

METAL

by

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## INTRODUCTION

This chapter presents the findings of a functional and descriptive analysis of the metal artifacts recovered during the summer of 1979 from the Golden Eagle site archaeological excavations in Sacramento, California. Over 5,000 whole and fragmentary metal objects were collected, representing a broad range of functional classes, as well as functionally specific, one-of-a-kind items. After the initial cataloguing of the metal by area, feature, and layer, the next task was to clean the materials as efficiently as possible. Most of the metal artifacts came into the lab as corroded, amorphous lumps, and many remained as such. The state of preservation was generally very poor and artifacts were cleaned only when it was felt that the effort would be repaid by more complete identification. The amorphous lumps which were transformed into recognizable artifacts bear witness to the great patience of the metal conservator, John Holson. A description of the conservation techniques used on the Golden Eagle metal collection is provided in appendix 12.1.

Once the cleaning process was completed, each recognizable artifact was measured (U.S. system). A description and/or drawing of each artifact was recorded on a corresponding catalogue card. Due to the size of the collection and extreme diversity represented by the metal artifacts, artifacts were initially sorted according to broad, functional categories. The following functional groups were developed: Hardware and Construction (fasteners, architectural hardware, and miscellaneous items); Household (kitchen and table ware, furnishings, and containers); Personal (clothing hardware, miscellaneous personal items, and arms and ammunition); Tools; Horse and Mule Trappings; and Miscellaneous and Unidentified Artifacts.

## ARTIFACT DESCRIPTIONS

### HARDWARE AND CONSTRUCTION

Items in the hardware and construction category included fasteners, architectural hardware, and miscellaneous items such as barrel hoops and wire.

#### Fasteners

For hundreds of years, iron nails have been the most efficient means commonly available for fastening pieces of wood together. Because Euro-American society in California relied heavily on wood for its built environment, any archaeological excavation of post-1850 habitation sites will invariably uncover a quantity of iron nails. Whether a miner's shack with only a few dozen nails or an urban site like the Golden Eagle Hotel where thousands of nails were used and recovered, the ubiquitous iron nail will usually form a large percentage of the metal artifacts in a site's assemblage.

Over 4,000 nails were recovered for analysis. Most of the nails were so highly oxidized that much of their length and thickness had been lost to corrosion. In addition, most if not all of the nails from the Golden Eagle sample had been used for construction purposes and were fragmentary or bent, or their heads were misshapen from hammer blows. Due to use, corrosion, and the time constraints involving the cleaning process, only 246 square cut nails, 15 wrought nails, and 14 specimens representing a variety of other types of fasteners were identified and sized during analysis.

Wrought Nails. Thirteen of the 15 wrought nails came from Area VII. All are made from 3/16-inch square stock, and all appear to have been clinched. The broken specimens are all missing tips at the point where the bend occurs when a nail is clinched (pl. 12.1a). The practice of "clinching"--bending over the protruding tip--is now regarded as poor workmanship, but the efficiency of this technique is obvious. Early batten doors with wrought nails on the outside and bent tips on the inside are cemented together so well that it is nearly impossible to pry them apart (Sloane 1964).

Although less expensive, machine-cut, square nails were readily available in Sacramento throughout the American period, wrought nails continued to be used for certain architectural features, such as the battens of doors, door latches, and lathed room partitions. For doors, wrought nails were better fasteners than the machine-made nail, because they withstood jarring and could be more easily clinched than cut nails. The wrought nails from the Golden Eagle assemblage probably represent the remains of door or sash manufacturing.

Square Cut Nails. Square cut nails from the Golden Eagle were classified into two functional types according to their head and shank characteristics: common nails (including square cut spikes) and finishing nails. Over 95 percent of the square cut nails analyzed were "common cut" (pl. 12.1b, c). Only 10 specimens were identified as finishing nails. When the square-cut nails were measured and their total length rounded off to the nearest 1/8 inch, they fit nicely into "a nineteenth-twentieth century penny sizing system which defined specific nail sizes in relation to standard lengths in inches. Thus, a 2d nail equaled one inch, 6d equaled 2 inches, 10d equaled three inches, 20d equaled four inches and 40d equaled five inches" (Ross 1976:889).

When the frequency of occurrence for each nail size is plotted on a graph (fig. 12.1), it is apparent that the carpenters and contractors who constructed the Golden Eagle Hotel and surrounding buildings preferred certain sizes over others. Nail size correlates directly to the type of construction for which the nail was used. It was customary for 4d nails to be used for shingling and slating, 6d for clapboarding, 6d and 8d for finishing, 8d and 9d for flooring, 9d and 10d for boarding, and 40d and larger for heavy framing, rafters, and studding for partitions (Fontana and Greenleaf 1962). Based on these distinctions, the high proportion of 10d common nails suggests two possibilities: boarding was the primary construction activity which took place on the site; the 10d nail was used for purposes other than boarding. The 10d nail was medium sized (3 inches in length) and could be easily substituted for many fastening functions which traditionally required a smaller or larger nail.

