A Sharp Little Affair

A SHARP LITTLE AFFAIR:

The Archeology of the Big Hole Battlefield

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Chapter 1

INTRODUCTION

The year of 1877 was a tragic one for the Nez Perce. Broken promises, misunderstood treaties, and conservative factions on both sides resulted in open warfare between the Nez Perce and the United States Government. In July the Nez Perce fled Idaho, at first to find refuge in Montana, and then in a final desperate bid for freedom they attempted to reach Canada. This trek became an epic event in American history. The flight ended in October at Snake Creek near Bear Paw, Montana, with the surrender of most of the Nez Perce under the leadership of Chief Joseph. The Nez Perce fought several skirmishes and at least six pitched battles with the army along the way. A number of the battle sites along the Nez Perce flight route are now preserved and interpreted by various state and federal agencies as memorials. One of those sites is Big Hole National Battlefield in southwestern Montana. The site of the Battle of the Big Hole is now ascribed a sacredness by the Nez Perce for the events that occurred there on August 9 and 10, 1877. As a memorial, the site highlights the tragic outcome of hostile relationships between two cultures.

In a pre-dawn attack on August 9, 1877, the Seventh U.S. Infantry, led by Colonel John Gibbon, surprised a Nez Perce camp on the banks of the North Fork of the Big Hole River. The infantry suffered a decisive loss, but the Nez Perce, although winning the day, suffered an irreplaceable loss of between eighty and ninety women, children, and men. Discussion and interest regarding what happened began virtually as the gunsmoke cleared from the field and still continue. Today the Big Hole National Battlefield memorializes the struggle, and is now a federal property administered by the National Park Service. Tens of thousands of people visit the battlefield each year to learn more about the Nez Perce War and the tragic events of August 9 and 10, 1877.

This is a new kind of story about the Big Hole fight. It is about history, but it is not a history. The focus is the battle, but the tool of study is historical archeology, a unique science that shares a common goal with history, that of understanding the past.

If history turns pages, then archeology turns the ground. Historical archeology, as the name implies, does both. Records and documents are

essential ingredients in historical archeology but no more so than the knowledge gleaned from artifacts left behind by participants in the event. Thus, historical archeologists weave the strands of history with clues painstakingly sifted from the earth to form a fabric unlike that attainable through history or archeology alone.

Our premise is that the modern study of a battlefield requires a combination of historical sources and archeological data. How is this achieved? An analogy may suffice. In solving a crime, police rely upon two very different types of evidence. Detectives interview witnesses while other investigators gather fingerprints, blood samples, and other physical evidence. These investigators address different types of evidence using unique methods. Evaluated together, this partnership enhances the likelihood of solving the crime.

The records and documents that historical archeologists utilize, especially first-hand accounts of historical events, are tantamount to eyewitness testimony. They provide the material for generating hypotheses that can be tested in the archeological record. They also furnish the basis by which archeologically observed patterns can be assigned historically meaningful identities. The archeological record contains historical clues in the form of physical remains, including artifacts, and their contextual relationships. These relationships, which include distributions and spatial associations of various types of artifacts, can reveal a great deal about the activities that were carried out at a site. The historical archeologist continually compares both sets of data as work progresses in order to eventually better explain the events under scrutiny. Sometimes history and archeology may be at odds, necessitating, on occasion, significant revisions in current perceptions of historical events. Thus historical archeology provides important checks and balances between the two data sets, allowing for a more complete approach to understanding historical events and the cultural milieu within which they transpired.

The basic tenet upon which anthropology and archeology rest is straightforward. Human behavior is patterned. The residue of that behavior should therefore also be patterned and reflect, in varying degrees, details of that behavior. Battlefields represent the most violent expressions of human behavior, and it is our premise that physical evidence of violent behavioral patterns are likely to be evident (Fox and Scott 1991). Warfare has special rules by which it is practiced. Within our own culture this may be seen in the preparation and training given members of the military. This training is given, and such was true in 1877, to insure that those engaged in battle will perform

their duties based on their training and respond to orders without dwelling on the consequences (Dyer 1985). That is patterned behavior. While the warriors of the Nez Perce did not have the same training nor did they respond to orders in the same manner as the soldiers, they nevertheless had a culturally established warfare behavioral pattern.

Besides the ability to provide additional details about historical events, historical archeology also has the capability to "identify specific relationships between certain kinds of behavior under the stress of war and the characteristic material by-products of that behavior in their final (archaeological) context of discard" (Gould 1983:134). The means to understanding behavioral relationships in the archeological record is pattern analysis. This archeological tenet argues that artifacts, the leavings of behavioral acts, will occur in recognizable and interpretable patterns.

Battlefields provide a unique opportunity to study the material by-products of human conflict. Gould (1983:105-107) argues that artifacts are signatures of particular kinds of behavior and that behavior can be identified if the relationships between the signatures are studied. Gould (1983:105) makes a significant point that artifacts or physical evidence should be viewed as another form of documentation. Just as the written word or oral testimony can be assessed and analyzed the meaning of artifacts and their context can be understood and interpreted.

Pattern analysis is as old as professional archeology. Patterns reside in the way in which artifacts are found in the ground and the relationship an artifact or a group of artifacts has with other items - context and provenience. South (1978) and Lewis (1984) were among the first historical archeologists to clearly develop a deductive theoretical perspective based on pattern analysis. By way of example, a group of cut nails recovered in association with a structural foundation can provide the archeologist and historical architect with an idea of what kind of structure once stood on the site. Certain sizes of nails were used by carpenters to erect framing, others for siding, lathing, and finish work. The spatial distribution or clustering of the nails is one element of the pattern. Another is the fact that groups of different sizes of nails are present. That carpenters were trained to use certain nail sizes for specific construction sequences is an example of culturally induced behavior. Analysis of the patterns reveals where the structure was placed, how it was built, and suggests what it may have looked like. In addition, other artifacts provide clues to the location of doors and windows, and even to what types of doors and windows were in use. Even more important are the artifacts of daily life. Food refuse, food service, lighting, clothing,

and personal items all reveal something of the personal habits of those who inhabited the structure, the structure's function, the social and economic status of the inhabitants, and how those people viewed their own role and importance within their society.

The analysis of the artifacts recovered in an archeological investigation can take a myriad of forms. It can be simple inductive reasoning or it can be hypothetical and deductive. The process followed here is the deductive approach, based on the development of research questions that guide the recovery of information and the analysis of the data. It is with these conceptual tools that the archeological investigations of Big Hole National Battlefield were developed.

Historical archeology at Big Hole National Battlefield is not new, but by no means have such investigations been frequent. Sporadic efforts at systematic artifact collecting began in the 1950s and continued until the late 1970s. Many of these collecting efforts, particularly those of Don Rickey, Jr., Aubrey Haines, and Kermit Edmonds, were careful and systematic. The information they collected was used to guide this investigation and, because of their precise recording of artifact location, substantially enhanced the data analysis and interpretive potential of this effort.

The opportunity for the current archeological investigation of the battlefield occurred in 1990 when a conversation between Firearms Specialist Dick Harmon and Entertainer Hank Williams, Jr., turned to the techniques and results of the Custer Battlefield Archeological Project. Mr. Williams wanted to know if something of a similar nature could be accomplished at Big Hole. After deliberations with Unit Manager Jock Whitworth and Rocky Mountain Regional Archeologist Adrienne Anderson it was decided to proceed with developing research questions that would guide any field investigations. The questions developed primarily from a desire on the part of battlefield officials to improve interpretive capabilities for the public. A draft research design was developed and sent to all parties concerned for review and comment. Mr. Williams funded the project, and the effort was expanded to complete the Scope of Work and Research Design. Following standard National Park Service requirements and procedures, compliance with the National Historic Preservation Act was achieved with the aid of Marcella Sherfy and Mark Baumler of the Montana State Historic Preservation Office, and Claudia Nissley and Alan Stanfield of the Denver office of the Advisory Council on Historic Preservation.

The Research Objectives

For the past one hundred-plus years, the Battle of the Big Hole has been the subject of diverse opinion. The specific issues surrounding the nature of events during the fight fall squarely into the analytical domain of historical archeology. The goal is to investigate the events of the Big Hole fight as they are represented by the archeological record.

The historical issues surrounding the events of the fight provide the direction in the research. In this regard the major goal is to understand battle events. The specific research objectives, on the other hand, are shaped by the realization that there exists a behavioral relationship between historical events and the physical remains of those events. Therefore, behavior on the battlefield can be understood by exposing these relationships and evaluating them in historical context. The research objectives are designed to do this, and they are varied. Specific research questions were developed for each objective and are enumerated in the project Research Design (Scott 1991). The research objectives subsume the specific questions and are encapsulated in the following discussion.

ARMAMENT: WEAPON TYPES AND NUMBERS

The first objective is to analyze the nature of armament used at the fight. The historical record gives evidence as to what weapons the soldiers used. But the Nez Perce may have been better equipped and could have had more firepower than supposed. Resolution of Nez Perce firepower requires understanding the variety and number of weapons in their hands. Modern firearms identification analysis, such as that used in crime labs, provides the key. Using these procedures, firearm types are determined by identifying ammunition calibers, distinguishing marks on cartridge cases and bullets, and firearm parts. Distinguishing marks, such as those left by firing pins, are indicative of individual firearms, as well as firearm type. By comparing these marks it is possible to ascertain a minimum number of firearms per weapon type, thus providing important new information on the nature of Nez Perce firearms.

CHRONOLOGY OF THE BIG HOLE FIGHT

The second objective is to trace deployments during the battle and account for these in behavioral terms. This issue is of considerable interest to historians and interpreters, since they want the historical interpretations

that are presented to the site's visitors to be as accurate as possible. During the field investigations, the precise locations of cartridge cases and all other artifacts were recorded in order to trace combatant movements and assess the battle developments. Combatant positions can be evaluated on this basis also, but other criteria are also relevant. Positioning is evaluated by observing variations in artifact densities and associations.

Within this overall context a number of specific issues can be addressed by the artifact distributions and spatial patterning of the artifact types. These include location and extent of the Howitzer Capture Area, further clarification of the location and extent of riflepits in the Siege Area, lines of attack, lines of retreat, location and extent of the Nez Perce camp, and extent of the battle area.

CAMPAIGN EQUIPMENT

The Seventh Infantry brought with it to the Big Hole substantial variety in military hardware and personal belongings. A third research objective is directed toward evaluating the equipment of the infantryman on field campaign with respect to what is perceived to be the fully and properly equipped soldier of the time (Chappell 1972).

A RESEARCH FRAMEWORK

Concern with behavioral dynamics is not new in historical archeology, even though battlefield archeology is a relatively new area of study (Fox and Scott 1991). The battlefield model states that individual and unit movements on the battlefield can be reconstructed using pattern-recognition techniques. The model also predicts certain types of behavior will be present and will reflect the culture, training, and organization of the combatant groups. The Big Hole inventory provides an opportunity to objectively test that model and refine it by adding the artillery (the howitzer) and the Nez Perce camp as factors.

The ability to translate artifact patterning into behavioral dynamics, particularly through the use of modern firearms identification procedures, makes an important contribution in this regard. Accordingly, research into the Big Hole fight provides, in addition to new data bearing on the fight, a framework within which the behavioral aspects of many other battles can be studied.

History and Historical Archeology

The accumulation of historical literature pertaining to the Big Hole fight is sizable. Most of the uncertainties in historical perspectives of the fight stem from limitations in the primary historical record. This primary record consists mostly of eyewitness accounts. There is no dearth of testimony available regarding events during the battle. In fact, the Big Hole is one of the best historically documented battles of the Indian Wars. As might be expected, though, these accounts must be critically examined, and historians have long recognized this. The soldier, civilian, and Nez Perce accounts are fairly consistent. However, there are some contradictions and ambiguities between and among participant accounts. The major ambiguity in the testimony seems to lie in the nature of Indian warfare and perhaps all warfare. Regardless of training or cultural affiliations, individuals rarely witness more than a few incidents in a fight. It is thus difficult to piece together various individual testimonies in order to form a coherent account, in our own cultural terms, of the fight's process. With participants who do not speak the English language fluently, even straightforward accounts are subject to interpreter error.

Inconsistencies between accounts is an example of confusion in the historical record. Some individuals may have been participating in their first combat action; thus their memories may have focused on the most memorable event they witnessed. Others were old hands at combat and were perhaps less excited than the recruits, allowing them to remember more details. However, in any situation the individual's personality comes into play as well. Contributing to this is the tendency, in some instances, for testimonies to change over time as memories dimmed. Some accounts were not written down until 30 or more years after the fight, and there may be situations where closely spaced separate events were collapsed into, and recounted as, a single episode. Finally, eyewitnesses, who could not have anticipated the future, generally failed to comment on, or were less than specific about, details that are of interest today.

Contradictions punctuating the historical record cannot be resolved through studies of the historical record alone. The physical evidence and spatial patterning contained in the archeological record should help to resolve some of these issues. It is equally recognized that historical archeology does not represent the "last word" in the study of the Battle of the Big Hole. On the contrary, the work is complementary to history and is a vehicle by which new data can be brought to bear on historical problems. The archeological record is only a new set of data contributing to the study of the battle.

Chapter 2

AN OUTLINE OF THE HISTORY OF THE BATTLE

It is important to have an understanding of the historical events that led to and occurred during the battle. This understanding is necessary to be able to interpret the archeological data in proper context. With the Battle of the Big Hole it is unnecessary to rewrite the battle history, because of the extensive literature base already available. Yet it is important to have a basis for subsequent interpretation of the archeological data. An outline of the events leading to the Big Hole battle, as well as the sequence of the battle as described in the primary sources (Howard 1972; Shields 1889; Beal 1963; Brown 1982) and in the synthetic work of Aubrey Haines (1991), is presented here.

The Nez Perce had agreed, in 1877, to a reduced reservation area as a result of increased Euroamerican settlement of Idaho and Washington. There was disagreement and hard feelings among and between tribal bands and individuals regarding the loss of ancestral lands. Some bands, particularly Joseph's, were reluctant to give up their lands, but they planned to do so. Some Nez Perce bands requested an extension of time for moving to the new reservation due to the need to assemble all their members and associated stock. The government denied the extension, which exacerbated an already tense situation. As anxiety built over preparations for leaving their homeland, a taunt by one or more tribal members over not avenging the death of his father led Wah-Lit-its to act. Wah-Lit-its and two cousins went in search of the white settler responsible for the death. Not finding the settler they raided a number of ranches and homesteads in the Carson's Prairie and Salmon River, Idaho, area, killing several people. This incident created an unalterable cycle of events that led to the open hostilities between the Nez Perce and the U.S. Army.

When the army learned of the raids, a unit of the First Cavalry set off in pursuit of the Nez Perce. Captain David Perry, accompanied by thirteen civilian volunteers and two companies of cavalry, located the Nez Perce camp at White Bird Canyon, Idaho. An early morning peace parley quickly ended in battle when civilian guide Arthur Chapman fired two shots at the Nez Perce. The ensuing fight left thirty-four soldiers dead but only two Nez Perce wounded. The Nez Perce made good their escape.

General O. O. Howard then took personal command of the army units and began a search for the fleeing Nez Perce. The army further exacerbated

the situation by an unprovoked attack on peace advocate Chief Looking Glass's camp. Looking Glass's band lost most of their camp equipage and personal items, but they escaped to join Joseph. The Nez Perce continued to elude the army, although there were several skirmishes. Lieutenant Rains and ten men were attacked and killed on a scout or reconnaissance near Cottonwood, Idaho, and Captain Randall and a volunteer were also attacked with the cost of Randall's life and that of the civilian. Here the first Nez Perce death occurred. Up to this point the Nez Perce had only suffered a few wounded as casualties.

The next major engagement was at the Nez Perce camp on the South Fork of the Clearwater River. Howard employed a force of 400, including a battery of the Fourth Artillery. The Nez Perce were able to form an effective screen with twenty-five warriors that kept the army from crossing the river and gaining the camp. The fighting went on for two days. During the second day the Nez Perce evacuated the camp, leaving behind caches of food and many personal belongings.

Eluding the army again, the non-treaty Nez Perce halted at Weippe Prairie to discuss the next direction to take. The 700 Nez Perce, represented by their Chiefs and spokesmen, decided to go to Montana and join their friends, the Crow.

Following the Lolo Trail across the mountains the Nez Perce began their trek into Montana. Word of the fights and the Nez Perce flight reached Montana before they arrived. Captain Charles Rawn, Seventh Infantry, commanding a detail to build a new army post at Missoula, headed a combined force of Bitterroot and Missoula Valley volunteers, a few friendly Indians, and about 30 soldiers to a point on Lolo Creek about 23 miles east of Lolo Pass. Rawn, with his few men, threw up a line of log and earth breastworks and a few riflepits across a narrow portion of the trail leading into Montana. Reinforced by additional volunteers to about 216 effectives, Rawn hoped to halt the Nez Perce flight. After several unproductive meetings the Nez Perce, using their knowledge of the local terrain, on July 28 passed around the barricade, which then became known as Fort Fizzle. The Nez Perce once again made good their escape.

The Nez Perce made their way into Montana and continued on their trek to find the Crow. Passing through the area of Stevensville and along Rye Creek they raided a few homes, traded with some individuals, and may have even purchased ammunition. In the meantime, Colonel John Gibbon (Figure 1) began to assemble his scattered Seventh Infantry. Gibbon, commanding

Figure 1 Colonel John Gibbon, army commander at the Battle of the Big Hole.

the District of Montana, pulled his understrength companies from their scattered posts. They reached Missoula August 3 and left for the field the next day.

Lieutenant James Bradley scouted ahead of the slow moving column, which was impeded by supply wagons traveling over a rough road. Bradley and his detachment located the Nez Perce camped along the North Fork of the Big Hole River and sent a courier back to Gibbon. Bradley waited throughout the day of August 8, watching the Nez Perce camp.

Gibbon's column, minus the wagons and a guard left about three and one-half miles from the battlefield, found Bradley late in the afternoon of August 8. At eleven o'clock that night the command of seventeen officers, 132 enlisted men, and thirty-four volunteers started down the mountain toward the village in the valley. Each man carried ninety rounds of ammunition, probably fifty in a cartridge belt and an additional forty rounds in two twenty-round boxes in his haversack.

Gibbon moved his men along an old trail down into the valley (Figure 2). Passing over a wooded point of land (an old alluvial fan), Gibbon noted it as a good defense point should a retrograde movement become necessary. In hindsight this was a wise observation, as it would become known as the Siege Area to history. Gibbon passed on north of the fan and deployed his men along the Trail, which is situated on a steep hillside above the swampy willow-covered land west of the river. The Nez Perce Village was arrayed in a slightly V-shaped line along the east side of the river in a camas meadow (Figures 3, 4).

Gibbon found his command in a good position. Some Nez Perce horses were grazing on the hillside behind his position and to the north. The soldiers effectively separated the camp from those horses. About four o'clock in the morning of August 9, the order was given for two companies and the volunteers with Lt. Bradley's detachment to advance through the willow swamp to the edge of the Village.

Bradley was on the north or left flank. He is thought to have crossed the river and then entered dense willows that continued to the edge of the Village. Captain James Sanno with Company K was on Bradley's right. Captain Richard Comba with Company D was to the right of Company K, but due to a meander in the river channel was in the Willows across the river from the Village. The plan was to charge the Village at daylight. However, a lone Nez Perce was seen coming out of the Village and moving toward Bradley's de-

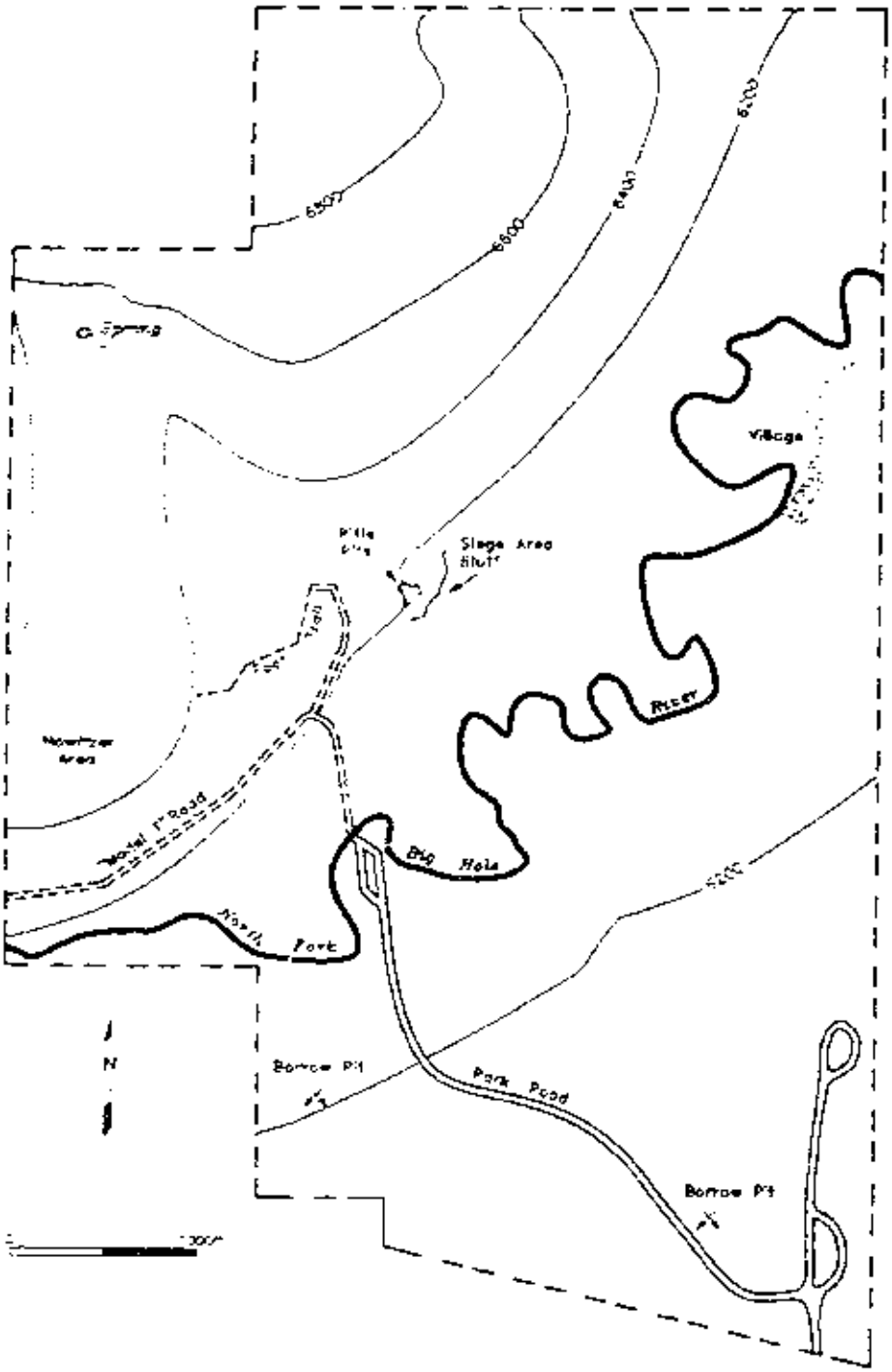


Figure 2. Map of the Big Hole National Battlefield showing the main topographic and historic features.

Figure 3. A view to the northwest of the valley and village area.

tachment. One or more volunteers fired, killing the individual, which opened the battle.

The Nez Perce killed was Wetistokaith or Natalekin, an old, nearly blind man, on his way to tend his horses. At the first shots Comba's Company D on the right flank stopped about 75 feet from the river and delivered volley fire low into the tepees. Captain Comba then ordered his men to charge across the river and into the Village, near its southern end.

At nearly the same time Company K, in the center, also charged and entered the camp. Sanno's men also apparently fired into the tepees during their charge. The tepee nearest their line was a maternity tepee where the bodies of a young woman and an older woman acting as midwife were found.

The Nez Perce were surprised and initially confused. Many men grabbed their arms and, moving to the north, south, and east, found refuge in the Willows, along river meanders, and on the terraces east of the camp. Women and children did the same. Some Nez Perce, reportedly mostly women and children, ran across the meadow to the terraces to the east of the Village. The warriors quickly returned fire from their cover.

Figure 4. A Nez Perce tepee village taken in 1871 by W. H. Jackson. The general configuration approximates that at the Big Hole.

Company D experienced fire from two warriors to their south. Wah-Lit-its (the same man who had started the raiding in July) found cover in a low spot behind a log. Yellow Wolf reported Wah-Lit-its fired, killing a soldier, and then was killed himself. His wife next took up his rifle and was shortly killed.

Bradley's men also apparently fired volleys into the northern end of the Village. As they made their way through the willows after crossing the river, Bradley was killed along with a volunteer. With the loss of their leader the men formed a firing line at the edge of the Willows. The historic accounts suggest they did not gain the north end of the Village, which was still held by the Nez Perce. The left flank broke up and joined Captain Sanno's company as they attempted to burn the tepees.

Although the attack was initially successful in taking most of the Village, the soldiers were still under fire from the Nez Perce. Gibbon committed his reserves. Companies A, F, and I are believed to have been sent in on the right flank or southern end of the Village to support Captain Comba. Captain George Browning with Company G apparently supported Sanno. Browning also made a move to attack the Nez Perce on the bluffs to the east, but was recalled.

Gibbon left his command position along the western hillside and rode into the Village. There he and his horse were wounded by the same bullet. In order to deprive the Nez Perce of shelter and other amenities, the command attempted to burn the tepees. The army's assumption was that without horses and shelter the Nez Perce would be destitute and would return to the reservation a humbled group.

Several women and children were hiding in the tepees, and a great loss of life occurred. Even while the burning was going on, the Nez Perce continued to fire on the soldiers. Gibbon's command suffered several casualties, most in the fighting near the southern end of the Village. Captain William Logan was among the soldiers killed. The Nez Perce also continued to suffer losses in the firefight. One killed was Five Fogs, whose tepee was the Village's southern extreme. Here he defended his home with a bow and arrows until cut down by a soldier's bullet.

The Nez Perce, rallied by the exhortations of their leaders like Looking Glass, poured heavy fire into the village. Within an hour, Gibbon realized his position in the village was untenable. The command was ordered to fall back across the river and through the Willows to the timber-covered point of land (Figure 5). The command gathered the guns of the fallen and the captured weapons. The stocks were broken and then thrown into the river. As the demoralized command began to retreat, the Nez Perce warriors pressed the battle. The soldiers bunched up, causing a halting retreat. At least one Nez Perce marksman took up position at a location that has become known as the Twin Trees. The Twin Trees are located on the steep hillside above

Figure 5. The point of timbers at the base of the mountain that became the Siege Area for Gibbon's command.

the Trail originally followed by Gibbon and near where the horses were grazing. This marksman harassed the retreat from the Village and through the Willows until Gibbon had two of his marksman return the fire. The soldiers, attempting to find the range (about 500 yards) walked their shots up the hill until the fire was effective. The warrior fell and rolled to the base of the hill.

There was some hand-to-hand fighting along the retreat and several more soldiers were killed. Several Nez Perce warriors were killed or wounded, including one named Rainbow. The retreat became somewhat chaotic, even though Captain Rawn's Company I covered the retreat, and one man was lost along the way.

As the command reached the old alluvial fan, several Nez Perce were already there and began to fire. The soldiers charged up the fan's steep toe and pushed the Nez Perce across the gulch that dissected the fan and up the hills on either side of the fan. Upon reaching the fan, Gibbon deployed his men in an area about 100 feet on a side near the eastern edge

of the tan. As some men began dragging in logs to form firing positions, the men of Companies A and I, issued trowel bayonets, began to dig riflepits (Figure 8). Others used knives and makeshift tools to create cover. The Nez Perce in the timber on the south side of the tan as well as on the hills to the west above the soldiers continued their fire.

The Indian fire into the Siege Area caused some casualties. Lieutenant Woodruff's horse was used to carry a wounded soldier in the retreat. He was killed upon reaching the tan and the horse was wounded. It had to be destroyed. Lieutenant William English was badly wounded, dying later.

About 9:00 a.m. a howitzer was heard while the men were digging in at the Siege Area. This was a 12-lb. Mountain Howitzer mounted on a Prairie carriage and drawn by six mules. The howitzer was following the command, guided by a civilian scout. The gun was crewed by six quickly trained infantrymen, only one of whom had any artillery experience.

When the howitzer and crew arrived at the scene it was set up above the Trail followed by Gibbon. It was well south of the Village and high on a

Figure 8. A rifleman firing by one of Gibbon's command during the fighting in the Siege Area.

timbered slope. The Nez Perce, probably alerted to gun's presence by its first discharge, assaulted its location. The gun crew fired two shots, apparently at the Village, before they were overrun. One crewman was killed and two were wounded. The survivors fled back to the wagon train.

The Nez Perce dismounted the gun's wheels and rolled them down the hill. The limber ammunition was scattered, the tube hidden in some brush or buried, the rammer and sponge carried off, and the carriage wrecked.

Also in the vicinity, either near the howitzer or possibly lower on the slope and along the Dry Creek Trail was William Woodcock, a black servant of Lieutenant Joshua Jacobs and civilian guide Joseph Blodgett. Woodcock and Blodgett were leading a mule with 2,000 rounds of extra ammunition for the soldiers. They lost the mule and its ammunition to the Nez Perce. They escaped, but the Nez Perce gained a substantial resupply of ammunition for the captured soldiers' guns.

After the howitzer incident, the Nez Perce continued the attack on the Siege Area. A well-known warrior, Sarpsis, was mortally wounded west of Battle Gulch. Several other warriors were wounded trying to recover his body. After several attempts, it was successfully recovered under intense fire from the soldiers.

Five Wounds was at or near the Siege Area when he learned that his war mate Rainbow had been killed. A pledge to die on the same day had to be honored, and Five Wounds took a partially loaded magazine rifle and rushed up the mouth of Battle Gulch. He nearly gained the lip of the gulch when he was cut down in a hail of bullets. His body was not recovered by the Nez Perce; it was later mutilated by Howard's Bannock scouts.

The Nez Perce essentially surrounded the riflepits. They fired from the timber to the east and west of the entrenchments as well as from the hillsides to the north and west. Some warriors in a group of pines south of the entrenchments and opposite the mouth of Battle Gulch were able to direct their fire very effectively. From the heights of the hill to the north of the riflepits the warriors used trees as cover to fire at the soldiers and volunteers. From one of these positions, gunfire mortally wounded Lt. English and killed at least one other man.

During the late afternoon the warriors fired the grass west of the entrenchments hoping the east-blowing breeze would cause the smoke to drive the soldiers out of their riflepits. But the grass was too green to burn effectively, and soon the fire had burned itself out.

While some of the warriors were engaged in fighting the entrenched soldiers, others returned to the Village. The surviving women and children also returned. There they found their dead and dying. Among their own dead they also found a soldier and a volunteer alive. Both were killed, but not mutilated.

The Nez Perce began to mourn and bury their dead. Some were apparently buried in camas ovens that had been prepared for roasting the locally abundant camas root. Others were buried along the river bank, and still others were carried away and buried by their surviving family. As the dead were buried the Nez Perce attempted to salvage what they could from the Village.

During the night of August 9, the Nez Perce warriors continued to fire harassing shots at the soldiers. The main body in the camp packed what belongings they could find and prepared to depart. With the sunrise the camp and most of the people left the valley, departing to the east. A few warriors, perhaps fifteen, were left behind to keep the soldiers at bay. They did so until about eleven o'clock the night of August 10, when they fired a departing volley and left.

These warriors joined their grieving families on a trek that would take them on a route south into Idaho and then east through Yellowstone National Park and two months later to the final battle on Snake Creek near Bear Paw, Montana. There the majority of the surviving Nez Perce, now under the general leadership of Chief Joseph would surrender on October 5, and close the Nez Perce War.

The night of August 9 was not a quiet one for the soldiers. Since they were fatigued, wet from two crossings of the river and swamp, nearly out of food, and thirsty it was a difficult situation for them. And the situation was exacerbated by the harassing fire of the few warriors left. Gibbon did call for volunteers to get water, which was done. He also sent three volunteer couriers out with messages. One was to Deer Lodge with messages to his commander's headquarters, a second to General O. O. Howard requesting his assistance, and a third to the miners in the vicinity of Gibbonville, Idaho, to warn them that the Nez Perce may move their direction.

The early daylight hours of August 10 saw the arrival of the first of the soldiers' relief. A messenger from General Howard arrived stating Howard was on his way with 200 cavalry. This message was in response to Gibbon's of August 6, requesting Howard's support in the upcoming attack on the Nez Perce. During the day Gibbon sent a detachment back to the wagon train to

bring forward supplies. They arrived late in the day and were parked in or near the Siege Area. Howard's cavalry and later Howard himself with the remainder of his command arrived at the Big Hole on the morning of August 11, effecting the relief of Gibbon's command after the Nez Perce had departed.

Among the survivors of Gibbon's command were thirty-nine wounded (five officers, thirty enlisted men, and four civilians). Two wounded, Lt. English and one non-comissioned officer, would die later. The dead on the field totaled 29 (two officers, one post guide, five volunteers, and twenty-one enlisted men). The actual Nez Perce count of wounded and dead is unknown (Figures 7, 8). Between eighty and ninety are believed to have been killed, with at least two-thirds of those women and children.

The number of dead and wounded was a destructive blow to the Nez Perce. Coupled with the loss of horses as well as personal items in this and earlier battles, they were crippled and nearly destitute. Nonetheless, they did manage to continue to elude the army for nearly two more months.

Figure 7. Sketch of the battlefield in 1877 by Granville Stuart.

Figure 8. Another nineteenth century battlefield sketch purportedly by Granville Stuart.

Chapter 3

GATHERING THE EVIDENCE

Aubrey Haines (1991) recognized that both Nez Perce and soldier testimony provided essential information for understanding how the Battle of the Big Hole was played out. He also recognized limitations and ambiguities in Nez Perce and soldier accounts. Foreshadowing these investigations, Haines' artifact collecting efforts and those of others (White n.d.; Rickey 1959; Edmonds 1964; Pouliot 1962) showed that artifact concentrations indicated combatant positions, and that distributions of artifacts suggested the routes of adversaries (Figure 9). Gathering the physical evidence for the present study required two separate elements. First was the consolidation of previous collecting efforts, and second was the systematic metal-detecting inventory and artifact collection of the battlefield.

Consolidation and Synthesis of Previous Study Efforts

The Battle of the Big Hole produced uncounted pieces of debris, cartridge cases, and bullets that were left behind on the site. These artifacts have been the focus of relic and souvenir collectors for over a century. George Shields (1889:102-103) noted that "thousands of empty cartridge-shells still lie scattered over the field, though it is said that thousands more have been carried away by relic hunters or trampled into the earth." Shields may be correct, but the archeological project and the systematic collecting efforts that preceded it have shown that much has remained in the ground in good context.

Thain White (n.d.) was one of the more active early relic collectors who has left accounts of his activities. He began his efforts as a young boy in 1926, continuing them until the 1960s. White concentrated his efforts in the Indian Camp and the Siege Area. In the late 1950s and early 1960s he began utilizing a metal detector with very good results.

White located hundreds of cartridge cases and bullets during his forays onto the battlefield. He also recovered, or was given by others, relic firearms, personal items, and accouterments. White made a very solid attempt to document his finds in a written report, which included a description of the

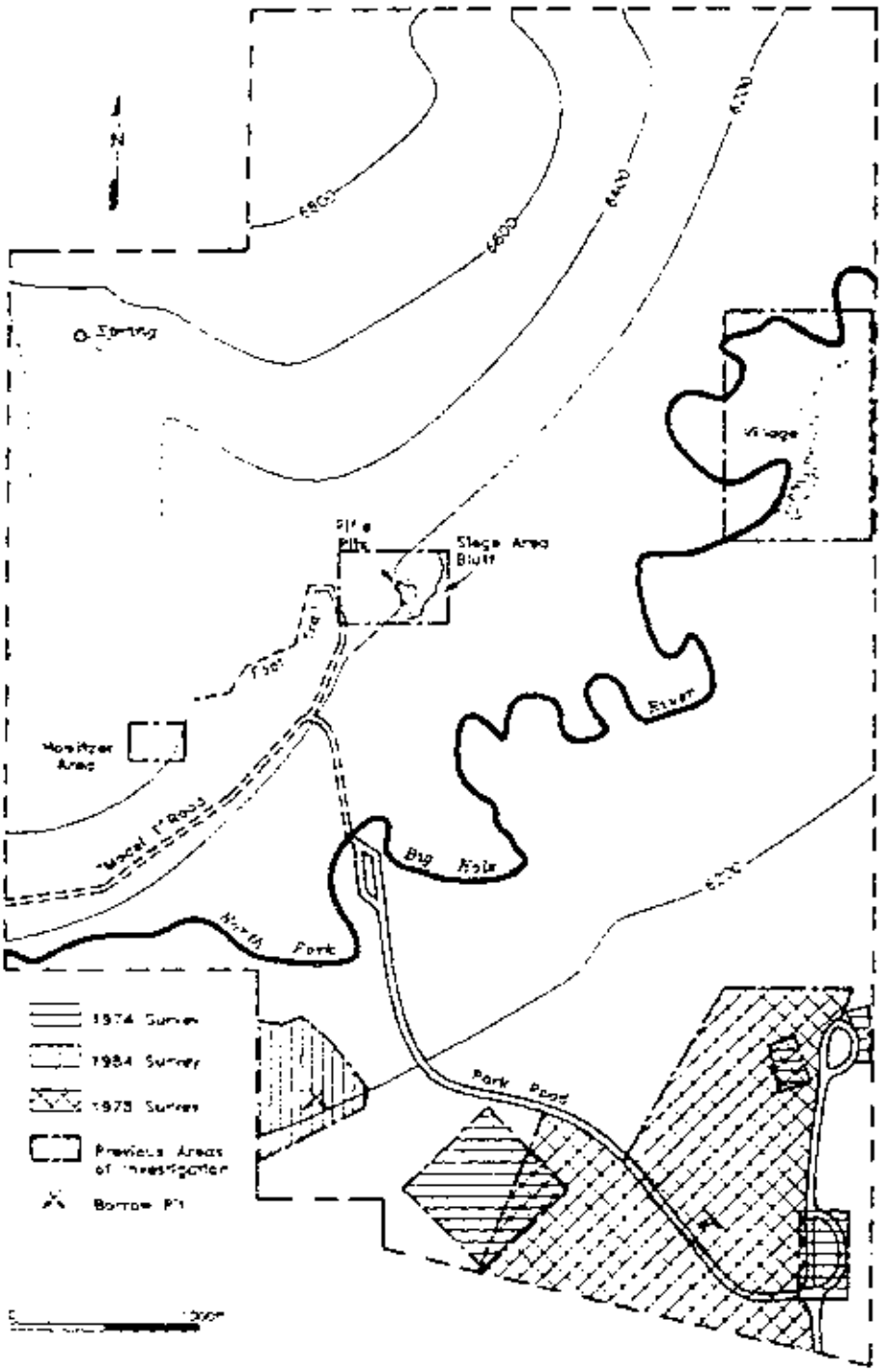


Figure 2. Big Hole National Battlefield with areas of previous archeological investigations noted.

items, photographs of the general find areas, general descriptions of the find sites, and interpretations of the significance of the finds. Although undated, the report may have been completed in 1961 or 1962, based on a dated addendum by Gordon Pouliot, another collector. White completed a number of other reports on his collecting activities at other historic battlefields, many of which are on file at Big Hole National Battlefield.

