Company. If so, cut nails may tend to reflect the military occupation more so than the fort's fur trading era.

These potentials are difficult to discern due to two factors, 1) the (apparent) palimpsest nature of construction at the fort, and 2) facility repairs. Both can be expected to lead to mixing in the archaeological record. This is particularly the case in the shallow cultural deposits of relatively short-lived historic sites. Episodes are typically not clearly defined stratigraphically, and that limitation is exacerbated by the susceptibility of displacement of small artifacts from original contexts.

These are the kinds of contextual problems that exist at Fort Pierre Chouteau, at least with respect to the nail assemblage. Clear evidence of mixing is shown, as the nail types and type frequencies are not neatly distributed vertically by age or type frequency in excavated units (see Tables 6.6–6.8). For example, wire nails are mixed with cut and wrought specimens at XU N446 E511.

Sized cut and wrought nails in the assemblage are distributed over the entire size range. Noticeably underrepresented in both types, however, are nails in the 16d size (n = 7; two-tenths of a percent of the cut and wrought

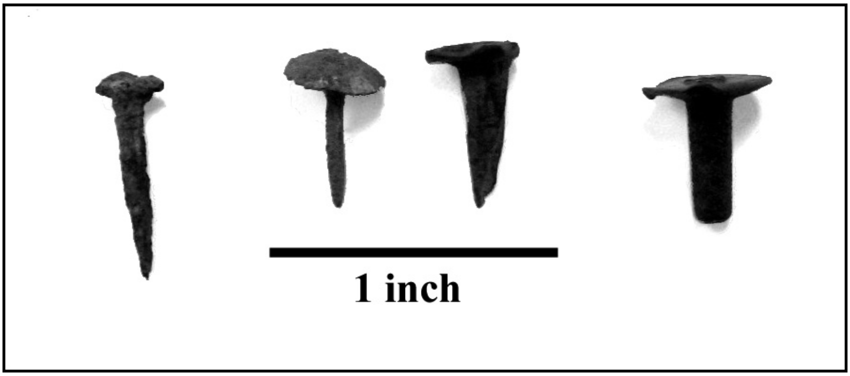

Figure 6.17: Left to right: carpet tack, dome-headed tack, tack anomaly (01-73-1447), and a cuprous rivet.

assemblage). This size is typically representative of light (stud) frame construction (platform and balloon) using full- or modern-dimension framing lumber. Under-representation suggests that light frame buildings within Fort Pierre Chouteau (as defined by palisades) were uncommon during either occupation. This may not be surprising. Balloon framing, which is earlier than platform framing, was not introduced in the U.S. until the 1830s. In any case, larger size nail quantities are consistent with this observation. Spikes (20d–60d) in both types (n = 887) make up 24.8% of the cut and wrought assemblage (n = 3577). The disparity points to a preponderance of pole/plank and/or log buildings (which typically are held together by spikes), rather than frame construction.

On the other hand, 12d nails are comparatively numerous (n = 560; 15.6%). Nails in this size, but not any smaller, can be substituted for framing nails. But substitution typically results in light frame buildings of less substantial stability. Whatever, the numerous cut and wrought nails in smaller sizes (2d–12d) can be expected (n = 2683; 75% of the assemblage). These are typically used for finishing—wall boards, shingling (reported historically in De Land 1902:348–349), sash installation, etc. All wood structures at the fort would have required these sizes, so they are not useful in distinguishing building types.

This observation (little if any light frame construction) is supported in the historical record. Most eyewitness descriptions focus on building dimensions and locations; they say little about construction methods. One exception is a structural inventory made by the Army prior to purchasing the fort from the American Fur Company. The inventory reports the state of repair of 23 structures. Of those that contain hints of construction methods, none are light frame buildings. For example, the shops and stables were of logs placed horizontally between vertical posts (De Land 1902:348–349). Thaddeus Culbertson mentioned another log building—the bourgeois house with porch (McDermott 1952:76).

The assemblage also contains clinched cut and wrought nails (Figures 6.18 and 6.19). Nails are typically clinched for at least one of two reasons. First, the nail used is too big for the job and needs to be clinched to eliminate the potentially hazardous protrusion. Second, extra holding power may be need. The large nail is purposely selected, driven through the joined parts, and then clinched. In the case of the Fort Pierre Chouteau, the U-shaped specimen suggests the latter function, which is typical for non-frame structures. Otherwise, clinching seems to have been mostly for safety purposes.

Investigations to date have, for the most part, sampled buildings at Fort Pierre Chouteau. That is because excavations have primarily been at or near the palisade's interior perimeter where most structures were located. Thus the nail assemblage is representative of fort structures. However, from the point of view of horizontal distributions of buildings, using nails little more can be said beyond the recognition that the assemblage does not appear to be representative of widespread light frame construction, and that the large majority of nails represent finish work common to most building types and functions (log, frame, pole, etc, or storage, living, activity, etc.). The extent of materials salvaged (in 1857 to build Fort Randall) at Fort Pierre Chouteau, if any, on the nail assemblage is not known.

Other Fasteners

The blacksmith shop location (at least during the fur traders' tenure) is well known on the basis of metal artifact analysis (see Collison *Forging the Fur Trade: Metal Artifacts at Fort Pierre Chouteau* in this volume) and historical documentation. On the modern site grid, the location lies approximately N470–N490 to E555–E570 (along the east palisade wall nearer the central gate than the southeast palisade corner). Several nail artifacts are consistent with that. In particular, the four unfinished wrought nails (Figure 7) were found here.

Not surprisingly, most of the wrought pins were also found in the blacksmith shop location. They may have been used in shop hardware fixtures, or perhaps made and stored for future use. The same is true for most of the bolts. The two ferrous rivets, however, were found over 50 feet north of the blacksmith shop excavations.

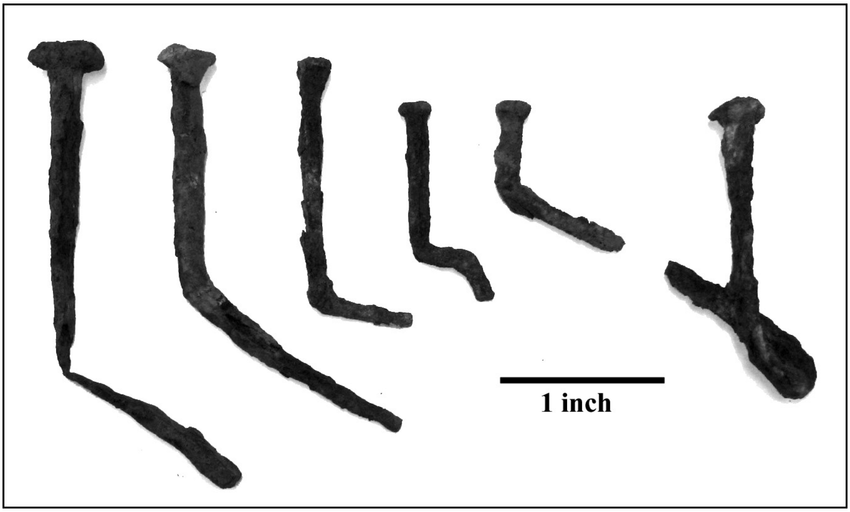

Figure 6.18: Examples of clinched cut nails.

Mass-production screw technology dates to the 1790s (Bellis n.d.). Screws therefore would not be expected to be concentrated in the blacksmith shop location. In fact, they are spread widely throughout the excavated area, including at the smithy location. Since machine-made screws lack temporal attributes, at least in the context of the Fort Pierre Chouteau occupation, they are not useful in discerning site chronology.

The two rectangular staples were also found in the blacksmith excavations. Shanks on the larger of the two are bent over, indicating the staple was discarded here, perhaps during repairs to the item into which it had been driven. The smaller rectangular staple does not appear to be used; it may have been made at the shop for later use. Most of the tacks are also from blacksmith shop excavation units. Why this might be is unknown, unless they too are discards from items brought to the smith for repairs.

Horseshoe nails in the assemblage are a mixture of wrought and machine-made specimens. Like tacks, most horseshoe nails come from the blacksmith shop location. Wrought shoe nails can be expected in this area. The machined nails may have found their way to the smithy shop with horseshoes in need of alterations. Another possibility is that machined horseshoe nails signal post-fort ranching activities at the site. This, however, does not explain their prevalence at the smith shop location.

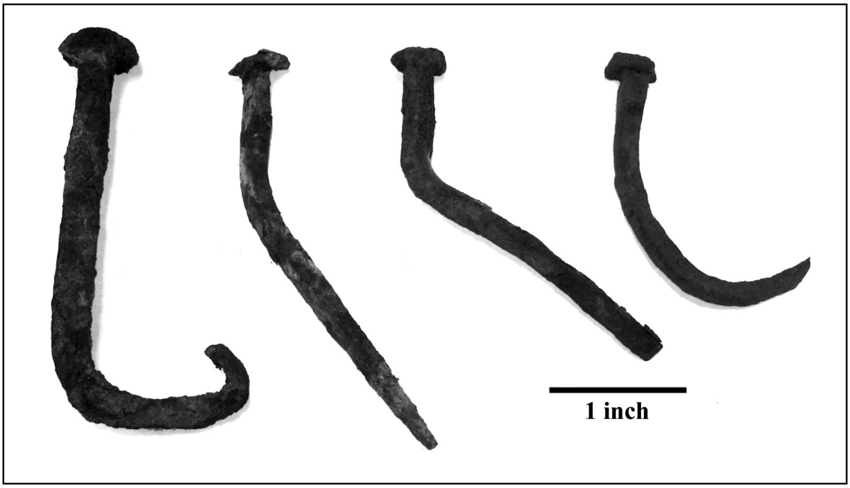

Figure 6.19: Examples of clinched wrought nails.

Conclusion

The few wire nails in the assemblage almost certainly post-date Fort Pierre Chouteau, as do wire fencing staples. These likely represent the post-fort ranching era. Otherwise, the co-occurrence of cut and wrought nails is consistent with the technological times. The fort existed during a time when nail technology transitioned from hand-made to mass production, machine-made nails.

Cut and wrought nail distributions cannot be used to identify specific construction methods at specific locations within the fort palisade. Size range distributions, however, do indicate the primary construction methods, wherever a building might be located, did not use light framing. Rather the buildings were, based on nail analysis, combinations of log, pole/post and planking. This observation is consistent with the few descriptions of construction methods in the documentary record.

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Table 6.6: Cut nails by size and excavation unit.

Unit/Level	2d	3d	4d	5d	6d	7d	8d	10d	12d	16d	20d	30d	40d	50d	60d
Surface															
80-303-831				1			2	4			4	2	1		
80-303-852									1						1
80-303-853									4		3				
Unit Nxxx Exxx															
N426 E569															
L. 2 (10-20cm)					2			2			1				
N442 E500															
L. 4		1	1												
N442; 448 E509															
L. 3		3	3												
N442 E509															
L. 5					1		1	1							
N443 E504															
L. 4			2												
N443 E509															
L. 3								1							
L. 4			1	1	1		1		2		2				
L. 5											1				
Subtotal:			1	1	1		1	1	2		3				

Table 6.6: continued

Unit/Level	2d	3d	4d	5d	6d	7d	8d	10d	12d	16d	20d	30d	40d	50d	60d
N443.5 E506															
L. 4 (30-40cm)					1				12						
L. 5 (40-50cm)				1											
Subtotal:				1	1				12						
N443.5 E508															
L. 4 (30-40cm)		1						2							
L. 5 (40-50cm)									1						
Subtotal:		1						2	1						
N444 E502															
L. 4									1			1			
N444 E504															
L. 3									1						
L. 4				1				2							
L. 5												1			
Subtotal:				1				2	1			1			
N444 E505															
L. 3				2											
L. 4									2		1	1			
Subtotal:				2					2		1	1			
N444 E506															
L. 4 (30-40cm)				1	1			1	1		1				
L. 5 (40-50cm)								1							
Subtotal:				1	1			2	1		1				

Table 6.6: continued

Unit/Level	2d	3d	4d	5d	6d	7d	8d	10d	12d	16d	20d	30d	40d	50d	60d
N444 E507															
L. 4 (30-40cm)			1		3		2	4	3		1				
L. 5 (40-50cm)				1							1				
L. 6 (50-55cm)					1										
Subtotal:			1	1	4		2	4	3		2				
N444 E508															
L. 4 (30-40cm)		1						1							
L. 5 (40-50cm)		1						1							
Subtotal:		2						2							
N444 E509															
L. 3					2										
L. 4					1										
L. 5		1		1							1				
Subtotal:		1		1	3						1				
N444 E510															
L. 4 (30-40cm)								1			1				
N445 E509															
L. 3									1						
L. 4				1											
L. 5		1		3							2	1			
Subtotal:		1		4					1		2	2			
N446 E511															
Area 1, Wood 4		2	1				1								
L. 3 (20-30cm)		1	1	2					1						

Table 6.6: continued

Unit/Level	2d	3d	4d	5d	6d	7d	8d	10d	12d	16d	20d	30d	40d	50d	60d
L. 4 (30-40cm)		10	52	3	1	1		3	3						
L. 5 (43-53cm)				1							1				
L. 6 (50-60cm)									1						
L. 7 (60-70cm)		3	1								1	1			
Subtotal:		16	55	6	1	1	1	3	5		2	1			
N448 E509															
L. 2 (10-20cm)					1										
N449 E509															
L. 3 (20-30cm)			2	3	1		1								
N449 E554															
L. 2 (10-20cm)			1												
L. 3 (20-30cm)			1												
Subtotal:			2												
N450 E554															
L. 1 (0-20cm)			1	1				1	1						
L. 2 (20-30cm)									1						
Subtotal:			1	1				1	2						
N451 E569															
L. 1 (0-10cm)								1							
N451 E570															
L. 1 (0-10cm)											3				
N451 E572															

Table 6.6: continued

Unit/Level	2d	3d	4d	5d	6d	7d	8d	10d	12d	16d	20d	30d	40d	50d	60d
L. 2 (10-20cm)											1				
N451 E573															
Clean-up			1												
L. 1 (0-10cm)		1		1					1						
L. 2 (10-20cm)				1					1						
Subtotal:		1	1	2					2						
N452 E570															
L. 2				1											
N452 E572															
L. 1 (0-10cm)							1								
L. 2 (10-20cm)			1												
Subtotal:			1				1								
N452 E574															
L. 1 (0-10cm)		1	1												
N453 E569															
L. 1 (0-10cm)				1											
N453 E570															
L. 1 (0-10cm)				2											
N453 E572															
L. 1 (0-10cm)				1											
N454 E545															

Table 6.6: continued

Unit/Level	2d	3d	4d	5d	6d	7d	8d	10d	12d	16d	20d	30d	40d	50d	60d
L. 3 (20-30cm)								1							
N454 E569															
L. 2 (10-20cm)					1										
N454 E571															
L. 2 (10-20cm)				1			1		1		2				
N454 E573															
L. 1 (0-10cm)			1				1					1			
L. 2 (10-20cm)				1											
Subtotal:			1	1			1					1			
N454 E574															
L. 1 (0-10cm)		1													
L. 2 (10-20cm)			1	1											
L. 3 (20-30cm)			1	2							3				
L. 4 (30-40cm)					2							1			
Feat. Fill (40-123cm)			1												
Subtotal:		1	3	3	2						3	1			
N454 E575															
L. 1	1	5	1		1		1	1	2		2				
L. 2		15	2	3	1						1				
L. 4					1				1						
Subtotal:	1	20	3	3	3		1	1	3		3				
N455 E569															
L. 1 (0-10cm)												1		1	

Table 6.6: continued

Unit/Level	2d	3d	4d	5d	6d	7d	8d	10d	12d	16d	20d	30d	40d	50d	60d
N455 E571															
L. 1								1							
N455 E572															
L. 1 (0-10cm)								2						2	
L. 2 (10-20cm)											1				
Subtotal:								2			1			2	
N455 E573															
L. 1											2				
N456 E569															
L. 1				1							1				
N456 E571															
L. 1					2						1	1			
L. 2				1	1		1	1	1		2				
Subtotal:				1	3		1	1	1		3	1			
N456 E572															
L. 1	2				3			2	2		1				
N456 E573															
L. 1		1	1	1	2						1				
N457 E569															
L. 1		1													

Table 6.6: continued

Unit/Level	2d	3d	4d	5d	6d	7d	8d	10d	12d	16d	20d	30d	40d	50d	60d
N457 E570															
L. 1							2	1							
N457 E571															
L. 1		1							3						
N457 E572															
L. 1			1					1				2			
L. 2		4	1												
Subtotal:		4	2					1				2			
N457 E573															
L. 2				1											
N458 E570															
L. 1			1					1	2						
N458 E571															
L. 1					2		1		1						
N459 E569															
L. 1					1										
N460 E571															
L. 2 (10-20cm)											1				
N460 E572															
L. 1 (0-10cm)								1							

Table 6.6: continued

Unit/Level	2d	3d	4d	5d	6d	7d	8d	10d	12d	16d	20d	30d	40d	50d	60d
N460 E573															
L. 1 (0-10cm)							1	1							
N465 E499															
L. 1		1	1		1										
L. 2			1		1		2								
Subtotal:		1	2		2		2								
N465 E500															
L. 2				1	1										
L. 3		2			2		3		2		2				
L. 4									2						
L. 6							1								
Subtotal:		2		1	3		4		4		2				
N465 E501															
L. 2			2	1											
L. 3	1	1						2	1		1				
L. 4		1							1		1				
L. 5					1										
(30-50cm)									1						
L. 6 (50-70cm)			1	1	2		1	5	3		5	2			
Subtotal:	1	2	3	2	3		1	7	6		7	2			
N465 E502															
L. 1 (0-10cm)		1	1	2											
L. 2 (10-20cm)		2	1	1				1							1
L. 3 (20-30cm)		1					1		1		1				
L. 4 (40cm)			3	2							1				

Table 6.6: continued

Unit/Level	2d	3d	4d	5d	6d	7d	8d	10d	12d	16d	20d	30d	40d	50d	60d
L. 5 (40-50cm)							2		2	1	2	1			
L. 6 (50-60cm)				1	1										
Subtotal:		4	5	6	1		3	1	3	1	4	1			1
N465 E503															
L. 1 (0-10cm)		3	2												
L. 2 (10-20cm)		2	3					1							
L. 5 (40-50cm)			1												
Subtotal:		5	6					1							
N465 E504															
L. 1 (0-10cm)			3	1					2		2				
L. 2 (10-20cm)		1	4	2				5	1		1				
L. 3 (20-30cm)			1		1			1							
L. 4 (30-40cm)				1	1		2								
L. 5 (40-50cm)		2							1						
Subtotal:		3	8	4	2		2	6	4		3				
N465 E505															
L. 1 (0-10cm)		1	6	5	2			6	4		3				
L. 2 (10-20cm)		4	6		1		3	3			2				
L. 4 (30-n/acm)		1													
L. 5 (wall scrapings)								1							
Subtotal:		6	12	5	3		3	10	4		5				
N465 E506															
L. 1 (0-10cm)		3	3	1			1	1							
L. 2 (10-20cm)			2												
L. 3 (20-30cm)			1	1							1				

Table 6.6: continued

Unit/Level	2d	3d	4d	5d	6d	7d	8d	10d	12d	16d	20d	30d	40d	50d	60d
Subtotal:		3	6	2			1	1			1				
N465 E509															
L. 1 (0-20cm)		2	4						1						1
L. 2 (20-30cm)		1		1											
Subtotal:		3	4	1					1						1
N469 E569															
L. 1			1												
L. 2											1				1
Subtotal:			1								1				1
N469 E570															
L. 1							1								
L. 2				1											
Subtotal:				1			1								
N469 E571															
L. 1				2			1								
L. 2				1											
Subtotal:				3			1								
N471 E569															
L. 1											1				
N471 E571															
L. 1 (0-10cm)		1				1									
L. 2 (10-20cm)						1			1						
Subtotal:		1				2			1						

Table 6.6: continued

Unit/Level	2d	3d	4d	5d	6d	7d	8d	10d	12d	16d	20d	30d	40d	50d	60d
N472 E567															
L. 4 (40-45cm)				2											
N474 E568															
L. 4 (30-40cm)				1											
N477 E568															
L. 1 (0-10cm)			1	2			1	1							
L. 2	1		2	1				6			1				
L. 3	1	1	1	5			6	5	4		5	5			
L. 4	1	3	1	2			2		2		4				3
Subtotal:	3	4	5	10			9	12	6		10	5			3
N478 E567															
L. 1 (0-10cm)	1		2	3	2		5	5	7			1			
L. 2 (10-20cm)			1	6	2		2	5	5		8	5			
L. 3 (20-30cm)		2	3	7	3		3	3	7		4				1
L. 5 (40-45cm)		1					2		4		2				
Subtotal:	1	3	6	16	7		12	13	23		14	6			1
N479 E565															
L. 1 (0-10cm)				2			1								
L. 3 (20-30cm)				1				5	2						
L. 4 (30-40cm)		1													
Subtotal:		1		3			1	5	2						
N479 E567															
L. 1 (0-10cm)			2	4	2		5	4	10		4				

Table 6.6: continued

Unit/Level	2d	3d	4d	5d	6d	7d	8d	10d	12d	16d	20d	30d	40d	50d	60d
L. 2 (10-20cm)				6			3	3	4		8	2			1
L. 3 (20-30cm)			2	5					4		3	3			
Subtotal:			4	15	2		8	7	18		15	5			1
N479 E569															
L. 1		4		3	2		1	5	3		2	2			
L. 2								1							
L. 3					1										
L. 4					1										
Subtotal:		4		3	4		1	6	3		2	2			
N479 E573															
L. 1 (0-10cm)											1				
N480 E520															
L. 2 (10-20cm)			2	2				2	1		1				
N480 E567															
L. 1 (0-10cm)					4				1		4				
N480 E568															
L. 2 (10-20cm)		1		3				2	1		4				
L. 3 (20-30cm)			3		1		1	2	6		4	1			
Subtotal:		1	3	3	1		1	4	7		8	1			
N480 E569															
L. 4 (30-40cm)				2	5		4	10	3		3	4			
N480 E570															

Table 6.6: continued

Unit/Level	2d	3d	4d	5d	6d	7d	8d	10d	12d	16d	20d	30d	40d	50d	60d
L. 1		4	2	2			1	4	5						
L. 3 (20-30cm)			1		1		3	2	4		1	1			
Subtotal:		4	3	2	1		4	6	9		1	1			
N480 E572															
L. 1 (0-10cm)		1									1				
L. 2 (10-20cm)									1			1			
L. 3 (20-30cm)							1								
Subtotal:		1					1		1		1	1			
N481 E561															
L. 1		1		1	1		1	2	1						
L. 2			1				2	1			2				
Subtotal:		1	1	1	1		3	3	1		2				
N481 E562															
L. 1			3		1	1		2	2		1	1			
L. 2			3	6	2		9	8	13		3	1			
L. 3				2	1			3							
L. 4					1						1				
Subtotal:			9	8	5	1	9	13	15		5	2			
N481 E563															
L. 1 (0-10cm)				9			1		2						
L. 3 (20-30cm)				5				2	1		1	1			
Subtotal:				14			1	2	3		1	1			
N481 E564															
L. 1 (0-10cm)				3				3	2						

Table 6.6: continued

Unit/Level	2d	3d	4d	5d	6d	7d	8d	10d	12d	16d	20d	30d	40d	50d	60d
L. 3 (20-30cm)				4			2	2	3		3				
L. 4 (30-40cm)			1		1			1							
Subtotal:			1	7	1		2	6	5		3				
N481 E567															
L. 1 (0-10cm)	1		1	7	3		3	8	4		5	1			
L. 2 (10-20cm)	2	2	5	4	6		3	9	4		5				
L. 3				2				1	2		3				
Subtotal:	3	2	6	13	9		6	18	10		13	1			
N481 E569															
L. 1		1	2	7	4		6	5	7		2	2			
L. 2	1		1	6	7		2	5	5		2	1			
L. 3			2	6	2			3	3		1	1			
Subtotal:	1	1	5	19	13		8	13	15		5	4			
N481 E571															
L. 3 (20-30cm)				1				1							
N482 E565															
L. 1			1	6	1		1	2	2		1				
L. 2			1	3	2		2	5	4			2			
L. 3			3	2	1		1	2	4		1				
Subtotal:			5	11	4		4	9	10		2	2			
N482 E566															
L. 4 (30-40cm)									1						
N482 E568															

Table 6.6: continued

Unit/Level	2d	3d	4d	5d	6d	7d	8d	10d	12d	16d	20d	30d	40d	50d	60d
L. 1 (0-10cm)	2	1	1		1		1	4	3						
L. 2 (10-20cm)			4	6			4	8	7		8				
L. 3 (20-30cm)			1		2		8	9	10		8	2			
L. 4 (30-40cm)			3	3			2	3	4		1	2			
Subtotal:	2	1	9	9	3		15	24	24		17	4			
N482 E569															
L. 2 (10-20cm)		1	3	3			1	5	6		2	1			
N482 E570															
L. 3 (20-30cm)		1	1	1	1		1		2		4	1			1
N482 E572															
L. 1 (0-10cm)					1		2	1	1						
L. 2 (10-20cm)			1				1	2	3		6	2			
L. 3 (20-30cm)								1			1				
Subtotal:			1		1		3	4	4		7	2			
N483 E565															
L. 1				3	2			5	4		3				1
L. 2			2						2						
L. 3				8	1		4		3						
L. 4											1				
Subtotal:			2	11	3		4	5	9		4				1
N483 E567															
L. 1 (0-10cm)			3	1	5		2	6	7		3				
L. 2 (10-20cm)			1	4	3		6	7	2		8	3			
L. 3 (20-30cm)		1	1		1			3							

Table 6.6: continued

Unit/Level	2d	3d	4d	5d	6d	7d	8d	10d	12d	16d	20d	30d	40d	50d	60d
L. 4 (30-40cm)								4	1		2				
Subtotal:		1	5	5	9		8	20	10		13	3			
N483 E569															
L. 1				3				2			2				
L. 2		1	1	9	2		4	8	5			1			
L. 3												1			
L. 4							2	1							
Subtotal:		1	1	12	2		6	11	5		2	2			
N483 E570															
L. 2 (20-30cm)		1		1			1				1				
N483 E571															
L. 1 (0-10cm)			1		1			1	1						
L. 2 (10-20cm)							4	1	1		2				
Subtotal:			1		1		4	2	2		2				
N484 E565															
L. 1			2	4	2		1	5	9		3	1			
L. 2		1	3	11	3		7	6	9		11	3			
L. 3			3	4				7	3		10	1			
L. 4	1	1	2	6	1		2	1			1				
Subtotal:	1	2	10	25	6		10	19	21		25	5			
N484 E566															
L. 1							1	1							
L. 2 (10-20cm)		2		1			1	1	1	2		1			
L. 3 (20-30cm)			1	1					12		2				

Table 6.6: continued

Unit/Level	2d	3d	4d	5d	6d	7d	8d	10d	12d	16d	20d	30d	40d	50d	60d
L. 4 (30-40cm)				3	1		1								
Subtotal:		2	1	5	1		3	2	13	2	2	1			
N484 E567															
L. 1 (0-10cm)									1						
L. 2 (10-20cm)			1		1			2	1		1	2			
L. 3 (20-30cm)											1				
L. 4 (30cm)					3										
Subtotal:			1		4			2	2		2	2			
N484 E568															
L. 1 (0-10cm)		3		4	6		5	5	4		4				
L. 2 (10-20cm)			1	7	2		5	5	8						
Subtotal:		3	1	11	8		10	10	12		4				
N484 E569															
L. 1					2		2	2	1		2				
L. 2 (10-20cm)			2					1							
L. 3 (20-30cm)				1				2							
Subtotal:			2	1	2		2	5	1		2				
N484 E570															
L. 1 (0-20cm)		3	1	1	3		2				3				
L. 3 (30-40cm)		1		1					1						
Subtotal:		4	1	2	3		2		1		3				
N490 E494															
L. 2 (10-20cm)			2						1		1				
L. 3 (20-30cm)			3	4			1		1		2				

Table 6.6: continued

Unit/Level	2d	3d	4d	5d	6d	7d	8d	10d	12d	16d	20d	30d	40d	50d	60d
L. 4 (30-40cm)		1						1							
Subtotal:		1	5	4			1	1	2		3				
N490 E494-504															
L. 1			1		1		1	1	3						
N490 E495															
L. 2 (10-20cm)			1	6	1		2	5	1						
L. 3 (20-30cm)		1	1	1	2		1	1	2						
L. 4 (30-40cm)			2	1											
Subtotal:		1	4	8	3		3	6	3						
N490 E496															
L. 1			2	1					1						
L. 2	2		2	3				1	4		4				
L. 3					1										
L. 4								1							
L. 5									2						
Subtotal:	2		4	4	1			2	7		4				
N490 E497															
L. 1			3					1			1				
L. 2		3	3								1				
L. 3			1												
Subtotal:		3	7					1			2				
N490 E498															
L. 1			2						1						
L. 2		1	2	1	1				4			3			

Table 6.6: continued

Unit/Level	2d	3d	4d	5d	6d	7d	8d	10d	12d	16d	20d	30d	40d	50d	60d
L. 3			1	1	1		1	1			2				
L. 4				2					1						
L. 5				1											
Subtotal:		1	5	5	2		1	1	6		2	3			
N490 E499															
L. 1 (0-10 cm)					6			1	4		1				
L. 2 (10-20 cm)				1											
Subtotal:				1	6			1	4		1				
N490 E500															
L. 2 (10-20 cm)				5					1		1				
L. 6 (50-60 cm)											1	1			
Subtotal:				5					1		2	1			
N490 E501															
L. 1 (3-10 cm)				1	1			4			1				
L. 2 (10-20 cm)			2	2	2			4	1		3				
Subtotal:			2	3	3			8	1		4				
N490 E502															
L. 1 (3-10 cm)		1	4		1			4							1
L. 2 (10-20 cm)		1	1	5	3				3		2				
L. 3 (20-30 cm)												1			
Subtotal:		2	5	5	4			4	3		2	1			1
N490 E503															
L. 1		2						2			3				
L. 2		13	1					2	1		4				

Table 6.6: continued

Unit/Level	2d	3d	4d	5d	6d	7d	8d	10d	12d	16d	20d	30d	40d	50d	60d
L. 3									1						
L. 4								2							
Subtotal:		15	1					6	2		7				
N490 E504															
L. 1 (3-10 cm)		1					1	5	3		1	2			
L. 2 (10-20 cm)		1	1	3			1	2			1				
L. 3								2			1				
Subtotal:		2	1	3			2	9	3		3	2			
N490 E505		2		1	2		1	4	5	2					
L. 1 (0-20 cm)	1		2		1		2		1						
L. 2 (20-40 cm)	1	2	2	1	3		3	4	6	2					
Subtotal:															
N490 E508.5		2		1				3	2						
L. 1 (0-20 cm)		4	14	8	1		4	2	7		8				
L. 2 (20-40 cm)		6	14	9	1		4	5	9		8				
Subtotal:															
N490.3 E490.5					1										
(90-110 cm)					1										
N512 E573															
L. 1	1							1							
N513 E489															
L. 2 (10-20 cm)		1	1	1				1							
L. 5 (40-46 cm)											1				

Table 6.6: continued

Unit/Level	2d	3d	4d	5d	6d	7d	8d	10d	12d	16d	20d	30d	40d	50d	60d
Subtotal:		1	1	1				1			1				
N513 E490															
L. 2 (10-20 cm)								1							
L. 3 (20-30 cm)											1				
Subtotal:								1			1				
N513 E491															
L. 3 (20-30 cm)		1		1			1	1							
N513 E492															
L. 1 (0-10 cm)				1											
N513 E494															
L. 1 (0-20 cm)				1	2		1	1							
L. 2 (20-30 cm)				1											
Subtotal:				2	2		1	1							
N513 E495															
L. 2 (10-20 cm)				1		1									
N513 E499															
L. 4 (30 -40 cm)		1	1												
N513 E573															
L. 1 (0-12 cm)								1							
N514 E499															
L. 2		1		2											

Table 6.6: continued

Unit/Level	2d	3d	4d	5d	6d	7d	8d	10d	12d	16d	20d	30d	40d	50d	60d
L. 3							3								
Subtotal:		1		2			3								
N517 E573															
L. 1		1		1											
N518 E573															
L. 1							2								
N519 E573															
L. 1								1							
N520 E573															
L. 1								1							
N521 E572															
L. 2									7						
N521 E573															
L. 1								1	1		1				
N522 E573															
L. 1								2			1				
N523 E573															
L. 1															1
N526.5 E495															
(20-40 cm)				1											

Table 6.6: continued

Unit/Level	2d	3d	4d	5d	6d	7d	8d	10d	12d	16d	20d	30d	40d	50d	60d
N527.5 E500															
L. 1 (0-20 cm)							1								
L. 2 (20-40 cm)		1	1					1	3						
L. 3 (40-60 cm)									2						
Subtotal:		1	1				1	1	5						
N529 E567															
L. 2							1	1							
L. 3			1		1			1	4		1				
L. 4					1		1	1	2						
Subtotal:			1		2		2	3	6		1				
N529 E570															
L. 1			1												
L. 2		1						1	1						
L. 3								1	1						
Subtotal:		1	1					2	2						
N530 E541															
L. 2			2						3						
N530.5 E568.6															
L. 1											1				
L. 2								1			1				
Subtotal:								1			2				
N531 E540															
L. 2 (10-20 cm)							1								

Table 6.6: continued

Unit/Level	2d	3d	4d	5d	6d	7d	8d	10d	12d	16d	20d	30d	40d	50d	60d
L. 4							1								
L. 6							1								
Subtotal:							3								
N531 E541															
L. 1		1	1		1			1							
L. 2												1			
L. 4											1				
Subtotal:		1	1		1			1			1	1			
N531 E549															
L. 3 (20-30 cm)							1		1						
N532 E543															
L. 1					1						1				
N533 E541															
L. 1								1							
L. 4					1							1			
L. 5											1				
L. 6 (50-56 cm)									1		2				
(56-60 cm)								4	2						
(56-65 cm)								2	5						
(54-71 cm)					2		1								
L. 9 (70-NA)												2			
(70-86 cm)								1	2		1				
Subtotal:					3		1	8	10		4	3			
N533.5 E542															

Table 6.6: continued

Unit/Level	2d	3d	4d	5d	6d	7d	8d	10d	12d	16d	20d	30d	40d	50d	60d
L. 3 (41-50 cm)											2				
N535 E541															
L. 3 (20-30 cm)											1				
L. 5 (35-40 cm)								1							
Subtotal:								1			1				
N535 E542															
L. 1 (0-22 cm)											2				
N538 E567.6															
L. 1 (0-15 cm)											1				
L. 2 (15-30 cm)												1			
L. 3 (30-40 cm)					1		1				1				
Subtotal:					1		1				2	1			
N539 E563															
L. 2 (15-30 cm)				1											
L. 3 (30-40 cm)				1			1								
Subtotal:				2			1								
N539 E567.2															
L. 1					1				2						
N539.5 E565															
L. 3 (20-30 cm)							1								
L. 4 (30-45 cm)							1								
Subtotal:							2								

Table 6.6: continued

Unit/Level	2d	3d	4d	5d	6d	7d	8d	10d	12d	16d	20d	30d	40d	50d	60d
N540 E567.2															
L. 1 (0-15 cm)				1	1		1	1							
N542 E543															
L. 3 (20-35 cm)									1						
N545 E540															
L. 1									1						
L. 2												2			
L. 3			1												
L. 4				1									1		
L. 5								1							
L. 6												1			
Subtotal:			1	1				1	1			3	1		
N547 E540															
L. 1			1								1				
L. 2								1							
Subtotal:			1					1			1				
N547 E549															
L. 2											1	1			
N548 E540															
L. 1									1		1				
L. 2								1	1						
L. 3											1				
Subtotal:								1	2		2				

Table 6.6: continued

Unit/Level	2d	3d	4d	5d	6d	7d	8d	10d	12d	16d	20d	30d	40d	50d	60d
N549 E540															
L. 2					3			2			1				
L. 3				2				3							
L. 4				1											
Subtotal:				3	3			5			1				
N550 E540 W1/2															
L. 2				1				2							
N551 E540															
L. 1											1				
L. 2				1				4	1						
Subtotal:				1				4	1		1				
N551 E549															
L. 2								1							
N552 E540															
L. 1	1		1	3				4							
L. 2		2					2	7	1		1				
Subtotal:	1	2	1	3			2	11	1		1				
N552 E549															
L. 2								1							
N553 E500															
L. 1										1					
N553 E549															

Table 6.6: continued

Unit/Level	2d	3d	4d	5d	6d	7d	8d	10d	12d	16d	20d	30d	40d	50d	60d
L. 2				1											
L. 3		1					1	1							
Subtotal:		1		1			1	1							
N554 E549															
L. 3		1													1
Subtotal:		1													1
Total:	20	169	280	357	188	5	217	411	410	6	313	89	2	3	14
Total Nails:	2484														

Table 6.7: Wrought nails by size and excavation unit.