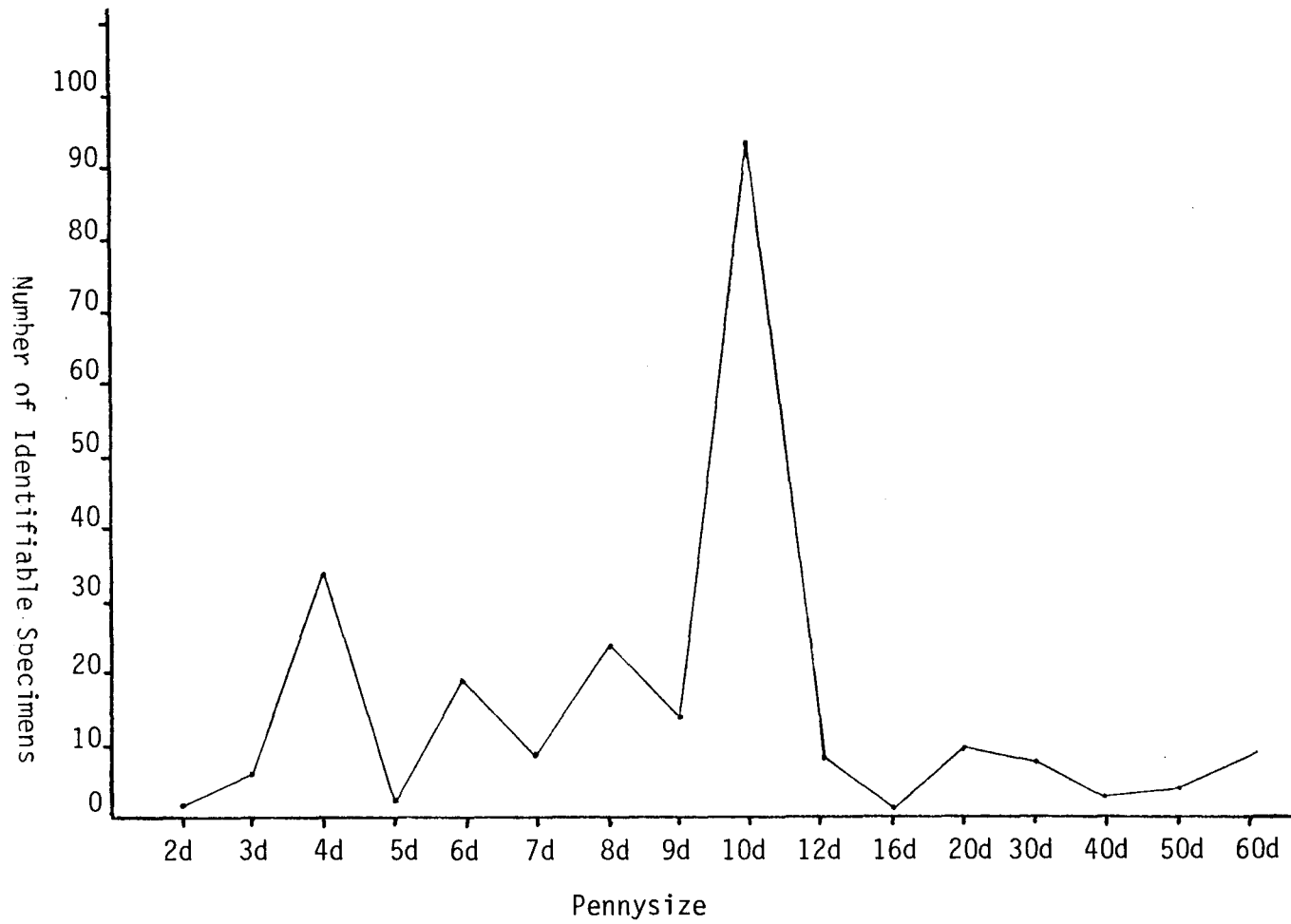


FIGURE 12.1: Frequencies of Square Nail Types by Size

Square cut nails were not made locally; they were manufactured in the eastern United States and shipped to Sacramento in kegs containing thousands of nails. Since nails were "imported" and each size was bought by the thousands, contractors may have used certain standard sizes for many purposes in order to save on expenses. When a job came up that customarily required a nail size that was not on hand, the contractor would most likely use the size he had available. Due to the abundance of 10d nails used for construction activities in the hotel and surrounding areas, it appears that this nail was a very versatile and popular size for building contractors active in Sacramento in the mid-1800s.

Machine-cut square nails were the predominant nail type sold from about 1800 until 1890, when wire nails became the most common fastener. Until about 1825, nails were headed by hand hammering; after 1825, water-driven machines were used to cut and head the nails in one process. Between 1825 and 1830, the stamped heads were thin and lopsided. It was not until the 1840s that the heads of cut square nails became uniform (Fontana and Greenleaf 1962). About 1871, manufacturers began to anneal cut nails--a process in which nails are heated and then slowly cooled. This process softened and toughened the metal at the same time and made square cut nails suitable for clinching. Using this dating framework, the Golden Eagle assemblage of nails can be placed after the 1840s and before 1871.

Cast Nails. One cast copper-alloy nail with a round head was recovered from Area VII. Its function is unknown.

Screws. Five iron wood-screws were recovered from Feature 8. All were found rusted into place in L-shaped iron brackets.

Tacks. Five tacks were found in areas VII and VIII. Four were badly corroded, iron, square cut tacks. One specimen found in Feature 15 had a 3/8-inch head diameter and may have been an upholstery tack.

Rivets. Two hand-forged, iron rivets were recovered from Feature 20. What they riveted together remains unknown.

Staples. One iron staple was found. Its form is almost identical to a modern fencing staple, but this piece of hardware could have been used for any of a variety of purposes.

### Architectural Hardware

Architectural hardware in the Golden Eagle collection is strictly utilitarian in form, with no ornamentation. The heavy-duty iron brackets found in Feature 8 are particularly diagnostic of large commercial buildings such as the Golden Eagle Hotel. The other architectural hardware recovered was related to interior fixtures associated with doors, furniture, and plumbing.

Hinges. Three hinge fragments were recovered: one from Feature 20, another from Feature 15, and a third from Feature 8. All were badly oxidized and fragmentary, making it difficult to determine their function. The hinges from features 15 and 20 appear to be fragments of iron butt

hinges, a type commonly used for doors and furniture. The hinge from Feature 8 is some form of strap hinge (pl. 12.1d).

Brackets. Three L-shaped brackets from Feature 8 (pl. 12.1e, f) were identified. Screws used to fasten the brackets to wood beams are still intact in two specimens. The brackets had served as braces and load-bearing, anchoring devices.

Pipe and Pipe Fittings. Three pieces of pipe were recovered. One piece of copper-alloy pipe from Feature 15 was 1/2 inch in diameter and threaded on one end (pl. 12.1h). Its form suggests a gas pipe, but it might have been used for other purposes. Two fragments of lead pipe, 3/4 inch in diameter, were found in Feature 20. Two brass, threaded pipe fittings were identified, although their function is unknown. One piece came from Feature 15, the other from Area VI.