During the same era National Park Service Regional Historian Merrill Mattes requested that Custer Battlefield Historian Don Rickey, Jr., visit Big Hole and conduct a metal-detecting test of selected areas where he located the probable site of the Company K firing line at the edge of the Willows. Rickey (1959) arrived at Big Hole in mid-July. He conducted a limited metal-detecting inventory in the Siege Area, the Nez Perce Village, and in the Willows adjacent to the Village. Rickey recovered a number of cartridge cases and bullets. He also found a brass army spur and a brass buckle from an 1876-pattern cartridge belt in the riflepits in the Siege Area.

Rickey had the foresight to stake the locations of his finds and draw a sketch map of the battlefield and find locations. This information was later incorporated into an archeological base map developed by Aubrey Haines. Following Rickey, another private citizen, C. W. (Bill) Judge, metal-detected in the village area. According to Acting Site Manager Jack A. Williams (1961), Mr. Judge found thirteen .45/70 cartridge cases along the river and in the Willows adjacent to the Village. Judge also found a brass thimble with a hole punched in the end for suspension and a brass open-frame belt buckle. Williams provided a sketch map with a rough location of Judge's finds.

Aubrey Haines (1961), acting superintendent for two years of the Big Hole National Battlefield, reported finding the remains of a blacksmith shop in the Indian Camp area. The shop is assumed to date to the post-battle homesteading period. He documented the find in a report to Headquarters in Yellowstone.

Aubrey Haines (1966a) then set himself about the task of correlating the previous find sites and the artifacts. Edmonds (1964) reports that Aubrey Haines made attempts to recover battle-related artifacts in a systematic way between 1959 and 1964. Haines and others used detectors to recover battle-related artifacts, marking the discovery sites with stakes, nails, and bolts bearing stamped field numbers or affixed numbered aluminum tags. In 1964, Haines established a 50-foot-square and a 100-foot-square grid system over portions of the Big Hole Battlefield site. Datum points were set in concrete and marked for future reference. About this time Edmonds (1964) constructed a master

list of artifact finds based on the previous records and on the finds he made during his tenure as a seasonal historian. Edmonds also completed a descriptive report on his work, including a description of the artifacts that had been collected.

Haines' surveying skills were used to excellent advantage as he developed a base map of all finds. Each find site was numbered with a corresponding artifact collection catalog number. Haines also plotted a number of other natural and cultural features. His map included the locations of trees and tree stumps used in the fight as shelter by various individuals, riflepit locations, modern walkways and features, and L. V. McWhorter's locations of individuals killed as well as tepee locations gathered during site visits with surviving Nez Perce.

Haines' map with all the relevant information gathered from most of the previous collecting efforts is a milestone. It, too, showed significant insight into the need to gather and protect artifact distribution pattern information. Haines utilized the data in developing his history of the battle (1991). The map was a primary resource used in planning and executing the archeological investigation.

In 1972 Seasonal Historian Kermit Edmonds wrote a memorandum to David Stinson, Management Assistant, regarding his concerns about river-caused erosion. Mr. Edmonds noted that each spring the North Fork of the Big Hole River cut into the river banks, causing erosion and slumping. This resulted in the loss of some elements and artifacts related to the Nez Perce Village. He also was concerned that the river had shifted its channel at the north end of the Village and cut off a spit of land containing artifacts relating to a significant episode in the battle. Edmonds found a number of artifacts eroding from the river bank after the channel cut off the meander. Among the items was an iron skillet or pan probably associated with the Village occupation. Edmonds believed the change had destroyed some potential tepee sites and caused the loss of artifacts.

Another remarkable piece of foresight and management acumen was demonstrated when Joseph Baker (1980) reported on the replacement of various interpretive markers in the Siege Area. Baker conducted informal but well-planned excavations around each of the interpretive marker sites as a prelude to their placement. The excavations were aimed at recovering any battle relics that might be disturbed. Unfortunately no artifacts were recovered. However, Baker did note several locales where decayed wood was found. He believed these may have been rotted logs that once sheltered and pro-

tected Nez Perce warriors and civilian volunteer fighters during the battle. He suggested more formal investigations might prove or disprove his supposition. Baker also recorded the stratigraphic profile in the holes he dug. He noted the uppermost layer was composed of a sandy clay/loam mixed with forest humus. This was underlain by a strata of yellow/orange clay mixed with alluvial and colluvial till. Baker's observations were astute, as this is essentially the sequence found during the archeological investigations.

The first systematic inventory by a professional archeologist was completed in 1974 by Midwest Center Archeologist Robert Nickel (Calabrese 1974), when four small areas under consideration for sewage treatment facilities were surveyed (Figure 9). In 1978, Midwest Center Archeologists Tom Lincoln and Mark Guthrie (Lincoln 1978) conducted a pre-construction inventory of the Ruby Bench area. No archeological resources were located in either survey.

In 1984 Ann Johnson of the Rocky Mountain Regional Office conducted an inventory for a proposed land exchange (Johnson 1986), and in 1987 Scott (1987) conducted proton magnetometer studies of selected areas of the Indian Camp and the Siege Area. The magnetometer survey suggested that tepee sites and buried riflepits are ephemeral features that do not produce sufficiently unique magnetic signatures to be identified with this technique.

Interestingly enough, only one item of prehistoric age has been found at the battle site. This artifact is a projectile point (Haines 1966b:5-6). Haines found the point in May 1962 during some maintenance work. The small point is a tan chert with a triangular shape. It is typical of the Late Prehistoric period. An extensive effort was made to locate any evidence of prehistoric occupation during the archeological inventory. Milo McLeod (personal communication to Douglas Scott August 13, 1991) had observed some stone debitage in the vicinity of the Soldier Monument several years ago. Unfortunately, visitor and other activities have destroyed or obliterated the evidence noted. No evidence of prehistoric activities was noted during the archeological project.

Archeological Project Methods

Haines and the other researchers did not have the luxury of examining the entire battlefield area, nor did they have the analytical techniques now available. Their efforts were concentrated on the Siege Area, Howitzer

Area and the Nez Perce Village Area. As they recognized, it is not enough to know where artifacts were found, but also where artifacts were not found. A primary research goal of the Big Hole Battlefield Archeological Project was to define the limits of the battlefield. The first requirement, then, was to develop field procedures that were capable of examining the entire extent of the battlefield or at least that area within the park boundary. Faced with examining a large area (655 acres total), and assuming that most artifacts of war would either be metallic or associated with metal, metal detectors were employed as an inventory tool based on the success of the technique at Little Bighorn Battlefield National Monument (Scott and Fox 1987; Scott et al. 1989).

The use of metal detectors operated by knowledgeable people has overwhelmingly proven its value, not only in locating metallic objects but also non-metallic remains. Non-metallic items such as bone and leather were found when metal detectors sensed nearby metal objects. Recovery methods that meticulously uncovered artifacts with minimal disturbance were an integral part of the field procedures.

The metal detector survey and excavations located over 1,000 artifacts, most of which are battle-related. Precise locational control was accomplished through the use of a total station transit and electronic data collector. The instrument was a Lietz SET3C total station transit with an SDR33 data recorder. Each transit shot was recorded on the data recorder and given a previously established identification code. The specific artifact number was provided by the SDR33 used in auto-generate point mode. At the completion of a given day's work the recorded data was downloaded onto a laptop computer containing the SOKKIA software program MAP. The raw file was processed by the computer, and a map of that day's finds was then displayed. Upon return to Midwest Archeological Center the MAP files were transferred to AutoCAD. The maps provided a clear picture of the nature of artifact distributions and associations. In turn, this precise locational information allowed us to ask how and why these contextual relationships between artifacts came about. The how and why questions represent inquiry into the behavioral aspects of the fight.

FIELD METHODS

The field investigations were guided by a work plan and research design (Scott 1991) prepared as a part of the compliance procedures used by the National Park Service to meet legislative and regulatory requirements of the Historic Preservation Act (as amended), the Secretary of Interior's Stan-

dards for Archeology and Historic Preservation, and the Park Service's own internal cultural resource preservation guidelines.

The fieldwork consisted of two phases: (1) the inventory phase, and (2) the testing phase. During the inventory phase we employed electronic metal detectors, visual survey methods, and piece-plot recording techniques. The testing phase consisted of test units excavated at specific locations in the Siege Area and the Indian Camp. Details of each phase are explained below. Procedures generally relevant to all phases follow.

General Procedures

Standard archeological data-recording methods were used in both phases of the fieldwork. Individual artifacts, spatially discrete clusters of identical specimens, or associated dissimilar specimens received unique Field Specimen (FS) numbers. We used field notes and standardized Midwest Archeological Center excavation forms to record the tests. Exposed excavations, selected in-place artifact specimens, and topography were photographed and recorded in black-and-white print and color slide film. Many crew activities, some excavations, and some artifact discoveries were also recorded on videotape by the park staff.

During the summer of 1992 an area of the dense willows was burned as part of a vegetative management plan. Kermit Edmonds and Don Johnson, seasonal interpreters and project participants, detected the burned area. They recovered a horseshoe, a silver-plated spoon, and eight cartridge cases. These specimens were numbered 92-1 through 10. The objects are included in the artifacts description and analysis.

Inventory Phase

The inventory phase included three sequential operations: survey, recovery, and recording. During survey we located and marked artifact finds. The recovery crew followed and carefully uncovered subsurface finds, leaving them in place. The recording team then plotted individual artifact locations, assigned field specimen numbers, and collected the specimens. Underwater research in the river uniquely combined survey with recovery and recording activities.

Survey. Survey operations were designed primarily 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 sur-

vey. The survey crew consisted of a crew chief, metal detector operators, and visual inspectors. We maintained continuity in survey operations by utilizing the same volunteer crew chief for the project's duration.

We used various brands of metal detectors during the survey. Volunteer operators furnished their own machines, and this contributed to the variety. The standardization of machines (i.e., all one brand), though perhaps methodologically desirable, was 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 10- to 15-ft intervals. The operators walked transects oriented to cardinal directions or, when necessary, by topographic feature orientation, maintaining, as closely as possible, the designated intervals. Orientation and interval spacing were maintained by direction from the crew chief. Deviations in spacing were unavoidable in rough terrain. The daily composition of the detector crew ranged from five to eight operators.

Detector operators proceeded in line (Figure 10), using a sweeping motion to examine the ground. We estimate that each operator covered a sweep of five and three-fourths to six and one-half feet depending on individual height and technique. Another volunteer placed a pinflag 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 occasionally necessary because of the sophisticated nuances of interpreting machine functions, such as depth readings, metallic object type-differentiation functions, object size interpretation, and pinpointing of subsurface objects. The usual procedure was to mark the location and leave it intact for the recovery crew.

The visual inspectors walked behind the detector operators and served a dual function. They inspected the ground surface for artifacts and features while carrying pinflags. When an operator discovered a location, an inspector moved to pin that location. The number of visual inspectors largely depended on the number of people available each day, varying from two to four. Visual inspectors were on the alert primarily for nonmetallic artifacts, such as bone, wood, glass, stone, or cultural features such as fire-altered rock.

Recovery. The recovery crew excavated artifact locations marked by pinflags and left the artifacts in place for recording. The team consisted of excavators and metal detector operators, the number of operators and excavators varying from day to day depending on the workload.

Figure 10. Metal detector line working in the Willows.

Excavation procedure was 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, were considered of primary importance. We therefore excavated with great care so as to expose each artifact without disturbance. To this end every recovery crew member was thoroughly briefed on artifact patterning and the need for exposing artifacts in place. Techniques for doing so were also demonstrated.

We used hand tools, such as spades, trowels, and dental picks, 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. In some instances accidental disturbance of the artifact occurred. Information to that effect was left at the artifact location to alert the recording crew. Artifacts were rarely found at depths that exceeded six inches.

Certain provisions were made for discontinuing excavation at an artifact location. Recovery team members were briefed on these provisions. We required that excavation cease at any location where bone, leather,

wood, or other sensitive or perishable artifacts were encountered when a metal object was being exposed.

After exposure the pinflag was left upright at the location to signal the recording crew. On some occasions the recording crew lagged behind the recovery team, and it was impossible to record and collect the exposed artifacts before the end of the workday. In these instances we assigned a temporary alpha or numeric designation to the artifact and respective pinflag. We then recorded the provenience, bagged the artifact, and placed it with the collection for security purposes. The following day the specimen position was recorded.

Recording. The recording crew assigned field specimen numbers, recorded artifact proveniences, and collected the specimens. Recorders backfilled artifact-location holes upon completion. The crew consisted of an instrument operator, a rod person, and one or two recorders. Artifacts were assigned sequential field specimen numbers beginning at 1000. Records were coded in the SDR33 data collector and a hand-written field specimen catalog was also kept as a backup. The locational and catalog information was transferred from the SDR33 to a laptop computer daily.

Each artifact marked by a pinflag was piece-plotted as follows. The instrument was set up at an established datum point. Distance, azimuth, and coordinate point readings for each artifact location were recorded electronically. Distance was read to the nearest one-thousandth of a foot as well as the north and east coordinate. The instrument operator transmitted this information to the recorders by portable two-way radio or by unaided voice. Recorders identified the artifact to the instrument operator who entered the appropriate artifact code in the SDR33. The recorders also entered the information in the catalog, and noted the depth of the artifact and its orientation to the cardinal directions and declination from the horizontal. This information was used to determine bullet trajectories and fields of fire. Orientation and declination were not recorded for surface specimens. For certain types of artifacts this information either was not determinable or was considered superfluous to patterning studies. Examples were nails, buttons, suspender clips, coins, horse trappings, leather goods, cans, and amorphous metal fragments. In the main, orientation and declination were important considerations in recording projectiles (e.g., bullets and metal projectile points) and cartridge cases.

Underwater Investigations. The historical documentation indicated that both the army units and the Nez Perce utilized the river. Both combatants

crossed the river during the course of the fight, and the army disposed of some firearms by throwing them in the river during their retreat from the Village. Two detector operators were chest waders and walked the river from near its juncture with the park's eastern boundary to the southern end of the Village site. They detected the river's course for metallic objects (Figure 11).

Two archeologists accompanied the operators and, using diving masks and snorkels, excavated each of the targets found in the river. Most of the metallic debris was related to modern-era recreational fishing activities. However, a few period cartridge cases were found and recovered. The locations were flagged and the targets recovered and cataloged according to the procedures followed on land.

Testing Phase

Test units were all three-by-three-foot excavations or an eighteen-inch-wide, eight-foot-long trench for the rifle pit. All test unit locations were recorded with the total station transit and backfilled upon completion of investigations. Crew members involved in excavations and other tests were supervised by an archeologist at all times.

Figure 11. Metal detecting and artifact recovery in the river.

Before excavations commenced at any unit, we inspected the surface visually and subjected the unit to metal detection. Each unit was excavated with hand tools after vegetation and sod had been removed with skimming shovels. All soil from the excavations was screened through one-quarter-inch hardware cloth as it was removed from the excavation unit. Artifacts were left in place as they were found. Field notes were taken during the excavation, appropriate excavation forms were filled out, photographs were taken, and the excavation was mapped.

LABORATORY METHODS

The methods employed in cleaning the 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. Most cartridge cases that were subjected to firearms identification procedures required a treatment in dilute glycolic acid to remove oxides that had built up on them during the years they were in the ground. After it was cleaned and stabilized, each artifact was rebagged in a self-sealing, inert, clear plastic bag with its appropriate FS number on the bag. The artifacts were then 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. For example, all the cartridge cases were placed together and then subsorted into their respective types, such as .45/70-caliber Springfield rifle cases or .44-caliber Henry rimfire cartridge cases. Some artifacts were sorted to even more discrete levels if warranted, such as the .44-caliber Henry cases into long and short cases, headstamped and not headstamped, and paired firing pin marks and multiple pairs of firing pin marks. Sorting and identification of the artifacts were undertaken by personnel experienced with artifacts of this period, who compared the artifacts with type collections and with standard reference materials. The pertinent reference material is cited in the discussion of the particular artifact.

Selected artifacts, the firearm, the trowel bayonet, and some belt knives, were treated in an electrolysis bath. The bath removed the oxidation from the metal. Once the oxidation was removed, the metal was washed in distilled water, dried, and coated with a clear microcrystalline wax. Leather items were stabilized using Lexol leather treatment. All artifacts were cataloged in accordance with the National Park Service Automated National Cataloging System requirements.

At the time of this writing, the artifacts and original supporting notes, records, and other documentation are held at the National Park Service's Midwest Archeological Center. The artifacts will be returned to Big Hole National Battlefield for their collection, display, and use in further scientific research when the park requests.

Firearms Identification Procedures

The comparative study of ammunition components is known as firearms identification analysis. Firearms, in their discharge, leave behind distinctive metallic fingerprints or signatures on the ammunition components. These signatures, called class characteristics, allow the determination of the type of firearm (i.e., model or brand) in which a given cartridge case or bullet was fired. This then allows determination of the number of different types of guns used in a given situation.

Further, they allow the identification of individual weapons by comparing the unique qualities of firearm signatures, called individual characteristics. This capability is very important because, coupled with the precise artifact locations, identical signatures can be used to identify specific combat areas. This can be done with cartridge cases and bullets even though the actual weapons are not in hand. With this information, patterns of movement can be established and sequences of activity can be more precisely interpreted.

The means to this end is reasonably simple in concept. When a cartridge weapon is fired, the firing pin strikes the primer contained in the cartridge, leaving a distinctive imprint on the case. The primer ignites the powder, thus forcing the bullet down the barrel. The rifling in the barrel imprints the lands and grooves on the bullet in mirror image. The extractor also imprints the spent case as it is removed (extracted) from the gun's chamber. These imprints are called individual characteristics. Individual characteristics are also present on projectiles fired from muzzle-loading firearms like flintlocks and percussion weapons, even smooth-bored guns.

Law enforcement agencies have long used the investigative technique of firearms identification as an aid in solving crimes. Two methods commonly used by police departments include comparisons of bullets and cartridge cases (Harris 1980; Hatcher, Jury, and Weller 1977) to identify weapon types from which they were fired. Police are routinely successful in matching bullets and/or cartridge case individual characteristics to the crime weapon simply by demonstrating that the firing pin, extractor marks, or the land and groove marks could only have been made by a certain weapon. In the event that weapons

used in a crime are not recovered, police can say with certainty, on the basis of the individual characteristics from recovered bullets and cases, that specific types and numbers of weapons were used.

The comparison microscope is critical to the analysis of ammunition. Simply, the microscope is constructed so that two separate microscope tubes are joined by a bridge, with prisms mounted over the tubes. Two separate images are transmitted to the center of the bridge, where another set of prisms transmit the images to central eyepieces. The eyepieces are divided so that each image appears on one half of the eyepieces. Movable stages allow the objects under scrutiny to be manipulated so that they can be directly compared for class and individual characteristics.

All cartridges, cartridge cases, bullets, and other ammunition components were analyzed utilizing these firearms identification procedures. The specific results of the analyses are discussed in Chapter 7.

Chapter 4

TEST EXCAVATIONS

The research design identified test excavations to be undertaken in two separate areas. The Village was slated for one set of excavations to ascertain if tepee sites could be identified archeologically. The tests were to also determine if the tepee sites had any internal structure or pattern, and they were to determine if later agricultural activities had affected the integrity of the site.

The second area to be tested archeologically was a riflepit in the Siege Area. The purpose of the riflepit test was to determine the amount of erosion or deflation that had taken place over the years, essentially a condition assessment. In addition, the test was to determine riflepit construction techniques. The riflepits were initially dug under fire on August 9 by the soldiers and civilians. Some were dug with trowel bayonets and some with expedient tools. The riflepits were improved during that evening and perhaps again on the 10th.

One riflepit was selected for excavation after the metal-detecting inventory was completed in the Siege Area. Initially one tepee location was to be identified. However, the metal-detecting inventory identified a dense concentration of metal items in a tightly circumscribed area which was not within the tepee locations identified by Yellow Wolf (Figure 12) to L. V. McWhorter (1991) in the early part of this century. The concentration was thought to indicate a possible undocumented tepee site, and it seemed appropriate to test this location. A second village test area was selected on the basis of McWhorter's mapped tepee locations. The one selected for testing was identified as a burned tepee location, although metal detecting yielded very few artifacts in its immediate vicinity.

In addition to the planned tests, there was an unanticipated discovery of a human burial in a fired-rock feature. The feature appears to be a camas oven, and limited excavation was undertaken at this location to recover the remains for reburial elsewhere on the battlefield at the request of the Nez Perce tribe.

Figure 12. The Nez Perce, Yellow Wolf, depicted many years after the battle.

Possible Tepee Location

A large concentration of .360-caliber cartridge cases was found 171 feet west of McWhorter's mapped location of Tepee 2 in the northern portion of the village. This area is near the Willows from which the army attack originated and is at the Village's historically recognized western edge. The area was first found by Kermit Edmonds during his study of the site in the 1970s. Edmonds recognized the concentration's potential significance. He marked the location but did not otherwise disturb the site. The significant concentration of targets was different from the dispersed artifact pattern noted in the rest of the Village Area. Because of the artifact concentration it was deemed appropriate to conduct formal evaluative excavations at this site. The area was intensively metal-detected, and a 6-by-6-foot excavation unit was laid out over the densest concentration of metal targets. The southeast and northwest quadrants (3-by-3-foot squares) were designated Test Units 2 and 3, respectively (Figure 13). Only these units were excavated for evaluative purposes.

The units were hand excavated using shovels, trowels, and other hand tools. The upper four to six inches of the fill was the humic root zone. This sod layer contained many edible roots including camas and cous. Below the root and sod layer was a dark-gray silty loam. The excavations ceased at 12 inches below present ground surface. The recovered artifacts were found within the first two to four inches of deposition. Only one area of soil color or compaction differences was noted. This was in the southeast unit near its southern edge. It may have been a krotovina (rodent burrow).

Although no culturally affiliated features were noted, the upper two to four inches of fill yielded numerous artifacts in Test Unit 1. Only two artifacts were recovered in Test Unit 2, also at the same depth. A total of thirty-five .360-caliber cartridge cases (Figure 14), ten bullets, and two primers and anvils were found in the units and by metal detecting within a ten foot radius of the excavations. Two concentrations of seed beads were located in Test Unit 1. One area, approximately 8 inches in diameter, yielded several beads. This small concentration is at the northern edge of the unit. The second concentration, approximately 14 inches in diameter, yielded the remainder of the glass trade beads found. The second concentration was not completely excavated, as it continued beyond the unit's eastern boundary.

The shallowness of the artifacts, as well as the variety of nearby materials, unfired cartridges, trade beads, a fork, and a knife or fork handle, suggests the artifact concentration's origin was a cultural feature. The ap-

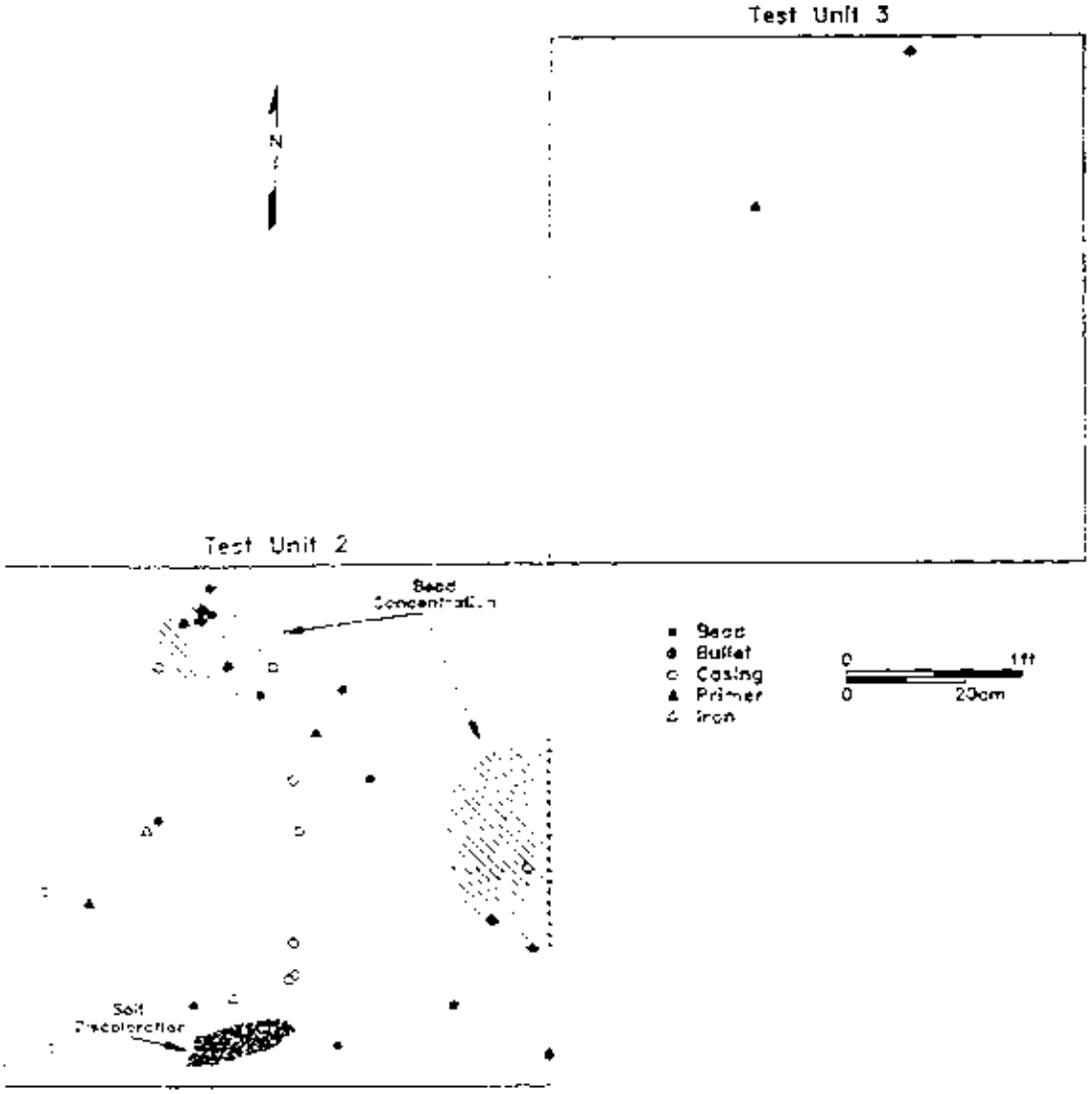


Figure 13. Test excavation units at the possible tepee site.

proximately 20-foot diameter area for the artifact distribution, and the concentration of most materials in a 3-foot square (Test Unit 1) suggests the items were originally confined by some cultural feature. However, there is no indication of the type of feature. The feature may have been a pile of material that was gathered by the soldiers for destruction. Another interpretation is this group of artifacts represents the site of a Nez Perce tepee. Although there is no physical evidence to confirm a tepee site, the location at the northwest edge of the Village, the types of debris, and the spatial distribution of the artifacts in a relatively confined area suggest a feature like a tepee might be the source.

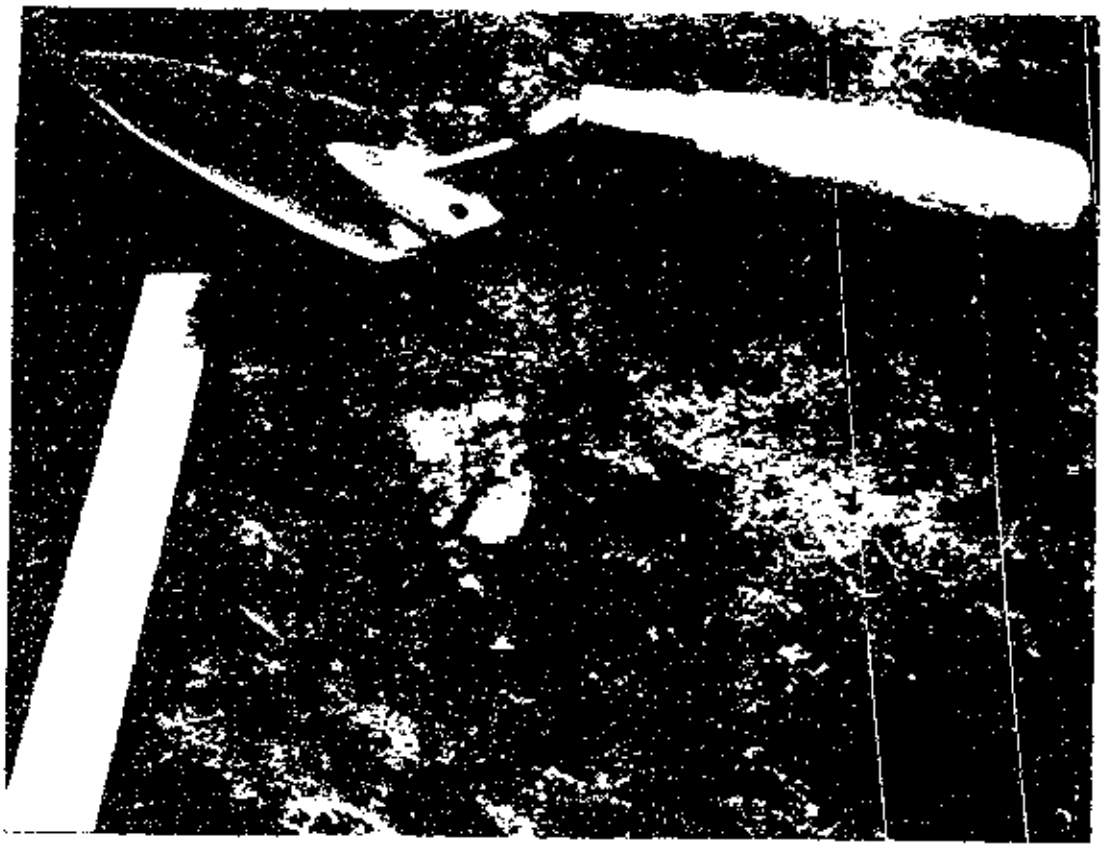


Figure 14. A .360-caliber cartridge case found in the tepee test excavations.

A second tepee location was also evaluated with testing (Figure 15). This location is the site of McWhorter's Tepee 40. It is about 50 feet north of the site of the presumed post-battle blacksmith shop. Yellow Wolf reported to McWhorter that he recalled this location to be a tepee site where the soldiers burned a tepee. No concentration of metal items was located in this area; however, it seemed appropriate to conduct test excavations to determine if any evidence of a burned structure remained. A twelve-by-twelve-foot square was gridded, and then sub-divided into three-foot-square units. Two units were excavated. Test Unit 4 was located in the northwest corner and Test Unit 11 on the eastern edge of the larger grid.

Excavations followed the same methods previously outlined. The soils were similar in profile. There was no evidence of burning or of a cultural feature in the excavation. The only artifact recovered was a piece of hot-cut iron scrap. It probably is associated with the blacksmith shop operation and post-dates the battle.

Test Units 4 and 11 yielded no artifactual or other evidence of a tepee location. There were no soil discolorations nor other evidence of burning to suggest a tepee had been destroyed at the site. If a tepee was burned at this site there should have been some charcoal intermixed in the fill. The absence of artifacts and other evidence suggests that this may not be the site of a burned tepee. Yellow Wolf's memory of precise tepee locations may have been faulty, or the locations as mapped may have been incorrect. McWhorter's staked locations were first mapped by a U.S. Forest Service employee, Lloyd Henderson, in 1937, probably by compass and pacing. In the intervening years the locations were trampled by cattle. Then they were remapped and the maps correlated by Aubrey Haines (personal communication February 23, 1993) as much as possible. Errors in memory, staking, or in the mapping may all be present.

The soil profiles in both test excavation areas determined that no plowing had been conducted in the Village Area. The artifact recovery efforts carried out during the metal-detecting inventory also support this conclusion. There is no doubt the site was used as a hayfield at some point in the past, but there is

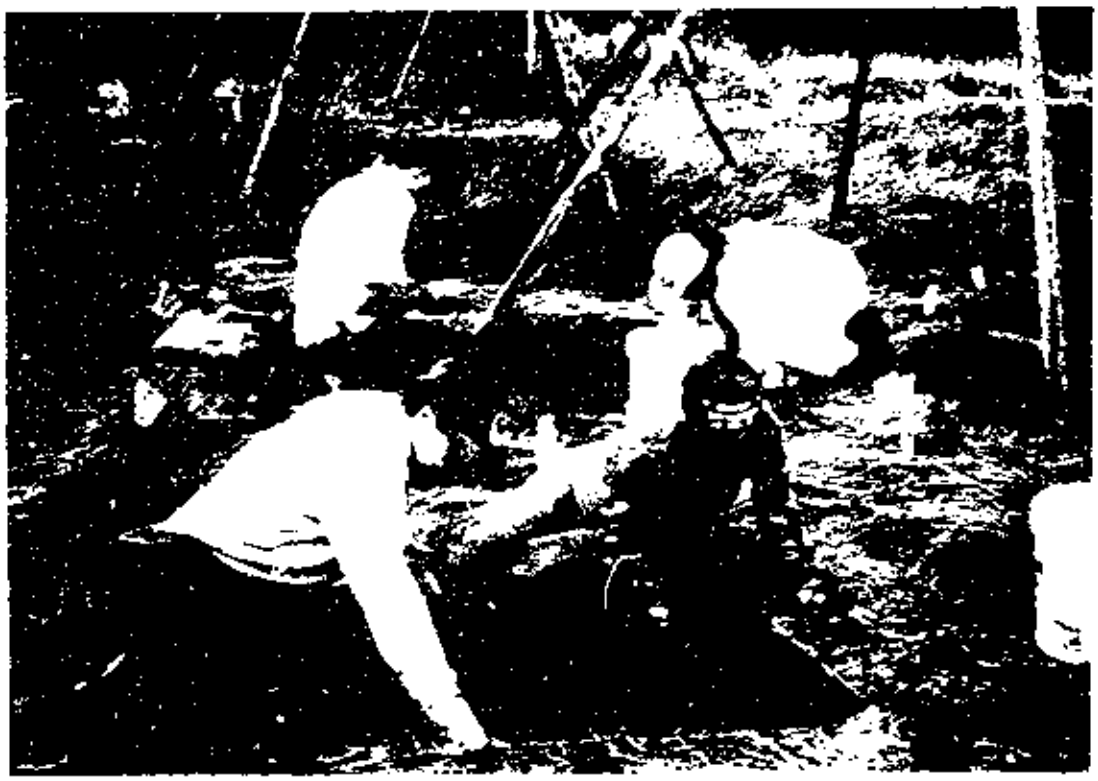


Figure 15. Test excavations at the site of the burned tepee.

absolutely no evidence to suggest the sod has ever been broken by the plow. Bioturbation aside, there is little likelihood that the artifacts recovered at the Big Hole have been disturbed from their original context by agricultural activity.

Riflepit Test Excavation

A single isolated riflepit (Figure 16), north of the main Siege Area riflepit concentration, was selected for excavation. The feature was defined as a shallow depression approximately three feet long and two feet wide. It was oriented northwest to southeast. A two-foot-wide and eight-foot-long test trench (Test Unit 1) was laid out diagonally across the depression.

The excavation revealed that the first five inches of fill consisted of a pine duff and humus layer. Immediately below the duff and humus the pit outline was evident. The sterile soil surrounding the pit was a decomposed bedrock. It was very light in color, and appeared to be a sandy loam mixed with gravels and cobbles. The pit was distinguished by its fill. The fill was a mottled brown sandy loam and humus. The pit was dug into the native soil (Figures 17, 18) three to six inches and was 51 inches long and 24 inches wide. The eastern end was nearly straight walled with a depth of six inches. The western end was only three inches deep and the floor gradually rose from the eastern to west-

Figure 16. Riflepit test excavations in progress.

Figure 17. Profile of riflepit as seen after excavation.

ern end. The feature floor undulated slightly. No artifacts were found in the feature.

The riflepit's excavated dimensions follow field fortification construction guidelines used by the army during the Indian Wars and Spanish-American War (Figure 19). The U.S. Army published few field manuals for small-unit tactics before the beginning of the 20th century. Two of them directly relate to riflepit construction and specifically to the use of the trowel bayonet (Rice 1874; Anonymous 1960). In addition, a number of practical guides for officers were privately published throughout the century to bridge the gap left by the lack of official guidance available outside the West Point classroom. One of the most used guides was *Mountain Scouting* by Captain Edward Farrow. Farrow was an instructor at West Point when he wrote his practical guide in 1881. He had seen active field service during the Nez Perce campaign of 1877. Farrow (1881:243) noted, "The history of all battles of late years has shown the expediency of making use of natural shelter or constructing field intrenchments."

