

**Archeological Mitigation of the Federal Lands Highway Program Plan
to Rehabilitate Tour Road, Route 10,
Little Bighorn Battlefield National Monument, Montana**

By
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This report has been reviewed against the criteria contained in 43CFR Part 7, Subpart A, Section 7.18 (a) (1) and, upon recommendation of the Midwest Regional Office and the Midwest Archeological Center, has been classified as

Available

Making the report available meets the criteria of 43CFR Part 7, Subpart A, Section 7.18 (a) (1).



Abstract

Archival and archeological research was conducted in support of the planned rebuilding of Route 10, the tour road, from Last Stand Hill to the Reno–Benteen defense site parking lot at Little Bighorn Battlefield National Monument. Archival research in the National Archives and at the park provided background information on the nature and extent of road construction by the U. S. Army in the mid-1930s that now constitutes the tour road right-of-way.

Close-order metal detecting in a corridor 20 meters to either side of the tour road alignment and at Calhoun Hill Loop recovered over 300 artifacts associated with the Battle of the Little Bighorn in 1876. The distribution and density of artifacts recovered during the metal detecting validated the mid-1980s sampling effort, finding the predicted soldier and Indian warrior positions posited in the earlier investigations.

The number of artifacts recovered was also within the predicted range based on the earlier investigations. No new or unanticipated soldier or Indian warrior positions were identified, nor were any new firearms types identified. A number of additional individual guns were identified using comparative firearm identification techniques. The planned road reconstruction will not affect any marble marker locations, thus no additional mitigative excavations are required. Based on current plans for the road rehabilitation the close-order metal detecting has mitigated the effect of the road construction along the right-of-way. A multi-instrument geophysical survey was conducted around the Reno–Benteen parking lot to ensure that no buried rifle pits or other battle features will be impacted by reconstruction efforts in that area. Once the current asphalt overlay is removed, it is recommended that metal detecting of the original base be conducted prior to reconstruction in order to ensure there are no buried deposits in the roadbed.

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Contents

Abstract.....	i
Acknowledgments.....	ii
List of Tables.....	iv
List of Figures.....	iv
Introduction.....	1
Historical Overview of the Battle	5
2004 Archeological Investigation Methods	7
Field Methods	7
Phase I Close-Order Metal Detecting Procedures	7
Recovery.....	8
Recording	8
Laboratory Methods and Analytical Methods	8
Artifact Identification and Analysis.....	9
Arms and Ammunition	9
Caliber .38	16
Caliber .45 Colt	16
Caliber .45 Bullets.....	16
Caliber .50 450-Grain Bullets	16
Suspender Grip.....	17
Boots and Boot Nails.....	18
Canteen Stopper Ring	18
Camp Boiler Bail	18
Cartridge Belt Buckle	18
Tack Buckles	18
Tack Parts	18
Horseshoes	18
Results of the 2004 Investigations	21
The Reno–Benteen and Weir Point Episodes	22
The Medicine Tail Coulee Episode	25
Deep Coulee to Calhoun Hill Episode.....	26
Greasy Grass Ridge and Calhoun Hill.....	27
Calhoun Hill to Last Stand Hill	28
Conclusions.....	29
References Cited	31
Figures	35

Tables

1. Firing Pin Imprint Matches .44-Caliber Cartridge Cases	11
2. Firing Pin Imprint Matches for .45–55-caliber	13

Figures

1. Little Bighorn Battlefield National Monument road inventory area	35
2. A 1932 U.S. Army aerial oblique photograph showing the informal track from Last Stand Hill to the Calhoun area	36
3. By 1935 the road from Last Stand Hill to well beyond Calhoun Hill had been graded, widened, and graveled in preparation for the more extensive work in 1938	36
4. The road was graded and an oiled surface was applied in 1938	37
5. A 2004 image of the same area as Figure 4 showing the road alignment	37
6. Another view of the completed tour road alignment in 1938 viewed from the Keogh area toward Last Stand Hill	38
7. This modern view approximates the 1938 view in Figure 6	38
8. A metal detector sweep underway above the tour road near Medicine Tail Coulee	39
9. Conrad Angone and Douglas McChristian excavate a metal target on Finley–Finckle ridge	39
10. Harold Roeker and Carl Drexler used a Trimble Pro XL global positioning system device to precisely record artifact find locations before collecting each artifact	40
11. Distribution of all artifacts recovered during the 2004 investigations	41
12. Locations of miscellaneous cartridge cases and bullets found along the road corridor	42
13. Miscellaneous cartridges and cases	43
14. Locations of .44-caliber cartridge cases and bullets	44
15. .44-caliber cartridge case heads	45
16. .44-caliber and .45-caliber bullets	46
17. Locations of .45–55-caliber Springfield cartridge cases and bullets	47
18. Firing pin marks on Spencer cartridge cases	48
19. Locations of .50-caliber cartridge cases and bullets	49
20. Spherical lead bullets	50
21. Gun parts	50
22. Butcher knife or sheath knife handle	51
23. Iron arrowheads	51
24. Buckles	52
25. Canteen stopper ring	52

Introduction

The Little Bighorn Battlefield tour road, also known as Route 10, that is traversed by hundreds of thousands of park visitors each year is narrow and in poor condition. Its poor condition is, in part, due to an ever increasing amount of vehicular traffic. The late 1930s road was never designed to carry the amount of traffic seen today, nor was it designed to handle the increasing weight loads of large SUVs or mobile homes and campers. Due to the tour road's deteriorating condition the National Park Service and park management have proposed rebuilding and widening the road to insure that visitors have a safe and enjoyable experience in the park. The archeological project reported here was conducted in support of Section 106 of the Historic Preservation Act, as amended to ensure that the project's effect on the park's archeological record is mitigated.

Previous archeological investigations of the Battle of the Little Bighorn, Montana, have yielded thousands of artifacts (Scott and Fox 1987; Scott et al. 1989; Scott and Bleed 1997). Spatial patterning analysis of the physical evidence of the 1876 battle revealed new insights into the movements of individual combatants as well as precise locations of Indian and soldier positions. The archaeological investigations at Little Bighorn Battlefield National Monument have provided a new perspective on the various elements of the Battle of the Little Bighorn. Combatant positions have been identified, firearms identified and quantified, and the sequence of events has been elucidated, history enhanced, and in some areas revised.

The Battle of the Little Bighorn did not occur entirely within the limits of the present National Park Service boundary. Battle-related relics have long been found on lands surrounding the Park as well as in the park itself. Systematic archeological research began in the park in 1984 and 1985 (Scott and Fox 1987; Scott et al. 1989) with a parkwide metal detector and visual sampling based inventory. In 1994 the first systematic inventories of non-National Park Service lands were undertaken (Scott and Bleed 1997). This effort was followed by additional investigations on Crow Tribal allotments in 1996 (Scott 1996), 1998 (Scott 1998), and other private lands in 1999 (Scott 2000). The purpose of those archeological investigations was to determine the extent that battle-related remains might extend on to non-NPS owned lands. Each of the projects was successful in its own right yielding over 5000 artifacts that have aided in reshaping the story of the battle.

Design and placement of the Americans with Disabilities Act compliant sidewalk from Last Stand Hill parking lot to the Indian Memorial led to identifying an unanticipated impact to the archeological feature known as the horse cemetery or pit. The horse pit is the location where battle-related horse skeletal remains were deposited in 1881 during the installation of the Seventh Cavalry memorial on Last Stand Hill. The sidewalk construction specifications and terrain constraints required the removal of two or more feet of dirt, and/or subsurface disturbance up to a depth of four feet for the installation of retaining walls that were believed to likely directly impact the horse cemetery site. Given the constraints of the landscape and the construction specifications there was no feasible avoidance alternatives and a mitigation plan was developed to excavate the horse pit site. Fieldwork was conducted from April 29 to May 1, 2002. The field investigations determined that the horse pit was near, but outside the direct construction impact zone. The horse pit was documented and preserved *in situ* (Scott 2002; Nichols 2002; De Vore 2002)

The earlier archeological metal detector inventories, which sampled approximately 35 percent of the extant resource (Scott and Fox 1987; Scott et al. 1989), recovered over 5,000 artifacts related to the history of the site. The sampling approach, while providing significant insight into the battle, left in place a major portion of the archeological deposits. The artifact types recovered include cartridge cases, bullets, iron arrowheads, personal adornment items, army equipment, firearms parts, buttons, and even fragments of uniform and underwear cloth as well as human skeletal elements from the soldiers' remains (Scott, Willey, and Connor 1998). These objects and their provenience information constitute the physical evidence of the battle and represent the positions and movements of the individual participants.

The national significance of Little Bighorn Battlefield National Monument has long been established under Criteria A, B, and C. The results of archeological investigations (Fox 1983; Scott and Connor 1986; Scott and Fox 1987; Scott et al. 1989) of the battlefield document an added dimension of the site's national significance and supported its inclusion on the National Register under Criterion D as well.

Previous archeological inventory indicated that the proposed action of rebuilding the park tour road would likely affect archeological artifacts and/or features associated with the Battle of the Little Bighorn. This project was a data recovery effort designed to mitigate the effects resulting from the undertaking.

The objectives of this research were to document additional evidence of the Battle of the Little Bighorn and/or other use and occupation of the landscape through the following means: (1) a search of the National Archives for historic documentation for detailed information on the 1938 effect of the original road construction; and (2) conduct archeological mitigation through close interval metal detecting of the road corridor to insure there will be no loss of archeological data without appropriate documentation (Figure 1).

The road corridor is best viewed as a linear transect slicing through the heart of the Little Bighorn Battlefield. As such it crosses all major terrain and cultural features associated with the battle except the Indian village site and the valley and retreat areas. From Reno–Benteen the road traverses the route Custer probably took during his movement north toward Weir Point then into Medicine Tail Coulee and finally to where the command rejoined and made its final movements before being annihilated by the Lakota and Cheyenne warriors. Likewise the road crosses the route that elements of Reno's command took in their movement to and withdrawal from Weir Point as well as crossing the lines created for defense of command after the consolidation of the command at the defense site. Further the road crosses locations where warriors took position to fire on Reno's command as well as the ill-fated Custer command.

The road itself has an interesting history. No formal road, although wagon tracks did exist, was developed beyond Last Stand Hill prior to 1934 (Figure 2). Until 1934 there were 111 Fort Phil Kearny dead buried on a flattened portion of Custer Ridge just south of the granite Seventh Cavalry memorial marker on Last Stand Hill. At the same time as the Fort Phil Kearny dead were removed to the current Custer National Cemetery the remains of Lt. John J. Crittenden were also removed from the Calhoun Hill area. At the request of his family Crittenden's body had been reburied in 1879 where it had been found after the battle in 1876 (Greene n.d.). The body removals set the stage for the construction of a graded and oil surfaced road from Last Stand Hill to the Reno–Benteen defense site.

That road had been planned as early as 1924, but was delayed until a road right-of-way could be negotiated with land owners and the Crow Tribe, through whose reservation the road would run. The payment issue was not settled until 1936 (Greene n.d.). Between 1938 and 1940 the 20-ft-wide road was graded, graveled, and part was surfaced from Last Stand Hill (Figures 3–7) to the middle of Section 23. The remainder of the road to the Reno–Benteen defense site was graveled. The construction drawings show that significant cuts and fill were made along the right-of-way.

Archival research relative to the construction of the road along battle ridge and from Custer battlefield to the Reno–Benteen defense site confirmed that wagon trails and two track "roads" existed on the battlefield prior to the construction of the current road alignment in 1938. Army aerial oblique photographs dating to 1932 and 1935 show a dirt two track road running along Battle Ridge or Custer Ridge on the same alignment as the current road (National Archives and Records Administration RG79, National Park Service Central Classified File, 1933–1949, Custer Battlefield, Box 2129, Historical Record of Custer Battlefield National Monument, Crow Agency, Montana, August 1, 1932). A variety of images in the historical record or ledger book show the road after the 1938 construction as well. Most images were taken around the caretaker or superintendent's house and the Custer National Cemetery, but a few show other areas.

One box of records (National Archives and Records Administration RG79, National Park Service Central Classified File, 1933–1949, Custer Battlefield, Box 2131) contains the contract and plans for grading the road, installing culverts, and surfacing the road (File 504-04) between Last Stand Hill and the

Reno–Benteen parking lot. Among the blueprint drawings in the file are several sheets showing the grading plan and denoting the areas of cut and fill along the road. The grading plan shows the cuts and fill on Battle Ridge and on the right-of-way between Custer battlefield and the Reno–Benteen defense site. Significant cut and fill episodes occurred between Calhoun Hill to Deep Coulee, across Deep Coulee, Medicine Tail Coulee was channelized and crossed with a good deal of fill in that area, and the grading plan shows additional significant cut and fill areas up to the gate at the Reno–Benteen defense site. Two areas at Reno show cutting and filling in the grading plans. There is little doubt the road construction destroyed or affected archeological deposits on Battle Ridge, at Deep Coulee, at Medicine Tail Coulee, at Weir Point, between Weir Point and Reno, as well as on the Reno–Benteen defense site based on the earlier archeological investigations find locales.

Historical Overview of the Battle

The history of the battle is well documented in a variety of publications (Gray 1976; 1991; Kuhlman 1951; Utley 1988; Graham 1953). Previous archeological investigations are summarized in Scott and Fox 1987; Scott et al. 1989; Fox 1993; Scott, Willey, and Connor 1999; Scott and Bleed 1996; Scott 2002). None needs to be repeated here except to support the questions developed for the archeological research effort.

In the spring of 1876, a three pronged campaign was launched to shepherd the Sioux and Cheyenne back to the reservation. The first column, under General John Gibbon, marched east from Fort Ellis (near present-day Bozeman, Montana). The second column, led by General Alfred Terry (and including Custer) headed west from Fort Abraham Lincoln near Bismarck North Dakota. The third column consisted of General George Crook's men moving north from Fort Fetterman, Wyoming, into Montana. These three columns were to meet near the end of June in the vicinity of the Little Bighorn.

Unknown to Terry and Gibbon, Crook encountered the Indians near the Rosebud Creek in southern Montana, and was defeated by them about a week before Custer's battle. After this, his force withdrew to Wyoming, breaking one side of the triangle. Meanwhile, Terry was moving west up the Yellowstone River to the Little Big Horn. The 7th Cavalry, under Custer, was to scout ahead and departed Terry's command on June 22. On the morning of the 25th, the 7th Cavalry was at the divide between the Rosebud and the Little Bighorn Rivers. From a spot known as the Crow's Nest, they observed a large Indian camp.

Worried the Indians might escape; Custer decided to attack and descended into the valley of the Little Bighorn. Captain Frederick Benteen was ordered to travel southwest with three companies to block a possible southern escape route. A few miles from the Little Bighorn, Custer again divided his command, as Major Marcus Reno was ordered to take three companies along the river bottom and attack the Indian village on its southern end. The remaining five companies would follow Custer in support of Reno.