Plumbing Fixtures. Two fragments of plumbing fixtures were recovered from Feature 15. One fragment suggests a spigot, the other is possibly a handle.

### Miscellaneous Hardware

Artifacts in this category include a large quantity of wire, bundling strap and bar stock associated with blacksmithing, and several barrel hoops.

Wire. Three hundred and twenty-five iron wire pieces were identified. The diameter of the wire ranged from 1/16 to 1/4 inch. Wire of these gauges might have served a variety of functions, including use as stove-pipe wire, baling wire, and heavy, smooth fence wire. The urban nature of the site and the recovery of only one staple fragment (possibly related to fence building) suggested that the recovered wire functioned as baling or stove-pipe wire. Four pieces of narrow copper wire, 1/32 inch in diameter, were recovered from Feature 6. Their function is unknown.

Bundling Strap and Bar Stock. Fifty-four metal artifacts were identified as straps used to bundle blacksmith's iron stock for shipment. The bundles of bar stock were held together by twisting the free ends of the straps together. The iron straps recovered were square, round, and rectangular in cross section. Nine of the straps were found in Feature 8, while the remaining 45 came from Area VI, associated with a blacksmith's shop. In addition, 31 fragments of round, square, and rectangular iron bar stock were recovered from Area VI. Iron bar stock was the primary raw material used in a blacksmith's shop to shape and form a myriad of metal items and implements. The quantity of bundling strap and bar stock found in Area VI is strong evidence of blacksmithing activities.

Barrel Hoops. Fifteen barrel-hoop fragments were identified; two hoop fragments were recovered from Feature 8, while the remainder came from Feature 6. Many of these banding fragments had riveted junctures (pl. 12.1i,j). Wooden barrels were the most popular containers for shipping most commodities during the mid-1800s, and many large-scale

shippers employed their own coopers to make them. Depending upon size, commodity, and country of origin, wooden barrels were identified by a multitude of terms, such as casks, firkins, hogsheads, kegs, pipes, punch-ions, tierces, and tubs (Ross 1976).

Hooks. Two hand-forged hooks were found in Area VI. One hook had an attached stirrup, the function of which has not been determined.

Chain. Six fragments of chain links were recovered from Area VI. Several of the fragments appeared to be chain repair links. These were made in an open spiral, to be forged closed by a blacksmith when repairing broken lengths of chain.

## HOUSEHOLD

### Kitchen and Table Ware

All kitchen and table ware in the collection came from Feature 15 associated with the Golden Eagle oyster saloon (pl. 12.2a, b, c). Two fork fragments, one complete spoon, a spoon fragment, and five tableware handle fragments comprised the collection of eating utensils; they exhibited only minimal engraved decoration. All the tableware was made of "nickel silver," an alloy of 55-75 percent copper, 18-27 percent nickel, and 5-18 percent zinc. This alloy was popular in the latter half of the 19th century because of its chemical resistance to acid foods and also because it was an inexpensive imitation of fine silverware (Callaway 1978). One fragment of an iron pot or kettle was also found in Feature 15. Its original size could not be determined.

### Furnishings

Nine cast-iron fragments recovered from Feature 20 were identified as stovetop parts. Since most of the fragments fit together, it is probable that they represent the remains of one stove, certainly not more than two. One brass ring pull from Feature 15 would have served as a drawer handle (pl. 12.2e). Two brass lamp fittings from Feature 15 were the remains of a single kerosene lamp (pl. 12.2d).

### Containers

Sixteen tin-can fragments were recovered from Feature 6, a deposit associated with the Golden Eagle Oyster Saloon. No complete cans were found, and preservation of the fragments was very poor. Identifiable fragments were all "hole-in-top" cans. These cans were first patented in 1810 and were used throughout the century. The body of the can was formed around a cylinder, and the seam was soldered. Separate top and bottom pieces were cut and soldered to the body. Before the Civil War, a hole was left in the top of the can through which the contents of the can were forced. A smaller cap was then soldered on to fill this opening, and the can was heated to cook the contents. During processing, a pinhole was left in the can top for venting steam. One last drop of solder over this pinhole completed the canning process.

Around the time of the Civil War, a series of open-top cans was developed. These cans were similar to the original hole-in-top cans, except that they were filled and capped in one step. Pinholes were still needed to vent gases during the heating process, and solder-drop final closures continued to be used (Teague and Shenk 1977). The can fragments from Feature 6 appear to be of this later type.

Fifty-four fragments of lead foil were recovered from Feature 20, associated with the Golden Eagle Hotel restaurant, while only one fragment came from Feature 15. Several of the fragments had turned edges. No embossed stamps or markings of any kind could be discerned on the foil fragments. Lead foil in the mid-19th century served to cover the tops of corked bottles. Large pieces might have been used for some food-packaging purpose.

Feature 6 also contained the body fragments, rim fragments, and wire handles of at least four iron pails or buckets (pl. 12.2f). During the 19th century, metal pails were all-purpose containers. Eleven fragments of smaller metal containers were recovered; their function is not known.

#### PERSONAL ITEMS

In keeping with the commercial context of the Golden Eagle site, relatively few personal items were recovered. Artifacts in this category included clothing, hardware, miscellaneous items, and arms and ammunition.

##### Clothing Hardware

With the exception of one triple-tongued, brass buckle fragment found in Feature 8, all clothing hardware came from Feature 15 (pl. 12.2g, h). Two buckles were very fragmentary, and their analysis was therefore impossible. Identifiable pieces included: one single-tongued, cuprous metal buckle; one double-tongued center-post, brass buckle; and one brass buckle for a vest strap or suspenders.