Unit/Level	2d	3d	4d	5d	6d	7d	8d	10d	12d	16d	20d	30d	40d	50d	60d
Surface															
80-303-831								2	2		4	2			2
Subtotal:								2	2		4	2			2
80-303-852									1		1	1			1
Subtotal:									1		1	1			1
N442; 448 E 509															
L. 3													1		
N442 E509															
L. 4												1			
N443 E504															
L. 4							1		1						
L. 5											1	1			
Subtotal:							1		1		1	1			
N443 E509															
L. 4											1				
N443.5 E506															
L. 4 (30-40 cm)									1						
N443.5 E507															
(40-50 cm)							1	1							
N443.5 E508															
L. 5 (40-50 cm)				1											

Table 6.7: continued

Unit/Level	2d	3d	4d	5d	6d	7d	8d	10d	12d	16d	20d	30d	40d	50d	60d
L. 6 (50-55cm)			1												
Subtotal:			1	1											
N444 E505															
L. 4								1							
N444 E507															
L. 4 (30-40 cm)											1				
L. 5 (40-50 cm)												1			
Subtotal:											1	1			
N444 E508															
L. 5 (40-50 cm)					1		1	3	3		1				
N444 E509															
L. 5 (40-50 cm)												1			
N444 E510															
L. 5 (40-50 cm)		1						1							
L. 6 (50-55cm)												1			
L. 7 (55-200 cm)												1			
Subtotal:		1						1				2			
N445 E509															
L. 3															1
N446 E511															
Area 1, Wood 4									1						
L. 4 (30-40 cm)									11						

Table 6.7: continued

Unit/Level	2d	3d	4d	5d	6d	7d	8d	10d	12d	16d	20d	30d	40d	50d	60d
L. 5 (43-53 cm)									1						
Subtotal:									13						
N449 E554															
L. 4 (30-40 cm)				1											
N451 E569							1		1						
L. 1 (0-10 cm)				2	1		1	2							
L. 2 (10-20 cm)				2	1		2	2	1						
Subtotal:															
N451 E570					1										1
L. 1 (0-10 cm)					1										1
N451 E571												1			
L. 1 (0-10 cm)												1			
N451 E572							2								
L. 2 (10-20 cm)							2								
N451 E573								1							
L. 1(Cleanup)			2					1							
L. 2 (10-20 cm)			2					2							
Subtotal:															
N452 E569															
L. 2 (10-20 cm)					1				2						
N452 E572															

Table 6.7: continued

Unit/Level	2d	3d	4d	5d	6d	7d	8d	10d	12d	16d	20d	30d	40d	50d	60d
L. 2 (10-20 cm)					1										
L. 4 (30-40 cm)							1								
Subtotal:					1		1								
N452 E574															
L. 1 (0-10 cm)	1				1										
N453 E569															
L. 1 (0-10 cm)									1						
L. 3 (20-30 cm)											1				
Subtotal:									1		1				
N453 E570															
L. 1(0-10 cm)				1					1						
L. 2 (10-20 cm)		1		1			1								
Subtotal:		1		2			1		1						
N453 E571															
L. 3 (20-30 cm)			1	1					3						
L. 4 (30-40 cm)		1	6	1		1									
L. 5 (40-50 cm)									1		2				
Subtotal:		1	7	2		1			4		2				
N453 E572															
L. 1(0-10 cm)				1				1							
L. 2 (10-20 cm)								1		1					
Subtotal:				1				2		1					
N454 E545															

Table 6.7: continued

Unit/Level	2d	3d	4d	5d	6d	7d	8d	10d	12d	16d	20d	30d	40d	50d	60d
L. 3 (20-30 cm)			4	1			1	2	1					1	1
N454 E569															
L. 1(0-10 cm)									1		1				1
L. 2 (10-20 cm)		1				1									
L. 3 (20-30 cm)						1									
Subtotal:		1				2			1		1				1
N454 E570															
L. 1(0-10 cm)			1	1								1			
L. 2 (10-20 cm)				1	1			1							
Subtotal:			1	2	1			1				1			
N454 E571															
L. 1(0-10 cm)			1		2							1			1
L. 2 (10-20 cm)			5		1			2	1		2	1	1		
L. 3 (20-30 cm)			2				1	1							
L. 4 (30-40 cm)			1				1				1				
L. 5 (40-50 cm)				2											
Subtotal:			9	2	3		2	3	1		3	2	1		1
N454 E572															
L. 1(0-10 cm)					1							1			
N454 E573															
L. 2 (10-20 cm)			2												
N454 E574															
L. 1(0-10 cm)		1						1	1			2			

Table 6.7: continued

Unit/Level	2d	3d	4d	5d	6d	7d	8d	10d	12d	16d	20d	30d	40d	50d	60d
L. 2 (10-20 cm)			5												
L. 3 (20-30 cm)			4	9							1		1	1	
L. 4 (30-40 cm)									1						
L. 5 (40-123 cm)									2		3	4			
Subtotal:		1	9	9				1	4		4	6	1	1	
N454 E575															
L. 1					1										
L. 4							2								
Subtotal:					1		2								
N455 E569															
L. 1(0-10 cm)				1	1			1							
N455 E571															
L. 1								1							
N455 E572															
L. 1(0-10 cm)				3			1								
L. 2 (10-20 cm)								3	1		1				
L. 3 (0-30 cm)								2	2		2	1			
Subtotal:				3			1	5	3		3	1			
N455 E573															
L. 1							1		1				1		
N456 E569															
L. 1							1								

Table 6.7: continued

Unit/Level	2d	3d	4d	5d	6d	7d	8d	10d	12d	16d	20d	30d	40d	50d	60d
N456 E571															
L. 1									1						
N456 E572															
L. 1					1										
N456 E573															
L. 1 (0-10 cm)													1		
N457 E570															
L. 1												1			
N457 E571															
L. 1								1							
N458 E572															
L. 1(0-10 cm)											1				
L. 2 (10-20 cm)															1
Subtotal:											1				1
N459 E569															
L. 1(0-10 cm)					1										
L. 2 (10-20 cm)			1						1						
Subtotal:			1		1				1						
N459 E572															
L. 1 (0-10 cm)											1				
N460 E569															

Table 6.7: continued

Unit/Level	2d	3d	4d	5d	6d	7d	8d	10d	12d	16d	20d	30d	40d	50d	60d
L. 1 (0-10 cm)		1		1											
L. 2 (10-20 cm)													1		
Subtotal:		1		1									1		
N460 E571															
L. 2 (10-20 cm)									1						
N460 E572															
L. 1 (0-10 cm)											1				
N460 E573															
L. 1 (0-10 cm)					1							1			
N465 E500															
L. 3														1	
N465 E501															
L. 6 (50-70 cm)														1	
N465 E502															
L. 2 (10-20 cm)									1						
Subtotal:									1						
N465 E503															
L. 2 (10-20 cm)				2				1	2			1			
L. 4 (30-40 cm)		2	1	1	2				1						
L. 5 (40-50 cm)		1		1				2							
L. 6 (50-60 cm)				1			1	1			3				
Subtotal:		3	1	5	2		1	4	3		3	1			

Table 6.7: continued

Unit/Level	2d	3d	4d	5d	6d	7d	8d	10d	12d	16d	20d	30d	40d	50d	60d
N465 E504															
L. 1 (0-10 cm)								2	3						
L. 2 (10-20 cm)			4					2	2						
L. 4 (30-40 cm)											1				
L. 6 (50-60 cm)									2		4				
L. 7 (60-70 cm)			2	1											
L. 8											2				
L. 9									1		1	2			
Subtotal:			6	1				4	8		8	2			
N465 E505															
L. 1 (0-10 cm)				1	1			1							1
L. 2 (10-20 cm)		2		2	1		1	4			1				
L. 3 (20-30 cm)					1		1								
L. 4 (30-NA)									1		2				
Subtotal:		2		3	3		2	5	1		3				1
N465 E506															
L. 1 (0-10 cm)			7		1			1	2		1				
L. 2 (10-20 cm)			1	2			1	1	1						1
L. 3 (20-30 cm)									1		1				
L. 4 (30-40 cm)									1		2				
L. 5 (40-50 cm)											1				
Subtotal:			8	2	1		1	2	5		5				1
N469 E569															
L. 3								1							
N469 E570															

Table 6.7: continued

Unit/Level	2d	3d	4d	5d	6d	7d	8d	10d	12d	16d	20d	30d	40d	50d	60d
L. 1									1						
L. 2									1			1			
Subtotal:									2			1			
N469 E571															
L. 1					1										
N471 E569															
L. 1											1				
N474 E568															
L. 4 (30-40 cm)							1								
N475 E569															
L. 4 (30-40 cm)		1		1				1				1			
N476 E569															
L. 2 (10-20 cm)														1	
N477 E568															
L. 1(0-10 cm)		2	1	1	1	1		2	1				1		
L. 2 (10-20 cm)	1	1		1			1				1			1	
L. 3											1	2	1	1	1
L. 4							1					3			
Subtotal:	1	3	1	2	1	1	2	2	1		2	5	2	2	1
N478 E567															
L. 1 (0-10 cm)													3		
L. 2 (10-20 cm)								1				3	6	7	7

Table 6.7: continued

Unit/Level	2d	3d	4d	5d	6d	7d	8d	10d	12d	16d	20d	30d	40d	50d	60d
L. 3 (20-30 cm)											1	1		1	1
L. 4 (30-40 cm)												1		4	
Subtotal:								1			1	5	9	12	8
N478 E569															
L. 1 (0-10 cm)												2			
N479 E565															
L. 3 (20-30 cm)											2	3		3	1
L. 4 (30-40 cm)							3		1		2			5	
L. 5 (40-45 cm)															1
Subtotal:							3		1		4	3		8	2
N479 E567															
L. 1(0-10 cm)				9				4	6		5	10			4
L. 2 (10-20 cm)		3		6			1	1	7		6	8			26
L. 3 (20-30 cm)							1	1	5		4	2			9
Subtotal:		3		15			2	6	18		15	20			39
N479 E569															
L. 1									1						
L. 2								1							
L. 3											1				
Subtotal:								1	1		1				
N479 E573															
L. 1 (0-10 cm)				2	2			1				1			
L. 2 (10-20 cm)			1	1				1			2				
L. 3 (20-30 cm)				1											

Table 6.7: continued

Unit/Level	2d	3d	4d	5d	6d	7d	8d	10d	12d	16d	20d	30d	40d	50d	60d
Subtotal:			1	4	2			2			2	1			
N480 E520															
L. 2 (10-20 cm)					2		2				1	2			
N480 E567															
L. 1(0-10 cm)			1				6	4	7		3	1			
N480 E568															
L. 2 (10-20 cm)			2	8	3				5		4	1			
L. 3 (20-30 cm)			1		4		1	6	3		2				
Subtotal:			3	8	7		1	6	8		6	1			
N480 E569															
L. 4 (30-40 cm)											1		4	2	
N480 E570															
L. 1									2			2			
L. 2 (10-20 cm)													2		
L. 3 (20-30 cm)														1	1
Subtotal:									2			2	2	1	1
N480 E572															
L. 1 (0-10 cm)					1		1	4	2		3	1			
L. 2 (10-20 cm)							1	4	1						
L. 3 (20-30 cm)											3	1			
Subtotal:					1		2	8	3		6	2			
N481 E561															

Table 6.7: continued

Unit/Level	2d	3d	4d	5d	6d	7d	8d	10d	12d	16d	20d	30d	40d	50d	60d
L. 1							1								
L. 2											1				
Subtotal:							1				1				
N481 E562															
L. 1												2			
L. 2								1	2		1				
L. 3						1		1	2						
L. 4											3				
Subtotal:						1		2	4		4	2			
N481 E563															
L. 1 (0-10 cm)								1	2		2	1			
L. 3 (20-30 cm)									2		2	1			
Subtotal:								1	4		4	2			
N481 E564															
L. 3 (20-30 cm)								1	2			2			
L. 4 (30-40 cm)							1				1				
Subtotal:							1	1	2		1	2			
Page Total:			3	8	8	1	5	18	23		23	11	6	3	1
N481 E567															
L. 1 (0-10 cm)														1	
L. 2 (10-20 cm)															
L. 3															1
Subtotal:														1	1
N481 E569															

Table 6.7: continued

Unit/Level	2d	3d	4d	5d	6d	7d	8d	10d	12d	16d	20d	30d	40d	50d	60d
L. 1								1			1				
N481 E571															
L. 1 (0-10 cm)				1			1		1		3				
L. 2 (10-20 cm)								2	2		2	1			2
L. 3 (20-30 cm)							3	1			2	1			1
Subtotal:				1			4	3	3		7	2			3
N482 E565															
L. 1											1	1			
L. 2								1	1		2	4			2
L. 3								2	3		1	2			1
Subtotal:								3	4		4	7			3
N482 E566															
L. 4 (30-40 cm)							2		1		1				
N482 E568															
L. 1 (0-10 cm)															1
L. 2 (10-20 cm)											2				3
L. 3 (20-30 cm)												1			
Subtotal:											2	1			4
N482 E569															
L. 2 (10-20 cm)												1			
N482 E572															
L. 1 (0-10 cm)												1			
L. 2 (10-20 cm)												1			

Table 6.7: continued

Unit/Level	2d	3d	4d	5d	6d	7d	8d	10d	12d	16d	20d	30d	40d	50d	60d
Subtotal:												2			
N483 E565															
L. 1								2			1				
L. 2				3				2			1	1			
L. 3				1			1	1	3		1				
Subtotal:				4			1	5	3		3	1			
N483 E567															
L. 1 (0-10 cm)											1				
L. 3 (20-30 cm)											1				
Subtotal:											2				
N483 E569															
L. 2	2							2	1		1				
L. 3			1	3	3		2	3	3		1				
Subtotal:	2		1	3	3		2	5	4		2				
N483 E570															
L. 2 (20-30 cm)				1											
N483 E571															
L. 1 (0-10 cm)												1			
L. 3 (20-30 cm)															1
Subtotal:												1			1
N484 E565															
L. 1								2			1				1
L. 2					1		1				2	1			
L. 3											1				

Table 6.7: continued

Unit/Level	2d	3d	4d	5d	6d	7d	8d	10d	12d	16d	20d	30d	40d	50d	60d
L. 4											1	1			
Subtotal:					1		1	2			5	2			1
N484 E566															
L. 1				1	1		2	2	4						1
L. 2					1			1	1		2	2			2
L. 3					2		1	2				4			
L. 4			1	1	2		3				1	1			1
L. 6				2											
Subtotal:			1	4	6		6	5	5		3	7			4
N484 E567															
L. 1 (0-10 cm)				3			1					1			
L. 2 (10-20 cm)				2	2			3				1			
L. 3 (20-30 cm)				1					2						
L. 4 (30 cm)			1	1	1										
L. 5 (30-35 cm)									1						
Subtotal:			1	7	3		1	3	3			2			
N484 E568															
L. 2 (10-20 cm)			1	1					1						
L. 3 (20-30 cm)			1	1				1			1	1			
L. 4 (30-35 cm)												1			
Subtotal:			2	2				1	1		1	2			
N484 E569															
L. 1				1											
N484 E570															

Table 6.7: continued

Unit/Level	2d	3d	4d	5d	6d	7d	8d	10d	12d	16d	20d	30d	40d	50d	60d
L. 1 (0-20 cm)													1		
L. 3 (30-40 cm)							1								
L. 4											1				
Subtotal:							1				1		1		
N490 E494															
L. 2 (10-20 cm)												1			
L. 3 (20-30 cm)							1								
Subtotal:							1					1			
N490 E494-504															
L. 1								1				3			
N490 E496															
L. 3											1				
L. 5								1							
Subtotal:								1			1				
N490 E497															
L. 1				2				1	1		1	2			1
L. 2				2			1				5	1			
L. 3												1			
L. 4					1										
Subtotal:				4	1		1	1	1		6	4			1
N490 E498															
L. 1									1			2			
L. 2		1	1		2			4	3		2				1
L. 3			3	1	2			1			4	1			1
Subtotal:		1	4	1	4			5	4		6	3			2

Table 6.7: continued

Unit/Level	2d	3d	4d	5d	6d	7d	8d	10d	12d	16d	20d	30d	40d	50d	60d
N490 E499															
L. 1 (0-10 cm)											2	1			
L. 2 (10-20 cm)															1
Subtotal:											2	1			1
N490 E500															
L. 1 (0-10 cm)			1					3	1		1				
L. 2 (10-20 cm)								1			3	1			
L. 5 (40-50 cm)											1				
Subtotal:			1					4	1		5	1			
N490 E501															
L. 2 (10-20 cm)											4	3			
L. 3 (20-30 cm)											1				
L. 4 (30-40 cm)											1				
L. 5 (40-50 cm)								2	1		1				
Subtotal:								2	1		7	3			
N490 E502															
L. 1 (3-10 cm)											1	1			
L. 2 (10-20 cm)								3	1		1				
L. 3 (20-30 cm)											1				1
Subtotal:								3	1		3	1			1
N490 E503															
L. 1											1				
L. 2							1	1			1	1			
Subtotal:							1	1			2	1			

Table 6.7: continued

Unit/Level	2d	3d	4d	5d	6d	7d	8d	10d	12d	16d	20d	30d	40d	50d	60d
N490 E504															
L. 1 (3-10 cm)												1			
L. 2 (10-20 cm)									1			1			
L. 3									1		1				
Subtotal:									2		1	2			
N490 E505															
L. 1 (0-20 cm)								2	1		1				
L. 2 (20-40 cm)												1			
Subtotal:								2	1		1	1			
N490 E508.5															
L. 1 (0-20 cm)												1			
L. 2 (20-40 cm)									1		3				
Subtotal:									1		3	1			
N512 E494															
L. 1 (0-10 cm)				1							1				
N513 E490															
L. 5												1			
N513 E491															
L. 3 (20-30 cm)					1										
N513 E493															
L. 2 (10-20 cm)					1										

Table 6.7: continued

Unit/Level	2d	3d	4d	5d	6d	7d	8d	10d	12d	16d	20d	30d	40d	50d	60d
N513 E499															
L. 4 (30-40 cm)				1											
N518 E573															
L. 1															1
N522 E573															
L. 1							1								
N524 E573															
L. 1			1	1											
N526.5 E595															
40-60 cm							1	1			1				
Subtotal:							1	1			1				
N527.5 E500															
L. 3 (40-60 cm)														1	
Subtotal:														1	
N529 E567															
L. 3												1			
N529 E570															
L. 1									1						
N530 E541															
L. 2					1										
L. 3								1							
Subtotal:					1			1							

Table 6.7: continued

Unit/Level	2d	3d	4d	5d	6d	7d	8d	10d	12d	16d	20d	30d	40d	50d	60d
N530.5 E568.6															
N531 E540															
L. 3			1									1			
L. 4								1	3						
L. 5			1	1				1							
L. 6							1				2	1			
L. 7											2		1		
L. 9			1					1	1		1				
L. 10												1			
Subtotal:			3	1			1	3	4		5	3	1		
N533 E541															
L. 2									1						
L. 5												1			
56-65 cm									2						
54-71 cm											1				
Subtotal:									3		1	1			
N533.5 E542															
N535 E539															
L. 1 (0-10 cm)		2			1							1			
N535 E541															
L. 5															1
N535 E542															

Table 6.7: continued

Unit/Level	2d	3d	4d	5d	6d	7d	8d	10d	12d	16d	20d	30d	40d	50d	60d
L. 1 (0-22 cm)							1				1	2			
L. 3 (30-40 cm)									1			1	2		
L. 5 (45-47 cm)							1								
Subtotal:							2		1		1	3	2		
N538 E567.6															
L. 1 (0-15 cm)												1			
N539 E563															
L. 1 (0-15 cm)			1	1			1								1
L. 3 (30-40 cm)									1						
Subtotal:			1	1			1		1						1
N539 E567.2															
L. 1															1
N539.5 E565															
L. 4 (30-45 cm)											1				
N540 E567.2															
L. 1 (0-15 cm)	1		1						1						
L. 2 (15-24 cm)							1								
Subtotal:	1		1				1		1						
N544 E540 E1/2															
L. 1 (0-20 cm)									1						
L. 3								1							
Subtotal:								1	1						

Table 6.7: continued

Unit/Level	2d	3d	4d	5d	6d	7d	8d	10d	12d	16d	20d	30d	40d	50d	60d
N544 E540															
L. 5 (48-60 cm)												2			
N549 E540															
L. 4									1						
N551 E540															
L. 2												1			
Subtotal:												1			
Total:	5	21	71	102	58	5	70	134	160	1	177	142	27	32	88
Total Nails:	1093														

Table 6.8: Wire nails by size and excavation unit.

Unit/Level	2d	3d	4d	5d	6d	7d	8d	10d	12d	16d	20d	30d	40d	50d	60d
Surface															
80-303-866						1	1								
Subtotal:						1	1								
97-66-1292															1
Subtotal:															1
N444 E510															
Level 6 (50-56cm)								1							
Subtotal:								1							
N446 E511															
Level 3 (20-30cm)						1									
Subtotal:						1									
N452 E571															
Level 1 (0-10cm)					1										
Subtotal:					1										
N455 E569															
Level 1 (0-10cm)		1													
Subtotal:		1													
N477 E568															
Level 3					1										
Subtotal:					1										
N478 E567															
Level 2 (10-20cm)		1													

Table 6.8: continued

Unit/Level	2d	3d	4d	5d	6d	7d	8d	10d	12d	16d	20d	30d	40d	50d	60d
Subtotal:		1													
N481 E567															
Level 1 (0-10cm)				1											
Subtotal:				1											
N481 E569															
Level 1					1										
Subtotal:					1										
N482 E565															
Level 2							1								
Subtotal:							1								
N483 E567															
Level 1 (0-10cm)	1														
Subtotal:	1														
N484 E565															
Level 2			1												
Subtotal:			1												
N490 E503															
Level 2							1								
Subtotal:							1								
N511 E573															
Level 1 (0-20cm)		1													
Subtotal:		1													

Table 6.8: continued

Unit/Level	2d	3d	4d	5d	6d	7d	8d	10d	12d	16d	20d	30d	40d	50d	60d
N512 E573															
Level 1		1					1	1			1				
Subtotal:		1					1	1			1				
N513 E573															
Level 1 (0-12cm)								1							
Subtotal:								1							
N519 E573															
Level 1			1	1											
Subtotal:			1	1											
N520 E573															
Level 1							1	1							
Level 2					1										
Subtotal:					1		1	1							
N521 E572															
Level 1									1						
Level 2			1					1	1						
Subtotal:			1					1	2						
N529 E567															
Level 1								2							
Subtotal:								2							
N530 E541															
Level 2		1				1	2	1			1				

Table 6.8: continued

Unit/Level	2d	3d	4d	5d	6d	7d	8d	10d	12d	16d	20d	30d	40d	50d	60d
Subtotal:		1				1	2	1			1				
N531 E541															
Level 1			1		1		3	1							
Level 2					2										
Subtotal:			1		3		3	1							
N532 E543															
Level 1								1							
Subtotal:								1							
N533 E541															
Level 2				1	2		1	1							
Level 3					4			1							
Level 4								1							
Level 6 (50-56cm)								1							
(56-65cm)					1										
Level 9 (70-cm)					1										
Subtotal:				1	8		1	4							
N545 E540															
Level 1			1					3			1				
Level 2			2												
Subtotal:			3					3			1				
N546 E540															
Level 1							1				1				
Subtotal:							1				1				

Table 6.8: continued

Unit/Level	2d	3d	4d	5d	6d	7d	8d	10d	12d	16d	20d	30d	40d	50d	60d
N548 E540															
Level 2									1						
Subtotal:									1						
N550 E540 W1/2															
Level 1								1							
Subtotal:								1							
N551 E549															
Level 1											1				
Level 2					1										
Subtotal:					1						1				
N552 E540															
Level 1							1								
Subtotal:							1								
Grand Total:	1	5	7	3	16	3	13	18	3	0	5	0	0	0	1
Grand Total Nails:	75														

Table 6.9: Horseshoe nails by catalog number.

Cat. No.	Count	N	E	L/D	Size	Comments
81-113-116	1	n/a	n/a	n/a	#7	Wrought?
81-113-398	1	n/a	n/a	Trench E (south)	#10	Some corrosion, partial, wrought
81-113-597	1	n/a	n/a	Trench F	#8	
97-66-626/627?	1	512	573	n/a	#7	Partial
98-131-554	1	n/a	n/a	n/a	#9	Partial
98-131-694	1	n/a	n/a	n/a	#8	Corrosion, partial
99-70-146	1	484	565	L. 1 (0-10cm)	#7	Wrought
99-70-261	1	530	541	L. 3	n/a	Much corrosion, partial
99-70-455	1	533	541	n/a	#5	Partial
99-70-972	1	479	565	L. 1 (0-10cm)	#9	Wrought?
99-70-1087	1	482	566	30-40cm	#9	Partial
99-70-1276	2	542	543	20-35cm	#9	Much corrosion, partials
99-70-1353	1	n/a	n/a	L. 1 (0-30cm)	#9	Partial, corrosion
99-70-1400	1	481	562	n/a	#9	Partial
99-70-1497	1	481	562	n/a	#7	Partial, corrosion
99-70-1582	2	481	564	L. 3 (20-30cm)	#8	Partials
99-70-1643	1	484	566	33-35cm	#8	Partial, cut?
99-70-1697	4	481	562	L. 1 (0-10cm)	#7	3 partial
99-70-1764	1	481	563	n/a	#9	
00-90-327	1	465	504	n/a	#7	Cut
00-90-385	1	465	505	L. 1 (0-10cm)	#8	Cut, partial
00-90-937	1	465	504	L. 3 (20-30cm)	#9	Cut
00-90-1177	1	444	510	50-55cm	#5	Wrought
00-90-1525	1	465	502	n/a	n/a	Much corrosion, partial
00-90-1582	1	490	502	L. 4 (30-40cm)	n/a	Much corrosion, partial
01-73-953	1	479	567	n/a	#9	Cut
01-73-1021	1	479	567	n/a	#8	
01-73-1266	1	478	567	n/a	#8	Cut
01-73-1266	1	478	567	n/a	#9	Corrosion

Table 6.9: continued

Cat. No.	Count	N	E	L/D	Size	Comments
01-73-1294	1	478	567	n/a	#9	Partial
01-73-1294	1	478	567	n/a	#8	
01-73-1416	1	480	568	n/a	#5	
01-73-1416	1	480	568	n/a	#9	
01-73-1499	1	478	567	n/a	#9	Much corrosion, partial
01-73-2150	1	479	569	n/a	#8	Partial
01-73-2554	2	476	569	L. 3 (20-30cm)	#9	Cut, partials
01-73-2763	3	477	568	n/a	#9	Cut, partials

Table 6.10: Ferrous wood screws by catalog number.

Cat. No.	Count	N	E	L/D	Size	Comments
81-113-599	1	n/a	n/a	Trench F	#14; 1.7″	Some corrosion, flathead, one way slot
81-113-705	1	n/a	n/a	Trench E	#14; 1.3″	Much corrosion, flathead, gimlet point
97-0066-40	1	548	540	L. 1 (0–10cm)	#14; 2”	Shank only, slight bend at one end
97-0066-582	1	531	540	L. 2 (10–20cm)	#12; 1.3″	Corrosion, flathead, one way slot, gimlet point
97-0066-685	1	519	573	L. 1 (0–20cm)	#14; 1.8″	Some corrosion, flathead?
98-131-48	1	n/a	n/a	n/a	#14; 1.3″	Corrosion, flathead, one way slot, gimlet point?
98-131-385	1	n/a	n/a	n/a	#12; 1”	Much corrosion, gimlet point
98-131-535	1	n/a	n/a	n/a	#12; 0.5″	Head only, flathead?
98-131-592	1	n/a	n/a	n/a	#14; 1.6″	Corrosion, gimlet point?
98-131-686	1	n/a	n/a	n/a	#12; 0.9″	Flathead?, gimlet point?
98-131-842	1	n/a	n/a	n/a	#12; 1”	Slight corrosion
98-131-852	1	n/a	n/a	n/a	#12; 1.2″	Some corrosion, flathead, one way slot, gimlet point
98-131-1526	1	n/a	n/a	n/a	#14; 0.9″	Shank only, gimlet point?
99-70-13	1	484	568	n/a	#14; 1.6″	Much corrosion, flathead
99-70-904	1	483	565	L. 3 (20–30cm)	#14; 2.1″	Much corrosion, flathead, gimlet point?
99-70-1087	1	482	566	30–40cm	#14; 1”	Much corrosion, flathead
99-70-1236	1	482	565	10–20cm	#8; 0.5″	Flathead with side slots, pseudo-countersunk fillister head, green color
99-70-1478	1	481	562	L. 3 (20–30cm)	#14; 1.5″	Corrosion, flathead
99-70-1478	1	481	562	L. 3 (20–30cm)	#14; 1.6″	Much corrosion, flathead

Table 6.10: continued

Cat. No.	Count	N	E	L/D	Size	Comments
99-70-1647	1	484	566	n/a	#14; 1”	Much corrosion, gimlet point?
00-90-145	1	490	504	L. 2 (10–20cm)	#14; 1.5″	Some corrosion, flathead, one way slot, gimlet point
00-90-372	1	465	505	L. 1 (0–10cm)	#12	Much corrosion
00-90-558	1	490	498	L. 3 (20–30cm)	#14; 1.2″	Screwed into a rectangular box-shaped piece of metal, flathead, one-way slot, gimlet point?
00-90-788	1	490	494504	0-10cm	#14; 1.1″	Much corrosion, flathead, one way slot, gimlet point?
00-90-1010	1	465	500	L. 2 (10–20cm)	#10; 1.5″	Flathead, one way slot, gimlet point?
00-90-1347	1	490	508.5	L. 2	#14; 0.7″	Much corrosion, flathead?
00-90-1350	1	490	508.5	20–40cm	#12; 0.8″	Corrosion, flathead, one way slot
01-73-509	1	481	569	L. 1 (0–10cm)	#12; 1”	Flathead, one way slot, gimlet point?
01-73-509	1	481	569	L. 1 (0–10cm)	#14; 1.5″	
01-73-615	1	481	571, sw 1/4	0-10cm	#12; 0.8″	Flathead, one way slot
01-73-652	1	480	567	0–10cm	#14	Corrosion, flathead
01-73-688	1	482	569	L. 2 (10–20cm)	#8; 0.5″	Flathead with side slots, pseudo-countersunk fillister head
01-73-708	1	480	570	n/a	#14; 0.8″	Flathead, one way slot?
01-73-769	1	483	567	10–20cm	#14; 1.6″	Corrosion, flathead, gimlet point?
01-73-769	1	483	567	10–20cm	#14; 1.3″	Corrosion, flathead, gimlet point
01-73-769	1	483	567	10–20cm	#12; 0.8″	Corrosion, flathead

Table 6.10: continued

Cat. No.	Count	N	E	L/D	Size	Comments
01-73-769	1	483	567	10–20cm	#10; 0.7″	Corrosion, flathead
01-73-769	1	483	567	10–20cm	#10; 0.8″	Corrosion, flathead, one way slot
01-73-769	1	483	567	10–20cm	#14; 0.6″	Flathead?
01-73-769	1	483	567	10–20cm	#14; 0.7″	Partial shaft
01-73-789	1	481	567	0–10cm	#14; 1.1″	Flathead, one way slot, gimlet point?
01-73-804	1	482	568	10–20cm	#14; 1.5″	Much corrosion, exfoliation of shank, flathead
01-73-953	1	479	567	n/a	#14; 1.1″	Flathead, one way slot, gimlet point?
01-73-953	1	479	567	n/a	#14; 1.1″	Flathead, one way slot, gimlet point?
01-73-959	1	479	567	10–20cm	#14; 1.3″	Flathead, deep one way slot, gimlet point?
01-73-1099	1	481	567	L. 3 (20–30cm)	#12; 0.9″	Corrosion, flathead, traces of wood
01-73-1109	1	480	569	n/a	#14; 1.8″	Flathead, one way slot?, gimlet point, slight curvature of shaft
01-73-1137	1	481	567	L. 2 (10–20cm)	#14; 1.1″	Flathead, one way slot?
01-73-1137	1	481	567	L. 2 (10–20cm)	#14; 1”	Corrosion, flathead, one way slot, gimlet point?
01-73-1192	1	480	570	L. 3 (20–30cm)	#14; 1.6″	Flathead, one way slot?
01-73-1209	1	484	568	L. 2 (10–20cm)	#12; 1.1″	Flathead, corrosion on one half (lengthwise)
01-73-1209	1	484	568	L. 2 (10–20cm)	#14; 1.1″	Corrosion on head, one way slot, flathead

Table 6.10: continued

Cat. No.	Count	N	E	L/D	Size	Comments
01-73-1209	1	484	568	L. 2 (10–20cm)	#14; 1.1″	Corrosion, flathead
01-73-1247	1	478	567	10–20cm	#14; 1.5″	Much corrosion, flathead, one way slot?
01-73-1247	1	478	567	10–20cm	#14; 1.1″	Flathead, corrosion on head, slight curvature of shaft, gimlet point
01-73-1247	1	478	567	10–20cm	#14; 1”	Flathead, gimlet point, one way slot?
01-73-1247	1	478	567	10–20cm	#14; 1”	Flathead, gimlet point, one way slot?
01-73-1247	1	478	567	10–20cm	#14; 0.8″	Corrosion, flathead, one way slot?
01-73-1251	1	478	567	0–10cm	#14; 1.1″	Flathead
01-73-1251	1	478	567	0–10cm	#14; 1”	Much corrosion, flathead, one way slot?
01-73-1294	1	478	567	n/a	#14; 1”	Much corrosion, flathead, one way slot, felloe screw?
01-73-1299	1	478	567	20–30cm	#8; 0.7″	Corrosion, flathead
01-73-1347	1	482	568	L. 4 (30-40cm)	#12; 1.1″	Flathead, one way slot?
01-73-1493	1	478	567	30–40cm	#14; 1.1″	Flathead, one way slot, gimlet point
01-73-1610	1	n/a	n/a	n/a	#14; 1.6″	Some corrosion, flathead, one way slot, gimlet point?
01-73-1610	1	n/a	n/a	n/a	#14; 1.1″	Rust buildup, flathead, one way slot, gimlet point
01-73-1610	1	n/a	n/a	n/a	#14; 1.1″	Corrosion, flathead, one way slot, gimlet point
01-73-2763	1	477	568	n/a	#4; 0.5″	Flathead

Table 6.11: Wrought pins by catalog number.

Cat. No.	Count	N	E	L/D	Size	Comments
97-0066-1231	1	531	540	L. 8 (45–50cm)	Head diameter 1.2”, shaft diameter 0.5”, length 2.7″	Wrought, corrosion
98-131-1585	1	n/a	n/a	n/a	Head diameter 0.9”, shaft diameter 0.3”, length 2”	Wrought, corrosion, shaft cleanly snapped, head slightly domed, white color
98-131-1585	1	n/a	n/a	n/a	Head diameter 0.6”, shaft diameter 0.3”, length 2.1″	Wrought, corrosion, shaft cleanly snapped, head slightly domed, white color
99-70-441	1	484	566	L. 3 (20–30cm)	Head diameter 0.8”, length 2”	Wrought drive pin, corrosion, beveled shank
99-70-536	1	484	565	L. 4 (30–40cm)	Square head 1.2″ × 1.2″, shaft 0.6″ × 0.6″, total length 3.1″	Wrought, corrosion, shaft broken at 0.9″, slightly tapered at end
99-70-632	1	484	566	L. 4 (30–40cm)	Head diameter 0.9″, shaft diameter 0.3″, length 1.4″	Wrought, corrosion, white color, shaft broken at an angle as if cut
99-70-632	1	484	566	L. 4 (30–40cm)	Oval head 0.9″ × 0.6″, length 2.1″	Wrought, much corrosion, exfoliation of head and shaft, shaft slightly tapered

Table 6.12: Rivets by catalog number.

Cat. No.	Count	N	E	L/D	Size	Comments
81-113-488	1	n/a	n/a	n/a	Diameter 0.4”, length 1.8″	Iron, much corrosion, both heads present
97-0066-6	1	547	540	L. 1 (0–10cm)	Diameter 0.4”, length 1.4″	Iron, corrosion, both heads present
99-70-1116	1	481	564	L. 1 (0–10cm)	Head diameter 0.9”, length 0.4″	Copper, machine made, embossed five point star on head

Table 6.13: Bolts by catalog number.

Cat. No.	Count	N	E	L/D	Size	Comments
80-303-449	1	0	90	L. 2 (10–20cm)	Head diameter 0.6″, shaft diameter 0.3″, length 1″	Corrosion, shaft snapped, some exfoliation at end
98-131-912	1	n/a	n/a	n/a	Head diameter 0.7”, shank diameter 0.3”, length 4”	Carriage bolt fragment
98-131-1593	1	n/a	n/a	n/a	Diameter 0.7”, length 1.4″	Threaded bolt fragment
99-70-346	1	484	565	L. 3 (20–30cm)	Head 0.8″ × 0.8″, shaft diameter 0.4″, length 1.9″	Square head, fragment
01-73-898	1	483	567	n/a	Diameter 0.3″, length 1.3″	Fragment, corrosion, no head, thread exfoliated from one side of shank

Table 6.14: Staples by catalog number.

Cat. No.	Count	N	E	L/D	Size	Comments
81-113-150	1	(S)41	103	L. 1 (0–10cm)	2.5″	Fence staple, wrought
81-113-683	1	n/a	n/a	Trench E (north)	2.5″	Fence staple, wrought
98-131-464	1	n/a	n/a	n/a	2.5″	Fence staple
98-131-533	1	n/a	n/a	n/a	2.5″	Fence staple
98-131-615	2	n/a	n/a	n/a	3”	Fence staples
98-131-1249	1	n/a	n/a	n/a	3”	Fence staple
99-70-1644	1	484	566	33–35cm	3”	Fence staple
01-73-266	2	453	571	0–10cm	3.5″	Fence staples
01-73-359	1	460	569	0–10cm	3”	Fence staple
01-73-472	1	460	569	L. 2 (10–20cm)	3”	Fence staple
01-73-799	1	482	568	10–20cm	2”	Fence staple, wrought

Table 6.15: Tacks by catalog number.