Custer, took the remaining five companies along the east side of the river to an ephemeral tributary of the Little Bighorn. He must have finally realized the gravity of the situation as the north end of the village came into view. From here, he sent a message back to Benteen: "Benteen, Come on. Big village, be quick, bring packs. P.S. Bring pacs [*sic*]. W. W. Cooke." The messenger, bugler John Martin, was the last soldier to see Custer and his command alive.

Custer and five companies rode to their fate. Custer apparently further divided his command in the lower reaches of Medicine Tail Coulee sending one wing of two companies to the ford at the mouth of the coulee where it debouches into the Little Bighorn River. Custer and the other three companies held higher ground to the east, now known as Nye-Cartwright Ridge. Whether due to increasing warrior pressure on the wing at the mouth of Medicine Tail Coulee or pressure on his wing Custer apparently ordered a withdrawal from the coulee with the five companies rejoining at the southern end of what is now called Battle Ridge and Calhoun Hill. There Custer left Lts. Calhoun and Crittenden with two companies of soldiers to hold the position while he rode to the north with the remaining three companies. Custer's goal may have been to move further north and cross the river with the intent of attacking the village from the north and relieving the pressure on Reno's command. Custer deployed Capt. Miles Keogh about 300 yards in the rear of Calhoun and Crittenden's position while he moved on to the north with two companies, E and F. Some of Custer's command did move to the northwest along a spur of land or an extension of Custer or Battle Ridge, now just outside the park boundary, but at some point was forced back to take positions at Last Stand Hill. The command was under attack by increasing numbers of Cheyenne and Lakota warriors who soon outnumbered, outgunned, and out fought Custer and his men, destroying the command to a man by late that Sunday afternoon.

In the meantime, Indian warriors had forced Reno and his men to retreat across the river and up the bluffs to a defensible position. Reno and the men on the hilltop were joined by Benteen's forces and the pack train, both moving along Custer's line of march in order to bring up the ammunition packs. The In-

dians pinned down all until June 27th; when the village retreated as Generals Terry's and Gibbon's combined column arrived. For that day and a half, Reno, Benteen and the men fought to keep their defensive position and wondered when Custer would relieve them. Reno sent two men to meet the advancing column, and they found Terry and Gibbon near the abandoned Indian village. Here, a scout brought the news. Custer and his men lay dead on a ridge above the Little Bighorn.

2004 Archeological Investigation Methods

The mitigation efforts took place in a corridor approximately 20 meters either side of the park tour road, also known as Route 10, running from Last Stand Hill to the Reno–Benteen parking lot, a distance of approximately 4.5 miles. The road right-of-way passes through Sections 17, 20, 28,29, 33, and 34; T3S, R35E as depicted on the Crow Agency, Montana 7.5-minute, 1967 USGS topographic quadrangle map.

Field Methods

The Phase I fieldwork consisted of close-order metal detecting and visual inventory 20 m either side of the park tour road (Figure 8). The road inventory corridor runs between two sparse prehistoric lithic sites (24BH2466, 24BH2467) on Custer battlefield, but not through them. The two sites were tested and evaluated for their National Register potential and determined to be ineligible (Scott 1987, 1989).

The field investigations for the road mitigation were conducted between September 12 and September 17, 2004.

Procedures

Standard archaeological data-recording methods were used in each phase of the operation. Individual artifacts, spatially discrete clusters of identical specimens, or associated dissimilar specimens received unique Field Specimen (FS) numbers. Field notes and standardized Midwest Archeological Center forms were used to record field data. Selected in-place artifact specimens and topography was photographed and recorded in black-and-white print and in digital format.

Phase I Close-Order Metal Detecting Procedures. Phase I inventory work included three sequential operations: survey, recovery, and recording. During survey the crew located and marked artifact finds. The recovery crew followed and carefully uncovered subsurface finds, leaving them in place. The recording team plotted individual artifact locations using a Trimble Pro XL global positioning system, assigned field specimen numbers, and collected the specimens.

Metal detecting operations were designed to locate subsurface metallic items with the use of electronic metal detectors. Visual inspection of the surface was carried out concurrently with the metal detector survey. The survey crew consisted of a crew chief, Charles Haecker, metal-detector operators, and visual inspectors. Continuity was maintained in metal detecting operations by utilizing the same crew chief for the project's duration.

Various brands of metal detectors were employed during the Phase I fieldwork. The standardization of machines (i.e., all one brand), though perhaps methodologically desirable, is highly impractical. Like models operate on the same frequency, causing interference at close intervals. We therefore needed to alternate different brands of machines on the line to ensure adequate survey coverage. Metal-detector operators were aligned at approximately 2-m (6-ft) intervals. The operators walked transects following the road alignment or when dictated by topographic feature orientation, maintaining, as closely as possible, the designated intervals. Orientation and interval spacing were maintained by direction from the crew chief. The daily composition of the detector crew was six or seven operators depending on pin pointing work needed to assist the recovery effort.

Detector operators proceeded in line, using a sweeping motion to examine the ground. The 2-m detector operator interval allowed for slight overlap among operators ensuring as close to 100 percent surface coverage as is possible. The selected interval has been shown to be effective in similar mitigation situations (Garrow et al. 2000; Connor and Scott 1998). A pinflag was placed at each target located by an operator. As soon as the location was pinned, the operator continued along the transect. In some instances the location was excavated immediately to provide the operator with a check on machine performance. This was necessary because of the sophisticated nuances of interpreting machine functions, such as depth readings, metallic and object type-differentiation functions, object size interpretation, and

pin pointing of subsurface objects. The usual procedure was to mark the location and leave it intact for the recovery crew.

Several areas of high-density artifact concentrations were found, one at the north end of the Reno–Benteen entrenchment area, one below Sharpshooter Ridge near the entrance gate to the Reno–Benteen defense site, and one at Calhoun Ridge on Custer battlefield. Once each of these area was cleared of initial finds the detector crew re-swept each area with additional transects oriented perpendicular to the initial transects. This insured that maximum recovery was accomplished in each of the high-density artifact area.

Recovery. The recovery crew excavated artifact locations marked by pin flags and left the artifacts in place for recording (Figure 9). This team consisted of excavators and metal-detector operators. The number of operators and excavators varied slightly from day to day depending on the workload, but was usually a team of six to eight.

Excavation procedures were based on the concept of artifact patterning, a central tenet in the research strategy. Provenience data, the location in space and the position in the ground of each artifact was considered of primary importance.

Hand tools, such as spade and trowels were utilized to expose subsurface artifacts. Excavators were assisted by metal detector operators to ensure in-place exposure. Detector operators provided pinpointing and depth information to the excavator, thereby allowing a careful and accurate approach to the artifact. After exposure the pin flag was left upright at the location to signal the recording crew.

Recording. The recording crew assigned field-specimen numbers, recorded artifact provenience, and collected the specimens. Recorders also backfilled artifact-location holes upon completion of the recording process. The recording crew employed a Trimble Pro XL GPS (Figure 10). All data was collected using precise UTM coordinates that is compatible with previous archeological inventories in the park and the parkwide GIS database. The project data was added to the existing electronic maps and databases for the park to ensure a comprehensive and accurate data set for all investigations were kept up to date.

Laboratory Methods and Analytical Methods

Once the collected materials were returned to the Midwest Archeological Center, they were cleaned, sorted, and analyzed. The methods employed in cleaning these artifacts are the standard laboratory procedures of the Midwest Archeological Center. Essentially they consist of washing the accumulated dirt and mud from each artifact and then determining the condition of the artifact to see whether it requires further cleaning or conservation. For analysis and identification purposes some metallic items required a treatment with e-z-est (a commercial coin cleaner found to be very effective in removing verdigris and not harmful to the underlying metal) to remove oxides that have built up on them during the years in which they were in the ground. After cleaning and stabilization each artifact was rebagged in a self-sealing clear plastic bag with its appropriate Field Specimen (FS) number and other relevant information on the bag. The artifacts were then be identified, sorted, and analyzed.

The identification, sorting, and analysis consisted of dividing the artifacts into classes of like objects and then subsorting the artifacts into further identifiable discrete types. Sorting and identification of the artifacts was undertaken by personnel experienced with artifacts of this period, who compared the artifacts with type collections and with standard reference materials. Firearms identification procedures followed established analytical standards (Harris 1980; Hatcher, Jury, and Weller 1977; Scott and Fox 1987; Scott et al. 1989).

Artifact Identification and Analysis

Sorting of the artifacts determined there are 337 individual or groups of artifacts recovered at 320 separate find spot locales (Figure 11). Once final cleaning, sorting, and identification were completed for the artifacts the modern debris was documented and discarded. Only those more recent items that have association with various memorialization activities at the battlefield or cannot be reliably identified were kept in the collection and are listed in the artifact description. The bullets and cartridge cases were analyzed using firearms identification procedures and all findings of matches were compared to the results of previous investigations to determine the total number of firearms types present as well as determine a minimum number of individual firearms present.

Arms and Ammunition

Smith and Wesson American and Russian .44-Caliber

Two brass cases (FS 9735 and FS 9736) were recovered from Custer battlefield that were fired from a .44-caliber Smith and Wesson American pistol (Figures 12, 13b). Both were fired in the same gun. The .44-caliber Smith and Wesson American cartridge was introduced in 1869 or 1870 for the Smith and Wesson Model #3 or American model pistol. The army used the round for a few years, but it was more popular as a commercial pistol round (Barnes 1969:167). Based on the total of six cases found during the investigations, at least four different firearms using this cartridge are represented, all from Custer battlefield.

A single unfired .44-caliber Smith and Wesson Russian cartridge (Figure 13a) was recovered in 2004 (FS 9758). It is a brass case with a Berdan primer with a two groove round nosed bullet. It was found on the Finley–Finckle Ridge.

Sharps .44- and .45-Caliber

The Sharps firearm was patented in 1852 and was a very popular military and commercial firearm for the next 50 years. It was produced in both percussion and cartridge styles. Its popularity was due to its accuracy and its reputation for having effective stopping power. Particularly in the larger calibers it was the favored gun of big game hunters on the plains and in the west in general (Gluckman 1965:230, 268; Barnes 1989:139).

Weapons manufactured by Sharps fired some of the .50–70 cartridge cases recovered as described in that section. Two .44–77-caliber bottle necked cartridge (Figures 15e, f) cases were found on Greasy Grass Ridge and west of the tour road and Calhoun loop, respectively (FS 9754, 9826). The two cases were fired in the same gun. Two Sharps firearms in this caliber were turned in by warriors Two Moons and Iron Shirt in 1877 when they surrendered to the army at what became Fort Keogh. These guns and their serial numbers are listed in the Nelson Miles Indian Surrender ledger (Scott and Harmon 1993). These guns now reside at Springfield Armory National Historic Site. Modern cartridge cases were fired in the guns and the firing pin imprints compared to the two cartridge cases recovered in 2004. The Two Moons Sharps (Sharps C53698 SPAR 4819) can be ruled out, as the firing pin imprint does not match the archeological cases. The Iron Shirt Sharps (Sharps C53729 SPAR 4815) cannot be excluded as a possibility. The firing pin shape, depth, placement, and other class characteristics are consistent between the archeological specimens and the modern cases, but no indisputable individual characteristics are present that conclusively prove the cases were fired in the same gun.

There were also two types of distinctive Sharps bullets found during the road inventory. The first Sharps bullet is .44-caliber with a pointed nose and two crimping or lubricating grooves and a raised base ring (F9767). The second distinctive Sharps bullet is a .44- or .45-caliber round nose two groove flat based bullet with Sharps rifling evident (FS 9785).

Henry .44-Caliber

There were forty-two .44-caliber Henry rimfire cartridge cases found during the 2004 investigations (Figures 14, 15). Including all single and double firing pin imprinted cases found during all archeological investigations a total of 274 .44-caliber Henry rimfire cartridges and cartridge cases have been recovered. The .44-caliber bullets relating to these cartridges and cases are described in the following section.

The .44-caliber Henry rimfire cartridge was developed in the late 1850s by B. Tyler Henry, the plant superintendent for Oliver Winchester at the New Haven Arms Company. The company's name was changed to Winchester Repeating Arms Co. in the mid-1860s. Henry also developed the first successful repeating rifle that would fire this cartridge by improving the Smith & Wesson Volcanic repeating arms, which were a failure due to the small caliber and extraction problems. Henry's conception of a flexible claw shaped extractor was probably the most important single improvement leading to the success of the Henry Repeating Rifle and its .44-caliber rimfire cartridge.

The history and manufacture of the Henry cartridge is outlined in the 1984 report (Scott and Fox 1987). The 42 cases in the collection fall into four variations. The majority are the long case variety with a raised H headstamp in a recessed depression. The other varieties are long case with no headstamp, short case with H headstamp, and short case with no headstamp.

The tendency for this rimfire ammunition to misfire was a serious problem in the early development of cartridge firearms. Henry designed a double firing pin for his repeating rifle that would strike the rim of the cartridge at points on opposite sides. The firing pins were wedge shaped, each being located on one side of the breech pin collar. The collar was threaded into the breech pin, which was designed to move a fraction of an inch forward and rearward during firing. Both the Henry Rifle and its improved version, the Model 1866 Winchester, had firing pins that were exactly alike in shape and dimensions (Madis 1979:97). The firing pins were less pointed on some Model 1866s between serial numbers 24,000 and 26,000 but were changed back to their original shape due to misfire problems (Madis 1979:79).

Even with the double strike firing pin used in the Henry and Winchester Model 1866 rifles, these weapons were still prone to misfires. If the breech pin was dirty or rusty, a very hard blow was required before the firing pins would penetrate the rim of the cartridge deeply enough to detonate the primer. This problem is very evident on the cartridges and cartridge cases found in the previous investigations (Scott et al. 1989). The 2004 finds also demonstrate this. Twenty-one, one-half the total recovered, had 2, 3, or 4 sets of firing pin imprints indicating misfires. One case also had a firing pin imprint from a Colt Model 1871 Open Top revolver (FS 9808) that failed to detonate the cartridge. Thus attempts were made to fire this round in a Colt once, and three times in a Henry or Model 1866 Winchester before the round succeeded in detonating. A Colt Open Top fired cartridge case (FS 9712) also had evidence of an unsuccessful attempt to fire it in a Henry or Model 1866 Winchester.

Some cases show bulging of the head that is commonly found on fired .44 Henry cases. This is the result of the failure of the breech bolt, in either the Henry or Model 1866, to fit snugly against the face of the chamber, it is not the result of being fired in one model or the other.