##### Miscellaneous Personal Items

A fragment of a pocketknife handle was found in Area VI. Two eyelets and two shoe tacks were recovered from Feature 6, which was associated with the bootmaker, Hillebrand, from 1868 to 1873. Feature 6 also contained a cuprous metal child's toy cup which was 11/16 inch high and had a broken handle. Several personal items were recovered from Feature 15: the brass ends of two wooden handles, possibly the remains of artist's paint brushes; a brass case for a pocket watch (pl. 12.1j); and one complete, although badly corroded, pocketknife with a mother-of-pearl inlaid handle (pl. 12.2j).

##### Arms and Ammunition

Two pistols and 10 percussion caps were recovered from Feature 15. Because the pistols were highly oxidized, x-ray photographs were taken

to assist in their conservation and identification (pl. 12.3a, b, c, d). From the x-rays, it was established that the pistols were a single-shot cap-and-ball and a pepperbox. Both were percussion pistols--firearms using copper caps with fulminate of mercury as the powder ignition system.

The single-shot, percussion pistol is a good example of the belt handguns manufactured between 1830 and 1860. Belt handguns were a class of pistols larger than a derringer or pocket pistol, but small enough to fit comfortably into a belt or waistband. Percussion belt pistols were handmade, and most specimens were one-of-a-kind or at best follow stylistic trends of the era, with features peculiar to individual gunsmiths. If a maker's mark once existed on this specimen, it has long since corroded. The following features were identified during analysis of this specimen: brass furniture and mountings; octagonal steel barrel with a relatively large bore--probably 45 caliber; checkered handle for a good grip; and a compartment in the butt that held four spare percussion caps. The discovery of this compartment illustrates the importance of x-ray photography in the analysis of multi-component historic artifacts; because corrosion obscured the compartment's opening, this feature might otherwise have gone unnoticed. These features point to a well-made, relatively expensive handgun. One knowledgeable collector whom the author consulted felt the pistol was American made, possibly by a Philadelphia gunsmith.

The pepperbox was firmly identified as an Allen, manufactured at Worcester, Massachusetts, between 1847 and 1865. Although there are no factory records of Allen models, they have been the subject of extensive research, due to their extreme popularity and the frequent references to them in contemporary literature. Some of the features that served to identify this specimen were the Worcester-style, bag-shaped handle and rounded mainspring; the flat ribs between the six, smooth-bore, 31-caliber, steel barrels; a bar hammer; a nipple shield; and an overall length of 7-1/4 inches.

The Allen was the fastest-shooting handgun of its day and was very popular with 49ers and other frontiersmen. There was one major problem with the pepperbox and other percussion revolvers: it was not uncommon to have all six barrels go off in unison! Mark Twain knew of this phenomenon. In Twain's book Roughing It, a character named Bemis tells of shooting a tree-climbing buffalo with an Allen pepperbox and of a man named Hank, who questioned his story. Bemis said, "I should have shot the long gangly lubber they called Hank if I could have done it without crippling six or seven other people--but, of course, I couldn't, the old Allen's so confounded comprehensive."

Finding these two artifacts at the Golden Eagle site raises a puzzling question: Why were these guns thrown away? The percussion belt pistol was a well-made, expensive gun, and the Allen pepperbox, although quite common, cost as much as \$15.00--a good deal of money at a time when hourly wages were as low as 10 cents. One plausible explanation is that both pistols had developed certain defects that contributed to their disuse and deposit in a trash pit. Since the guns were found very close to one another in the same layer, they may have been discarded at the same time, perhaps by the same person.

When analyzed with x-ray photographs, the mainspring of the belt pistol was found to be fully depressed; the hammer, therefore, should have been fully cocked (pl. 12.3d). Although the hammer was completely oxidized, its shadow remains to show that it was in a half-cocked or forward position. Something was apparently amiss with the internal mechanism, possibly a broken spur or mainspring.

Looking at the pepperbox, again using the x-ray photographs, the top barrel appears very irregular and faint (plate 12.3c) indicating that the barrel may have blown out on the last shot fired. This accident would have reduced the gun's value considerably. In addition, the trigger guard was missing and part of the walnut handle had broken off.

These defects could have been repaired by a gunsmith, especially in the case of the belt pistol. The imperfections might well have lowered the guns' value in the eyes of their owners, however, so that they were replaced rather than repaired. By 1860 the types of pistols found in Feature 15 were becoming outmoded by the single-barreled revolver introduced by Samuel Colt. For the first dozen years of the Colt revolver's production, the Allen pepperbox far outsold it; the Allen was double-actioned and could fire as fast as the trigger was pulled, whereas the Colt was single-actioned. The drawbacks to the Allen were a heavy trigger pull, revolving barrels which spoiled one's aim, a small bore, and a great lack of accuracy. The belt pistol could only fire one shot between reloadings, which was a serious drawback if its user was being attacked by more than one person at a time. The Colt and other revolvers, having none of these faults, largely replaced the earlier styles during the Civil War.

The disposal of two repairable guns indicates the availability and popularity of handguns in Sacramento during the mid-1800s. In the 1850s and 1860s, owning a handgun of either type found at the Golden Eagle site was similar to owning a moderately priced Timex watch today. If your old Timex should break, quite often you would throw it away, rather than repair it, and purchase a new style watch, probably a digital. It is possible that these guns were discarded in a refuse pit because innovations in pistol design rendered them obsolete. Much of the material in Feature 15 apparently resulted from a cleanup of the bootmaker's shop when the building was being remodeled for the oyster saloon. The suggestion that Hillebrand or the barbers preceding him abandoned these guns, and that Cronin disposed of them, supports the hypothesis that such firearms were no longer considered valuable by the early 1870s.

## TOOLS

Seven tool fragments were recovered from the Golden Eagle site. Two file fragments were recovered from Area VI, one of which was identified as a flat, smooth file. Another file fragment came from Feature 20 (pl.12.4b). Due to oxidation, two of the file specimens had no visible chisel marks. One fragment of a cold chisel bit and the head of a shingling hatchet (pl. 12.4a) were found in Feature 6. Two tool-handle fragments were recovered from Area VI; their function could not be determined.