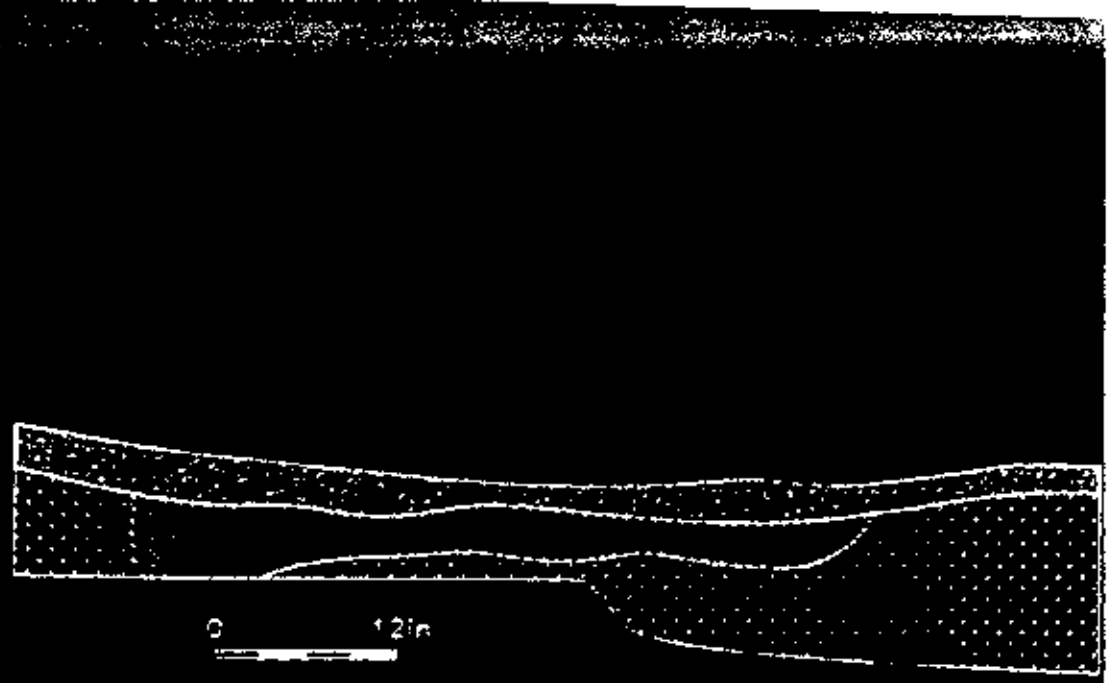


Figure 18. Profile drawing of the riflepit.

Figure 19. Riflepits in use in 1898 during training exercises for the War with Spain. Note the similarity with the excavated example from Big Hole.

Farrow (1881:244-5) describes how to dig a riflepit or, as he terms it, a shelter-pit. He appears to have borrowed heavily from the 1874 and 1875 manuals both for illustrations and wording.

> All soldiers, and especially recruits, should be frequently exercised in throwing up **shelter-pits** and **shelter-trenches**, on grounds of variable contours, and where there is no natural cover.
>
> A very slight parapet of newly excavated earth is sufficient to protect men from the effects of rifle balls. Experiment shows that the penetration of the ball (service rifle) at a range of 10 yards is 20 inches, and only 10 inches at 200 yards.
>
> After a little practice, each soldier will ascertain the form of pit that best suits and protects him. The depth need not be uniform, but should be at least ten inches where the body rests, and six inches elsewhere. With a view to lessening the effect of the enemy's fire, the soldier should lie down well under and behind the cover..... Many are the instances recorded where it was impossible to forward the **intrenching tools** to the front until after the exigency for their use had passed, and the men were compelled to use tin plates, tin cans, fragments of canteens, knives, sticks, etc., in order to get temporary shelter from the enemy's most galling fire..... I am an advocate of Colonel Rice's trowel bayonet, after several practical tests of its merit.

Although Farrow was not at the battle of the Big Hole he was with Howard's command and saw firsthand the value of the trowel bayonet. A plan and profile drawing accompany his discussion and illustrate an L-shaped pit with a lunate mound of earth thrown up to its front. The plan and profile indicate the pit should be six inches deep on the long axis and about four feet long, the dirt mound to be thrown up toward the enemy. A space of six inches should be left between the pit and the mound, and the mound should have a height of fourteen inches and a basal width of eighteen inches.

The late 1870s were a period of experimentation and development for army equipage as a result of the extensive Indian fighting in the west. One experiment at Springfield Armory included testing belt knives, a hunting knife (later adopted as the Model 1881 Hunting Knife), and an entrenching tool for their reliability in digging hasty entrenchments. The October 15, 1879, test involved four soldiers digging riflepits with the various tools to test their efficiency (Hardin and Hedden 1973:4-8). The pits dug took from eight to eleven minutes to construct. They were all about four feet long, thirty-two inches

wide, 12 inches deep, with the spoil dirt mound up at one end of the long axis, and essentially the same as riflepits employed during the Civil War.

The excavated riflepit feature clearly meets the expectations of how a shelter trench should be configured based on the historic documents. The impression left from studying the historic source material on riflepit construction and the pits still extant at the Battle of the Big Hole is they were constructed in the heat of battle and were hasty and expedient affairs. In a sense this is true. They were hastily constructed, they were expedient, and they were temporary. But this does not mean they were haphazardly constructed. The army obviously did train their personnel throughout this period, and a part of the training was in the construction of earthworks and riflepits.

It appears the riflepits used at the Big Hole are typical of entrenchments used throughout the Trans-Mississippi West. They appear to have been dug with a prescribed pattern in mind. The pit excavated in 1990 did not appear to have suffered significant erosion or deflation. The pit backfill appears to have eroded and slumped back into the pit itself. Undoubtedly some soil was washed or blown away, but the pit itself appears stable and in good condition. The excavated depression provided a sense of what lay beneath the surface. It corresponded roughly in size and shape to the actual pit. It may be assumed that the other remaining riflepit depressions will provide the public with a sense of their shape and purpose.

Camas Oven and Human Burial

by

Melissa A. Connor

A fire-cracked rock feature (Figure 20) and associated human burial were found during the metal-detecting inventory west of an abandoned river meander situated between the west side of the Village and the North Fork of the Big Hole River. They were opposite Tepee 5 on the L.V. McWhorter map (Haines 1991:166), which is identified as the maternity tepee. There is no historically identified tepee in the feature's immediate area.

The human remains were those of a teen-aged Native American female. Full documentation of the excavation and description of the remains can be found in Connor (1992).

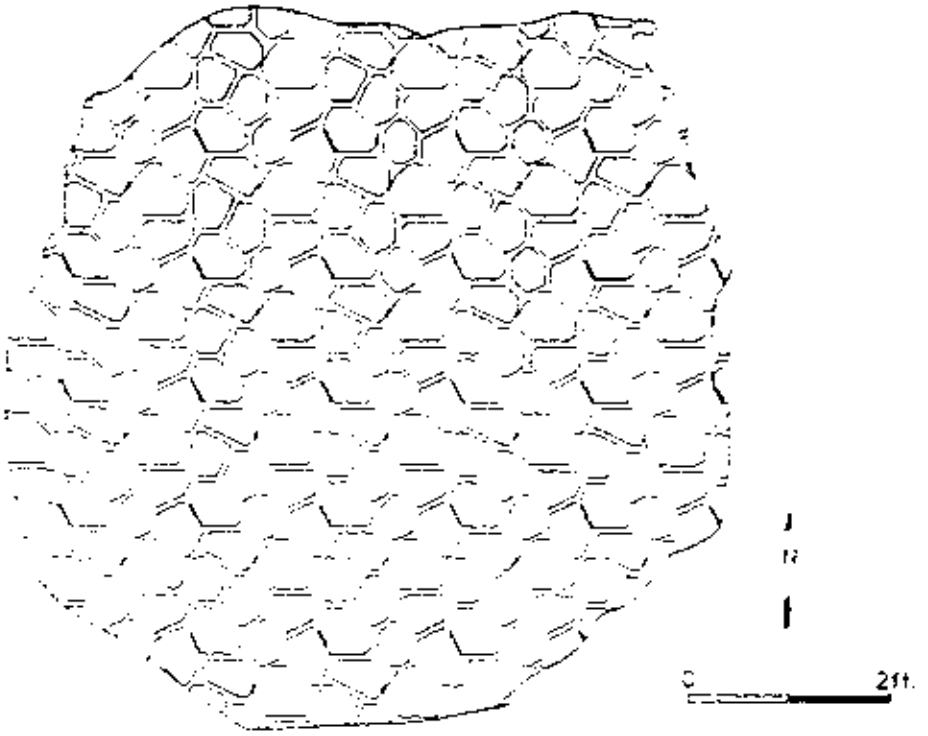


Figure 20. Plan view of the camas oven feature.

An overflow channel of the North Fork of the Big Hole River is to the east of the feature. It was dry in August, but apparently had been active earlier in the year. There was a large mammal long bone fragment, unidentifiable to species, in the middle of this channel. The fragment was oriented in the direction of water flow, and there is no evidence that it was associated with the burial. The exterior of the bone showed signs of extreme weathering, including cracking throughout the piece and a hard, white color. In terms of coloration and condition, the piece was not consistent with the human remains. The fragment is probably a part of an animal bone washed down the river in the spring floods and is considerably more recent than the burial.

The feature and the human remains were covered with four to six inches of a fine-grained, alluvial soil. This is probably a loam, although samples for particle-size analysis were not taken. There was a thick cover of grasses, including camas and other edible roots, over the soil, and large willows were scattered throughout the area.

The remains lay on top of a large rock hearth about six and one-half feet in diameter. Hearths with a similar construction are ethnographically documented as used in roasting camas and other root crops (Steward 1938). The size of the earth oven varies with the size of the group utilizing the oven. Ethnographies describe a range between 1.8 square meters and 7.4 square meters (Spinden 1908). The large ovens involve cooperation among several women for preparing large harvests.

The meadow around the camp presently contains large amounts of camas, yampa, and other root crops. Wounded Head's wife, Penahwemonmi, recalled that on August 8th many women dug camas and baked it overnight...

> ... many women who had camas were killed. Their camas were left where they had baked it when we had to leave. (McWhorter 1991:371).

This feature undoubtedly is a camas oven that had been in preparation during the days previous to the battle. The human remains found on the rocks of the oven show no signs of charring, so it is unlikely that the rocks were hot when the remains were deposited. The sequence of camas processing often called for digging the earth oven and gathering the wood and rocks one evening, then lighting the fire to start heating the rocks the next morning, as the fire needed to be fed frequently during the first twelve hours (Downing and Furniss 1968). The oven was probably prepared the day before the battle and the fire may never have been lit. A small amount of charcoal was found in the excavation. This amount may have become mixed in the soil from charcoal in the oven working its way up through bioturbation, in which case the oven was lit. However, it may also have become mixed in the soil following post-battle grass fires. Only by completely excavating the oven would the question of whether or not it was fired be answered. The excavations undertaken were to salvage the human remains, and the oven itself was only uncovered to its margins.

The location of the body confirms the historical accounts of burial of remains inside camas ovens. Throughout the village, the soil is fine-grained and difficult to excavate. In addition, the thick grass cover is difficult to cut through. Thus, it is unlikely that people in a hurry would dig a large hole when either the riverbank or the camas ovens were available. That the time was taken to ensure burial, even under the pressing circumstances, emphasizes the importance of the burial of the remains in the Nez Perce culture.

The human remains are those of an unidentified young girl in her late teens. The skeleton was on top of a camas oven, which is consistent with

historical accounts of the disposal of some of the bodies from the battle. The body showed evidence of extensive post-mortem mutilation. The arms had been *cut* off and laid below the pelvis, one leg had been detached and was not with the remains, and a minimum of three hatchet marks were found on the ventral side of the vertebra. The extensive post-mortem trauma is typical of trauma found at other Indian Wars battlefield sites (Scott et al. 1989) and is consistent with the historical documentation that some of Howard s Bannock Scouts exhumed and mutilated some of the Nez Perce dead (Howard 1972). A more complete discussion of the burial can be found in Connor (1992).

This individual appears to have been buried alone, although the oven was large enough for at least one other body. The historic accounts suggest that each family buried its own members. Perhaps this woman was the only member of her family to die in the battle. That this woman was alone might also suggest that it was not difficult for the families to find expedient places to bury the dead. Several such camas ovens, as well as the riverbank, may have been used for burial.

Chapter 5

INTERPRETING THE EVIDENCE

Combined here are the historical documentary evidence and the data derived from the archeological artifact analyses. Rather than insert detailed artifact descriptions and analyses into the narrative, those details are presented in Chapter 7.

In reading these interpretations, it is appropriate to keep in mind the crime scene analogy presented in Chapter 1. The historical documentation is analogous to the witness testimony, and the archeological data is the event's physical evidence. The artifact evidence gathered over the years has been used to some degree in earlier interpretations. The 1991 archeological project added significant new data. Combining the new archeological data with earlier artifact finds and interweaving the historical data creates a rich new tapestry for interpretation.

Interpreting the battle through archeological evidence is subject to several biases. Uncontrolled relic collecting over the years has reduced the total artifact quantity and has undoubtedly disrupted some artifact distribution patterns. However, the excellent collecting documentation of Aubrey Haines and Kermit Edmonds, as well as the records of Don Rickey and Thain White, has provided an important and substantial documentation on some past collection efforts. Another bias to consider is that the battle is not the only cultural event to have taken place at this location. Construction of fences, buildings, and roads, and even disposal of trash have added to the battlefield's archeological record through time. The pre- and post-battle activities were generally easily recognizable by datable artifact types. These biases were kept in mind as the interpretations were developed.

The battle of the Big Hole has one of the most extensive and richest sets of documentary evidence available in the Indian Wars literature. However, there are gaps and conflicts in that record, which is one reason the archeological project was undertaken. The archeological evidence does fill in some gaps in the story and, in some cases, does clarify conflicting historical accounts. It also raises new questions in its own right.

The interpretations offered here are based on the analysis of the archeological evidence—the artifacts. Artifacts are the physical evidence of human behavior. They are the material culture remains of past activities. As

such, they retain information regarding the nature of those activities. That information resides not only in the individual artifact, but also in the spatial and contextual relationships between artifacts. Whether the artifact is a bullet from the battle, a piece of equipment used by a soldier, or a nail used in fence construction, each helps to piece together the history of human use of the battlefield.

The Evidence for Clothing and Equipment

The number of artifacts representing clothing and equipment used by the combatants is relatively small. This is not unexpected given the nature of the battle, which was a brief affair. Clothing itself is not likely to survive the ravages of time, but metal buttons and fasteners, as well as decorative devices do provide some information about the clothing worn on August 9 and 10, 1877.

SOLDIERS' AND VOLUNTEERS' CLOTHING

The command's attire has been the subject of exhaustive research by Kermit Edmonds (n.d.). He consulted many contemporary records and accounts of battle survivors to develop a comprehensive view of the Seventh Infantry's 1877 campaign clothing. He has concluded that the enlisted personnel wore regulation sky-blue kersey trousers over canton flannel underdrawers, a coarse pullover shirt in either prescribed gray or older Civil War–issue white, and some men possibly wore privately purchased shirts. The military blouse was not generally worn on this campaign according to Edmonds sources, although a few men may have worn them. The 1874 fatigue blouse appears to have been the choice when worn at all. The foot was covered by the issue shoe or bootee, while the cavalry contingent probably wore the regulation boot. The head was covered by either the unpopular 1872 campaign hat or one of private purchase. The other clothing item mentioned by Edmonds' sources is the heavy wool overcoat, a sky-blue kersey double-breasted item with a long cape.

There are suggestions that officers had much more latitude in choosing their campaign clothing. At least one officer wore white corduroy trousers, which he considered conspicuous and tried to mute with an application of mud (Woodruff 1910).

Archeological evidence for clothing consists of buttons, hooks and eyes, a trouser or vest buckle, suspender grips and rings, and shoes. Three

types of buttons were found distributed in the Siege Area and the Nez Perce Village. One is the general service brass buttons, another the trouser fly and suspender buttons, and the third are two civilian-style buttons. The brass general service buttons were found in two sizes. The smaller size was commonly worn on blouse cuffs and forage cap chinstraps. With one exception the smaller buttons are plain eagle-style general service buttons. The exception has an "I" in the eagle's shield. The "I" or infantry button could have been on the cuff of an 1858-pattern frock coat or the blouse cuff or forage cap of an infantry officer. Five small general service buttons were recovered during the archeological project. Nine others were recovered during earlier collecting in the Village and one in a riflepit in the Siege Area.

The remaining six general service buttons are the large blouse type. While the specific blouse type cannot be ascertained, it suggests that some soldiers were wearing their blouses or had utilized older blouses modified for field use during the battle. Those general service buttons found in the Village may indicate where some of the men lost buttons in the heat of the battle, where men were killed, or where the Nez Perce may have left army clothing taken at earlier engagements or from the dead. All incidents could be the likely source of the buttons. The general service buttons in the Siege Area were probably deposited by the soldiers themselves. Their presence is certainly indicative that some soldiers were wearing some form of a blouse during the battle.

Sixteen iron and white-metal trouser buttons have been found on the battlefield. Nine were found in the vicinity of the camas oven feature, one by White (n.d.) at the Willows grave site, and the others in the Siege Area. These buttons were used to close the fly and attach suspenders on trousers. These button types are common on nineteenth-century civilian trousers, and were the regulation buttons for army-issue trousers. These button finds suggest that the men were wearing regulation trousers.

The non-military buttons may or may not be battle-related. One is a two-piece brass 4-hole button. It is similar in style to the trouser buttons. The other is a plain brass face, loop-shank button. This button could be associated with the Nez Perce or with a civilian style shirt or coat. It is a common button style for the nineteenth century. Both buttons were found in the Siege Area during earlier collecting efforts.

A few other clothing-related artifacts either corroborate the association of other finds or suggest additional items of clothing were present. A trouser or vest adjustment buckle adds to the trouser button data base or sug-

gests a vest was present. The presence of seven suspender grips and six suspender rings adds to the trouser data. The grips are private purchase types. The army did not issue suspenders in 1877, so their association could be with either an officer, an enlisted man, or a volunteer. At least one suspender set is represented by the two grips and rings found in proximity in the willows. Three sock or garter fasteners recovered may or may not be battle related. If they are, then sock fasteners are represented in the Siege Area. Pouliot (1962) also recovered two brass forage cap letters, a **D** and a **G** during his collecting efforts.

Two hooks from hook and eye assemblies were also recovered. Hooks and eyes were used to fasten the brim up on the issue campaign hat, on overcoat capes, and to fasten the collar or skirt on the obsolete blouses and coats. These hooks and eyes are the large variety and were most likely used on the overcoat or the campaign hat. The blouse alternative cannot be completely dismissed, however. In any case, the presence of blouse buttons or overcoat buttons and campaign hat or overcoat hooks confirms the presence of these items in the battle.

These button and hook and eye finds are in contradiction with the historical documentation. Colonel Gibbon had ordered all unnecessary equipment including blanket rolls, overcoats, and blouses cached with the wagon train (Haines 1991:51). Clearly not all elements of the command complied with the order, given the archeological evidence, and some men wore a regulation or an older blouse modified for field use.

The final piece of soldier apparel represented archeologically is footwear. Recovered boot nails and portions of six shoes (four archeological specimens, one found in the Willows near a depression in 1964, and one found by Thain White) suggest the pre-1872 or 1872 bootee or shoe was the most common footwear. A single heel-reinforcing cleat was found by Pouliot (1962); however, its recovery location is uncertain.

The archeological shoe specimens were found in widely scattered areas. One fragmentary shoe was found in the Willows associated with the suspender grip set and several blouse buttons. The artifact assemblage suggests this is the site of a soldier's death and temporary post-battle burial. There was no obvious depression or other evidence of a grave, but a shallow burial and disinterment within a few months might not leave tell-tale signs.

Another shoe was found in the Willows about 100 yards east of the Siege Area. It may also indicate the site of a soldier death during the retreat. A third shoe was found in the forested area north of the Howitzer Area. Cor-

poral Robert Sale was killed in the howitzer incident. His body was found, two days after the fight, stripped naked and wearing a horse collar (Haines 1991:75,83). Perhaps this shoe was one of Corporal Sale's and was discarded by the victorious warriors. A shoe heel fragment was found on the hill slope below the Howitzer Area, and it may well be part of Sale's other shoe.

A few personal items were recovered. A single five-cent piece was found near the river and along the Retreat Line through the Willows. Although the date is obscured by erosion, it is of the period and may represent a coin lost by a soldier during the retreat. Seven pocket knives or blade fragments were also found in the Siege Area, Willows, and Village. Some could post-date the battle, although they could be contemporaneous as well. A harmonica reed fragment suggests a soldier may have carried a harmonica, losing it in the riflepits in the Siege Area, although it could have been lost by a later site visitor. A brass ring thought to be a watch bezel was recovered by Pouliot (1962) and may represent a pocket watch lost during the fight.

It is likely tobacco was present at the battle. Four tobacco tags were found in the Siege Area as well as a rubber pipestem. Tobacco tags were devices attached to plug tobacco to identify it by brand name. This indicates plug tobacco was present at the battle, but whether for smoking or chewing is not clear. Again the artifacts may also be attributed to later site visitors.

SOLDIERS' AND VOLUNTEERS' EQUIPMENT

The average soldier carried a variety of equipment during a campaign. He, of course, carried weapons, but he also had a cartridge belt with a buckle, a rifle, a trowel bayonet (at least for members of two companies), and would have had a canteen, mess gear, and a haversack. The officers and the few men of the Second Cavalry would also have had a holster for their revolver. The Second Cavalrymen wore carbine slings and spurs.

The archeological evidence for equipment is limited in quantity, but diverse. Aside from the firearms evidence, discussed later, perhaps the most significant equipment artifact is a trowel bayonet (Figure 21) found on the Retreat Line through the Willows. The trowel bayonet, or more properly accouterment, holds the distinction of being the first truly American bayonet design. Although it was wholly an experimental concept it was issued for field trials. It was those trials that saw its use in the Big Hole battle. About 10,000 of the Model 1868, 1869, and 1873 entrenching bayonets were manufactured for experimental and field trials (Reilly 1990:121).

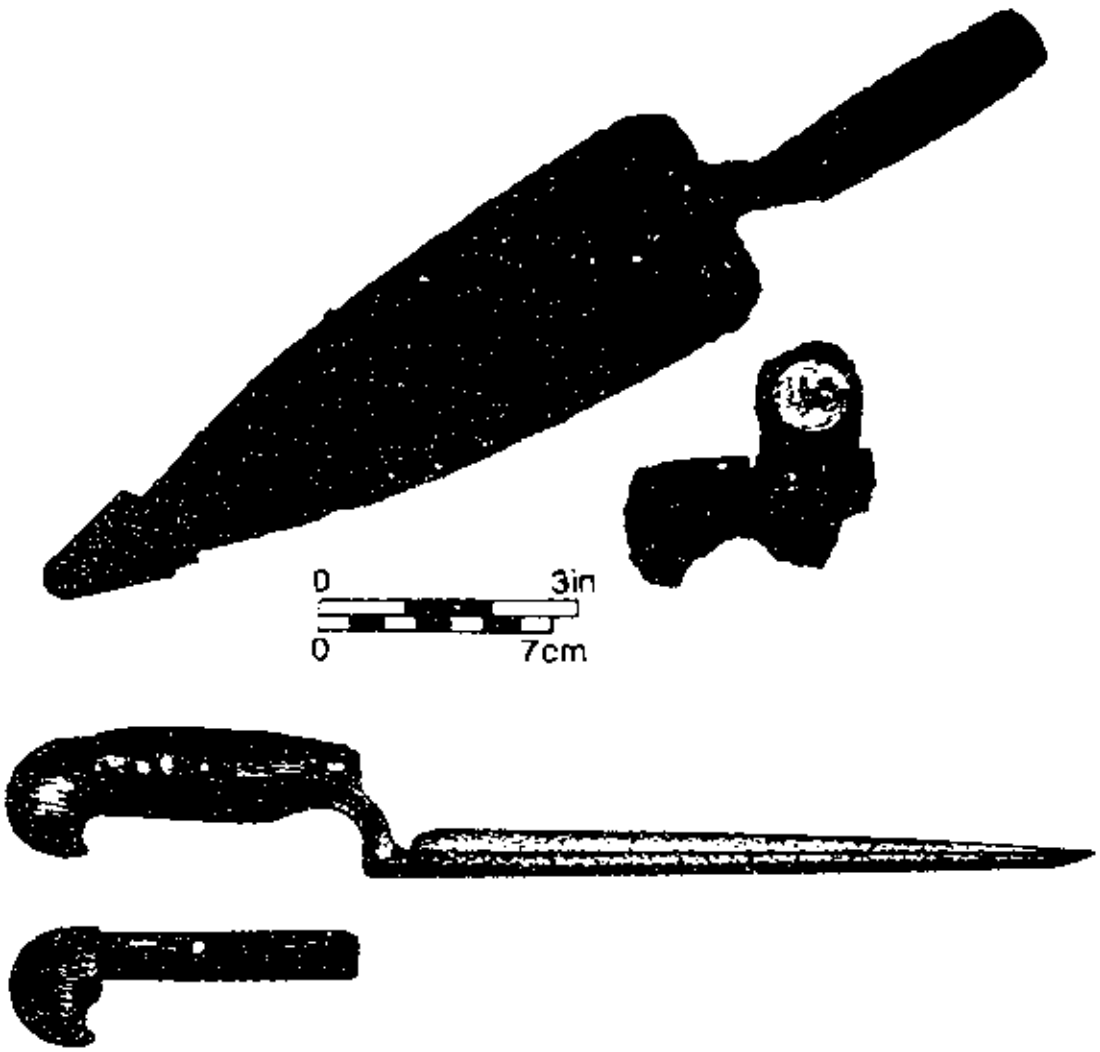


Figure 21. The scabbard fragment and trowel bayonet.

The Model 1873 trowel bayonet was designed as a multi-purpose tool. It was meant to function primarily as an entrenching tool and hand axe, but could also double as a rifle-mounted bayonet. The socket, normally used for mounting it to the rifle, also served as the handle for digging purposes. A walnut plug could be inserted in the handle to provide a more secure grip. Remnants of this plug handle were found on the archeological specimen. When recovered, the bayonet was encased in the remnants of a scabbard, which indicates the bayonet was carried in its entrenching tool configuration, and not as a bayonet.

That the trowel bayonet was definitely used in the battle is confirmed in a number of reports: "Getting into position, the command at once began to intrench, and although only two companies had trowel bayonets, and the sharpshooters fire was murderously accurate, a sufficient rifle pit was soon thrown up..." (*The New Northwest* August 17, 1877, 9(7) whole number 424:2, column 2).

Members of the Seventh Infantry vividly remembered the trowel bayonet and the service it rendered during the battle. The following is an excerpt of a letter from Charles Loynes to L. V. McWhorter June 6, 1926, McWhorter Collection, Washington State University Library Archives, Pullman, copy on file Big Hole Battlefield National Monument.

> Our bayonets were not of the ordinary kind. The 7th Infantry was issued it for an experiment what was then known as the "Rice Trowel Bayonet". It was not as long as bayonets usually are - and with a broad surface at the base - with one edge sharp to cut wood - or anything else - and it could be used to dig with - as it had a wooden short handle to place in the socket for that purpose

Later Corporal Loynes also recalled a specific use of the trowel bayonet: "When in the entrenchments.... I was ordered to crawl out followed by Corporal Heides of 'A' Company to cut some small trees with our trowel bayonets" (letter from Charles Loynes to L. V. McWhorter, June 1940, McWhorter Collection, Washington State University Library Archives, Pullman, copy on file Big Hole Battlefield National Monument).

Colonel Gibbon had very strong feelings about the trowel bayonet: "[Gibbon] was sitting by a bunch of willows when Major Clark and I walked up to see him. Clark introduced himself and said, 'You had a hard fight, General'. 'I tell you, Major Clark, that we hadn't been in that fight but a short time when I thought it would be another Custer massacre, and to tell the truth, there is only one reason, in my mind it was not. When we left Missoula we had trowel bayonets issued to us; these were used with which to dig holes into which we got for protection. If it hadn't been for them, none of us, in my opinion, would have lived to tell the tale." (Noyes 1914:33).

In addition, one of the civilian volunteers recalled: "I had picked up a trowel bayonet on the battlefield... It proved to be the most valuable thing I ever had in my possession..." (Tom Sherrill to A. J. Noyes, n.d.:9, The Battle of the Big Hole As I Saw It, manuscript SC-739, Montana Historical Society). Yellow Wolf (McWhorter 1991:121) recalled that when he crossed the river

and entered an open space in the Willows he killed a soldier and captured his gun, cartridge belt, and took "his trench digging knife."

Finally a note appended to the Seventh Infantry Company K muster roll for the period 30 June 1877 to 31 August 1877 commanded by Captain J. M. J. Sanno apparently sums up the general feelings about the value of the trowel bayonet: "The experience of this campaign convinces me that the trowel bayonet is an indispensable part of the soldier's equipment in the field and adds very materially to his effectiveness." The army withdrew the trowel bayonet from service, and did not replace it with any type of individually carried digging tool until the advent of the Model 1881 hunting knife.

How did the archeological specimen find its way to the spot in the willows? Some bayonets may have been dropped by wounded men or torn from the belts of others during the retreat through the Willows. The two companies issued the trowel bayonet were A and I. Only one individual from Company A was killed, Private John B. Smith. Three men from Company I were killed, Sergeant Michael Hogan, Corporal Daniel McCaffery, and Private Herman Broetz. All three Company I men died in the fight in or near the Village (Haines 1991:62). At least eight individuals in those two companies were wounded but survived. The historical accounts indicate two trowel bayonets were recovered during the battle, per Tom Sherrill's and Yellow Wolf's accounts. It is intriguing to speculate that the archeological specimen may well represent where Private John B. Smith met his fate. Perhaps this was the "trench digging knife" captured by Yellow Wolf.

Other equipment items found during earlier collecting efforts include an army-issue brass 1859-pattern spur from the Siege Area. A single, private purchase, iron spur was also found in one of the riflepits by White (n.d.), and it may have belonged to one of the volunteers. Another equipment item recovered is a chain ring for the army canteen cork stopper.

In addition, two army picket pins were recovered; one was found inside the trench perimeter near the shelter pit occupied by Gibbon and his adjutant, and the second was found driven into the ground below the bluff in front of the Siege Area. Only one horse, Lt. Woodruff's, made it to the Siege Area where it was killed in the course of the battle. While the picket pin found in the Siege Area could be associated with Lt. Woodruff's horse, it could just as easily be associated with horses from the command's wagon train or General Howard's relief column. While probably not directly battle related, the pins are certainly associated.

Four and possibly five other items relate to the army equipment. Three were found in the Siege Area. One is a knapsack adjustment hook made of brass. This hook was also utilized as an adjustment hook on the 1872-pattern haversack. No mention of knapsacks is made in the historical documentation of the battle, whereas haversacks are mentioned. It seems appropriate to ascribe this hook to the presence of the 1872 haversack.

A brass open-frame belt buckle with remnants of canvas webbing was found by Rickey in 1959. It is the buckle to an 1876-pattern cartridge belt. This was the first cartridge belt adopted for army use, although many soldiers had cartridge belts privately made up for their use on campaigns prior to this.

A leather percussion cap pouch was found in the Willows along the army Retreat Route. The pouch was empty, but still retained some of its lamb's wool lining. The pouch may have belonged to one of the cavalrymen. The cavalry often utilized older cap pouches to hold extra cartridges for their revolvers. The army arsenals even modified the pouches expressly for this purpose (Meadows 1987). The pouch may also have been carried by a volunteer utilizing a percussion-fired weapon. And another possibility is that it was used by a Nez Perce who discarded it after capturing a rifle and cartridge belt.

Near the pouch, an iron belt or sheath knife was recovered. The knife, a small butcher or so-called scalper, is iron with brass rivets. The rivets once held a wooden handle or scales on the tang. The knife is typical of belt knives of the nineteenth century. Its association with the Retreat Line and the cap pouch suggest an army or volunteer context; however, a Nez Perce association cannot be ruled out.

A brass-plated iron escutcheon plate was recovered in the Siege Area. It is the same size and style as those used on the Model 1874 McKeever cartridge box (Meadows 1987). If this is a McKeever escutcheon, then the presence of the cartridge box is strongly suggested. It may be possible this escutcheon is a closure for a lady's purse of a much later era. The brass-plated iron is unusual for army equipment, but it is possible. The piece must remain of questionable battle association.

A few mess items were recovered. An iron bone or wooden handled three-tined fork was recovered near the bluff in the Siege Area. Stylistically it is of the battle period; however, this style persisted to the end of the nineteenth century; so it could be a later picnicker loss. It may very well also be a fork used and lost by a volunteer. An 1874-pattern army mess spoon with the letter "F" stamped on the handle was found in a riflepit near the edge of Battle Gulch some years earlier. Company F was not issued the trowel bayonet, so it

is possible the spoon was used as an expedient tool in the construction of a riflepit.

SUMMARY OF SOLDIERS' AND VOLUNTEERS' CLOTHING AND EQUIPMENT

The small quantity of clothing- and equipment-related artifacts adds some new information to the historical documentation, but does not prove exceptionally enlightening. The primary value of the archeological data, in this case, is that it strongly supports the battle's historical information and oral traditions. There are no significant conflicts between the archeological and historical evidence as to the clothing or equipment types utilized by the battle participants.

The archeological data does indicate that the officers or Second Cavalrymen wore spurs, and perhaps some volunteers did also. Haversacks and canteens were present, as well as forage caps, as had been indicated by the company letters. The percussion cap pouch may have been used for pistol cartridges, and may have been lost by one of the cavalrymen. It is also clear from the archeological button evidence that some members of the command did not leave their overcoats or blouses behind with the wagon train. Considering the cool nights of the Big Hole Valley in August, this is not a surprising decision nor an unanticipated finding.

The presence of a possible McKeever cartridge box escutcheon plate is intriguing. If it is part of a McKeever box then its presence suggests that not all men wore the Model 1876 cartridge belt. Given the fact that most Seventh Infantry companies had been widely dispersed to different posts in Montana, it is likely that not all would have had the opportunity to acquire every item of new equipment available before the campaign started. Thus a variety of dress and equipment is not unlikely. It is also clearly known that only two companies carried the trowel bayonet for experimental purposes.

Probable Nez Perce Personal Items and Camp Equipment

A number of personal artifacts can be ascribed to the Nez Perce combatants. A brass trade bell was found in the Village during the earlier collecting efforts. A brass thimble with a suspension hole and two cone tinklers, one brass and the other iron, were found in the Siege Area. An unidentified brass item, possibly the backing to a small mirror was found in the Village Area, and was probably left behind by the Nez Perce. A pre-1872 hat eagle device was

found in the Village. Obsolete styles of clothing and headgear were often given to Native Americans as portions of annuity gifts. It may be possible this item was in Nez Perce hands at the beginning of the battle. It is also possible the device was an army item, perhaps part of some obsolete pattern hat utilized for campaign headgear by a soldier who did not favor the issue campaign hat.

Some of the more definitively personal items are finger rings. Thirteen brass rings of several different sizes were recovered. Seven were found in the Siege Area and six in the Village. The seven from the Siege Area were essentially clustered near the bluff edge. It is possible the rings were collected as souvenirs, like the thimble and tinklers, by the soldiers or volunteers and cached when they thought they might be annihilated. Another possibility is the rings represent an unrecovered cache of a woman who was cutting lodge poles prior to the battle (Haines 1991:49). Yet another possibility is that they may be an offering left by later visitors to the site. The rings are all the same style, and if left as an offering it must have been in the nineteenth century. The rings found in the Village were probably left behind when the camp was abandoned. Nez Perce men and women wore various types of jewelry and decorative devices. Most were removed at night and the rings may represent those small items that were abandoned during the early morning attack by the soldiers. Thus their presence may indicate the general location of tepee sites.

Two brass conchas have been recovered in the Village Area. One was recovered by Gordon Pouliot (1962). A second was found during the archeological investigations. Both appear to be handmade from sheet brass. It is possible both were in the same vicinity. Pouliot's description of the find suggests it was in the vicinity of the archeological specimen. If so, then the two pieces may have been part of the same artifact. Pouliot's concha is broken. He believed it may have been struck by a bullet. The archeological specimen is complete and still has a portion of a buckskin thong tied around the center bar. These conchas may have been parts of a belt, decorative devices on clothing, or horse trappings.

Several artifacts were found in the Village Area that are probably camp items lost or left behind by the Nez Perce in their hasty departure. Among the items is the bowl of a brass spoon. It was broken into numerous fragments, and may have been crushed in the melee of the battle. The camp also yielded a bone-handled table knife during earlier collection efforts. In addition, three other fragmentary iron table knives were recovered during the archeological investigations. One was a handle only, with brass rivets for the scales. It was found in the probable tepee site where trade beads were also

recovered. Another had remnant wooden scales. Fragments of an iron three-tined fork were found near the river at the north end of the Village. This same area also yielded a part of an iron skillet or pan when the river changed course and cut off an old meander. An iron skillet handle was recovered at the north end of the Village during the archeological investigation. Whether the two are associated is uncertain. Another artifact recovered in the north end of the Village is possibly a handmade fishing spear.

A previously recovered artifact found in the Village is a fragment of bar lead. Generally associated with the making of lead balls or shot for firearms, this fragment has the letters "**L.G.A. W**" cast into the bar. The source of the bar lead has not been identified.

An assemblage of glass trade beads was recovered in the possible tepee site near the north end of the Village. The beads are seed beads in a number of different sizes and colors. Whether they represent a single item destroyed with the tepee or several beaded artifacts cannot be determined. They do represent the loss of one or more decorated items near where the attack on the Village first occurred.

A belt or camp knife was found below the modern visitor center well south of the Village. This is believed to be an area to which some of the Nez Perce may have escaped during the attack on the Village. The iron knife had a bone or wooden handle, and is marked with a maker's logo. The mark indicates the knife was made by Lockwood of Sheffield, England. The mark is definitely a nineteenth-century type. Knives of this type were common items in the Indian trade.

Two step or offset iron awls were found in the Siege Area. These awls were also a common item in the Indian trade of the era. Similar awls have been found in many historic trading post and Indian village sites. Their presence in the Siege Area suggests they may have been souvenir items discarded by the soldiers. They may, along with the finger rings and other Native American artifacts, also represent a pre-battle occupation of the pine-covered alluvial toe that became the Siege Area.

Weapons at the Battle of the Big Hole

Bullets, cartridges, cartridge cases, arrowheads, and knives are the direct evidence of the weapons used during the battle. Combining the direct physical evidence with the available historical documentation allows, in expanded detail, examination of the role of weaponry in the battle.

NON-FIREARMS WEAPONS

Weapons other than firearms used at the battle are limited to cutting and crushing implements. These include knives, spears or lances, bows and arrows, and war clubs. The number of non-firearm artifacts is few.

Historical accounts indicate the bow and arrow played an insignificant role in the fight. Only one Nez Perce, Five Fogs, is identified as having or utilizing a bow and arrows during the battle. He was killed early in the fighting at the Village's southern extreme, thus we did not expect significant evidence of bow and arrow usage.