Cat. No.	Count	N	E	L/D	Size	Comments
Cat Num	Ct	N	E	L/D	Size	Comments
81-113-151	1	(S)41	103	L. 1 (0–10cm)	#10	Carpet tack
97-0066-158	1	513	492	L. 1	n/a	Flat head tack
97-0066-357	1	513	499	L. 5 (40–50cm)	n/a	Thumb tack
97-0066-1199	1	444	504	L. 5 (40–50cm)	n/a	Thumb tack
98-131-349	1	n/a	n/a	n/a	n/a	Thumb tack
98-131-518	2	n/a	n/a	n/a	n/a	Thumb tacks
98-131-568	1	n/a	n/a	n/a	n/a	Thumb tack
98-131-923	1	n/a	n/a	n/a	n/a	Thumb tack
98-131-1333	1	n/a	n/a	n/a	#8	Carpet tack
98-131-1437	1	n/a	n/a	n/a	#10	Carpet tack
98-131-1625	1	513	565	20–30cm	n/a	Large thumb tack
99-70-111	2	484	566	L. 2 (10–20cm)	n/a	Thumb tacks
99-70-897	1	529	570	n/a	#10	Carpet tack
99-70-1096	2	482	565	30–40cm	n/a	Thumb tacks
99-70-1240	2	482	565	10–20cm	n/a	Thumb tacks
99-70-1801	1	482	565	20–30cm	n/a	Thumb tack
00-90-416	1	490	502	L. 1	#10	Carpet tack
00-90-772	4	465	504	L. 5 (40–50cm)	n/a	Thumb tacks
00-90-894	1	465	501	n/a	#6	Carpet tack
00-90-1271	1	490	505	L. 1	#10	Carpet tack
01-73-115	1	480	569	30–40cm	n/a	Thumb tack
01-73-654	1	480	567	0–10cm	n/a	Thumb tack
01-73-686	1	482	569	L. 2 (10–20cm)	n/a	Thumb tack
01-73-706	1	480	570	1–10cm	n/a	Thumb tack
01-73-773	3	483	567	10–20cm	n/a	Thumb tacks
01-73-797	3	481	567	0–10cm	n/a	Thumb tacks
01-73-811	2	481	568	10–20cm	n/a	Thumb tacks
01-73-827	3	482	568	n/a	#10	Carpet tacks

Table 6.15: continued

Cat. No.	Count	N	E	L/D	Size	Comments
01-73-1143	1	481	567	L. 2 (10–20cm)	n/a	Thumb tack
01-73-1203	1	n/a	n/a	n/a	#10	Carpet tack
01-73-1226	1	484	568	L. 2 (10–20cm)	n/a	Thumb tack
01-73-1239	1	478	567	10–20cm	n/a	Thumb tack
01-73-1342	2	482	568	L. 4 (30–40cm)	n/a	Tacks
01-73-1349	1	482	568	n/a	#10	Carpet tack
01-73-1371	2	482	568	L. 3 (20–30cm)	n/a	Thumb tacks
01-73-1374	3	482	568	n/a	#10	Carpet tacks
01-73-1381	1	483	569	10–20cm	n/a	Thumb tack
01-73-1401	2	480	568	L. 3 (20–30cm)	n/a	Thumb tacks
01-73-1416	5	480	568	n/a	n/a	Carpet tacks
01-73-1447	1	483	569	L. 3 (20–30cm)	n/a	Flat head thumb tack
01-73-1484	1	478	567	30–40cm	n/a	Thumb tack
01-73-1590	1	483	567	L. 1 (0–10cm)	n/a	Thumb tack
01-73-2008	1	480	572	10–20cm	n/a	Thumb tack
01-73-2102	2	482	568	0–10cm	n/a	Thumb tacks
01-73-2138	4	480	568	10–20cm	#10	Carpet tacks
01-73-2141	1	480	568	10–20cm	n/a	Thumb tack
01-73-2208	1	483	569	10–20cm	n/a	Thumb tack
01-73-2372	1	481	567	L. 2 (10–20cm)	n/a	Thumb tack
01-73-2420	1	480	520	n/a	#10	Carpet tack
01-73-2446	1	478	567	40–45cm	n/a	Thumb tack
01-73-2550	1	476	569	L. 3 (20–30cm)	n/a	Thumb tack
01-73-2726	1	477	568	n/a	#10	Carpet tack
01-73-2786	1	477	568	n/a	#8	Carpet tack, much corrosion
01-73-2786	1	477	569	n/a	#10	Carpet tack, much corrosion

Chapter 7

Personal, Trade, and Decorative Items at Fort Pierre Chouteau

Richard A. Fox[1]
with substantial research contributions by Patrick J. Collison[2]

Introduction

The contract for this work called for the analysis and reporting on the personal items assemblage from the excavations at Fort Pierre Chouteau. This report liberally interprets "personal items" to include not only the personal but also artifacts recognized as trade, decorative and ornamental items. Even at that, a number of artifacts included in the inventory provided by the Archaeological Research Center for study are not reported here. These are items such as lead foil, disks, rods, scrap copper, and many other specimens—some entirely enigmatic. They have all been recorded on artifact record forms, but since they cannot be construed as, or are not remotely related to personal items, they are not described below.

A few items that qualify for this report have been reported elsewhere. They are saw blade fragments, ax head/bits, a firesteel (aka strike-a-light), numerous animal trap parts (chain link, bow fragment, spring eyes, jaw, pan, post, dog, cross, etc.), and two halves of a brass fleam case with fragments of its triangular steel blades. For detailed information on them, see

[1]Department of Anthropology, University of South Dakota
[2]Department of Anthropology, University of South Dakota

Collison's *Forging the Fur Trade: Metal Artifacts at Fort Pierre Chouteau* and *Button Assemblage from Fort Pierre Chouteau* in this volume.

What is described here includes toys such as dolls and marbles, various jewelry specimens, many of which are fur trade items, coins, various kinds of fasteners, most related to apparel, writing paraphernalia, items used for ornamenting other articles, some known, some not, as well as a military insignia, a comb, certain utensils, or rather parts thereof, and footwear.

Specimens reported are from seven years of fieldwork at Fort Pierre Chouteau, beginning in 1980 and ending in 2001. All artifacts are summarized by field year, provenance and Archaeological Research Center accession number; they are summarized in Tables 1980 is summarized in Table 1, 1981 in Table 2, 1997 (Table 3), 1998 (Table 4), 1999 (Table 5), 2000 (Table 6) and the year 2001 in Table 7. In the text that follows, many artifacts are identified by a truncated accession number—for example, 99-382 is actually 99-70-382. The tables list the full number.

Marbles

The inventory contains two marbles (Figure 7.1), both known as "Chinas" after the paste, not the country. They are glazed. Chinas were made of fine grade clay—sometimes glazed, sometimes not, and hand painted (Grist 2000:41)—in Germany until the 1880s, then also in the U.S. The two specimens here are apparently early period Chinas dating between 1846 and 1870 (Anonymous 2008).

One China marble (00-unknown) in the inventory is broken approximately in half; when intact it most likely was an inch in diameter. The body is a fine grain crystalline paste. The whitish surface is painted with green and brown concentric rings (three to each bull's-eye), two at the equator (opposite each other), one at the remaining pole, and presumably a fourth at the missing pole. Grist (2000:44) illustrates several Chinas that could be mistaken for this specimen.

Another China (98-888), this one complete, weighs 3.7 g; it is 0.576″ in diameter. The marble is milky white, glazed and with faint traces of green concentric circles.

One item (80-645) is irregularly spherical (1.0″ min, 1.10″ max), and, although marble-like, is probably a waterworn stone. It weighs 25.1 g. The inventory also contains a roughly spherical clay ball (wt. = 3.1 g). Whether a naturally formed phenomenon or not has not been determined. The specimen has a rough surface, and measures 0.62″ max and 0.56″ min (00-1665). These two items are shown with the marbles in Figure 7.1.

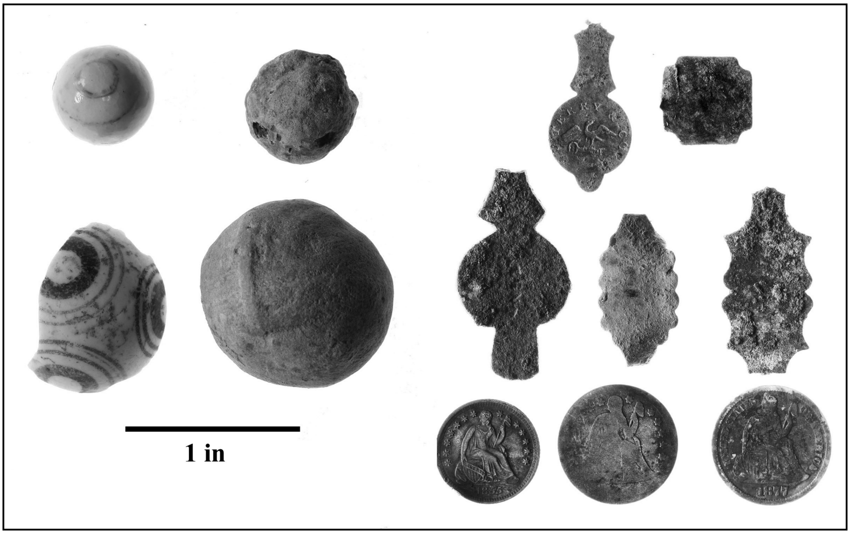

Figure 7.1: Marbles and coins. Left: China marbles (left column); unknown clay balls (right column). Right: Terry & Co drop cover, rectangular drop cover (top, left to right); “PATENT” drop cover, possible drop cover, possible drop cover (center, left to right); Seated Liberty half-dime; 1854 Seated Liberty dime; 1877 Seated Liberty dime (bottom, left to right).

Coins

The inventory contains five U.S. coins. Two are three-cent silver pieces (01-50: 01-962), both dated 1852, the second year of production; both also were minted in Philadelphia. These are made of 75% silver and 25% copper.

The seated liberty half dime (with drapery) is dated 1855 (with arrows). The “O” mint mark signals production at the New Orleans mint. This specimen (01-641) is 90% silver, 10% copper. The half-dime is illustrated in Figure 7.1.

Of the two seated liberty dimes (Figure 7.1), which are from the same excavation unit (80-59), one is so badly worn the date is illegible to the naked eye. The zoom function on the photograph, however, reveals it is of 1854 vintage. In fact, this coin is very badly worn everywhere, indicating that it circulated for decades after minting. Perhaps it was lost after the fur and military eras at Fort Pierre Chouteau. The other seated liberty dime was definitely lost afterwards. It is dated 1877, and design details are consistent with this date. Composition of both dimes is 90% silver, 10% copper, and both are from the Philadelphia mint.

Locks

Locks are not present in the inventory, but evidence for them is—a key and lock drop covers. The skeleton key (98-1337), molded of iron and somewhat rusted, was probably for a trunk lock or padlock. It is only 1.5″ long. The key bow defines a figure-eight; the blade is a very simple square without notching.

Two locks for sure were protected by drop covers, plus probably another, and possibly two others. Drop covers covered keyholes (view all in Figure 7.1). One exhibits a bird in flight with talons holding a skeleton key, around which is found "TERRY & CO," both image and letters impressed into the thin brass escutcheon (00-204; see Figure 7.2). This is the mark of J. Terry and Company of Terryville, Connecticut. James Terry began making cabinet locks in 1846. After acquiring two competitors, his firm eventually (in 1854) became the Eagle Lock Company (Hennessy 1997:9). So this specimen probably dates from 1846 to 1854 inclusive (manufacturing date range), but whether military or fur related cannot be determined.

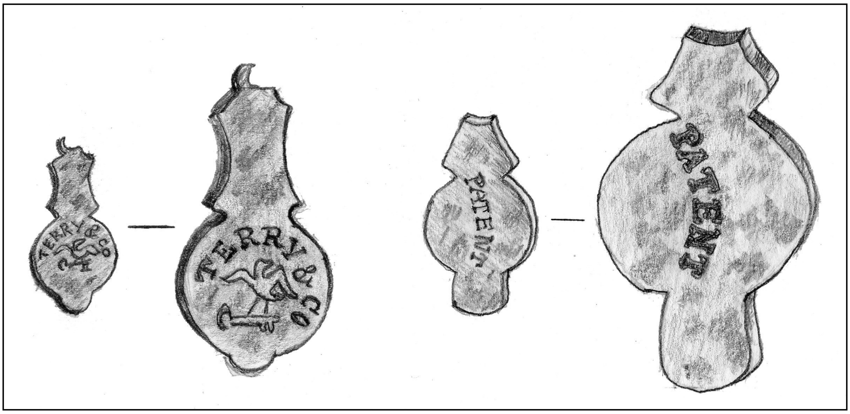

Figure 7.2: Terry & Co. drop cover (left); "PATENT" drop cover (right).

The Terry specimen is 1″ in height, 1/2″ wide at the widest, and 0.03″ thick. Another brass specimen is a little larger (99-316; Figures 7.1 and 7.2). It measures 1.25″ by 2/3″, and is 0.06″ thick. This cover is impressed with "PATENT," and nothing more. An identical specimen is attached to a ferrous padlock found during archaeological investigations at the Reed farmstead in West Virginia. Based on archival and archaeological research, it appears the plot was occupied between 1803 and 1883 (Baker 1988a, 1988b). Also, an 1832 order list sent from Fort Pierre Chouteau to St. Louis requesting 2½ dozen "strong padlocks" (Schuler 1990:90).

A third specimen (80-7) is also brass, but very thin (0.02″) and bendable (Figure 7.1). It is a little over a half-inch square, although one edge is broken—probably it originally was rectangular. Rectangular drop covers of this sort are illustrated and itemized in Russell and Irwin's (1865:70–71) 1865 catalog of American hardware. Here they are called "metal drop escutcheons," available in iron and brass.

Two possible drop covers are also in brass (Figure 7.1). Surfaces on both are rather badly corroded, but upon close examination it is highly unlikely any markings existed originally. Both have crenulated edges. One (99-1807) is 1.09″ long (broken) and 0.54″ wide (max; wt. = 1.1 g). The other (00-1088; wt. = 0.7 g) is smaller: 0.89″ long (broken) and 0.47″ wide (max). The larger specimen is stamped from 0.345-inch thick sheet brass, the other from 0.225-inch stock.

Apparel Fasteners

Buttons in the inventory have been reported elsewhere (see Collison in this volume). This report concerns buckles or grips, hook and eye fasteners, and pins/needles.

Buckles/Grips

Most specimens are shown in Figure 7.3. Three represent Hartshorn buckles for apparel. Selden Hartshorn obtained the patent (#13,907) on December 11, 1855, claiming that with this design there was no need for another fastening device (Commissioner 1856). One nearly complete buckle (00-1779) is of iron (rusted; if marks are present, they are obscured). The two-tine buckle is 1.2″ wide, 0.91″ in height, and roughly 0.19″ thick. A second Hartshorn buckle, undecorated and without marks, is in brass (complete; 99-343). It is 1.15″ wide, 1″ in height and 0.10″ thick. The strap loop on both is 0.91″ wide. The third specimen (01-2966) is also of brass, but only part of the frame remains; roller bar, tines and strap loop are absent. The frame is 1.12″ wide.

Buckles of this type, also found at Fort Union, are described in Perry and Hunt (1986:20, 52-53) as "two-tined grip guides" used as "a fastener

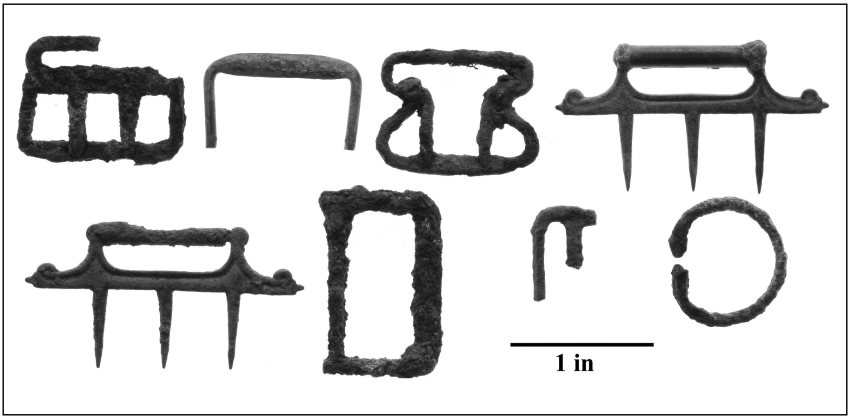

Figure 7.3: Buckles and grips. Top: Hartshorn buckle (00-1779), Hartshorn buckle frame (01-2966), two-tined iron buckle(81-324), suspender grip (00-908). Bottom: suspender grip (01-782), iron buckle frame (81-288), grip fragment (01-2300), D-ring (97-828).

for a waist adjustment at the back of men's trousers." Herskovitz (1978:37–38) calls it a shoulder brace and hose supporter buckle. Fontana and Greenleaf (1962:85) say this type was used on vest straps or with suspenders. Apparently brass and black-lacquered iron grip guides like these were found on the steamer Bertrand which sank in 1865 (Perry and Hunt 1986:20, 52, 53). This type was also found at Fort Ellsworth, Kansas, an Army post briefly occupied right at the end of the Civil War (Fox 2001:168, 171).

Another two-tined iron buckle (81-324) may also be a multi-purpose item, although it cannot at the moment be affiliated with Hartshorn because the frame sides are not straight (like the three above). The buckle frame is 1.16″ wide; the roller portion is 1.1″ wide. Overall, the specimen is 0.90″ in height. Traces of woven fabric adhere to the roller. Perry and Hunt (1986:52-53) illustrate an identical specimen from Fort Union.

Two incomplete brass specimens (00-908; 01-782) are probably from suspender grips. These are three-tine grips with roller intact. The frame is absent on both. The exterior face of both is decorated (ridge with scrolls and peaks); other markings are absent. They are the same size: 1.9″ wide and 1″ in height; roller diameter is 0.16″. Information about this type has not been found.

An iron buckle frame is badly rusted (81-288). The specimen is rectangular, measuring 1.37″ by 0.85″. The flat iron stock is roughly 0.19″ thick. This is a generic frame which cannot be tied to a specific buckle type. Neither can a fragment from a grip (01-2300). This specimen is ferrous; it exhibits parts of two tines. The best guess is that it came from a suspender grip. Finally, a small D-ring (97-828) is technically not a buckle or grip, but it probably functioned to secure a narrow strap of some sort, perhaps a fob. The specimen is made of approximately 0.09-inch iron round stock. It is 0.92″ high and 0.84″ wide.

Hook and Eye Fasteners

The wire hooks and eyes shown in Charles Atwood's 1849 U.S. patent (#6745) are identical to those in the Fort Pierre Chouteau artifact inventory (Figure 7.4). Atwood's 1849 patent was not for the fasteners, but for an improved way to package them on cards. Nonetheless, this patent shows that the hook and eye type found at the fort existed before 1849. In this regard, a website reports that the first American patent for the hook and eye was obtained by one James Stewart in 1831 (Anonymous 2006), but U.S. patent records prior to 1836 were destroyed by fire, so details of Stewart's device have not been found.[3] Levi Lincoln made the first automatic hook-and-eye machine about 1830 (Camp 1889:275), and all of those in the assemblage appear to be machine-made.

Hooks and eyes, of course, were designed as cloth fasteners, and it in that regard it is interesting to note that apparently clothing outfits were made at Fort Pierre. Schuler (1990: 58, 74) cites an 1851 source that claims some clothing was "made up and sold at Fort Pierre," and he points out that the fur post at least at times had a tailor. Possibly the hooks and eyes were on hand for tailoring tasks, accounting for some in the assemblage reported here. On the other hand, these small items could easily be lost from clothing during daily activities.

The hooks in the inventory are not the DeLong hook (aka "hump" hooks that also prevented unwanted unfastening), which was patented in 1889 (patent #411,857). Rather they are common hooks (as Atwood called them in his 1849 patent), otherwise known generically as "swan bill hooks and eyes," without security improvement. There are seven complete brass hooks (unspread), one of which is disfigured, and one is now in two parts.

[3] Elisha Savage patented a hook and eye improvement in 1844 (U.S. #3512). Henry McEvoy did the same in 1849 (U.S. #6329) , which he had two years earlier patented in his native England (Commissioner 1848:228; Commissioners 1876:116). Patent searches show the Savage and McEvoy devices are unlike those in the artifact inventory. The improved hook patented in the U.S. in 1851 by Charles Atwood (#8198) is similar, but not quite the same as those in the inventory. These improvements were to prevent accidental unhooking. They show the common hook and eye existed before at least 1844, and that it was by then a matter of improving them.

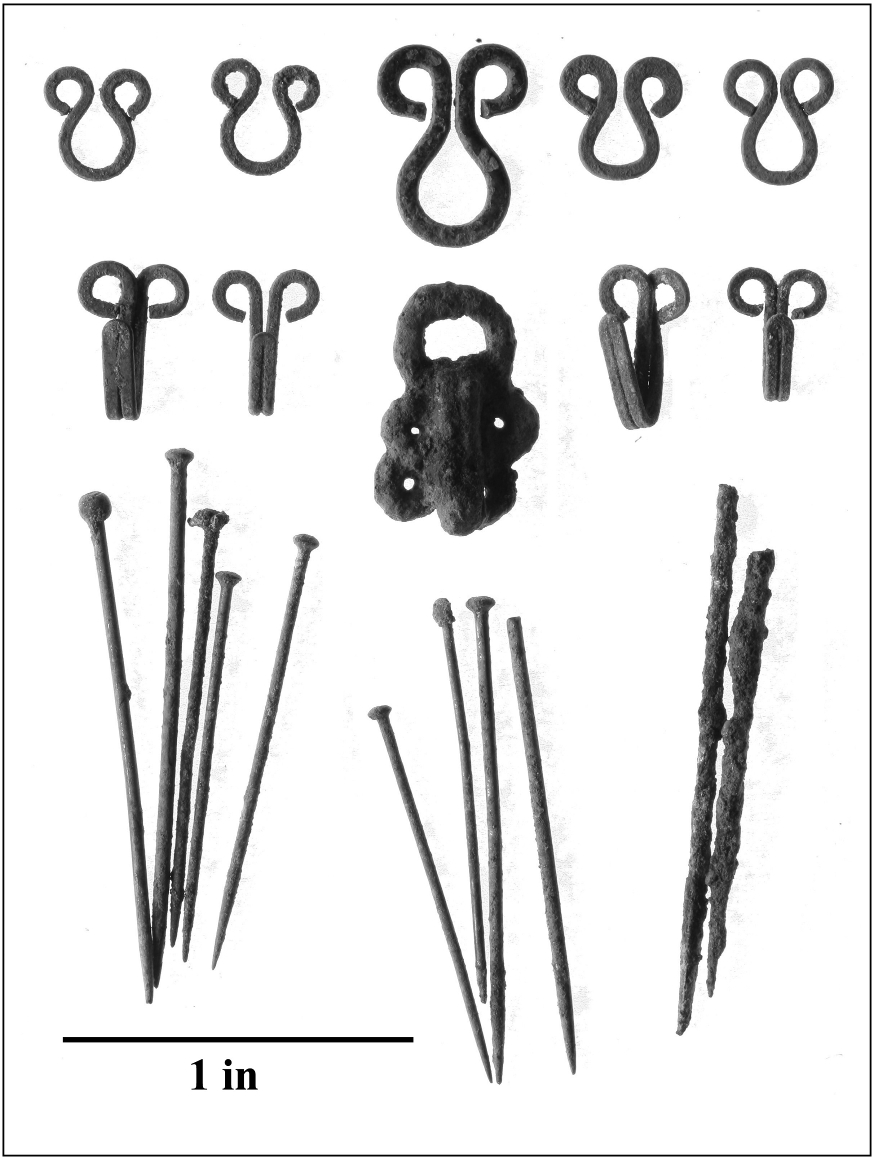

Figure 7.4: Hooks and eyes, and straight pins. Top: various brass eyes. Center: two brass hooks, rusted iron hook and eye, two brass hooks. Bottom: various straight pins, flat and round head with two steel needle fragments on far right.

They are of the small size, ranging in length from 0.42″ to 0.49″, half measuring 0.45″ long. Wire diameters are 0.03″ except for one, which is 0.06″. Catalog numbers are 80-225, 80-491 (disfigured), 99-2093, 00-228 (in two pieces), 00-669, 00-1840, and 01-1469.

Complete brass eyes (unspread) number eight, one of which is in two pieces. Sizes based in length (height) are approximately 0.33″, 0.36″, 0.39″, 0.42″, and 0.58″. Flat wire widths range from 0.02 to 0.05″. Generally the greater the height, the greater the thicker/wider the wire. Catalog numbers for these specimens are 80-329, 80-741 (n = 2, including the largest eye), 80-752 (in two pieces), 99-1544, 00-1858, 01-2541, and 01-2865.

One specimen is ferrous (00-1456), the hook and the eye rusted together (Figure 7.4). Design is the same as the common brass hooks and eyes. Height is 0.71″, width is 0.47″, and the wire diameter is 0.08″. These measurements are inflated slightly due to the corroded nature of the specimen.

The inventory also contains broken common hooks and eyes. One of iron is part of an eye (80-329), the broken length of which is 0.36″. The others (n = 3) are of brass; they too are parts of eyes. Catalog numbers are 80-198, 00-867, and 00-1839.

Pins and Needles

Straight pins (n=37) are in two varieties, round-head and flat-head, most of which are brass. Some are shown in Figure 7.4, along with the few steel needle fragments. The only two iron pins (80-12) have flat heads. There are 22 intact brass flat-head pins. These range in length from one inch to 1.5", the most common in 1.25" length. Five of the brass pins exhibit round heads; lengths include 1.25" and 1.5". Ten of the pins are broken, either head/shank or parts of the shank. Only two are round-head pins. Catalog numbers for all pins are 80-12, 80-220, 80-287, 80-340, 80-371, 80-618, 98-573, 00-213, 00-1375, 00-1456,01-1882, 01-2926, 01-2940, and 01-2993.

The inventory's pins are all uniform, machine-made pins, indicating a *terminus post quem* date of 1832. That is the year the first practical machine was made by John Ireland Howe for producing pins with a solid head from a single piece of wire (eNotes 2009). Howe's patented machine (Patent No. 2013) raised the head and sharpened the opposite end of a brass or other metal wire piece in one process (see patent record at http://www.uspto.gov).

Three needle fragments (80-543, 00-1521) are of steel, and are broken such that the eyes and/or points are missing. Fragmentation makes it impossible to determine needle type, but needles were trade items known for Fort Pierre Chouteau as evidenced by an 1850 ledger (Schuler 1990:116, 151 fn11). Also, the American Fur Company is known to have ordered White Chapel (an English type) sharps, darning and common needles, plus glover, silver-eye and gilt-eye needles (Phillips 1992:10).

Insignia

This specimen is the letter "A" (01-1067). It is pictured in Figure 7.5. The inch-high letter is either of brass-coated, hollow-backed copper sheet, or from a stamped brass sheet. It is 0.10″ thick. The letter signifies Company "A", while height of the letter indicates the insignia was worn on an enlisted man's hat. In 1875, one-inch company insignia were replaced with one-half-inch high letters (Brinckerhoff 1972:7-11). So this specimen predates 1875, and of course can only be explained by the military presence at Fort Pierre Chouteau. Whether infantry or dragoons cannot be determined, since company insignia were the same for all military branches. However, there is no indication Company A of the 2nd Dragoons was ever at the fort, but companies A of the 2nd and 6th infantry were. So it was likely lost by an infantryman.

Ornamentation

Included in this category are trade goods, namely finger rings, earbobs, beads, and tinklers, plus ring settings, a thimble (modified for ornamentation) and other ornamentation, metal, shell, bone and tooth.

Finger Rings

The inventory contains two finger ring types—signet and band (like a wedding band). These rings, all of brass, are trade rings (samples in Figure 7.6). None of the four signet rings (three of which are shown in Figure 7.7) appears to be a Jesuit ring, although they are in the same tradition. The signet on one (99-983) is a narrow rectangle (0.2195″ by 0.364″). The impressed design mimics two flared rectangles (concave sides create pointy corners) in mirror image. The interior sports tiny hash marks around the sides. The band next to the signet exhibits an unintelligible design, probably geometric. Moving from this design, the band narrows rapidly and terminates

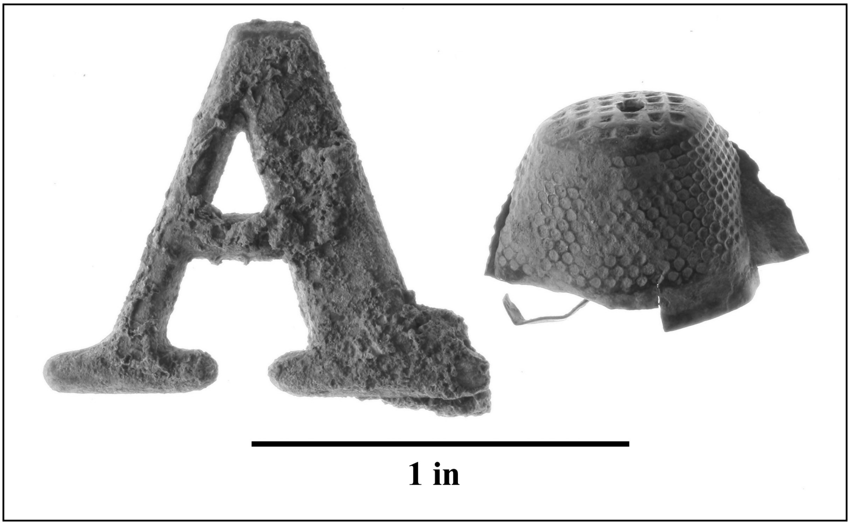

Figure 7.5: Company A hat insignia; modified thimble.

(0.083″ wide) before it reaches the other side of the signet. It is difficult to tell if the band is broken, or if this was originally an adjustable-size ring. Whichever, ring size cannot be determined.

Another signet specimen (00-unknown) is definitely an adjustable-size ring. The ends of the band meet directly below the signet. The signet is lozenge-shaped (a narrow rhombus with truncated points) and measures 0.0215″ thick. The signet surface is plain (no decoration), but it sports a solder mark indicating that a decorative piece was once attached. The band is 0.016″ thick.

One signet ring may have originally been an adjustable-size ring (01-2864). In any case, only about half of the narrow band (0.11″ wide) remains. The signet is a scalloped rectangle (roughly) which exhibits a combination of impressed chevrons and hash marks in a roughly rectangular border. The signet area is 0.304″ wide, about 0.45″ long, and 0.046″ thick.

A non-geometric design is found on one signet ring. This is a five-petal flower with two branching leaves to the sides (00-1618). The design is raised (not impressed) on an oval signet (0.39″ long, 0.28″ max width). The delicate band (0.08″ thick) seems complete, but it is broken from one side of the signet. When attached, this ring was about a size 7.

Hanson (1982a:4) reports that a Fort Pierre Choteau merchandise requisition dated 1846 lists “100 gross brass finger rings.” Schuler (1990:117), on the other hand, reports 1728 brass finger rings. Whether these were

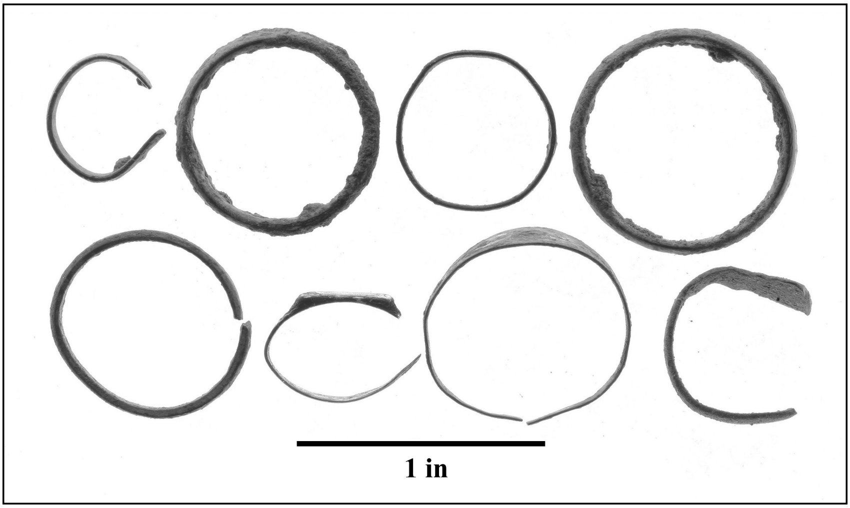

Figure 7.6: Finger (trade) rings. Top: flat and domed brass rings. Bottom: adjustable size rings, domed brass ring, signet ring (99-983), signet ring (00-unknown), signet ring (01-2864).

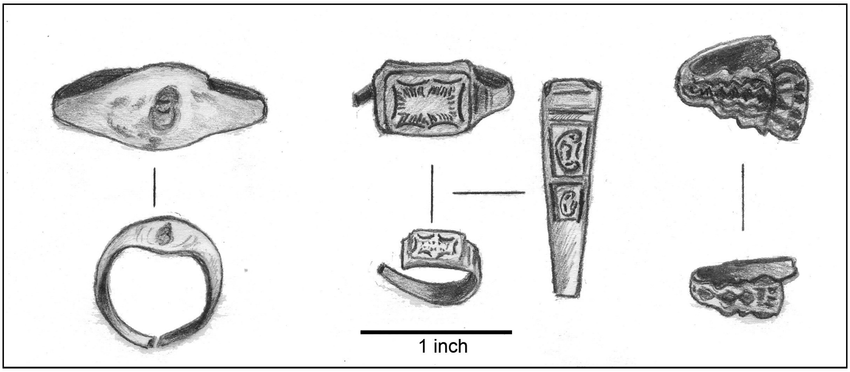

Figure 7.7: Brass signet rings, actual sizes and 2x actual size detail. Signet ring with solder mark (00-unknown), signet ring with flared rectangle design (99-983), signet ring with chevrons (01-2864).

band, signet or both types is not known. But band rings (n = 12) in the inventory are more plentiful than signet rings by a three to one margin. Bands in the inventory are in two varieties—domed band and flat band.

Setting Stones

There are two "stones" in the inventory (Figures 7.8 and 7.9). One (98-1287) is made of slightly murky, translucent glass. It is a diamond cut with pavilion, girdle and crown (total ht. = 0.1845″). The stone is square with truncated corners (similar to a cushion cut), measuring 0.287″ on a side. The pavilion and crown are faceted, the crown faceting terminating at a roughly square table (vaguely similar to a square emerald faceting). Weight is 0.3 g. This could be from an early earbob, some of which did have faceted glass settings (cf. Hanson 1983:4; see text and far left illustration).

Figure 7.8: Ring settings. Left: clear diamond-cut "stone" (01-2526). Right: red diamond-cut gemstone (98-1287).

The other specimen (01-2526) is also in the diamond-cut shape. It is a red translucent setting. Three local jewelers examined it, disagreeing on its composition. One identified a poor quality ruby, another thought it either garnet or glass, and the third identified the stone as an almandine garnet. The stone is complete with pavilion, girdle and crown. The pavilion is faceted. The crown also exhibits facets that terminate at an oblong table.

Another specimen is a very small, intact bean-shaped item (Figure 7.9), identified by a local jeweler as amber (99-1772). It may or may not be a setting. In any case, the material is yellowish, translucent with speckled orange inclusions. The amber (wt. = 0.4 g) is 0.41″ long and 0.15″ thick (max). Amber beads were a common fur trade item, but this artifact, although bead-sized, is not perforated.

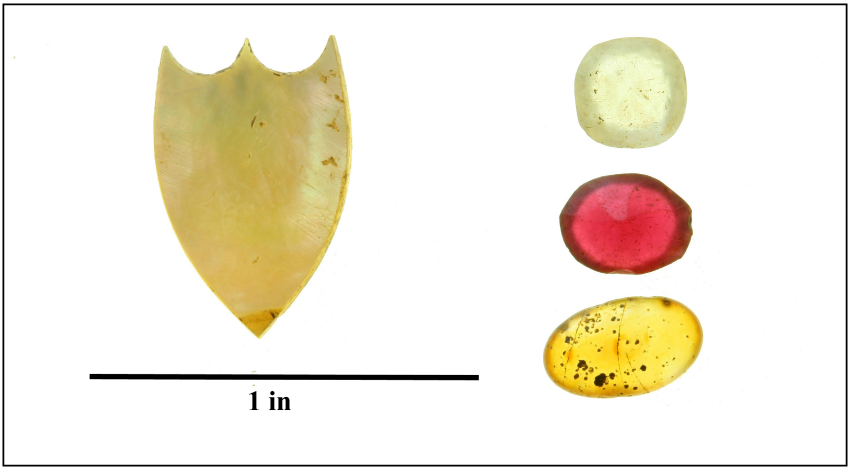

Figure 7.9: Edged shield made of shell and ring settings. Left: shell edged shield (00-225). Right: ring settings (top to bottom); clear diamond-cut “stone”(01-2526); red diamond-cut gemstone (98-1287), setting (?) in amber (99-1772).

Beads

An 1845 Fort Pierre Chouteau inventory lists nearly 700 items on hand, including trade beads, and another list, date unknown, specifies white, blue, and ruby barley beads, plus 344 bunches of blue, white, ruby and red agate beads (Schuler 1990:116, 117). The single trade bead (01-1950) in the inventory, ovalish is shape, is white with some brown discoloration. It is split in half latitudinally. Original length was probably about an inch (what is left measures 0.5″). Width is 0.75″. This bead resembles two from Fort Union, namely Figure 12j and Figure 15y in DeVore (1992:75, 77).

Another specimen (98-1675)) from a bird (probably) bone. Now broken on each end, the specimen was some sort of bead, maybe a hairpipe. The homemade bead (wt. = 0.05 g) is 0.36″ long and 0.29″ in rough diameter. Yet another also appears to be from an avian bone (01-809). The small tubular, unbroken specimen is 0.52″ long and 0.22″ in rough diameter (wt. = 0.3 g). One end has been beveled (tapered), evidently with a knife, which was also used to cut a short groove near mid-length. This specimen is highly polished. Both of these are shown in Figure 7.10.

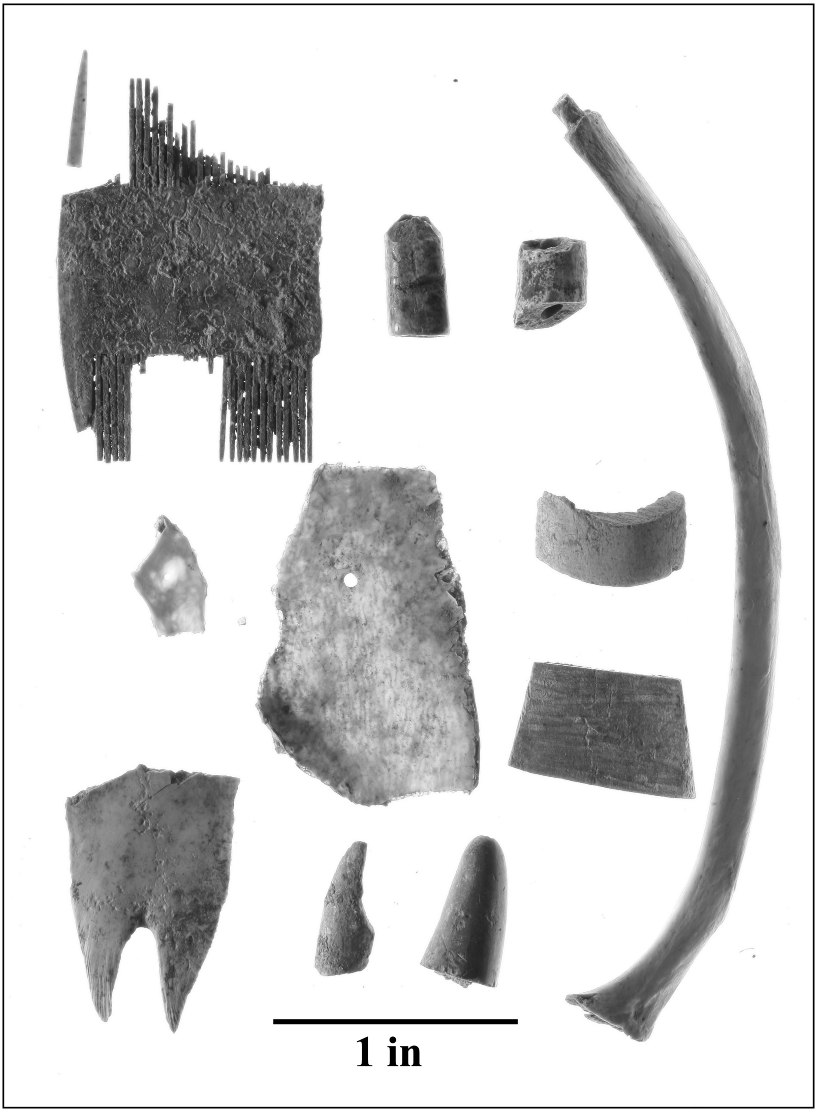

Figure 7.10: Bone items. Top (left to right): fine tooth comb and comb tooth; two bone beads. Middle: two thin perforated bone fragments, two cut bone pieces (band and trapezoidal). Bottom: bone fragment (hair piece?), two bone tips, painted (left) and polished/abraded (right). Far right: rib bone with pegged end.