## HORSE AND MULE TRAPPINGS

Fifty-two horseshoes and horseshoe fragments and two mule shoes were identified in the collection. Two complete horseshoes came from Feature 8 and one fragment was found in Feature 15. The remaining 49 horseshoes, 2 mule shoes and a partially completed horseshoe were recovered from Area VI, the site of a blacksmith's shop. Only 35 specimens were complete enough for analysis. The horseshoe collection appears to have been hand-made from wrought iron. The fibrous texture of the wrought iron is visible on many of the conserved shoes.

Most of the complete, recognizable shoes had been "fullered." The fuller was a groove on the underside of a shoe through which the nail holes were punched. When the horse was shod, the horseshoe nails were sunk into the fuller to prevent the nail heads from wearing against the ground, ultimately causing the loss of the shoe. All of the identifiable Golden Eagle horseshoes have four nail holes. Many of the shoes still have clinched number 5 and number 7 horseshoe nails in place.

Eleven of the horseshoes and the two mule shoes have toe and/or heel calks, and two of the horseshoes also have toe clips (pl. 12.4e, f, g, h, i). Shoes with calks were generally put on animals required to do heavy work. Clips were used to fasten shoes more securely and to diminish the number of nails required. Also an indication of heavy work, clips were used primarily on the hooves of draft horses employed on paved streets. Two wide-webbed horseshoes, broadened on the inside to protect and support fallen soles, were recovered (pl. 12.4g, k). Such shoes were specially made for horses with foot pathologies (Berge 1966). The remaining complete horseshoes would have been made for horses used in light work, such as riding animals and coach horses (pl. 12.4j).

Analysis of a site's archaeological horseshoe collection can provide information about the type and the varied use of the area's draft-animal population during the period in which the site was occupied. The archaeological recovery of one or two horseshoes could be attributed to an animal throwing a shoe accidentally, but the presence of 51 horse and mule shoes in Area VI clearly indicates that a farrier was practicing his trade there. Analysis of the collection also indicates that the farrier was a skilled craftsman with a knowledge of hoof care. There were a number of considerations that a skilled farrier took into account before making the shoe. The horse's weight, the type of work it was to do, its standing position, gait, hoof forms, and the ground surface on which the horse would be walking all influenced the type of shoe the farrier made. It is apparent from the Golden Eagle horseshoe collection that the farrier manufactured individualized shoes to suit the needs of each of his customers' horses. Since well over half of the identifiable horse and mule shoes were made with calks or clips, most of the horses brought to the farrier were probably used for heavy work. The use of toe clips in conjunction with calks suggests that some of the horses were walking on hard surfaces, such as paved or cobbled streets. Since nearly all the animal shoes were for horses, it is apparent that horses were more widely used for transportation and as draft animals than were mules. Oxen were either not used as work animals by the farrier's customers or they were not shod at his establishment.

## DISCUSSION

The metal collection from the Golden Eagle site was on the whole poorly preserved, with most of the sample in fragmentary condition. Analysis of the identifiable items, augmented by historical records, led to interpretations of the areas of the site from which the metal was recovered. Distribution of the metal artifacts is shown in figure 12.2.

The metal artifacts from Feature 15, a brick-lined trash pit, represent three functional categories: household items, hardware associated with building interiors, and nearly all of the personal items found during the excavations. In the absence of historic records, the high proportion of personal and household items from Feature 15 would indicate domestic habitation rather than commercial or industrial use. One important element to be expected in a domestic site is absent: there was not a single artifact from the Golden Eagle metal collection which would be specifically related to female use. While artifacts that were considered exclusively male in the 1800s, such as vest buckles, shingling hatchets, files, and pocketknives, are present in abundance, the only suggestion from the archaeological metal collection that women were present is the child's metal toy cup found in Feature 6, also associated with the barbershop, bootmaker, and oyster saloon. The personal items in Feature 15, instead, might be seen to support the hypothesis that much of the material from this feature resulted from the cleanup of the bootmaker's shop prior to oyster-saloon renovations. The number of household and personal items is not more than might be expected to accumulate in the back of the barbershop and, later, the bootmaker's shop over a 15-year period. The only datable metal artifacts in this deposit, the two guns, were probably purchased before the mid-1860s and can therefore be attributable to the period prior to oyster saloon operation.

Feature 20, the brick-lined trash pit associated with the Golden Eagle Hotel restaurant, also shows a high proportion of household items on figure 12.2, but it contained no personal metal artifacts. These "household" items are actually the 54 fragments of lead foil, suggesting a commercial food establishment rather than a residence. Feature 8, a trash dump associated with the Golden Eagle Hotel and the blacksmith shop, contained the largest quantity of hardware related to building construction. Although much of this material may have been deposited by the blacksmith, some items may be associated with the Golden Eagle Hotel. Feature 6, associated with Cronin's oyster saloon, contained most of the site's barrel hoops, pails, and cans. Due to the quantity of these containers, a commercial establishment associated with food importation and storage is indicated. The child's cup and other personal items recovered from this feature may have been deposited before the oyster saloon was established.

Area VI would have been recognized as a blacksmith's and farrier shop, even if historical records had not documented this fact. The large quantities of horseshoes, bar stock, bundling straps, slag, and scrap metal mark this area as a locality of intensive metal-working activities.