Three of the .44-caliber cartridge cases in the collection bear only a single firing pin mark, which indicates they were fired from other firearms types chambered for the .44-caliber rimfire. Two (FS 9712, 9856) were fired in two different Colt Model 1871 Open Top Revolvers (Figure 15a) and one (FS 9713) in a Wesson sporting rifle (Figure 15b). One Open Top fired case (FS 9856) matched to a cartridge case found in 1985 (FS 5021), the remaining one adding one more 1871 Colt to the number of guns represented. The Wesson fired cartridge case (FS 9713) matched to a 1984 recovered cartridge case (FS 1796). Both were found in the same general area of Calhoun Hill.

Firearms examination of the 41 (FS 9602, 9603, 9610, 9611, 9613, 9634, 9635b, 9637, 9652, 9653, 9654, 9656, 9707, 9732, 9734, 9738, 9739, 9740, 9741, 9742, 9743, 9745, 9748, 9765, 9768, 9777, 9781, 9789, 9795, 9798, 9799, 9800, 9804, 9806, 9808, 9809, 9825, 9828, 9842, 9848) .44-caliber cases fired in either the Henry rifle or the Model 1866 Winchester demonstrate a number of matches (Table 1; Figures

15c, d). Comparisons to the cases found during the previous investigations also identified several matches (Table 1). These matches provide further support for the movement of warriors between the fields and movement around Custer battlefield. The analysis of the double strike firing pin marks left on all Henry .44-caliber cases and cartridges has now identified 124 different Henry rifles and Winchester Model 1866s. Several guns were used at both battlefields. The same analysis also shows that thirteen different weapons fired the cases with a single firing pin marks.

Table 1. Firing Pin Imprint Matches .44-Caliber Cartridge Cases.

Field Specimen No.
9602 (H) ^a (3 strikes) ^b , 9603 (H), 9611 (H) (2), 9613 (H) (2), match to 1985 specimen 2296.
9610 (H).
9634 (H) (2), 9656 (4), match to 1985 specimen 4325.
9635b, 9653, match to 1985 specimen 2044.
9637 (H), match to 1984 specimen 1278.
9652, match to 1985 specimen 2273.
9654.
9707 (H) (4).
9732 (3), match to 1985 specimen 4146.
9734 (H), 9742, 9777 (H) (2).
9738, 9739, 9800 (2).
9740 (H), 9795 (H), match to 1985 specimen 2017.
9741 (H) (2), 9799 (H), 9806 (H) (2), match to 1985 specimen 2048.
9743, 9748 (H) (4), match to 1984 specimen 1753.
9745 (H), match to 1984 specimen 1283.
9765 (H) (2), 9768 (H), 9808 (H) (2), 9809 (H) (2), match to 1985 specimen 2365.
9781 (H) (2), match to 1985 specimen 5357.
9789 (H).
9798 (H) (2).
9804.
9825 (H) (2), match to 1984 specimen 1293.
9828 (H), 9842 (2), match to 1985 specimen 3837.
9848, match to 1984 specimen 1766.

^a H means Henry headstamp present.
^b Indicates number of firing pin strikes present on cartridge case head.

Caliber .44 Bullets (200 Grain)

The 2004 investigations recovered twenty-one .44-caliber bullets in five types that exhibit the distinctive Winchester or Henry rifling marks (Figure 16c, d) (flatbase-flatnose FS 9557, 9722, 9724, 9805, 9817, 9824; flatbase-crimping groove FS 9759, 9762, 9782, 9813, 9841; raised base FS 9564, 9619, 9774, 9763, 9780; recessed base 9787; two ring flatbase 9786, 9790, 9861). In addition to those recovered during the earlier investigations the total is 292 Winchester or Henry fired bullets. They are of the type used in the .44-caliber rimfire ammunition but some of them may have been fired from the early .44–40-caliber center-fire ammunition. These are described separately from their related cartridges and cases, due to the fact they could have been fired from either type of ammunition. The majority were probably fired from either the Henry or Winchester Model 1866, because of the higher number of the Henry rimfire cases (257) recovered compared to the number of .44–40 center-fire (20). The 2004 investigations duplicated the bullet varieties recovered and described in the previous investigations (Scott et al. 1989).

Winchester .44–40-Caliber

Four cartridge cases of .44–40-caliber (FS 9612, 9624, 9730, 9801) were found during the 2004 investigations. These brass cases are centerfire and were primed with the Winchester-Milbank or Boxer type primer (Figure 13c).

There were approximately 23,000 guns of the Model 1873 Winchester lever action rifle shipped from the Winchester warehouse by the end of 1876, all were .44–40-caliber (Madis 1979:132, 214). The Model 1873 was a great improvement over the Henry and Model 1866 because it had been adapted to handle the stronger and more powerful center-fire cartridge which could be reloaded. This model was produced in three variations, rifle, carbine, and musket.

The firing pin and extractor mark analysis identified these four cases as being fired in three different guns. FS 9612 from Reno–Benteen matched to case FS 9730 from Custer battlefield. These two cases also matched to FS 1749, a case found on Custer field in 1984 in the Calhoun area. The 2004 finds add three Model 1873 Winchesters to the previous number for a total of eleven guns (Scott et al. 1989). FS 9612 represents use of a weapon at Reno–Benteen and at Custer battlefield (FS 9730 and 1749). The previous investigations identified two other guns used at both Custer and Reno–Benteen battlefields. The 2004 data demonstrates additional movement between the various areas of engagement by at least three warriors armed with a Model 1873 Winchester.

Colt .45-Caliber

During the battle, the soldiers used the .45-caliber Colt Single Action Army Revolver Model 1873. The 2004 investigations yielded three more cartridges (FS 9621, 9812b [misfire] 9830) and four more cartridge cases (FS 9598, 9622, 9628, 9812a) in addition to the 45 recovered in earlier investigations (Figures 13d, e). The 2004 recoveries are Colt-type Benet primed cases.

Firearms identification analysis indicated the 2004 cases were fired in Colt revolvers. Four different Colts are represented by the cases. No Colt cases cross-matched to any of the previously collected Colt or Schofield cartridge cases. FS 9812a matched to FS 9812b, a misfired Colt cartridge. The two matched cases were found in close proximity to one another on Calhoun Hill.

Four .45-caliber bullets (FS 9662, 9663, 9666, 9681) were recovered in 2004. All are Colt-type hollow-base bullets and all retain the distinctive left-hand twist rifling marks of the Colt Model 1873 revolver.

Springfield .45–55-Caliber

There were five unfired cartridges (FS 9553, 9590, 9633, 9794, 9838) recovered during the 2004 investigations (Figure 17). These cartridges were used by the army in the Model 1873 Springfield carbine. This was the principle firearm used by the soldiers at the battle. These cartridges duplicate those found during the previous investigations. Two cartridge cases were broken due to oxidation revealing pasteboard wads seated below the bullet. This indicates these two cartridges are .45–55-caliber carbine rounds.

(Figures 13f, g). This find is consistent with findings in the earlier investigations that the .45-caliber Springfield rounds were the carbine variety.

In addition, to the cartridges, 79 fired cases for the .45–55 Springfield carbine were found. The cases are Benet internally primed with a wide basal crimp and have no headstamp. One case recovered at Reno–Benteen (FS 9635a) had a .44-caliber Henry case (FS 9635b) shoved in the mouth. One cartridge case was too damaged by being struck by a mowing machine and could not be analyzed (FS 9582).

The 2004 investigations recovered forty-six .45-caliber 405-grain bullets (Figures 16e, f, g, h, i), which duplicate the varieties previously recovered (Scott et al. 1989). These bullets are: FS 9562, 9563, 9567, 9571, 9572, 9573, 9577, 9580, 9588, 9597, 9631, 9660, 9667, 9668, 9673, 9674, 9675, 9677, 9683, 9690, 9689, 9691, 9695, 9698, 9701, 9703, 9704, 9705, 9709, 9720, 9725, 9727, 9764, 9769, 9775, 9783, 9793, 9810, 9818, 9822, 9823, 9832, 9836, 9837, 9851, 9855.

An examination of the firing pin and extractor marks indicates there are thirteen sets of matches for the cartridge cases found at Reno–Benteen, with two sets not matching cases found during the earlier investigations. This adds two new guns to the Reno–Benteen defense site assemblage.

Firing pin matches among the cartridge cases found between Medicine Tail Coulee and Last Stand Hill identified fifteen individual firearms. Two of those matched to cartridge cases found in during the earlier investigations thus identifying 13 new Springfield carbines used on Custer battlefield (Table 2). The matches indicate some soldier movement on the battlefield. FS 9696a was found in the Medicine Tail Coulee area and it matched to Springfield carbine cases found in the Finley–Finckle area as well as on Calhoun Hill. Another case (FS 9697) from Medicine Tail Coulee area also matched to a case (FS 9719) found in the Finley–Finckle area.

Table 2. Firing Pin Imprint Matches for .45–55-caliber

Reno–Benteen Defense Site
FS Number
9552,9636,9643, matches to 1985 FS4778.
9554, 9568, 9569, 9601, 9626, 9632.
9558, 9561, 9584, 9585, matches to 1985 FS3669.
9559, matches to 1985 FS2056.
9560, 9591, 9605, 9638 (total of 18 cases), matches to 1985 FS2939.
9565, 9566, matches to 1985 FS2019.
9581, 9583, 9623, matches to 1985 FS2096.
9586, 9587, 9589, 9604, 9615, matches to 1985 FS3193.
9593, 9606, 9618, matches to 1985 FS2067.
9594, matches to 1985 FS2120.
9617, matches to 1985 FS2076.
9635, matches to 1985 FS2051.
9650, 9651, 9655, 9657, matches to 1985 FS3863.
9672.

Table 2, continued.

Custer Battlefield

FS Numbers

9696a, 9717, 9761, 9820.

9696b.

9697, 9719, matches to 1985 FS 199.

9711, 9846, 9847.

9715.

9744.

9772.

9788, 9818.

9814, matches to 1985 FS 240.

9815.

9821.

9833.

9835.

9850.

9852.

Spencers

The Spencer carbine was a military firearm used during the Civil War and the early Indian Wars. It was also produced in civilian models, was widely available, and was a popular weapon. The two calibers of Spencers recovered during the fieldwork were produced for the both military and the commercial market (Barnes 1989:281; Gluckman 1965:388). Eleven cartridge cases representing two different calibers of Spencer rimfire ammunition were found during the previous inventory efforts (Scott et al. 1989; Scott and Bleed 1997).

The 2004 investigations recovered five additional Spencer rimfire cartridge cases. One (FS 9609) is a 56–50-caliber case with a semi-circular firing pin imprint indicating it was fired in a Joslyn carbine (Figure 18a). The case has tool point marks from the power head used to seat the bullet that are consistent in type with those known to have been used by Frankford Arsenal.

The remaining four cases are all .56–56-caliber. FS 9753 has a raised H headstamp indicating it was made by the Winchester Arms Company (Figure 18b). It was fired in a Ballard carbine. FS 9756 has no headstamp but has five Spencer firing pin marks indicating it misfired four times before being fired (Figure 18c). FS 9807 also has five Spencer firing pin marks, two from one gun and three from another, although none fired the round. This case also has the distinct Joslyn semicircular firing pin imprint, and it was the Joslyn that finally fired the cartridge (Figure 18d). The same Joslyn also fired FS 9829.

Thus there are now six or seven Spencers, one Ballard, one Ball, one Sharps, and two Joslyn rimfire guns attributed to the battle based on the unique firing pin imprints on the archeologically recovered cases.

Caliber .50–70

The .50–70 cartridge was developed for the army's first servicewide adoption of a cartridge weapon. The round was used in various Springfield model rifles and carbines from 1866 to 1873. It was also a very popular commercial cartridge, with Sharps, Remington, and other arms manufacturers, chambering single-shot firearms for this caliber (Logan 1959). The army also had 33,734 Sharps percussion weapons converted to fire .50/70 cartridges (Sellers 1978:181–182).

Nine .50–70-caliber cartridge cases, five .45–70-caliber cartridge cases, and one .44–77 cartridge case that were fired in .50–70-caliber guns were recovered during the 2004 investigations (Figure 19). One cartridge case is Boxer primed and Remington made with a slightly rounded head (FS 9755), two other cartridge cases are also Remington made with a raised ring head and are Berdan primed (FS 9702, 9731). FS 9731 was fired in a .50–70-caliber gun, but the cartridge is a .44–77-caliber that was fired in the larger caliber Sharps firearm causing the case to expand in the larger chamber and splitting the case neck.

One .50–70 cartridge case (FS 9555) is Bar primed, three are Benet primed (FS 9658, 9796, 9797), and three are the Martin primed variety (FS 9749, 9802, 9803) (Lewis 1972). There are five .45–55 Benet primed cartridge cases that are ruptured and split along their length indicating they were fired in larger caliber, circa .50-caliber firearms (FS 9639, 9640a, b, c, 9641).

The firing pin analysis indicates the fifteen cartridge cases represent 11 separate firearms, two Model 1866 Springfields (FS 9555, 9749); three Model 1868 or 1870 Springfields (FS 9658, 9746, 9797); four Sharps rifles or carbines (FS 9639 [matches to 9641], 9640a, b, c [match], 9731, 9802 [matches to 9803]), and two Remington rifles (FS 9702, 9755). None of the cases match to any .50–70-caliber cases available for examination from previous investigations, although not all were available. This brings the .50–70-caliber weapons total to as many as 68 used in the battle.

Eleven .50–70-caliber bullets were recovered in 2004 (F S9575, 9579, 9710, 9721, 9723, 9728, 9746, 9760, 9766, 9827, 9854). The bullet varieties duplicate those found in the previous investigations (Scott et al. 1989). Most of bullets have the three wide land and groove rifling impressions of typical government rifling specifications (Figure 16k, l). These bullets may have been fired in Springfields, Sharps, Remingtons, or any other .50-caliber gun rifled to these specifications. A few have 6 land and groove impressions consistent with Sharps rifling (FS 9721, 9723, 9854).

Spherical Balls .36-, .44-, .45-, and .54-Caliber

Round balls were usually fired in muzzle-loading firearms, which were considered obsolete by 1876. However, muzzle-loading weapons continued in use across the country for many years due to their wide availability and inexpensive price. Indians, as well as others, enjoyed the use of these weapons because where a cartridge of the appropriate caliber could not always be found, powder and ball were easily obtainable, if not from commercial sources, then by disassembling a cartridge for its components and reforming the ball to the approximate caliber.

There were nine spherical lead bullets recovered in 2004. One (FS 9860) is a .36-caliber ball with a ramrod loading mark and impressions of a left-hand twist 7 land-and-groove rifling (Figure 20a). This bullet was fired in a .36-caliber Colt revolver. Three .44-caliber round balls (FS 9625, 9718, 9779) were also found (Figure 20b). All have 5 land-and-groove impressions that are consistent with being fired in a Remington revolver, probably the Model 1858 New Model Army .44-caliber revolver.