Earlier collecting efforts recovered a single iron arrow point at the base of a boulder in the Siege Area. The archeological investigations located another iron projectile point and a brass point. Both were also recovered in the Siege Area. Two explanations are posited. One is that earlier Nez Perce or other Indian camps occupied the Siege Area and may account for the arrow point deposition. The second explanation is that more bows and arrows were utilized in the fight than were recalled by Yellow Wolf (McWhorter 1991:119).

Five Fogs' bow, quiver, and several arrows were found on the battlefield and acquired by S. G. Fisher, leader of the Bannock scouts in General Howard's command. The bow, quiver, and arrows passed into the hands of Colonel Frank Parker, a scout, and then to L. V. McWhorter (1991:119). The items are now in the collections at Big Hole National Battlefield. McWhorter described the bow as sinew-backed with a sinew bowstring. It is 32 inches long. The 26-inch-long quiver is half-tanned deerskin and red flannel with a short fringe on the under edge. Ten arrows were in the quiver when acquired by McWhorter. They ranged in length from 24 to 33 1/2 inches, with the three shortest tipped with iron projectile points. The remaining arrows were heavier in construction tapering to a flattened point. All were fletched with eagle or hawk feathers.

Two belt knives, one possibly a soldier's and the other Nez Perce related, were found. Knives do not appear to have played a significant role in the fight. The little hand-to-hand fighting was apparently rough and tumble, but still decided with a gunshot or a crushing blow with a war club according to Yellow Wolf (McWhorter 1991). Milton (Bunch) Sherrill recalled having carried a scalping knife, which he used as an entrenching tool in the Siege Area. Although sharp when he began his digging to entrench, the knife looked like a "saw blade" the next morning (A. J. Noyes, 1916, page 4, Montana Historical Society manuscript SC-739). Andrew Garcia (1967), visiting the site in 1879,

found an iron-tipped lance which he hid away in a tree. Many years later he went back to the site and recovered the lance. All the historical accounts are consistent in one respect, and that is, that firearms were the primary weapon in the fight.

FIREARM TYPES

The different firearm types and their quantity are a central point to the study of the Big Hole battle. From the firearm types we can begin to appreciate the variety of arms used by the combatants. Both the historical documents and the archeological record provide some insight into the range of weapons available and used in the battle.

The historical documentation identifies a number of firearm types that were present at the battle. Civilian volunteer Riley Cooper is reported to have carried a Henry rifle, serial number 6775 (Big Hole National Battlefield Research Files), during the attack. Tom Sherril had a cap and ball revolver, and Lt. Jacobs' servant, William Woodcock, is known to have carried a shotgun while at the wagon train.

As noted earlier, the infantry contingent carried the Model 1873 Springfield rifle, while the cavalrymen carried the Model 1873 Springfield carbine. Both arms were .45-caliber, the rifle .45/70 and the carbine .45/55-caliber. Officers and the cavalrymen would have also carried the Model 1873 Colt revolver in .45-caliber Long Colt. Some officers may have used privately purchased firearms, as well.

The Nez Perce arms are more difficult to identify, although there is some documentation available. Yellow Wolf stated he utilized a Winchester Model 1866 rifle, although he did capture several soldiers' weapons during the battle. At Big Hole he reported killing a wounded soldier with a war club and taking a government rifle and belt (McWhorter 1991:117). Yellow Wolf recalled several other battle episodes involving firearms, including the one related earlier involving the capture of a rifle and trowel bayonet (McWhorter 1991:121).

Yellow Wolf also remembered that when he returned to camp from the Willows fighting he found several dead soldiers. He took their guns and found bacon and hardtack on or near them. He ate the food (McWhorter 1991:128-9). He further reported that in the fighting near the south end of the village ten warriors firing from shelter killed several soldiers and captured three guns and ammunition (McWhorter 1991:120).

Prior to the Battle of the Big Hole the Nez Perce engaged in two significant battles and several skirmishes during the 1877 war. A few observations regarding the role of firearms in those fights are valuable as insights into the firearm types used by the Nez Perce at Big Hole only a few weeks later. During the initial raids, before the initial battle at Whitebird Canyon, arms and ammunition were taken from the settlers by the Nez Perce (McDermott 1978:6-15). At one ranch house the warriors took a Henry rifle and a shotgun from Patrick Brice and George Popham (McDermott 1978:16).

The Whitebird Canyon battle documentation contains several observations on firearms. Sgt. John P. Schorr, First Cavalry, was of the opinion the Nez Perce were well supplied with magazine guns (McWhorter 1986:235). Sgt. Michael McCarthy had a much more personal observation about the Nez Perce firearms. McCarthy, who tried to hide on the battlefield from the victorious Nez Perce, recalled seeing an old man and two women looking for him. They came so close that McCarthy remembered looking into the bore of the man's smoothbore musket (McDermott 1978:107).

The next major engagement was at the Clearwater. General O. O. Howard sent a telegram to J. C. Kelton at Division of the Pacific Headquarters on July 28, 1877, after the Clearwater battle (RG 94 No. 5117-77 cited in Brown 1982:195-6):

> The fact of several hundred rounds of metallic ammunition being found in the hostile camp, it is rendered certain that the Indians are largely if not entirely armed with breech loading rifles of the following description Henry, Winchester, U.S. Springfield Carbine Cal. 45, U.S. Springfield Rifle Cal 45 and apparently some long range rifles name unknown.

Apparently not all the Nez Perce were armed with breech-loaders, as Yellow Wolf remembered fellow warrior Toohoolhoolzote had a muzzle-loader at the Clearwater battle (McWhorter 1991:87).

Following the Clearwater episode the Nez Perce moved across the Lolo Pass. After crossing they were observed by two Deer Lodge volunteers who spied on the Nez Perce camp. John DeChampe and Bob Irvine told newspaper editor James Mills on August 5 they counted 250 guns, many of which were Winchester guns and cavalry carbines taken from dead soldiers. They also noted the ammunition belts were full (Brown 1982:234).

While not directly related to the Big Hole battle, the observation of Colonel Nelson A. Miles after the last battle of the Nez Perce War, the Bear Paw, is interesting, as it may reflect some of the arms used in the earlier fights.

Miles reported to General Alfred Terry that the Nez Perce were armed principally with Sharps, Springfields, and Henrys, which is consistent with Howard's earlier observations. Miles was also very concerned that the Nez Perce had used explosive bullets, wounding several of his men (Brown 1982:412).

Some direct evidence of firearms is available. A few relic firearms were found during the earlier collecting activities. Thain White (n.d.) describes a relic Model 1866 Winchester found on the battle site about 1880. The relic consists of a barrel and frame. Originally the sideplates and numerous other parts were present, but they were lost in subsequent years. White noted that a partial serial number of "1307.." was present on the remainder of the lower tang. An unusual feature is present on the gun. A brass oval with an "O" stamped in the center has been let into the upper barrel flat about 1/2 inch ahead of the frame.

Two Remington-made firearms are also described by White (n.d.). One is the frame of Remington New Model army revolver. It was found in 1938 in the river bank near the old bridge. The other Remington is a barrel and action of a rolling block rifle. It is reported to have been found about 75 to 80 yards northeast of the soldier monument located in the Siege Area. A serial number of "8125" was found on the cleaned gun. It is reported as both a .50 70-caliber and a .43 Spanish caliber. If the latter, the gun would postdate the battle.

The final relic gun is a U.S. Rifle Model 1841 (Hicks 1961:70) found during the 1991 archeological investigations (Figure 22). With the exception of the walnut stock the rifle was found nearly intact and still assembled in an old slough at the edge of the Willows just east of the northern part of the Village. However, the rifle's heavy brass butt plate and two iron butt plate screws were not located even after a very thorough search of the area.

The patch box cover was found near the trigger guard and in an open position. The cover was hinged away from the stock, and the trigger guard is slightly bent. This leads to the speculation that the rifle's stock may have been smashed or intentionally broken at the wrist. A radiograph of the rifle's barrel (Figure 23) indicates it was double loaded at the time it was destroyed.

During the soldiers' retreat from the Village they gathered up rifles from their dead and wounded comrades and other weapons found in the Nez Perce Village. In the retreat the surviving soldiers broke the stocks, and reportedly threw them into the river (Haines 1991:72) in order to avoid having them used against the command. The Model 1841 Rifle may be one of the

weapons destroyed during the retreat. It may also represent a gun used as a clubbed musket, which could result in a broken stock.

This type of rifle (Figure 24) was first patterned and constructed at Harpers Ferry Arsenal and approved by the Ordnance Department in 1841, thus the model designation of 1841 (Gluckman 1965:182). Harpers Ferry Arsenal and five private contractors produced 70,796 rifles of this model between 1846 and 1855 (Flayderman 1980:445).

The archeological specimen was altered from its original arsenal configuration. The front sight is missing, although the sight's dovetail is still evident. The rear sight has been moved forward five inches from its original location. The original dovetail is filled in with an iron piece. The present rear sight is too badly corroded to determine if it is the original military sight or a replacement. Both sling swivels on the stock's underside have been removed. The swivel on the trigger guard is missing, although the mounting stud is still present. The mounting stud on the front barrel band has been entirely filed away.

The front trigger guard screw is missing and, as noted previously, the guard is bent. A small piece of lead, crudely shaped to fit the front tip of the trigger guard, was found near the trigger guard. The lead piece retains a small iron wood screw. This lead piece is apparently a repair patch meant to hold the trigger guard in place on the stock.

Two screws originally held the lockplate secure to the stock. The forward screw is missing. There is no damage to the lockplate or the sideplate through which the screw passed, so it is likely the screw was deliberately removed some time before the gun was lost or destroyed. The butt plate and screws are completely absent.

The regular army troops, Seventh U.S. Infantry and Second U.S. Cavalry, were armed with the regulation shoulder arm during the battle, the Model 1873 Springfield rifle and carbine. The volunteers were issued breech-loading Model 1868 .50-caliber Springfield rifles (Haines 1991:36-37; Kermit Edmonds, personal communication March 4, 1993). The Model 1841 Rifle was obsolete by this time and there is very little likelihood it would have been issued to volunteer troops. The Army's Ordnance Department would not have issued a muzzle-loading rifle to regular troops for combat, although some were kept at western posts for hunting and for use in stretcher drills (Kermit Edmonds, personal communication March 4, 1993).

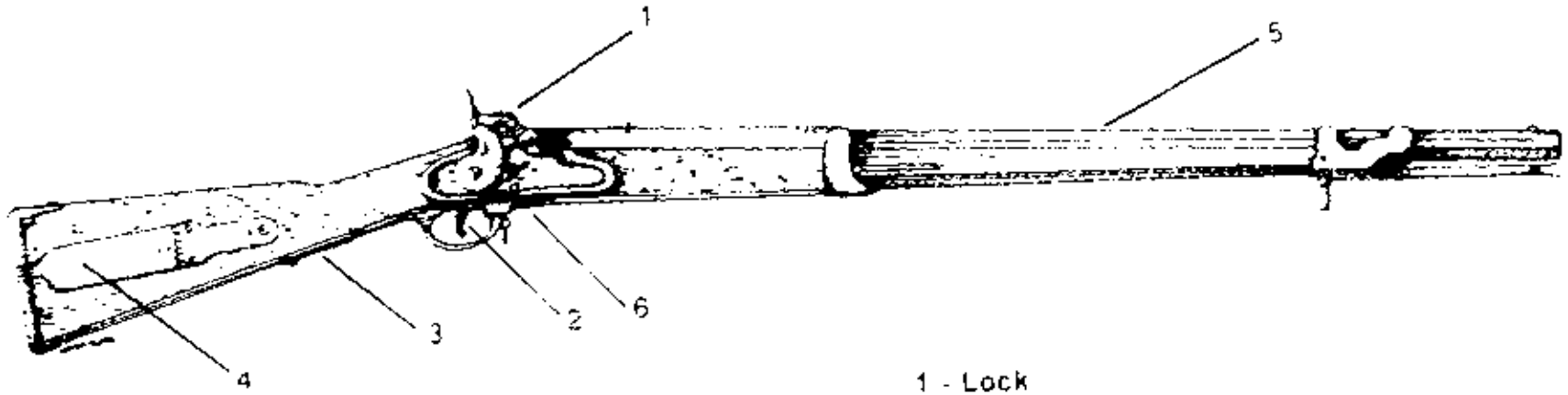
The modifications found on the rifle would not have been allowed even if it was issued to the volunteers. The modifications, along with the knowl-

edge of the arms of the regulars and volunteers engaged in the battle, lead to the conclusion that the Model 1841 Rifle found in the slough was one of the Nez Perce guns. At least one other Model 1841 Rifle was also present at the battle. A Model 1841 Rifle ramrod, identical to the specimen found in the slough, was recovered several years ago near the Howitzer Area on Battle Mountain (Haines 1991:82).

The historic record is clear that a 12-lb. Mountain Howitzer was used, albeit briefly, during the battle. The howitzer, a bronze tube mounted on a wooden carriage, had started from the wagon train at daylight on the morning of August 9. It was accompanied by a six-man gun crew recruited from various infantry companies, and possibly two civilians. The civilians, a black servant of Lt. Jacobs and Joseph Blodgett, a guide, were leading a pack mule with 2,000 rounds of extra rifle ammunition for the command and may have been with the howitzer or below it on the Dry Creek Trail. About the time Gibbon's men reached the Siege Area the gun reached a point overlooking the Village. The crew apparently went into action and was able to fire two rounds before the Nez Perce overran the position, dismounted the tube, and disassembled the carriage. One soldier was killed and the others escaped under fire (Haines 1991:75-83; Shields 1889:68).

The gun's ammunition limbers carried sixteen rounds. The rounds consisted of ten spherical case (explosive rounds triggered by a Bormann fuse), four shell (also explosive rounds triggered by a Bormann fuse), and two canister. Since the battle there have been at least seven known cannonball finds (Haines 1991:77-79). The balls were found near the stream at the base of Howitzer Hill, near the presumed site of the Howitzer Emplacement, in the Village, and in the draw behind the Siege Area. The one found in the Village may have been one fired by the gunners. One of the other balls found in the draw behind the Siege Area is in the possession of Mr. Leslie Moles. This ball was examined by the author. It is fused with a Bormann fuse. The fuse is uncut.

Kermit Edmonds (personal communication August 18, 1991) stated he had recovered several fragments of iron sabot strapping near the presumed location of the howitzer. Sabot strapping is meant to hold the ball, fuse up, on a wood sabot or block for loading into the gun's bore. Finding the sabot strapping in the area is consistent with the reports of finding two balls in the same area in 1928 (Haines 1991:79). Edmonds also mentioned that there had been some unauthorized metal detecting in the Howitzer Area by unidentified persons several years ago. It is his belief these individuals may have found several friction primers, used to fire the gun.



1 - Lock
2 - Trigger & Trigger Plate
3 - Trigger Guard
4 - Patch Box Cover
5 - Barrel & Ramrod
6 - Lead Repair

Figure 24 - A Complete Model 1841 Rifle

1

2

3

4

0 3in

0 7cm

5

0 1ft

0 30cm

6

0 1in

0 2cm

Gibbon's men found the disassembled gun after the battle and, placing it in a wagon, took it with them to Deer Lodge. It remained at the Territorial Prison for many years, until it was transferred to the U.S. Forest Service about 1936 and then to the National Park Service. The carriage has been restored, and the gun is part of a prominent display at the Big Hole visitor center.

In addition to the relic arms mentioned there is a substantial body of firearms evidence in the form of the archeologically recovered cartridge cases and bullets. The archeological specimens are the physical evidence of actual firearm use. The artifacts certainly expand the historical data base relating to firearms types. There was an astounding array of arms represented in the cartridge cases and bullets recovered. Many clearly post-date the battle. Only those that can be reasonably associated with the battle, either because the typological features indicate an 1877 association or they are found in a clear battle context, are discussed here. The identifications were based on the presence of specifically identifiable firing pin imprints on the cases, size and shape of the bullet, and land and groove marks on the bullets.

Muzzle-loading weapons are definitely represented in the collection. These are represented by a .45-caliber round ball, a rifle percussion cap, .54-caliber round balls, the relic Model 1841 Rifle, and a .58-caliber musket ball, for a total of four types of muzzle-loaders. A variety of shot suggests shotguns were likely in use as well. The sabot strapping and relic cannon balls confirm the usage of the Mountain Howitzer, technically a muzzle-loading weapon.

Cartridge guns clearly predominate over the other firearms types. The .45-70-caliber bullets and cartridge cases confirm the use of the Model 1873 rifle and carbine. A few cases were found which had the paper tube liner indicating a carbine load. The numerous .45-caliber, 405-grain lead bullets also support the use of the rifle and carbine. Colt revolver cases and bullets indicate the Model 1873 Colt was present as well. The Springfield Model 1868 or 1870 .50-70-caliber was identified by bullets and cases, as was the Sharps .50-70-caliber rifle or carbine.

Other Sharps present included a .44 or .45-caliber rifle and .40-caliber sporting rifles. The Remington .50-70-caliber Rolling Block rifle is identifiable from unique extractor marks on several cases. The Spencer .56-50-caliber rimfire carbine is also present.

The many cases and bullets in .44-caliber indicate the rimfire Model 1866 Winchester and or the Henry rifle were utilized. The .44-rimfire cases also demonstrate that the Colt Model 1860 conversion revolver was present as well as the Colt Model 1872 Open Top.

Two foreign or express rifles were also noted. A single cartridge for a .500 express rifle was found several years ago. The bullet appears to have been cut down, perhaps in an attempt to make it fit a .50/70-caliber rifle. Numerous .360-caliber explosive bullets and case heads (Figure 25) were also recovered. None have been fired, and all were found concentrated in a single locale. The term "explosive bullet" was used in the nineteenth century to identify both true explosive bullets, those with an explosive charge, and bullets which expanded upon impact, the equivalent of a hollow point bullet.

We thus have nineteen types of firearms represented by the cases, bullets, and saddle strapping. Seventeen types, four muzzle-loader calibers, one cannon, one shotgun type, and eleven breech-loading firearm types, were definitely used in combat. There is little doubt that the army used the howitzer and the Model 1873 rifle and carbine, as well as the Colt Model 1873. The civilian volunteers probably used the Model 1868 or 1870 Springfield rifle. Those same types and the remaining types were used by the Nez Perce.

Two express calibers were present at the battle, but the archeological data do not indicate whether or not they were really utilized. Lieutenant Charles Coolidge and Private Holmes Coon both believed and reported the Nez Perce used explosive bullets during the battle (Haines 1991:88). Colonel Nelson Miles did report the use of explosive bullets at the Bear Paw battle. As noted earlier, Miles was to send several examples of those bullets to higher authority. He or his senior medical officer did this. The cartridges are described and reported as a footnote to the use of explosive bullets in the Civil War in the *Medical and Surgical History of the War Of the Rebellion*.

Figure 25. .360-caliber cartridge components.

The volume published 1883 contained this footnote:

> There are, however, on exhibition several specimens of centre-fire metallic cartridges for a breech-loading rifle .35 caliber, loaded with explosive bullets contributed by Major-General M. C. Megis, Quartermaster General U.S.A. and Surgeon H. R. Tilton, U.S.A. and found in the camp of Chief Joseph's band of Nez Perces, in 1877, after their surrender to General Miles. The projectile is represented in Fig. 387. A copper shell nearly three-fourths of an inch in

> length, loaded with fulminate, is enclosed in a boring at the head of the bullet: the end of the shell projects sufficiently to act as a percussion cap by which the missile is exploded. The following extract from a letter from Surgeon H. R. Tilton, U. S. A., give some interesting facts in connection with this and another form of explosive missile: " Fort Riley, Kansas, April 5, 1881. Surgeon D. L. Huntington, U.S.A., Washington, D.C. Dear Doctor: In reply to your note of enquiry about explosive balls used by the Nez Perce, I will give you such information as I have. During the siege, which lasted five days I was disposed to doubt that the Nez Perces had any explosive balls, although several men insisted that they had been struck by them, as they distinctly heard the explosion. One man of the 9th Cavalry was shot through the thigh in front of the femur: the skin was discolored, and the hole large enough to admit the thumb: there was only a bridge of skin. After the surrender and discovery of explosive balls in the village, I was convinced that a number of wounds had been caused by explosive balls.. I was curious to know how the Indians had obtained these explosive balls and heard upon enquiry that in passing through Idaho they had made a raid upon a 'ranch' of an Englishman who had hunted in all parts of the world, and was well supplied with rifles and ammunition, including explosive balls, and the Nez Perces had captured his outfit although he escaped... (Otis and Huntington 1883:702 note).

Contact with the National Museum of Health and Medicine (Armed Forces Institute of Pathology, Walter Reed Army Hospital) confirmed they still had two of the cartridges in their collection. This collection is from the former Army Medical Museum. The cartridges are not .35-caliber as noted, but the .360-caliber. One cartridge is intact and the other has had its bullet pulled. The paper-wrapped brass cases both have penciled notations stating they are from Chief Joseph. These cartridges are identical to the archeological specimens recovered from the Big Hole battle.

The English gentleman referred to in the medical footnote is identified by General O. O. Howard (1972:138-40). Howard stated in his account of the Nez Perce war that a Mr. Crosdaile had put a nice farm under cultivation near Mt. Idaho, Idaho. Howard also noted Crosdaile had a beautiful young wife of refinement and culture. Howard dined with the Crosdailes and others at Mr. Rudolph's in Mt. Idaho.

Brown (1982:413) concluded that Mr. Crosdaile was a former British officer who settled near Mt. Idaho. McDermott (1978:40) says he was ex-Royal Navy and that Crosdaile superintended the building of the defensive stockade at Mt. Idaho. Howard also noted that the Englishman helped build the stockade. Mr. Derek Batten, a British volunteer on the archeological project, kindly performed some research regarding Mr. Crosdaile. He was

able to determine that Henry Edward Crosdaile was commissioned a Sub-Lieutenant in the Royal Navy on June 17, 1867. He served on a number of British naval vessels and was promoted to Lieutenant on October 22, 1870. He retired from the Royal Navy indefinitely on May 17, 1872, as there was no opportunity to utilize his services. Mr. Batten compiled this information from the Record Book at the Public Records Office, Kew, England, and from published *Navy Lists*.

FIREARMS QUANTITY

The ability to identify firearms types is a useful analytical tool, and the ability to determine the minimum number of individual guns present and where they were used in the battle can be a powerful interpretive tool. The means to this firearms identification has been taken from the realm of the criminal investigator. The technique of firearms identification has been discussed in Scott and Fox (1987), and has been summarized in Chapter 3 of this volume.

Here again, the historical data base provides useful insights regarding the numbers of firearms in combatant hands. The soldiers and civilian volunteers were all armed. There were 154 officers and soldiers of the Seventh Infantry and Second Cavalry engaged in the battle. Some officers may not have carried the Springfield rifle or carbine, although some undoubtedly did. A reasonable estimate for army firearms, based on the presence of seventeen officers, nine Second Cavalrymen, eight mounted infantrymen from Company F, and 120 other infantrymen, is at least 145 Springfield rifles, nine Springfield carbines, twenty-six Colt revolvers, and one Mountain Howitzer. The civilian volunteers totaled thirty-seven, including the servant Woodcock. Given the assumption the volunteers were armed with Springfield .50/70 rifles or personal weapons, then approximately thirty-four Springfield .50/70s, one Henry rifle, one other magazine gun, a cap and ball revolver, and possibly one shotgun comprise the volunteers' armament.

The number of Nez Perce arms is more difficult to determine. At least one shotgun and one Henry rifle were captured by the Nez Perce as noted earlier. Analysis of the documentary evidence from the Whitebird Canyon and Clearwater battles, as well as several other skirmishes, provided some information on potential numbers of captured firearms in Nez Perce hands.

Brown (1982:196) indicates that four Springfield rifles were captured at the Clearwater and perhaps as many as 33 carbines were captured from Perry's command at Whitebird Canyon. The primary Nez Perce informant,

Yellow Wolf, told of capturing at least 2 rifles and belts of ammunition at Whitebird (McWhorter 1991:59), and he recalled that 63 guns were captured *in toto* (McWhorter 1991:61-2). Yellow Wolf also noted he had used a 16-shot rifle (McWhorter 1991:78). A Model 1866 Winchester rifle purported to be Yellow Wolf's is in the Big Hole National Battlefield collections.

At Whitebird Canyon, About Sleeps and No Leggings On recovered pistols. Wounded Head also captured a carbine from a soldier he killed. He left behind a cap and ball pistol as a gift to the conquered foe (McDermott 1978:101-102). Yawishekaikt said the Nez Perce recovered some 35 or 36 weapons at Whitebird, although Yellow Wolf remembered it was 63 and Yellow Bull thought upwards of 90 (McDermot 1978:104).

An Army Court of Inquiry into the Whitebird Canyon battle (McDermott 1978:174-5) indicates the Company F men were armed with revolvers, while in Company H only the non-commissioned officers, trumpeters, and officer had revolvers. Given the deaths in Companies F and H, at least 26 revolvers could have been lost. Carbine losses were at least 35. By army estimates then, around sixty weapons may have been lost.

On July 4, 1877, Lt. Rains' party of ten men was annihilated near their camp at Cottonwood, Idaho. The Nez Perce warriors took the guns and ammunition (McWhorter 1986:283). Following the Clearwater battle Colonel Mason's four Indian scouts, in pursuit of Joseph, were intercepted and lost their arms to the Nez Perce (Howard 1972:169).

The historical record is incomplete on the total numbers of firearms used by either side. However, it does provide hints at the numbers present. Certainly the 210 soldiers and volunteers were all armed. The army believed the Nez Perce were armed primarily with the magazine rifles. The historical record does confirm that some Winchesters and Henry magazine rifles were indeed in Nez Perce hands. The army records and Nez Perce recollections suggest that somewhere between sixty and ninety army weapons and an unknown quantity of ammunition were captured by the Nez Perce prior to the Big Hole battle. In addition, the Nez Perce purchased or seized other ammunition during their movements through the Bitterroot Valley.

The bullets and cartridges recovered during the archeological investigations form the core of data on which the analyses to determine the minimum number of firearms present were based. The site yielded 79 cartridges, 43% cartridge cases, 230 bullets, and some fragments of cannonball sabot strapping. The .44-caliber Henry and Model 1873 Winchester cases represent only about 4% of the total; the Springfield .50-70, 5.9%; and the .45/70 Model 1873

Springfield cases account for the majority at 82.1%. Corresponding bullets were found in similar quantities with 6%, 18%, and 57%, respectively. The sheer number of these cases indicates the Model 1873 Springfield, the Springfield .50/70, and the Winchester-manufactured repeating firearms played a prominent role in the battle, accounting for over 92% of all cartridge cases and 81% of all bullets found.

The firearms identification analysis has found evidence for at least 147 individual guns among the nineteen firearm types used in the battle (Table 1). The archeological data provide the direct physical evidence of the guns used on the battlefield site. This is a conservative estimate in that we have counted only those cartridges and bullets which can be sorted and identified with certainty. Groups of balls such as the .45- and .54-caliber, as well as the shot, were counted as representing only one gun in each type. There is little question that if these round balls could have been sorted and identified further, the tally of individual firearms would have mounted considerably. We are well aware that the firearms count represents only those cartridge cases and bullets found during the archeological project and within the formal battlefield boundary, and by no means represents all of the possible firearms used. The figures represent only a minimum number of firearms that can be identified from the archeological evidence. No doubt, many more were used by the combatants.

The largest number of individual guns is represented by Springfield Model 1873 .45/70-caliber rifles (Table 1). For convenience the Springfield .45-caliber cases are assumed to be .45/70s. Carbine cases cannot be discriminated from rifle cases unless the tube liner or paper wad is present. The cartridge cases indicate a minimum of 90 Springfield rifles were present. The second largest group is the Springfield .50/70 with a minimum of twenty-four guns, with the Henry and Winchester Model 1866s represented by at least ten repeating guns (Table 1). Four or five different Sharps, two Remington Rolling Blocks, and three Model 1873 Winchesters were also identified.

The Colt Model 1873 army revolver cases indicate a minimum of two were used. The remaining bullets and cases account for a minimum one additional firearm each. The cartridge case evidence totals 92 individual firearms associated with either the Model 1873 Springfield army rifle or carbine or the Model 1873 Colt army revolver.

The army firearms account for 62.5% of all individually identified guns. The Henrys and Winchester Models 1866 and 1873 repeating firearms amount to only 8.8% of all firearms and 23.6% of the non-army firearms.

Table 1. Archeological evidence of firearms types and quantity.

Firearm Type	Cartridge Cases	Bullets	Minimum Number of Guns Represented*
Express .360	35	10	1
Sharps .40	-	3	1 or possibly 2
Henry .44	26	14	10
Winchester M1873	4	-	3
Colt conv. .44	1	-	1
Colt M1871 .44	1	-	1
Colt M1873 .45	2	3	2
Springfield M1873 .45	524	131	90
Sharps .45	-	1	1
Remington .50	2	-	2
Sharps .50	2	-	2
Springfield .50	38	41	24
Spencer 56/50	2	1	2
Express .500	1	-	1
Unknown cal .45	-	1	1
cal ca. .54	-	11	2**
conical ball .58	-	1	1
shotgun	-	13	1
Mountain Howitzer			1***
Total	638	230	147

* Where no cartridge cases were present, bullets were assumed to represent a minimum of one firearm for that type.

** The individual balls cannot be identified to a specific gun; however, the .54-caliber Model 1841 Rifle and the additional ramrod find are minimally counted as representing two .54-caliber firearms.

*** One cannonball is in the Big Hole collections, and one additional ball was examined. As many as seven have apparently been collected. Sabot strapping for a least one round was also recovered.

The historical documentation indicates that Gibbon's command may have had about 154 .45/70 rifles and carbines. The Nez Perce may have captured about 63 Springfields in previous engagments. Thus there may have been about 217 Springfield .45/70 guns at the Big Hole. The archeological data indicates there were at least 90 .45/70 Springfields. The archeological

recovery rate is 41% of the expected quantity. This recovery rate is slightly higher, although consistent with the archeological identification/historical documentation ratio found during the archeological investigations at the Little Bighorn battle (Scott et al. 1989). Therefore, the archeologically recovered firearms sample is representative of weapon types present, and is a significant sample of the total potential firearm quantity. Since the cartridge case and bullet distribution data is patterned, it can be viewed as representative of the combat actions occurring in various parts of the field of battle.

The ability to identify individual weapons is an important achievement in the study of the battle. It helps to address questions on the minimum numbers and types of armament of the Indians. But, coupled with the piece-plotted data, locating precisely where cartridges and bullets were found, this capability becomes even more important by allowing us to trace individual movements during the battle and to reinterpret a number of specific questions related to firearms and to the overall chronology of events of that short span of time.

THE QUESTION OF EXTRACTION FAILURE

Cartridge case extraction failure has been blamed for the army's defeat at the Battle of the Little Bighorn (Graham 1953:146-147). There the archeological evidence suggests the army experienced about a six-percent failure rate, while the Indian firearms showed nearly the same rate of extraction problems. Historical (Hedren 1973:66) and archeological evidence (Scott et al. 1989) indicate that even though carbine cartridge case extraction failure was a factor, it was not significant to the outcome of the battle.

Since the Big Hole battle occurred only thirteen and one-half months after the Little Bighorn and involved some of the same men who had assisted in the burial of Custer's dead, and the archeological evidence demonstrates the same weapon and ammunition types were still in use, it is a useful exercise to examine the cartridge extraction failure rate to determine its effect at Big Hole.

The historical documentation is silent on the army's extraction problems at Big Hole, if any occurred. Examination of the archeological cartridge cases shows the same types of cartridges were used at Big Hole that had been used, and apparently caused problems, at the Little Bighorn.

The army cartridges, at both battles, had Benet primed copper or Bloomfield Gilding Metal cases. These copper cases were fairly soft and prone to development of verdigris (copper acetate) when carried in leather belts.

They were also prone to sticking in the chamber if the gun barrel was extremely hot, which caused the copper case to expand and jam. A comparison of the cases found at both sites demonstrates both battles used the so-called short crimp to hold the Benet cup primer in the case. No long-crimp varieties were identified on either battlefield. This indicates that the ammunition lots were manufactured prior to mid-1877.

The primary difference between the two battles is in the presumed manner in which the cartridges were carried by the individual soldier. At the Little Bighorn the soldier probably carried his ammunition in a Prairie belt, a personally fashioned leather belt with leather loops to hold the cartridges. If the cartridges were not regularly cleaned, verdigris could develop and become a cause of extraction problems. By the time of the Big Hole battle the army had adopted the canvas Model 1876 cartridge belt (McChristian 1982; Dorsey 1992). This canvas belt also had canvas cartridge loops. The Model 1874 McKeever cartridge box was leather but had canvas loops to hold the cartridges. Thus the problem of verdigris development had been nearly eliminated.

How the Sioux and Cheyenne carried their ammunition is not known. Except for notations that the Nez Perce captured some army cartridge belts, it is not known how they otherwise carried their ammunition. Very few Big Hole archeological cartridge cases exhibit any evidence of extraction failure. However, three cases fired in two different .50/70 Springfields have torn heads that suggest extraction problems. Two .45/70s are split, indicating they were fired in a .50/70-caliber gun. In this case it was also a Springfield. In all probability the split cases caused some extraction problems. Thus we have three different .50/70 Springfields with apparent extraction problems. This translates to 13.6% of the Springfield .50/70s that had some type of extraction problem, at least as seen in the archeological sample.

One .45/70 case has a torn rim. This probably occurred during extraction. If so, the extractor would not have fully extracted the cartridge from the chamber, thus requiring its removal by hand or with the gun's cleaning rod. In any case it would have required the soldier to stop fighting to clear the chamber. Several other cases were located that were fired in this same weapon, and no others exhibited any evidence of extraction problems.

Thus while there is evidence of extraction problems at the Big Hole, it does not appear significant. The .45/70 cases exhibited only one instance of extraction problems. The .50/70s on the other hand, and probably those in Nez Perce bands, exhibited over a 13% extraction failure. The army appears

to have solved their extraction problem with the issue of the canvas cartridge belt. The Indians still had a few problems, but not enough to cause them to lose the battle.

EVIDENCE OF SOLDIERS' OR VOLUNTEERS' PERSONAL FIREARMS

The Nez Perce certainly utilized personal firearms during the engagement. Yellow Wolf is known to have used a Model 1866 Winchester as well as captured army firearms. Five Wounds was given a magazine gun of an unidentified type when he began his suicide charge into Battle Gulch (Haines 1991:85). The soldiers and volunteers were issued the Springfield rifle in .45/70-caliber and .50/70-caliber, respectively. It is also known that at least three volunteers used a personal firearm rather than the issued one. Riley Cooper used a Henry rifle rather than the .50/70; John Shinn utilized a magazine rifle of some type, probably a Winchester (Haines 1991:89); and Tom Sherril used a cap and ball revolver.

The archeological .50/70-caliber cartridges cases indicate two Remington Rolling Block rifles were used in or near the Siege Area. One cartridge case for a Remington .50/70 was found near the northeastern corner of the riflepits several years ago. This string of riflepits is known to have been used by volunteers, and the cartridge case association with the riflepits suggests a volunteer may have used a Remington rifle. A second cartridge case fired in another Remington was found to the east of the riflepits, but in the area known to have been used by the Nez Perce. The historical base maps of the site also show numerous tree locations known to have been used as cover by the soldiers and volunteers, as well as the Nez Perce. This second Remington is not clearly associated with a soldier or Nez Perce position; however, it was found near two other .50/70 cases that can be shown to have been fired in a gun that was used on the initial soldier attack line of the village and on the narrow spit of land that was originally in a river meander. That association suggests the second Remington may well have been a volunteer weapon as well.

At least one other individual weapon was used by a soldier or volunteer. A single .44-caliber rimfire cartridge case fired in a Model 1860 Colt conversion was found near the northeastern riflepits occupied by some volunteers. It was in the same area as the Remington .50/70 case. Although the archeological data and historical documentation are limited, there is evidence for at least three and possibly four personal firearms being used by the volunteers during the battle.

Movements and Actions at the Big Hole Battle

To interpret the events that occurred during the battle by utilizing the archeological evidence it is necessary to break the battle into a series of discrete elements. These breaks are artificial, in a sense, as they are discrete elements identified for discussion purposes only. The battle was a continuous and evolving situation that only in retrospect had discrete and definable elements. Certain things happened simultaneously, but for description and discussion purposes they are broken into a variety of discrete actions or elements. The following interpretations combine the archeological evidence with historical documentation. Agreements and disagreements between the data sets are noted, and where disagreements are found, a reinterpretation is offered based on both sets of evidence.

THE ATTACK ON THE VILLAGE

The opening salvo of the Battle of the Big Hole was fired by Lt. Bradley's men in the predawn of August 9. Colonel Gibbon sent several companies of his command through the swampy willows during the night to take positions just inside the Willows and opposite the sleeping Nez Perce villagers. Bradley with his dismounted detachment and many of the volunteers crossed the river, and concealed themselves in the Willows near the north end of the Village. Captain Sanno with Company K apparently also crossed the river to the south of Bradley and took position in the Willows. Captain Comba with Company D was on the southern, or right, end of the line. Comba's men were concealed on the west bank of the river, in the thick Willows opposite the southern end of the Village. When the attack began, they were the only group that had to charge across the river to reach the Village. The firing began, the historical documents indicate, with three volleys fired by some elements of the attacking force before they entered the Village and drove the Nez Perce out.

The attack at the Village's north end faltered when Lt. Bradley was killed in the early moments of the fight. There is a suggestion that this element did not actually reach the Village, but was pinned down by Nez Perce fire at the edge of the Willows. However, Sanno and Comba, initially supported by Logan's Company A and later Companies F, I, and G, did enter and hold at least the southern portion of the Village. The Nez Perce were able to regroup and drive the soldiers from the Village after several hours. The documentary sources suggest there was initial confusion in the Village, but fierce resistance by several determined warriors caused the soldiers problems. Fire may have been sporadic as the Nez Perce retreated from the Village. Once

the Nez Perce were able to regroup, they were exhorted by several leaders to re-double their efforts and force Gibbon's command out of the Village and back across the river.

Presumably the attacking elements of Gibbon's command attempted to deploy in proper skirmish order as required in the tactical manuals of the day. Skirmish intervals were about 15 feet between men, although the terrain could dictate wider or more closely spaced intervals as necessary (Upton 1872). A normal skirmish line had the sergeants placed about 30 feet in the rear of their sections, the lieutenants 75 feet behind the line, and the company captain 240 feet behind the line. At the Big Hole most companies had only one or two officers present for duty. Undoubtedly those officers modified their location relative to the line to be in the most effective place to observe and command the skirmishers.