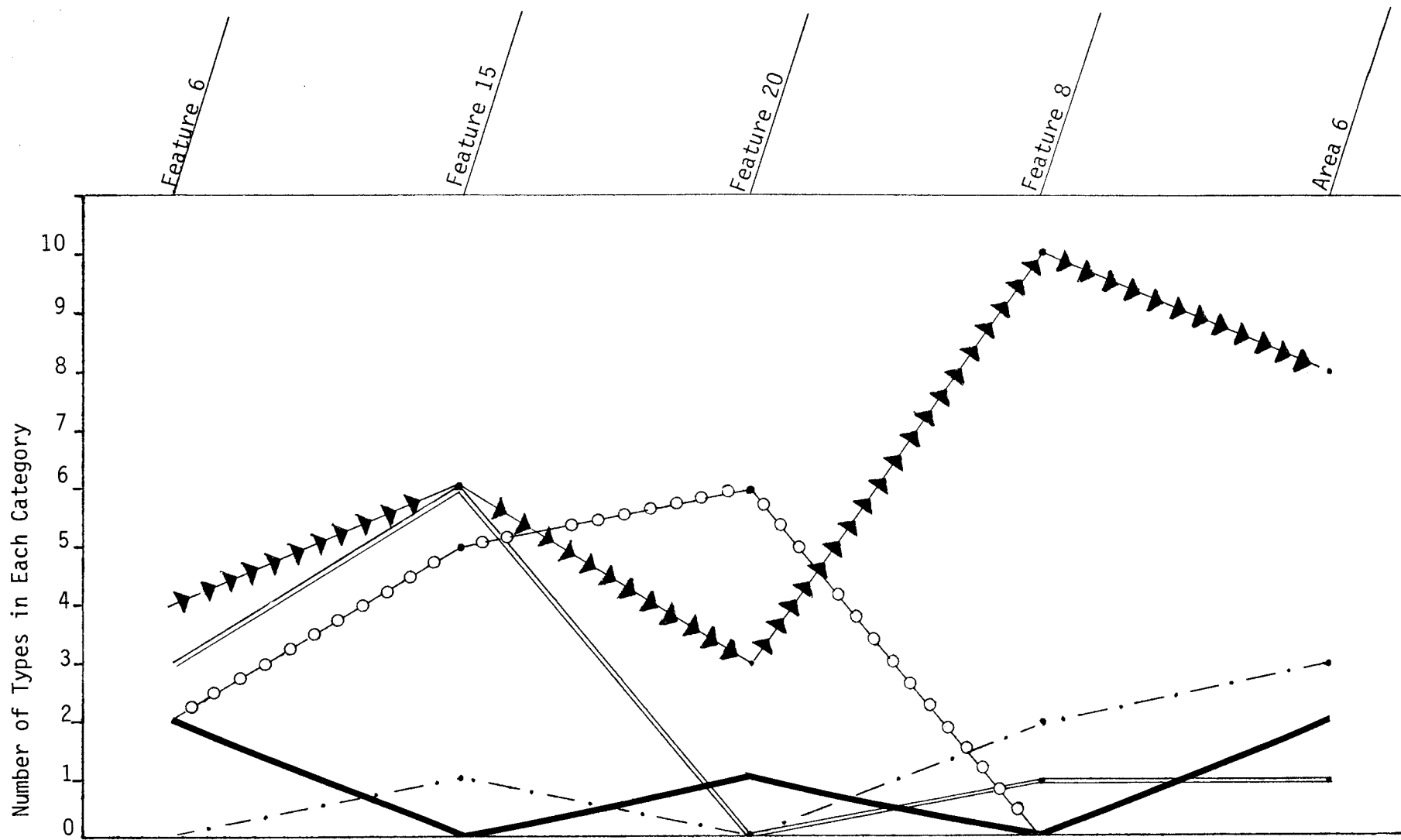


FIGURE 12.2 : Variety of Metal Artifacts for Features and Area VI by Functional Category

Key:

- ▶▶▶▶▶ Hardware and Construction
- Household
- ═══ Personal
- Transportation
- — — Tools

Although most metal artifacts can not serve as sensitive time markers, some of the metal items do suggest depositional chronology, even though no makers' marks were discovered. The nails which were recovered from all areas of the site provide reliable chronological data. Because most of the square cut nails recovered had been ruptured or broken during use, they were undoubtedly made before the practice of annealing was instituted in the early 1870s. Since the heads of the common and finishing nails among the identifiable specimens were uniform, the nails must have been manufactured after the 1840s. The analysis of the pistols, as well as the types of tin cans found, also supports a circa 1850 to 1870s deposition date for the metal collection recovered from the Golden Eagle site.

The functional requirements of the area's occupants, as reflected in the metal collection, were strictly utilitarian. Decoration was minimal at best and confined almost entirely to personal items. The only non-utilitarian metal artifact found was a personal item identified as a child's toy cup. It is clear from the archaeological record that highly decorative, non-essential metal artifacts were either very low on the priority list of the occupants of the site or were not thrown away.

PLATE 12.1

- a) Wrought nails
- b) "Common" cut nails
- c) "Common" cut nails
- d) Strap hinge
- e) Bracket
- f) Bracket
- g) Bracket
- h) Copper-alloy pipe
- i) Barrel-hoop fragment with riveted juncture
- j) Barrel-hoop fragment with riveted juncture



**Plate 12.1**

PLATE 12.2

- a) Table fork
- b) Spoon
- c) Serving fork
- d) Brass lamp fitting
- e) Brass ring pull
- f) Iron pail rim with handle fragment
- g) Brass buckle fragments
- h) Brass buckle from suspender or vest strap
- i) Pocket knife
- j) Pocket watch