Other Ornamentation: Metal

A tiny figurine (Figure 7.11) vaguely resembling a human figure is made of stamped brass (97-451). The featureless head sits above protrusions that can be interpreted as shoulders with arms folded across the chest, although this area is also featureless. Below the shoulders, the specimen splits as if meant to depict flared legs. Part of the leg area is torn away. Two fragments refit to form the image. The refit pieces measure 0.66″ in height. The item weighs less than a gram. Clues to the origin of this piece have not been found.

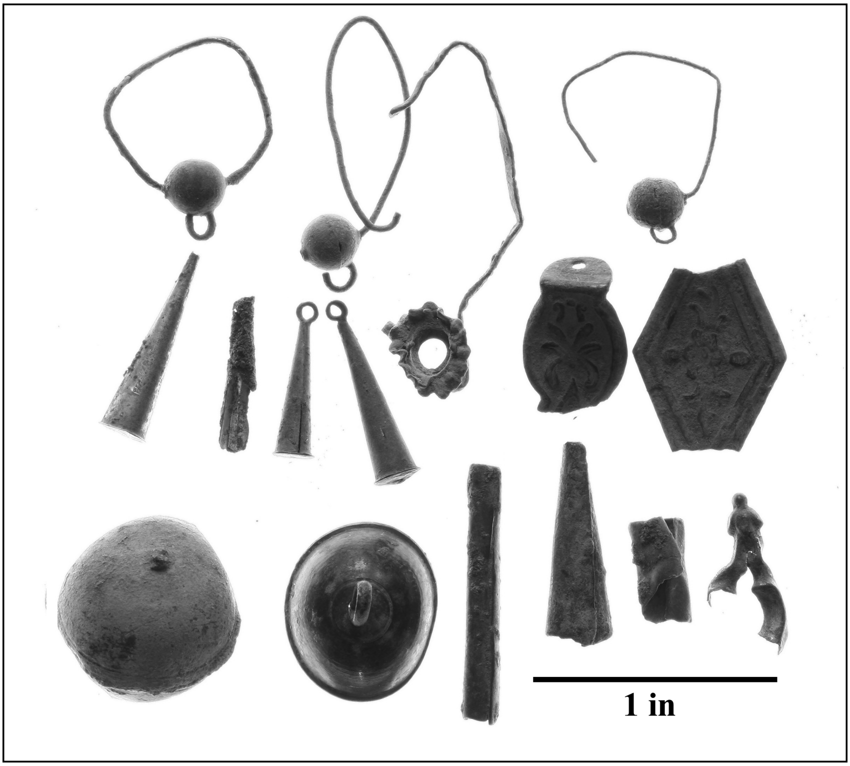

Figure 7.11: Jewelry trade items. Top: four brass earbobs with balls and wires (80-235, 00-210, 00-1715, 80-338). Center: four cone earbob pendants (99-348, 80-540, 99-1235, 80-540), two earbob dangles (both 01-705). Bottom: two brass earbob spheres (80-235, 97-611), three cuprous tinklers (01-965 [tubular], 98-880, 01-406), stamped brass figurine (97-451).

A brass pin or stud (Figure 7.12) exhibits a fancy, decorated head (97-753). The tiny specimen is 0.41″ high and 0.355″ wide (max width). It weighs but 0.7 g. The head is faceted; what appear to be ankhs are impressed on one of three facets. The two others exhibit florets. Part of the shank is missing, although from what is left it is clear the distal end was originally bifurcated. For what purpose is not known, but possibly it served an attachment function.

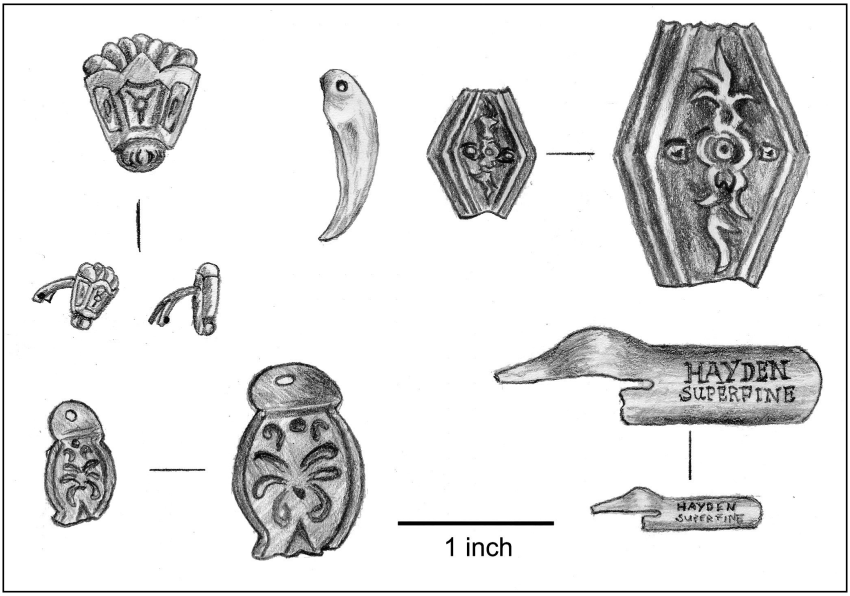

Figure 7.12: Brass stud, tooth pendant, brass dangles, pen nib. Top (left to right): brass stud (to scale and 2× scale (97-753); fox tooth pendant (to scale and 1.5× scale) (99-147); brass dangle (to scale and 2× scale) (01-705). Bottom (left to right): brass dangle (to scale and 2× scale) (also 01-705); Hayden Superfine steel pen nib (to scale and 2× scale) (00-214).

Other Ornamentation: Bone, Shell and Tooth

One ornament is very small, in the shape of an edged shield, and is finely made of shell (Figure 7.9). The specimen has a shiny silvery surface, is quite symmetrical, and exhibits a uniform thickness (0.06″). The shield (wt. = 0.6 g) is 0.5″ wide and 0.77″ high. It could perhaps be a stringed instrument inlay. Hanson (1973:8-10) notes that abalone was a trade item.

Shells were used either intact, or cut up, the pieces made into smaller ornaments, including inlays and wampum. An 1850 inventory at Fort Union included nearly 100 “California shells” (Hanson 1973:10). Fort Pierre Chouteau also carried sea shells graded in quality 1 through 4 (Schuler 1990:117). Hanson (1983:7) notes that Plains tribes, including the Sioux, favored ear drops cut from abalone shell, although there is no perforation on this specimen, and no attachment device.

One other item, complete and unbroken, may be from a stringed instrument, perhaps a bridge, or the string rest part of a bridge (98-267). It sports four nearly equidistant grooves such as would accommodate the strings of a 4-string banjo or mandolin—although this specimen is very small (1.0″ wide, max ht. = 0.27″, thickness is 0.19″). It appears to be of polished ivory. The specimen (wt. = 1.0 g) is shown in Figure 7.13.

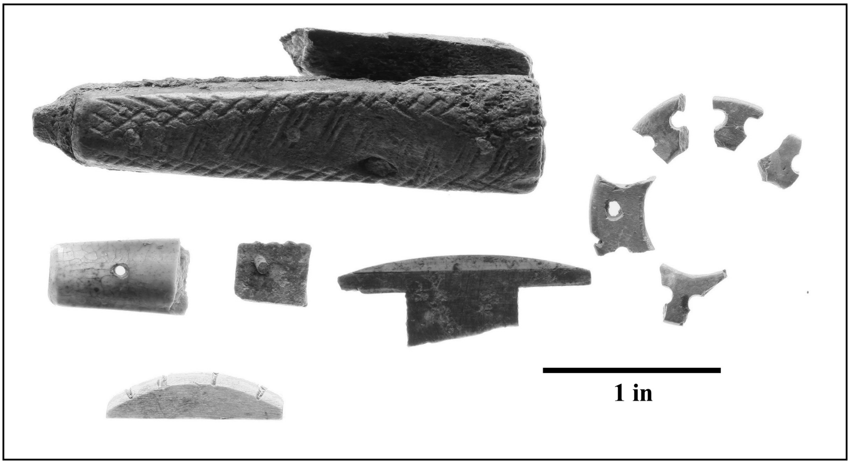

Figure 7.13: Various items. Top: utensil handle with bone inlay. Middle (left to right): bone inlay fragment with perforation, bone inlay fragment with brass rivet (both from utensils), toadstool shaped plastic piece. Bottom: stringed instrument bridge(?). Far right: perforated plastic disk fragments.

Another artifact (80-117) may be from a cut abalone shell. It is just a fragment now, but the roughly rectangular item has a perforation at one end. The piece measures 1.75″ in length, and is roughly 5/8″ wide.

One specimen is a perforated, polished tooth made into a pendant (99-147; Figure 7.12). It appears to be a canine tooth, possibly from a fox. The item is 1.07″ long, 0.22″ wide at the widest, and 0.17″ thick. The tooth weighs 0.6 g. The perforation is at the proximal end.

The inventory contains other modified bone items, most now broken and some perhaps originally from decorated pieces. They are shown in Figure 7.10. Two are very thin (about 0.025″) bone fragments, one very small (00-2052; wt. < 0.1 g), the other a bit larger (01-2902; 0.3 g), each with a very small perforation. Two others pieces are the tips from unknown items. Both appear to be purposely polished or abraded, especially one specimen (80-247). It weighs 0.3 g, and is 0.63″ long. Max width is 0.35″. The other tip (97-1326) is split lengthwise (0.58″; wt. = 0.1 g); it exhibits traces of red paint.

There is also a small, roughly trapezoidal bone piece (01-1376), this obviously purposely cut to that shape. Long and short lengths are 0.78″ and 0.62″. Average width is 0.48″, while uniform thickness is 0.125″ (wt. = 0.9 g). The polished side exhibits faint striations. A broken piece (wt. = 0.3 g) was once a circular-cut bone band with hollow interior (01-1376)—too large for a bead (broken length and width (min) are 0.62″ and 0.27″; thickness is about 0.08″)—but perhaps some sort of decoration.

Still another piece (98-unknown) is an enigmatic specimen made from a thin (0.08″ min, 0.13″ max), moderately curved rib (3.65″ long). One end has been cut to form a short peg; the opposite end is unmodified. Weight is 0.2 g. This is probably a large bird rib. The final specimen (00-697) reported here may be part of a bone hair piece, this made apparently from an animal cranium (about 0.06″ thick). The broken specimen (wt. = 0.7 g) exhibits two "saw-tooth" like projections. Maximum broken dimensions are 1.12″ long and 0.73″ wide.

Thimble

The lone thimble in the inventory is made of brass (01-1623; see Figure 7.5). The specimen is crushed, and otherwise mangled, but rim and pounce marks remain quite evident. The altered dimensions are 0.56″ high, 0.85″ wide at the rim, and 0.48″ wide at the top. The key attribute is a perforation in the top. This indicates the thimble was used as jewelry or decoration, likely by a native person. Perforating the top, threading a string with bead at one end through it made the thimble into a tiny bell or tinkler, which was then sewn to a garment or accoutrement (Woodward 1965:23).

Earbobs

Over the years, the American Fur Company purchased thousands of earbobs. Hanson (1983:3) mentions one order: 13,000 pairs (large and small sizes) shipped in 1840 by one James Scrymgeour to Pierre Chouteau, Jr.

and Company at St. Louis. Earbobs consist of an attachment wire (fine wire), the ends of which are soldered to a hollow sphere. The sphere sports a loop (shank) from which an ornament dangles. The ornament(s) can be a cone, a teardrop pendant, a crescent, circle, or other shape.

None of the earbobs (Figure 7.11) in the inventory is complete. They are represented by wire and sphere (or portions), conical pendants, and wire fragments. There are five cone and wire specimens, all of brass (with copper wires). Only four of the five exhibit complete spheres (80-235; 80-338; 00-210; 01-2162). Diameters are uniform: 0.23″; all four retain their shank. The sphere on the other specimen is fragmentary (00-1715), and the wire is flat (0.06″ wide, 0.027″ thick). Otherwise, attachment wires are round, approximately 0.032″ in diameter.

Earbob pendants include decorated dangles and conical pendants (Figure 7.11). Earbob pendants are distinguished from tinklers, which are made by rolling sheet metal into a cone, leaving both ends open. The earbob pendants here are formed similarly, but the edges are soldered, and the ends were closed, one with an attachment loop, and the other (the wide diameter) by capping it with a soldered thin disk. This type of pendant (and earbobs) was also found at Fort Union (DeVore and Hunt 1993:14).

The seven conical earbob pendants are all of brass or copper, however at least four were plated with "German silver", an inexpensive alloy used after 1835 on Indian trade items (DeVore and Hunt 1993:14). Only traces of the alloy remain on the four specimens, and incidentally, one of these is an incomplete pendant (80-540; catalog numbers for the other three plated specimens are 99-348; 00-12; 00-1491). Schuler (1990:117) says the 1846 Fort Pierre Chouteau inventory lists "163 pair silver ear bobs". Likely "silver" refers to German silver plating.

If they were originally plated, the other three pendants no longer exhibit alloy traces (90-540; 99-1235; 01-1198). Five of the seven pendants are complete (with shank and cap; one is missing the shank). Based on length, they seem to represent three sizes: 0.65″, 0.78″ and 0.85″.

The earbob assemblage also contains a slightly crushed earbob sphere (80-539) of brass, a fragment of a brass sphere (98-1631), and 10 fine wire fragments. The copper wires, from 0.02″ to 0.05″ in diameter, were no doubt once part of earbobs (80-01; 80-250; 80-529; 80-1715; 98-1631; 01-1198). Some wires exhibit looped or hooked ends. One is twisted into an oval.

Large earbob spheres may be represented by two incomplete brass specimens (Figure 7.11). One is moderately crushed (80-235), but somewhat complete. Both hemispheres remain, but the shank is missing. The disfigured shape suggest a sphere originally around 0.75″ in diameter. The item, which has some dirt inside, weighs 2.7 g. The other specimen (97-611)is the top half of a sphere—the shank remains. It weighs 1.3 g. Now slightly bent, when complete it probably was about 2/3″ in diameter.

The inventory contains two dangles (01-705; Figures 7.12 and 7.11). One resembles a dangle illustrated in Hanson (1983:4, far right) collected from an Iroquois in 1849. Broken at both tips, it is diamond shaped and impressed with a flower design. The dangle is 0.82″ high (broken) and 0.65″ wide (max width; wt. = 0.8 g). The perforation is absent on this one (it is on a missing piece), but not on the other. On this one (wt. = 0.7 g), the hole is through a small tab that extends from the oval shaped body, upon which is impressed an unintelligible design. The end opposite the tab is broken away. Broken length is 0.65″, max width is 0.44″. Both specimens are stamped from 0.03-inch thick sheet brass.

Tinklers

The inventory contains three cone tinklers (two fragmented), all of copper (Figure 7.11). One is a true cone shape (98-880). It is 0.84″ long; the large opening is about 0.20″ in diameter. The other (00-48) is "out-of-cone", so to speak. It appears to be partially unrolled, leaving rather large openings (0.28″ and 0.19″). The specimen is 0.95″ in length. Palmer (1999:28–29) identifies an irregular specimen (from a Potter County, South Dakota protohistoric site) similar to this one as a "homemade" tinkler made from a piece of trapezoidal sheet metal. Hanson (1982b:12–13) notes the popularity of "homemade" metal tinklers among Native Americans beginning as early as 1610.

Writing Paraphernalia

Writing/drawing is represented by a pen nib, pencil lead, slate pencil fragments and slate fragments (shown in Figure 7.14). Nibs for dip pens did not become popular until after 1822 when mass manufacture became possible (Miles 2006). One tine is missing from the slit-nib in the writing assemblage (00-214), which is embossed "HAYDEN/SUPER FINE" (Figure 7.12). The specimen was probably produced by the Hayden brothers in Haydenville, Massachesetts. They set up a button factory, and added the manufacture of "steel pens" in 1839 (Bishop 1866:348-349). Duration of the Hayden enterprise has not been determined, nor has this particular maker's mark, so the nib cannot at this time be firmly associated with the fur or military eras at Fort Pierre Chouteau. The quality mark "super fine" (or superfine), however, is found on other items of these eras such as buttons. Plus, some at Fort Pierre Chouteau used ink, as eyewitness Thaddeus Culbertson (1952:91) recorded. Further, 1846 and 1850 inventories at the American Fur Company's Fort Union list "steel pens" (Hanson 1987:12).

Pencils are also represented in the writing assemblage by, described as "lead" (graphite composite). One is a small, round lead fragment (98-1705). It is 0.08″ in diameter, and 0.37″ long. Two others are square lead pieces (01-644), both 0.08″ on the sides. One is a third of an inch long, the other 0.37″. Square-lead wood pencils predominated until the 1870s, although round lead was used in mechanical pencils, the earliest of which date from 1822 (Petroski 1998:184; Wikipedia 2009). Lead pencils are known for the American Fur Company's Fort Union as early as 1834 (Hanson 1987:10). Also, the first order sent from Fort Pierre Chouteau to St. Louis (in 1832) included two dozen lead pencils (Schuler 1990:91).

Slate pencils are also known for Fort Union (Hanson 1987:10), and they occur in the Fort Pierre Chouteau inventory. Of the two specimens (which refit; both leave marks on paper), one exhibits the telltale tapered point (01-1138) indicative of use for writing. It is a fragment, 0.28″ wide, 0.10″ thick and 0.87″ long. The small slate weighs just 0.6 g. The other specimen (01-2377), fractured at both ends, is not "sharpened." Width and thickness are the same as above; the slate is 0.91″ long (wt. = 0.7 g).

Slate boards and tablets were also used for writing, and fragments of such are present in the inventory (98-1429; 01-393; 01-2315). The largest is 41.2 g; it is broken in an irregular fashion (roughly 3.5″ by 2.8″). The other two pieces are quite small—1.8 g and 1.0 g. Two slates are 0.15″ thick; the other is comparatively thin, only 0.08″.

Comb

One specimen (00-1323) is part of a double-sided bone comb with broken teeth remaining on each edge (Figure 7.10). It is actually quite a good portion of the comb, measuring about an 1″ by 1.5″ (thicknesses is 0.08″). This comb appears similar to a horn comb illustrated in Hanson (1985:9, top right). If they are the same type, then the Fort Pierre Chouteau comb was 3″ long (thicknesses is 0.08″). Combs of this nature are typical at western fur posts, including Fort Pierre Chouteau. An 1839 invoice lists combs (Schuler 1990:74). Also, an 1846 inventory at the post listed no less than 75 dozen combs on hand (Schuler 1990:75), and the American Fur Company was buying horn combs from a London source as early as 1827 (Hanson 1985:10).

A bone comb tooth fragment is also present (00-1843; Figure 7.10). It was analyzed by Patrick Collison who found that the tip had been smoothly abraded, indicating use as a toothpick. Toothpicks (fish bone and comb teeth) at Fort Pierre Chouteau are reported in Collison (2004), who examined the assemblage reported here. It is not known if this particular specimen is reported in that document. In any case, the specimen is tiny—just under 0.5″ long, 0.06″ wide and 0.02″ thick. It appears to be a fine tooth (as opposed to coarse).

Utensils

This assemblage contains a broken fork, a utensil handle, a fork tine fragment, and two fragments from handle inlays. The fork (01-1730) is made of wrought iron, badly rusted. The handle inlays are no longer present (although a rivet hole is evident), and part of only one tine remains. Broken length is 4.3″. The long trapezoidal handle measures 3/4″ at its widest.

The handle (97-406) consists of an iron frame (rusted) with bone inlay on both sides (Figure 7.13). One inlay is in two pieces. It reveals extremely heavy wear in the area contacted by the thumb of a right-handed person. The inlays exhibit a cross-hatch decoration and are attached to the frame with three cuprous rivets. The handle, only slightly trapezoidal, is 3 7/8″ long. Width at the handle end is 0.684″, and 0.53″ at the opposite end. The business end (tines, bowl, blade?) is missing.

A handle inlay fragment (wt. = 2.2 g) is rather small (00-192). Broken length is 0.80″, while width is 0.44″. Inlay thickness is 0.20″. This is probably from the middle on a handle inlay, since a rivet hole lies equidistant from the broken ends. The specimen is a porcelain-like quality ceramic inlay. The other inlay fragment (00-711; probably bone) is smaller(0.3 g; 0.42″ by 0.36″; 0.07″ thick), but it does exhibit a cuprous rivet (dia. = 0.06″). Both inlays are shown in Figure 7.13. The fork tine fragment (01-564) is also small, weighing just 4.8 g. It also is of wrought iron (rusted). Small parts of two tines remain.

Doll And Other Sherds

Ceramic dolls and parts generally came in two types of porcelain: china and bisque. In doll classifications, china is glazed porcelain, and bisque is unglazed. Bisque was used for doll heads from about 1860 to about 1920 (Lorentzen 1994), but, according to one author, not until the late 1890s in the United States did bisque dolls (or doll parts) replace wax dolls in popularity (St. George 1950:44). China was used in Europe by 1820, and by around 1873, china doll heads and dolls were made in quantity in Germany (White 1966:22, 23).

Three of the inventory's eight sherds (all from 80-851; see Figure 7.15) are glazed and painted black (over white), including a painted shoe/boot (1.8 g). The shoe/boot resembles a ladies Victorian high-top consistent with Fort Pierre Choteau times. The other two black-painted sherds exhibit unintelligible molded designs (1.4 g and 0.8 g). Another tiny sherd (0.6 g), this one white, glazed and unpainted, appears to be a portion of a baby's foot (carpals, phalanges, and a bit of the ankle absent heel). These four sherds are clearly from one or more dolls.

Of the other four sherds, all of which are curved, one clear glazed white specimen (4.4 g) appears bisque-ish due to deterioration of the glaze. Another is in bisque (off-white; 1.7 g), the exterior of which (the convex side) has a decidedly pinkish or flesh tone. These two specimens, safe to say, are from dolls, although just where on the body is difficult to say.

The remaining two curved sherds (white) may not be from dolls. They exhibit rims that could be indications of toy ceramic tableware. Both of these sherds are clear glazed, and one (the larger of the two; 5.4 g) exhibits an "O" (or zero; the mark is impressed molded). This mark has not been found. The small rimsherd weighs 1.4 g.

Footwear

Footwear in the collection has not been cleaned (for example, dirt and rootlets adhere to many specimens) or preserved, in most cases making analyses difficult and therefore provisional interpretations. Whatever the problems, footwear at this site is not surprising; everyone wore shoes or boots, and according to Hanson (1990:75, 121) the company store (fur post) sold footwear, including women's shoes. Some arrived as steamboat cargo (Schuler 1990:74). As well, cobblers may have been at the fort, as some of the items below (e.g. outsole with heel lifts, a stitched welt) suggest footwear under construction or repair (although Schuler's [1990:55–59] short list of craftsmen does not identify a cobbler/shoemaker).

Only the part of a heel and the outer part of the sole remain on one specimen (80-295; see Figure 7.16). The outsole is apparently attached to the welt with square brass nails, and the welt is attached to the insole with ferrous tacks. The heel and lifts are attached in similar fashion, heel to lifts by brass nails, lifts to insoles with tacks driven from the bottom up, and very small brass nails from the insole down into the first lift. Nailing and tacking appear to be by hand, suggesting this item predates the ad-

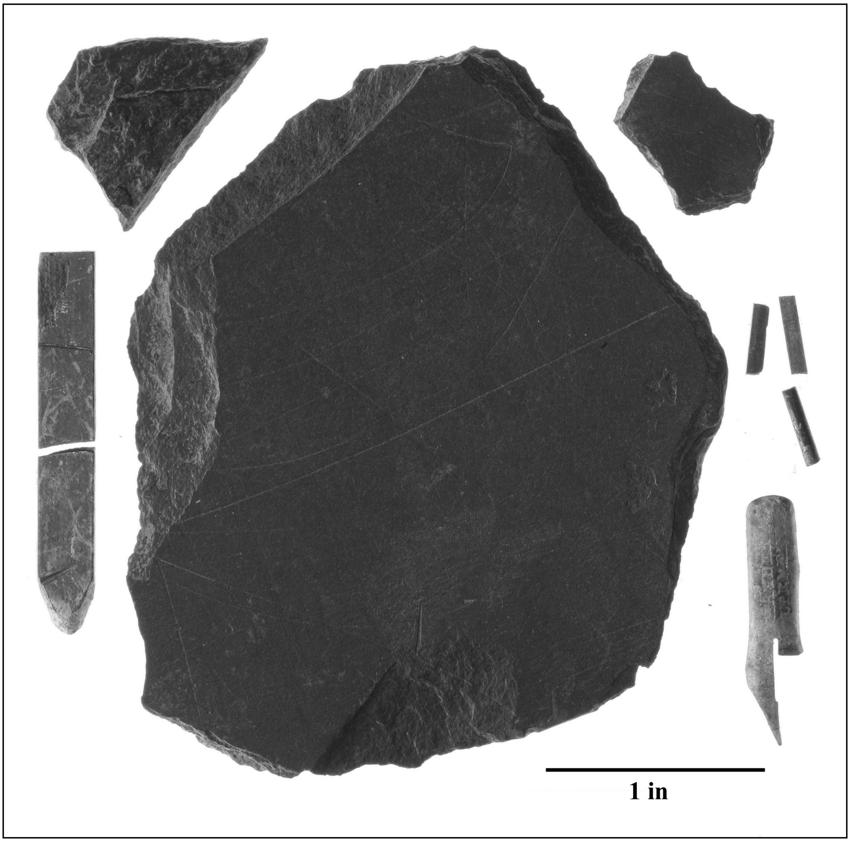

Figure 7.14: Writing paraphernalia. Center: large slate fragment (01-2315). Left (top to bottom): slate fragment (00-393), two refit slate pencil fragments (both 01-1138). Right (top to bottom): slate fragment (98-1429), two square pencil leads (both 01-644), round pencil lead (98-1705), Hayden Superfine steel pen nib (00-214).

Figure 7.15: Doll and other Sherds. Top: bisque sherd with flesh tone, China rimsherd with "O" mark. Left: China rimsherd, China sherd with deteriorated glaze. Right: China sherds painted black and a small white China sherd.

vent of machine nailing ca. 1860 (cf. Anderson 1968:64). Apparently this specimen is from a turned shoe or boot.

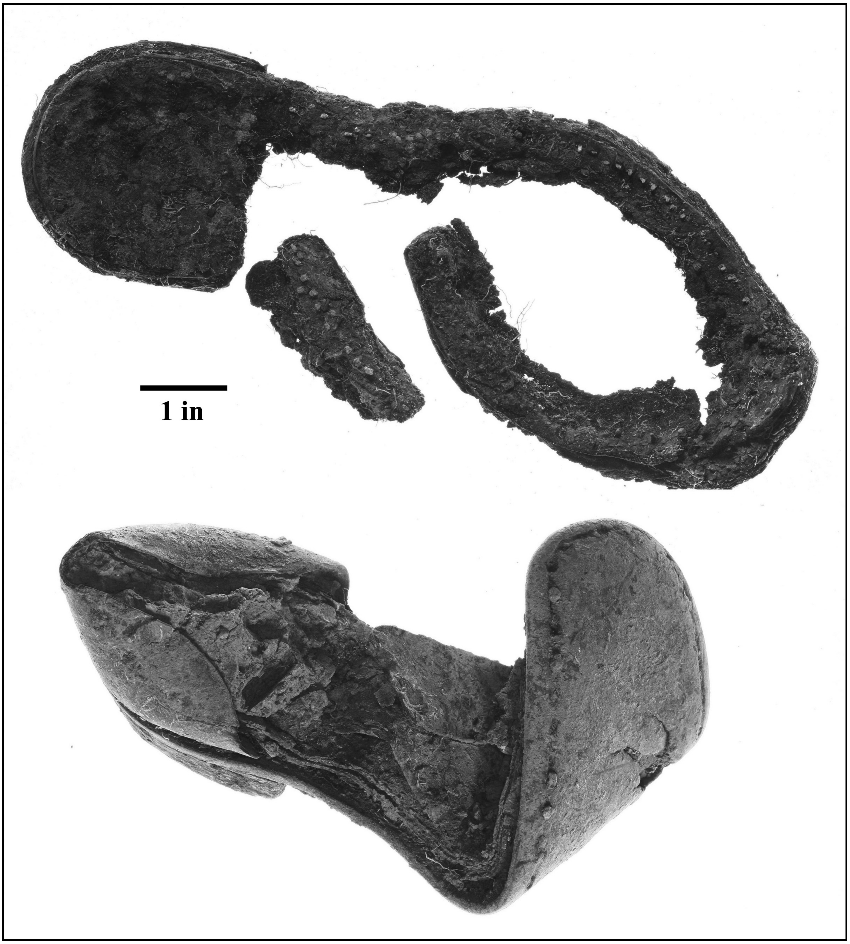

Figure 7.16: Footwear. Top: part of outer sole and heel (80-295). Bottom: shoe/boot with counter, heel and sole (80-191).

One specimen (80-191), probably also a turned shoe/boot, has much soil adhering (see Figure 7.16). It exhibits the heel with lifts, the sole, and the counter. The sole is bent back midway between heel and toe. The outer sole exhibits a wear hole near the toe. Eight thin lifts separate the worn heel plate for the outsole. It appears the lifts were attached with ferrous nails (now rusty), and the leather heel plate to the lifts with brass nails (now with cuprous oxide). The heel plate is sufficiently worn to expose a few of the ferrous nails. The outsole is attached to the welt (warped and badly deteriorated) with ferrous nails, and it appears welt to insole (also warped and deteriorated) was secured the same way.

There are other interesting attributes. For one, the outsole nails seem to follow a trough, but there are no stitching holes, and thread evidence is absent. For another, it appears this sole was made on a single last (as opposed to right and left). The nails seem to have been applied by hand. These attributes (single last, hand nailed, no stitching) suggest this shoe/boot was made prior to 1860–1862 (Anderson 1968:64).

A child's shoe (80-810) is also hand nailed, much in the same fashion as the two adult-size specimens—outsole fastened to welt with brass nails, insole to welt with ferrous nails, and heel to lifts (three of them) with iron. This small shoe (4.5″ long) is made from a single last, but that is not unusual even today for footwear meant for ages up to four or so. Several very small fragments of the upper remain, this apparently of black leather. Discolaration at the heel where insole meets welt suggests this shoe had an orange colored cloth liner. This specimen is pictured in Figure 7.17.

The inventory contains a very badly deteriorated outsole with heel lift remnants (99-1822). Dirt and rootlets adhere. No nails can be seen, but there are several traces of rust and cuprous oxide. Entire length is 10″. This specimen is shown in Figure 7.17.

Two heels (98-1724) are deteriorated, one so badly that only three lifts remain, one of which has separated from the other (see Figure 7.18). Rust stains indicated they were fastened with ferrous nails. This specimen suggests a very small adult foot, possibly a lady. The other heel is very likely from a ladies shoe with high arch. This is based on the ferrous shank (arch support) which remains in place. It was inserted between the outsole and welt, or maybe the welt and insole. In any case, this heel appears to have been built entirely with ferrous nails (the inner and outer surfaces attract the magnet).

The bag in which the two heel specimens are found contains various shoe fragments, and that is the case for most of the footwear containers in this assemblage, including several that hold nothing but leather fragments (80-467, 80-625, 97-1166). Two small boxes hold material recovered in 1980, but they lack unique numbers. These specimens are dirt conglomerates with impressions, perhaps of leather or cloth. (A four-hole button, possibly of rubber, adheres to one of these dirt clumps).

Finally, the assemblage contains a welt (80-unknown) which clearly exhibits stitch holes (Figure 7.17), showing that the upper was stitched

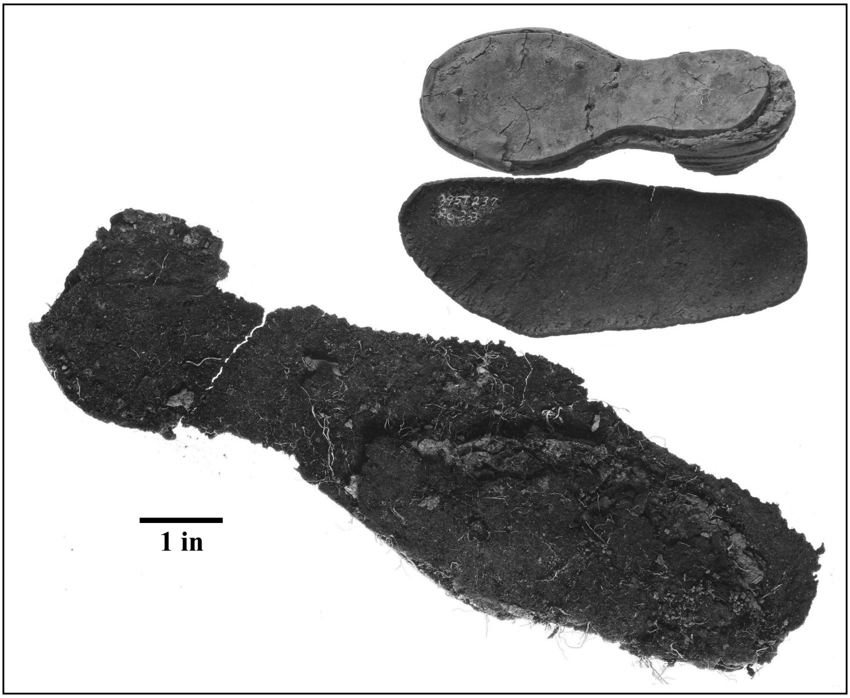

Figure 7.17: Footwear. Top (top to bottom): child's shoe heel and sole (80-810), and stitched welt (80-unknown). Bottom: deteriorated outsole with heel lift remnants (99-1822).

to the welt. The welt is small enough to indicate juvenile footwear (the specimen box also contains various fragments). Another specimen (97-1206) is from a heel, either the heel plate or a lift. Traces of rust remain on the item, which otherwise lacks fasteners. Now curled due to drying, the specimen's size (ca. 1.4″ long, somewhat over 1.5″ wide) suggests either a child's shoe or the lower part of a female's highly tapered heel.

Other Leather(?)

One bag (00-2030) is labeled "knife sheath." The bag contains an archival box, in which is a consolidated clump of dirt/sand (actually two dirt pieces which refit). Apparently the original observer recognized a sheath, probably upon field recovery, but such is not apparent now (at least to this observer). What is noticeable is a thin band, best seen in profile (see Plate

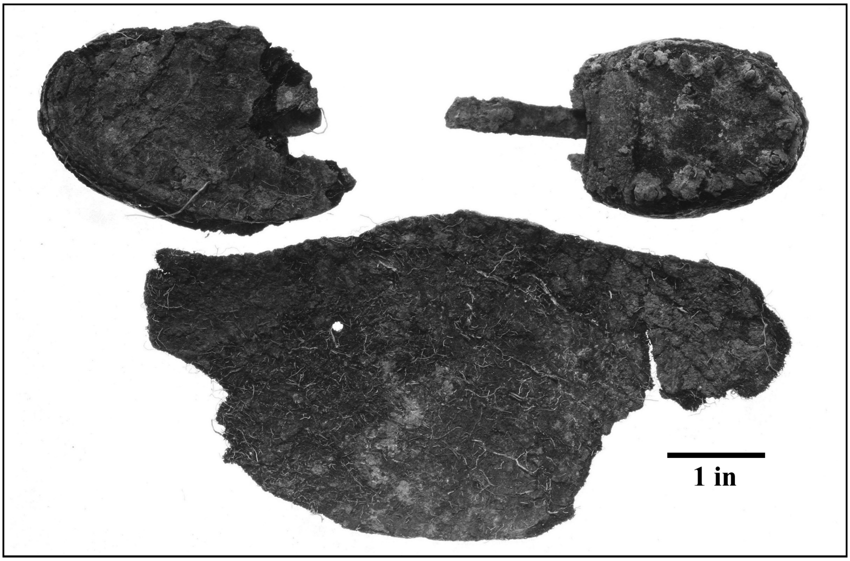

Figure 7.18: Footwear. Heel fragment and heel fragment with iron shank (both 98-1724), and outsole fragment (00-2032).

10), of something stuck to the dirt. The top view (Figure 7.19), however, is not recognizable as a knife sheath, or as leather or hide for that matter.

Plastic

Two items are made of plastic. One (00-2021) is some sort of a decorative piece for some unknown item. It is flat and thin (0.7 g), and in side view looks like a 'toadstool' (Figure 7.13). The other (00-536) is in five tiny pieces (sort of gun metal gray in color) thought to be part of what once was a perforated decorative disk. The five pieces (0.8 g) are shown in Figure 7.13 in what is thought to be proper order.

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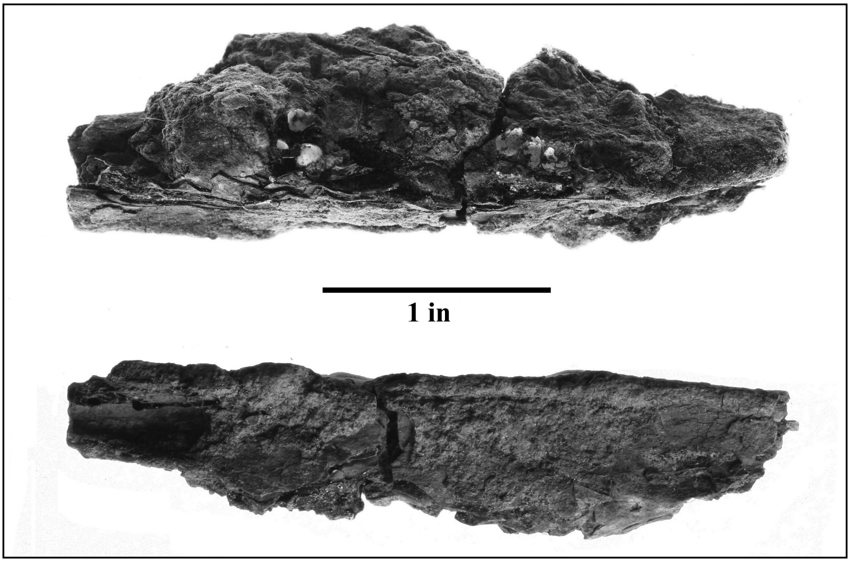

Figure 7.19: Unidentifiable item (00-2030). Above scale: side view showing dirt/sand clump and thin band (band is toward scale). Below scale: top view of same item.

students Katie Sheets and Candace Keierleber.