Charles Woodruff (1910:107-108), the command's adjutant, stated that Rawn, Browning, and Williams with their respective companies were in line behind Comba and Sanno, while Logan was on line and ready to strike at the extreme right. Woodruff is not precise about the location of the reserve companies. However, tactics manuals (Upton 1872:97) state that the reserve company will be posted about 150 yards from the attacking line. In addition, the main reserves should be posted about 400 yards from the line, where the ground is favorable to sustain that formation.

Upton's tactics manual established ideally how men were to be deployed and rules of engagement. For maneuvering in the field, a command was divided into Armies, Corps, Divisions, Brigades, Regiments, Battalions, and Wings. Gibbon's command was too small to be divided or maneuvered except by battalions or wings. Given the strength of the command, maneuvering by wing is the most plausible for the Big Hole battle.

Wings, as defined by Upton (1872), were fluid organizations. Two wings, a right and a left, were composed of the available companies. The right wing was made up of the odd companies and the left of even companies. The odd and even concept is unique to the military and is based solely on seniority of the company commanders (Fox 1993). The company commander with the greatest seniority, appointment of rank at the earliest date, is number 1. The remaining company commanders then follow in numerical order based on their date of appointment. The wings are then established by company commander seniority ranking with number 1 as commander of the right wing and number 2 in seniority as commander of the left wing. Number 1, being senior, could also take command of the entire unit if the overall commanding officer be-

came incapacitated. This ranking structure was known to every officer so that he could assume command of any command element at any time based on his seniority within the command.

Within the Seventh Infantry, company commander seniority, based on an analysis of Heitman (1965), was Rawn of I number 1, Comba of D number 2, Browning of G number 3, Sanno of K number 4, Williams of F number 5, and Logan of A number 6. The right wing was then composed of Companies I, G, and F; while the left wing was made up of Companies D, K, and A. This posited organizational structure is consistent with Woodruff's (1910:107-108) description of company association and deployment during the attack.

The attack on the Village utilized Bradley with his scouts and civilians on the left, Comba with Company D on the right, and Sanno with Company K in the center. Comba, Sanno, and Logan made up the left wing, if the organization postulated is correct. The historical accounts suggest Logan's Company A came in on the right to support Comba fairly soon after the firefight began. If this is correct, then the left wing made the initial attack. Logan's company may have been in reserve in the Willows during the initial attack.

The right wing may have been held in reserve on or just below the Trail with Gibbon. The distance between the attacking companies and this posited reserve is nearly what was required in the period tactical manuals. When Gibbon saw the fight in the Village escalating and perhaps swaying in favor of the Nez Perce he committed his reserves, the right wing. Rawn and Williams with Companies I and F respectively supported Comba and Logan on the right near the south end of the Village. Browning with Company G supported Sanno in the center or what by that time may have become the left of the line as Bradley's men moved to join Sanno when they lost Bradley near the north end of the Village.

This posited deployment is consistent with a battalion-sized maneuver for commands in the latter half of the nineteenth century. Tutherly (1898:215-217, 262-268) explains ideal battalion-sized deployments, for favorable terrain, as skirmishers or advanced party deployed on line with initial reserves arrayed in line of squads about 500 yards to the rear. Additional reserves are deployed 600 yards to the rear of the support line. Gibbon's known deployment fits Tutherly's criteria as adapted for less than ideal terrain conditions. Assessment of the tactical manuals of the era demonstrates Gibbon did not haphazardly organize his men or companies for battle with the Nez Perce. He appears to have divided and deployed his command based on the standard and approved military tactics of the day. Gibbon's command

structure was well organized according to the manuals of the day, at least for the initial stages of the attack on the Village.

Before discussing the individual firearm evidence from the Village it is useful to establish the potential number of attackers. The following numbers are based on Haines (1991) history of the battle. Bradley's command consisted of his mounted detachment and citizen volunteers. The number would be 38 or fewer men. There were eight Second Cavalrymen and up to 30 volunteers that could have been with Bradley. However, some volunteers, perhaps five, and a few soldiers were detailed to capture the Nez Perce horse herd. The number of individuals involved ranges from five to 20, depending on the source's memory. Therefore, a maximum of 38 is used for Bradley's command.

Captain Sanno's Company K had 21 effectives according to the rosters, and Comba's Company D had 20 effectives. Logan's Company A had only 13 men available, although his command may have been strengthened with the addition of four men present as casuals from Company H. The initial attack may have been composed of between 82 and 101 men. Gibbon's reserve companies, F, G, and I, had 21, 27, and 18 effectives according to the rosters. Company G had the largest contingent, and it is suspected that at least one eight-man squad was detached as a reserve, as argued in the discussion on the Trail episode. Thus the reserve companies were composed of between 58 and 66 men. The officers, guards left with the wagons, and the howitzer crew make up the remainder of Gibbon's command. Aubrey Haines (personal communication Feburary 29, 1993) estimates the effective attacking force to have numbered 113 with 49 in reserve.

The Village Area, that area east of the river, accounted for several hundred .45-70-caliber cartridge cases. The minimum number of individual guns identified is 58. One gun fired sixteen shots in the Village and five more in the Willows west of the river. Four guns demonstrate movement from the Village to the Willows and to the Siege Area. Six guns also demonstrate movement from the Village to the Siege Area.

The Village can be divided into two segments, north and south, based on the concentration of artifact finds. The cartridge case data shows that 49 guns were used in the north Village Area and 21 in the south (Figure 26). Thirteen guns were used in both areas.

Most .45-70s used in the Village have one or more matched cases. There is clear evidence for movement of firearms between linear groups of cartridge cases, which appear to be firing lines. At least five separate lines can

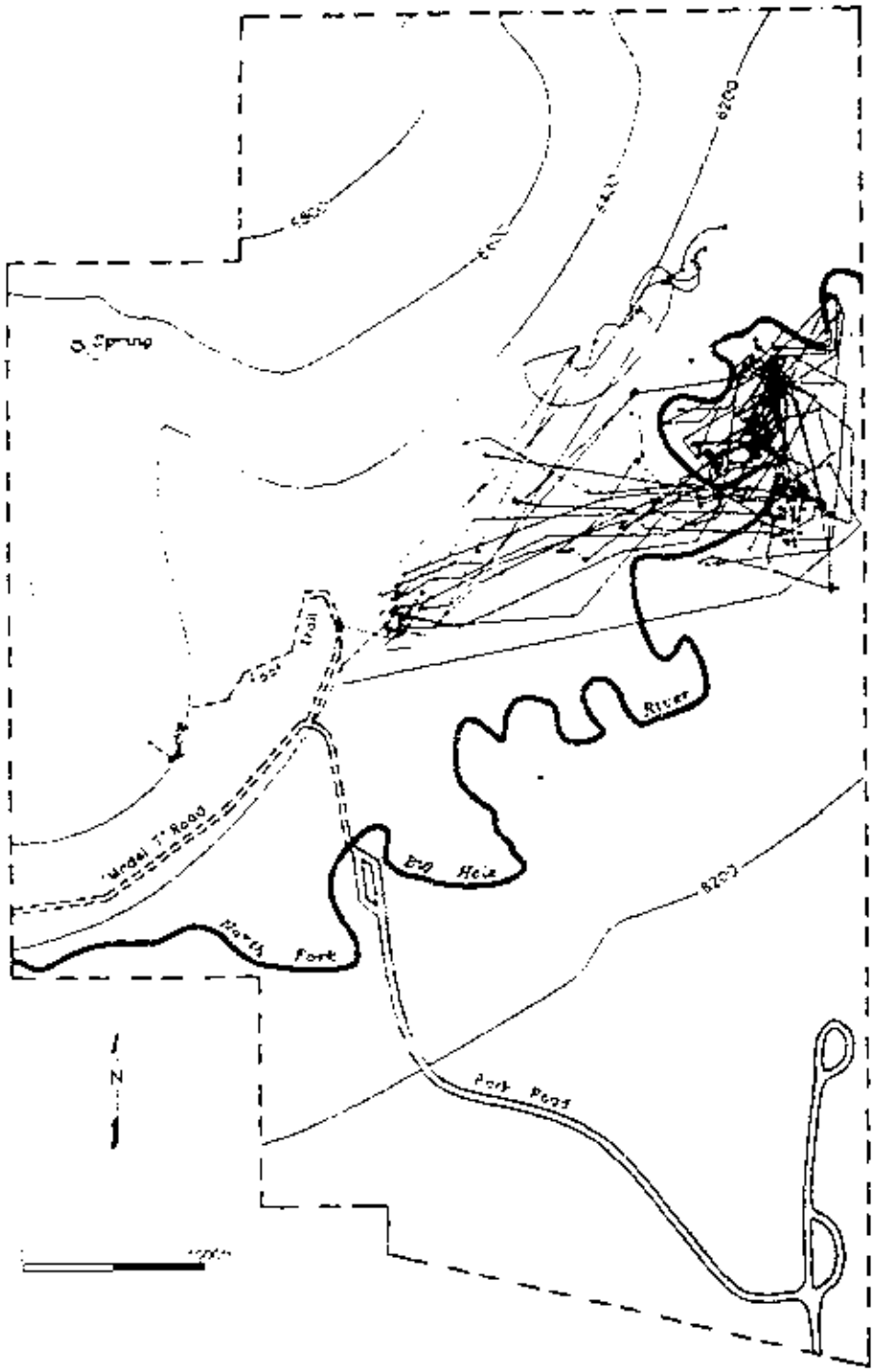


Figure 26. Map of .45/70 cartridge case matches.

be distinguished west of the Village. Much of the case movement noted is between firing lines. Many of the guns fired a shot or two on one line, then appear to have moved a few yards or tens of yards and fired one or more shots on that line. There is some evidence of individual movement along a given line as demonstrated by matching cases found distributed over tens of yards in that line.

The spatial distribution of the case matches in the northern Village Area appears to have more order than that of those found in the southern portion. The southern area case matches appear more randomly distributed, with wide dispersion of matched cases. This may be interpreted as meaning that the initial attack was more orderly in the northern area, those areas commanded by Bradley and Sanno: that Comba's charge across the river at the Village's southern end may have been more chaotic, thus requiring the reserves to be deployed in that area: or that Comba's understrength company met significant resistance from the Nez Perce in this area. Such a supposition is supported by other archeological evidence. At least six Henry or Winchester rifles were used by the Nez Perce at the Village's southern extreme. Stiff resistance, as is suggested in the historical and archeological record, may have caused Comba's attack to falter and required the early commitment of Logan's reserve company followed by Gibbon's commitment of the remaining reserve companies as additional support.

There is definite evidence of movement from the northern areas to the south, where there appears to be more mingling of men. The historic sources note that men assembled toward the southern end of the Village and attempted to burn the tepees. Such an action suggests more intermingling of men from the various companies.

Captain Browning is supposed to have moved to the east from the Village in attempt to rout the Nez Perce from their firing positions on the bluffs. There is no clear archeological evidence to support this movement, although his charge may have taken place beyond the current boundary fence line. The few .45/70-caliber cartridge cases (Figure 27) found to the east of the Village Area match to cases found in the northern group and to cases in the southern end of the Village. The more easterly distribution of cases shows four or five groups roughly aligned north to south. The four southern groups are spaced about 50 to 60 yards apart. Each case group represents two to five individual guns. This suggests the shooting to the east of the Village was more haphazard than previously supposed. Perhaps these case groupings on the southeast, center, and northeast represent picket deployments or more ran-

dom wanderings of men looking through the Village. The north to south alignment might suggest pickets posted to maintain an eye on the Nez Perce while the bulk of the command attempted to burn the Village. Such a postulated deployment is in agreement with tactical manual recommendations for a halt under fire.

The most northerly cartridge case group may represent a picket post or Nez Perce–utilized captured weapons. This intriguing group of six .45/70 cases (Figure 27) was found in the north loop of the river, at the northeast edge of the Village. The river shifted its course several years ago, and this loop is now an abandoned meander. Several cases were too eroded to consider in the analysis, but the others indicate at least three .45/70 rifles were used in this area. The three all match to cases in the north Village group within suspected soldier positions.

In addition, six .50/70 cases (Figure 28) were found in this area as well. All six cases match to a case found in the northern area, as well as to a case found in the Willows retreat area and to two cases found in the Siege Area (Figure 29). This combined evidence may suggest that some of Bradley's or Sanno's men moved about 125 yards to the north, perhaps engaging some Nez Perce warriors in the process. An alternative explanation is that these cases represent the movement of the group who unsuccessfully attempted to capture the horse herd. If so, the cases represent their movement from the north to the south and suggest they were under fire as they made their movement to join the men in the Village.

The northern end of the Village, east of the Willows, is nearly devoid of .45/70-caliber cartridge cases. It is tempting to speculate that this indicates and verifies that Bradley's command was stalled at the Willows after he was killed. However, such an interpretation must be made carefully. The absence of cartridge cases in this area may also be due to intensive relic collecting efforts in the past. Thain White's photographs of find areas suggest he concentrated his collecting efforts in this northern area. Thus the relic finds he made may have biased the archeological sample recovered in this area. There were also numerous .45/70-caliber bullets found in this same area. In fact, the distribution of .45/70 bullets shows a higher concentration in the northern end of the Village than elsewhere (Figure 30). The same can also be said for non-.45/70 bullets. This certainly suggests there was combat in this area, and it should be pointed out the non-.45/70 bullet distribution is more random than that of the .45/70 bullets. The .45/70 bullets are not found in the Willows but almost exclusively in the Village, to its east, as well as south of the Village.

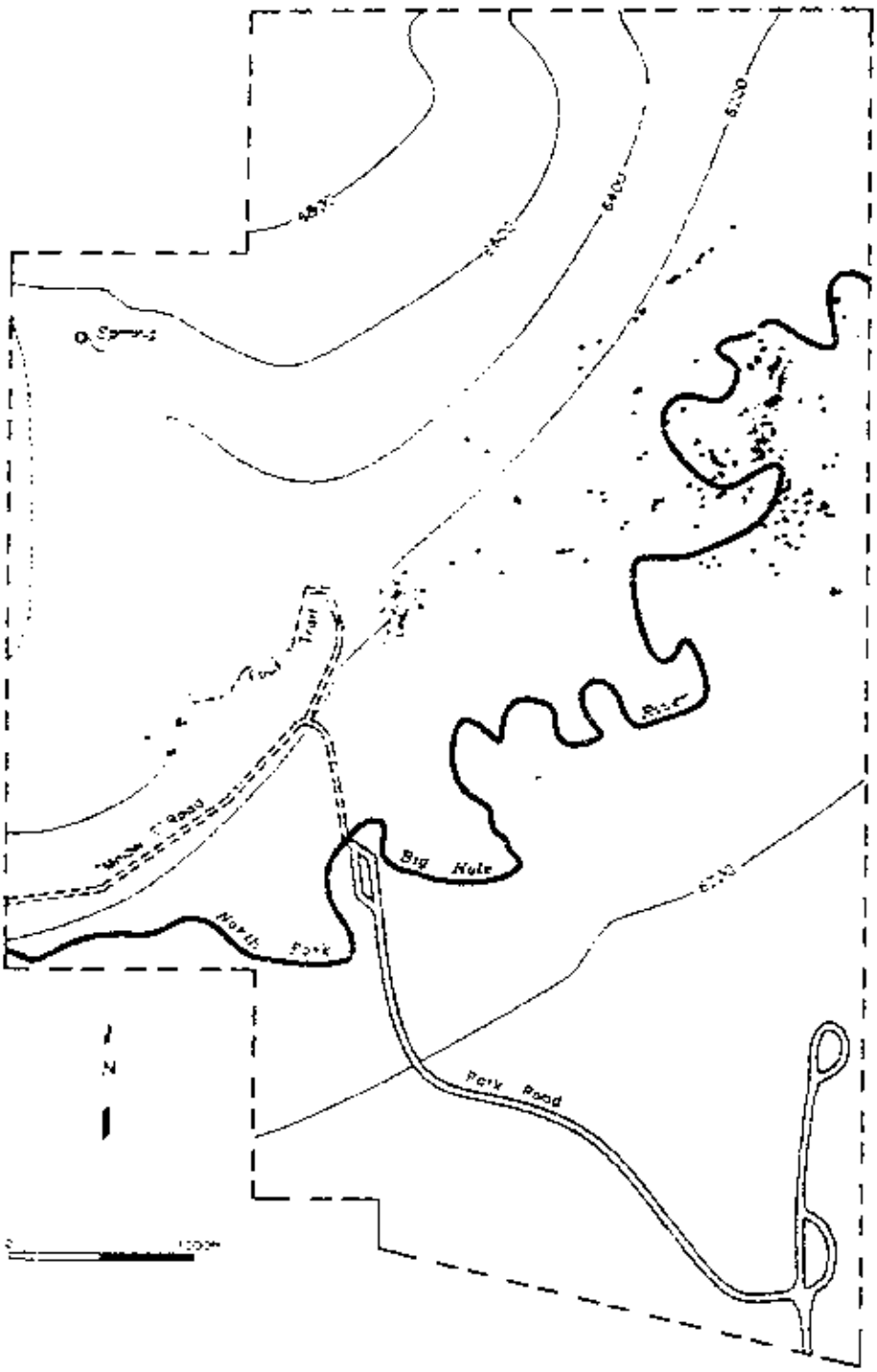


Figure 27. Distribution of .45/70-caliber cartridge cases.

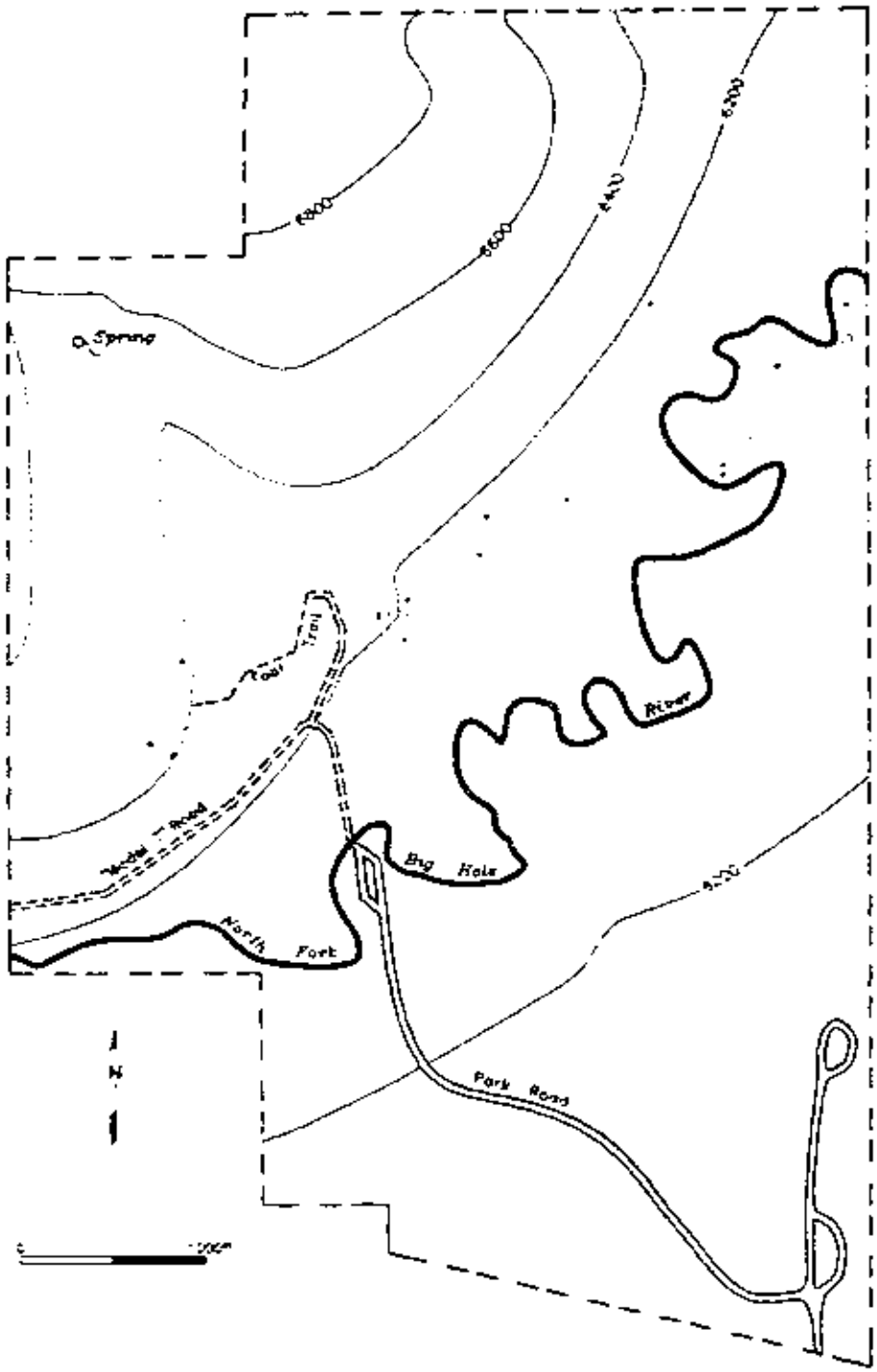


Figure 28. Distribution of .50/70-caliber cartridge cases.

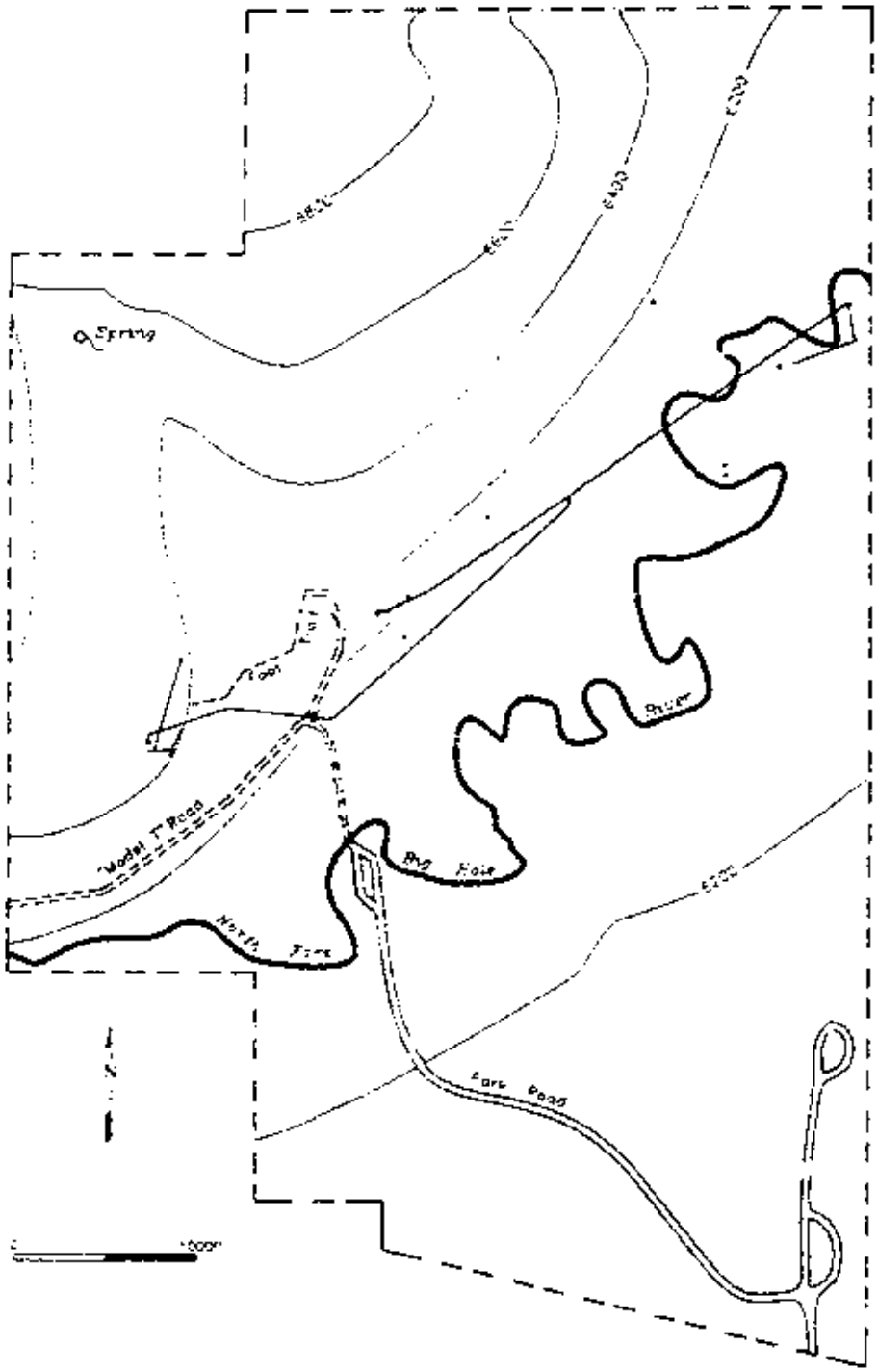


Figure 29. Map of .50/70 cartridge case matches.

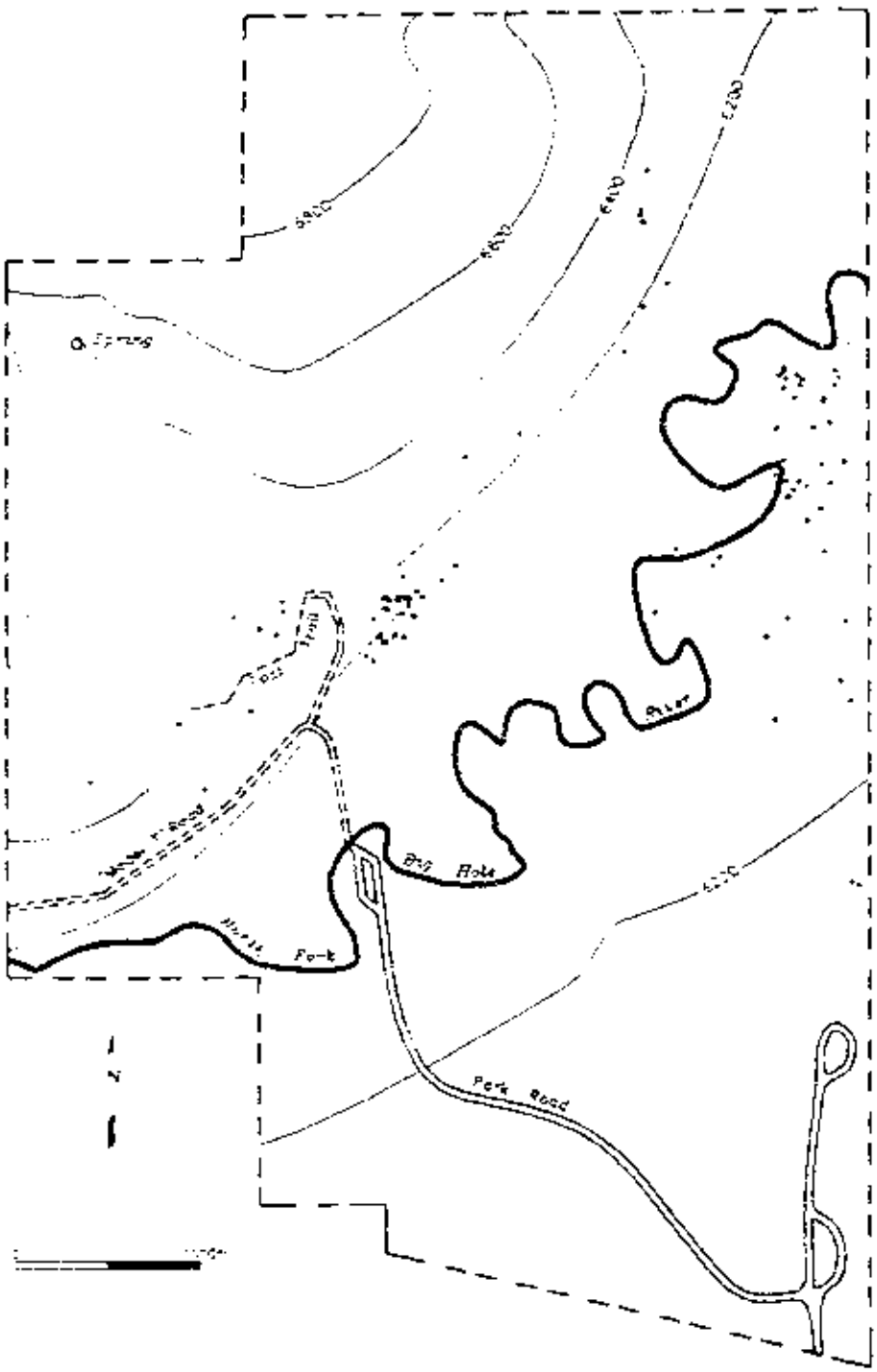


Figure 30. Distribution of .45/70-caliber bullets.

The presence of bullets in the north end of the Village confirms that combat occurred there. The absence of cases in the same area does not confirm that Bradley's command was stopped at the edge of the Village. Aubrey Haines (personal communication Feburary 29, 1993) suggests Bradley may have actually attacked the camp from the north as well as the west. However, he may not have been able to secure his position before being killed, and his men may have been pushed back to the Willows line on the west side of the camp. Relic-collecting efforts may have been biased toward cartridge case recovery. Unfortunately the question cannot be easily resolved with the available evidence.

Another factor to take into account in these interpretations is the known fact that the Nez Perce had captured .45/70-caliber firearms in their possession at the beginning of the battle. Some of the recovered cases may be associated with the Nez Perce combatants. However, the cartridge case spatial distribution and matches suggest the majority are army related. This is especially true in viewing the distribution of .45/70 bullets in the Village (Figure 30). Most can easily be postulated to have originated from the soldiers' firearms.

Given these parameters, the archeological evidence suggests that the initial attack may not have begun at the edge of the Willows as thought, but closer to the river. Assuming the northern group of cartridge cases represents Bradley's charge, the central group Sanno's, and the southern group Comba's men, then the following scenario can be posited (Figure 31).

Bradley's northern group may have halted about 33 yards east of the river. A linear arrangement of cartridge cases in this area suggests the initial firing took place in this area. Cases from this group match to cartridge cases in a second linear alignment 66 yards to the east of the river. This second line tends to be more clustered than the first and third lines. The third line was located at the edge of the modern day willows and about 88 yards from the river. This line is more extended and shows more intermingling of cartridge case matches with those immediately to the south. Several cartridge cases on the extreme northern end of the third line match to cartridge cases located in the river's north bend, which is now a cut-off meander. Those cases are 125 yards from the northern end of the line.

Captain Sanno's postulated movement also begins east of the river, but about 150 yards south of Bradley's first line. The linear array of cartridge cases is aligned northwest to southeast about 37 yards east of the river. A few scattered cartridge cases were found between this line and a more easterly line

75 yards to the east. Sanno's movements appear to have been in two stages instead of the three suggested for Bradley.

Sanno's second line is roughly aligned with Bradley's third line at the edge of the modern willows (Figure 32). Cartridge cases from Sanno's first line match to cases in the second line as well as to cartridge cases fonnd in Bradley's third line.

There is no clear evidence of Comba's charge into the Village or even of a formal skirmish line such as those seen to the north. This suggests that Comba's charge was chaotic and/or broken by determined Nez Perce resistance as discussed earlier. This area of the Village is also the site of a post-battle blacksmith shop, and such activities may have contributed to the disruption of any patterning. In any case the cartridge case and bullet distribution suggests less organization in this area. There are also thirteen individual guns represented by cartridge cases found on the northern lines matched to cases found in the southern area. Again, no clear linear or formal alignment of these cases was noted. These matched cartridge cases were randomly intermingled among the other cartridge cases found in the southern end of the Village. This appears to be consistent with the historical documentation that the men gravitated to the southern end of the Village after Bradley was killed.

The documentary sources suggest that the Nez Perce continued the fight from the north and south. The .44-caliber rimfire (Henry) cartridge cases as well as the Sharps, Spencer, and .50/70-caliber bullet distribntions indicate Nez Perce fire came from the south, north, and east (Figures 33, 34, 35). The archeological and historical data sources are certainly consistent in the locations of the Nez Perce defenders. Yellow Wolf and other Nez Perce warriors (McWhorter 1991) repeatedly identify heavy fighting at the south end of the Village. The Nez Perce took cover along the river bank and in the Willows to return the soldiers' fire. The cartridge case evidence strongly supports these recollections. The .45/70-caliber bullets were also found to the south and east of the Village. The distribution confirms the historical accounts of the soldiers returning fire. Many of the .45/70 bullets were found to the east of the Village proper and near the park's eastern boundary fence. That distribution, as well as the same type bullets found to the south of the Village, supports the supposition that the army was firing toward Nez Perce who were east as well as south of the Village.

Several .45/70 bullets were found impacted to the southwest of the Village and along the river bank in the general location where Kermit Edmonds and this project recovered .44-caliber Henry or Model 1866 Winchester cartridge cases. This location is about 200 yards south of the southern end of the

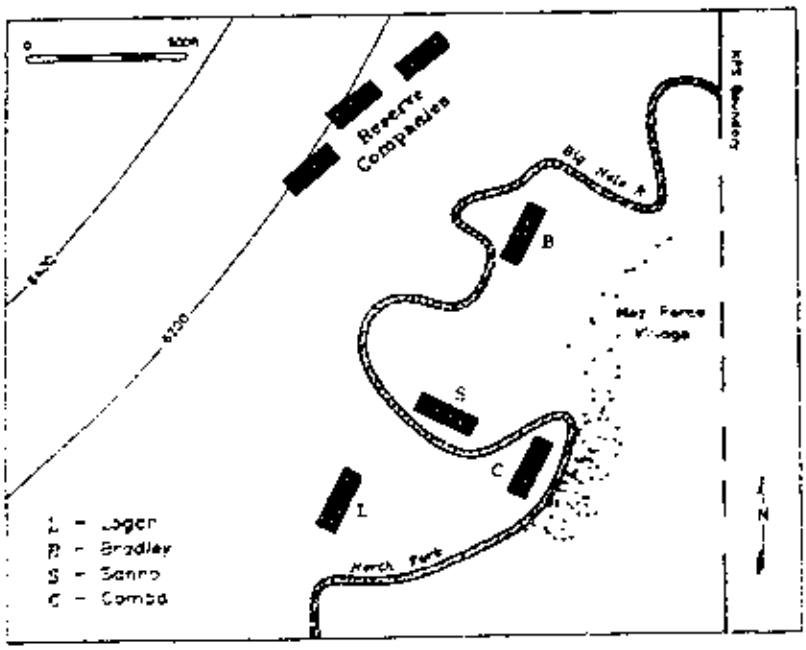


Figure 31. Posited initial troop movements at the Big Hole Battle.

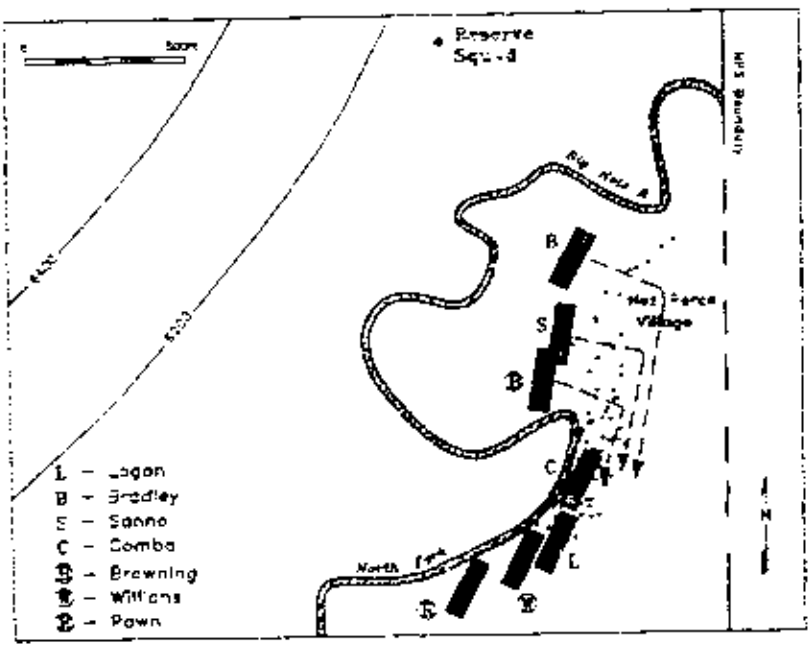


Figure 32. Posited second phase troop deployment during the battle.