The 2004 investigations recovered five .54-caliber balls (FS 9576, 9596, 9700, 9784, 9811). Only one retained any distinctive rifling impressions (FS 9811) which also had cloth impressions on one surface probably from a cloth loading patch (Figure 20d). This one also had a ramrod mark and three land and groove rifling impressions. Although the specific gun cannot be identified at present it is probably a .54-caliber trade rifle. Three of the spherical bullets (FS 9576, 9596, 9784) have clear remains of casting sprues (Figure 20c). Each is a poor quality casting, possibly cast in an inadequately filled mold. The casting sprue is distinct suggesting that all three balls were cast in the same mold. Two were found at

Reno–Benteen and one on the Custer battlefield indicating that bullets cast from the same mold found their way to both battlefields, although the rifling remains are indistinct enough to preclude determining if the same gun fired them as well.

Deformed Bullets and Lead Scraps, Benet Primers, and Cartridge Case Fragments

Within the collection are two lead bullet fragments too deformed by impact to identify. They are represented by FS 9839 and FS 9858. Two fragments of cartridge cases are also present (FS 9608, 9729). Four loose Benet primers for .45-caliber cartridges were found blown from their cases (FS 9737, 9750, 9751, 9752). The Benet primers were found on Greasy Grass Ridge and probably represent army, .45-caliber ammunition fired in larger caliber guns that blew the primer out when the cartridge case expanded in the chamber. See the section on split .45–.55-caliber cases in the .50–70-caliber discussion.

Post-Battle Ammunition

Randomly scattered across the inventory area were cartridges, cases, and bullets not associated with the battle. These ammunition components postdate the battle. They represent later hunting activities, incidental shooting activities, salute firing, battle reenactments, and movie production. A field decision was made to collect only a sample of these cartridge cases and related materials for retention in the park collection.

Caliber .38. One .38-caliber Colt New Police cartridge (FS 9616) was recovered as were four .38-caliber lead alloyed bullets (FS 9599, 9629, 9708, 9857).

Caliber .45 Colt. A single .45-caliber Colt brass cartridge case with a boxer primer (FS 9607) was also found. The primer type post-dates the battle, but could date to the 1886 era.

Caliber .45 Bullets. FS 9671 is a .45-caliber lead alloyed bullet. It has three lubricating grooves and a flat base. It was likely fired in a .45-caliber Winchester rifle. Another (FS 9849) .45-caliber bullet is a 405 grain variety, but is unfired and may represent a field loss of a modern bullet used for interpretation at the park.

There are also three .45-caliber 500 grain bullets in the group (FS 9688, 9692, 9699). This bullet type was not produced by the army until several years after the battle. These bullets postdate the battle and are probably associated with activities such as the reburials, administration of the National Cemetery, hunting, or target shooting.

Caliber .50 450-Grain Bullets. Two .50-caliber bullets weighing 450 grains were found (FS 9551, 9570). Both are heavily alloyed with tin and were produced in modern molds. These represent twentieth century activities and not battle era depositions.

Firearms Parts and Tools

A total of fifteen firearms parts and one tool were recovered from the earlier archeological investigations. The 2004 investigations recovered two additional parts and a piece of a cleaning tool. FS 9684, found in Medicine Tail Coulee, is the barrel band for the Model 1873 Springfield carbine (Figure 21c). It is intact and is the plain band type with no stacking swivel. While it is likely that this is a battle period loss, the possibility that the item was lost during the filming of the 1970 movie *Little Big Man* or by a re-enactor carrying a period firearm cannot be excluded.

A Colt revolver backstrap screw (FS 9792) (Figure 21a) was found along the road near the south gate to Custer Battlefield National Monument. A Model 1873 Colt revolver backstrap was found in this same area in 1984 (Scott and Fox 1987).

The final item is brass ferrule (FS 9614) for a Civil War era carbine cleaning brush (Shaffer, Rutledge, and Dorsey 1992:285). The ferrule (Figure 21b) is the female end with threads. A leather thong would have passed through a small hole in one end and a natural fiber brush mounted in another brass ferrule would have screwed into the threaded opening. These Civil War era brushes were popular

with Indian War era cavalymen before jointed cleaning rods were installed in the butt stock of the carbine beginning in 1877.

Knives

Knives were recovered during each of the archeological investigations. The earlier investigations recovered four folding pocket knives, portions of three knife blades, and a skinning knife handle.

The 2004 work recovered another skinning knife handle (FS 9773) on Finley–Finckle Ridge. The handle (Figure 22) has an iron tang with iron bolsters and has wooden slabs or scales held in place by five iron pins. The blade is broken at the bolsters and the remains are 4½ inches long and 1 inch wide.

Arrowheads

Eight arrowheads and one tip fragment were found in 1984 on the Custer Battlefield. One additional iron arrowhead was found near Calhoun Hill during the 1994 investigations, and three more were recovered in 2004. Iron or metal arrowheads were a common trade item from the early 1600s to the early twentieth century, and had almost completely supplanted chipped stone projectiles by the mid-nineteenth century (Hanson 1972; Russell 1967). The arrowheads found are mass-produced types.

The 2004 specimens are of two types. Two (FS 9669, 9770) are iron and 3.25 and 4.5 inches long respectively, and they are ⅞-inch wide each (Figures 23b, c). Both have ¼-inch-wide serrated tangs. This long arrowhead type is illustrated by Hanson (1972) but he does not identify this type, although he later (1975) illustrates an identical specimen that was found in a human vertebra collected at Custer battlefield by the reburial party in 1877. The other arrowhead type is also iron (Figure 23a), but the tip is broken. It is (FS 9757) ⅝-inch wide with a remaining length of 1¾ inches. It, too, has a ¼-inch-wide serrated tang. This arrowhead type is also unnamed but illustrated by Hanson (1972, 1975).

Clothing and Personal Items

The 2004 personal items recovered were relatively few. There are three buttons that can be associated with soldier's trousers. One (FS 9600) is an iron two-piece four-hole variety that is thirteen-sixteenths inch in diameter. It was used to support suspenders and to close a trouser fly. The other two buttons (FS 9791, 9859) are four-hole pressed white-metal buttons with a stippled front pattern. These were also used on military trousers for attaching suspenders and as closures. These buttons are eleven-sixteenths of an inch in diameter.

Two post-battle buttons were also recovered during the investigations. FS 9578 is a convex front portion of a two piece iron button (¾-inch in diameter) that is consistent with a type of ladies dress button that was cloth covered and used in the late 19th and early 20th centuries. FS 9853 is a large (1.2-inch diameter) four-hole iron overcoat button. It is consistent in style with buttons used on dusters and overcoats in the very late 19th and early 20th centuries.

One other button (FS 9831) may be a period button but could date later as well. It is a brass ball button with an omega style back loop. It is ⅜-inch in diameter. The button style is known to have been manufactured from the early 19th century until well into the 20th century. The button could be associated with women's clothing, but it is also known to have been a favored trade item with American Indians for use as decoration and as button.

FS 9685 is a stamped brass hawk bell. It is ½-inch in diameter and is consistent with known trade bells used by American Indians as ornamentation on various items of dress and on horse tack.

A single brass tack with a convex shaped head (FS 9670) may also be part of an Indian ornamented item, like a war club or rifle stock. It is ⅜-inch in diameter and has the remains of a square shank on the underside.

Suspender Grip. A stamped brass suspender grip (FS 9592) was found in the Reno–Benteen defense site. It is a simple brass stamping with a double iron tongue (Figure 24a). The grip is a private purchase style and could have been used by either an officer, enlisted man, or a civilian. The military did not have

a standard issue suspender during this period, and did not adopt issue suspenders until 1883 (Herskovitz 1978).

Boots and Boot Nails. Three boot nail sizes were found on Custer battlefield in 1984 (Scott and Fox 1987). They were recovered in thirty-two groups totaling sixty-seven different nails. The number of nails in a group ranges from one to sixteen. The 1985 investigations recovered six additional boot nails. The 2004 investigations recovered several more boot nails. FS 9595 is a single one-inch-long heel nail found at the Reno–Benteen defense site. FS 9747 consists of 13 boot nails of various sizes and a piece of boot leather found in the Finley–Finckle area of Calhoun Hill. An iron boot toe or heel cleat with three nail holes present was recovered in the same area (FS 9747).

Accouterments and Equipment

The quantity of military equipment recovered in 2004 is relatively small, but it is representative of the types in common use during the 1870s.

Canteen Stopper Ring. A Model 1858 canteen stopper ring was recovered from Custer battlefield in 1984 (Scott and Fox 1987). The ring is broken near its tip, but it conforms to the Models 1858 and 1872 stopper type (Sylvia and O'Donnell 1976). It was found on the South Skirmish Line. Two complete canteen stopper rings (Figure 25) were recovered in 2004 (FS 9620, 9834), one from the Reno–Benteen defense site and one along Custer Ridge on Custer battlefield. Both have the tinned cork washer present and the ovoid brass retaining nut present on the lower end of the shank.

Camp Boiler Bail. A thin wire bail (FS 9716) was recovered on Calhoun Hill. The bail is consistent with a wire handle from a camp boiler or coffee pot. These were private purchase items in the 1870s, but known to be produced from at least the 1860s through the 1890s. The context of recovery suggests this piece was part of a soldier's mess equipment and was lost during the battle.

Cartridge Belt Buckle. A brass framed cast brass belt buckle is from a Model 1876 canvas covered leather cartridge belt (FS 9682) (Figure 24b). It was recovered as an isolated find in Medicine Tail Coulee. The Model 1876 cartridge belt also known as a Prairie Belt was not introduced until late in 1876 (McChristian 1995:197–198) thus is a post-battle deposition.

Tack Buckles. One iron center bar harness buckle (FS 9664) was recovered. It is of the size used on bridle cheek pieces, link straps, and the carbine socket.

Tack Parts. A single brass saddle guard plate (FS 9776) was recovered. This plate used as a strap slot to buckle various equipment items to a saddle. It meets the specifications for the Civil War era and Model 1872 saddles.

Horseshoes. There were two horseshoes (FS 9676, 9693) and one mule shoe (FS 9665) found during the archeological project. It is difficult to ascertain if the shoes are battle-related, since horses and mules were used for many years in the area, and the method of construction and attachment of shoes varies little through time. The shoe identification follows Morris (1988) and Berge (1980:237–249). The shoes recovered are consistent with types in use during the battle. A single horseshoe nail (FS 9627) was also found, it is unused.

A single horse bone (FS 9845) was found on Finley–Finckle Ridge. It is heavily weathered from exposure on the ground surface, but is still recognizable as the intermediate carpus right front leg.

Miscellaneous Items

Several non-battle artifacts were collected as they were deemed of sufficient interest to add to the collection as being illustrative of other land use activities associated with the park lands.

FS 9574 is a piece of gray chert lithic debitage. It was found on the Reno–Benteen defense site and reflects prehistoric use of that landscape.

Six square nails were found on Custer Ridge. Five were found adjacent to the Lt. Crittenden marker and probably represent nails from the fence that once enclosed his grave site. They (FS 9644, 9645, 9646, 9647, 9649) are all 4d cut nails. One other cut nail (FS 9706) is a 16d cut nail that was found about mid-way along the Custer Battle Ridge. Its function is unknown.

A modern stainless steel crematory tag (FS 9642) with 'Restland Crematory 21732' stamped on one face was found on the west side of the road near the Reno–Benteen gate. It was found among a scattered human cremation. This cremation is one of several unauthorized cremation locations found in the park in recent years.

Three other items, a brass letter 'O' (FS 9816), a brass umbrella ferrule (FS 9648), and an flat iron padlock key (FS 9714) reflect items lost on the field by visitors and workers. All of the items date to prior to 1950.

A single unidentified piece of cast iron (FS 9661) remains a puzzle for identification. It was found in the Reno–Benteen defense site. It is broken on each end, but it is about 1 inch long and ½ inch wide and has a slight curve to its form.

A group of modern glass beads, modern zoomorphic figures carved from shell, two aluminum grommets (FS 9686), and a small carved seashell (FS 9687) were found along the road on the Realbird property near Medicine Tail Coulee. These items represent modern Indian-made jewelry and tarpaulin covering associated with souvenir stands set up in that area during the 1980s and 1990s. These items represent American Indian business ventures in that period, and these artifacts constitute the physical evidence of those activities and were thought worthy of collection and recording.

The final miscellaneous item is FS 9844. It consists of two brass stripper clips and a single brass .30–06 blank cartridge case. The cartridge case is headstamped FA 9 08 indicating it was made at the Frankford Arsenal in September 1908. The stripper clips and the fired blank undoubtedly represent one of the many memorial events that have taken place at the battlefield over the years. It is possible the items are associated with memorial activities recorded during 1908 by the Dixon–Wannamaker expedition.

Results of the 2004 Investigations

In all, 337 individual artifacts found at 320 locations were recorded during the 2004 metal-detecting efforts. The finds were recovered in roughly the same areas and at approximately the same relative densities as predicted by previous investigations. No previously unidentified soldier or Indian positions were located. Battle Ridge or Custer Ridge (from Road Stake 5+600 to 7+200) yielded 127 artifact find locations. The majority of those were found from Calhoun Hill to Greasy Grass Ridge (approximately Road Stake 6+400 to 7+200). This was the scene of the earliest fighting on Custer battlefield and Greasy Grass Ridge is an archeologically identified Indian position. The 1984 sampling investigations recovered 55 battle related artifacts in this same area which is 30.2 percent of the total of 183 artifacts recovered for both projects.

The Calhoun Hill loop road was also swept during the course of this project with 28 new battle-related finds made as opposed to over 100 in 1984. This area was swept twice with close-order transects in 1984 as it was of interest at that time to determine the extent of fighting in that area, so more artifacts were recovered there in the earlier project than anywhere else.

From the road gate at Greasy Grass Hill to the Medicine Tail Coulee box culvert (Road Stake 7+200 to approximately 8+800) eleven artifact finds were made. The 1994 inventory recovered 16 battle-related artifacts in this same area. Earlier relic collection efforts found more materials but the provenience is less than certain (Greene 1979). The 1994 inventory also recovered a sample of movie prop cartridge cases used in the filming of the 1970 movie *Little Big Man* between road stakes 8+400 to 8+700. The 2004 work also recovered a number of movie prop cartridge cases as well as numerous hairpins used for holding wigs in place in the same area. As a sample was collected in 1994 these modern items were not recorded or collected. The 2004 work located a cluster of broken, lost, or discarded modern Native American jewelry items consisting of glass and metal beads, carved shell beads, carved animals, and metalwork designs between Road Stakes 8+000 and 8+300. Some of these items were collected and recorded to document the use of this area for a series of open air tourist sales stands dating to the 1990s and operated or leased by the owners.