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Table 7.1: Fort Pierre Chouteau (39ST237) personal, trade, and decorative artifacts by 1980 catalog number (accession 80–303-xxxx).

Catalog #	Description	Unit	Level	Count	Wt (grams)	Remarks
0001	Wire	S39 E100	10–20 cm	1	< 0.1	Copper, from earbob
0007	Lock Part	S39 E100	L2/10–20 cm	1	0.4	Drop cover
0012	Straight Pins	S39 E100	n/a	18	0.8	(16 brass 2 iron); 11 flat heads, 3 round, 4 shanks
0059	Coins	S12 E49	L4	2	n/a	Seated Liberty dimes, Philadelphia, 1877 and unknown date
0083	Sherds	S12 E49	L4	8	n/a	Doll and other sherds, bisque, China, China painted
0191	Footwear	S12 E49	L3/90 cmbd	1		Parts of sole, heel, counter
0193	Trade Rings	S36 E94	L1/0–10 cm	2	n/a	Brass
0198	Eye	S36 E94	L1/0–10 cm	1	< 0.1	Brass; hook and eye
0220	Straight Pin	S36 E94	L2/15–30 cm	1	0.1	Brass
0224	Trade Ring	S36 E94	L2/15–30 cm	1		Flat; split circumference; brass
0225	Hook	S36 E94	L2/15–30 cm	1	0.2	Hook and eye
0235	Earbob	S38 E100	L1/0–10 cm	1	2.7	Brass; sphere, moderately crushed
0235	Earbob	S38 E100	L1/0–10 cm	1	0.4	Brass; cone is missing
0247	bone	S38 E100	L2/10–23cm	1	0.3	tip of something; abraded/polished
0250	Wire	S38 E100	L2/10–23 cm	4	1	Copper, fragments from earbob
0261	Trade Ring	S38 E100	L2/10–23 cm	1		Brass; domed
0287	Straight Pin	S38 E100	L4/28–33 cm	1	0.1	Brass; flat head
0295	Footwear	S38 E100	L5/33–40cm	1	n/a	sole and heel parts
0329	Hook Eyes	S36 E95	L1/0–10 cm	2	0.4	Iron & brass; hook and eye
0338	Earbob	S36 E95	L2/10–20 cm	1	0.2	Brass; cone missing
0340	Straight Pins	S36 E95	L2/10–20 cm	4	0.6	Brass, flat heads (1 shank)
0371	Straight Pins	S33 E95	L1/0–10 cm	2		Brass; 1 flat head; 1 round head
0491	Hook	S35 E100	L2/10–20 cm	1	0.1	for eye; brass
0538	Strips	S33 E100	L2/10–20 cm	2	2.2	Brass

Table 7.1: continued

Catalog #	Description	Unit	Level	Count	Wt (grams)	Remarks
0539	Earbob	S33 E100	L2/10–20 cm	2	0.2	Wire and sphere
0540	Earbob	S33 E100	L2/10–20 cm	2		Cone pendant, German silver traces
0543	Pin (or Needle)	S33 E100	L2/10–20 cm	2	0.2	Iron
0618	Straight Pins	S39 E100	L3/20–30 cm	2	0.3	Brass
0645	Unknown	S55 E100	L2/10–20cm	1	25.1	waterworn stone?, roughly spherical
0735	Trade Ring	S34 E100	L1/0–10 cm	1		Out of Round; brass; split circumference
0741	Hooks	S36 E91	L1/0–10 cm	2		Hook & eye
0752	Hook and Eye	S13 E36	L1/0–10 cm	2	0.2	Brass
0810	Footwear	S12 E49	Hist zone I	1	n/a	Sole and heel, child’s

Table 7.2: Fort Pierre Chouteau (39ST237) personal, trade and decorative artifacts by 1981 catalog number (accession 81–113–xxxx).

Catalog #	Description	Unit	Level	Count	Wt (grams)	Remarks
0196	Trade Ring	S34 E112	L1/0–20 cm	1	2.2	Brass
0288	Buckle Frame	S37 E104	L2/10–20 cm	1	3.7	Iron
0324	Buckle/Grip Guide	S45 E116	Shallow Surface	1	2.7	Woven fabric adhering; iron

Table 7.3: Fort Pierre Chouteau (39ST237) personal, trade and decorative artifacts by 1997 catalog number (accession 97–0066–xxxx).

Catalog #	Description	Unit	Level	Count	Wt (grams)	Remarks
0406	Utensil Handle, Tableware	N553 E549	230 cm	1	20.7	Iron frame, bone handle; 2nd piece, well worn
0423	Trade Ring	N513 E495	L2/10–20 cm	1	1.1	Brass
0451	Figurine	N523 E573	L1/0–10 cm	1	n/a	Human; stamped brass; fragmented
0611	Earbob	N552 E540 W1/2	L3/30–40 cm	1	1.3	Sphere, top half only, w/ shank; brass
0753	Decorative Pin	N444 E505	L4/30–40 cm	1	0.7	Brass
0828	D–Ring	N443 E504	L4/30–40 cm	1	1.1	Iron; rusted; fob ring?
1326	Bone	N531 E540	L6/35–42cm	1	0.1	tip of something; split; traces of paint

Table 7.4: Fort Pierre Chouteau (39ST237) personal, trade and decorative artifacts by 1998 catalog number (accession 98–0131–xxxx).

Catalog #	Description	Unit	Level	Count	Wt (grams)	Remarks
??	Bone	unknown	unknown	1	0.2	rib bone with peg cut into one end
0126	Trade Ring	n/a	n/a	1	1.2	Brass flatstock; out of round
0267	Unknown	unknown	unknown	1	1	stringed instrument bridge, or part? Ivory?
0573	Straight Pin	n/a	n/a	1	0.1	Brass
0821	Trade Ring	Metal Detection	n/a	1	1.3	Brass, domed, undamaged, circular
0874	Trade Ring	n/a	n/a	1	0.3	Brass
0880	Cone Tinkler	n/a	n/a	1	0.9	Copper
0888	Marble	n/a	n/a	1	3.7	Glass or glazed ceramic; milky white w/ traces of green concentric circles
1287	Ring Setting Stone	n/a	n/a	1	0.3	Square w/ rounded corners faceted; milky clear (glass?)
1429	Slate Fragment	n/a	n/a	1	1	Black
1631	Earbob Fragments	N 514 E 565	L3/20–30 cm	2	0.3	Brass
1705	Graphite	N 513 E 564	L2/10–20 cm	1	< 0.1	Round lead
1724	Footwear	N533 E540	L2/15–22 cm	2	n/a	two heel parts, one with arch support shank

Table 7.5: Fort Pierre Chouteau (39ST237) personal, trade and decorative artifacts by 1999 catalog number (accession 99–70–xxxx).

Catalog #	Description	Unit	Level	Count	Wt (grams)	Remarks
0127	Trade Ring	N484 E562	L2/10–20 cm	1	1.5	Brass; half rounded (domed)
0147	Tooth Pendant	N484 E565	L1/0–10 cm	1	0.6	Polished surface, canine tooth, possibly fox
0316	Keyhole Cover	N484 E565	L2/10–20 cm	1	2.5	Padlock; impressed lettering, unintelligible
0343	Buckle/ Grip Guide	N484 E565	L3/20–30 cm	1	3.4	Two-tined, tines pivot across bar
0348	Earbob	N484 E565	L3/20–30 cm	1	0.2	Pendant; traces of German silver
0983	Trade Ring	N533 E541	60–70 cm	1	1.2	Brass; signet
1235	Earbob	N482 E565	L2/10–20 cm	1	0.1	Pendant
1235	Cone Tinkler	N482 E565	10–20 cm			Copper
1412	Trade Ring	N481 E562	L2/10–20 cm	1	2.4	Brass
1544	Hook and Eye	N481 E563	L4/30–40 cm	1	< 0.1	Eye for "eye and hook"
1772	Amber	N481 E563	L3/20–30 cm	1	0.4	Ring setting?
1807	Lock Part?	N482 E565	L3/20–30 cm	1	1.1	Probably a broken drop cover
1822	Footwear	N484 E567	L3/20–30 cm	1	n/a	Deteriorated sole and heel parts

Table 7.6: Fort Pierre Chouteau (39ST237) personal, trade and decorative artifacts by 2000 catalog number (accession 00-90-xxxx).

Catalog #	Description	Unit	Level	Count	Wt (grams)	Remarks
?	Marble	N465 E502	L5/40–50 cm	1	4.6	White fine grained crystalline; broken surface
?	Trade Ring	N444 E507	L4/30–40 cm	1	0.8	Brass; signet
0012	Earbob	N490 E504	L1/0–10 cm	1	<0.1	Pendant; German silver traces
0048	Tinkler	N490 E503	L1/0–10 cm	1	2.5	Copper
0192	Utensil Handle	N490 E502	L2/10–20 cm	1	2.2	Ceramic or porcelain-like material; broken
0204	Keyhole cover	N490 E502	L2/10–20 cm	1	1	Padlock; impressed “Terry & Co” with bird image
0210	Earbob	N490 E503	L2/10–20 cm	1	0.4	Sphere and wire
0213	Straight Pin	N490 E503	L2/10–20 cm	1	0.1	Brass, shank
0214	Pen Nib	N490 E503	L2/10–20 cm	1	0.3	Hayden Super Fine
0225	Shell Shield	N490 E503	L2/10–20 cm	1	0.6	edged shape
0228	Iron Eye Hook	N490 E500	L2/10–20 cm	2	0.3	Hook and eye
0536	Unknown	N465 E506	L2/10–20cm	5	0.8	frags of perforated plastic disk?
0697	Bone	unknown	unknown	1	0.7	hairpiece fragment?
0669	Eye Hook	N465 E506	L1/0–10 cm	1	0.3	Hook and eye
0671	Trade Ring	N465 E506	L1/0–10 cm	1	0.7	Brass
0711	Inlay	N443 E509	L5/40–50cm	1	0.3	fragment with cuprous rivet
0867	Eye	N444 E508	L5/40–50 cm	1	<0.1	Hook and eye; broken
0908	Buckle/Grip Guide	N490 E501	L5/40–50 cm	1	5.5	Brass
1088	Lock Part?	N433.5E508	40–50cm	1	0.7	Brass, drop cover?
1323	Comb, Bead	N490 E508.5	L3–4/20–40 cm	1	1.8	Bone; bead (hairpipe?) is beveled at one end
1375	Straight Pin	N565 E504	L6/50–60 cm	1	0.1	Brass
1456	Straight Pin	N465 E501	L6/50–60 cm	1	0.1	Brass
1491	Earbob	”TR.A Area 3”	Level 5	1	<0.1	Pendant

Table 7.6: continued

Catalog #	Description	Unit	Level	Count	Wt (grams)	Remarks
1521	Needle	N465 E504	Rodent Back Dirt	1	0.3	Iron; fractured
1618	Trade Ring	N444 E506	L5/40–50 cm	1	0.8	Brass; raised flower design on signet
1665	Clay Ball	N465 E505	L2/10–20cm	1	3.1	rough surface
1715	Earbob	N444 E506	L4/30–40 cm	2	0.8	Brass, wire loop
1779	Buckle/Grip Guide	N465 E501	L4/30–40 cm	1	2.3	Iron; fractured
1839	Eye Fragment	N490 E503	L2/15–20 cm	1	< 0.1	Brass; hook and eye
1840	Eye Hook	N490 E503	n/a	1	0.1	Hook and eye
1843	Comb Tooth	N490 E503	L2/ 15–20 cm	1	< 0.1	One tooth; modified into toothpick
1858	Eye	n/a	L5/40–50 cm	1	0.2	Brass; hook and eye
2021	Unknown	N465 E506	L3/20–30cm	1	0.7	Plastic?, toadstool shape, broken
2030	Unknown	N465 E505	L4/30–40cm	1	n/a	“knife sheath” observed by original analyst
2032	Footwear	unknown	unknown	1	n/a	Shoe/boot sole part
2052	Bone	TrA,Feat1	L5	1	< 0.1	Perforated fragment

Table 7.7: Fort Pierre Chouteau (39ST237) personal, trade and decorative artifacts by 2001 catalog number (accession 01-73-xxxx).

Catalog #	Description	Unit	Level	Count	Wt (grams)	Remarks
0050	Coin	N541 E572	L2/10–20 cm	1		1852 3 cent piece
0393	Slate	N460 E572	L1/0–10 cm	1	1.8	Fragment
0564	Fork Tines	N453 E569 SW1/4, N454 E369 NW1/4	L6/50–60 cm	1	4.8	Wrought iron
0641	Coin	N479 E567 NE1/4	L1/0–10 cm	1	1.2	Half dime, 1855, seated Liberty, “O” mint mark (New Orleans)
0644	Slate Pencil	N470 E568	L1/0–10 cm	2	< 0.1	Fragment
0705	Ornaments	N480 E570	n/a	2	1.5	Brass; Repousse design
0782	Buckle/ Grip Guide	N481 E567	L1/0–10 cm	1	3.3	Type “C” (three-tined) buckle/grip guide
0809	Bone Bead	N481 E568	L2/10–20 cm	1	0.3	Bird radius; hollow center
0962	Coin	N479 E567 SW1/4	L2/10–20 cm	1	0.8	1852 3 cent piece
0965	Tinkler	N479 E567	10–20cm	1	0.8	Tubular
1067	Company Insignia	N479 E567	L3/20–30 cm	1	1.4	“A”; Brass
1138	Slate Pencil	N481 E567	L2/10–20 cm	1	0.6	Tapers to a worn point
1376	Bone	N474 E568	L4/30–40cm	2		cut trapezoidal (0.9 g); cut band (0.3g)
1198	Earbob	N480 E570	L3/20–30 cm	3	< 0.1	Copper wire
1406	Tinkler	N480 E568	L3/20–30cm	1	0.2	Copper; fragment
1456	Hook & Eye	N483 E564	L3/20–30 cm	1	1.2	Iron; corroded together
1469	Hook	N481 E567	L3/20–30 cm	1	0.2	Hook and eye
1623	Thimbel	N454 E575	L1/0–10 cm	1	1.2	Brass, perforated
1730	Fork	N483 E571	L2/10–20 cm	1	15.4	Wrought Iron; heavily corroded, tines broken
1882	Straight Pin	N457 E572	L2/10–20 cm	1	< 0.1	Brass; flat head
1950	Large Bead	N452 E572	L4/30–40 cm	1	8.9	Half glass
2162	Earbob	N478 E569	L1/0–10 cm	1	0.4	Sphere and wire
2300	Buckle Frame	N479 E573 SW1/4	L1/0–10 cm	1	1	Fragmented, grip teeth
2315	Slate	N454 E569	L1/0–10 cm	1	41.2	Fragment

Table 7.7: continued

Catalog #	Description	Unit	Level	Count	Wt (grams)	Remarks
2377	Slate Pencil	N481 E567	L2/10–20 cm	1	0.7	Fractured
2541	Hook and Eye	N476 E569	L3/20–30 cm	1	< 0.1	Brass
2864	Trade Ring	N477 E568	L2/10–20 cm	1	0.8	Brass, signet, combination chevron/slash design
2865	Hook and Eye	N477 E568	L1/0–10cm	1	0.1	Brass
2926	Straight Pin	N477 E568	L2/10–20 cm	1	< 0.1	Fragment, head/shank, flat head
2940	Straight Pin	N477 E568	L3/20–30 cm	1	< 0.1	Brass, flat head
2902	Bone	N474 E568	L4/30–40cm	1	0.3	Perforated fragment
2966	Buckle Frame	N477 E568	L4/30–40 cm	1	1.4	Brass, broken, not decorated
2993	Straight Pin	N477 E568	L1/0–10 cm	2	< 0.1 each	Brass, one is head/shank; one is complete, bent; flat head

Chapter 8

Clay Smoking Pipes from Fort Pierre Chouteau

Michael Fosha[1]

With contributions from Doris MacDonald

Introduction

The report focuses on the clay smoking pipes recovered from the excavations at Fort Pierre Chouteau in regards to the artifacts role in the "tobacco consumption package" (Cessford 2001). Clay smoking pipes remain the most obvious method of recognizing this practice in most archaeological deposits due to their preservation. The fledgling study of clay pipe research has grown considerably in the recent decades and has addressed such topics as the clay pipe industry, international and local trade, economics, status, cultural or ethnic indicators, and chronologies. As an artifact, smoking pipes are typically good chronological markers due to their stylistic changes over the history of production. Because of their fragile and inexpensive nature, a smoking pipe consumer could go through multiple pipes in a period of a year and contribute to a large artifact assemblage at many historic sites. Clay smoking pipe attributes such as pipe configuration, style, decorative elements, maker's marks, and bowl-stem size are used to date archaeological deposits. These attributes and especially stem bore diameter is key in dating archaeological contexts prior to the late eighteenth century. Late 18th through the nineteenth century pipes are dated primarily

[1]Archaeological Research Center, South Dakota State Historical Society

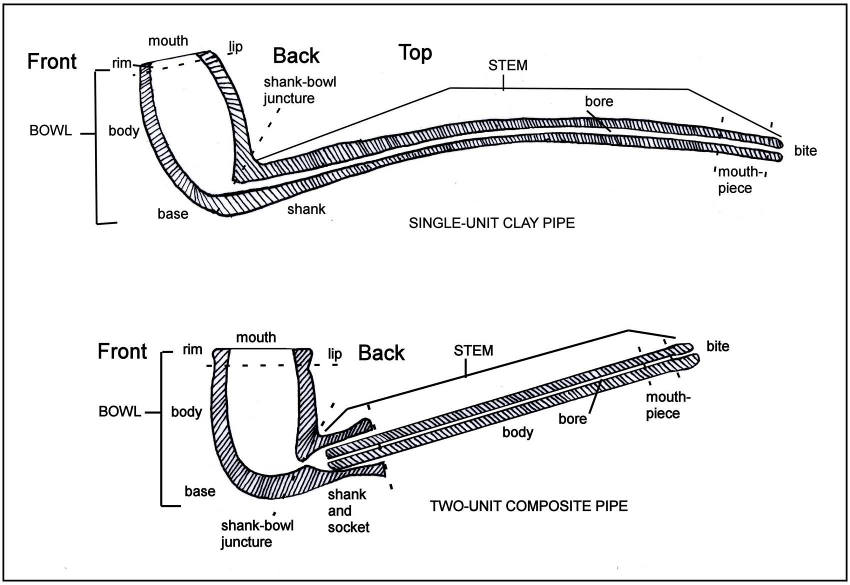

Figure 8.1: Smoking pipe terminology. Redrawn from C.F. Richie in Bradley 2000:105, by Doris MacDonald.

upon the period of operation for a known manufacturer or rely on general attribute changes based upon cultural or iconological preferences in the local, regional and world markets.

Two varieties of pipes are present in the Fort Pierre Chouteau assemblages. These are discussed in this report as single-unit clay pipes and two-piece composite pipes (Bradley 2000:104). Single-unit clay pipes (also referred to as a ball-clay) are molded pipes made from refined clays that were the staple of tobacco consumers well into the twentieth century. Two-piece composite pipes (also referred to as reed stem) consist of a bowl and that holds the substance to be smoked and socket shank designed to accept a stem which could be made from a variety of materials (Figure 8.1).

The majority of the smoking pipe terminology used in this report is from Bradley (2000:104–133). Left and right sides, front and back, and top and base are applied from the perspective of the smoker using the pipe. Figure 8.1 identifies the terminology and features of the pipes recovered at Fort Pierre Chouteau. Other pipe features discussed in the text relate to single-unit clay pipes and include spurs, pegs or pedestals and bite. Spurs, pegs, and pedestals relate to early pipe design in which heels and feet were added to the base of the pipe at the shank-bowl juncture, which enabled the pipe to remain upright when placed upon a flat surface (Bradley 2000:109). Spurs, pegs, and pedestals on nineteenth century pipes are too narrow to allow for this but allow the smoker the means to hold a hot pipe bowl without being burned. As with pipes of the 16th through eighteenth century, these features are occasionally decorated or indicate a specific manufacturer. Not all pipes of this period of study incorporated these appendages. Bite or bit refers to the morphology of the end of the pipe stem which can include several styles (Pfeiffer 1978).

Clay smoking pipe characteristics of the nineteenth century evolved from attributes found on pipes from earlier centuries and allows for a relative chronological age. Bradley (2000:114–116) gives of brief evolution of the clay smoking pipe attributes. Pertinent clay smoking pipe attributes to this study can best be recognized beginning prior to the end of the eighteenth century. It is at this time the angle of the axis of the pipe bowl to the stem was becoming less obtuse to nearly a right angle by the end of the century. Embellishments of the bowl such as fluting and the addition of leaves or floral motifs to the mold seams on the front of the bowl became a common addition at the end of the century or the beginning of the nineteenth century. Effigy pipes and elaborate decoration become common during the first half of the nineteenth century. Factory identification, the name of the master potter, advertising and symbolism became common during the mid-late nineteenth century. This was especially true with pipes of European origin from companies or potters whose pipes were considered of high quality. Bradley (2000:115) also notes a return to old features such as the plane of the bowl lip becoming more obtuse or slanted away from the smoker and other companies designing pipes to imitate the increasingly popular and potentially cost prohibited meerschaum pipes. Also, as many clay pipe researchers have noted, with mass production of these pipes attention to detail such as a lack of hand burnishing or removal of mold seams becomes prevalent during this period, especially common on domestically produced pipes of the U.S. Near the end of the nineteenth century, the U.S. McKinley Tariff Act of 1891 required all imported ceramics to identify country of origin which in some cases can be used to assign pipes to this period.

There appears to be adequate data to make local chronologies of the early to mid-nineteenth century smoking pipes in the plains through assemblages associated with fur/bison robe trade and military occupations. Though many excavation reports do not thoroughly discuss or illustrate characteristics of the smoking pipe assemblages for adequate comparisons, attempts have been made to recognize local trends of this period (Pfeiffer 1982, 1983; Sudbury 1979; Walker 1983) and some generalizations through relative dating. For this study, only those pipes with characteristics which have meaningful attributes are discussed in detail. Meaningful here, considers design elements, maker's marks or attributes unique to a specific manufacturer. Measurements are recorded in millimeters with the exception of single-unit clay smoking pipe bore diameters which are recorded in 64ths of an inch following traditional methods of measure (Alexander 1983). Proveniences of the pipes discussed in this report are presented in terms of their position in relation to known structures. Structure location was gleaned from a map and narrative of the early period (ca. 1832 to mid 1840s) of the fort by Maximilian, Prince of Wied, in 1832 (published in 1843); a late fort period (ca. mid 1840s to 1855) depicted in an 1854 watercolor by Frederick Behman and accompanying narrative by Pierre Chouteau Jr.; and an 1855 plan view by Captain Parmenus T. Turnley.

Two-Piece Composite Pipes

Two-piece composite smoking pipe fragments total 115 and make up 7.4 percent of the Fort Pierre Chouteau smoking pipe assemblage. This style of pipe consisted of a bowl and shank formed to accept a separate stem. Some Early Euroamerican manufactured forms were copied from Native American forms in the early seventeenth century (Trubowitz 2005). By the mid-1700s the two-piece composite pipe was being produced by cottage industries in the U.S. and became the dominant pipe style manufactured in the country from the 1840s to the early 1900s (Bradley 2000:118). A result of the nineteenth century industrial revolution, major large scale production plants in Point Pleasant, Ohio, and Pamplin, Virginia were producing hundreds of thousands of this variety of pipe per year.

Two piece composite pipes from the fort fall into three categories: Anthropomorphic (Naturalistic), Geometric, and Plain/Undecorated. The anthropomorphic category had the greatest frequency with 64 fragments or 55.7% of the two-piece composite pipes followed by Plain/Undecorated with 45 fragments (39.1%) and Geometric with six fragments (5.2%). The anthropomorphic pipes from the Fort Pierre Chouteau assemblage are attempts in realistic representation of known and idealistic individuals. Pipes of this type are being produced in the U.S. by cottage industries as early as the beginning of the nineteenth century. Many of these pipes had limited distribution and are not recognized in most archaeological deposits on the plains until the mid nineteenth century. European production of this type were being produced and shipped in large quantities throughout the world market by this time and became very popular by the middle of the nineteenth century becoming part of many assemblages dating to this period.

Style: Anthropomorphic, Native American Indian face pipe with head dress (Figure 8.2a 99-70-920 and 01-73-1080). This style is represented by 19 fragments with a minimum number of two pipes. It is manufactured with a tan to light orange clay, unglazed, and covered on the exterior with an orange (2.5YR 5/8) slip or paint that has largely eroded away from primary surfaces. Decoration is applied from the bowl/stem juncture with hair framing a face and a headdress of feathers encircling the back and top of the head ending 2 mm below a plain lip The pipe stem has a raised ring finish 19.6 mm in diameter, the stem in front of the finish is 15.3 mm in diameter with a stem bore diameter of 7.1 mm. Inside bowl diameter is 18.4 mm with an outside diameter of 22.0 mm. Seventeen fragments of this pipe were recovered from an area approximately 6 × 8 m in the vicinity of what is identified as a late period shop on a map produced by Turnley and identified archaeologically as the blacksmith shop. Two additional sections were recovered 6 m apart and 16 m to the south of this cluster near the southeast bastion and early period employee residence based on Maximilian's map.

Red clay anthropomorphic pipes are sometimes related to the Moravian pipe industry. This industry had several master potters who operated in Bethabara and Salem, North Carolina communities beginning in 1755 and continuing until 1900 (Sudbury 1979). Pipes from these factories are typically two-piece composite pipes of various quality and styles which are known to occur infrequently in early-mid nineteenth century sites in the plains and frontier regions of North America. However; while this pipe is an example of the styles and manufacturing of the Moravian pipe industry, it cannot be directly identified to this or any other pipe maker.

Style: Anthropomorphic, President Grant face pipe (Figure 8.2b-d 99-70-96 and 99-70-1160). Fragments of several colors of this style are represented in the assemblage. This includes various hues of yellow, orange, brown and the most common color, dark brown (7.5YR 2/4, 5YR 3/6, 2.5YR 2/2-2/3, 7.5YR 7/8-10YR 7/8). A total of 34 fragments represent a minimum of eight pipes. The pipes are glazed and manufactured from clays similar to the finished color. Bowl decoration is a full bearded face and upper head covered with wavy hair. A flowing garment begins at the neck and continues onto the stem. The stem has a stem ring finish 19 mm in diameter, the stem below the finish is 16 mm in diameter with a stem bore diameter of 12 mm. The stem and bowl are formed at a nearly 45° angle. The bowl rim is a raised flat ring approximately 3.7 mm in height with an interior bowl diameter of 23 mm and an exterior diameter of 29 mm (all measurements on this style are approximate). These pipes were located in the general area identified as the black smith shop. With the exception of two outlying fragments, these were recovered within a 4 × 9-meter area.

Figure 8.2: Selected two-piece composite smoking pipes from Fort Pierre Chouteau.

Pipes of this style and color are of German manufacture (Pfeiffer et al. 2007) and referred to as *stummelpfeifen* or stub pipes which were specifically manufactured for the U.S. market beginning in the 1830s. By the 1840s, millions of stummelpfeifen a year were exported to the U.S. German manufacturers were probably the first pipe makers to issue this style of pipe, which they marketed as "Philosopher" pipes. They have been called Grant pipes by collectors and by some researchers. Ulysses S. Grant did not become popular among the American populace until the early 1860s, after becoming a successful general in the civil war; he ultimately forced the surrender of General Robert E. Lee in 1865. Grant ran for president and was elected in 1868; he continued in that capacity until March of 1877. His early period of popularity as a general may have initiated the manufacture of these pipes in the early 1860s in the U.S., as they were copied and produced by the American potter John Taber, Jr. sometime during operations of the East Alton, New Hampshire plant during the period 1850–1872. These pipeswere much cruder in contrast to the German manufactured examples (Sudbury 1979; Jung 1996; Pfeiffer et al. 2007). The inception date of the German philosopher style is unknown to the author but may have been during the 1850s. It appears likely that they were taken up as Grant pipes by the U.S. because of the physical similarity to the military hero during the civil war and continued to be marketed as Grant pipes into his tenure as president.

Style: Anthropomorphic, President Pierce face pipe (Figure 8.2e 01-73-1395). This style is represented by ten fragments with a minimum number of three pipes. The pipe is manufactured from white clay with a tan-cream slip (10YR 8/4) and a clear glaze. The bowl consists of flowing and curly hair with a clean shaven face above an upturned collar. The stem is embossed "PRESIDENT" on the right and "_ _ IERCE" on the left (presumably "FR PIERCE"). A band of stars encircles the shank. The stem and bowl are formed at a nearly 45° angle. The lip/rim consists of a raised ring 2.7 mm in height with an interior diameter of 19 mm outside diameter of 24 mm. The bowl height is 40 mm with an interior depth of 34.7 mm. The stem length is 42.1 mm with a stem ring finish 19 mm in diameter and a stem diameter of 14 mm at its narrowest in front of the finish. The stem bore is 8 mm in diameter. Sections identified to this style and color was found within three meters of each other and most likely represents one pipe. Three refits were recovered from two adjacent units, the depths varied from 0–10 through 20–30 cm below surface. Eight of the fragments were recovered from an area less than 3×4 m in size in the area of the blacksmith shop, and two fragments were recovered near the southeast blockhouse and early period employees' residence.

Pfeiffer et al. (2007) indicate this variety of Pierce pipe is identical to those manufactured in Grossalmerode, Germany which are characterized by a band of stars encircling the shank near the base of the bowl and "FR PIERCE" on the left side of the stem. A similar pipe from Uslar, Germany is marked "FRANK PIERCE" on the left side of the stem and lacks the band of stars. Like other varieties of German-manufactured face pipes, these varieties were well made and had a stem approximately 45° to the bowl and were produced in a variety of colors both glazed and unglazed. According to Pfeiffer et al. (2007:10) Pierce pipes are thought to be the last of the presidential series manufactured by the German producers. Pierce ran for the office of president in 1852 and served from 1853–1857, indicating its use during the later period of occupation at the post.

Style: Anthropomorphic, President Fillmore face pipe (Figure 8.2f–g 01-73-1368 and 01-73-684). This style is represented by four bowl fragments with a minimum number of two pipes. They were manufactured from off-white clay with a yellow to greenish-brown glaze (10YR 7/4) and yellow clay with a clear glaze (2.5Y8/4). One of the fragments comes from the forehead on the front of the bowl and is decorated by strands of hair and a laurel wreath, representing President Fillmore. The other fragments are of various sections of the face and forehead and contain laurel wreath and a heavy brow ridge; they could represent a number of political figures including Fillmore, Zachary Taylor, Lewis Cass, or Henry Clay. These fragments were recovered two meters apart from the location of the late period blacksmith shop.

Like other anthropomorphic presidential or election pipes, many of these were manufactured in Germany although probably copied in the U.S. President Fillmore served in office from 1850–1853. Lewis Cass ran for and lost the presidential election in 1848. Zachary Taylor served as the president from 1849–1850. Henry Clay ran for the office of president in 1824, 1832, 1840, 1844, and 1848 but was never elected. Pipes representing any of the above individuals were in use during the period of the fur and bison robe trade at the post.

Style: Anthropomorphic, Queen Victoria face pipe (Figure 8.2h 99-70-96). This style is represented by a single bowl/rim fragment manufactured from brown clay and clear or brown glaze (7.5YR 2/2). The fragment is composed of the back of the bowl which represents the back of the head. It is exhibits hair with tight curls with a laurel wreath motif. The interior diameter at the lip is 22 mm with an exterior diameter of 26.5 mm. This specimen was recovered from the location of the late period blacksmith shop.

Victoria was queen of the United Kingdom of Britain and Ireland from 1837–1901, bracketing the time frame for the fur and bison robe trade at the post. Queen Victoria pipes from Germany were are of Grossalmerode or Uslar manufacture and include a double bead necklace and ornate gown, which begins at the bowl/stem juncture and continues to a raised ring finish on the stem. The stem is approximately 45° to the bowl (Pfeiffer et al. 2007:8, Figure 2,b). Copies of this style, presumed to be of American manufacture, have a yellow-brown glaze over a white clay body and are poorly formed in comparison (Pfeiffer et al. 2007:9).

Style: Glazed X-Banded (Figure 8.2i 80-303-93). This style is represented by a single bowl/rim fragment manufactured from orange clay with a clear glaze (5YR 4/8). The decoration consists of two raised thin lines 4.0 and 6.5 mm beneath the lip. A band of conjoined raised Xs 4.4 mm wide are attached to the lower of these raised lines. The interior diameter of the bowl is approximately 18.8 mm in diameter and the exterior rim diameter is approximately 24.5 mm. The fragment was recovered in the location of the early period employee quarters near the southeast block house.

This pipe is similar to pipes manufactured in Ohio by several potters in the Point Pleasant area. Sudbury (1979) and Murphy (1976) both indicate that the clay smoking pipes possibly began to be produced at this location in the 1840s and continued into around 1890. The glazed X-Banded is described by Murphy (1976:13) as a Point Pleasant Criss Cross variant A, although the additional raised line above the X banding is not identified in his description or figure (Murphy 1976, Figure 1, G:14).

Style: X-Banded Type B (Figure 8.2j 99-70-311). This style is represented by a bowl/rim and a shank/bowl fragment manufactured from olive green clay with a dull glazed surface (5YR 4/2–3/2). The bowl decoration consists of conjoining narrow X banding 1.8–2.0 mm wide and 5.6 mm high and four 1.0-millimeter-wide raised lines encircling the bowl. The lowest line is 16.0 mm below the lip approximately mid-point to the bowl height. Encapsulating the X banding are lines at 12.3 and at 5.6 mm below the lip. The upper raised line is 2.7 mm beneath a slightly outward beveled lip. The fragments were recovered from the late period blacksmith shop area.

The author has not observed this style in the literature, but the finish, color and type of decoration make the Ohio Point Pleasant factories a good candidate.

Style: X-Banded Type C (Figure 8.2k 00-90-1827) This style is represented by a bowl/rim and a shank/bowl fragment manufactured from brown clay with a dull glazed surface (7.5YR 3/4). The bowl decoration consists of conjoining X banding 4.5–5.0 mm wide and 6.0 mm high, with two raised lines encapsulating the X banding at 3.0 and 11.0 mm below the lip and one 2.5 mm below a flat lip. Additional raised curvilinear lines are located below the X banding. This pipe fragment was located from an area of multiple activities including the early period manager's residence and west gate and the late period kitchen.

This pipe is similar to pipes manufactured in Ohio by several potters in the Point Pleasant area. The glazed X-Banded is described by Murphy (1976:13) and pictured in Murphy (1976:14, Figure 1, i; Sudbury 1979:260 Plate 11:3) as a Point Pleasant Criss Cross variant B, although the additional raised curvilinear lines below the X banding is not illustrated or described.

Style: Point Pleasant Chevron (Figure 8.2l 00-90-1717). This style is represented by a bowl fragment manufactured from a grey or dark olive clay with a green glaze (2.5Y 3/2). Decoration includes a band of raised chevrons pointing clockwise, 4.0 mm apart and 11.5 mm in height. The band is bisected by a raised line approximately 1.0 mm wide. A raised line 1.8 mm thick borders the top of the chevron band. This pipe fragment was recovered adjacent to the south west corner of the palisade.

This pipe is identified as manufactured in Ohio by one of the potters in the Point Pleasant area. This style is described by Murphy (1976:13) and pictured in Murphy (1976:14, Figure 1, a; Sudbury 1979:259, Plate10, 9) as a Point Pleasant Chevron Variant B.

Style: Punctate Plain (Figure 8.2m 01-73-648). This style is represented by a bowl fragment manufactured from dark grey or dark olive clay with a light brown (5YR 4/4) slip. Decoration is a single punctuate 5.5 mm in diameter 4.5 mm below the lip. A raised line encircles the lip. This fragment was recovered from the late period blacksmith shop area.

Murphy (1976) and Sudbury (1979) show several varieties of Point Pleasant punctate decorated pipes. Although this style does not match any of the variants, it is very likely to be manufactured from one of the Point Pleasant factories.

Style: Point Pleasant Miscellaneous (Figure 8.2n 99-70-195). A rim/-bowl fragment is manufactured from dark grey or dark olive clay with a light brown (2.5 YR 3/2) glaze. Decoration consists of multi-directional raised lines beneath a raised line 2.7 mm wide encircling the bowl 1.5 mm below the lip. This fragment was recovered from the late period blacksmith shop area.

While the fragment is too small to fully articulate the decoration, the fabric, color, and finish represent Point Pleasant manufacturing.

Style: Glazed Row-of-Dots (Figure 8.2o - -2001). This style is represented by bowl fragment manufactured from dark grey clay with a cream to off-white slip and a clear glaze (10YR 8/1). A row of raised dots 2.1 mm on center with a single raised dot 3.0 mm below this. The fragment was recovered in the vicinity of the late period blacksmith shop.

Style: Glazed Undecorated. This style is represented by a bowl fragment manufactured of orange clay with a clear glaze (5YR 4/8). The “orange peel-like” surface texture is strongly comparable to salt glaze. The fragment was recovered from the location of the early period employee quarters near the southeast block house.

Style: Plain Unglazed (Figure 8.2p 01-73-2727). This style is represented by four refitting bowl fragments. It is manufactured of unglazed reddish-brown clay (2.5YR3/6). The only decoration is a raised 2.0-millimeter-wide band encircling the bowl 2.0 mm below a rounded lip. The fragments were recovered from the area of the late period blacksmith shop.

Plain unglazed pipes of this style were manufactured by many companies in the North America and probably abroad.

Style: Plain Earthenware (Figure 8.2q 00-90-458). This style is represented by the shank/socket of a large earthenware pipe. The pipe is manufactured from dark reddish-brown clay with a black exterior finish which appears to have been burnished prior to firing. Silt-size sand particles are either naturally occurring or have been added to the clay as a tempering agent. The exterior dimensions of the back of the socket are 20.5 mm in diameter. The interior diameter is 8.23 mm, which tapers to 3.0 mm at the bowl/shank juncture. This pipe fragment was located from an area of multiple activities including the early period manager’s residence and west gate and the late period kitchen.

Single-Unit Clay Smoking Pipes

The single-unit clay smoking pipes of European manufacture dominated the market during the fur and bison robe trade of central and western North America prior to the civil war. Even after this period, trade in foreign single-unit clay pipes still show a significant presence in the archaeological assemblages. The persistence of using European manufactured goods may be due to the higher quality of clay or manufacturing as opposed to many North American manufacturers of this period. Furthermore, even with custom fees and tariffs on imported goods, the price of American manufactured pipes was not significantly cheaper. Around the period of the civil war, an increased variety of pipes are observed. While the single-unit clay pipe continued to maintain a strong market, two-unit composite varieties and multi-unit composite pipes were becoming more popular. All of the single-unit pipes recovered thus far from the post has been manufactured from white clay. A total of 1432 single-unit clay pipe fragments make up 92.6% of the total clay smoking pipe assemblage.