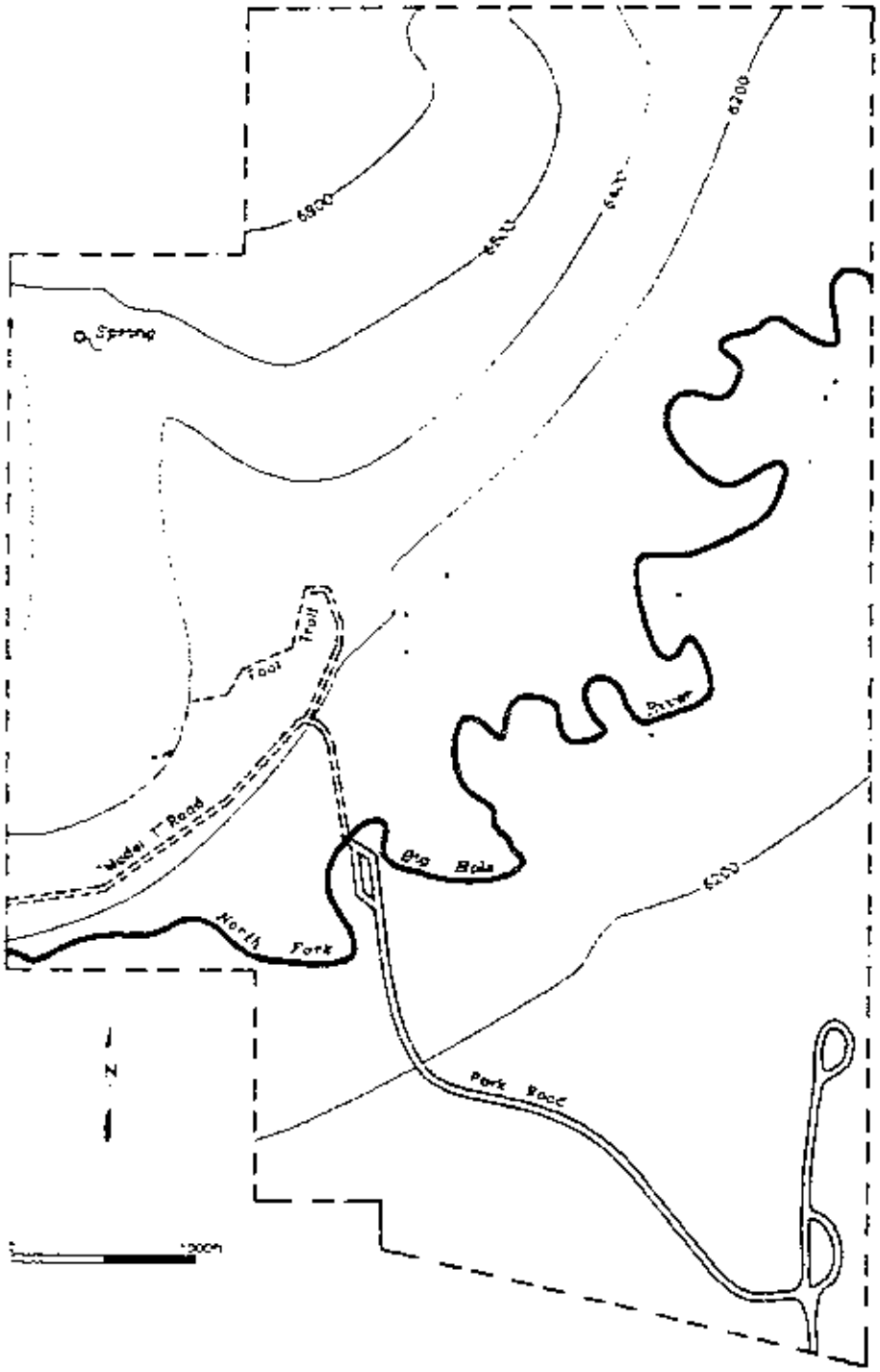


Figure 33. Distribution of .44-caliber rimfire cartridge cases.

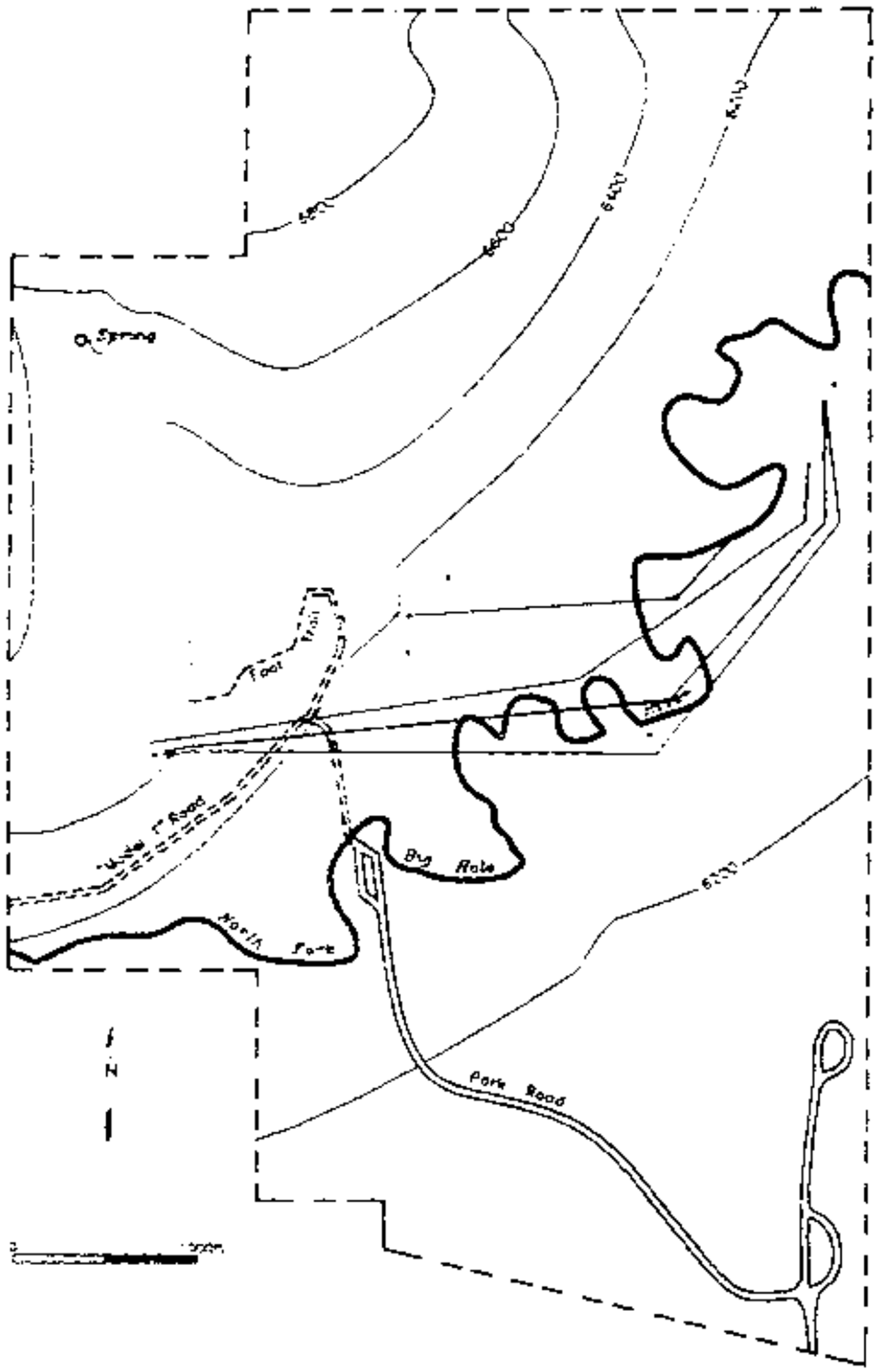


Figure 34. Map of .44-caliber rimfire cartridge case matches.

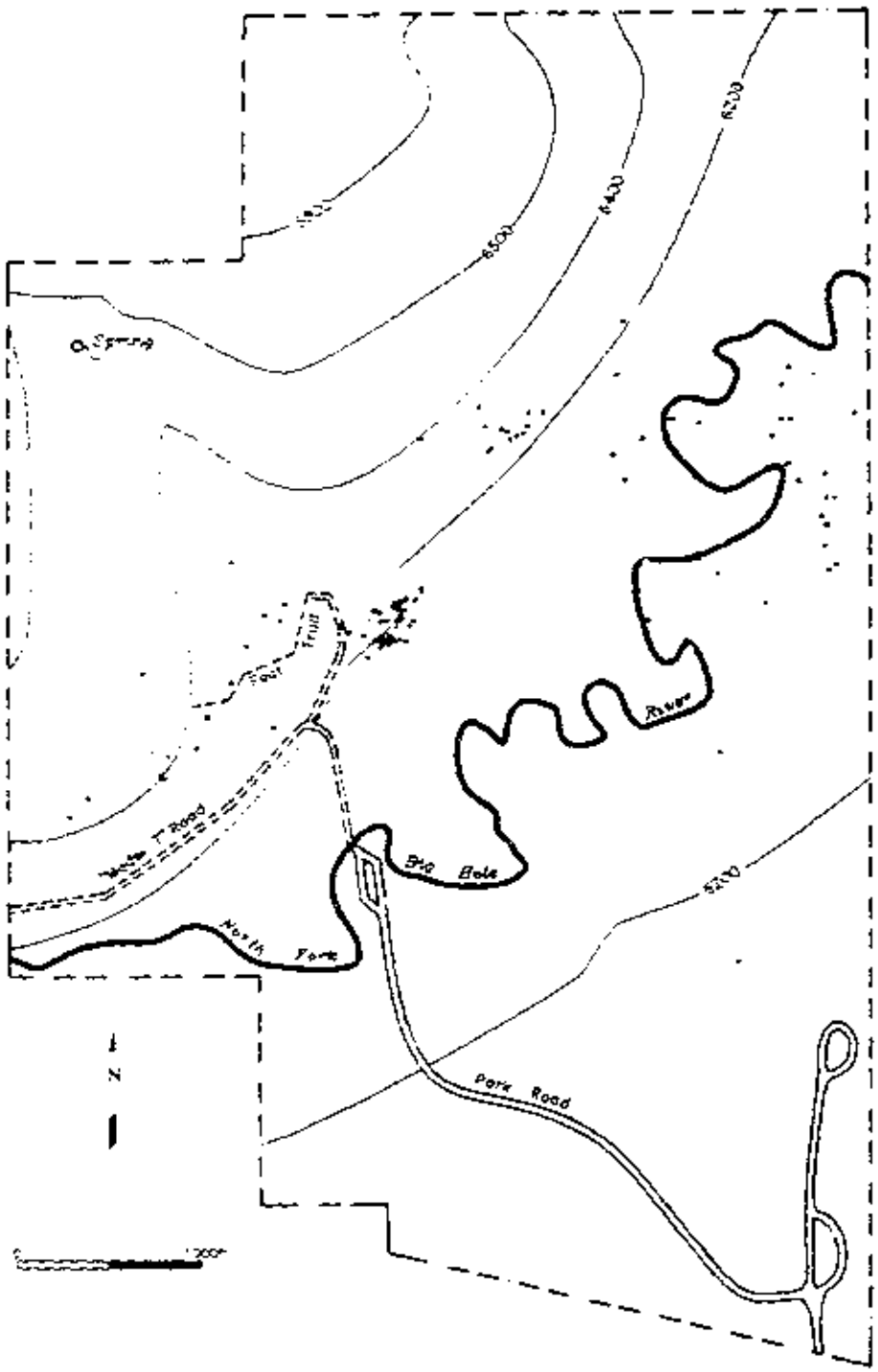


Figure 35. Sharps, Spencer, .44-caliber, .50/70-caliber, other bullet distribution.

Village. This pattern suggests Nez Perce warriors armed with repeating rifles took cover in this area and exchanged fire with the soldiers in the Village.

If the posited movements are correct, then the intermingling of cartridge cases in the southern end of the Village suggests an overall breakdown of command structure in this area. This suggestion is also consistent with the documentary sources. Captain Logan and at least eight other men were killed in this area. Colonel Gibbon was wounded here as well. Nez Perce fire from the east and south appears to be the cause of the command breakdown.

After Gibbon realized that the Village was an untenable position, he ordered a retreat to the point of land they had seen earlier. Gibbon suggests the men were not well ordered at the beginning of the retrograde movement by the comment "The men were therefore, collected and orders given to move back" (John Gibbon. The Battle of the Big Hole, *Harper's Weekly*, December 28, 1895, page 1235).

MOVEMENTS THROUGH THE WILLOWS

Although covered by Captain Rawn's Company I, the retreat from the Village was somewhat chaotic, and two men were lost along the way. The retreat required the command to recross the river and move through the Willows to the timbered alluvial fan (Figure 36). A retreat in battle, while perhaps not desirable, was a recognized military maneuver. Tactics manuals provided for such a withdrawal, and the men were trained to execute a retreat in an orderly fashion. Upton's (1872:111) description of a retreat required the skirmishers, on command, to leave the line and move to a new position where the officer in command would call a halt. The men were then to face the enemy and fire. The men were to hold a position as long as possible to give the other elements of the command who were retreating as much covering fire as possible. Where skirmishers were on the edge of woods or where the terrain was favorable they were to hold "to the last instant...before the enemy arrives within too deadly range."

The archeological evidence (cartridge cases, bullets, and equipment) suggests that the men crossed the river with some semblance of order, but once in the Willows the organization dissolved. The Willows were thick, as they still are today, so there would be no easy passage through the dense stands. Any group trying to pass through the Willows is required to break formation, a supposition supported by the metal-detecting inventory. No line could be kept straight and orderly for more that 25 or 30 yards.

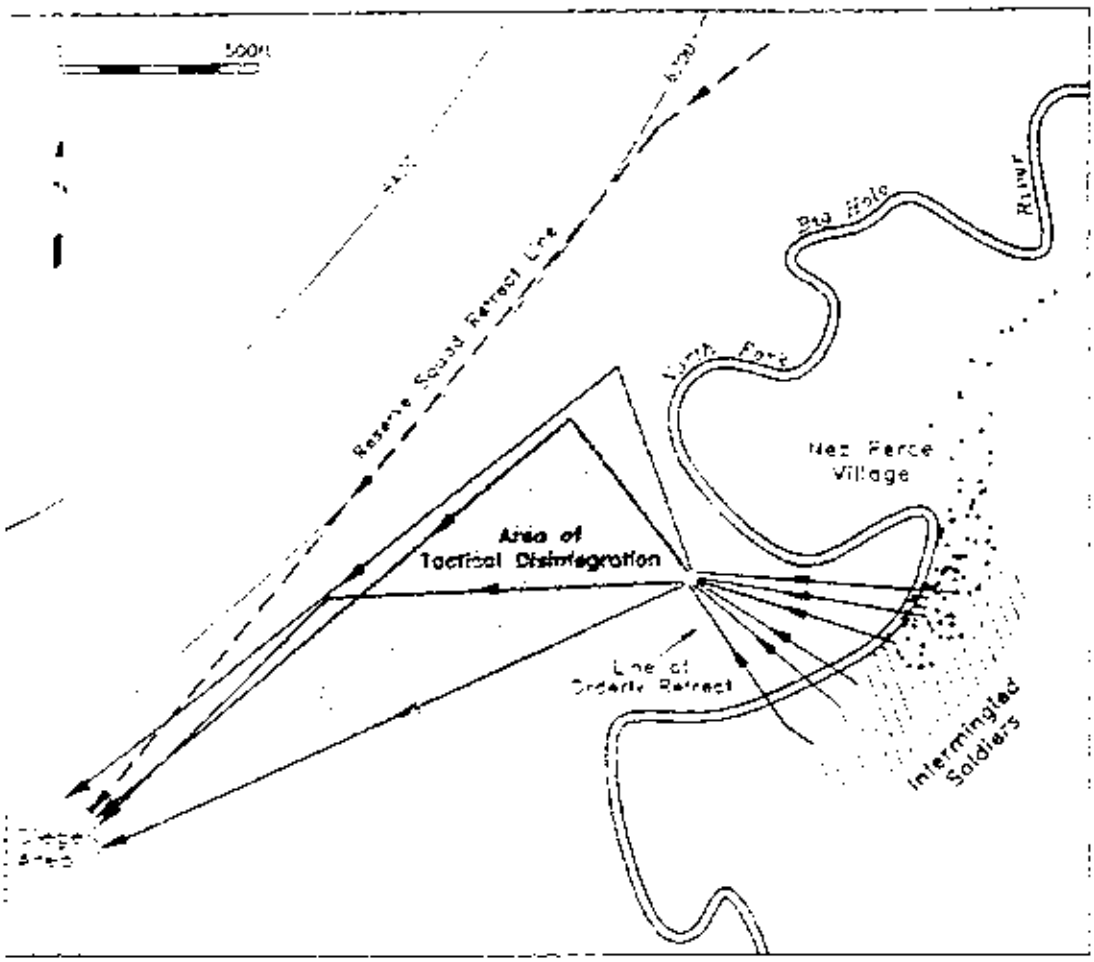


Figure 36. Posited third phase troop movements during the battle.

The archeological evidence of .45/70 cartridge cases (Figure 26) indicates there were at least sixteen Springfields involved in the retreat. Eight guns fired only one round each, while one fired three rounds, three fired four rounds each, two five rounds each, one fired six rounds, and one fired eight rounds in the retreat. The three-round group includes one round that retained a cardboard tube liner indicating it was a carbine round. These cases also match to cases fired in the Siege Area. If this case represents a carbine then it may identify one of the Second Cavalry soldiers' movements.

Of those guns used in the retreat on the west side of the river six were also used in the Siege Area. These cases undoubtedly represent guns used by the soldiers during the retreat and in defense of the Siege Area.

Other combat-related artifacts from the retreat include a trowel bayonet, a percussion cap pouch, a belt knife, and a possible soldier's burial place indicated by a shoe heel, several uniform buttons, and suspender parts.

Six .45/70 bullets (Figure 30) were found intermingled in the retreat area as well as ten .50/70 bullets, a single .44/40 bullet, and three .50/70 cartridge cases. One .50/70 case matches to a case found in the Howitzer Area. The case from the retreat area may represent a Nez Perce gun used in both places or a volunteer gun lost to the Nez Perce in the retreat and used later during the howitzer episode. One of the .50/70 cases was found at the toe of the slope below the Trail and the other east across a slough. This may suggest locations where Nez Perce, firing at the retreating soldiers, sought cover.

Immediately west of the river bend across from the southern end of the Village is a line of six .45/70 cartridge cases (Figure 27). These cases may represent Capt. Comba's initial line of attack into the Village or Capt. Rawn's company as they covered the retreat through the Willows. Certainly two cases match to others found in the Village. One case found in the river itself matches a case found in a bunched group west of a linear case group nearest the river. Two cases in that first line also match cases in the bunch or in a line still further west.

The east line may represent the first halt of Capt. Rawn's Company I as they covered the retreat. Rawn's understrength company consisted of only eighteen men. At least three of those were killed in the fighting in the Village. When Rawn covered the retreat through the Willows on the west side of the river he had, at most, an effective strength of fifteen men. Interestingly, the total number of Springfields represented by the cases is sixteen, including the carbine round group. Whether all sixteen were soldiers' guns or some were in Nez Perce hands cannot be ascertained with any degree of certainty, but the evidence is definitely intriguing.

About 50 yards west of the first line of six cases is a bunched group of another six cases representing four Springfields. Cases representing two guns in the bunched group match to cases found in a line about 25 yards further west. This line of five cases represents four guns. One of those guns is next matched to two cases 150 yards further west, and then 200 yards west to a case found near the Siege Area access point. Another Springfield from this line also matched to a case in the same area, but there are no intermediate matches.

About 90 yards west of the line just discussed is a group of four cases representing only two guns. Both guns have matches in the bunched group and one match to a Springfield in the Siege Area. The percussion cap pouch

and a belt knife were found between these two lines. This general vicinity constitutes the locale where volunteer Alvin Lockwood was killed after he had killed Rainbow.

Movements west of this line appear broken and unorganized. The cases recovered generally indicate one or two individuals clustered together, fired from one to three rounds, then moved to the west or north. There are also matches from guns on the easterly retreat lines to cases found substantial distances to the north. Some of these northerly cases then match to cases in the Siege Area.

In general, the retreat movements on the west side of the river (Figure 36) appear to have been orderly and in formation initially. At least six soldiers crossed the river and provided covering fire. Some soldiers, including at least two from the first line then bunched and fired several rounds. The third line may represent a reformed line to the west of the river, which contains case matches from the first line and the bunched group.

Movements after the third line appear to be more individually oriented and less disciplined. Some men moved westerly through the Willows toward the Siege Area and some angled slightly to the south. Others moved north toward the Trail. The northerly group of individuals, perhaps three or more, may have attempted to join their comrades on the Trail, but they do not appear to have reached it. Instead they turned and moved southwest to the Siege Area. A combination of factors may have caused the turnabout. One was the limited movement allowed by the dense willow thicket and deep pools in the swampy ground may have been impassable. Another possibility is that the Nez Perce warriors may have hindered these individuals' retreat as well. Yet a third possibility is that the northerly cases, representing at least three individuals, could be the sharpshooters Gibbon sent to silence the Nez Perce marksman ensconced at the Twin Trees. It was also among these northerly cases that a possible soldier burial site, represented by the shoe heel, buttons, and suspender parts was found.

Two of the three Springfields represented in the northerly group of cases match to cases in the Siege Area. The other Springfield in that group matches to several cases found clustered about 50 yards east of the Trail and about 200 yards north of the Siege Area. This case group represents three guns. The trowel bayonet was found in the immediate area of these cases.

After the initial orderly appearance of the retreat or at least of the covering fire offered by Capt. Rawn's company, the unit breaks down. The

bunching of men as seen on the second line west of the river, reordering in the third line, then bunching and dispersing afterward is not without precedent. Bunching is well known in battle situations and the archeological evidence for it was also seen at the Little Bighorn battlefield Reno-Benteen defense site (Scott et al. 1989:132). There the officers were able to re-order the men and fall back to a position where they entrenched. That situation, under control of an officer, appears very similar to the archeological data in the Willows at the Big Hole battlefield.

The men appear to have broken into individual groups after the first 200 yards of the retreat. Undoubtedly the thickness of the willows was a factor in the breakup of organized units, but the pattern of movement suggest panic and a tactical disintegration of order and military discipline. Fox (1993) has demonstrated the archeological expression of tactical disintegration to be present at the Little Bighorn, Custer battlefield. The Willows retreat episode at Big Hole consistently follows that pattern, and such an interpretation is consistent with the historical documentation of the retreat. The retreat, as observed and recorded in the Nez Perce accounts, particularly those of Yellow Wolf, seem to demonstrate a haphazard and unorganized affair. Gibbon's reports and recollections suggest the retreat was more orderly, although order broke down toward the end. Witness Gibbon's statement as it appeared in his *Harper's Weekly* article "The Battle of the Big Hole" which appeared in the December 28th issue of 1895:

> Every one knows the demoralizing effect of a retreat in the face of an enemy. We had to pass an open glade in the valley, where the Indian sharpshooters posted on the high ground had us in plain view, and here several of the party were shot down. As we reached the foot of the bluff and commenced to rise toward the timber, a young corporal cried out, in a loud voice, "To the top of the hill - to the top of the hill, or we're lost!" I have never witnessed a more striking instance of the value of discipline than was now presented. To the top of the hill was the last place I wanted to go, or could go, and I called out to the corporal to remind him that he was not in command of the party. The men about him burst into laughter. Amongst regular soldiers the height of absurdity is reached when a corporal attempts to take command of his colonel, and the incident had a good effect by calling attention to the fact that the commanding officer was still alive.

Although Gibbon did not concede outright that a tactical disintegration of command structure had occurred, he did so tacitly in his remarks. There is little doubt his remarks imply that the men were rushing headlong for the alluvial fan. He was able to restore his command authority as they reached

the foot of the fan, through the unwitting opportunity of the unfortunate corporal's outburst.

THE TWIN TREES INCIDENT

When the command began to retreat, the Nez Perce warriors pressed the battle. The soldiers appear to have bunched up, causing a halting retreat. At least one Nez Perce marksman took position at a location that has become known as the Twin Trees. The Twin Trees are located on the steep hillside above the Trail over 250 yards from the river. This marksman harassed the retreat from the Village and through the Willows until Gibbon had two of his marksman return the fire. The soldiers walked their shots up the hill at a range of 400 or 500 yards until the fire was effective. The warrior fell and rolled to the base of the hill (Haines 1991:72).

Amede Bessette, who visited the battle site, and was the author of the Twin Trees story cited above, stated in his 1902 article in the *Dillon Examiner* that he found eleven cartridge cases near the Twin Trees. Kermit Edmonds found a single .50-caliber bullet north of the northern tree in 1972. Although no cartridges were found during the archeological investigations near the trees, five .45 70 bullets were recovered. One bullet was found immediately below the trees and four were found about 150 feet downslope from the trees.

The pattern of deposition is interesting (Figure 30). The lower four bullets are roughly aligned as one goes uphill and spaced 75 feet between the first and last. The fifth bullet, the one closest to the trees, is entirely separate and is 150 feet above the lower group. The bullet pattern certainly suggests one or more individuals fired at the trees. The linear arrangement of the bullets suggests a good marksman with enough knowledge of trajectory to walk his shots up slope until he found the correct range for his sights. While the archeological evidence does not directly identify a Nez Perce marksman position, the indirect evidence of the bullet patterning does suggest there was a reason shots were fired in that vicinity. Thus the archeological evidence and the historical sources are in agreement that a firefight occurred at or near the Twin Trees even though the area is known to have been heavily relic collected.

DEPLOYMENT AND MOVEMENT ON THE TRAIL

Prior to the dawn attack on the Village Gibbon had situated his command on a steep hillside above the swampy willow-covered land west of the river. This area is northeast of the Siege Area. The Nez Perce Village, about

250 yards east of the Trail, was arrayed in a slightly V-shaped line along the east side of the river in a camas meadow.

The position taken by the soldiers effectively separated the Village from the some of the Nez Perce horse herd, which was grazing on the steep hill above the Trail. About four o'clock in the morning of August 9, the order was given for two companies, K and D, and the volunteers with Lt. Bradley's detachment to advance through the Willow Swamp to the edge of the Village. Presumably Gibbon, his headquarters staff, and the right wing companies remained near the Trail as reserves.

After the initial attack on the Village, Gibbon rode into the Village with some of his staff. Prior to that time he also committed the right wing to the battle. Company G supported Company K in the attack on the Village's center, and Companies A, F, and I went in on the right flank in support of Captain Comba's Company D.

The archeological evidence appears to contradict the assumption that all reserves were sent into the fray. The Trail Area to the north of the Siege Area yielded nineteen .45/70 cartridge cases, four loaded cartridges, one fired .50/70, but only a single impacted .50/70 bullet. The .45/70 cases and cartridges were arrayed in a line running parallel to the slope of the bluff and just above the current interpretive trail, which apparently follows the old trail fairly closely.

The fired .45/70 cases indicate that at least seven Springfields are represented (Figure 26). One gun fired at least six rounds, one four, two three, and three one round each. The matches indicate there was movement among these individuals. All matches indicate a movement back to the Siege Area. The movement appears to have been made at intervals. The men fired, then moved to the southwest about 100 yards, stopped and fired, then moved 75 yards and fired, and finally made a break over the next 100 yards for the Siege Area, apparently without firing.

Three sets of matches were made with guns used along the Trail to those in the soldiers' positions in the Siege Area. Presumably the firing along the Trail to the Siege Area was done in support of the troops retreating from the Village through the Willows.

It appears that at least seven soldiers and perhaps one volunteer were stationed on the Trail. If the number of cases is indicative of the total number of men left on the Trail, then a squad-sized unit can be postulated. Tactics manuals of the 1870s (cf. Upton 1872) identify a squad as eight to twelve men.

If this is the case, then it can be suggested these cases represent a non-commissioned officer, a squad of at least six enlistedmen, and perhaps a volunteer who may have been left behind to cover the command's rear.

At or about the time of the retreat through the Willows those on the Trail may have effected a movement to join their comrades. It appears they followed standard infantry withdrawal tactics in their movement. It is suggested they provided supporting fire for their comrades in the Willows retreat. They also appear to have effected an orderly movement down the Trail, halting to fire at proper intervals at the first and second halts. At the third halt the case distribution suggests bunching up occurred, perhaps the men were under fire themselves or concerned about their retreating comrades. In any case, no additional .45/70 cases or matches were found until those located in the Siege Area, suggesting a disintegration of tactical organization occurred at this point.

It is possible, but unlikely, that the Trail movement reflects that of the volunteers involved in the attempt to capture the Nez Perce horse herd. M. F. Sherrill (Haines 1991:60) recalled there were 20 in the group who tried to capture the herd, although Quiller Wilkerson remembered only five, probably only those personally known to him. The group appears to have been composed of five volunteers and an undetermined number of soldiers. Sherrill's recollections indicate that he and at least two others fired at the Nez Perce who successfully stampeded the herd away from the volunteers. Sherrill's description of the herd location and the fight suggests that it was further north than the area of the finds along the Trail. Also, it appears that after the failed attempt to secure the herd the volunteers in the detail joined the command in the Village. There they assisted in the attempt to burn the tepees. These men retreated through the Willows to the Siege Area and thus could not have been on the Trail during the retreat.

DIGGING IN AND FIGHTING IN THE SIEGE AREA

As the command reached the old alluvial fan, several Nez Perce were already there and began to fire. The soldiers charged up the fan's steep toe and pushed the Nez Perce across the gulch that dissected the fan and up the hills on either side of the fan. Upon reaching the fan, Gibbon deployed his men in an area about 100 feet on a side near the eastern edge of the fan. As some men began dragging in logs to form firing positions, the men of the two companies issued trowel bayonets began to dig riflepits (Figures 37, 38). Others used knives and make-shift tools to create cover. The Nez Perce in the timber on the south side of the fan as well as on the hillslopes above the soldiers continued their fire.

The Indians' firing into the Siege Area caused some casualties. Lieutenant Woodruff's horse was used to carry a wounded soldier in the retreat. The wounded man was killed upon reaching the fan, and the horse was wounded and had to be destroyed. Lieutenant William English was badly wounded, dying later.

The physical evidence of the entrenchments or riflepits dug by Gibbon's men is clearly evident in the Siege Area today (Figure 38). There are visible signs of at least twenty-three riflepits of different sizes in the Siege Area (Figure 37). They are arranged in a roughly shaped rectangle. There are several isolated pits, three along the sides of Battle Gulch and one to the northeast of the main group. An old prospect pit west of Battle Gulch was also used by some volunteers (Haines 1991).

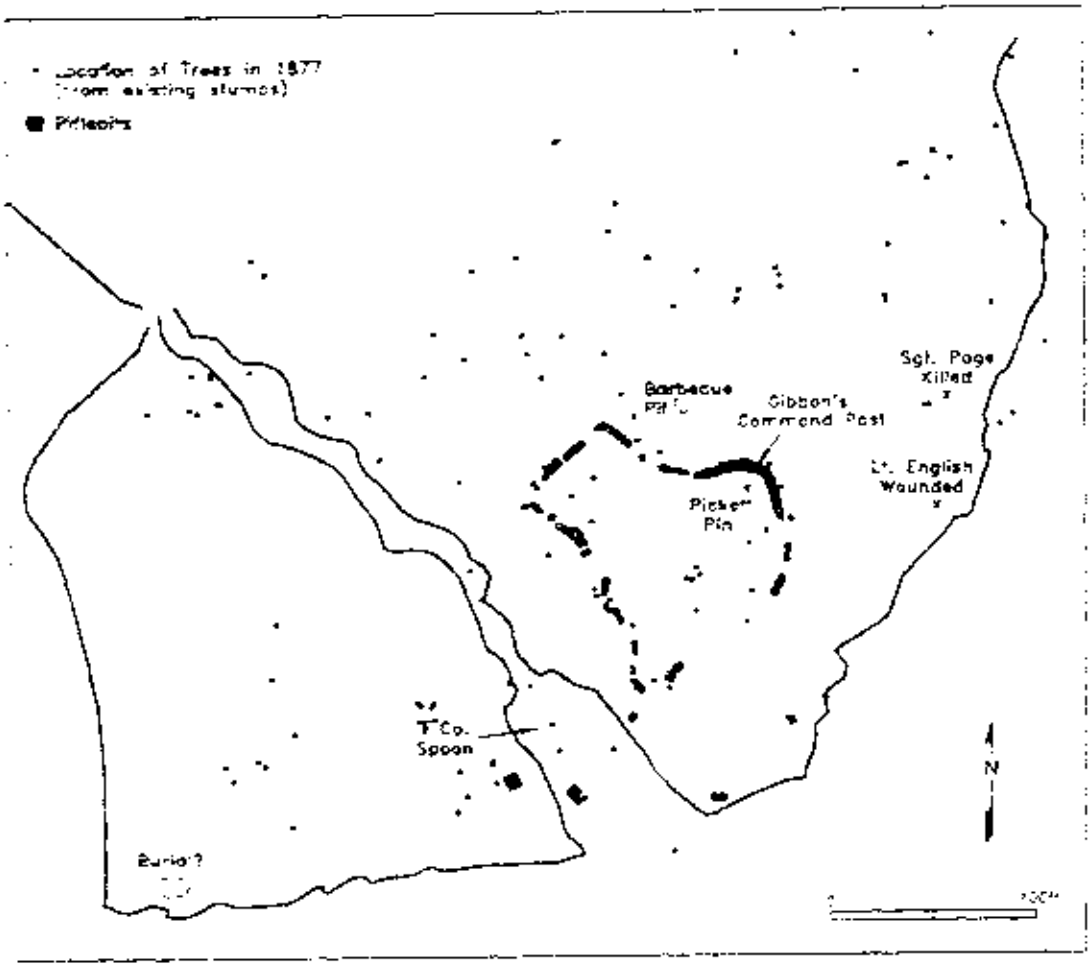


Figure 37. Map of the Siege Area showing the bluff line and riflepits.

Figure 38. One of the Siege Area riflepits with interpretive devices.

When mention of entrenchments occurs in the Indian Wars literature they are often referred to as hastily dug entrenchments with a mound of earth thrown up for protection, or a shallow riflepit. Such statements leave the impression of a haphazard construction to meet an immediate and life-threatening need. These references also convey a feeling of unpreparedness on the part of those constructing the earthwork; they imply a lack of familiarity, training, or knowledge of the purpose or use of a earthwork beyond that of turning a few bullets in the immediate engagement. None of this could be further from the truth.

The common perception of military engagements in the West is one of a running fight between antagonists or hit-and-run tactics of Indians versus the Euroamerican encroacher. A review of the historic literature relating to the Indian Wars era demonstrates that various types of earthworks were used in combat situations between Indians and Euroamericans. An interesting sidelight is that Indians did construct and utilize several types of entrenchments in

much the same manner as the Euroamerican combatants. Limited archeological investigation (Scott 1974:303; Bray 1958; see also discussion of the Big Hole riflepit excavation) of earthworks in the trans-Mississippi West demonstrates that the earthworks constructed by Euroamericans, specifically soldiers, were not hasty or haphazard as is the common perception. They were constructed according to procedures outlined in various military guides of the period.

The American classic, and one that guided the construction of earthworks in the Mexican War and the Civil War, is D. H. Mahan's 1836 *A Complete Treatise on Field Fortification, with the General Outlines of the Principles Regulating the Arrangement, the Attack, and the Defense of Permanent Works*. Hasty fortifications were defined as those constructed so that troops could take better advantage of the opportunities of natural cover (Mahan 1847). Nevertheless, hasty entrenchments were not to be the rule. American and, for that matter, European military thought was dominated by the concept of massed frontal assault. The use of entrenchments was to play a defensive role.

Dennis Mahan's treatise on field fortifications was uniquely American, in that it recognized that most American wars would be fought by militia and only the few regulars would be the most disciplined. If defense was necessary then the militia could build and occupy field fortifications strong enough to resist the enemy's frontal assault until a well-organized counterassault could displace them (Hagerman 1965).

Not until the latter part of the nineteenth century did military theorists begin to formalize the concept of small-unit tactics. Small-unit movement, essentially the squad level, was first introduced in Emory Upton's 1872 *Infantry Tactics*, but these were not small-unit fighting tactics, only mechanical movements.

Unfortunately the U.S. Army published few formal field manuals for small units before the beginning of the 20th century. However, a number of practical guides for officers were privately published throughout the century to bridge the gap left by the lack of official guidance available outside the West Point classroom. One of the most used guides was *Mountain Scouting* by Captain Edward Farrow. Farrow was an instructor at West Point when he wrote his practical guide in 1881. He had seen active field service during the Nez Perce campaign of 1877 and was with Howard when he arrived at the Big Hole. Farrow (1881:243) noted, "The history of all battles of late years has shown the expediency of making use of natural shelter or constructing field intrenchments."

Military manuals of the early 20th century are more structured than Farrow's instructions, but they describe essentially the same procedure for digging riflepits and trenches in the face of the enemy. Moss (1918:385-387) is a good example of such a work, and provides some clear definitions of the purpose of such works.

Moss (1918:385) states that the object of field fortifications is two-fold: first, to increase the fighting power of the troops by enabling the soldier to use his weapons with the greatest possible effect; and second, to protect the soldier against the enemy's fire. While the military objective might be stated in that order, the doughboy might have reversed the priority order.

Although written nearly forty years after Farrow's 1881 publication, the Moss description of entrenchment methods and types is very similar. It can be argued that riflepits or hasty entrenchments, those meant to be constructed in the face of the enemy, did not change in type or need. Even the World War II "foxhole," as described in the manuals of that period, does not differ significantly in purpose or construction from that advocated by Farrow in 1881.

The strong similarity in size and construction method of the archeological examples of riflepits at Fort Dilts (Haury 1989), Big Hole battlefield, and the Reno-Benteen defense site (Bray 1958) to the methods of entrenchment described in the period manuals emphasizes that the term "hasty entrenchment" does not mean "haphazard." Hasty entrenchments were a real type of earthwork that were constructed in a prescribed manner. Organized forces requiring hasty entrenchments to be dug in the presence of the enemy were trained and disciplined, and thus dug their hasty entrenchments in the manner in which they had been trained. The Big Hole Siege Area riflepits are the physical evidence of that training, and perhaps more than the trowel bayonet, it was that training that saved Gibbon's command from annihilation.

The Siege Area contains significant archeological evidence of the combat that occurred there. The Siege Area is also the site that received the most intense post-battle usage and that has undoubtedly affected some of the archeological patterns related to the fight. At one time there was a USFS barn and a museum building on the site, as well as associated water and electrical lines. The Forest Service and later the Park Service also maintained residences and associated outbuildings to the west of the site. In addition, there was once a parking lot and a number of picnic sites situated in or adjacent to the Siege Area. Even with all the impacts, the archeological data has survived surprisingly well.

Buttons, pieces of equipment, cartridge cases, and bullets were found in the Siege Area. Fifty-nine .45/70 cartridge cases were recovered in the area. These cases represent 26 individual Springfield firearms. The majority of cases cross-match with others. Eleven guns had only a single case representing their use in the battle. Five guns were represented by two cases each; six guns, three cases each; two guns, four cases each; and two by six cases each. One case retained a cardboard tube liner indicating it was a carbine round. If this case represents a carbine then it may identify a firing location of one of the Second Cavalry soldiers.

Whereas most .45/70 cartridge cases were found on the eastern edge of the point of land that makes up the Siege Area or actually within the riflepits, there is one exception. A single .45/70 cartridge case was found southwest of the riflepits and in the timbered area known to have been utilized by the Nez Perce warriors. However, the case matches to a case found among the riflepits.

The .50/70 cartridge cases found in the Siege Area entrenchments tend to concentrate in the western riflepits. This distribution is consistent with the historically documented location of most of the volunteers during the latter stages of the battle. A single .44-caliber rimfire cartridge case fired in a Model 1860 Colt Conversion was also found in this area, as was a .50/70-caliber cartridge case fired in a Remington Rolling Block rifle.

The cartridge case matches exhibited only limited movement in the Siege Area. There is some evidence that cases found near the lip of the alluvial fan match to some cases found in the entrenchments. This suggests that once the soldiers entrenched, there was little movement among the various shelter pits.