The road segment between Medicine Tail Coulee and Weir Point (approximately Road Stake 8+800 to 11+500) yielded only twelve artifacts, but the 1994 work yielded only one artifact in the inventoried segment. The low artifact recovery reflects three things: one is that this area played little role in the battle; second that approximately 1,000 m of this segment (from approximately Road Stake 10+000 to 11+000) show indications of significant surface disturbance and was excluded from the inventory; and third that portions of this area were not inventoried during the 1994 work due to lack of authorization from the land owners. The ground disturbance noted might have occurred during the original 1938 road construction and grading work or perhaps it was done later by private land owners. In either, case the top of one ridge was bladed down well into the subsoils and portions of the ground along the road right-of-way were also extensively modified. The 1938 grading and cut and fill plans (RG79, Box 2131 Files of maps and road contracts for 1940–1941, grading and installing culverts on Reno–Benteen road and File 504-04 maps of Custer Battlefield, National Archives) clearly show the extent of cut and fill depth on this segment. Due to the extent of the disturbance this segment was excluded from the investigations.

The area from Weir Point to the Reno–Benteen defense site gate (Road Stake 11+500 to 12+700) yielded fourteen artifacts during the investigations and five during earlier work. Access to some land was not authorized during the earlier inventory and that might explain the lower artifact recovery. In addition, the land adjacent to the Reno–Benteen fence and gate area (approximately Road Stake 12+300 to 12+700) appears to have had its surface area modified at some time in the past. Most of the battle-related artifacts recovered in this stretch of the road were found closer to Weir Point and most appear to associate with the advance or more likely the withdrawal of the soldiers from Weir Point to the Reno–Benteen defense site as well as the line of attack by the Cheyenne and Lakota warriors who pursued the withdrawal effort.

Artifact recovery along the road from the Reno–Benteen gate to the parking lot (Road Stake 12+700 to 13+440) was good with 89 find locations recorded. Forty-three finds (32 percent of the total of 132) were found in the 1985 work. The artifacts found along the road near Sharpshooters Ridge and up to Road Stake 13+100 reflect two episodes of the fight. One is the line of withdrawal of the troops from Weir Point, and the other is the positions taken by pursuing and attacking warriors to fire on the soldiers defending the Reno–Benteen position. From approximately Road Stake 13+300 to the parking lot, a fair number of finds were recovered that reflect the defensive positions used by the soldiers during the fight at Reno–Benteen. At one location (FS 9590, west of the parking lot proper) an unfired .45–55 carbine round was recovered at a depth of 25 cm (10 inches) suggesting a buried riflepit is likely to exist at this location. This area was occupied by Company B on June 25 and Company M on June 26. A line of cartridge cases was located below the road between Road Stakes 13+300 to 13+360 on the west side and might indicate soldiers' positions associated with covering fire being given other members of the command during the retreat from the valley to the bluffs. The newly discovered group of cases is at the head of retreat ravine.

The Reno–Benteen and Weir Point Episodes

When Maj. Marcus Reno's command made its unorganized movement from the timber in the valley to the bluffs, the first area it traversed after crossing the river were steep slopes and ravines. Reno's men were under fire during their movement up the slopes and a number of men were killed or wounded in the attempt to reach the heights (Stewart 1955). The available historical documentation notes the movement was somewhat random and perhaps on a broad front (Nichols 1992). The command may not have used any one locale or trail to climb to the bluff tops. The men appear to have scrambled up the slopes wherever they could. Dr. J. M. DeWolf and his orderly went up a slope which angles to the east northeast and away from the defense site. They were warned by some members of the command that they were about to run into warriors above them. Before they could retrace their trail, both were killed by the warriors firing at them from above. White marble markers have since been placed on a the bench of the slope where they were believed killed.

When those of the command who survived the river crossing and the upslope climb to the bluff tops gathered, there appears to have been little attention given to organizing a defensive perimeter. Capt. Frederick Benteen and his battalion arrived from the south about the time Reno's command gained the heights. Benteen was moving north in order to join Custer's command after receiving a communication from Custer via messenger. As Benteen joined Reno, some warriors situated in nearby ravines commenced firing into the command's position (Stewart 1955:391). Company D threw out skirmishers under Capt. Thomas Weir and returned fire. With this, the Indian fire slackened.

A discussion ensued among several of the officers concerning the appropriateness of attempting to join Custer's command. Maj. Reno apparently decided not to attempt to find Custer until the pack train, carrying the command's extra ammunition, could join his command. That train had been following Capt. Benteen's battalion. In the meantime Maj. Reno and several others attempted, unsuccessfully, to recover Lt. Benjamin Hodgson's body. Hodgson had been killed trying to cross the river.

Capt. Weir, demonstrating a great deal of impatience, mounted his horse and set out to the north to determine the whereabouts of Custer. Lt. Winfield Edgerly, assuming Weir was under orders, mounted Company D and followed Weir. Capt. Weir and Company D reached a high point about one mile north where they stopped to observe the country. The point is now known as Weir Point. Lt. Edgerly moved north with Company D about one-half mile before he was signaled to return by Capt. Weir (Sills 1994:45–46). Lt. Edgerly testified at the Reno Court of Inquiry that Capt. Weir signaled him to swing around to the right or east and return to Weir's position (Nichols 1992:444–445). Edgerly also testified that in the advance position his men fired individually at Indians who were within 150 to 200 yards of their position (Nichols 1992:446). It is unclear whether Edgerly is referring to the advanced Company D position or the firing from Weir Point proper.

When the pack train reached Reno's position; Reno sent Lt. Luther Hare to tell Weir that the rest of the command was about to follow him. Companies H, K, and M, under Benteen, joined Weir while Reno,

and the rest of the command transporting the wounded, began to move north. Lt. Varnum also rode to Weir Point and he recalled that Weir's company was dismounted and firing at the Indians "who seemed to be coming out on the prairie and turning back. It was quite a long range, but there were a good many shots being fired at him and he was firing away, a slow firing, a shot now and then at quite a little distance" (Nichols 1992:144–145; Carroll 1987:117). In other testimony Varnum recalled that the ranges were 700 to 800 yards (Nichols 1992:161; Carroll 1987:143).

Pvt. Edward Pigford recalled, many years after the event, that he and two other Company M men advanced ahead from Weir Point to a small hill where they saw the last of the Custer fight. He also said that the other two soldiers were killed on the movement back to the hill (Stewart 1955:403–404). His information seems to be of questionable value since it is so inconsistent with other testimony and there is no other record of any men being killed forward of or on Weir Point. The only man lost was Farrier Vincent Charlie during the retrograde movement back to the Reno–Benteen defense site.

There is little doubt that the Indians began to move to the south from their victory over Custer. The soldiers at Weir Point saw this movement and began to withdraw to their first position. Companies M and D covered the rather unorganized withdrawal until a few hundred yards north of the first position. Lt. Wallace testified at the Court of Inquiry that the movement back was under heavy fire (Nichols 1992:80). Near the present monument's gate on the tour road, Company K dismounted and deployed in skirmish order to cover the retreat. Lt. Edward Godfrey and his men began to withdraw slowly to the south covering the other companies' retirement. The soldiers' fire slackened and they bunched up, but Godfrey re-established skirmish order and continued the withdrawal in good order until within a few yards of the defensive position when Godfrey told the men to make a dash for the lines.

Within a short time the command was under fire from all sides, as the warriors took cover on hill-tops, in ravines, and wherever they could to shoot into Reno's position. On June 27, the combined column of General Alfred Terry and Colonel John Gibbon arrived to relieve the besieged Reno.

There is archeological evidence for the Weir Point episode that supports the statements made by the officers and men. In addition the archeological data identifies the movement north of Weir Point, fighting around the Point, and the route of the retrograde movement back to the Reno–Benteen defense site. The archeological evidence is not extensive, but the limited data available are patterned.

The historical documents relating to the action at Weir Point suggest that until the retrograde movement began there was only intermittent firing and at long ranges between the opposing forces. It is known that Companies M and D covered the retrograde movement until Company K formed a skirmish line and covered the final elements of that movement. Historical documents suggest the Company K covering fire began near Sharpshooters' Hill and there is ample archeological data to support the Company K skirmishing efforts found during previous investigations (Scott et al. 1989).

A 1994 inventory area of the lower end of Cedar Coulee (Scott and Bleed 1997) yielded a watering bridle snap hook, a Colt revolver cartridge, a Springfield carbine bullet, a Model 1870 carbine tool, a .50-caliber bullet, and a .44-caliber bullet. These data indicate movement and activity along the west slope of Cedar Coulee. The Colt cartridge, carbine tool, and carbine bullet were found in proximity. The meaning of this pattern is not clear, but it leaves an impression of an event occurring at that location. One possible interpretation, but not necessarily the only interpretation, is these artifacts may be associated with the wounding and or death of Farrier Vincent Charlie. The upper end of the coulee yielded, during a 1996 inventory, a curry comb, a spur and buckle, nine .45-caliber carbine bullets, two .50-caliber bullets, a live Colt .45 cartridge, and a live .45–55 Springfield cartridge (Scott 1996). These items found on the west slope of Cedar Coulee and below the modern park tour road probably indicate the line of Weir's retrograde movement to the defense site. The bullets are the physical evidence of the covering fire of one of the companies during the retreat, perhaps Company K. The 2004 investigations found additional cartridge cases and bullets fired by the soldiers and warriors during the retreat episode from Weir Point to the defense site.

The cartridges, spur, and curry comb suggest some of the haste inherent in the retreat. Although the artifacts may have all originated from a single individual it is more likely they represent discrete episodes of a rearing and plunging horses disgorging a curry comb from an unsecured saddle bag, a dismounted man catching and loosing his spur, perhaps in the haste of remounting, the discard of a carbine round after the bullet nose was deformed in a hurried attempt to reload a carbine, and a fumbled attempt to reload a revolver. All of this gives the impression that the soldiers passing along this side slope during the retreat, did so in haste. The bullet distribution also gives the impression that after the soldiers retreated the pursuing warriors also crossed the same ground, but under fire from the companies providing covering fire to the retreating soldiers.

The finds along the west slope of Cedar Coulee as well as south of Sharpshooters' Hill within the park boundary clearly indicate the route of the retrograde movement from Weir Point to Reno–Benteen. They also indicate that the area was subsequently used by Indian warriors as they fired on the troops during that movement or while in the defense site. These data are entirely consistent with the analysis and results presented on the 1985 archeological investigations at Reno–Benteen (Scott et al. 1989).

The warriors used at least ten Sharps or Remingtons and one Model 1868 or Model 1870 Springfield rifle in .50-70-caliber firing on the soldiers during their retreat from Weir Point and after they returned to the defense perimeter. The .44-caliber cases represent at least sixty-one individual lever action repeating guns were used in the fighting around Reno–Benteen. Four Model 1873 Winchesters have now been identified as being used by the Indians against the soldiers at Reno, as well as at least one Joslyn carbine.

The .44-caliber and .50–70-caliber data indicate that the warriors did utilize Sharpshooter Hill, the knoll, and the ravines south of the defense perimeter as firing positions. The cartridge case concentrations in these areas suggest that the warriors tended to take advantage of the same general locales, perhaps it was the best cover available. The isolated cases also indicate that almost every area of the battlefield was used. The distribution of Indian associated cartridge cases confirms the historical accounts that the warriors surrounded the command and poured a heavy fire into the defense perimeter. The cartridge case concentrations also indicate that the survivor's accounts of directions of fire are also accurate.

The Springfield carbine case distributional evidence is complicated, so it is perhaps best to begin with least complicated portion. The ridges and bluffs surrounding the Retreat Ravine contained a few Springfield cartridge cases. The cases indicate, along with Indian associated bullets found impacted in the vicinity, that the retreat was under fire. The Springfield cases found along the ravine correlate with those found in the defense perimeter. The ravine cases match cases found in the B, D, K, and M Company positions.

The gross distribution analysis identified three discrete areas of Springfield carbine case concentrations north of the defense perimeter. These are located on the west flank of Sharpshooter Hill, between the hill and a low knoll, and in the vicinity of the knoll located about one-half the distance between the army defensive perimeter and Sharpshooter Hill. The carbine cases found on the flank of Sharpshooter Hill all match cases found in the other positions and in the defense perimeter. The cases in the two concentrations between the hill and knoll also match cases at the knoll and in the defense perimeter. This strongly suggests that the carbine cases found north of the defense perimeter are associated with the movement to and from Weir Point. Further corroboration is found by analyzing the specific defense perimeter match locations.

The majority of the carbine cases found north of the perimeter match with cases found in the northeast perimeter area. Those cases found around the knoll and some to its immediate north correlate with the historically documented Company K position. It was Company K, commanded by Lt. Godfrey, that formed a skirmish line to cover the latter part of the retreat from Weir Point. The cases found near Sharpshooter Hill match cases found on the northwest part of the perimeter. This area was occupied by Companies B and D during the fight. They also covered the early part of the Weir Point retreat. In this situation it is not just one or two case matches we are discussing, but evidence for the use of twelve different

guns moving from Sharpshooter Hill then to the knoll, and finally to the Company K position in the perimeter.

The Medicine Tail Coulee Episode

Battle events in Medicine Tail Coulee and the cavalry's movement to Calhoun Hill are some of the most difficult to reconstruct from the historical record. It is now fairly well agreed by various authors that Custer halted in Upper Medicine Tail Coulee and divided his command into two wings, a right wing consisting of Companies C, I, and L and a left wing composed of Companies E and F under the command of Capt. Yates (Gray 1991:360; Fox 1993). It is Gray's (1991:360–370) assumption that Custer's purpose in dividing the command was for the left wing to conduct a feint to the mouth of Medicine Tail Coulee while the remainder of the command moved along the ridges to the north in an attempt to ford the Little Bighorn and attack the north end of the village. Gray (1991:362–363) cites the R. G. Cartright and Joseph Blummer cartridge case finds on Nye–Cartright Ridge as well as cartridge case finds on Luce Ridge as support for this argument. He also uses other Cartright and Blummer artifacts found along a line from Nye–Cartright to Calhoun Hill and from Deep Coulee to Calhoun Hill as further evidence of the convergence of the two wings.

As the Nye–Cartright episode is not within the inventory area further discussion is limited primarily to the Medicine Tail Coulee, Deep Coulee, and Calhoun Hill portions of the fight. Curly (Gray 1991:360–372) describes Yates' wing as moving down Medicine Tail Coulee to its juncture with the Little Bighorn and there firing at Indians on the river's west bank. At one point Curly, who presumably observed the left wing movements from his position with Custer, suggests Yates' command dismounted and fired into the village on the opposite side of the river, while in another narrative he says Yates did not dismount but fired across the river while mounted, then turned to move up Deep Coulee and reunite with Custer's command.