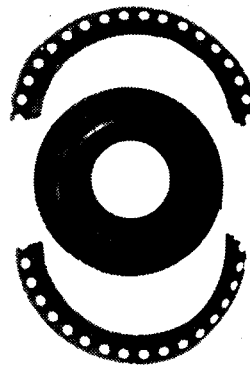
a



b



c



d



e



f



g



h

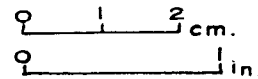


i



j

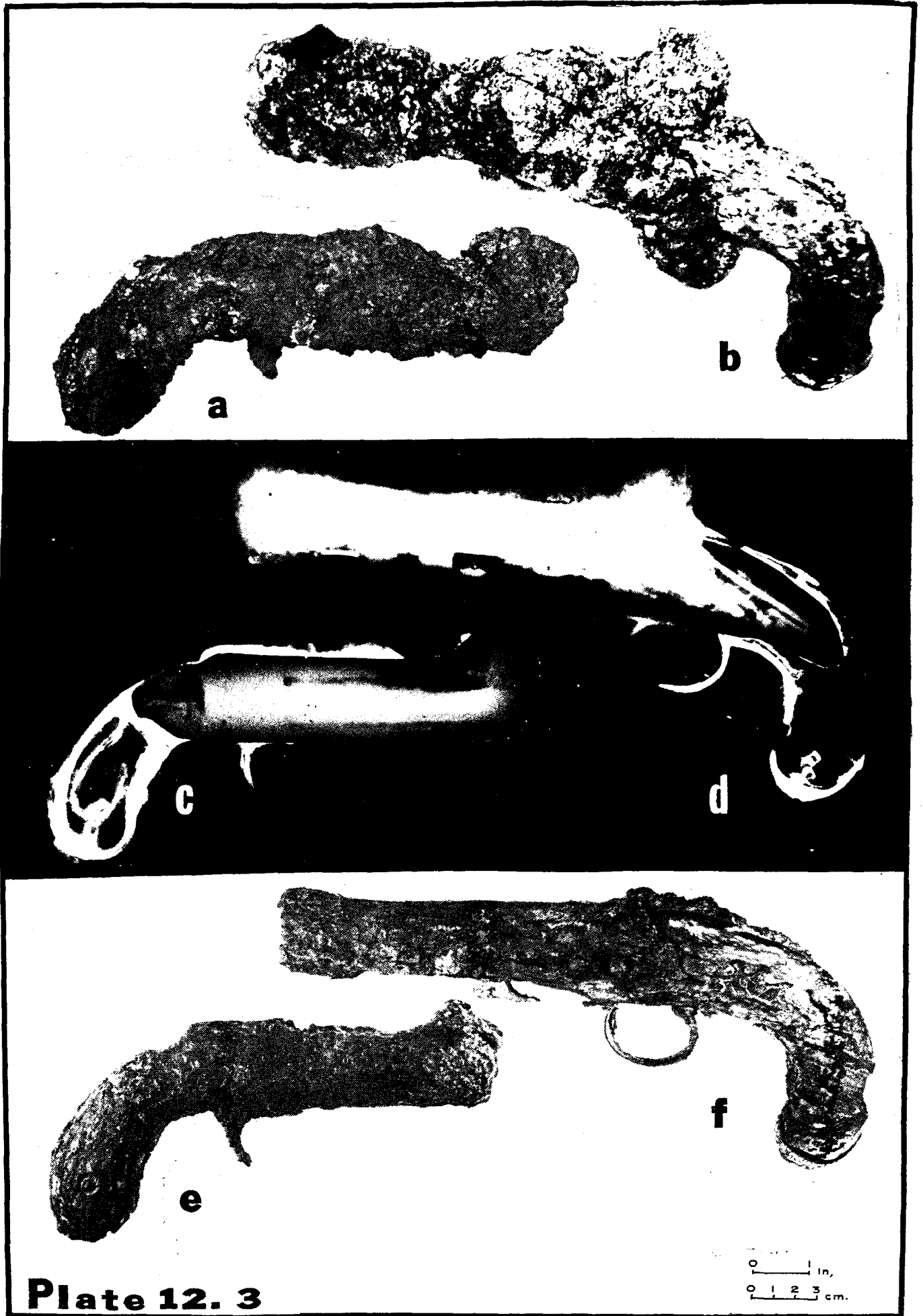
a-f = .43 x Scale  
g-j = .63 x Scale



**Plate 12.2**

PLATE 12.3

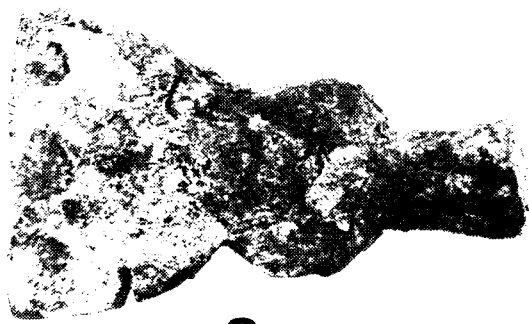
- a) Allen pepperbox pistol before cleaning
- b) Percussion cap pistol before cleaning
- c) X-ray of pepperbox before cleaning
- d) X-ray of percussion pistol before cleaning
- e) Pepperbox after cleaning
- f) Percussion pistol after cleaning



**Plate 12. 3**

PLATE 12.4

- a) Shingling hatchet
- b) File fragment
- c) Horseshoe with toe and heel calks
- d) Semi-completed horseshoe
- e) Horseshoe nails
- f) Horseshoe with toe and heel calks
- g) Wide-webbed horseshoe with toe clip
- h) Horseshoe with toe clip
- i) Mule shoe with toe calk
- j) Horseshoe
- k) Wide-webbed horseshoe