A total of 756 bowl fragments include 504 (66.7%) with no decoration present and 252 fragments (33.3%) with some form of decoration. Decoration was recorded as Naturalistic (floral, stars) Geometric (cockles or flutes, lines, etc.) and Symbolic (ethnic, patriotic, initials, numbers).

TD Pipes

A total of 46 pipe fragments can be positively associated with TD pipes which have the raised or recessed initials TD on the bowl, stem or spur. These have been subdivided into ten styles based upon decoration, sized of the initials or location of the initials on the pipe. The initials TD, in connection with single-unit clay pipes, goes back over 200 years and has become synonymous as a type of clay pipe in North America since the early nineteenth century to present (Walker 1966:86). The origin of the letters TD appear around 1750 and most smoking pipe researchers feel they are associated with the practice of the artisans marking their product with initials. The individual commonly associated with this is Thomas Dormer of London during this period. It is suggested that the pipes were of such an extremely high quality or of such a popular nature that the trademark was immediately plagiarized. The initials have been applied to pipes from major smoking pipe production regions in Europe and North America.

Style: TD and Stars/Horizontal Diamond (Figure 8.3a 80-303-586, 223 and 6). This style is represented by eight bowl fragments representing a minimum of three pipes. Features of this pipe style are the plane of the bowl lip moderately slanted away from the smoker and the presence of a peg on the base of the bowl/stem juncture. Decoration consists of a pattern of horizontal diamonds on the sides of the bowl terminating at a raised line at the rim, a raised circle on the back of the bowl, and a floral motif following the front mold seam from the lip of the bowl to the front of the peg. Within the raised circle is a circle of 13 raised, six-pointed stars with the letters TD inside this separated by a distinct rear mold seam. Above a raised band on the rim are 13 six-pointed stars. This band is located 4.4 mm below the lip of the bowl. The raised circle on the back of the bowl is 24.2 mm in height. The top of the D is located 14.0 mm below the lip and is 5.0 mm in height. The peg on the base of the bowl has a height of 3.6 mm. Diameters are $5/64''$ for the stem bore, 18.6 mm for the inside of the bowl and 23.0 mm for the outside of the bowl at the lip. The bowl height is 38.8 mm with an interior depth of 33.3 mm at the back of the obtuse bowl. The raised line separating the band of stars from the horizontal diamond pattern is 5.2 mm below the lip. Six fragments comprise the majority of the bowl and came from an area identified as the early period employee quarters. Other fragments were recovered from the late period kitchen area and one fragment near the northwest blockhouse.

This style is fairly uncommon in the archaeological literature of the Plains; however, Paddy (1976:2, Figure 4:A1, 2) indicates this unusual cross-hatched body became popular in the United States during the War of 1812 and remained so during the early-to-mid nineteenth century. Smith (1960:138) points out that the six-pointed stars and employment of only 13 stars suggests that the design may have been particularly for the American market, since the variety is known to have been manufactured in Europe and that American specimens are not known. Citing Quaife (1942:141, 147), Smith (1960:138) regards the use of six-pointed stars as an early type of TD and Stars stamping, which comes from the adoption of an American flag about 1777; regimental flags "are said to have exhibited 6-point stars almost as frequently as 5-point, and it is probable that the former design for the star was the earlier, whereas the latter came to be the proper style in the canton of the American ensign."

Style: TD and Stars (Figure 8.3b 99-70-1506 and c 00-90-33). A minimum number of seven TD and Star pipes, consisting of three slightly different configurations, are in the assemblage. The most complete of the fragments includes one example of a raised circle encapsulating a circle of raised five-pointed stars around raised letters TD on the back of the bowl (00-90-33). The letters are 4.7 mm in height and 3.3 mm apart separated by a prominent mold seam. Judging from the spacing, it would appear there had been thirteen stars on the original. A second band of stars is just below the rim, with a raised line encircling the pipe beneath this at a distance of 5.1 mm below the lip. The top of the raised circle surrounding the TD and stars and the raised band beneath the band of stars conjoin on the back of the bowl. Two additional variations of this style are similar, but lack the upper raised circle beneath the upper band of stars—and the stars on these specimens are six pointed. The circle of stars around the TD and the upper band of stars conjoin near the top of the back of the bowl (99-70-1506). One fragment consists only of a circle of stars around a TD with no other decoration. The other six fragments are too small to determine full decoration. Finds from early period structures include four from the employee quarters and one from the clerk quarters, and one from the clerk's quarters/office. Finds associated with late period structures include four bowl fragments from the area of the blacksmith shop and two fragments from the area of the kitchen.

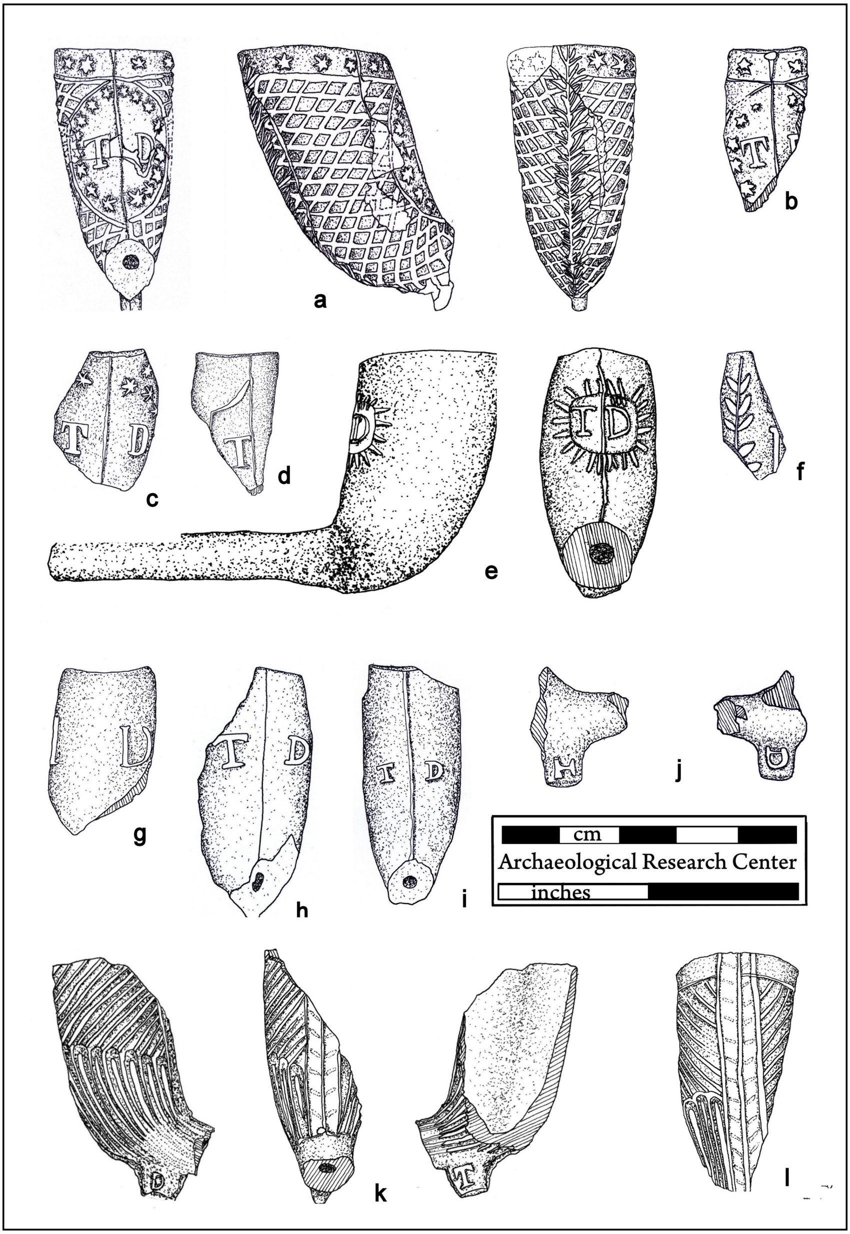

Figure 8.3: Selected single-unit "TD" smoking pipes from Fort Pierre Chouteau.

These are often referred to as patriotic pipes and have been found on sites beginning in the first decade of the nineteenth century. Complete pipes of this style have 13 stars (sometimes 12 or 14); occasionally present is a set of leaves on either side of the front mold seam running from the base of the pipe to the lip and occasionally a band of stars encircling the rim with a network of lines over the rest of the bowl (Walker 1966:89). It is not clear if this refers to the circle of stars and horizontal diamond motif mentioned above or another configuration. The TD circle of stars motif is common to sites of the early to mid nineteenth century on the Northern Plains.

Style: Shield TD (Figure 8.3d 01-75-1395). One example of this style is in the assemblage. Features of this style include a T and D measuring 5.0 mm high on either side of the rear mold seam surrounded by a shield, which terminates 4.0 mm below the lip of the bowl. A Shield TD pipe recovered from the Fontenelle trading post is described as having letters 3.5 mm high, with the shield bar continuing upward past a crossbar to a ring in the fashion of an anchor with a band of rouletting measuring 3.0 mm high surrounding the lip (Pfeiffer 1998:146 and Figure B-1, g). This fragment was recovered from the area of the late period blacksmith shop.

Style: Circle TD with Radiating Rays (Figure 8.3e 99-70-1375). This Dublin-style pipe is represented by 10 fragments representing a minimum of 10 pipes. The bowl is set slightly obtuse to the stem. The T and D are 5.0 mm in height, set on the back of the bowl 10.3 mm from the top of the letters to the lip. A raised circle approximately 8.0 mm high and 14.0 mm wide has lines radiating outwards approximately 3.0 mm. The exterior dimension at the lip is 25.6 mm front to back and the interior width of 13.3 mm front to back. The plain of the bowl mass is 40.0 mm, bowl length is 25.6 mm, and width is 20.5 mm. The stem is round with a bore diameter of $5/64''$. The front mold seam has been removed. It appears that a spur has been removed from the base of the bowl. The design element on this specimen and others recovered range from faint to moderate in legibility. Finds from early period structures include employee's quarters near the east entrance. Finds associated with late period structures include the sawmill and the blacksmith shop. Finds of undetermined age include one pipe from the southeast blockhouse.

Style: TD and Pinnate Leaves (Figure 8.3f 99-70-1506). One bowl fragment was recovered that is decorated with paired pinnate leaves extending from a mold seam. Adjacent to the leaves is a partial D 8.3 mm high beginning 12.4 mm below the lip of the bowl. This fragment was recovered from the late period blacksmith shop.

Style: Plain TD Large (Figure 8.3g 99-70-914). A minimum number of six pipes are included in the assemblage. Features of this pipe style from the fragments at hand suggest a plain bowl with the raised letters T and D separated by the back mold seam. The letters are 6.5 mm, with the exception of one measuring 6.1 mm; this could have from a slightly different mold. None of the sections suggest a spur or peg was applied. From the lip to the top of the letter D measured 8.0 mm with one example measuring 9.2 mm. The raised letters vary from easily identifiable to very faint or unseen without magnification. The vertical bar and half circle of the letter D are not conjoined at the top, and two examples of the letter T consist of the vertical bar and the serifs. One example is conjoined. Four examples of this style were recovered from the early period employee quarters, two fragments were recovered from the late period sawmill, and two from the blacksmith shop area.

Style: Plain TD Medium (Figure 8.3h 81-113-247). A minimum of five pipes of this style are in the assemblage. Features of this pipe are similar to those for the Plain TD Large style with smaller size raised font. Distance from the lip to the top of the letter D measured 8.3 and 10.2 mm on the two sections that had a rim present. The height of the letters were 5.0 mm (n = 6) and 4.7 mm (n = 1). The most complete bowl/shank fragment has a plane of bowl mass of 41.8 mm and a stem bore diameter of $^4/_{64}{}''$. Two fragments were recovered from the early period employee quarters and one from the clerk's quarters/office, and a minimum of two pipes were recovered from the late period blacksmith shop area.

Style: Plain TD Small (Figure 8.3i 01-73-2356). A minimum of three pipes of the style are in the assemblage. Features of this pipe are similar to the above referenced size respective TD pipes. The raised font is 3.1 mm in height. The most complete bowl/stem fragment has a plane of bowl mass of 40.1 mm and a stem bore diameter of $^5/_{64}{}''$. No spur or peg is present. All the fragments were recovered from the late period blacksmith shop area.

Style: TD Spur (Figure 8.3j 00-90-1325). This type is based on a single shank/bowl juncture fragment. Decoration consists of a T measuring 4.2 mm high on the left side of the spur and a D on the right. The peg style spur is 5.7 mm in length. The stem bore is $^4/_{64}{}''$. This specimen was recovered from the area of the late period kitchen. These spur markings are known to occur on a large number of pipe styles from the late 1700s to the mid-1800s (Pfeiffer 1998:152).

Style: Cockle and Scallop with Diagonal Line TD Spur (Figure 8.3k 01-73-784 and 8.3l 01-73-784). This type is represented by eight fragments with a minimum number of five pipes of this style. The most complete specimen includes portions of the bowl, the bowl/shank juncture and a tapering flat-oval spur with a T on the right and a D on the left of the spur. Decoration consists of two vertical lines 6.0 mm apart either side of the front and back mold seams, which emanate from the base of the bowl to the lip. Obscured within these lines are raised features 2.6 mm apart, which may be stars. Cockle-filled flutes begin at the bowl/stem juncture following the form of the pipe to the midpoint of the bowl. Above the termination of the flutes are raised diagonal lines at 45° to the front mold seam; they angle upward toward the back of the bowl approximately 2 mm apart and terminate at the lip on three examples and at 4.1 mm below a plain lip on one example. The bowl height is 38.0 mm with a bore/stem diameter of 6/64″. Finds from the early period fort structures include four from employee quarters. Finds from late period structures include three from the blacksmith shop. One fragment was recovered near the southeast blockhouse.

Other Styles

Style: Chevron (Figure 8.4a 98-131-1141). This type is represented by one bowl fragment. Decoration consists of upward slanting diagonal lines 1.1 mm wide spaced 1.61 mm apart from the right and the left, joining to create chevrons. The chevrons start at a raised line which encircles the bowl 5.5 mm below the lip and extend down the bowl of the pipe. Devore (1993:38) describes a chevron application similar to this on the back of Arrow Stem pipe bowls but does not illustrate this pattern. This specimen was recovered between the early period dwelling and a late period shop near the east entrance.

Style: Sun Emblem (Figure 8.4b 01-73-2538). This type is represented by one bowl/lip fragment. Decoration consists of two parts: an upper band measuring 2.8 mm wide filled with closely spaced vertical lines 0.7 mm on center extending from the rim to a horizontal line encircling the bowl; beneath this are portions of symbols and the complete symbol of a sun with radiating lines 9.5 mm in diameter. This fragment was recovered from the area of the late period blacksmith shop.

Style: Vertical Band of Dots (Figure 8.4c 99-70-1379). This type is represented by one bowl fragment. Decoration consists of vertically oriented raised dots approximately 2.0 mm apart bordered by raised lines 4.1 mm apart. This specimen was recovered in the area of the late period blacksmith shop.

Style: Curved Cockles (Figure 8.4d 01-73-2426). This style is represented by seven bowl fragments with a minimum of four bowls. Decoration consists of evenly and closely spaced raised cockles beginning at a raised

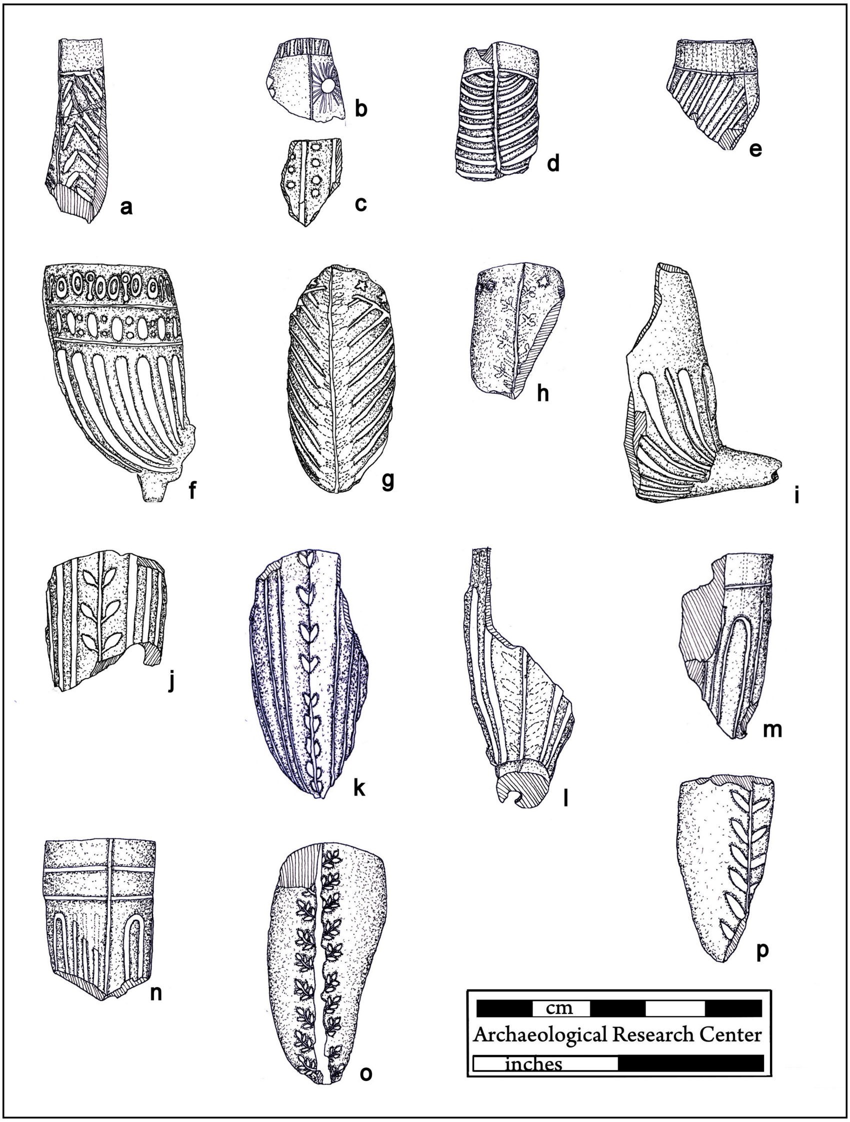

Figure 8.4: Selected single-unit decorated smoking pipes from Fort Pierre Chouteau.

line encircling the rim 5.5 mm below the lip and curving downward on a diagonal to the back mold seam. Two fragments were recovered from the early period employee quarters and four fragments were recovered near the late period blacksmith shop.

De Vore (1993:38) describes these bowls as Arrow Stem Pipes. Complete bowls are described as oval-shaped with evenly spaced diagonal lines which “originate 0.22 in (0.55 cm) beneath the squared rim. The lines curve downward from the undecorated rim border to the mold seam. At a point 0.22 in (0.55 cm) from the rear mold seam the downward curving lines are met by the upward slanting diagonal lines, producing a chevron border. The stems taper away from the bowl towards the tips. The stem portion of the pipe displays a line decoration on both the right and left side which terminates in an arrowhead at the bottom diagonal cockle on the bowl. One stem is decorated with a 0.9 in (2.4 cm) long arrow with four pinnate leaves on each side. The spur is cylindrical and undecorated. The tips of the pinnate leaves slant towards the bowl.” Metrically, the bowls are identical to those recovered at Fort Pierre Chouteau but could not be associated with the arrow stems in the collection and are treated here as separate styles.

Style: Straight Diagonal Cockles (Figure 8.4e 01-73-255). This style is represented by six bowl fragments with a minimum of three bowls. Decoration consists of evenly and closely spaced cockles beginning at a raised line encircling the rim 5.5 mm below the lip at a downward 45° angle to the back of the bowl. Four fragments were recovered from early period employee’s quarters, one fragment from the late period kitchen and one from the blacksmith shop area.

Style: Cockle, Oval and Dumbbell (Figure 8.4f 80-303-1101). This type is consists of 15-plus fragments representing a minimum number of five pipes; they display a combination of decorative motifs. The style has been described in other reports (Pfeiffer 1982:157 Figure 25 F, 160; 1998:158 Figure B-2:f, 149); De Vore and Hunt (1993:139 Figure 11d, 44) as

> . . . having prominent, widely spaced cockles rising to within 15 mm of the rim. Above this is a 5 mm wide band composed of two parallel, embossed lines encircling the bowl. Between these lines are embossed, vertical ovals separated by a pair of vertically oriented embossed dots. Above this band is a series of dumbbell-like outlines with irregular circles on both sides.

Pfeiffer (1982:160) indicates that a faint trace of floral decoration is barely discernable while De Vore and Hunt (1993:44) describe ornate oak leaves extending from the mold seams. The most complete specimen in the assemblage has an oval spur 4.7 mm in length, which tapers to a flat base. The interior of the bowl is 14.5 mm in diameter with an exterior diameter of 18.0 mm. The bowl height is 26.4 mm with an interior depth of 30.2 mm. The stem bore is $5/64''$ or 2.09 mm. Thirteen of the specimens were recovered from early period employee quarters, one from the early period manager's house and one from the late period blacksmith shop or early period residence.

Pipes of this style have been recovered from Fort Union [De Vore and Hunt 1983 (ca. 1828–1865)]; Love [Schneider 1967(ca. 1831-1834)]; Vanever Haworth [Baugh 1970 (ca. 1830–1850)]; and Fontenelle [Pfeiffer 1982 (ca. 1822–1838)] trading posts and early nineteenth century settings such as the Ermatinger House [Reid 1976 (ca. 1814–1858). The absence of this variety in fur trade and military post sites that postdate 1850 suggests the manufacture and distribution of this variety to the early to mid-1800s.

Style: Diagonal Lines with Stars and Opposite Pinnate Leaves (Figure 8.4g 80-303-43). One bowl fragment of this style was recovered. Decoration includes a horizontal line (cockles) 5.0 mm beneath the lip with a band of six-pointed stars positioned 5.0 mm on center encircling the rim. A front mold seam is decorated with opposite pinnate leaves which extends from the base of the bowl to the lip. A pattern of raised diagonal lines at intervals of 2.2 mm are oriented upward towards the smoker at a 45° angle from the mold seam. No provenience data is present with this pipe.

Style: Band of Stars and Pinnate (Figure 8.4h 01-73-975). One bowl fragment of this style was recovered. Decoration includes a whorled or rosulate arrangement of pinnate leaves either side of the front mold seam that extends to the lip of the bowl. A non-bordered band of stars are set 2.5 mm apart 5.0 mm below the lip. Slippage or double striking has obscured much of the decorative detail. This bowl fragment was recovered the late period blacksmith shop vicinity. This variety is most likely a TD pipe identified as Type I which dates from 1800–1850 (Alexander 1983:200).

Style: Alternating Wide and Narrow Flutes (Figure 8.4i 81-113-159). Two bowl fragments of this style were recovered. The most complete of these consists of an incomplete bowl and incomplete modified stem. Decoration consists of alternating wide and narrow cockles which begin as narrow lines at the bowl stem juncture and become more prominent at their termination point 16 mm below the lip of the bowl. The interior of the bowl is 18.0 mm in diameter, with an exterior diameter of 20.5 mm. The bowl height is 37.2 mm with an interior depth of 29.9 mm. The stem bore is $4/64''$ or 1.59 mm. The stem was modified to fit inside of a reed or other variety of stem, thus removing any additional decoration on the stem. The specimen was recovered from an early period employee quarters.

Alexander (1983:212) indicates fluted bowls were used by nearly all pipe makers of England in the nineteenth century. This particular style with half-way fluting is more common to sites North American sites, although they do occur in England. He identifies this style as Type I, which typically has flutes beginning at a series of four raised rings encircling the stem in back of the bowl/stem juncture (Alexander 1983:214, Figure V). He identifies 1825–1875 as a range of dates for this type. Alexander identifies several sites in the northeastern United States where this variety has been recovered. An identical specimen was also recovered at Fort Union (DeVore and Hunt 1993: 136, Figure 8, c) marked with a "C·P" on the stem above the raised rings.

Style: Fluted Bowl Type 1 (Figure 8.4k 81-113-537) This style is represented by four bowl fragments with a minimum of three pipes, although many small, unclassified bowl fragments may be included in this style as well. Decoration consists of extended cockles 2.0 mm wide and 2.0 mm apart at their upper terminus, which is 1.8 mm from the lip of the bowl. Alternating pinnate leaves decorate the front mold seam. More complete examples from Fort Union show the cockles rising from the bowl/stem juncture with alternating pinnate leaves decorating the front and rear mold seams. The most complete bowl of these is 41.0 mm high, has an exterior diameter of 27.9 mm, a bowl depth of 33.1 mm, and an interior diameter of 20.8 mm. This specimen has a cylindrical, flat-bottomed spur 5.5 mm in length and 4.5 mm in diameter and a stem bore of 2.4 mm (De Vore and Hunt 1993:41–42; 139, Figure 11, a). The samples from this assemblage were recovered near the southeast bastion and on the floor of an early period employee quarters. This style is similar to Alexander's Type XI (1983:215), who dates this variety to circa 1820–1870. It is found at numerous fur trade and military posts in North America.

Style: Fluted Bowl Type II (Figure 8.3l 01-73-2293). This style is represented by one bowl fragment, although many small fragments may be included in this style. Decoration consists of fully extended raised cockles 1.2 mm wide and 0.8 mm apart. The width of the scallops is uniform from their terminus at the lip of the bowl to the base. Paired pinnate leaves decorate the mold seam, which also terminates at the lip. The bowl fragment was found on the surface with no provenience. It is similar in style to the Fluted Bowl Type I and probably corresponds to the same age.

Style: Fluted Bowl Type III (Figure 8.3m 98-131-1312). This style is represented by three bowl fragments, although many small fragments may be included in this style. Decoration consists of thin raised cockles, which begin as thin raised scallops at the bowl/stem juncture on the back of the bowl; they become thicker where they terminate 7.4 mm beneath the rim. The back mold seam is decorated by nearly obscured large, paired pinnate leaves. This specimen was recovered from the floor of an early period employee quarters near the east entrance. This style is similar to Alexander's Type XI (1983:215), who dates this variety to circa 1820–1870; it is found at numerous fur trade and military posts in North America.

Style: Alternate Joined Cockles (Figure 8.3n 80-303-43, Figure 8.3o 98-131-1262). This style includes five bowl fragments, representing a minimum of four bowls. Complete pipes of this style have been described from the Fontenelle post (Pfeiffer1998:148–149) as embossed cockles rising to within 8 mm of the rim. A band 1.0 mm wide encircles the bowl 2.0–3.0 mm below the lip. These examples have no decoration on the stem and an undecorated spike-style spur measuring 7.0 mm long. Pairs of cockles on the bowl are connected by an arch; each pair of cockles is separated from the others by a single cockle. Fontenelle specimens have a bowl height of 38.0 mm, a bowl depth of 34.0 mm, and a bowl width of 24.0 mm. The interior of the bowl measures 21.0 mm front to back and 17.0 mm side to side, with a stem bore diameter of $^{4}/_{64}''$. Three fragments were recovered from early period dwellings, one from the late period blacksmith shop, and one is unprovenienced.

The Fort Pierre Chouteau specimens are identical to the Fontenelle pipes with some minor exceptions. One exception is that the distance from the top of the cockles to the lip is 11.0 mm, and the band encircling the bowl is 9.0 mm on three specimens and 6.0 mm on another beneath the lip of the bowl. Two additional bowl/rim fragments have a second intermittent band 4.0 mm beneath the lip. The assumed dates from Fontenelle and sites such as Anthony's Mills and Hunter site in Ontario (Kenyan 1971) suggest this style dates to the first half of the nineteenth century.

Style: Plain with Oak Leaves (Figure 8.3p 01-73-1666). This style is represented from two bowl fragments and a bowl/shank, coming from a minimum of three pipes. Decoration consists of alternating oak leaves stemming from the front mold seam, extending from the lip of the bowl to an undecorated oval spur 5.5 mm wide and 2.5 mm in length. The stem bore is $^{5}/_{64}''$. This decoration also occurs on the front of TD pipes, with an embossed circle of stars surrounding the letters. Both specimens were recovered from the area of the blacksmith shop.

Style: Plain with Pinnate Leaves (Figure 8.3q 80-303-42). This style consists of two bowl fragments, with a minimum number of one pipe. Decoration consists of paired pinnate leaves extending from the mold seam. The fragments were recovered from the area of the southeast bastion and early period employee quarters.

Style: DW Spur (Figure 8.5a 01-73-2843). This type is based on a single shank/bowl/stem fragment. Decoration consists of a W measuring 2.8 mm high on the left side of the spur and a D on the right. The peg style spur is 7.5 mm in length. The stem is 22.0 mm in length and has been modified to fit into a reed stem with a stem bore of $^4/_{64}{}''$. The fragment came from the area of the blacksmith shop.

Style: Geometric Symbol Spur (Figure 8.5b 01-73-975). This type is based on a single shank/stem fragment. Decoration consists of a filled open circle, much like an open copyright symbol, 3.5 mm high on the right side of the spur/stem juncture. The left side is not apparent. The round peg-style spur tapers sharply to a flat base. The stem bore is $^5/_{64}{}''$. The fragment came from the area of the blacksmith shop.

Style: LE Line and Dot Stem (Figure 8.5c 80-303-821). This type is based on a single stem fragment. Decoration consists of a pair of raised lines encircling the stem 1.5 mm apart followed by three panels 8.0 mm wide, with five raised dots per panel separated by raised lines. On the opposite side of the stem are two pairs of raised lines 3.0 mm apart on either side of the letters L.E, which are very faintly embossed. The stem bore is $^6/_{64}{}''$. The stem fragment was a surface find.

Style: E Stem (Figure 8.5d 97-66-1000). This type is based on a single stem fragment. Decoration consists of an E 2.5 mm in height on the edge of a break. This was most likely the end of a word, name, or initials. The stem bore is $^5/_{64}{}''$. The stem was recovered near the southwest corner of the palisade and early period employee quarters.

Style: Letters and Raised Circle Stem (Figure 8.5e 01-73-957). This type is based on a single stem fragment. Decoration begins at a raised line encircling the pipe near the bit end of the stem. The top and base of the stem are decorated with a raised line perpendicular to the stem, with raised paired circles on either side of the line. On one side are worn, embossed letters Co F.C (or E) and on the opposite are the letters T N R D H(?) with a backwards D. The stem bore is $^6/_{64}{}''$. The stem was recovered in the area of the blacksmith shop.

Style: Diagonal Lined Ohio Stem (Figure 8.5f 80-303-223 and 80-303-244). This type is based on two pipe refit stems. The refitted segment includes the bowl/stem juncture; it is 88.0 mm long and was broken in front of the bit. Decoration consists of raised diagonal lines 1.3 mm apart, beginning near the bowl/stem juncture and continuing for 52.0 mm, finished by a raised ring encircling the stem. Five millimeters beyond the diagonal lines are the weathered letters OHIO, which fills an additional 13.0 mm. The opposite side of the stem is too worn or weathered to make out additional lettering, but it initially may have been stamped RING BRISTOL.

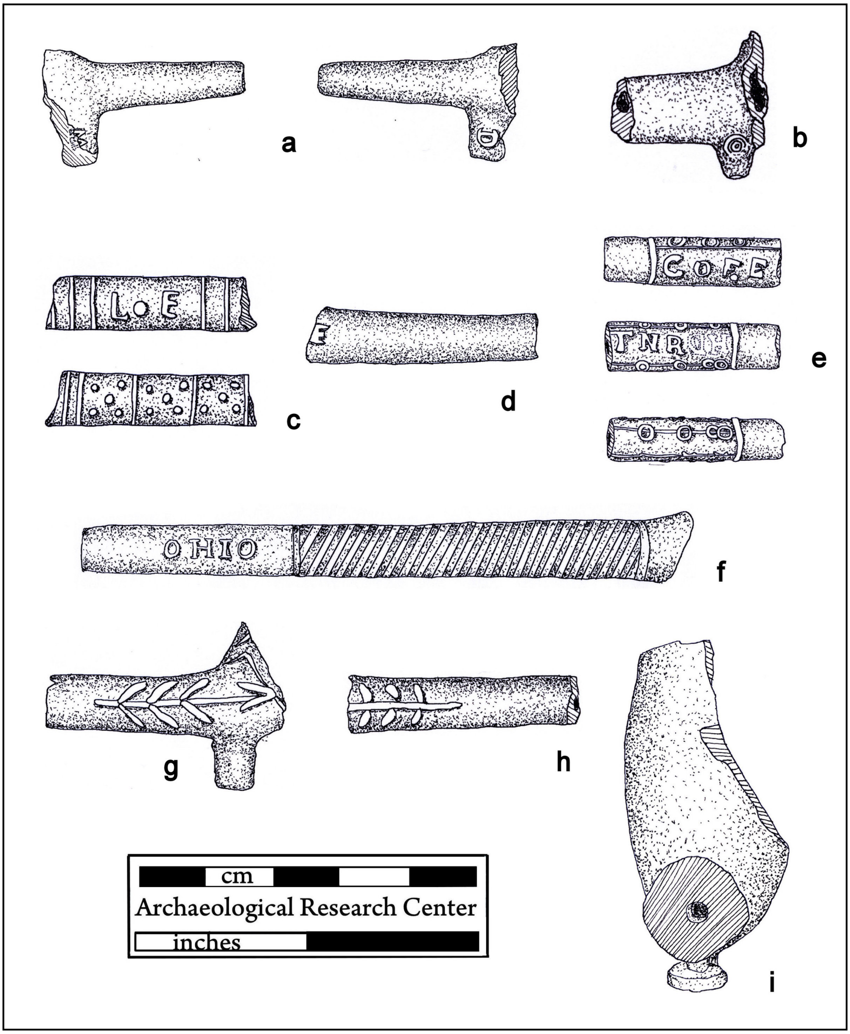

Figure 8.5: Selected single-unit smoking pipe stems, spurs, and bowl from Fort Pierre Chouteau.

The stem is round with a bore of $^{5}/_{64}''$. Both fragments were recovered from the same test unit in the area of the early period employee's quarters.

The fact that this specimen is a white ball clay pipes stamped OHIO indicates it was probably made by the Ring family, which manufactured pipes and other ceramics between 1802–1883 at Bristol England. DeVore and Hunt (1993:46) citing Walker (1977:1267–1272) suggest that pipes bearing OHIO from this company were used between 1816–1849. Around 1848 or 1849, the ownership of the company was changed between family members, and the OHIO may have been dropped from use at that time.

Style: Arrow Stem (Figure 8.5g 99-131-693 and 8.5h 81-113-264). This type is represented by a minimum of two stems and one stem-bowl/shank juncture. The former is the most complete specimen; it has a round stem and an undecorated oval peg spur with a flat base. The decoration of the stem is a line on the both the right and left sides, which terminates in an arrow at the bowl/stem juncture. The line is decorated with three pinnate leaves, slanting towards the bowl on each side. The distance between the individual leaves is 2.7 mm, and the leaves are approximately 5.0 mm in length. The other specimen has less space between the pinnate (1.8 mm), with shorter pinnate length (3.0 mm), and is broken prior to the arrow. Several examples of this style were recovered from the Fort Union excavations (DeVore and Hunt 1993:38). The stem bore for both examples is $^{5}/_{64}''$. The first of these was recovered between the early period employee quarters and a late period shop near the east entrance. The latter example was recovered near the southeast blockhouse and early period employee quarters.

Style: Plain with Pedestal (Figure 8.5i 80-303-56). This style is represented by one bowl fragment. Complete bowls of this style are 134.0 mm in length, 37.6 mm high, with an exterior diameter of 27.0 mm, a bowl depth of 36.2 mm, and an interior diameter of 22.1 mm. This specimen has a round, flat-bottomed pedestal 7.5 mm in diameter attached to the base of the bowl by an oval spur. The overall length of the spur and pedestal is 4.6 mm. The stems are straight, 90° to the bowl, and are diamond shape in cross-section, with a lipped bit. The stem bore is $^{6}/_{64}''$.

These pipes postdate the fur trade or military occupation of the post, and they are typically found in sites postdating the mid-1870s. They may continued to be manufactured into the late 1890s. Pipes of this style have been recovered from Fort Rice, ND, Fort Riley, KS, Chinatown in Deadwood, SD, Fort Randall, SD and several residence refuse areas in the Plains in features which most likely postdate 1875. This specimen was recovered from what was described as "more modern" refuse during the 1980 excavations and is assumed to be associated with a cattle/bison ranch located at this site.

Stems

A total of 585 stems were identified in the assemblage of single-component smoking pipes; they make up 77.4% of this category. Ninety-six, or 16.4% of the stems are oval, 487 (83.3%) are round, and 2 stems (0.3%) are diamond in cross section. Like bowl fragments, pipe stems recovered from the excavations were quite small, attesting to continuous trampling within the fort. Stem bore data was recovered using drill bits in 64th of an inch intervals, which is a standard unit of measure for pipe stems (Alexander 1983). Stem bore diameter studies (Harrington 1954; Binford 1962; Hume 1963) have been used as a dating technique on pipe stems and has some application on pipes from the colonial era. Its value in dating stems has been a subject of dispute, especially in sites that postdate that era or as additional insight into manufacturing techniques are brought into question (Alexander 1983). A recent attempt at using stem bore diameter in an attempt to place nineteenth century pipe stems into a relative chronology has been attempted by Pfeiffer (1978) and suggests there is some value in collecting this data from large collections. It is also possible that known manufacturers may have utilized smaller or larger diameter piercing wire over time that may have additional benefits in dating pipe stems, ergo archaeological deposits.

A total of 78 stem fragments (13.3%) measured $^4/_{64}''$ (10 oval and 68 round), 331 (56.6%) stem fragments measured $^5/_{64}''$ (65 oval and 265 round), and 94 (16.1%) stem fragments measured $^6/_{64}''$ (21 oval and 72 round). Eighty-two (14.0%) stem fragments were split and not measurable.

Bits

A total of 91 bits were identified in the assemblage of single-component smoking pipes and make up 12% of this category. Bit morphology was derived from Pfeiffer (1978) and may have significant chronologic meaning for assemblages within the span of the nineteenth century. All of the bits in this assemblage are flat. Flat bits have an abrupt termination at the end of the stem. This is occasionally difficult to identify without the use of magnification. The bits can typically be observed as having a polish or small bits of clay at the bore that was a product of removing the piercing wire used to create the bore. Other production features that can identify bits are finishing the bits with wax, paint or glaze to keep the bit from sticking to the smoker's lip. None of these finishes were observed on the bits from this assemblage. Postproduction modification was observed in the form of tooth wear on 10 bits and refurbishing by ringing and snapping a broken end of the stem to create a new bit end on 5 stem fragments.