Curly indicates two soldiers rode into the river but returned to the command before the movement up Deep Coulee. Curly reported only light firing occurred at the Coulee's mouth. The Indians on the west bank fired at the soldiers who were apparently in column, with perhaps only the column's front ranks firing on the west bank. The historical accounts generally agree that the movement to the mouth of Medicine Tail Coulee was of short duration with only limited firing on either side. Lt. Oscar Long reported his Sioux informants mentioned only one man killed at the ford (Brust 1995:8). The Sioux identified him as an officer who had a compass and field glasses. Gray (1991) cited a burial party account indicating the man was a non-commissioned officer who was found on the west bank was not mutilated. His horse was found near the body. Long's informants also mentioned that to them it appeared one company near the river mounted on bay horses tried to run away, but were fired upon by their own men and forced to return to the command (Brust 1995:8). Perhaps this incident could also be interpreted as a company moving to the mouth of the Coulee and retiring with the support of covering fire by another company or group held in a reserve position.

As Yates' wing moved northeast, presumably along the west bank of Deep Coulee, to reunite with the right wing and Custer on or near Calhoun Hill, warriors crossed the river and got in the rear of Custer's command (Gray 1991:366) as well as on his right flank. Fox (1993:143) argues that Yates' wing made the movement dismounted, but this is at odds with Curly's statements regarding the Deep Coulee movement. White Cow Bull, a Sioux, (Fox 1993:144) reported that before the soldiers dismounted they delivered an intense fire that drove the Indians back. Curly said (Gray 1991:366) by the time the command reunited near Calhoun Hill the Sioux and Cheyenne were in their front, in both ravines (presumably Deep Coulee and Calhoun Coulee) and a strong force in their rear. Gray (1991:370) and Wells (1989) reconstruct the reunion near the park's southern boundary fence and suggests that one or more companies dismounted and deployed in the vicinity of the so-called Finley Marker. There the soldiers tried to drive the warriors from a ravine in their front, but with men killed to their rear that attempt failed and the warrior advance was not checked. Fox (1993) places this event in Calhoun Coulee with Company C charging the warriors in the ravine. The charge failed in the face of overwhelming numbers of warriors and pre-

precipitated the collapse of the Company L position because Lt. Calhoun had to split his force to support the Company C retreat.

The 1994 (Scott and Bleed 1997) and 2004 archeological evidence for combat at the mouth of Medicine Tail Coulee is meager, but is definitely present. The area has been heavily collected as indicated by Greene's (1986) summary of previous collecting efforts. The area has also been the subject of many other uses. Its primary use is grazing land, but at least one movie (*Little Big Man*, 1970) was filmed along the tour road at the coulee's mouth. Archeological evidence of the movie making was recovered in the form of 5-in-1 movie cartridge cases (a blank cartridge designed for use in .44-caliber and .45-caliber firearms) and various other caliber blank cartridge cases. The Last Stand sequence was filmed on a cutbank west of the tour road at the mouth of Deep Coulee. Ample evidence of that scene's filming was recovered there. The charge to the river was filmed at the mouth of Medicine Tail Coulee where it joins the Little Bighorn River, and movie debris was recovered there as well.

It is interesting to note that the locations used in the movie to represent battle sequences were in fact set on sites actually used in the battle. The area along the tour road where the Last Stand sequence was filmed yielded lead balls and Sharps' bullets fired by the warriors and a .45-caliber carbine bullet probably fired by a soldier. These data alone indicate there was combat in this area. The Indian bullets were impacted in areas on the east side of Deep Coulee. They may represent shots fired in the direction of retreating soldiers or they may represent shots fired at Yates' wing as they moved to the mouth of the coulee during their movement toward the river. Many of the collected relics compiled and mapped by Greene (1986) are distributed in the same area.

The mouth of Medicine Tail Coulee, at the ford, also yielded period artifacts during the 1994 investigations (Scott and Bleed 1997). There were also numerous .45–60 caliber cartridge cases found in this location, wholly intermixed with the battle period items. These cases are both headstamped and non-headstamped, but all were fired in Winchester Model 1886 firearms. These clearly postdate the battle. The reason for the clustering at the ford is not known, although they may be associated with one of the earlier reenactments or filming episodes.

However, the 1994 investigations did recover two pieces of a broken Model 1874 army mess knife, a period butcher knife of the type that might have been carried by a soldier or a warrior as a sheath or belt knife, a lead rifle ball, the cylinder pin to a Colt revolver, and a .30-caliber Remington Smoot revolver cartridge case. Don Rickey and J. W. Vaughn (Greene 1986:20–25) also report finding a few .45-caliber army carbine cartridge cases, some equipment and personal items, bullets, and Indian caliber cartridge cases at or near the ford. Greene's compilation and the 1994 archeological data are entirely consistent in type and quantity. Those data are also consistent with the historical accounts that a small action with only limited firing occurred at the ford. The finds of soldier equipment indicates some items were lost at or near the ford, and are consistent with the conclusion reached by Rickey and Vaughn (Greene 1986:23) that at least one cavalry horse may have been hit, and in plunging around, scattered items attached to the saddle. Rickey and Vaughan also noted that they recovered some split Berdan primed .45-caliber cartridge cases. Unfortunately, these are not available for examination, but they may well be post-battle .45–60-caliber cases like those found in 1994.

Deep Coulee to Calhoun Hill Episode

Rickey and Vaughn (Greene 1986:33–34) found cartridges, cases, bullets, and equipment pieces in their research around Deep Coulee. Greene's compilation of other finds also generally mirrors the archeological finds. The distribution of the earlier finds is along the south side of Deep Coulee and adjacent and parallel to the park's boundary fence from Greasy Grass Ridge to Calhoun Hill. This is essentially the same distribution as the 1994 and 2004 artifact finds.

The artifact patterning and distribution gives the impression of soldiers moving up Deep Coulee toward Calhoun Hill (Scott and Bleed 1997). The expended army cartridge case distribution indicates there was some firing as the movement took place, but it appears light or at least limited in scope. The distribu-

tion of Indian caliber bullets also gives the distinct impression that the army movement was under fire. Most army bullets were found around the park's boundary fence near Calhoun Hill. The same is true of most of the Indian caliber cartridge cases. This bullet distribution is consistent with firing by Companies C and L after their deployment at the south end of Custer or Battle Ridge. Some army caliber bullets were also found northeast of the fence corner. These may have been fired toward warriors on or near Henry Ridge. One of those warriors may have been Gall who (Fox 1993:143) stated he joined the battle at Calhoun Hill via a route through Henry Ridge.

Although the cartridge case and bullet evidence suggests only limited fighting occurred during the movement from Medicine Tail Coulee to Calhoun Hill the distribution of equipment in the Deep Coulee area indicates it did not occur without some loss (Scott and Bleed 1997). Spurs, picket pins, and the curry comb finds suggest enough haste occurred in the movement to cause the loss of items from the horse equipage or from individual soldiers. An alternative interpretation of these data is they represent killed or wounded soldiers and/or horses. Some support for this supposition comes in the form of skeletal remains found in this general area. R. G. Cartright and Frank Blummer report finding at least one nearly complete human skeleton in 1928 and there are allusions to the location of several more in the Deep Coulee area (Willey 1993, 1997). In addition, Cartright and Blummer (Greene 1986:28) reported finding the skeletons of as many as four cavalry horses still partially outfitted with saddle gear near Deep Coulee. The horse remains could also represent wounded horses that got loose during the battle and died in this area as well.

In any case the archeological and relic evidence consistently point to a movement of soldiers to the mouth of Medicine Tail Coulee where a small and perhaps brief action occurred between the soldiers on the east bank of the Little Bighorn River and Indian warriors on the west bank. After this skirmish the cavalry withdrew and moved up the east bank of Deep Coulee to reunite with the rest of the command at or near the park's south boundary fence. During the movement up Deep Coulee the cavalrymen were under some fire, but perhaps not intense. It appears from the finding of human remains in 1928 that one or more soldiers may have been lost in this movement. Presumptively the movement represented by the artifacts is that of the left wing rejoining the remainder of the command as they passed from Nye-Cartright Ridge to Calhoun Hill. The two wings apparently rejoined at or near the present park boundary fence, probably not far from where the modern tour road breaks the fence line. From there Custer deployed Companies C and L on Calhoun Hill where heavy fighting ensued. The warriors used Deep Coulee, Calhoun Coulee, Greasy Grass Ridge, Henry Ridge, and other available cover to fire into the front and right and left flanks of the soldiers posted at Calhoun Hill.

Greasy Grass Ridge and Calhoun Hill

Upon gaining the ridge, Custer, or someone else in command, deployed a group of men on a line facing in a southerly direction. Traditionally the men deployed are assumed to have been from Company L and possibly some from Company C owing to the presence of identifiable remains of men of these two companies in this location after the battle. This includes ground at and surrounding the area traditionally known as Calhoun Hill. The soldiers on this line faced intense fire from Indians located south and east of their position. The deployment probably protected the southern end of Custer Ridge. We found evidence of at least fifteen Springfield carbines and three Colt pistols in use in the Calhoun position. Historical and relic evidence presented by Greene and artifacts subsequently collected by Weibert (1990) and other amateurs suggest that the warriors attacked from the south and southeast. These Indians found cover below the tops of ridges 100 to 800 yards away. Once the warriors advanced on the soldier position they were able to bring a diverse variety of firearms to finish off the surviving soldiers, including several .50-70-caliber rifles and carbines, at least one Joslyn carbine, and a number of .44-caliber Henry or Winchester 1866 rifles.

Another area of heavy Indian fire came from south and west of the Calhoun position on a lower portion of Greasy Grass Ridge. The 2004 investigations added to the number of guns used on Greasy Grass Ridge by the warriors. At least thirty .44-caliber rimfire lever-action weapons, one .44-77-caliber Sharps, one Smith and Wesson American .44-caliber revolver, sixteen .50-70-caliber guns, four Spencers, an uni-

identified .50-caliber rimfire, and two .44–40-caliber Model 1873 Winchesters were used in this area against the soldiers, a total of at least 55 different firearms. The heavy fire must have aided in the annihilation of Calhoun's men. From the cartridge case distribution matches, it appears that Calhoun's position was overrun by the same Indians who fired at the soldiers from Henry Ridge and Greasy Grass Ridge.

Two Springfield carbine cartridge cases found in the Medicine Tail Coulee area in 2004 matched to cartridge cases found in the Finley–Finckle and Calhoun Hill areas. Custer's left wing that went to the mouth of Medicine Tail Coulee is presumed to have been composed of Companies E and F while the units known to have fought in the Finley–Finckle area and on Calhoun Hill are Companies C and L. The cartridge cases matches are inconsistent with the traditional historical view without alternative explanation. One explanation may be that members of Companies C and L were under fire in Medicine Tail Coulee before deploying to Nye–Cartright Ridge or that members of Companies E and F returned fire as the command reassembled on Calhoun Hill before the deployment of Companies C and L by Custer to hold the ground to the south while he took the remainder of the command further north. This second scenario seems to be the more plausible explanation, suggesting that the entire command was under some hostile fire as it gained the Finley–Finckle area and Calhoun Hill.

Calhoun Hill to Last Stand Hill

Neither the mid-1980s archeological investigations nor the 2004 investigations recovered any substantial numbers of cartridge cases or bullets from either side of Custer or Battle ridge. Only 28 artifacts were collected between the end Calhoun Hill loop road and the parking lot at Last Stand Hill. Five of these finds are post-battle items and are excluded from further discussion. A canteen stopper ring, a horse bone, and a possible Indian ball button constitute the personal items. Four .45-caliber 405-grain army bullets and four warrior bullets (.44- and .50-calibers), one .45-caliber Colt cartridge case, seven .45–55-caliber cartridge cases, and four Indian cartridge cases (Henry, 1871 Colt, and a Joslyn carbine) clearly demonstrate both soldier and warrior activity along the ridge line, but not in significant numbers. This is consistent with the results of the earlier investigations.

Overall there is little evidence for soldier firearm movement beyond that seen between the Finley–Finckle area and Calhoun Hill. There is one exception to this situation as exhibited by FS 9711 from the Finley–Finckle area that had matches to two cases (FS 9846, 9847) found along the road near the Last Stand Hill parking lot. This may represent a surviving Company C man racing along Custer Ridge to join his comrades on Last Stand Hill or this may represent a captured carbine in warrior hands. As with the earlier investigations there is very little evidence of soldier weapon movement, but the Indian fired cartridge cases show extensive movement across the battlefield, including the use of several different firearms against not only Custer's men, but Reno and Benteen's men as well.

Conclusions

The metal detecting effort along the approximately 4.5-mile length of Route 10, Little Bighorn tour road, located and identified over 300 individual artifacts or artifact assemblages. The archeological investigations located extensive evidence for discrete actions that took place during the 1876 Battle of the Little Bighorn. That evidence added additional information and enhanced certain aspects of the previously known archeological record. However, no new soldier or Indian positions were located, rather the 2004 investigation confirmed that the earlier archeological sampling projects identified these locations and that the sampling design correctly predicted the relative percentage of artifacts recovered in each area.

The 2004 mitigation efforts added no new firearms types to the total previously identified, but the analytical work has added to the total number of individual firearms represented by the cartridge case and bullet assemblage. This was an expected outcome of the firearms identification analysis. Another anticipated outcome was that some cartridge cases in most calibers were matched by firing pin analysis to similar cartridge cases found during the earlier investigations. These firearm matches on the Custer battlefield support and enhance the previous interpretations by clearly demonstrating that few .45–55-caliber army carbines or Colt revolvers were moved about the Custer battlefield. This reinforces the view that the men of the Seventh Cavalry fought and died in their positions and that there is little evidence of a running fight by the soldiers.

In contrast those cartridge cases attributed to the Lakota and Cheyenne warriors' guns show substantial movement around the field of battle. This is entirely consistent with the findings of the earlier investigations. The 2004 Indian associated cartridge case evidence coupled with the data from the earlier work demonstrates that warriors fought in loose groups of men, taking advantage of the terrain to shield themselves from the gunfire of the soldiers.

The firearms data from the Weir Point and Reno–Benteen areas supports the historical record and oral histories that the warriors there also used the available terrain to shield themselves from incoming soldier fire. The cartridge data also confirms that warriors moved around the field as shown during the earlier investigations. The soldiers' cartridge case evidence confirms the route of advance and retreat to and from Weir Point. The cartridge cases also clearly show that the retreat from Weir Point was under fire, but was conducted in good order with significant covering fire laid down by the men of the companies who covered the retreat.