Bullets of various calibers were found in and around the entrenchments, as well as in the areas historically identified as Nez Perce positions. The .45/70-caliber bullets were found throughout the Siege Area. A few were found among the entrenchments, but most were outside the entrenchments proper. A large concentration was noted on the northeastern edge of the fan, and smaller concentrations to the south and upslope about 250 yards to the west.

The other caliber bullets, those more likely associated with the Nez Perce have a similar distribution. However, more lead scraps (unidentified bullets and bullet fragments) and .50/70-caliber and .44-caliber bullets were found among the entrenchments than .45/70 bullets. Many of the other caliber bullets were found embedded in the fan edge or to the northeast.

The Siege Area occupation is exceptionally well documented in the source materials. Not only did surviving soldiers and volunteers identify which shelter pit they occupied, they also pointed out trees and other areas where the Nez Perce took shelter.

The Nez Perce also vividly recalled the names of the warrior participants and which individual trees they utilized for cover. This makes the Siege Area one of the most thoroughly documented battle sites in the west. The archeological evidence is somewhat biased due to the intensity of post-battle occupation and site use that has occurred, but the archeological data does agree with the historical documentation. The distribution of .45/70 cartridge cases demonstrate that the army gained the Siege Area under fire and then entrenched. There was little movement of the soldiers and volunteers after that episode.

The Nez Perce-related cartridge case and bullet distribution indicates the soldiers were definitely under fire from most directions during the remainder of the battle. While extensive, the Nez Perce fire appears to have originated from a limited number of firearms. There may have been four different .44-caliber rimfire Henrys or Model 1866 Winchesters used at the Siege Area. One or more Sharps, a Spencer, captured .45/70 army weapons, and .50/70 Springfields, as well as at least one Remington Rolling Block rifle are also indicated by the cartridge case and bullet evidence.

The army believed they were under fire by numerous Nez Perce during the latter part of August 9 and during August 10. However, the Nez Perce indicated, in their chronicling of the battle, that less than fifteen warriors kept the army at bay during August 10. The cartridge case evidence suggests at least eight firearms used by the Nez Perce were employed against the soldiers. This number represents about one-half the number of Nez Perce identified by Yellow Wolf (Haines 1991:99) and is certainly in agreement with the Nez Perce accounts. It is also consistent with the percentage of army firearms represented in the archeological record as discussed previously.

One of the more dramatic accounts of the battle, from either side, is the death of Pathkatos Owyeen (Five Wounds) during a suicide charge up Battle Gulch. The location is commemorated today with a wooden feather interpretive device (Figure 39). Two concentrations of .45/70-caliber bullets (containing six and five, respectively) were found embedded on eastern side of Battle Gulch. The group of five is within fifteen feet of the feather interpretive device, and the group of six is about twenty-five feet from the marker. Either group could be associated with the death of Five Wounds or some other

Figure 39. The interpretive device indicates the area where Five Wounds is thought to have been killed during the battle.

episode in the battle. However, the proximity of the bullet concentrations to the historically documented location of Five Wounds' death site is another intriguing example of archeological evidence and history converging.

HOWITZER INCIDENT

As the soldiers were digging in at the Siege Area, a 12-lb. Mountain Howitzer mounted on a Prairie carriage and drawn by six mules went into action. It fired two rounds before it was overrun by the Nez Perce. Of the crew of six, one individual, Corporal Sale, was killed; two others were wounded; and the remainder beat a hasty retreat back to the wagon train.

Archeological evidence of the howitzer episode consists of a military-style D-ring from a saddle girth, a lynch pin from a cannon carriage wheel, and cartridge cases and bullets found high on the slope to the west of the Siege

Area. Fragments of sabot strapping for the explosive shells were recovered by Kermit Edmonds and a few additional possible fragments of strapping were found in 1991 in the same area.

The most conclusive evidence of combat action in the area is the firearms data. Twenty .45/70-caliber cartridge cases (Figure 27) were found clustered in the vicinity of the Howitzer Area. These cases represented five different Springfield guns. One gun fired eleven of the rounds; one, four rounds; two guns, two rounds each; and one gun, only one round.

Other firearms-related artifacts (Figures 28, 32, 34, 36) found near the Howitzer Area consist of unidentified bullet fragments, .45/70 bullets, .50/70 bullets, .40 Sharps bullets, a .44 or .45 Sharps bullet, and .44 Winchester or Henry bullets. A variety of cartridge cases were also found. These include nine .44 rimfire cases that represent five individual Henry or Model 1866 Winchester guns and fourteen .50/70 cases that represent eleven Springfields. Two of those cases, fired from the same gun, are .45/70-caliber and have split upon being fired in the larger caliber gun. In addition, a single percussion cap and the ramrod to a Model 1841 "Mississippi" rifle were recovered in the vicinity.

As there were only six soldiers with the howitzer, it may be logical to assume that the .45/70 cases represent the soldiers and their position. If the ammunition mule attendant and the civilian guide were near the howitzer, then a total of eight men were in the vicinity. The ammunition mule attendant may have been armed with a shotgun. If the non-.45/70 cases are assumed to represent the Nez Perce combatants, then at least eighteen different Nez Perce fired on the soldiers. Eleven were armed with .50/70 Springfields, five with .44-caliber Henrys or Model 1866 Winchesters, and at least one each with a .40-caliber Sharps and a .44- or .45-caliber Sharps firearm. It is also necessary to consider that some Nez Perce were armed with captured .45/70 Springfields and perhaps some of those cases actually represent additional Nez Perce instead of one of the six soldiers attached to the cannon.

The Nez Perce cases and bullets were found all around the location of the soldiers' cases. This suggests the soldiers were nearly surrounded by the Nez Perce. There is a limited suggestion of movement in the cartridge case distribution. There are five .45/70 cases, all fired in the same gun, that run in a line north of the main cluster of cases (Figure 26). These cases were fired in the same .45/70 that fired at least eleven of the soldier cases. Gibbon (Haines 1991:76) in his official report of the battle states that Sergeants Daly and Fredrics as well as Corporal Sale made the best resistance possible before they were overrun. Perhaps the eleven cases and the evidence of movement of that gun represents one of those soldiers.

Yellow Wolf's (McWhorter 1991:149-50) account of the howitzer incident identifies six mounted Nez Perce as responding to a scout's spotting of the cannon movement. Yellow Wolf and the other warriors had been near the Siege Area when the howitzer was spotted. They rode up the hill and fired at the soldiers, killing one and driving the remainder away. Wattes Kunnin (McWhorter 1991:149) was also involved in the attack on the howitzer. He describes the incident by noting that two Nez Perce came down the hill towards the cannon while he rode up the hill. When he arrived at the cannon, only one soldier was left. He was firing, possibly over his shoulder, at the attackers. He was killed. This may have been Corporal Sale.

Yellow Wolf (McWhorter 1991:150-51) thought they had run off about ten or eleven soldiers in the howitzer and pack mule fight. He also believed that about 30 Nez Perce were gathered around the captured ammunition crates after the fight. The time interval between the fight and the interview with McWhorter may, in Yellow Wolf's mind, have exaggerated the total numbers of individuals involved. It is also possible Yellow Wolf collapsed two separate but closely spaced incidents into a single episode in the re-telling. But, Yellow Wolf appears to have remembered the ratio of Nez Perce to soldiers fairly well, if the archeological firearms data portray the fight accurately.

Gibbon (Haines 1991:76) suggested the private soldiers, who were recent recruits and fled the howitzer fight, were cowards who fled without a fight. The cartridge case evidence does point to limited firing by three individuals who had .45/70 Springfields. Assuming that all .45/70 cases represent soldiers and not Springfields in Nez Perce hands, the cartridge case distribution patterns indicate the soldiers were outnumbered at least 2 to 1 by the Nez Perce. The Nez Perce brought to bear, against the soldiers, at least eighteen firearms, including five repeating firearms. They also surrounded those using the .45/70 Springfields. The cowardice issue aside, the soldiers with the howitzer were surrounded by a force of superiorly armed Nez Perce. Their choice seems simple, they might fight to the death or retreat in the face of superior forces, and they chose the latter.

Chapter 6

CONCLUSION

General Observations

The archeological evidence presented on the fight is supported more often than not by the testimony of the soldiers and Nez Perce battle participants. With the eyewitness accounts available it might seem the archeological data would be redundant or superfluous, but it is precisely for this reason that the archeological data base is important. The archeological information recovered from the Big Hole battlefield can be directly correlated with the historical accounts. This correlation of archeological data and interpretations with the historical accounts provides a means to assess the accuracy of the interpretations drawn from the archeological record. In essence, if the interpretations of the archeological record demonstrate positive correlations with the historical record, then the archeological interpretations are strengthened. A second point is that where the historical record is incomplete or even silent on individual movements, the archeological data may help to elucidate those individual movements or participation.

Research Questions

The archeological investigations were guided by a research design developed at the outset of the project. A number of research questions were identified that appeared to be reasonable levels of inquiry. The research questions were divided into three sections. The first dealt with issues related to park management, the second with historical battle-related questions, and the third with questions of particularism and matters of refining archeological theory.

MANAGEMENT-RELATED QUESTIONS

The park's Statement for Management and Resource Management Plan, Cultural Component identified a number of specific topics that archeological research could address.

1. Identification of all archeological resources on the property.

This element of the project was a complete success. Aside from the battle-related remains, the project recorded evidence of homesteading, mining, road development, irrigation projects, and public interpretation of the site. The battle-related materials are the subject of this report. The non-battle sites and objects are the subject of a future report.

2. Refinement of the location of various components of the battle, including location and extent of the Howitzer Capture Area, further clarification of the location and extent of riflepits in the Siege Area, lines of attack, lines of retreat, location and extent of the Indian Village, and extent of the battle area.

Question 2 was successfully addressed. The lines of attack and retreat were identified and new interpretations posited on Gibbon's tactical organization as seen in the archeological record. Clearly the archeological data expands and enhances the historical documentation. The archeological data also demonstrate that physical evidence can be used to identify combatant organization and/or fighting tactics.

Riflepits, their associated artifacts, and the Howitzer Area were further identified and refined. The extent of the battle area was defined, except on the east side. The battle appears to have occurred mostly within the boundaries of the park. However, some element of the battle may have been carried out to the east of the park boundary. The historical documentation identifies the bluffs east of the park boundary as locations where the Nez Perce took shelter during the battle, and it is also known the Nez Perce utilized this area as an escape route when leaving the field.

The location of the Village was refined and was determined to be within the boundaries of the park. The archeological evidence strongly suggests the historically identified location of tepees are only approximations and not precise. There appears to be limited archeological evidence for tepee sites in the form of "household artifacts" and their related distribution patterns. Additional research into this area may prove a fruitful endeavor in a future project.

HISTORICAL QUESTIONS

1. Where are the attack perimeter and lines?
2. Where is the site of the Nez Perce Village?
3. What are the tepee locations and camp configuration?
4. What was the area of the camp actually held by the soldiers?

5. Where is the soldiers' line of retreat to the Siege Area?
6. What is the extent of the Siege Area and number of riflepits dug?
7. Did citizens and soldiers occupy different portions of the Siege Area?
8. Where is the Howitzer Capture Area?
9. What areas did the Nez Perce warriors occupy after abandoning the camp to the soldiers?
10. What areas were occupied by the warriors to continue the harassing fire into the soldiers' lines while the camp retreated?
11. Can the individual movement of combatants be identified?

Each of these questions was addressed by the archeological evidence recovered. The data and the results are detailed in the previous sections of this report. At least a portion of each question could be addressed with the data recovered. In fact, most questions were answered with a plethora of data. The archeological data were abundant for this project and meshed with the historical documentation to a significant degree. In addition, the archeological data identified the Trail Area as a probable site of a squad of men held in reserve. Those reserves may have played a role in covering the rather chaotic retreat of the main elements of the command through the Willows. The archeological data also demonstrated that combat did occur at the Howitzer Area. The fighting that occurred there was rather one-sided as the soldiers were outnumbered and outgunned by the Nez Perce during that episode. Finally the archeological evidence supports the Nez Perce assertion that less than fifteen of their number held Gibbon's command at bay for over a day while the army was entrenched in the Siege Area.

RESEARCH QUESTIONS NOT SPECIFICALLY RELATED TO THE BATTLE

Feature Construction

1. Were riflepits constructed differently by the soldiers and the citizens?

There is no direct evidence that the soldiers' or volunteers' riflepits were constructed differently. The artifactual and the historical evidence both identify the western pits as the site of most of the volunteers' entrenchments. There is no physical evidence to suggest they were dug in a different manner from those of the soldiers.

2. Were riflepits dug according to the pattern prescribed in Edward Farrow's 1881 guide for officers, *Mountain Scouting*?

The limited testing that occurred fully corroborates that the entrenchments were dug in the prescribed manner. The physical appearance of the remaining riflepits as well as the test excavations demonstrates that hasty entrenchments may have been expedient affairs, but they were dug in a prescribed manner.

Post-depositional Considerations

3. What is the scope and effect of later homesteading and agricultural activities on the battlefield component of the site?

The Indian Camp locale was reported to have been plowed or possibly disturbed by agricultural activities in the late nineteenth and early twentieth centuries. There is no evidence of plowing in the valley area within the park boundary. The valley was once a hayfield, and does have irrigation ditches cut through it, but was not plowed or otherwise disturbed subsurface. A homestead and a blacksmith shop were located in the area. The homestead site is in the Willows Area west of the river. The blacksmith shop occupies part of the southern Camp Area. That area is disturbed, and the artifact patterns may have been partially disrupted in this area.

Battlefield Modeling

4. What changes or refinements need to be made to the Post–Civil War Battlefield Archeology Model as proposed by Scott et al. (1989) and Fox and Scott (1991)? The model states that individual, unit, and battlefield movements can be reconstructed using pattern-recognition techniques. The model also predicts certain types of behavior will be present, reflecting on the culture, training, and organization of the combatant groups.

Archeological studies of historic sites are often used in a confirmation role (Noël Hume 1969). Validation studies have been undertaken to determine correlation levels of archeological and historical data. Several studies (Scott 1977; 1973) have shown the techniques of archeology to be a valid means to reconstruct events of the past. These studies have also shown that no precise or one-to-one correlation between an event's historical documentation and the archeological record is likely to exist. The level of correlation is often excellent, but each of the two data sources provides information not contained in the other. It is at this point that the value of historical archeology becomes apparent. Historical archeology can add new details to the story, but its real value is in the fact that it is not history, but anthropology. Historical archeology is a means to study the recent past with an eye toward gaining a greater

understanding of social and cultural behavior. In the case of battlefields the focus of the study becomes cultural approaches to conflict. With the Big Hole as well as other Indian Wars battle sites the opportunity is to study the particulars and general trends of disparate cultures in conflict.

At the Big Hole the majority of army cartridge cases are clustered in spatially discrete units that are easily defined. These discrete spatial patterns clearly correlate with the historically documented elements of the battle and more importantly, they correlate with specific units known to have occupied these positions.

The archeological data correlates with the historic documentation at an exceptional level for the Big Hole study. There is evidence of combat at the site and it appears to have been conducted between two different groups. The discrete spatial distribution data, primarily drawn from the matching cartridge case evidence, adds a tremendous amount of detail. The discrete spatial data correlates with the historic accounts on nearly every point. There are no significant conflicts between the two data sets. The gross pattern analysis and the identification of unit patterns that can be ascribed to identified unit positions validate the archeological record's ability to correctly interpret historic events. In the realm of validation studies the degree of correlation between the data set and the historic documentation borders on the incredible.

In addition the Big Hole study has added two new components to the Post–Civil War Battlefield Pattern: the role of artillery and the identification of the Nez Perce Village site. In the case of the howitzer there was direct evidence of its presence in the form of sabot strapping. Had the area not been disturbed by relic hunters perhaps more archeological data might have been found. Although limited, the evidence for the use of artillery is present on the field and can be interpreted.

The Nez Perce Village evidence is represented by a wide variety of personal and camp equipage artifacts. Their presence alone, without the knowledge of tepee sites would have alerted us to the presence of a camp or village. Archeology has long been involved in the study of prehistoric and historic Indian camps and villages. The Big Hole data confirm such a presence can be recognized in a battle situation.

Archeological investigations at Little Bighorn Battlefield National Monument provided a new perspective on the various elements of the Battle of the Little Bighorn. Those investigations led to the development of a Post–Civil War Battlefield Model (Fox and Scott 1991). The Big Hole battlefield study demonstrates the utility of that model. Combatant positions have been

identified, firearms identified and quantified, and the sequence of events has been elucidated; history has been enhanced, and in some areas revised.

Archeological investigations are a part of the field of anthropology. The goal of anthropology is to define the culture of man and how man uses his environment, how he interacts with other social groups, and to define broad patterns or rules of culture. This study has focused on the historical reconstruction of battle events using archeological methods. In the field of historical archeology this is known as historical particularism. It is a valid goal of research, but it is not the only goal.

Fox and Scott's (1991) definition of a Post–Civil War Battlefield Pattern is predicated upon an axiom basic to archeological investigation. Human behavior is patterned. Behavioral patterns are expressed through individual behaviors that are constrained by the norms, values, sanctions, and statuses governing the group within which the individual operates. Among standing armies, military groups are rigidly defined and hierarchically ordered; they are less well defined among guerrilla forces, and individual behavioral roles are structured accordingly. Thus in warfare, tactical operations, both defensive and offensive, precipitate individual behaviors that are carried out within and on behalf of the military unit to which the individual belongs. War tactics, which represent patterned behavior, include establishment of positions and the deployment and movement of combatants. The residues of tactics in warfare, artifacts, features, and their contextual relationships, should also be patterned and reflect details of battlefield behavior.

That behavior is clearly reflected at the Big Hole. The distribution of army cartridge cases and bullets attests to the structured organization of the military unit at the beginning of the battle. The archeological data was able to show that Gibbon organized his command into wings and deployed and employed them according to the prescribed tactics of the day. The archeological evidence also demonstrates that Gibbon's tactical organization dissolved after the attack on the Village. Some semblance of order was restored during the initial stages of the retreat through the Willows, but that order disintegrated the deeper into the willows and swampy ground the command retreated. Gibbon regained control of the command when they reached the Siege Area. Order and tactical resolve are evident in the organization of the entrenchments and the minimal movement of individuals in those entrenchments.

The archeological data also tell the tale of the Nez Perce. Their combat strategy was much more individual oriented and the artifact distributions definitely reflect this. The firearms artifacts demonstrate the Nez Perce were

armed with a variety of firearms, perhaps sixteen different types. Most appear to have been cartridge firearms types, but older muzzle-loading firearms, including at least two Model 1841 "Mississippi" rifles, were present in the battle. The Nez Perce dispersed during the initial attack, taking cover and refuge east, north, and south of the Village as the situation dictated. Rallied by their leaders the warriors fought from available cover, firing into Gibbon's exposed position in the Village. Once Gibbon began his retreat, the Nez Perce pressed the attack individually as well as through sniping activities. The individual fighting style of the Nez Perce served them well in the combat on the Retreat Line. They were able to keep pressure on the command from numerous sides, causing a tactical disintegration of Gibbon's command structure. Gibbon had no physically unified enemy to focus his fire upon, thus disrupting the command's ability to function in a normal military mode.

Even with Gibbon's more organized defense of the Siege Area, the Nez Perce were able to keep the command at bay with less than fifteen warriors through the day of August 10. The archeological evidence identifies the command's position as well as positions of the Nez Perce. The warriors took advantage of the terrain and available cover to fire into Gibbon's entrenchments. The archeological data demonstrate the culturally prescribed and different fighting behaviors of the two combatant groups. Thus when individual patterns are integrated, unit patterns emerge, and this patterning is recognizable on the battlefield.

The integration of individual patterns provided the basis on which unit patterns were constructed. This involved tracing positions and movements, but at the unit-pattern level. In effect, the deployment of combat units was identified and traced archeologically.

The Battle of the Big Hole provides a relevant application of the Post–Civil War Battlefield Pattern for several reasons. The artifact inventory, including ammunition components, was readily amenable to the kind of analyses necessary in establishing the pattern. The Big Hole battle furnishes a test of the Post–Civil War Battlefield Pattern as it applies to two types of military organization virtually at polar opposites, the rigid military structure and the comparatively unstructured individually based tactics of the Nez Perce.

It is also important to reiterate that these data exist in a recognizable form in space on a field of battle, the place where organization is supposedly least likely to exist. In fact, those organizations and culturally opposing forces are recognizable. This study then becomes another step in defining the archeological aspect of the anthropology of war.

PART II

Artifact Description and Analysis

Chapter 7

ARTIFACT DESCRIPTION AND ANALYSIS

The archeological investigations at Big Hole National Battlefield yielded a wide variety of artifacts. The majority of specimens recovered can definitely be attributed to the battle, while the remainder are mainly related to the post-battle era. These latter artifacts represent items lost or discarded by visitors to the field, as well as items relating to the early homesteading and mining, and to the administration of the site by the Forest Service and the National Park Service.

This chapter consists of a description and analysis of the artifacts from the archeological inventory. The emphasis of these descriptions is on the battle-related artifacts, but the post-battle artifacts are also described. One artifact category that includes both battle-related and post-battle items is knives (Figure 40). The majority of artifacts recovered are bullets and cartridge cases, and the majority of these are battle-related artifacts. Because of the large quantity of firearms-related artifacts recovered, the description and analysis emphasizes that artifact type. A number of firearms-related artifacts were found on the battlefield by Don Rickey, Aubrey Haines, Kermit Edmonds, and others. These were collected, cataloged, and placed in the Battlefield collections. These were also examined and analyzed in conjunction with this project. Where these artifacts are discussed, the Big Hole catalog number is given with a "c" appended to the number to identify it as a Big Hole collection item. This approach was necessary, since some collection numbers and archeological field specimen numbers numerically overlap.

Arms and Ammunition Used in the Battle

The bullets and cartridge cases from the archeological investigations were subjected to comparative firearms identification analysis in order to determine the minimum number of weapon types present, and the minimum number of individual firearms within each weapon type. The analyses presented below are discussed by weapon type as identified using firearm class characteristic. The minimum number of weapons within each type are enumerated in each discussion. It is important to emphasize that these are *minimum* figures based on the artifact sample recovered during the archeological work at Big Hole Battlefield.

In general, we found most cartridge cases could be sorted to type and individual guns, although some, particularly the .45/70-caliber cartridge cases, were too corroded to identify beyond type. The bullets, on the other hand, were generally too corroded by lead oxides to sort beyond the weapon type. The process of microscopic comparison of each cartridge case to every other cartridge case of the same caliber, as well as each bullet, is very time-consuming, but results are worth the effort as will be seen in the following discussion.

U. S. RIFLE MODEL 1841, by Dick Harmon

One of the most important artifacts found during the project was a firearm (FS1117) discovered near the northwest edge of the Nez Perce camp site in the roots of a willow tree located in an old slough (Figure 22). The weapon is a U.S. Rifle Model 1841 (Hicks 1961:70). With the exception of the walnut stock, the rifle was found nearly intact and still assembled. The metal parts included the iron barrel, lock, trigger assembly, band retaining springs, ramrod retaining spring, brass barrel bands, trigger guard, and patch box cover. However, the rifle's heavy brass butt plate and two iron butt plate screws were not located even after a very thorough search of the area.

The patch box cover was found near the trigger guard and in an open position. The cover was hinged away from the stock. The patch box was originally located on the right side of the stock near the butt. We also observed that the trigger guard is slightly bent. The bent trigger guard and the location of the patch box cover lead to the speculation that the rifle's stock may have been smashed or intentionally broken at the wrist.

During the soldiers' retreat from the Village they gathered up rifles from their dead and wounded comrades and other weapons found in the Nez Perce Village. In the retreat the surviving soldiers broke the stocks and reportedly threw them into the river (Haines 1991:72) in order to avoid having them used against the command. The Model 1841 Rifle may be one of weapons destroyed during the retreat.

This type of rifle was first patterned and constructed at Harpers Ferry Arsenal and approved by the Ordnance Department in 1841, thus the model designation of 1841 (Gluckman 1965:182). Harpers Ferry Arsenal and five private contractors produced 70,796 rifles of this model between 1846 and 1855 (Flayderman 1980:445). It was first issued to the U.S. Regiment of Mounted Riflemen and the First Mississippi Regiment commanded

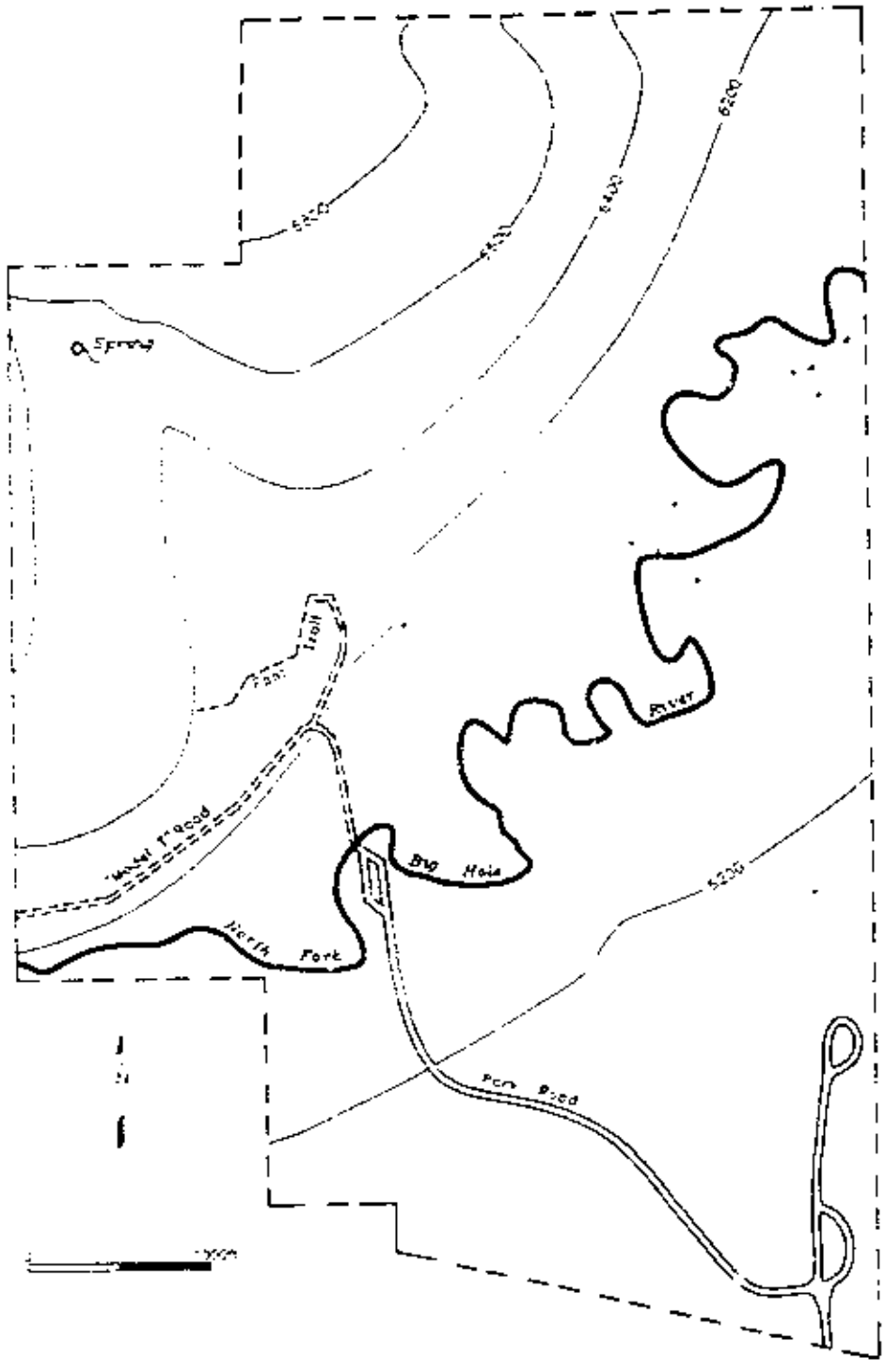


Figure 40. Distribution of knives found during the investigations.

by Jefferson Davis during the War with Mexico. The rifle soon proved to be an excellent weapon in the hands of the elite Regiment of Mounted Riflemen. It gained its commonly referred to nickname of "Mississippi Rifle" during the famous Battle of Buena Vista where Davis's troops used it with good effect (Arnold 1973:14-21). The rifles also saw much service during the Civil War.

The rifle had a 33-inch barrel with seven-groove rifling. The .54-caliber rifle fired a patched spherical ball using 75 grains of black powder. Many Model 1841 Rifles were later rebored to .58-caliber with 3-groove rifling in order to fire the new .58-caliber hollow-based Minnie bullets which were introduced in 1855. The rifle has always been considered by arms scholars as the most handsome of the U.S. military shoulder arms ever issued. The famous "Mississippi" rifle with its brass mountings and the brass-framed Henry and Model 1866 Winchester were very eye-appealing and highly sought after by Indians (Harmon 1987:73).

In 1877 the army (1879 Ordnance Department, Ordnance Notes 115) required the various frontier departments to assemble and forward to Springfield Armory guns captured from various hostile Indian groups. About 400 guns were turned in, and among those were several Model 1841 "Mississippi" Rifles. Some are still retained by the army at Springfield Armory National Historic Site and Rock Island Arsenal Museum. A captured Model 1841 Rifle at Rock Island Arsenal was found to still be loaded with a heavy charge of black powder, a round ball, and wad of horse blanket when it was cleaned in 1960 (Dorsey 1977:40).

The archeological specimen was altered from its original configuration. The front sight is missing, although the sight's dovetail is still evident. The rear sight has been moved forward five inches from its original location. The original dovetail is filled in with an iron piece. The present rear sight is too badly corroded to determine if it is the original military sight or a replacement. Both sling swivels on the stock's underside have been removed. The swivel on the trigger guard is missing, although the mounting stud is still present. The mounting stud on the front barrel band has been entirely filed away.

The front trigger guard screw is missing and, as noted previously, the guard is bent. A small piece of lead, crudely shaped to fit the front tip of the trigger guard, was found near the trigger guard. The lead piece retains a small iron wood screw. This lead piece is apparently a repair patch meant to hold the trigger guard in place on the stock.

Two screws originally held the lockplate secure to the stock. The forward screw is missing. There is no damage to the lockplate or the sideplate through which the screw passed, so it is likely the screw was deliberately removed some time before the gun was lost or destroyed. The butt plate and screws are completely absent.

The barrel was radiographed (Figure 23) to determine if it still contained a load. The radiograph confirmed the piece is loaded with two superimposed charges. One charge appears to be a conical bullet, and the second is a round ball abutting the bullet. It is not uncommon to multiple-load a muzzle-loading weapon during the heat of battle. Numerous Civil War arms were known to have been multiple-loaded in combat situations, sometimes with disastrous results. The radiograph showed the barrel and the bullets to be heavily oxidized. An attempt was made to measure the bore and bullet diameter to determine the caliber. Both were too oxidized to determine if the piece is .54 or .58 caliber. The presence of a conical bullet may suggest the gun had been altered to .58-caliber. However, the majority of round balls found during the archeological investigations are .54-caliber. This may suggest the Model 1841 Rifle was not altered to a larger caliber.

The regular army troops, Seventh U.S. Infantry and Second U.S. Cavalry, were armed with the regulation shoulder arm during the battle, the Model 1873 Springfield rifle and carbine. The volunteers had been issued the Model 1868 breech-loading .50-caliber Springfield rifle (Haines 1991:36-37). The Model 1841 Rifle was obsolete by this time, and there is very little likelihood it would have been issued to volunteer troops. The Army's Ordnance Department would not have issued a muzzle-loading rifle to regular troops for combat purposes.

The modifications found on the rifle would not have been allowed if it was issued to the volunteers. The modifications and the knowledge of the arms of the regulars and volunteers engaged in the battle lead to the conclusion that the Model 1841 Rifle found in the slough was one of the Nez Perce guns. At least one other Model 1841 Rifle was also present at the battle. A Model 1841 Rifle ramrod, identical to the specimen found in the slough, was recovered several years ago near the Howitzer Area on Battle Mountain (Haines 1991:82).

CALIBER .360

The deteriorated fragments of a relatively large quantity of unfired .360-caliber ammunition (Figures 14, 25, 41a) were recovered in a slight swale

near the northern and western extent of the Village Area. Many of the cartridges had deteriorated due to exposure to fire, leaving only bullets and case heads. Some bullets were melted by the fire.

Ten bullets, thirty-five case heads, three primers, two primer anvils (Table 2), and a number of thin brass case body fragments were found. These components represent an English sporting rifle big game or express cartridge. The original cartridge is known as the .360-caliber, 2 3/4 inch boxer. The cartridge was developed in the 1870s and was originally a paper-covered rolled (also incorrectly called foil wrapped) thin brass case with a heavier brass base. The cartridge was primed with a boxer-type primer in a battery-style cup. The bullet is smooth-bodied with a flat base and a hollow point filled with a wooden plug (Hoyem 1991:124).

The bullet is an explosive type. Explosive bullets were developed during the Civil War and most involved the use of a percussion cap in the nose over an explosive charge. The express bullet, represented by the .360-caliber, was developed for hunting larger game. The purpose of the express bullet was to give greater bullet expansion when it hit its intended target. The expansion caused greater tissue damage on impact (Peterson 1964:70). During the nineteenth century the term explosive bullet was used interchangably to mean a bullet that actually exploded on contact or a bullet that was designed to expand on contact.

Table 2. .360-caliber cases and bullets.

Case Heads:
840c, 849c, 850c, 851c, 2029, 2030, 2031, 2032, 2033, 2034, 2035, 2037, 2038, 2040, 2130, 2134, 2142, 2148, 2151, 2154, 2155, 2156, 2166, 2167, 2168, 2169, 2170, 2172, 2173, 2174, 2175, 2180, 2182, 2185, 2186
Bullets:
845c, 847c, 848c, 1114, 2036, 2133, 2150, 2158, 2178, 2179
Case Primers:
2131, 2132, 2157
Primer Anvils:
2158, 2183

SHARPS .40- AND .45-CALIBER

The Sharps firearm, produced in a number of different calibers and models, was patented in 1852 and remained a very popular military and commercial firearm for the next 50 years. It was produced in both percussion and cartridge models. 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 only two of the .50/70 cartridge cases recovered. These are discussed with the .50/70-caliber components.

There were three types of distinctive .40-caliber Sharps bullets found (Sellers 1978). The first (FS1353, 1633) has a flat nose, flat base, and three cannelures; the second (FS1342, 1865) is mushroomed at the nose but has a hollow base and is smooth bodied for a paper patch; the third (FS2076) is also mushroomed but has a flat base and three knurled cannelures. The three bullets have the distinctive Sharps sporting rifle land and groove imprints.

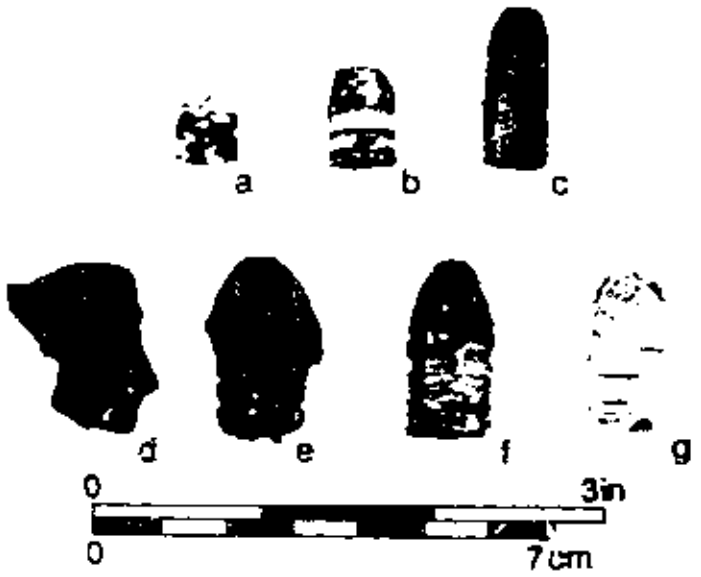


Figure 41. Various caliber bullets, a. .360 bullet, b. .44 bullet, c. .44 or .45 Sharps bullet, d.-g. .50 bullets.

There is one .44- or 45-caliber Sharps bullet (FS1864) (Figure 41c). The bullet's diameter is about .46 inch, but it is slightly deformed. The bullet has a hollow base with a smooth body for paper patching. The nose is deformed by impact. The lands and grooves indicate it was fired in a Sharps sporting rifle.

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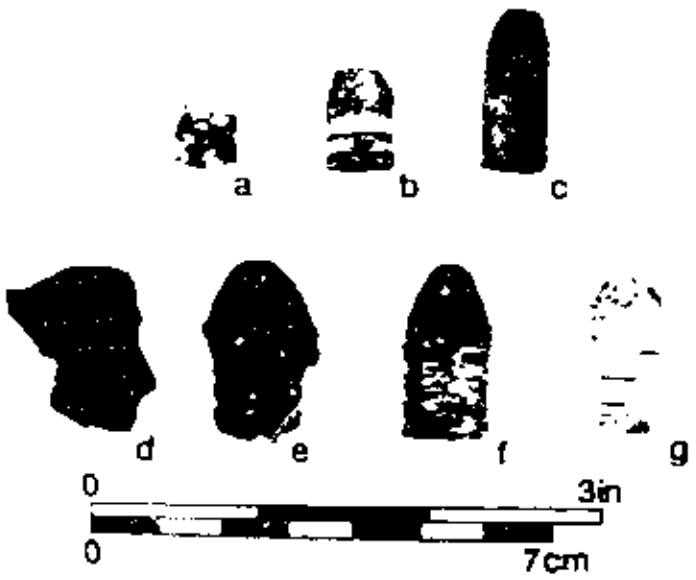

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The bullet distribution suggests that Sharps were used south of the village, fired at the soldiers on the Trail,

and used against the Howitzer. While the Sharps sporting rifle bullets are few, their distribution is consistent with other calibers.

COLT .41-CALIBER

A single hollow-base .41-caliber bullet (FS1483) was recovered. This bullet retains the Colt left-hand rifling marks. The .41-caliber Long Colt was introduced in 1877 (Barnes 1989:242) for the Colt Lightning revolver. Although it is chronologically possible that a gun of this caliber could have been present at the battle, the fact this bullet was found in the Siege Area where so many post-battle cartridge cases and bullets were found suggests it is non-battle related.