**a**



**b**



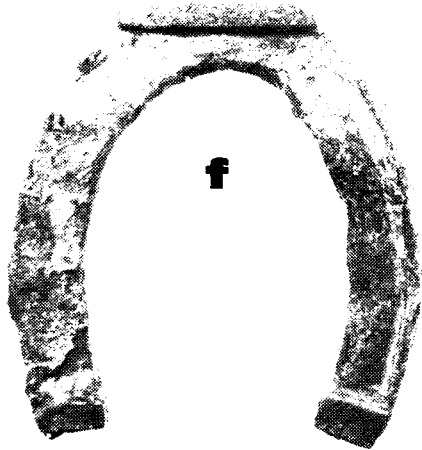
**c**



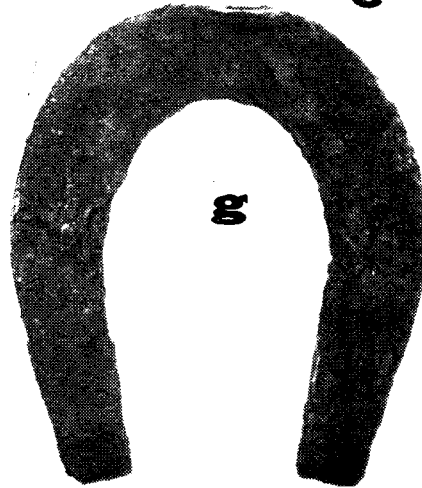
**d**



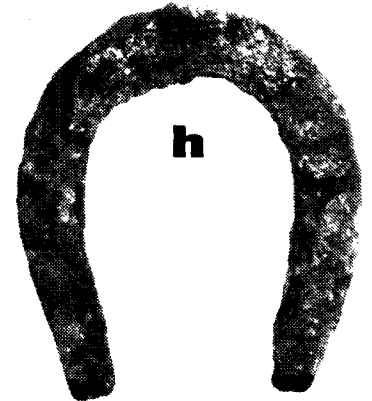
**e**



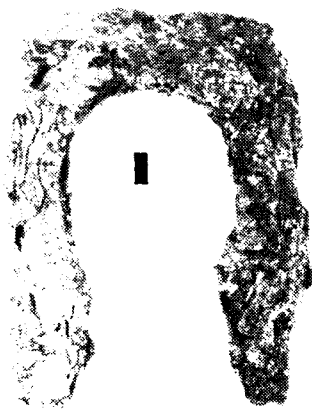
**f**



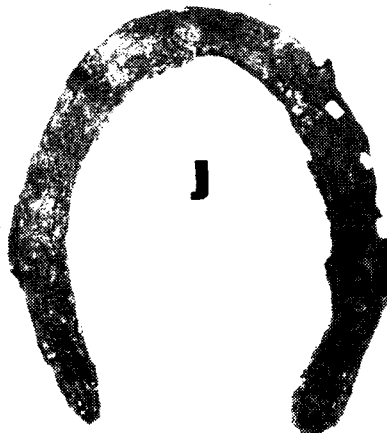
**g**



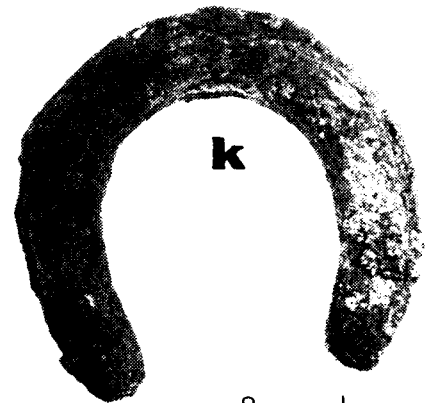
**h**



**i**



**j**



**k**

**Plate 12.4**

0 1 2 in.  
0 1 2 3 4 cm.

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## APPENDIX 12.1

### Metal Conservation by John Holson

Three different methods of corrosion removal were used to clean the metal materials from the Golden Eagle site excavations: manual, electrolytic reduction, and chemical. The majority of the metal was cleaned by a combination of manual removal of loose, surface deposits, followed by the electrolytic reduction process. The primary purpose of cleaning the materials was to aid in the identification of artifacts with potential historical significance. Due to the time constraints of the contract, not all the metal was cleaned; instead, cleaning was limited to those artifacts which exhibited a potential for interpretation of the site.

The majority of the metal artifacts recovered from the excavations were of iron. Prior to the removal of any surface corrosion from an iron artifact, it was visually inspected for clues to its identification, such as decoration, makers' marks, or evidence of tool use or function. A magnet was then passed over the object to determine the amount of solid metal still present in the encrusted object, to identify areas of varying density of preserved metal, and as an aid in the treatment of the artifact. If it was determined that the body of the artifact was of a substantial metal content, a preliminary cleaning was accomplished using a variety of hand tools. In addition, an electric vibrating hand tool with a large needle and a small, high-speed rotary tool fitted with various brushes and grinders were utilized. In many cases, no further cleaning of the object was necessary.

When an item could not be satisfactorily cleaned using manual methods, or if it was of a sufficiently fragile nature that cleaning might damage it, then the electrolytic reduction method of cleaning, as outlined by Noel Hume (1975) and Plenderleith (1971), was used. Electrolytic reduction uses the phenomenon of electrolysis--the chemical decomposition of a material through use of an electrical current (Field 1973)--to clean the artifact. There must be a suitable electrolyte present, such as caustic soda or formic acid in solution, in order for reduction to take place (Charlambous 1975). The cathode, usually the artifact to be consolidated, is connected to the negative pole by means of a wire. The anode, a plate of metal compatible with the metal of the artifact (Lane 1975), is connected by wire to the positive pole. Electricity is usually supplied by a direct current (D.C.), as alternating current (A.C.) does not enhance corrosion removal in all cases. Further elaboration of this process can be found in Noel Hume (1975), Plenderleith (1971), Plenderleith and Toracca (1968), and Barkman (1975).

In the electrolytic cleaning of materials from the Golden Eagle site, a six-gallon polyethelene container was used as an electrolytic tank. The electrolytic solution used was a 5 percent sodium-hydroxide solution dissolved in water. The anode was a stainless steel plate measuring 6 inches by 6 inches. Both the anode and the cathode were suspended into the electrolytic solution by means of a copper wire attached to a 3/8-inch zinc-coated, iron bar. The electrical source was a

10-ampere battery charger. The amount of current applied varied from 6 to 15 amperes, depending on the material being cleaned. The length of time that an object was subjected to this process was also dependent on its material. Periodic cleaning and examination of the artifactual material was conducted while cleaning was in process.

After treatment in the electrolytic tank, the objects were scrubbed with a mild detergent to remove any solution and loose corrosion. The artifacts were then boiled in distilled water and wiped dry.

A limited amount of chemical cleaning was done to copper-alloy objects such as buttons, coins, and small nails. The primary goal in the cleaning of these materials was to remove the green carbonates deposited on the surface of the artifact, which generally obscured distinguishing features. For this treatment, the object was immersed in a 5 percent solution of four parts sodium bicarbonate and five parts sodium carbonate dissolved in water. This treatment loosened the carbonate layer, which was then removed with a variety of small tools and soft brushes.

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