Nearly 40 percent of the bullets recovered, from both Indian and soldier contexts, have little or no damage to the bullet nose or body indicating that these rounds had lost most of their velocity and energy at the time of impact, thus indicating the shots were fired at long range. On the other hand about 20 percent of the soldier fired bullets and 30 to 35 percent of the Indian fired bullets show evidence of high velocity impact indicating, in this instance, that these were likely fired at shorter ranges. The lower number of soldier bullets with evidence of close-range firing and higher number of Indian rounds indicating close-range fire is consistent with the historic record of Indians firing on soldiers from long distances until the total numbers were reduced by wounds or death, when the warriors closed in to dispatch the remaining survivors.

In summary the metal detecting inventory recovered substantial numbers of artifacts in the areas where previous investigations predicted they would be found. Conversely few to no artifacts were found in areas where few to no artifacts were recovered in earlier investigations. The 2004 close order metal detecting efforts were effective in mitigating the effect of the proposed tour road rehabilitation project with two exceptions. The area north of the Reno–Benteen parking lot (approximately Road Stake 13+260 to 13+360) may contain buried rifle pits occupied by soldiers during the defense fight. It is well documented both historically and archeologically that rifle pits were used as expedient burial sites immediately after the battle (Bray 1958). Four sets of human remains were recovered in 1903 in a pit just outside the road impact area near the Reno–Benteen parking lot. At least nine soldiers' remains are unaccounted for at the Reno–Benteen defense site and are likely still buried there. The current plans indicate some road

realignment and widening is planned for the Reno–Benteen parking lot. A non-intrusive geophysical investigation using ground penetrating radar, and magnetometry was done over this area on either side of the parking lot and to the north for a short distance in the spring of 2005. Approximately ten 20-m square blocks (five on either side of the road) were swept with the recommended instrumentation and anomalies consistent with buried features, aka riflepits, were identified, but outside the area of likely impact. Steven De Vore filed a complete report on the geophysical investigations in the fall of 2005 (De Vore 2005).

The other issue relates to the actual roadbed that lies beneath the current asphalt surface. Once the current asphalt is removed to base in the area from Last Stand Hill to Greasy Grass Ridge (Road Stake 5+600 to 7+200) it is recommended the old base be metal detected to ensure no battle-related artifacts are buried in the original 1938 road alignment. Metal detecting should also take place on the road base south of Weir Point, road stakes 11+500 to 11+850. This area has yielded evidence of the soldiers' withdrawal from Weir Point to the defense site. Finally, once the 1938 base is exposed between road stakes 12+700 to 13+440 metal detecting should be undertaken on this portion of the road to ensure there is no loss of information on soldier and warrior positions in that segment.

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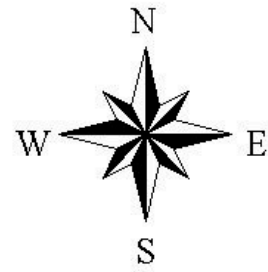
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-  Inventory Boundary
-  Roads and Trails
-  Crow Agency SE orthophoto quadrangle
-  Park Boundary

Figure 1. Little Bighorn Battlefield National Monument road inventory area.



Figure 2. This 1932 U.S. Army aerial oblique photograph shows the informal track from Last Stand Hill to the Calhoun area. Note the Fort Phil Kearny burials on Last Stand Hill.



Figure 3. By 1935 the road from Last Stand Hill to well beyond Calhoun Hill had been graded, widened, and gravelled in preparation for the more extensive work in 1938.

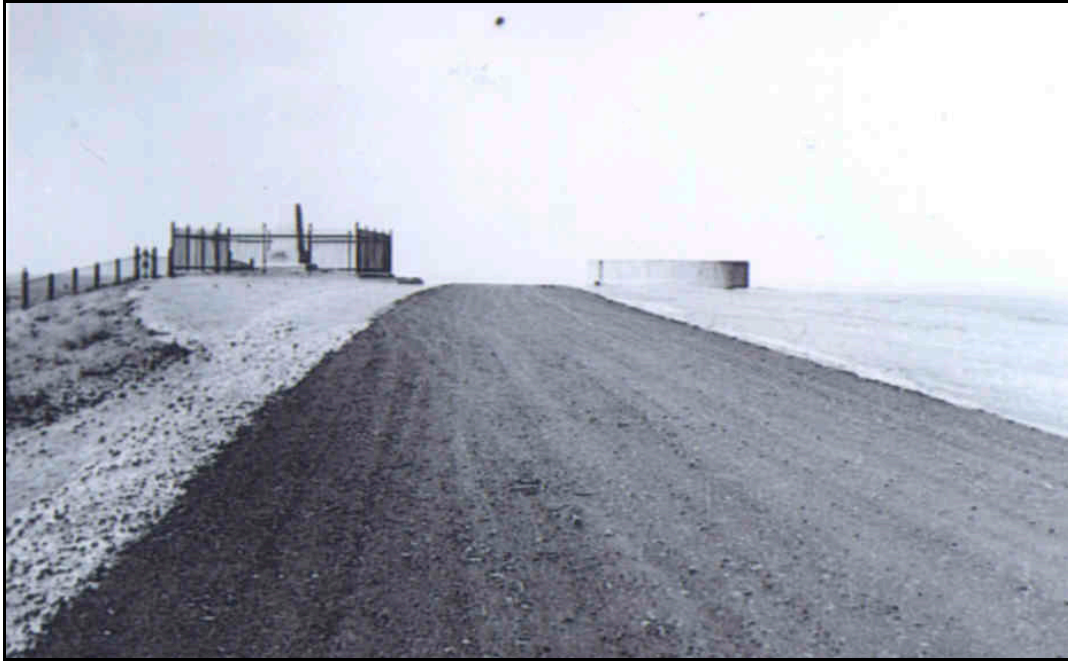


Figure 4. In 1938 the road was graded and an oiled surface applied. Note the 20,000 gallon concrete water reservoir on Last Stand Hill. It was used to irrigate the cemetery.



Figure 5. A 2004 image of the same area as Figure 4 showing the road alignment.



Figure 6. Another view of the completed tour road alignment in 1938 viewed from the Keogh area toward Last Stand Hill. Note the marble markers in the center of the image.



Figure 7. This modern view approximates the 1938 view in Figure 6. The markers are hidden behind the wayside sign. Note the addition of the pullout to accommodate visitor stops at the Keogh group.



Figure 8. A metal detector sweep underway above the tour road near Medicine Tail Coulee.



Figure 9. Conrad Angone and Douglas McChristian excavate a metal target on Finley–Finckle ridge. The flag in the foreground denotes another metal target waiting to be dug.



Figure 10. Harold Roeker and Carl Drexler used a Trimble Pro XL global positioning system device to precisely record artifact find locations before collecting each artifact.



2 0 2 4 Miles

- 2004 all artifact finds
- Park roads and trails
- Area roads and trails
- Park boundary

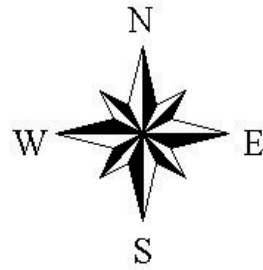


Figure 11. Distribution of all artifacts recovered during the 2004 investigations.



- Miscellaneous cartridge case and bullets
- .38 round ball
 - ▲ .44 S. W. American
 - .44 Wever
 - .44 round ball
 - ◆ .44-40 case fired
 - .44-77 Sharp's
 - .44-77 Sharp's
 - .46 Sharp's
 - .46 Colt bullets
 - ▲ .46 Colt cartridge case
 - ▲ .46 Colt fired cartridge and cartridge case
 - ▲ .46 Colt fired cartridge case
 - .64 round ball
 - 68-68 Spencer
 - 68-68 Spencer
 - ◇ Park road case and bullet
 - ◇ Area road case and bullet
 - Park boundary

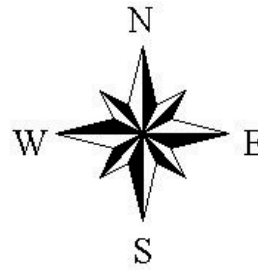


Figure 12. Locations of miscellaneous cartridge cases and bullets found along the road corridor.

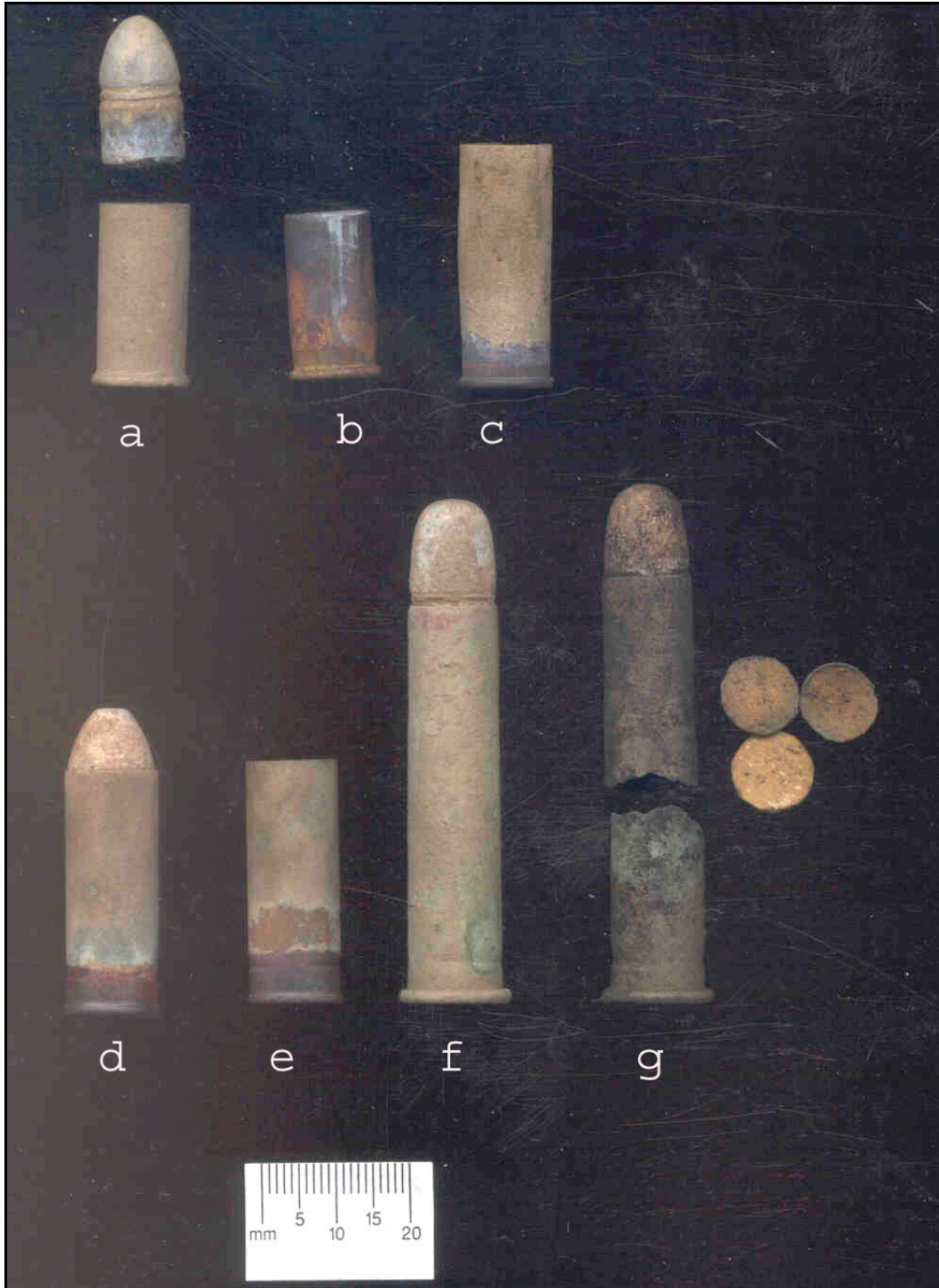


Figure 13. Miscellaneous cartridges and cases: (a) Smith and Wesson Russian bullet and case (FS 9758); (b) Smith and Wesson American cartridge case (FS 9735); (c) .44-40 cartridge case (FS 9616); (d) .45-Colt misfired cartridge (FS 9812); (e) .45-Colt cartridge case (FS 9812); (f) .45-55 unfired cartridge (FS 9553); (g) .45-55 unfired cartridge broken by oxidation and exposing the cardboard wads, also shown here, used to fill the case (FS 9633).



- .44-caliber cases and bullets**
- ▲ .44 Henry long cases
 - .44 Henry bullets
 - ▲ .44 Henry short cases
 - ▲ .44 Henry found in a .45-55 case
 - Park roads and trails
 - Area roads and trails
 - Park boundary

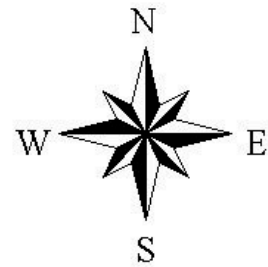


Figure 14. Locations of .44-caliber cartridge cases and bullets.

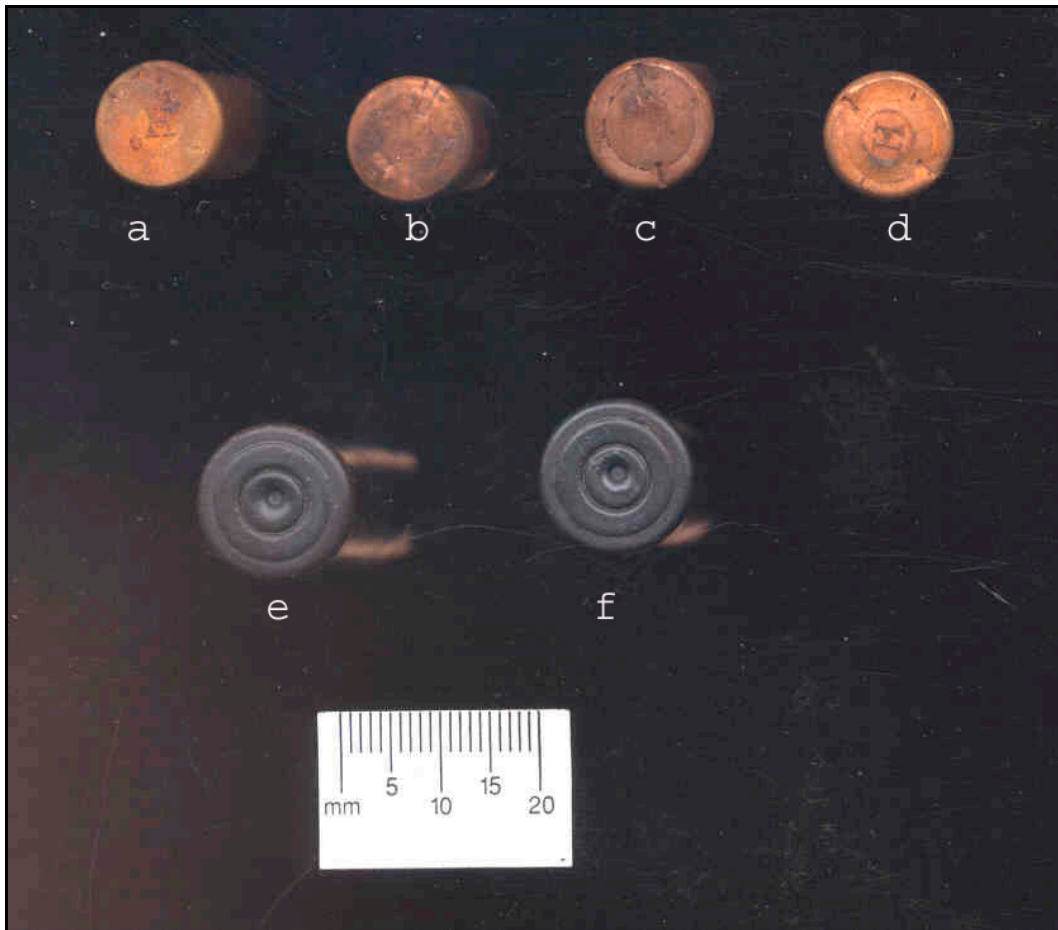


Figure 15. .44-caliber cartridge case heads: (a) case fired in a Colt 1871 revolver (FS 9712); (b) case fired in a Wesson carbine (FS 9713); (c) case fired in a Henry rifle, no headstamp example (FS 9848); (d) case fired in a Henry rifle with H headstamp (FS 9825); (e, f) .44-77-caliber cartridge cases fired in the same Sharps (FS 9754, 9826).