Twenty-three or 25.3% of the bits are on oval stems and 68 or 74.7% are on round stems. Thirteen of the total bits (14.3%) have a stem bore of $^{4}/_{64}''$, 63 (69.2%) have a stem bore of $^{5}/_{64}''$, and 15 (16.5%) have a stem bore of $^{6}/_{64}''$.

Conclusion and Observations

Tobacco consumption at Fort Pierre Chouteau is observable through a large assemblage of clay smoking pipe fragments recovered from the 1980–1981 and 1997–2001 excavations. While alternative forms of consumption would have been available at the post, clay smoking pipes are the only artifact associated with this recreation that has been identified through archaeological methods. As would be expected from much human activity within the confines of the fort, the majority of the specimens were reduced to small fragments by excessive trampling. Two-piece composite smoking pipes were in the minority, numbering 115 fragments totaling 7.4% of the total assemblage. This is also to be expected given the dates of occupation for the post and the increased availability and popularity of this style near the closing years of the post. The majority of these fragments are anthropomorphic in nature—specifically those that represent important individuals in American politics. Based upon comparisons, these are most likely an import from Germany. A large number of the plain or geometric decorations are very likely of U.S. manufacture and identify selected companies entering the national market in clay pipe sales following the industrial revolution of the early/mid nineteenth century.

Single-unit clay pipes are the largest category of clay smoking pipes in the assemblage and make up 92.6% of the total fragments. Decorations consisted largely of geometric (lines, fluted bowls, and cockles), symbolic (largely initials and stars), and naturalistic (floral representations on the mold seams) motifs. A large number of these are most likely of European manufacture—particularly of England and Scotland. Notable are the large number of "TD" pipes and stars. Typically thirteen stars are part of the decoration either circling the mouth of the bowl or surrounding the letters; they are often thought to be patriotic in nature but may also have been of European manufacture for the American market. One variety of single-unit clay pipes that was not identified is that of pipes of French manufacture; this type began to show up regularly in the archaeological record of the mid-to-late/middle nineteenth century.

The examination of clay smoking pipes identified two regions of the post that exhibit a marked higher density per square meter. One of these is the area identified as a shop on maps of the late fort period (ca. 1842–1856), and identified archaeologically as the blacksmith shop; the other includes the area of the southeast bastion and the location of an early period employee's quarters. In most frontier military posts (and one can make the same argument for fur trade posts) smoking was not allowed indoors because of the possibility of starting a fire. The blacksmith shop would be a likely location given the fact that a fire is constantly burning there, as well as the added warmth in the evenings or winter months. The southeast bastion would equally be a location of protection from the elements.

Acknowledgements

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Chapter 9

Pre-Fort Cultural Material from Fort Pierre Chouteau

Michael Fosha[1]

Introduction

Fur and bison robe trade establishments are very frequently situated on the settings that were found to be conducive to activities and settlements of earlier cultural groups. The location of Fort Pierre Chouteau is no exception to this. The Fort Pierre terrace within the Bad-Cheyenne Archaeological Region has been the focus of much dynamic cultural change during the Proto-Historic period. The archaeological materials that pre-date Fort Pierre Chouteau from this period are considered to have been deposited during the latter part of the Coalescent Tradition, or, more specifically, the Post Contact Coalescent variant dating to around A.D. 1675–1780. The distinguishing characteristic of this period is the change in culture of the populations of this period based largely upon the introduction of European artifacts followed by the acquisition of the horse. No features were encountered from which any further refinement of the period of occupation can be made at this time. At least one village was still occupied in the Fort Pierre Chouteau vicinity in March of 1743 when the La Verendryes exploration group visited the area. Described as a fort, this was the only mention of a population identified as “Gens de la Petite Cerise” which is believed to be their term for the Arikara or Post Contact Coalescent peoples living in the

[1] Archaeological Research Center, South Dakota State Historical Society

vicinity. It is also noted in their accounts that a French man had settled in this region "within three days journey" of this location (Smith 1980:112).

This report contains the description of the analysis conducted on the artifacts associated from the pre-fort period which were obtained through small-scale excavations from seven years of fieldwork at Fort Pierre Chouteau—beginning in 1980 and ending in 2001. Within the exterior walls of the fort this cultural material is badly mixed with fort period artifacts and displaced by fort construction and occupation. Exterior to the fort the mixing of the artifacts of these two periods is slightly less which still prohibits clear separation of these components.

Artifacts

Three major categories of artifacts were recovered from the excavations; they include chipped stone, ground stone, and ceramics. One class of ground stone artifacts made of pipestone could be related to the Pre-Contact populations or to the occupation of Fort Pierre Chouteau by Lakota who occupied the surrounding area; however, the pipes from this class are also similar to those manufactured during the Post Contact Coalescent period and are suggested as belonging to the pre-fort occupation. Glass beads are also considered part of the Post Contact Coalescent variant. However, no glass beads recovered from the excavations are of the style or age to be associated with this population (Bill Billeck, personal communication) and are treated elsewhere in this report at fort period trade goods. The remaining artifacts are treated as part of the pre-fort occupation.

Chipped Stone Industry

Lithic artifact analysis included metrical attributes, completeness, presence or absence of cortex and the identification lithic material based upon visual inspection and direct comparison to samples obtained by the author and those available at the Archaeological Research Center (ARC). Lithic artifact categories include 15 types of artifacts (Table 9.1). The distribution of lithic raw material types is presented in Table 9.2.

Projectile Points

One complete and three fragments of projectile points have been obtained from excavations (Figure 9.1, Table 9.3). The three specimens were sufficiently complete to identify them as side notched projectile points typical of the Late Prehistoric/Proto-Historic village populations in the region.

Table 9.1: Lithic artifact category totals.

Artifact Type	Count	Percentage
Complete Flake	96	43.4
Distal/Medial Flake	38	17.2
Proximal Flake	27	12.2
Ground Stone	24	10.9
Scraper	9	4.1
Shatter/Split Flake	9	4.1
Biface Fragment	4	1.8
Badlands Knife	4	1.8
Preform	2	0.9
Hammerstone	2	0.9
Distal Projectile Point	2	0.9
Complete Projectile Point	1	0.5
Proximal Projectile Point	1	0.5
Core	1	0.5
Modified Flake	1	0.5
Total	222	100.0

The two specimens retaining basal sections exhibit a concave base and slightly longer in length than width. The two distal sections have a greater length to width ratio than the two retaining bases. The points were made from a high-quality silicified wood, chalcedony, wood or chalcedony, and a fine-grained red jasper or chert with no cortex present.

Scrapers

Nine flakes used as scrapers are identified by the steep retouch and use ware along the modified margins (Table 3). The tools were formed from varieties of chert and chalcedony. Four of the tools were made from primary flakes off of stream cobbles. The dorsal surfaces ranged from strongly to slightly convex and the ventral surfaces were nearly straight. The only material not available in local stream gravels is the West Horse Creek Chert or chalcedony (Hannus and Nowak 1985).

Bifaces

Five biface fragments are manufactured from chalcedony, black chert, silicified sediment, and silicified wood or chalcedony. The only material not available locally in the stream gravels is the West Horse Creek Chert (chalcedony).

Table 9.2: Lithic source material for chipped stone artifacts.

Lithic Material	Count	Percentage
White jasper	1	0.5
Black chert	1	0.5
Knife River Flint	2	1.0
Fox Ridge	2	1.0
Bijou Hills	2	1.0
Silicified sediment	3	1.4
Tan jasper	3	1.4
Brown Jasper	4	1.9
White chert	4	1.9
Siltstone	5	2.4
Plate chalcedony	5	2.4
Quartz	6	2.9
Red Jasper	7	3.4
Granitic	7	3.4
Chalcedony	7	3.4
West Horse Creek	8	3.9
Tan chert	10	4.8
Grey chert	11	5.3
Red chert	12	5.8
Quartzite	17	8.2
Brown chert	24	11.6
Silicified wood	30	14.5
Silicified wood/chalcedony	36	17.4
Total	207	100.0

Table 9.3: Projectile points.

Catalog	Material Type	Portion	Location	Depth	Burned	Figure
98-131-1226	Red jasper/chert	Complete	N514 E567	30-42 cm	yes	9.1i
98-131-159	Silicified wood	Distal	N511/E573	10-20 cm	yes	9.1j
98-131-323	Chalcedony	Distal	N551/E565	10-20 cm	no	9.1g
97-66-1284	Silicified wood/chalcedony	Proximal	N513/E494	30-40 cm	no	9.1h

Table 9.4: Scrapers.

Catalog	Material Type	Location	Depth (mm)	Burned	Maximum Length (mm)	Portion	Cortex	Figure
99-70-963	chert red	N535 E542	20-30 cm	yes	20	Dorsal/Medial	y	9.1d
99-70-1224	chert brown	N526.5 E495	40-60 cm	yes	14	Dorsal/Medial	y	
98-131-909	chalcedony tan	N514 E571	10-20 cm	no	28	Dorsal/Medial	n	9.1l
81-113-667	chert grey	TRENCH C SOUTH	NA	no	38	Complete	y	9.1a
80-303-839	chert red	NA	Surface	no	25	Complete	y	9.1b
81-113-531	chert tan	FS115	NA	no	19	Dorsal/Medial	n	9.1c
1982 Ex.	chalcedony grey	NA	NA	no	33	Complete	y	9.1k
01-73-2109	chalcedony grey	N455/E571	0-10 cm	no	40	Complete	n	9.1m
01-73-2376	west horse creek	N481 E567	10-20 cm	no	21	Dorsal/Medial	n	9.1n

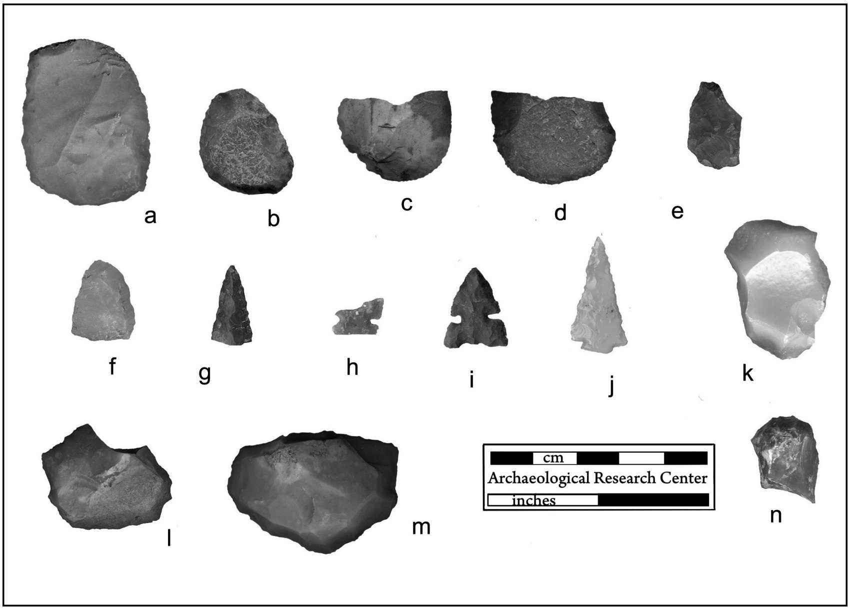

Figure 9.1: Projectile points and scrapers.

Badlands Knife

Four sections of Badlands Knives were collected during the investigations. Badlands Knives are identified as edge-modified sections of plate chalcedony common to the Badlands region of South Dakota.

Preform

Two unbroken preforms were recovered from the 2001 excavations. One is manufactured from silicified wood or chalcedony. The other is manufactured from Knife River Flint (Loendorf et al. 1984). The latter of the two is non-local material that can potentially be located in Missouri River gravel deposits.

Modified Flake

A single modified flake is manufactured from white chert. Modification consists of shallow unifacial flaking on one edge of the artifact.

Table 9.5: Bifaces, other retouched artifacts, and core.

Catalog	Material Type	Location	Depth	Burned	Max. Length	Portion	Cortex	Figure
1982 Ex.	badlands knife	Plate Chalcedony	NA	Surface	50	NA	y	9.2e
1982 Ex.	badlands knife	Plate Chalcedony	NA	Surface	34	NA	y	9.2g
00-90-1341	badlands knife	Plate Chalcedony	N490/E508.5	20-40 cm	22	NA	y	9.2h
80-03-837	badlands knife	Plate Chalcedony	NA	Surface	34	NA	y	
1982 Ex.	biface frag	Silicified Wood/Chal.	NA	NA	43	NA	y	9.2i
01-73-1212	biface frag	Black Chert	N484 E568	10-20 cm	25	Dorsal Medial	n	9.2b
01-73-165	biface frag	Silicified Sediment	N456 E572	0-10 cm	15	Proximal	n	9.2d
80-03-837	biface frag	Chalcedony	NA	Surface	37	Proximal	n	9.2a
80-03-837	biface frag	West Horse Creek	NA	Surface	11	Dorsal/Medial	n	9.2c
97-66-1364	Modified Flake	White Chert	N514/E499	40-50 cm	16	NA	n	
01-73-911	preform	Knife River Flint	N483 E567	20-30 cm	20	Complete	n	9.1e
01-73-1300	preform	Silicified Wood/Chal.	N478 E567	20-30 cm	18	Complete	n 9.1f	
99-70-964	Core	White Chert	N535/E542	20-30 cm	55	Complete	y	9.2f

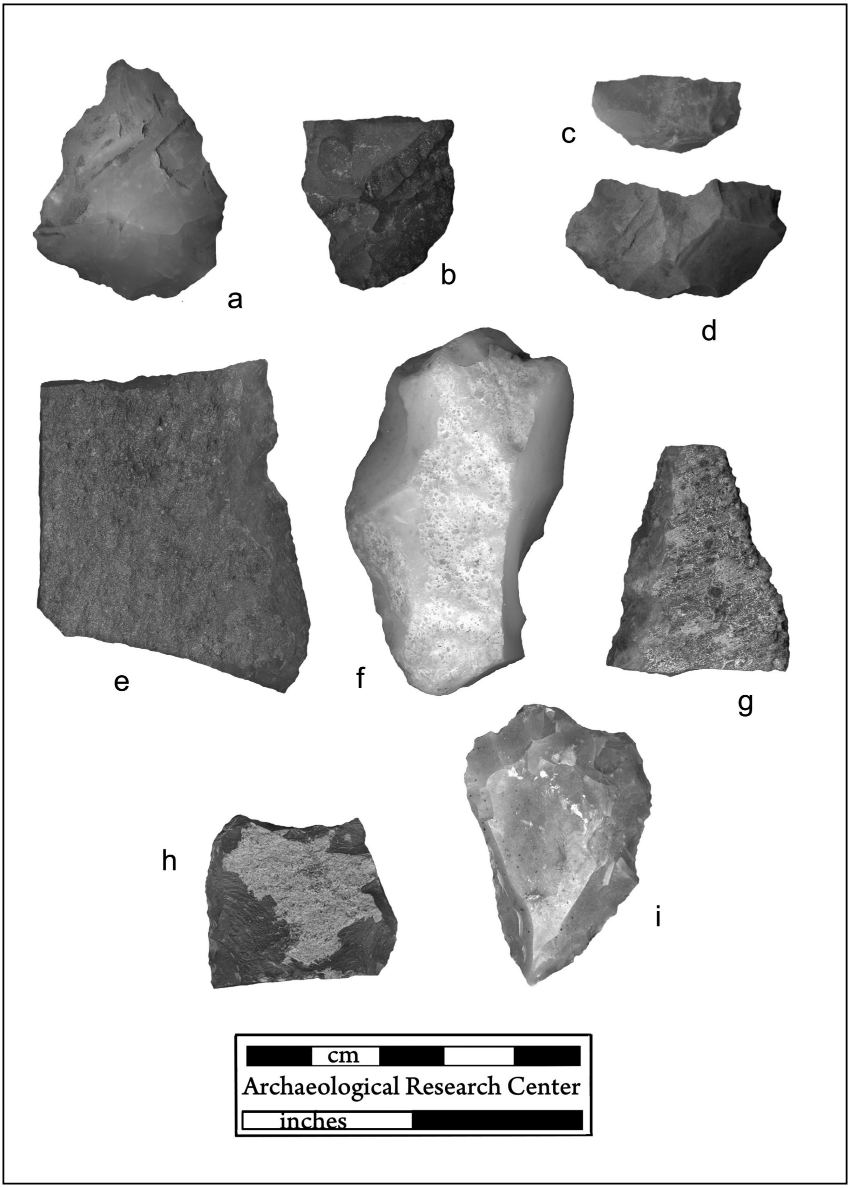

Figure 9.2: Bifaces and core.

Core

A single white chert stream cobble with multiple facets on two surfaces was recovered from the 1999 excavations.

Flakes (n = 170)

Flakes were divided into four categories of termination types including complete, distal/marginal, proximal, and shatter/split (Table 9.7). The major characteristic of the flakes are their small dimensions. The mean size of all the flake types is 14.8 mm, with 80% of the total 20 mm or less in length and with 50% of this amount 10 mm or less in length. This does not vary significantly when selecting the complete flakes with a mean length of 16.9 mm with 75% of these being 20 mm or less and with 51% of this subset measuring 10 mm or less (Table 9.6).

The largest flake category consists of flakes that exhibit both platform and a feathered termination (complete) and comprise 56.6% of the total flakes. Flakes incorporating a distal feathered edge were the second largest category (22.4%). Flakes with a platform terminating in a hinge or step (proximal) comprise 15.8% of the total flake assemblage. The smallest category is shatter (i.e. split or broken flakes without visible striking platforms), comprising 5.3% of the total. Of this category, two specimens are split with the remainder represented by shatter. Other observations noted that slight to heavy burning was present on 11.2% of the flakes and cortex was present either on the platform or dorsal surface of 24.7% of the flakes (Table 9.7).

Ground Stone Industry

Two types of ground stone artifacts were recovered from the excavations include items formed from pipestone and scoria.

Pipestone Artifacts (n = 29 specimens/fragments)

Red Plains Pipestone artifacts recovered from Fort Pierre Chouteau are a fine-grained sedimentary rock made up of predominatly of clay with occasional silt sized particles. All red plains pipestones, which include the catlinites, appear to have formed originally as thin but internally structureless lenses or layers of clay (without quartz) and mud (with quartz) derived from weathered Precambrian age sandstones. The diagenic litification process that accompanied the burial and subsequent mild metamorpic processes over time within the massive quartzite beds reconstitued the

Table 9.6: Flake and shatter length statistics.

Measure	Value
Mean	14.827
Standard Error	0.756
Median	12
Mode	9
Standard Deviation	9.945
Range	57
Minimum	2
Maximum	59
Sum	2565
Count	170
Confidence Level (0.95)	1.493

Table 9.7: Flake types and counts.

Flake Type	Count	%	Burned	%	Cortex Present	%	Mean Length (mm)
Complete	96	56.5	9	9.0	25	26.0	16.9
Distal/Marginal	38	22.4	5	13.2	10	26.3	13.1
Proximal	27	15.8	3	11.1	4	14.8	13.3
Shatter/Split	9	5.3	2	22.2	3	33.3	15.3
Total	170	100	19	11.2	42	24.7	14.8

thin claystones and mudstones into an argilite reffered to here as plains pipestone (Gundersen 1991).

Pipestone can come in a variety of colors and textures from many locations. The artifacts recovered from Fort Pierre Chouteau are various shades of red with occasional small dark or light inclusions. Often this material is prematurely referred to as Catlinite. Because of the groups that have controlled the catlinite quarry over time, artifacts of this material can carry cultural aspects. Catlinite, like other red pipestones, has its own chemical signiture and comes only from the Catlinite quarries in Minnesota. The red agilites in the South Dakotas and Minnesota are formed in beds within beds of Sioux Quartzite and are only accessable in selected locations. Some researchers (Sigstad 1970) have eroniousely determined that field inspection can identify the origin of these pipestones. The only way a determination can be made as to the origin of the pipestone is through laboratory tests, most commly x-ray defraction. None of the materials obtained from the excavations have been analized for chemical signatures that would give a origin of the parent material.

Pipestone artifacts include sections made for the use of tobacco, games, ornamentation and miscellaneous fragments not associated with a formal use. The pipestone artifacts were formed and finished by simple methods. The most common of these were sawing to obtain a desired shape, incising for decoration or to score a desired segment for the purpose of removal by snapping it off, and drilling. Finishing includes grinding and polishing to remove grinding marks. A total of 135.0 grams of red pipestone constitute the 29 specimens.

Tobacco Pipe (n = 11 fragments) A minimum of nine and a maximum of 11 stone pipes were recovered from the excavations. One pipe (98-0131-571, Figure 9.3a) conforms to Plains or Sioux pipes identified from Fort Union and other historic period sites (Murray 1968:7; DeVore and Hunt 1983:21) which are typically T-shaped with a prow projecting from the front of the bowl and a stem extending behind the bowl which was usually fitted with a long wood stem. The incomplete prow of this specimen is square in cross-section and extends 8.5 mm beyond the juncture of the bowl. The incomplete bowl has a round, slightly inverted cone-shaped and extends 20 mm above the bowl/stem juncture. The interior bowl is cone shaped with a diameter of 7.1 mm at the bowl/stem juncture. The incomplete stem has the appearance that it is round and extends 8.0 mm beyond the stem/bowl juncture. The inside diameter at the bowl/stem juncture is 6.1 mm.

The other 10 pipe fragments cannot be typed by styles identified for the plains (West 1934). These consist of bowl, prow and stem fragments. One bowl fragment (98-0131-1548 from undocumented 1982 excavations) is a cylindrical bowl with one flattened surface which shares characteristics to Plains or Sioux pipes but is too incomplete to classify (Figure 9.3b). The bowl has a minimum height of 37 mm and an outside diameter of approximately 24 mm. Two bowl or stem rim fragments, 01-73-1918 (Figure 9.3f) and 80-303-349 (Figure 9.3d) have been incised and snapped from a finished pipe for the possible purpose of making the pipe more esthetically pleasing after damage to the rim has occurred.

One stem fragment (99-70-418) appears to be from the largest of the pipes represented in the sample(Figure 9.3c). The fragment is 29 mm in length with both ends terminating in breaks. It is cylindrical and approximately 23 mm in diameter with a cylindrical inside diameter of 8.5 mm.

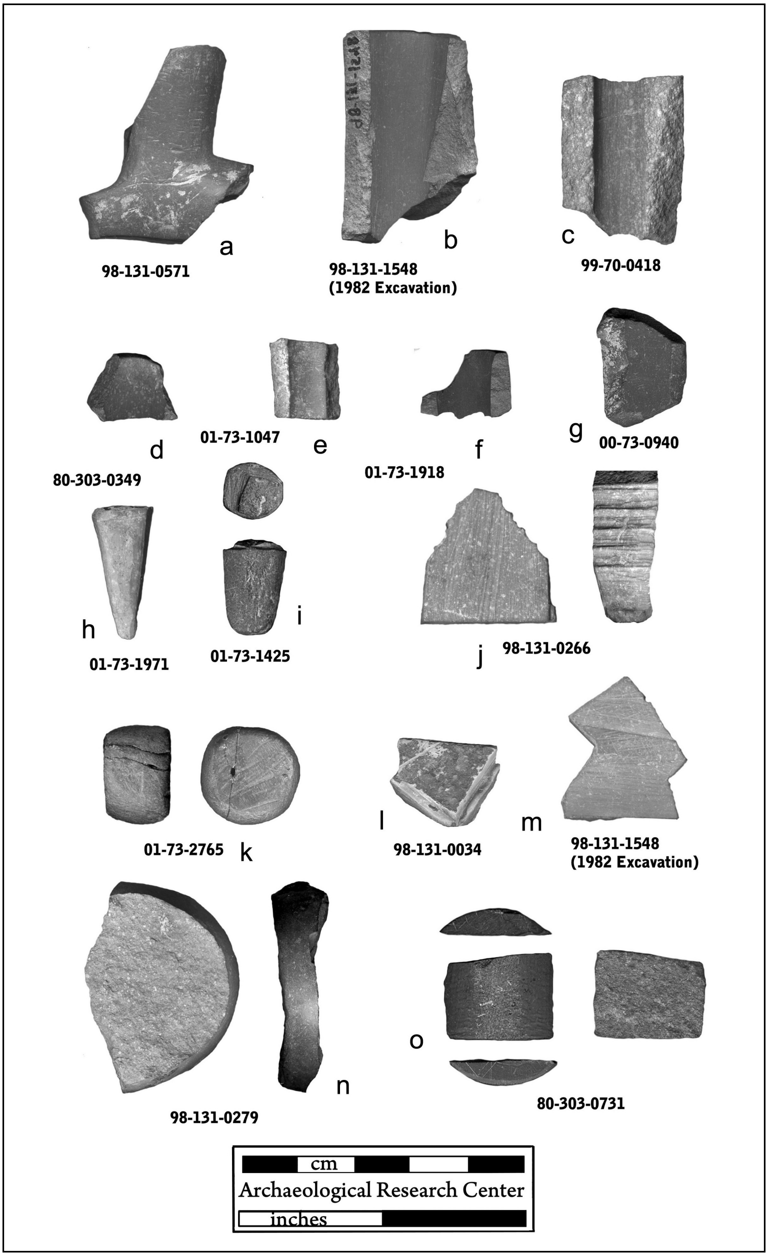

Figure 9.3: Pipestone artifacts.

The final stem fragment (01-73-1047) is 13.5 mm in length with one finished end (Figure 9.3e). It appears to have been square in cross-section.

One faceted prow (01-73-1425) was incised and snapped from a finished specimen (Figure 9.3i). It was recovered from the fill of Feature 112 of unknown function associated with the fort occupation.

Other Pipestone Items/Fragments Four items are either finished on all sides or represent items described in other sites of this period. One item is a ball fragment (98-0131-279). The pipestone ball would have measured 36.5 mm in diameter.

One specimen (01-0073-2765) seems to be a bead preform (Figure 9.3k). It is nearly round measuring 15.5 mm in diameter and has two opposing flat surfaces and is 11.7 mm thick. The artifact broke into three sections upon discovery.

One item of unknown function (98-0131-266) is a tabular section of pipestone which was originally 23 mm square and 11 mm thick (Figure 9.3j). Portions of two opposing edges were roughly carved, creating serrated surfaces.

One item of unknown function (80-303-0731) is the exterior portion of a cylinder that would have measured 26.2 mm in diameter with a height of 15.3 mm (Figure 9.3o). This item may be a section of a large bead.

The remaining sections of pipestone are fragments not attributed to any formal or finished item (Table XXX??). The majority of these are flat tabular sections. Some of these exhibit grooves near unfinished edges which may relate to trimming or in some cases decoration.

Other Ground Stone Artifacts

Scoria Abrader (n = 2 specimens) Two sections of scoria show use as an abrader. One of these is 55 mm in length and has a shallow groove 22 mm wide running the length of the artifact. The other specimen is 22 mm long and has a ground base.

Hammerstone (n = 2 specimens) One hammerstone (99-70-1360) was recovered from an area suggested as a blacksmith shop and could have been used as a temporary expedient tool of the blacksmith and not necessarily associated with earlier occupation. The hammerstone was made of a metamorphic glacial erratic and weighs 234.6 g and measures 77.8 mm in length, 52.4 mm wide and 37.6 mm thick. The use ware is typical to hammerstones used in late stage lithic reduction.

Table 9.8: Pipestone artifacts from Fort Pierre Chouteau.

Catalog	Location	Depth (cm)	Weight (g)	Length (mm)	Width (mm)	Thickness (mm)	Comments
80-303-0056	S12/E49	30-40	1.1	13.56	11.77	5.91	Pipe bowl or stem fragment. Exterior diameter: 18.25. Polished exterior. Interior diameter: NA
80-303-0349	FS54 (S36/E95)	10-20	1.2	11.7	15.93	4.26	Faceted pipe bowl or stem fragment, rim. Well polished on interior and exterior. EX diameter 20 mm. IS diameter 12 mm. Ringed and snapped, possibly for esthetic purposes after light breakage of the rim.
80-303-0349	FS54 (S36/E95)	10-20	0.6	12.6	11.6	4.0	Tabular and triangular. Two edges are polished, other surfaces unmodified after breakage. Unknown function.
80-303-0731	FS35 (S34/E100)	0-10	2.4	15.31	19.32	4.57	Exterior portion of a cylinder which would have measured 26.2 mm in diameter with a height of 15.3 mm. Unknown function.
80-303-0836	FS1	surface	32.2	49.6	40	16	Tabular and triangular. Three altered surfaces range from nearly polished on a curved thin edge of the item, fine saw marks and polish on flat face, rough cut/saw marks on one thin edge. Unknown function.

Table 9.8: continued

Catalog	Location	Depth (cm)	Weight (g)	Length (mm)	Width (mm)	Thickness (mm)	Comments
98-131-0034	N514/E573	0-10	2.3	18.2	14.9	4.9	Tabular section modified by grinding and incising one surface and grinding of three edges. Unknown function. Figure 9.3l
98-131-0266	N443/E505	50-60	10.5	23.58	23.86	11.73	Started as a tabular square with two edges forming a rough triangle. Ground on all surfaces, The two converging edges are serrated by perpendicular grooves. Unknown function.
98-131-0279	N444/E505	40-50	10.8	37.4	27.6	9.5	Flat section of a ball greater than 38 mm in diameter. Charring on one surface suggest it broke due to exposure to heat. Figure 9.3n
98-131-0418	N469/E571	0-10	9.6	29.9	21.4	6.5	A pipe stem fragment. Uniform stem bore 09.35 mm (0.37″) in diameter. Walls are 6-7 mm thick.
98-131-0571	N514 E568	0-10	13.0	30.9	37.3	17.04	Prow, stem and bowl fragment of pipe. Circular bowl and stem with a square pointed prow. Bowl and stem are conically drilled with the appearance of inverted cones.
98-131-0787	N513 E565	0-10	2.7	26.29	11.62	7.01	Pipe stem fragment. Proximal stem has been an incised near the bit. Breaks are well polished suggesting it later functioned as a pendant.

Table 9.8: continued

Catalog	Location	Depth (cm)	Weight (g)	Length (mm)	Width (mm)	Thickness (mm)	Comments
98-131-1304	N513/E565	20-30	1.6	23.03	8.7	5.5	Amorphous section of pipestone with two edges with minimal modification and incisions that suggest this is trimmed from a larger object.
98-131-1485	N481/E562	10-20	3.6	22.21	13.44	10.39	Amorphous with one flat ground and polished surface. Unknown function.
98-131-1548	SE quad 1982 excavations	surface	4.9	26.8	21.3	6.4	Tabular and multi faceted section with score and snap lines indicating it was trimmed from a larger item. All surfaces modified. Unknown function. Figure 9.3m
98-0131-1548	SE quad 1982 excavations	surface	12.4	37.54	23.53	6.66	Pipe bowl fragment. Average bowl wall thickness 6.5 mm, os diameter: 25 mm; is diameter: 12 mm.
01-73-374	Surface	Surface	0.8	1.9	8.0	4.0	Amorphous section trimmed from larger object.
00-90-0549	N444/E507	30-40	0.3	7.6	3.2	2.8	Angular fragment. Unmodified, unknown function.
01-73-0697	N480/E570	0-10	1.9	20.79	16.09	4.11	Tabular and triangular. One edge and one face polished, one face saw marks are present. Unknown function.
00-90-0818	N443.5/E507	40-50	1.2	8.1	8.1	8	Blocky fragment saw marks and grinding on three surfaces. Unknown function.

Table 9.8: continued

Catalog	Location	Depth (cm)	Weight (g)	Length (mm)	Width (mm)	Thickness (mm)	Comments
00-90-0940	N465/E504	20-30	3.0	20.98	15.47	5.5	Round pipe bowl fragment, mid-section. Well polished interior and exterior. IS diameter approximately 15 mm. EX diameter approximately 25 mm. Figure 9.3g
01-73-920	N454/E575	10-20	0.2	9.4	7.4	2.6	Triangular fragment with three small grooves or drill marks ground on one surface. Unknown function.
01-73-1047	N483/E569	30-40	1.9	11.34	11.6	4.7	Stem fragment from a small pipe. Stem was probably square or hexagonal with rounded corners. Unbroken surfaces are well polished.
01-73-1375	N482/E572	0-10	3.2	17.9	17.9	5.24	Tabular square shape with polished groove on one face. Unknown function.
01-73-1425	N454/E574	40-123	2.8	16.3	10.45	10.15	Tapered faceted pipe prow. Grind marks present, overall polished. Ringed and snapped.
01-73-1794	N452/E574	20-30	0.9	13.8	8.5	3.6	Tabular and rectangular. Saw marks and some polish on both faces and three edges. Unknown function.

Table 9.8: continued

Catalog	Location	Depth (cm)	Weight (g)	Length (mm)	Width (mm)	Thickness (mm)	Comments
01-73-1918	N454/E574	0-10	1.0	11.36	15.57	2.9	Round pipe bowl or stem fragment, rim. Well polished on interior and exterior. EX diameter 19 mm. IS diameter 11 mm. Ringed and snapped, possibly for esthetic purposes after light breakage of the rim.
01-73-1971	N451/E569	0-10	1.8	23.8	10.9	6.1	Flattened cone shape. Carving marks present on surfaces. Incised and snapped from larger artifact. Figure 9.3h
01-73	N455/E570	0-10	0.2	7.07	7.50	2.42	Lip fragment of pipe bowl or stem. Polished exterior, drill/scratch marks interior. Too small to detect diameter size.
01-73-2765	N447/E568	0-10	6.9	17.94	16.95	11.4	Three fragments refit into a disc, worked on all surfaces. Possibly a bead preform.

One hammerstone (81-113-568) is made of a meta-basalt from the local glacial till and weighs 521.4 g and measures 87.8 mm in length, 76.3 mm in width and is 51.1 mm thick. Very heavy battering and spalling of one end is a product of intense use.

Ceramic Industry

The prehistoric ceramic assemblage from the excavations at Fort Pierre Chouteau includes 52 rim sherds, 1293 body sherds, 6 neck sherds and 2 strap handles. Rim sherds have a combined weight of 297 g with an average weight of 6.9 g. Body sherds have a combined weight of 2680 g with an average weight of 2.07 g, indicative of heavy trampling. Analysis of the body sherds included the identification of temper type, surface treatment, count and weight. Due to the small size, any identification to vessel zone (Ahler and Swenson 1993) with the exception of rims and large neck or shoulder sherds would be highly speculative. Surface treatment was divided into three main categories including cord-roughened, simple stamped and plain. Cord-roughened surfaces were created by the impressions from cord-wrapped paddle, which can be applied in either a haphazard or somewhat linear fashion. Additional forms of surface preparation included red slip, tool marks, and possible fabric-impressed surfaces. Other forms of rim decoration or surface modification include brushing, stab and drag, pinched, finger impressed, incised, and dentate stamping. These surface treatments are described below.

Simple stamping utilizes a paddle with a series of raised parallel grooves and is utilized in the same fashion as cord-marked surfaces. This paddle creates linear grooves in the vessel wall that have repeated spacing and are usually vertically arranged on the vessel body. Simple stamping is not as random as cord-marked surfaces and appear to be placed methodically. The presence of simple stamping appears to be more of a decorative technique producing wide grooves with a consistent orientation.

Cord-marked surfaces are created by the application of a paddle wrapped with tightly spaced cords of plant or animal material and is used on the exterior surface of the vessel to thin the walls or produce wall thickness uniformity. The indentions left by this process can be oriented in a single direction or applied in a haphazard fashion.

Brushing is characterized by overlapping and uneven lines which appear to have been produced by a brush manufactured of bundled grass, twigs or quills. The amount of force used in this procedure varied to produce deep to faint incisions. This form of surface treatment was limited to the interior rim/neck juncture.

Fabric-Impressed ware is recognized as a cultural and temporal trait among some populations. It is formed when the vessel is still in a plastic form by pressing woven material into the exterior surface. The very small number of what appears to be fabric impression on body sherds at Fort Pierre Chouteau suggest this may be a product of placing a finished vessel on fabric during the drying period and is not considered an intentional attribute.

Incised form of decoration usually describes a line, series of lines, or motif created with a sharp object. This differs from tool impressions that are typically shallow U-shaped grooves. Incised decorations are typically V-shape manufactured from a sharp instrument.

Stab and drag is similar to the incised form of decoration and can be made by many forms of tools. Stab and drag can be observed under a low power magnification which clearly shows the initial starting point by clay being pushed away from applying the tool into the clay and linear lines within the groove created by dragging clay or temper particles along with the tool. Stab and drag is typically used to create a series of notches near the lip of the vessel.

Pinched decoration is typically restricted to the lip or brace of the vessel by impressing two fingers into the clay and squeezing them together to create nodes along the rim margin.

Finger impressed decoration can take multiple forms. Much of the finger impressed is similar to tool impressed motifs only a finger is used in place of a tool. Off-setting the two fingers with one on the interior and one exterior of the lip or rim and pushing the fingers past each other can produce a wavy rim appearance.

Dentate decoration is a form of stamping utilizing closely set small tines similar to a comb to create rows or to fill in zones with small impressions. Single point dentate stamping is made by a single tine or sharp object repeatedly pushed into the clay to create the same type of patterns as dentate stamping but the impressions are more random and lack the repeated intervals.

Rim sherds traits include those for body sherds but have a large body of characteristics that give insight into the cultural tradition of the population as well as defining a temporal period based upon slight changes in ceramic wares and types. Decorated techniques described above are also included in the analysis.

Body Sherds

A total of 1293 body sherds were found in the Fort Pierre Chouteau excavations, although 149 were considered too small for analysis and not included in the counts for tempering agents. The identification of temper constituent of the ceramic body was conducted under a binocular microscope with variable power magnification for each sherd in the assemblage. Sand or grit was the most common temper type observed (Table 9.9in body sherds retained in the analysis. Size of particles ranged from coarse (0.50–1.00 mm) to fine (0.125–0.25 mm). The particles included rounded stream transported sands and particles obtained through the burning and crushing of granite or feldspar rich stone. Body sherds exhibiting a sand and grog temper made up the second highest total. The grog temper in most cases consisted of angular to blocky clay fragments and in some cases consisted of crushed vessel sherds and daub-like particles. A small number of sherds exhibited no sand or grit particles and appeared to have a temper consisting entirely of grog. While only a tiny percentage of the collection was void of sand, the small size of some of the sherds could account for sand or grit not being observed.

Table 9.9: Temper recorded for body and rim sherds from Fort Pierre Chouteau.