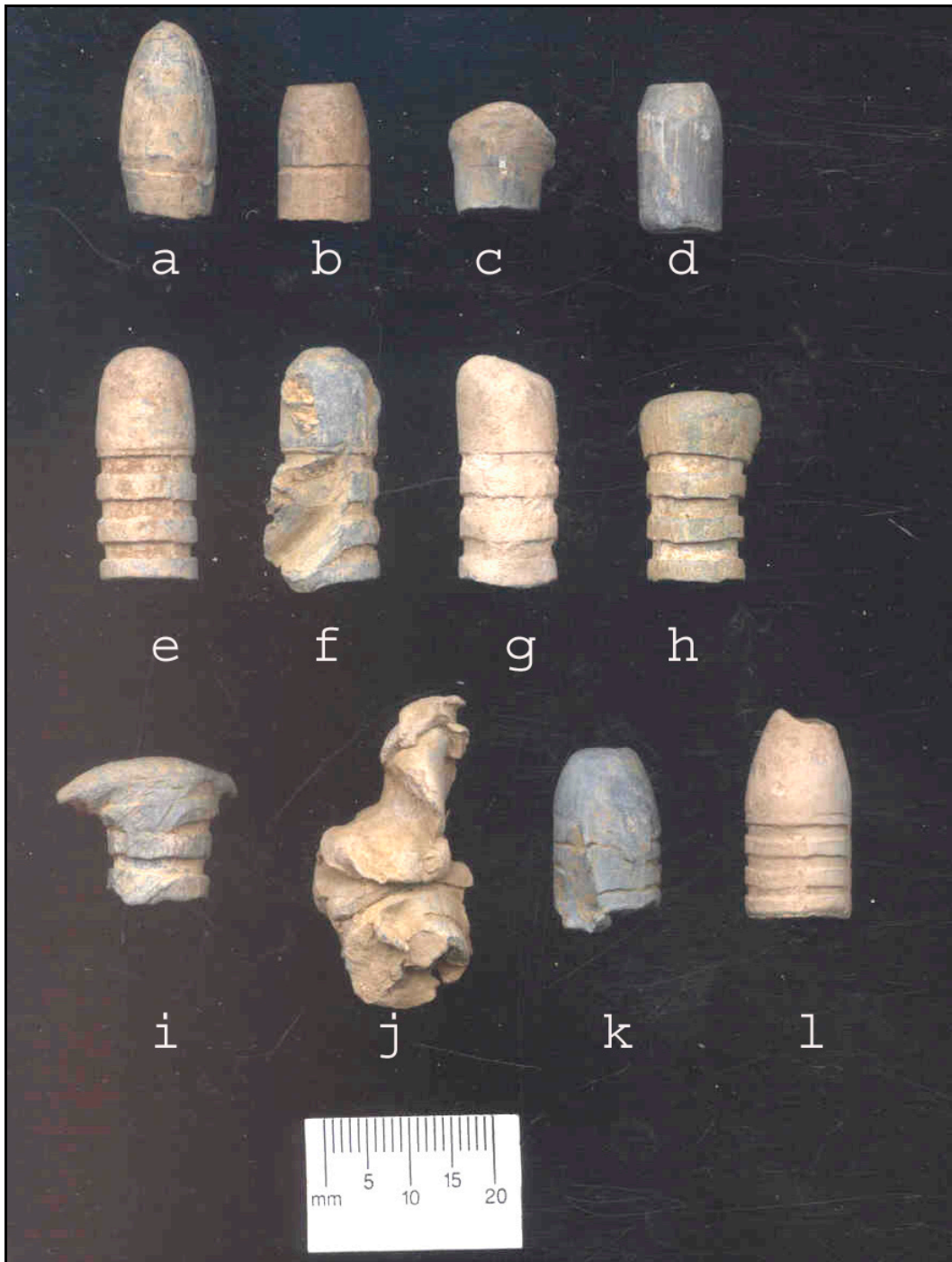


Figure 16. .44-caliber and .45-caliber bullets: (a) .44 Sharps (FS 9767); (b) .44 Henry single crimping groove (FS 9724); (c) .44 Henry deformed by impact (FS 9841); (d) .44 Henry raised-base variety (FS 9564); (e) .45-405 Springfield (FS 9563); (f) .45 Springfield with side impact damage (FS 9577); (g) .45 Springfield with slight nose deformation (FS 9572); (h) .45 Springfield with medium nose deformation (FS 9673); (i) .45 Springfield mushroomed by impact (FS 9674); (j) unidentified impact damaged bullet (FS 9783); (k) .50-450 bullet with 3 land-and-groove rifling impressions (FS 9759); (l) .50-450 bullet.



2 0 2 4 Miles

- .45-55 cartridge cases and bullets**
- ▲ 45-55 cartridge cases
 - ▲ 45-55 cartridge case with 44 Henry
 - 45-405 bullets
 - 45-500 bullets
 - Park roads and trails
 - Area roads and trails
 - Park boundary

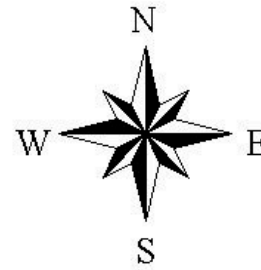


Figure 17. Locations of .45–55-caliber Springfield cartridge cases and bullets.

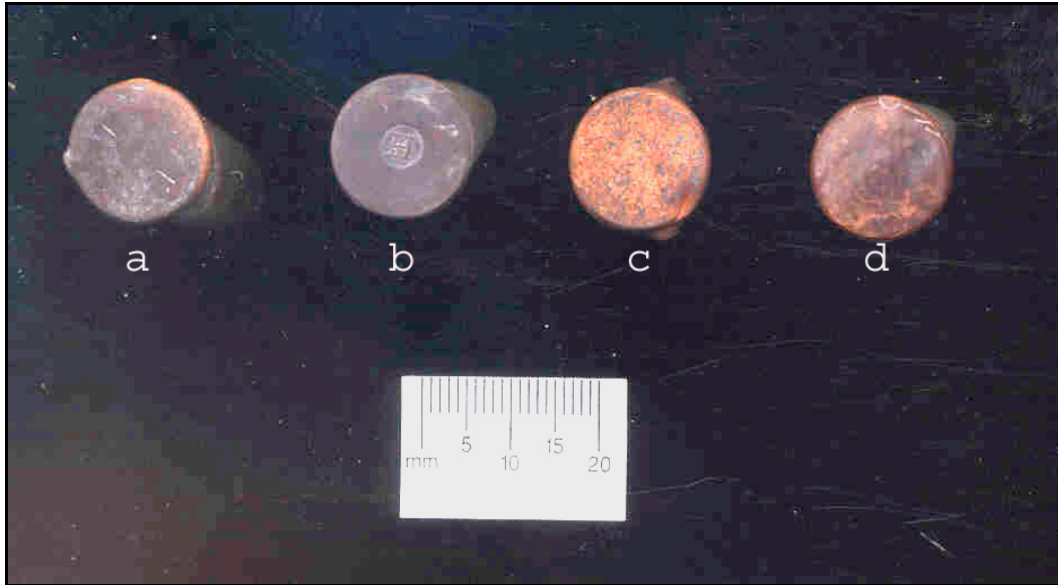


Figure 18. Firing pin marks on Spencer cartridge cases: (a) Joslyn carbine (FS 9609); (b) Ballard (FS 9753); (c) Spencer (FS 9756); (d) one Joslyn and five Spencer marks present on the same cartridge case (FS 9807), the Joslyn fired the round.



- 50-caliber cases and bullets
- 50-caliber bullets oriented north
- 50-caliber bullets oriented down
- 50-caliber bullets oriented east
- 50-caliber bullets oriented south
- 50-caliber bullets oriented southeast
- 50-caliber bullets oriented southwest
- 50-caliber bullets no orientation
- ▲ 50-caliber cartridge cases
- ▲ 50-caliber cartridge case group of 3
- ▲ 50-caliber cartridge cases - other
- ▲ Other 50-caliber bullets
- ▲ 50-caliber cases - miscellaneous
- Park roads and trails
- Area roads and trails
- Park boundary

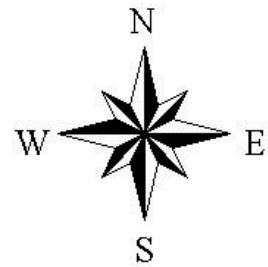


Figure 19. Locations of .50-caliber cartridge cases and bullets.

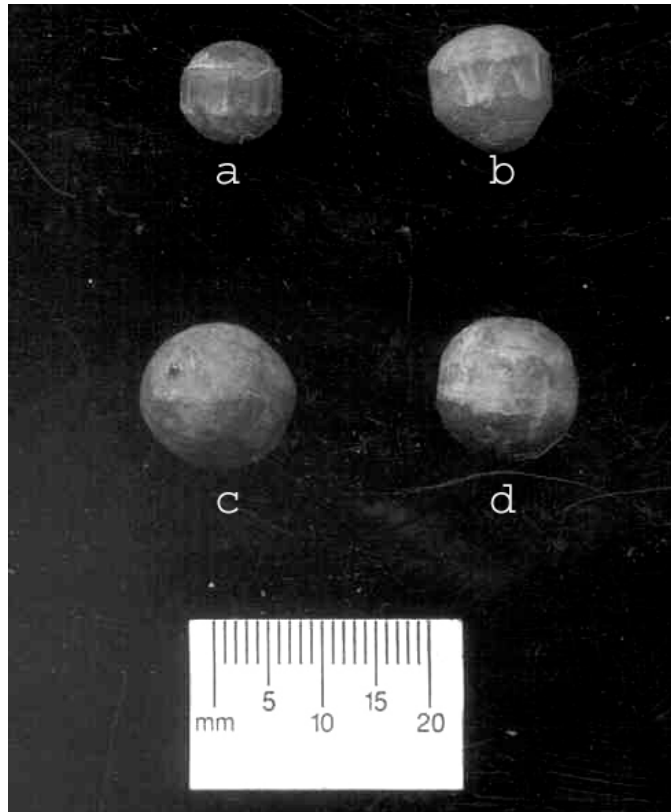


Figure 20. Spherical lead bullets: (a) .36-caliber fired in Colt revolver (FS 9860); (b) .44-caliber fired in Remington revolver (FS 9718); (c) .54-caliber ball with distinctive sprue mark (FS 9576); (d) .54-caliber ball with rifling and cloth patch impressions (FS 9811).

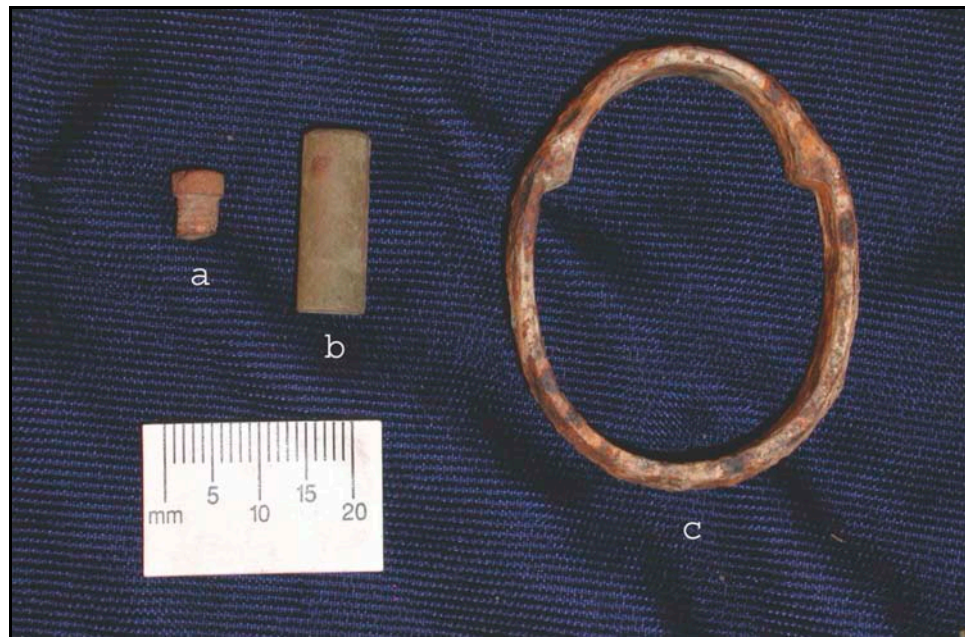


Figure 21. Gun parts: (a) Colt backstrap screw (FS 9792); (b) cleaning brush ferrule (FS 9614); (c) M1873 Springfield carbine barrel band (FS 9604).



Figure 22. Butcher knife or sheath knife handle (FS 9773).



Figure 23. Iron arrowheads: (a) broken small point (FS 9757); (b) long commercial-made point (FS 9669); (c) very long commercial-made point (FS 9770).



Figure 24. Buckles: (a) suspender grip (FS 9593); (b) M1876 cartridge belt buckle (FS 9682).



Figure 25. Canteen stopper ring (FS 9834).