Element	Sand/Grit		Sand/Grit/Grog		Grog	
	Count	Percent	Count	Percent	Count	Percent
Body Sherd	659	57.6	457	39.9	28	2.4
Rim Sherd	35	67.3	16	30.8	1	1.9

A total of 545 body sherds were large enough to classify with respect to surface treatment (Table 9.10). The largest category of identifiable surface treatment consisted of plain sherds, created by smoothing the exterior surface. Oftentimes the maker appears to have deliberately smoothed over a cord-roughened or simple-stamped surface prior to firing. Five smooth-surface sherds also have a red-slipped exterior, and two sherds of this category have a red-slipped interior. Red slip is the addition of a thin coat clay slurry on the surface which turns red when fired. None of the exterior surfaces exhibited a burnished or polished surface. The next largest identifiable category consists of simple stamping; these sherds are marked with consistent, parallel, trough-shaped impressions. Ten of these have a red-slipped exterior and one has a red-slipped interior. Cord-roughened sherds make up the third largest portion of the assemblage. Four of these

Table 9.10: Surface treatment on body sherds from Fort Pierre Chouteau.

Element	Count	Percent
Plain	289	53.0
Simple stamped	161	29.5
Cord roughened	57	10.5
Red slip	27	4.9
Tool impressed	7	1.3
Fabric impressed	4	0.7
Total	545	99.9

also have a red-slipped surface. Tool impressed sherds account for only a small segment of the assemblage. Tool impressions include a stab-and-drag technique and simple lines formed by a pointed object. Only a very small portion of the assemblage has a surface identified as fabric impressed, exhibiting wide-spaced weaving similar to check stamping impressions. It is not known if this was a purposeful form of decoration or if the vessel was placed on a fabric while in the plastic stage prior to firing. The remaining 748 sherds were too small or lacked an exterior surface to identify the surface treatment. Five of these sherds exhibit a red-slipped interior.

Rim Sherds

Temper identified in rim sherds closely follows that of percentages for body sherds (Table 9.9). Sand or grit was the most common temper type, followed by grog/sand combination, and grog temper, respectively.

Rim sherd surface treatment was examined for both the exterior and interior of the rims (Table 9.11). Plain or smoothed treatment made up the largest category for both exterior and interior sherds, followed by cord roughening for exterior surfaces and brushing for interior surfaces. Other techniques made up very minor percentages.

Rim forms were sorted into two groups. The first consists of 30 rims having out-curved profiles with collars (Figure 9.4). The second is made up of 11 or straight or out-curved rims (Figure 9.5. Eleven other rim sherds were too fragmentary to identify form. Rim decoration was located on the interior of the upper rim and lip, and the lip/brace of the exterior portion of the rim. Decorative elements are listed in tabular form by count and percentage for the exterior and interior portion of the rims in Table 9.12. A total of 12 rims exhibit no decoration on the interior or exterior portions; a few are either split or damaged so that decoration on the interior or exterior

Table 9.11: Surface treatment on rim sherds from Fort Pierre Chouteau.

Element	Exterior		Interior	
Count	Percent	Count	Percent	
Plain	17	32.7	23	44.2
Cord roughened	9	17.3	0	0.0
Simple stamped	2	3.8	0	0.0
Dentate stamped	0	0.0	1	1.9
Incised	3	5.8	0	0.0
Stab and drag	2	3.8	0	0.0
Tool impressed	1	1.9	1	1.9
Cord impressed	0	0.0	5	9.6
Brushing	0	0.0	17	32.7
Exfoliated	18	34.6	5	9.6
Total	52	99.9	52	99.9

surface could not be determined.

Rim forms and decorations on the assemblage strongly suggest a Post-Contact Coalescent (P-CC) occupation when compared to rim forms of this period (Johnson 2007:245–275). However, identifying a temporal age of this period based upon ceramic typology has proven difficult. Lehmer (1971:3) dates the P-CC for the Middle Missouri Subarea beginning around A.D. 1675 and extending to 1862, while more recent studies suggest it may have began much earlier—perhaps as early as A.D. 1600 (Ahler 1993:89; Ahler and Swenson 1985:110; Ahler and Toom 1995:377; Johnson 1998:320).

The P-CC variant is broken down into four phases in South Dakota: Felicia (Caldwell 1966:80, Smith and Johnson 1968:49) which dates between A.D. 1675–1700 (Lehmer 1971:201); LeBeau (Hurt 1957:26–30) dated at A.D. 1675 –1780 (Lehmer 1971:202); Talking Crow (Lehmer and Caldwell 1966:515) date to A.D. 1700–1750 (Lehmer 1971:202) or A.D. 1725–1780 (Smith 1977:151); and the Bad River (Hoffman and Brown 1967) phases. These phases are considered to have their beginnings at the end of the Extended Coalescent period with the introduction of European trade goods and are considered to represent the Proto-Historic Arikara. It has been suggested that the four phases discussed here may have represented four bands of the Arikara (Parks 1979:227) and represents the first change in Arikara culture due to European contact (Lehmer and Jones 1968:95).

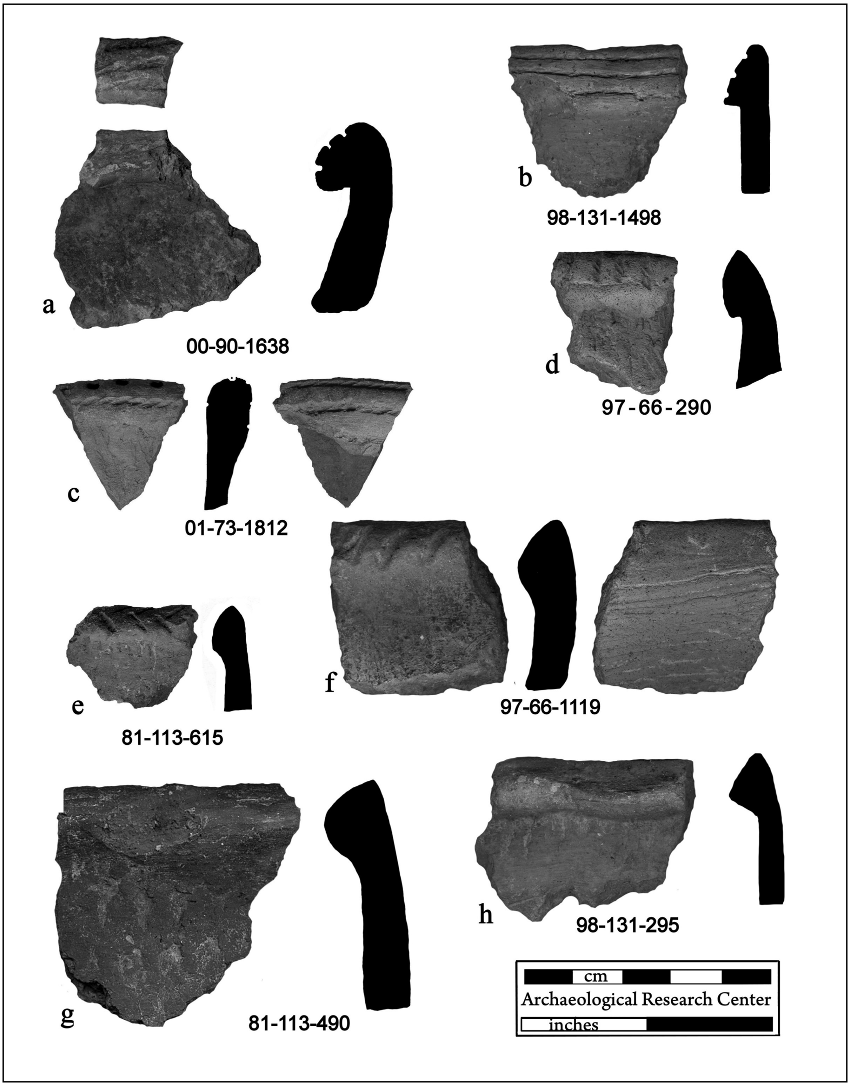

Figure 9.4: Selected collared rims from 39ST237: a–c, horizontal cord impressed (note interior cord impression c); d, vertical cord impressed; e, diagonal cord impressed; f, diagonal tool impressed (horizontal interior scraping); g, horizontal cord impressed and pinched; h, wavy rim.

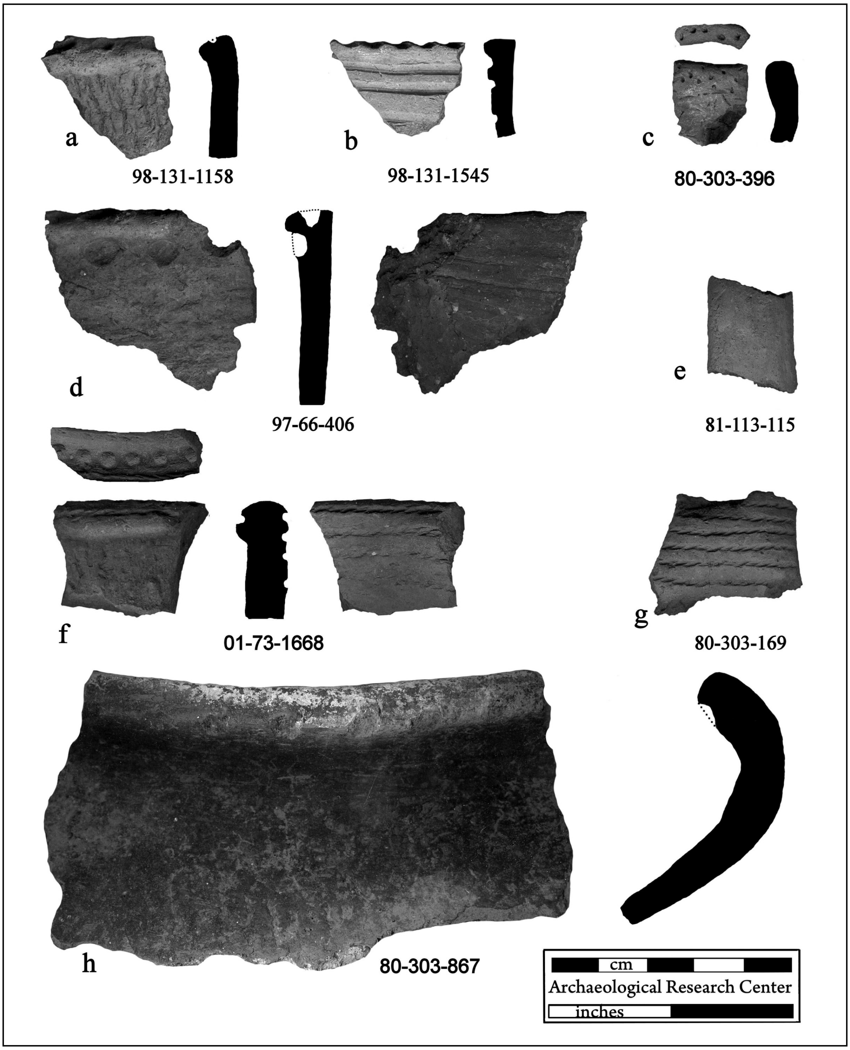

Figure 9.5: Selected rims and strap handles from 39ST237: a, tool-impressed lip; b, diagonal-tool-impressed lip/horizontal-incised rim; c, irregular-tool-impressed lip and rim; d, punctuated lip and rim (note horizontal scraping on interior); e, plain strap handle; f, horizontal-cord-impressed interior and exterior rim/tool-impressed lip; g, horizontal-impressed strap handle; h, tool-impressed lip.

Table 9.12: Decorative elements observed on prehistoric rims from Fort Pierre Chouteau.

Element	Exterior		Interior	
	Count	Percent	Count	Percent
Plain	12		38	81
Cord Impressed	11		5	11
Tool Impressed	11		2	4
Pinched	1		0	0
Stab and Drag	6		1	2
Finger Impressed	6		0	0
Dentate Stamping	4		1	2
Total				

Conclusion

Geographically and temporally the pre-fort component at Fort Pierre Chouteau is most logically associated with the Bad River phase of the P-CC. This phase has been further subdivided into Bad River 1 (A.D. 1675–1740) and Bad River 2 (A.D. 1740–1795) subphases. Lehmer and Jones (1968:97–100) discuss the categories that separate the subphases. The two differences that are applicable in this case are: 1) Bad River 2 occupations were enclosed by curvilinear ditches with palisades inside the ditch line with no observable fortifications surrounding Bad River 1 occupations; and 2) a rarity of glass and metal European trade items in Bad River 1 when compared to a higher occurrence of European trade goods including glass beads, gun parts as well as horse bone.

Toom (1979) refers to this phenomenon of differential European trade goods during the Proto-Historic period as lateral cycling of goods through Indirect Trade Phase (ca. 1675–1740). In this model limited European trade goods make their way up or down river to P-CC populations. During this phase populations with access to metal items such as fire arms, pots and knives which no longer retain their original form or function trade this material to other villages with a more limited access who in turn re-cycle the material leading to a nearly complete and total consumption. This is indicated in several house excavations where a very few fragments of ferrous metal represent the entire trade good assemblage. Following this is the Middlemen Trade Phase (ca. 1740–1807), which includes populations with surplus trade goods and are in an economic position to trade functioning trade goods to populations with limited access. Following this period, European fur traders are frequent enough for most populations in the Middle Missouri Subarea to have direct access the European trade goods but by this period, P-CC populations have vacated the area due largely to deprivation by disease and Lakota populations.

There are two points that should be addressed when assigning this component to Bad River 1 or 2 is that only limited testing was conducted in areas where the component is likely to be in tact. The first is that no implicit evidence of residential use of the site was identified. A few post molds have been suggested as possible pre-fort activity but could as likely be related to the post or ranching occupation of the area. This area could have been used for purposes other than occupation or flood processes or farming activities may have obscured occupational features and fortifications. The second is that Bad River 2 is identified from Bad River 1 by an increase in European trade goods such as gun parts, glass beads, and metal implements such as knifes, iron needles and ornaments. Horse bone is also a hallmark of Bad River 1 subphase. While all of these items are present in the assemblage, none of these artifact types could be associated with the pre-fort occupation and are therefore considered a product of the fur trade experience.

In summary, arrow points, ground stone and ceramics recovered and identified as part of a pre-fort occupation are most closely identified as Proto-historic Arikara of the Bad River 1 subphase of the Post-Contact Variant of the Coalescent Tradition in the Middle Missouri sub-region. This is a period marking an era of culture change due to European contact. The events that quickly followed such as disease and deprivation from Lakota tribes had a profound and immediate change in the Arikara way of life and the few remaining members of this population abandoned the area in an attempt insure their survival.

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Chapter 10

Oral Tradition: Toothpick Use at Fort Pierre Chouteau[1]

Patrick J. Collison[2]

Historical Context

The personal hygiene practices of nineteenth century fur traders are rarely examined in detail by historical investigators. Dismissive generalizations about this aspect of frontier life are typical: "These were men who drank too much and bathed too little." Even less is known about individual dental care, despite the fact that preserving dentition had significant functional value considering the predominance of lean meat and fibrous vegetables in the diet. Cosmetic concerns should not be discounted out of hand, since these were mainly young males, inclined to favorably impress such members of the opposite sex as were available to them. A perceived indifference to cleanliness in general, and oral health in particular, among fur trade employees was largely imposed by the constraints of the environment. Citing the harsh winter conditions faced by Hudson Bay Company men, Black (2004:13) notes: "The freezing cold absolutely prevented any effort to maintain personal hygiene…Near the end of the winter, engageé James Isham complained of his face being 'black as a chimney sweeper…' "

Regarding dental services in the early 1800s, certainly there were no professionally trained practitioners residing in these remote locations. Me-

[1]A slightly different version of this report appeared in *South Dakota Archaeology* 26:6x–86

[2]Department of Anthropology, University of South Dakota

dical procedures, such as the ill-fated inoculation plan during the 1837 smallpox epidemic at Fort Union, were carried out by the bourgeois and clerks (Larpenteur 1989:109). In rural America during the eighteenth and nineteenth centuries, the task of removing teeth often fell to blacksmiths (Ring 1985:187), then known to have been employed at Fort Pierre. A set of "teeth instruments", probably extraction tools, are listed among the medical supplies shipped to the fort in 1846 (Schuler 1990:80). The first American-made toothbrushes were not marketed until 1857, and the first toothpick-manufacturing machine in the U.S. was patented by Silas Noble and J.P. Cooley in 1872 (Foley 1988:39). Although toothbrushes are listed among the stock inventory at Fort Union in 1832 (Swaggerty 1994), and a single bone toothbrush has been found at one early fur trading post (Hunt 1986:49), they appear much more frequently among the artifacts excavated from military forts occupied later in the century (Briscoe 1991:27, McNerney 1989:236, Fox 1990:169, Herskovitz 1974:129). Toothpicks, whether mass-produced or fashioned by individuals, are not mentioned in fur trade archaeological reports. Dental floss, recommended by New Orleans dentist Levi Spear Parmly as early as 1815, was not commercially available until the Codman and Shurtleft Company of Randolph, Massachusetts produced unwaxed silk floss for human use in 1882. Because of its tendency to stretch and fray, silk was never widely accepted. Nylon supplanted it as a better material for removing interproximal food debris and plaque after World War II (Fischman 2000:10). Before toothbrushes were widely available, people cleaned their teeth with a piece of cloth wrapped around an index finger. For most of human history, this and the toothpick would have been the only devices used or even available for oral hygiene, even among the wealthy.

Bone artifacts, thought to represent at least three different types of toothpick, have been identified among the objects excavated from Fort Pierre Chouteau (29ST237), a mid-nineteenth century fur trade post located on the west bank of the Missouri three miles north of the mouth of the Bad River. Fort Pierre was the largest of the American Fur Company establishments on the northern Plains, and served as the principal trade site for several bands of Lakota Sioux, as well as the Yanktonai and Yankton Sioux, and the Arikara, Omaha, and Ponca tribes. It was constructed under the direction of William Laidlaw in 1832, and sold to the U.S. government as a supply depot for General William S. Harney's troops in 1855. The fort was abandoned in 1857 (Deland 1918). The archaeological fieldwork which yielded these particular artifacts was conducted during the summers of 2000 and 2001, under the direction of the Archaeological Research Center, South Dakota State Historical Society.

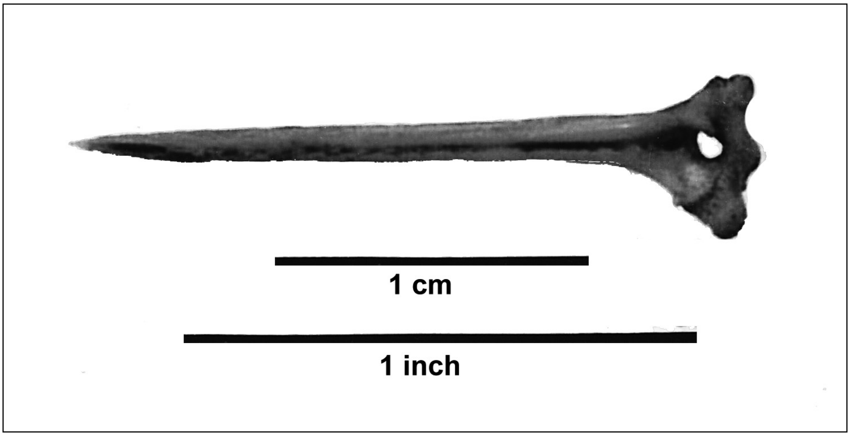

Figure 10.1: Catfish dorsal spine.

This modified faunal material, thought to have been fashioned by occupants of the fort as expedient tooth-cleaning instruments, will be described in detail. Its manner of use, based on physical appearance and archaeological context, will also be discussed.

Artifacts

Catfish Spines (n = 2)

The first object is identified as a second dorsal spine of a channel catfish (*Ictalurus punctatus*), disarticulated from its attachment to the second pterygiophore, a trilobed platelike bone which anchors the spine to the fish's dorsal surface (Figure 10.1). The second is a right pectoral spine, broken at its proximal end (Figure 10.2). On the slightly concave posterior surface of both spines is a row of sawlike serrae, directed retrose (toward the base), and a sharp hollow tip resembling that of a hypodermic needle. In life, muscular attachments and elbow-like joints allow these defensive weapons to bind and lock in an abducted position, producing a simultaneous acoustic warning, or stridulation, when the fish is threatened (Mundell 1975:8–9, Friel 1997:778). The spines remain adducted for a streamlined body surface while swimming through heavy cover.

Catfish are a very common species in the Missouri River system, and probably even more so, relative to other species, during the 1800s. In fact, *I. punctatus* made-up 99% of the fish faunal remains excavated at another

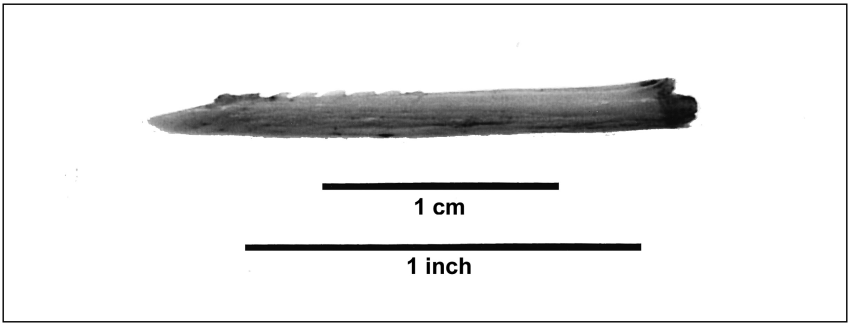

Figure 10.2: Catfish pectoral spine.

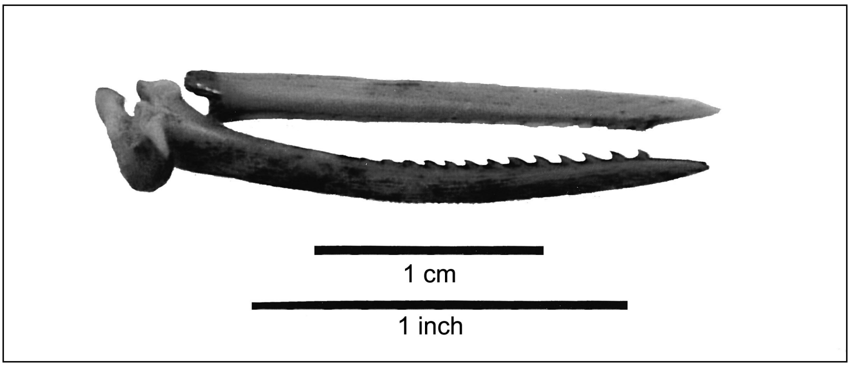

Figure 10.3: Modified (above) and unmodified (below) pectoral spines.

Missouri River trading post, Fort Union, in the 1960s and 1970s (Angus 1986:20). The position and orientation of the serrae on these spines indicate that they came from channel catfish, rather than blue (*I. furcatus*) or flathead catfish (*Pylodictus olivaris*) (Paloumpis 1963:129–133).

When compared to unmodified catfish spines, a smoothing down of the serrae and tip is evident. This may have resulted from repeated abrasion against calculus-filled interproximal grooves between the teeth, or intentional smoothing prior to use (Figure 10.3).

Bone Comb Teeth (n = 2)

Two nearly identical pointed bone artifacts were excavated from the same 1 × 1-meter unit and level (15–20 cm). Both measure 0.49″ × 0.07″ × 0.02″ in size, are light brown to tan in color, and display tips worn nearly to

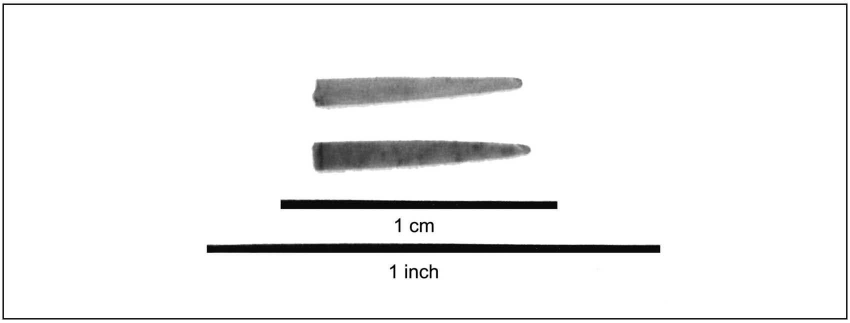

Figure 10.4: Bone comb teeth.

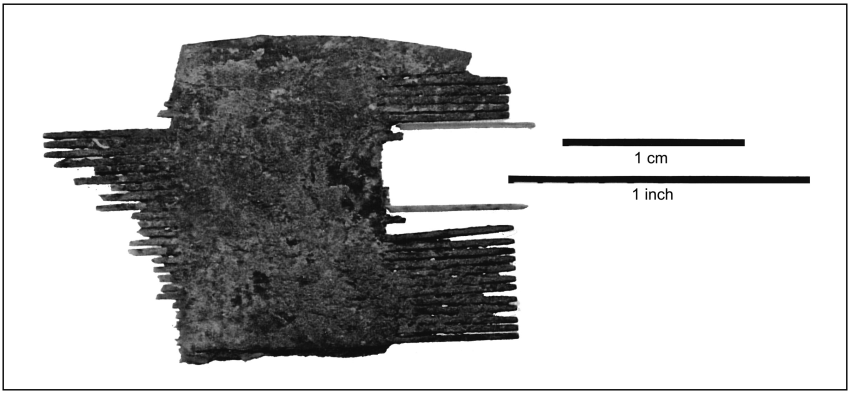

Figure 10.5: Bone comb with intact and broken teeth.

a point. The only difference between the two is that the darker colored one has a small parallel striations oriented vertically along the axis of the object, and the lighter colored one has a more diagonally oriented striations (Figure 10.4). When compared with a nearly intact bone "trade comb" excavated from a nearby unit, the broken comb teeth match the dimensions of the intact teeth exactly. However, close inspection of the broken teeth indicate that the tips are abraded nearly to a point, presumably from use as a toothpick, whereas the intact comb teeth are perfectly square at the end (Figure 10.5). Hanson (1985:12) notes that double-edged bone, horn, and ivory combs were the "premier comb of the fur trade", and the earlier ones were hand cut with a double-bladed saw, which would account for the striations along the wider surface of the comb teeth.

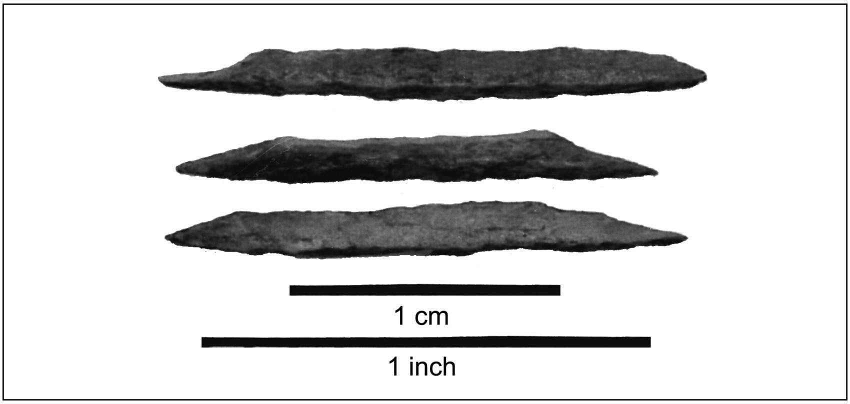

Figure 10.6: Cortical bone fragments.

Cortical Bone Toothpicks (n = 4)

These four fragments of cortical bone, of unknown faunal origin, are very similar in size and shape. All are about 1.2″ in length, 0.12″ in width, and 0.11″ in thickness. Three, found together in a single unit and level, come to a single-beveled point at each end; the fourth is pointed at one end and square at the other. The tips of these artifacts do not show the abrasive smoothing of the catfish spine and comb tooth toothpicks; they may not have been used very often before being lost or discarded (Figure 10.6). This observation suggests another feature of these worked bone objects which is worth considering. The amount of wear evident on the distal portion of artifacts indicates that the same toothpick was used repeatedly and habitually over some period of time. Toothpicks of various types were often saved for future use during the fourteenth through the nineteenth centuries by several means, including hanging them from chains around the neck, sequestering them in metal or leather cases, reserving them in toothpick holders at tables, or simply secreting them behind the ear or in the hair. They were also, of course, often held in the mouth for extended periods of time (Christen and Christen 2003:63).

Provenience data are available for the artifacts, which appears to be significant. All were excavated from between 10 and 40 centimeters below the surface, indicating that they were used during the fort's occupancy. Also, nearly all were located in a relatively restricted part of the fort, six of eight within a one-by-eight-meter area, suggesting that the use of these implements was a habitual activity carried out in the same area on a regular basis. Generally, they were found in the sector where the "elite" (officers and clerks) would have resided or taken their meals. The pectoral spine and the two bone comb teeth were found in or near structures serving as the bourgeois dwelling quarters before 1842, or the kitchen site after 1842. The four cortical bone toothpicks were found near the clerks' quarters along the west palisade, and the dorsal spine was found in a store room or artisan's shop (Mike Fosha, personal communication). The other artifacts found in these excavation units were of various types, with a high concentration of personal domestic items, such as a utensil handle, a hole-in-cap can, a broken marble, clay pipe fragments, and items of personal adornment. There were even some human teeth and fragments of tooth enamel in close proximity to these artifacts.

Discussion

The lowly toothpick has special significance in the history of human behavior, beyond its long debated merits as a dental hygiene tool, and its ambiguous role in mealtime decorum. Anthropologist Christy Turner notes that "As far as can be empirically documented, the oldest human habit is picking one's teeth" (Hubbell 1997:76).

The antiquity of toothpick use has been demonstrated by Peter Ungar (2000), who used electron microscopy to examine hominid teeth found at Olduvai Gorge from 1.8 million years BP, revealing parallel grooves on the side of teeth created by cleaning with bone implements. The skulls of Neanderthals and early *Homo sapiens* bear similar markings, interestingly more common in men than in women (Christen and Christen 2003:62). Prehistoric preventative dentistry need not be invoked to explain these findings, as Proskauer (1946:438) points out: "The intent of primitive man was by no means the artificial cleaning of his teeth, but simply the removal of an unpleasant subjective sensation." Toilet sets resembling key rings, dating back to 3500 BC in Europe, the Middle East, and Asia included thin lancets which may have been used as toothpicks by wealthy individuals (Kanner 1928:75-98).

The toothbrush itself may have first appeared in the form of "chewing sticks" used by the Babylonians as early as 3500 BC; Mohammed enthusiastically touted the spiritual benefits of the *miswak* or *siwak*. One end was frayed by chewing until it became brush-like, while the opposite was pointed and used to remove food from between the teeth. The mastix tree (*Pistacia lenticus*) was cultivated in Greek and Roman cultures as a source of effective splinters for toothpicking (Fischman 2000:8).

Paleopathological evidence of toothpick use, termed "interproximal grooving," has been noted in the remains of many Native American groups, including protohistoric Arikara living along the Missouri River near Fort Pierre. Gregg (1987:194–195) describes these findings in detail:

> Gum line caries were at the enamel root junction of the posterior surface of the second molar tooth... close inspection reveals that an attempt had been made to probe or file the diseased area. Repeated manipulative efforts to dislodge foreign material from between the teeth, or to relieve irritation, produced a groove on the tooth's posterior surface.

Ubelaker et al. (1969:145) and coworkers found 42 similar grooves in 37 teeth in skulls from Kansas, probably of Hopewell affiliation, and in skulls from other cultures elsewhere.

While fashionable Roman ladies regarded toothpicks as a necessity for oral hygiene (Wynbrandt 1998:209), their usage seems to have been neglected throughout the Middle Ages. Popularity, especially among the upper class, returned during the Renaissance, which appears to have been a "golden age" for toothpicks. Well-heeled diners could be seen adorned with jewel inlaid silver, gold, or ivory toothpicks dangling from chains around their necks, or ensconced in ornate cases. Christen and Christen (2003:62) observes that "These devices were freely employed at court dinners by the best mannered individuals, and the food particles they dislodged were spit out with gusto. At that time, such behavior was viewed as a complement to the host."

Coincident with the upper order's embrace of toothpicking as a display of conspicuous consumption was a countervailing condemnation of the practice: first in public, as a "travesty of good manners" and later as an ill-advised technique which caused more dental damage than it prevented. A flood of etiquette manuals were published in the U.S. and England during the early nineteenth century—28 versions in the 1830s alone—which consistently admonished refined diners against picking their teeth at table, and advised the genteel to "... stifle all signs of internal bodily processes" (Kassen 1990:13).

In the late 1800s, dental specialists on both sides of the Atlantic weighed in eagerly with dogmatic pronouncements defending discrete toothpicking as a necessary part of oral hygiene, and likewise condemning it as harmful to the user's teeth and public image. English dentist S. Phillips Day and American J.E. Cravens engaged in a spirited debate regarding the propriety and health advantages of this practice, published in the *Missouri Dental Journal* in 1874. Day offered a blistering attack on toothpicking: "One can scarcely conceive a habit more ungentlemanly, offensive, and abominable..." and "... they are not only highly injurious to the human teeth, they create apertures between them, destroying the delicate enamel which protects them, thus inducing premature decay" (Day 1874:25). His sense of national pride offended, Cravens countered that his countrymen use toothpicks intelligently as the British do not, which "... accounts for the nasty, dirty condition in which American dentist usually finds Englishman's *[sic]* teeth" (Cravens 1874:27). Others, such as the editor of the *Dental Register* profered a guarded endorsement of the unobtrusive and proper use of toothpicks, which could be "... a valuable aid in dislodging impacted food which may injuriously affect the gums, or if left, undergo decomposition, which will result in offensive odors and dangerous chemical reagents" (Anonymous 1905:595).

Authors of numerous dental articles during the twentieth century have cautioned against the indiscriminate use of toothpicks, citing a litany of oral and systemic ill effects, including:

> halitosis, dental caries, injury to the interdental papilla, mouth ulcers, allergic reactions, getting the device stuck in the back of the mouth or throat, puncturing of tissues of the gastrointestinal tract, gingival abscesses, or recession, sensitive teeth, worn down or abraded enamel, dentin and/or cementum of both permanent and primary dentitions [Christen and Christen 2003:66].

Anecdotal reports of perforation of the bowel or other viscera by ingested toothpicks, resulting in serious illness or death, appear sporadically in the medical literature. The most celebrated and well-documented toothpick fatality involved the prolific American novelist Sherwood Anderson in 1941. It has also been suspected that President Warren Harding, whose toothpicking habit exasperated the White House butler ("That's being too much a man of the people"), died from peritonitis following a toothpick ingestion (Christen and Christen 2003:67).

Despite the fact that arbiters of social mores have viewed toothpicking with opprobrium throughout the nineteenth and twentieth centuries, a certain cachet has attended the proper display of this implement in the corner of the mouth. Curtis (2002:63) pointed out that a toothpick can serve as an expression of personality, endowing the user with an air of casual self-confidence. In the right context, this projects a sense of strength and control, heightened by a cavalier attitude bordering on insolence. Public toothpick use continues to occupy an ambiguous middle ground between jaunty self-assurance and offensive vulgarity. The toothpick's position in the armamentarium of dental care may be summed up as follows: "Toothbrushes are honest implements and floss is even righteous. But toothpicks are the hoodlums of oral hygiene" (Curtis 2002:123).

A variety of materials have been used as toothpicks through the ages, including bird claws; bone; ivory; metals such as bronze, gold, silver, and iron; quills; straw; tortoise shell; walrus whiskers; and of course wood (Christen and Christen 2003:62). Self-styled wooden toothpicks may have been the type most frequently used at Fort Pierre, notwithstanding the fact that these few bone implements described in this report are all that have been preserved a century and a half later. It is possible, but unlikely, that commercially produced toothpicks were provided to the fort's workers by the American Fur Company. Such items are not listed specifically in orders, inventories, or company steamboat invoices from that period. Manufactured toothpicks were first promoted commercially in America around 1826 at the Union Oyster House in Boston. They were imported from South America by Charles Foster of Maine, who paid Harvard students to request toothpicks when dining at that establishment, hoping to create a demand for his product.

The occupants of Fort Pierre appear to have made the effort to fashion expedient tooth cleaning implements out of the most suitable materials they had at hand. This in itself evinces at least a modicum of attention to personal cleanliness and perhaps even the preservation of viable dentition. Several clinical studies have been conducted to determine the most effective size, shape, and physical properties of interdental devices for the removal of plaque. The results show that a triangular tip shape is the most effective, and materials exhibiting low surface hardness and high strength work the best (Mandell 1990:129). The tip profiles and tensile strength properties of the Fort Pierre toothpicks, especially those fashioned *de novo* from cortical bone, but also the catfish spines, fit these criteria well. In this instance, it appears that the improvised design of these tools, arrived at by trial and error, corresponds exactly with that determined to be optimal by rigorous testing.

The assumption that these objects were used as toothpicks probably cannot be proven conclusively. Alternative explanations may be considered. They could have been used as awls by the Native American women at the fort, but they seem too delicate for this purpose; traditional bone awls were much more substantial, as Sundstrom (2004:85) has shown. Also, native women had changed over to iron awls completely by the 1830s, and several of these are found in the Fort Pierre collection. Of course, these pointed bone implements could have served several purposes, such as for cleaning gun parts, just as toothpicks are used today. It seems likely for several reasons that the Euro-American occupants of the fort, rather than their Native American trading partners, were the ones that used these items. They were located in areas frequented by the fur trade and military officers, and less accessible to the Indians, the engagées, or their families. Also, the traditional dental hygiene practices of many Plains Indian groups, and specifically the Lakota, involved the use of floral material such as plant stems as chewing sticks and toothpicks. They utilized not only the abrasive properties of the stem surface (due to opal phytoliths), but the additional medicinal effects of the analgesic and anti-inflammatory resins in prairie plants such as Black Sampson (*Echinacea angustifolia*) (Wiley and Hoffman 1994:152).

A backhanded comment on the value placed on preserving one's teeth is provided by Alexander Culbertson, a career fur trader and bourgeois at Fort Pierre from 1849 to 1850. Prince Maximilian of Wied, then a well-known German naturalist and adventurer, toured the Missouri River forts with Swiss painter Karl Bodmer in 1833–34. The context of Culbertson's disparaging appraisal of Maximilian's appearance ("...probably the greasiest pair of trousers that ever encased princely legs" and "*sans* teeth") indicates that the Prince's celebrity status was diminished by the fact that he was edentulous (Bradley 1900:206).

It is believed that meals at Fort Pierre were generally served in a mess hall at regularly scheduled times, when workers within earshot were alerted by the ringing of a bell (Schuler 1990:65). The relatively concentrated distribution of these bone toothpicks in or near the kitchen or the elite living quarters, and the wear patterns on their tips seems to indicate that this was a habitual activity carried out in a specified location around mealtime. One can easily imagine that these postprandial interludes involved relaxed conversation, pipe smoking, and decorous toothpicking.

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