HENRY OR WINCHESTER MODEL 1866 .44-CALIBER, by Dick Harmon

There are twelve .44-caliber rimfire cases (Figure 42a) in the Big Hole collection and fourteen additional cases were recovered during the archeological project (Table 3). The 26 cases fall into three varieties. The majority are the long case variety with a raised "H" headstamp in a circular depression. The other varieties are long case with no headstamp and a long case with a raised "U" headstamp. The raised "H" headstamp indicates a Winchester manufacture. This headstamp dates 1860 to 1890 (Barber 1987). The raised "U" was manufactured by the Union Metallic Cartridge Company. The headstamp was only used between 1875 and 1878 (Barber 1987). These cases are likely to be battle associated. The .44-caliber bullets relating to these 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 Company in the mid-1860s. Henry also developed the first successful repeating rifle that would fire this cartridge by improving Smith & Wesson's Volcanic repeating arms which was a failure due to the small caliber and the 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.

There were approximately 100,000 firearms of the .44 Henry rimfire caliber that could have been on the frontier in 1877. The Henry rifle gained its popularity during the Civil War but was replaced shortly thereafter with what Winchester advertised as the "Improved Henry," the Model 1866 Winchester.

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Table 3. .44-caliber rimfire cases.

Field Specimen or Collection Number	Headstamp	Firing Pin Imprints	Fired in Gun Type
174c	H	2	Henry*
353c	U	single	Colt 1860
415c	H	1	Henry
422c	H	1	Henry
424c	H	4	Henry
430c	H	2	Henry
431c	H	1	Henry
433c	H	1	Henry
434c	H	1	Henry
708c	none	3	Henry
715c	none	1	Henry
1342c	H	1	Henry
1033	H	unfired	
1044	H	7	Henry
1045	H	7	Henry
1260	H	2	Henry
1291	none	8	Henry
1292	H	2	Henry
1293	H	4	Henry
1294	H	5	Henry
1354	H	single	Colt 1872
1471	U	1	Henry
1525	H	unfired	
1918	H	1	Henry
2093	U	1	Henry
2097	H	1	Henry

* = Henry or Model 1866 Winchester rifle or carbine.

The "Improved Henry" was easier to load, lighter in weight, and it was produced in three variations.

Both weapons were very popular on the frontier during the 1870s and highly sought after by the Indians, not only for their rapid firing ability, but they were also very eye-appealing (Parsons 1955:69). They were often called "Yellow Boy" or "Yellow Fire Stick" by the Indians.

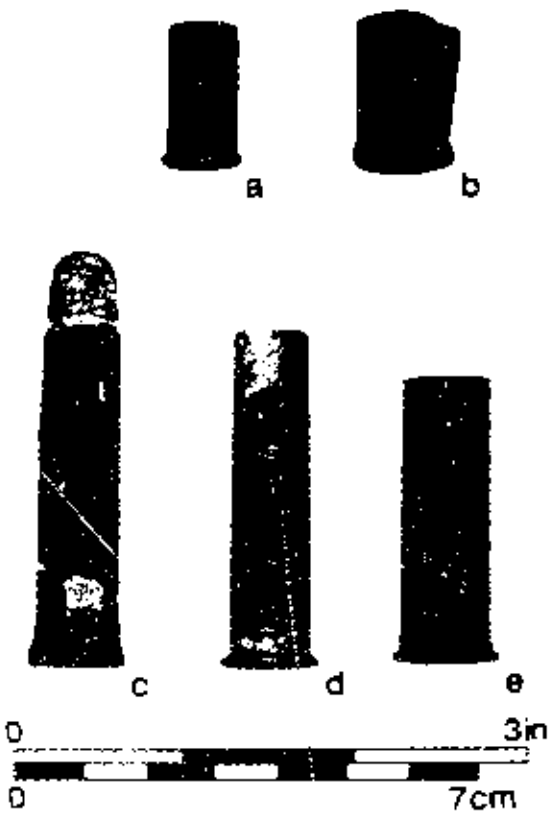

Figure 42. Various caliber cartridge cases. a. .44 rimfire Henry case. b. .56-50 Spencer case. c. complete .45/70 cartridge. d. .45-70 case. e. .50-70 case.

The first Henry cartridges were manufactured by the New Haven Arms Company. The cartridge had a copper case, a length of 0.82 inch, a round nose lead projectile 0.443 inch in diameter, and a weight of 210 grains, with a black powder charge of 25 grains. The total length of the cartridge assembled was 1.363 inches. The base of the case had no headstamp. In 1862 the company introduced another Henry cartridge and referred to it as the .44 Henry Flat because of its flat-nose bullet. It weighed 216 grains. This was the first cartridge case to bear the letter H as a headstamp in honor of Henry. The raised letter H is in a circular depression in the center of the base of the case (McDowell 1984:35-6). The flat-nose-bullet variation was designed to lessen the danger of explosion in the magazine tube (Williamson 1952:28). Manufacture of this cartridge after 1865 was on a wide scale in America and Europe, owing to the popularity of the Henry Rifle and the Winchester Model 1866, the latter being an improvement of the Henry (Hoyem 1981:129). With such a large number of manufacturers the cartridge varied in case dimensions and projectile shapes, having at least nine different variations (McDowell 1984:63-4).

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 listed in Table 3. Eleven cases bear more than one set of the double-strike firing pin marks, indicating misfires. One case, FS1291, has eight sets of firing pin marks. Two cases (FS1044, 1045) have seven sets; one (FS1294), five sets; two (424c, FS1293), four sets; one (708c), three sets; and three (174c, 430c, FS1260), two sets. Some of the cases show the bulging of the head which 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.

The large number of misfires brings up some interesting facts. Spacing of the firing pin marks on these cases indicate they were rotated in the chamber slightly each time they were fired. This was not a easy task to perform with loaded cartridges in a Henry and Winchester Model 1866, as experimentation has shown. If the finger lever is gently thrown down when extracting the cartridge, the case will drop back onto the cartridge lifter and it can be inserted by hand back into the chamber. One must also look at the base of the case and rotate the misfire marks away from the firing pins. This all takes time. This leads to the speculation that these misfires were repeatedly chambered until they finally were fired at some point in the battle when warriors had plenty of time for single-shot reloading or they were running low on ammunition and tried the misfires until they detonated.

Five cases (FS1260, 1291, 1292, 1293, 1294) fired from the same weapon all have multiple sets of firing pin marks, leading us to believe that this weapon was malfunctioning. The same may be true for the gun firing cases 424c and FS1044. These cases have two and seven firing pin marks, respectively. FS1045 also has seven firing pin marks, while the case it matches, 431c, has only one set.

Two of the .44-caliber cartridge cases bear only a single firing pin mark (Table 4), which indicates they were fired from firearms other than the Henry, chambered for the .44-caliber rimfire. The two were fired in the Colt Model 1871 Open Top Revolver (FS1354) and a Colt Model 1860 Conversion (353c).

Firearms identification procedures determined that there are ten individual Henry or Winchester Model 1866 guns, one Colt Model 1872 Open Top revolver, and one Colt Model 1860 Conversion revolver represented by the 26 cases. The heads of two unfired cartridges (FS1033 1525) were also noted. These heads represent the remains of corroded cartridges.

The distribution of .44-caliber rimfire cases suggests a Nez Perce association, with one possible exception. Three archeological cases were found east of the Village, six south of the Village, one in the Howitzer Area, and four around the Siege Area. The Big Hole collections cases were distributed one in the Village, two south of the Village, one in the Siege Area, and the rest around the Howitzer Area. Cases (FS 1044, 1045) representing two individual .44-caliber rimfire guns were used at the northeast side of the Village. These guns were then used in the fight at the Howitzer Area, as they match cases found there (FS1044 to 424c and FS1045 to the group 415c,422c,431c). Sev-

Table 4. .44-caliber rimfire cartridge case matches.

Henry or Winchester Model 1866

1. 174c*, 1918**
2. 415c, 422c, 431c, 1045
3. 424c, 1044
4. 430c, 433c, 434c
5. 708c
6. 715c
7. 1342c
8. 1260, 1291, 1292, 1293, 1294, 1471
9. 2093
10. 2097

Colt Model 1860 Conversion

1. 353c

Colt Model 1872 Open Top

1. 1354

* = numbers followed by "c" identify Big Hole collection artifacts.
** = these numbers represent archeological Field Specimen numbers.

eral other cases were found in or south of the Village Area. Big Hole collection case 174c, found in the Village, also matches to FS1918 found in the Howitzer Area. Cases 708c and 715c represent two guns used south of the Village. Archeological specimens FS1260, 1291, 1292, 1293, 1294, all fired in one gun, were also found south of the Village. FS1260 was found on the river bank and the others in the Willows about 200 yards south. They were in close proximity. FS1471, which matches to this group, was recovered in the western part of the Siege Area. Two cases (FS2093, 2097) representing different guns were found east of the Siege Area. Cases 430c, 433c, and 434c, which represent one gun, were found in the Howitzer Area. At least one other .44-caliber repeater is represented in the Howitzer Area by case 1342c.

The case (353c) representing the Model 1860 Colt Conversion was found near one of the riflepits in the Siege Area. This suggests this gun may have belonged to one of the soldiers or volunteers. Finally, the case (FS1354) representing the Model 1872 Colt Open Top revolver was found south of the Village. The distributions and cross-matches indicate one revolver and three different .44-caliber repeating rifles were used in or near the Village. One revolver and two repeating rifles were used in or near the Siege Area, and five repeating rifles were used in the fight at the Siege Area. One gun used in the fight at the Village was also used in the fight at the Siege Area. Three repeaters used in the Village were also used in the fight at the Howitzer Area. These distributions indicate that several individuals were involved at more than one location during the battle. These individuals moved significant distances around the field of battle.

CALIBER .44 BULLETS (200 GRAIN)

There were fourteen .44-caliber bullets (Figure 41b) recovered. They are of the type used in .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.

Several bullets bear rifling marks clear enough to identify as having been fired from either the Henry rifle or Winchester Models 1866 and 1873. The rifling in these weapons is five-groove right-hand twist. Some Henrys in the serial number range of 17,000-22,000 had six-groove right-hand twist rifling (Madis 1979:113). At least one bullet (FS1061) has the six-groove rifling marks.

There are four variations of bases and cannelures of the .44-caliber bullets: single cannelure-flat base (FS1567, 1954), two knurled cannelure-flat base (FS1061, 1074, 2077, 2084), three cannelure-raised base (341c, 359c, 1356c, 1416c, FS1545), and four cannelure (FS1137). Seven bullets were deformed on impact, and on two (FS1568, 1991) the rifling marks could not be determined.

Cannelure distortion, caused by black powder build-up in the bore, appears on a number of bullets. Repeated firing, twenty or thirty rounds, without cleaning the bore causes this build-up to occur. It is not surprising to see this evidence on the Henry and Winchester battle-related bullets, and it is consistent with the cartridge case misfire evidence discussed previously. These two independent lines of evidence tend to support the contention many of the repeating firearms were not clean or became fouled during the battle.

The .44-caliber bullet distribution shows three were found in the Village Area, nine in the Siege Area, and two in the Howitzer Area. The bullet distribution is consistent with the .44-caliber case distribution. The bullets were recovered in the same general area as the cases, but not in proximity. Distances between bullets and cases is consistent with firing from Nez Perce positions into soldiers' positions.

WINCHESTER .44/40-CALIBER, by Dick Harmon

Only five cases of .44/40-caliber (479c, 1405c, FS1635, 1892, 92-8) were found at Big Hole. These brass cases are centerfire and were primed with the Winchester-Milbank primer. The .44/40 cartridge was first introduced in 1873 along with the lever action Model 1873 Winchester Repeating Rifle. There were approximately 25,000 guns of this model shipped from the Winchester warehouse by the end of 1877, all .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 heavier center-fire cartridge which could be reloaded. This model was produced in three variations, rifle, carbine, and musket.

Firearms identification procedures determined that the four cases represent four different guns. The gun represented by 479c was used near the Siege Area, while the gun represented by FS1635 was used along the Nez Perce Trail northwest of the Siege Area. The gun represented by 1405c and FS1592 was used in two places. Case 1405c was found near the southern extent of the riflepits in the Siege Area, and FS1892 was found near the Howitzer Area.

Both cases 479c and FS1635 have flat heads. This head type is indicative of Winchester manufacture. Cases 1405c and FS1892 have slightly raised central rings on their heads. This may indicate manufacture by Remington or Union Metallic Arms Company. If so, this may mean these two cases postdate the battle. Case 92-8 has a "**WRA Co**" headstamp indicating a post-1877 manufacture by the Winchester Repeating Arms Company.

COLT .45-CALIBER

During the battle, some soldiers and Nez Perce were armed with the .45-caliber Colt Model 1873 Single Action Army Revolver. Two fired Colt Benet-primed cases (356c, FS1033) and three hollow-base bullets (250c, FS1273, 2177) were recovered.

Firearms identification analysis indicated the cases were fired in different Colt revolvers. Case FS1033 was found in the north end of the Village and case 356c was found in the Siege Area. The two Colt bullets were found east of the Village.

One additional Colt case (FS1189) was recovered south of the Village. It is a brass .45-caliber Auto-rim case. It was manufactured for the Model 1917 Colt revolver and thus post-dates the battle.

SPRINGFIELD .45/70-CALIBER

There were 30 cartridges (Figure 42c) and 524 .45/70-caliber cases (Figure 42d) found on the battlefield (Table 5). These cartridges were used by the army and the Nez Perce in the Model 1873 Springfield rifle and carbine. The rifle was the principle firearm used at the battle, although some Second Cavalrymen's and Nez Perce–captured arms were undoubtedly carbines.

The recovered cases and cartridges are Benet internally primed with a wide basal crimp and have, with one exception, no headstamp. The single exception is FS1280 which is headstamped "**R/F 5/77.**" which identifies it as a rifle cartridge made at Frankford Arsenal, Pennsylvania, in May, 1877.

The .45-55 carbine cartridge does not differ from the .45/70 rifle cartridge, issued to the infantry, except that the case was filled with only fifty-five grains of black powder. In order to keep the smaller powder volume compacted, ordnance personnel developed a wad for the carbine load. Later, experiments used a cardboard tube liner in place of the wad (War Department 1875). Two of these liners were recovered in their cases (FS1734, 1798) indicating the cavalry load was present in the battle. Undoubtedly more were

used, but the tube was generally blown from the case when fired, thus leaving no evidence behind to identify the lighter cavalry load.

One hundred and thirty-six .45-caliber 405 grain bullets were found in three varieties. All have three cannelures, but the bases have three different cavity sizes, large, medium, and small. There are also several deformed bullets that could not be sorted to a specific cavity variety. These bullets had been deformed on impact. All these types are from government arsenal stampings or from government contract production (Lewis 1972).

Firearms identification procedures were applied to all cases (Table 5). Twenty cases were too oxidized or eroded to compare and were excluded from the analysis, although included in the total cartridge case count. These were found in the Village Area or along the Retreat Line through the Willows. The Village Area and the Willows east of the river yielded 282 cases. There are a minimum of 55 separate Springfields represented by the cases in the north end of the Village and 30 separate Springfields represented by these cases in south end of the Village. One case has a torn rim which suggests there may have been a case extraction problem. This case matched to a group of four other cases. This was the only one with evidence of an extraction problem.

The headstamped case matches seven other cases found in the Village and in the Willows west of the river. Four groups also match to cases found along the Retreat Line west of the river, and four groups match to cases found in the Siege Area.

Table 5. Springfield cartridges, bullets, and cartridge cases by Field Specimen number.

Unfired .45/55 cartridges: (specimens = 30)
1024, 1031, 1097, 1187, 1223, 1243, 1393, 1403, 1434, 1596, 1603, 1609, 1622, 1625, 1631, 1729, 1730, 1774, 1794, 1818, 1836, 1838, 1840, 1890, 1916, 1949, 1968, 1971, 2006, 2184
Cartridge cases: (specimens = 524 [number 766c has 11 cases])
214c, 215c, 216c, 217c, 218c, 219c, 221c, 222c, 223c, 224c, 226c, 227c, 228c, 229c, 230c, 231c, 232c, 233c, 234c, 235c, 236c, 237c, 238c, 239c, 240c, 241c, 242c, 243c, 244c, 245c, 246c, 247c, 248c, 249c, 253c, 301c, 303c, 308c, 309c, 310c, 311c, 312c, 316c, 317c, 318c, 321c, 322c, 326c, 327c, 331c, 342c, 345c, 351c, 361c, 369c, 371c, 372c, 374c, 376c, 377c, 391c, 402c, 406c, 407c, 409c, 411c, 414c, 420c, 421c, 423c, 425c, 427c, 428c, 429c, 435c, 436c, 437c, 438c,

Table 5 Continued.

439c, 440c, 441c, 476c, 477c, 487c, 488c, 489c, 490c, 491c, 492c, 493c, 494c, 495c, 496c, 497c, 498c, 499c, 500c, 501c, 502c, 503c, 504c, 533c, 534c, 547c, 553c, 554c, 557c, 558c, 560c, 561c, 562c, 563c, 564c, 565c, 566c, 567c, 569c, 570c, 571c, 572c, 573c, 574c, 576c, 578c, 580c, 581c, 582c, 583c, 584c, 587c, 588c, 589c, 594c, 595c, 596c, 597c, 600c, 601c, 605c, 606c, 607c, 608c, 609c, 671c, 673c, 700c, 703c, 704c, 705c, 707c, 709c, 710c, 713c, 717c, 718c, 719c, 720c, 721c, 723c, 724c, 725c, 726c, 727c, 728c, 729c, 730c, 731c, 732c, 733c, 734c, 735c, 737c, 738c, 739c, 740c, 741c, 743c, 744c, 745c, 746c, 747c, 748c, 749c, 750c, 751c, 752c, 753c, 754c, 755c, 756c, 757c, 758c, 759c, 760c, 761c, 762c, 763c, 764c, 765c, 766c, 767c, 768c, 769c, 770c, 771c, 772c, 773c, 774c, 775c, 776c, 777c, 778c, 779c, 780c, 781c, 782c, 783c, 784c, 785c, 786c, 787c, 788c, 789c, 790c, 791c, 792c, 793c, 794c, 795c, 796c, 797c, 800c, 801c, 802c, 806c, 808c, 828c, 838c, 839c, 843c, 844c, 845c, 1221c, 1244c, 1308c, 1338c, 1360c, 1381c, 1383c, 1391c, 1408c, 1429c, 1046, 1047, 1051, 1054, 1059, 1063, 1064, 1065, 1066, 1067, 1068, 1070, 1072, 1073, 1080, 1091, 1092, 1093, 1095, 1111, 1113, 1119, 1142, 1145, 1146, 1147, 1151, 1152, 1153, 1155, 1160, 1167, 1168, 1175, 1177, 1179, 1180, 1181, 1182, 1183, 1184, 1186, 1190, 1191, 1192, 1193, 1195, 1196, 1197, 1198, 1199, 1200, 1202, 1204, 1205, 1206, 1207, 1208, 1209, 1212, 1213, 1214, 1215, 1217, 1218, 1220, 1221, 1222, 1224, 1225, 1226, 1227, 1228, 1229, 1230, 1231, 1232, 1233, 1234, 1235, 1236, 1237, 1238, 1239, 1240, 1241, 1242, 1244, 1245, 1246, 1247, 1253, 1254, 1259, 1268, 1269, 1272, 1275, 1279, 1280, 1282, 1284, 1285, 1286, 1300, 1301, 1302, 1304, 1305, 1306, 1307, 1308, 1309, 1310, 1311, 1312, 1313, 1314, 1315, 1316, 1317, 1318, 1319, 1320, 1321, 1323, 1324, 1325, 1329, 1330, 1332, 1333, 1334, 1335, 1336, 1355, 1372, 1375, 1378, 1401, 1408, 1409, 1469, 1474, 1597, 1599, 1600, 1601, 1602, 1604, 1605, 1607, 1608, 1612, 1613, 1615, 1618, 1620, 1621, 1623, 1624, 1625, 1628, 1644, 1645, 1725, 1734, 1735, 1736, 1737, 1738, 1750, 1758, 1759, 1763, 1764, 1765, 1766, 1767, 1768, 1771, 1773, 1775, 1776, 1778, 1783, 1784, 1785, 1787, 1788, 1789, 1791, 1795, 1796, 1798, 1799, 1800, 1805, 1806, 1809, 1810, 1811, 1815, 1821, 1822, 1823, 1831, 1841, 1842, 1843, 1844, 1845, 1851, 1853, 1854 1915, 1973, 2004, 2019, 2020, 2021, 2043, 2044, 2045, 2046, 2047, 2048, 2049, 2050, 2051, 2052, 2053, 2054, 2055, 2056, 2057, 2064, 2065, 2066, 2067, 2069, 2070, 2086, 2091, 2092, 2110, 2119, 2120, 2121, 2122, 2123, 2128, 2160, 2162, 2163, 2164, 2192, 92-2, 92-3, 92-4, 92-5, 92-6

Large cavity bullets: (specimens = 106)
219c, 220c, 252c, 258c, 333c, 362c, 365c, 382c, 389c, 552c, 586c, 702c, 722c, 807c, 820c, 830c, 1365c, 1392c, 1003, 1004, 1012, 1021, 1040, 1042, 1043, 1048, 1050, 1058, 1060, 1069, 1101, 1107, 1110, 1123, 1129, 1157, 1188, 1277, 1281, 1295, 1297, 1341, 1346, 1350, 1351, 1361, 1362, 1363, 1364, 1365, 1373, 1374, 1384, 1402, 1413, 1433, 1446, 1551, 1606, 1611, 1637, 1647, 1653, 1658, 1660 1661, 1662, 1665, 1668, 1673, 1674, 1677, 1678, 1705, 1708, 1715, 1724,

Table 5. Concluded.

1731, 1896, 1898, 1901, 1908, 1911, 1935, 1946, 1978, 1984, 1993, 2003, 2009, 2011, 2018, 2023, 2026, 2041, 2042, 2063, 2075, 2078, 2079, 2082, 2090, 2094, 2114, 2127, 2161

Medium cavity bullets: (specimens = 6)
367c, 674c, 817c, 1423c, 2010, 2118

Small cavity bullets: (specimens = 5)
403c, 515c, 818c, 1150, 1154

Miscellaneous and deformed bullets (specimens = 14)
358c, 809c, 1360c, 1406c, 1418c, 1030, 1036 (melted with bead embedded), 1086, 1100, 1394, 1449, 1712, 1817, 1970

Table 6. .45/70-caliber cartridge case matches.

Springfield rifles and carbines

1. 229c, 237c, 239c, 562c, 592c, 729c, 1145, 1180, 1235, 2057
2. 230c, 721c, 766Hc, 1191, 1192, 1193, 1194, 1205
3. 231c, 747c, 1230, 1231, 1239, 1245
4. 232c, 764c, 765c, 775c, 801c, 1234
5. 233c, 234c, 235c, 553c, 557c, 718c, 759c, 767c
6. 236c, 558c, 560c, 574c, 720c, 751c, 1119, 1142, 1232, 1272
7. 238c, 704c, 1147, 1151, 1153
8. 301c, 310c, 311c, 312c, 726c, 778c, 1380c, 1381c, 1795, 1796, 1798
9. 303c, 322c, 327c, 371c, 1372, 1766, 2163
10. 308c
11. 309c
12. 316c, 317c, 372c
13. 318c, 326c, 601c, 724c, 732c, 779c, 1047, 1217, 1238, 1240, 1241, 1244, 1332, 2045, 2054
14. 321c, 342c, 1429c
15. 331c
16. 345c, 744c, 1318, 1725, 1973, 1821, 2110, 2123, 2164
17. 346c, 351c, 402c
18. 361c
19. 369c, 487c
20. 374c

Table 6. Continued.

21. 376c, 477c, 1182
22. 377c, 391c, 1375, 1409, 1601, 1608, 1612, 2091, 2092
23. 406c, 407c, 437c, 441c
24. 411c, 414c
25. 420c, 421c, 423c, 426c, 438c, 440c, 1338c, 1851, 1853, 1854, 1915
26. 435c, 436c
27. 439
28. 476c, 1383c, 1378, 1763, 1768, 1775, 1800, 2160
29. 533c, 534c, 547c, 1195, 1198, 1778, 1783, 1785, 1787
30. 554c, 1054, 1181, 1236, 1237, 1312
31. 563c, 770c, 788c, 793c, 794c, 800c
32. 561c, 580c, 594c, 790c, 790c, 1046, 1051, 1059, 1146, 1183, 1186
33. 564c, 576c, 703c, 1152, 1155, 1167, 1168, 1175
34. 565c, 584c, 1246
35. 566c, 740c, 743c, 753c, 773c, 774c, 791c, 792c, 795c, 797c, 802c, 806c, 1179, 1310, 1764, 1765, 1784, 1788, 1810, 2069, 2122, 2128
36. 567c, 569c, 571c, 1309
37. 570c, 581c
38. 572c, 575c, 727c, 731c, 766Fc, 766Gc, 766Jc, 1320
39. 573c, 583c, 587c, 588c, 741c, 745c, 748c, 752c, 755c, 756c, 757c, 759c, 1313, 1314, 1315, 1319, 1355
40. 578c, 1197, 1199, 1305
41. 582c, 1323, 1325, 2019, 2043, 2066, 2067
42. 595c, 597c, 600c, 1247, 1285
43. 607c, 608c, 769c, 1063, 1066, 1070, 1072, 1080, 1091, 1093, 1111, 1789, 1791, 1823, 1841, 1842, 1944, 2004
44. 609c, 787c
45. 719c
46. 723c, 728c, 730c, 766Ac, 766Bc, 781c, 1300, 1306, 1307, 1308
47. 725c, 754c, 758c, 761c, 772c, 1302, 2120, 2122
48. 746c, 749c, 762c, 777c, 1067, 1160, 1177
49. 763c, 785c, 1207, 1214, 1215, 1224, 1228, 1242, 1268, 1329, 1330, 1333, 1336
50. 766Cc, 766Dc, 766Ec, 766Ic, 766Kc, 783c, 2056
51. 782c, 784c
52. 1054, 1408c, 1750
53. 1065, 1068, 1280, 1282, 1646, 1758, 1773, 1776
54. 1073, 1113, 1217, 1316
55. 1092, 1095, 1279, 1284, 1286
56. 1184
57. 1190, 2021
58. 1196, 1200, 1213

Table 6. Concluded.

59.	1202
60.	1204, 1206
61.	1208, 1221, 1229
62.	1222, 1227
63.	1233
64.	1253, 1259, 1275
65.	1254, 1843
66.	1269
67.	1301, 1304
68.	1311, 1324, 1325
69.	1317, 1321
70.	1334
71.	1391
72.	1408, 1620, 1621, 1623
73	1464, 1735, 1736
74.	1469, 1597, 1602, 1616, 1618, 1628
75.	1474, 1737
76.	1599, 1600, 1605, 1625
77.	1604
78.	1607
79.	1613
80.	1644, 1759, 1767, 1771, 1799, 1805
81.	1734
82.	1738
83.	1806, 1808, 1809, 1810, 2064
84.	1811
85.	1815
86.	1845
87.	2020
88.	2047, 2055, 2070, 2119, 2162
89.	2085, 2192
90.	2097

The area of the Retreat west of the river yielded 52 cases. Those that could be analyzed allowed identification of sixteen individual firearms. One case retained a cardboard tube liner, which suggests it was fired in a Springfield carbine. The case matched eight other cases found west of the river and in the Siege Area. No other cases in this group had the cardboard liner remaining. It is not known if this represents a Second Cavalry soldier's weapon, a Nez Perce–captured carbine (unlikely with the finds of the cases in the Siege

Area), or a mixed use of ammunition. The most likely interpretation is that these cases represent the movement of a Second Cavalry soldier. The absence of other tube liners is not unexpected, since most would have been blown free of the case during discharge. A total of six case groups also had matches in the Siege Area. No cases matched to those found along the Trail.

The Trail Area yielded nineteen cases which represent seven individual Springfield firearms. Three sets matched to cases found in the Siege Area.

The Siege Area yielded 59 cases representing 26 individual Springfield firearms. One case had the remains of a cardboard tube liner. As noted earlier this indicates it was a carbine round. Several case groups matched to cases found along the Trail, in the Village, and along the Retreat Line.

The Howitzer Area yielded twenty cases that represented the use of five Springfield firearms. There are no matches to any other area.

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. Spencers were produced for the military in two calibers and the commercial market in one additional caliber (Barnes 1989:281; Gluckman 1965:388). Two cartridge cases (FS1369, 1749) were recovered (Figure 42b). Only one identifiable Spencer bullet (FS1025) was recovered during the battlefield inventory. It is a .50-caliber variety with three cannelures. Undoubtedly a number of other .50-caliber bullets were fired in Spencers; however, most Spencers were rifled to arsenal specifications of three land and grooves. Most U.S. military .50-caliber shoulder weapons of this period were rifled to those same specifications, so it is very difficult to determine weapon type from bullets with three land and groove imprints.

Firearms identification analysis indicates at least two .56/50 Spencers were present at the battle. The bullet was recovered east of the Village near the boundary fence. One Spencer cartridge case was found on the western edge of the Siege Area and the other on a slope below the Trail to the northeast of the Siege Area.

CALIBER .50/70

The .50/70 cartridge was developed for the army's first service-wide 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).

There were five cartridges and sixteen .50/70 cases (Figure 42c) recovered during the archeological investigations. An additional case (FS1884) is unfired, but the bullet has been removed. The Big Hole collection contained an additional twenty-eight fired cases. One case (551c) in the Big Hole collection is unfired; however, it exhibits evidence of exposure to fire. The case has bulged and exploded.

The specimens represent five different primer types (Lewis 1972). The first are U.S. government issue, internally bar primed cases; second, Benet primed cases; third, Winchester-Millbank primed brass cases; fourth, Berdan primed brass cases; and fifth, Boxer primed cases (Table 7). In addition, two .50-caliber Benet cup primers (FS1968, 1972) were found. These had been blown out of their cases when fired. A single (FS1079) two-hole disc anvil was also recovered. This anvil type was only used for experimental purposes. Apparently only 30,000 rounds of ammunition were manufactured in 1870 with this anvil type (Logan 1959; Lewis 1972). Its presence at the Big Hole suggests an old lot of ammunition was issued to the volunteers or had been surplused and found its way west and into the hands of the Nez Perce.

Firearms identification analysis indicates that three firearms types are represented by the fired cases (Table 8). One is the Springfield .50/70. This army weapon was manufactured in three models. The Model 1866 leaves a unique extractor mark. None of the cases exhibit this mark. The Models 1868 and 1870 leave identical extractor marks on the case. While it is not possible to determine which of the two Springfield models were used at the battle, it is possible to determine from the historical record that the Model 1868 was used, so the archeological evidence of the extractor marks is in concordance with the documentary record. There are three cases (409c, 1337c, 2086) which are .45/70s that have expanded and split from being fired in a .50/70-caliber guns. They were fired in two different Springfields.

The other firearm types represented by the fired cases are the Remington Rolling Block and the Sharps .50/70. Several models in each type were chambered for the .50/70 and each leaves behind similar firing pin and extractor impressions, so it is not possible to determine the model from the data available.

Table 7. .50/70-caliber cartridge cases.

Field Specimen or Collection Number	Headstamp	Primer Type	Fired in Gun Type
211c	none	Benet	Springfield
225c	none	Berdan	Springfield
287c	none	Berdan	Springfield
290	none	Berdan	Springfield
293c	E. Remington and Sons	Boxer	Remington?
340c	none	Berdan	Springfield
395c	none	Berdan	Springfield
405c	none	Benet	Springfield
408c	none	Benet	Sharps
412c	none	Bar	Springfield
413c	none	Boxer	undetermined
416c	none	Boxer	Springfield
419c	none	Boxer	Springfield
520c	none	Benet	undetermined
521c	none	Boxer	Springfield?
522c	none	Boxer	Springfield?
549c	none	Boxer	Springfield
555c	none	Bar	undetermined
559c	none	Berdan	undetermined
585c	none	Boxer	Springfield?
819c	none	Boxer	Springfield?
822c	none	Boxer	Springfield?
824c	none	Boxer	Springfield?
825c	none	Boxer	Springfield?
829c	none	Boxer	Springfield?
833c	none	Benet	Springfield
1346c	none	Berdan	Springfield
1216	none	Bar	Springfield
1219	none	Benet	Springfield
1326	none	Benet	undetermined
1327	none	Benet	undetermined
1328	none	Benet	undetermined
1420	none	Berdan	Springfield
1422	none	Berdan	Springfield
1444	E.Remington and Sons	Boxer	Remington
1544	none	Berdan	Sharps
1610	none	Benet	Springfield
1835	none	Berdan	Springfield?

Table 7. Concluded.

Field Specimen or Collection Number	Headstamp	Primer Type	Fired in Gun Type
1882	none	Berdan	Springfield?
1883	none	Berdan	undetermined
2125	none	Millbank	undetermined
92-1	none	Boxer	Springfield
92-7	none	Berdan	Springfield?

Table 8. .50/70-caliber cartridge case matches.

Remington	Springfield
1. 293c	1. 211c
2. 1444	2. 225c, 287c, 290c
	3. 340c
Sharps	4. 395c
	5. 405c, 412c
1. 408c	6. 409c, 2086
2. 1544	7. 413c
	8. 416c
	9. 419c, 1346c
	10. 520c
	11. 521c
	12. 522c
	13. 549c
	14. 555c
	15. 585c, 819c, 822c, 824c, 825c, 829c, 1420, 1422, 2125
	16. 833c
	17. 1337c
	18. 1216
	19. 1326, 1327
	20. 1329
	21. 1610
	22. 1835, 1882
	23. 1883
	24. 92-1
	54. 92-7

Within the three firearm types, at least 29 individual .50/70s are represented by unique firing pin impressions. Two cases are too eroded to ascertain whether they match any other cases or represent individual weapons. They were therefore excluded from this discussion. Table 8 identifies the cases and matches as they represent individual firearms.

The .50/70 cartridge and cartridge case distribution is similar to other distributions. Several cases were found in the Village Area, some in the Retreat Area, some in the Siege Area, and some in the Howitzer Area. The matches provided excellent evidence for firearm movement and strongly suggest that both combatant groups were utilizing the .50/70. Big Hole collection case 585c was found in the Willows west of the Village Area. That case matches to a series (819c, 822c, 824c, 825c, 829c, 2125) found north of the Village. This area was once in a river meander that has now been cut off. This series of cases also match to cases FS1420 and FS1422 which were recovered in the Siege Area. This suggests these cases represent a citizen volunteer who moved from the Willows west of the Village during the initial attack to the northern extent of the Village and finally retreated to the Siege Area.

Another case of firearm movement is noted with cases FS1835 and FS1882. The former case was found in the Willows in the Retreat Area. A match was found in the Howitzer Area. This suggests two possibilities. One is a volunteer's gun being lost and falling into Nez Perce hands to be used in the fight at the howitzer, or that this was a Nez Perce gun used against Gibbon's command during the retreat and at the Howitzer Area.

The case evidence indicates that at least two guns were used in the river meander at the northern extent of the Village, at least six in the Willows west of the Village and in the Village itself, one on the Trail, three in the retreat through the Willows, eight in the soldier-held positions in the Siege Area, one in the Indian-held portion of the Siege Area, and at least ten in the fight around the Howitzer Area. These .50/70 firearm counts include those guns used in more than one place.

The .50/70s used west of the Village and to the north, as well as those found in and around the riflepits, were probably used by the volunteers. The cases found in the Village could represent .50/70 use by either the volunteers or the Nez Perce, or both. The same may also be said for the cases found around the Howitzer Area. However, these are more likely to represent Nez Perce guns, as the soldiers manning the howitzer should have been armed with .45-70s.

There are six varieties of bullets (Figure 41d-g) from .50/70's in the collection. Undoubtedly, the forty-two bullets represent individual manufacturer's castings, swagings, experiments, or preference in design of bullets. Most bullets (Table 9) in the collection are a three-cannelure type with only minor variations distinguishing them. The single most common .50/70 bullet is the one used in most of the standard-issue cartridges up to 1868 (Lewis 1972:28). These bullet variations simply represent the ammunition available to the army and Nez Perce at the time of the battle. The types were all exhibited by the army during the 1876 International Exposition in Philadelphia (Lewis 1972).

Thirty-three bullets were deformed to varying degrees as they struck an object. Several bullets have gouges or grooves on their surface, some were mushroomed by impact, and others had deformation of the bullet tip. These deformations were caused by impacts of undetermined origin.

The bullet distribution is similar to other calibers. Bullets were found concentrated in the Indian Village, the Siege Area, and Howitzer Area. This is consistent with other calibers and further delineates the combat zones.

CALIBER .58

A single .58-caliber minnie ball (524c) was found on the battlefield. The conical ball with a hollow base is identical to Civil War–issue rounds, and

Table 9. Caliber .50/70 bullets by Field Specimen number and type.

Cadet - two cannelures with flat base (1 specimen): 1353c
Knurled cannelure - three knurled cannelures with flat base (1 specimen): 1368
Experimental with deepened cannelures - three cannelures and small raised base (1 specimen): 1819
Experimental paper patched - three cannelures with large raised base (3 specimens): 1339, 1445, 1792
Experimental with extra tin added - three cannelures and flat base (13 specimens): 1339, 1575, 1634, 1636, 1643, 1655, 1659, 1742, 1832, 1910, 1937, 1957, 2017
Standard issue - three cannelure with small hole in base (23 specimens): 251c, 387c, 346c, 397c, 532c, FS1071, 1076, 1082, 1089, 1096, 1287, 1299, 1347, 1370, 1565, 1615, 1642, 1645, 1790, 1912, 1948, 1987, 1992

may be representative of surplus Civil War ammunition. The bullet shows no evidence of deformation or land and groove marks. It is possible that it was fired in a smoothbore musket, although in all probability it represents a lost and unfired round.

MISCELLANEOUS AND UNIDENTIFIED ROUND BALLS

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. Any lead bullet could be reformed into a usable projectile by hammering or recasting in an appropriately sized mold.

There are twelve round balls from the Big Hole battlefield. One (FS1278) is approximately .45-caliber. It is somewhat flattened by impact, and no rifling marks can be identified. Another (FS1132) is so flattened by impact that its original diameter could not be determined. The remaining balls (363c, 481c, 568c, FS1125, 1128, 1283, 1669, 2008, 2058, 2089) are about .54-caliber. Unfortunately, rifling marks were indistinct on these balls, so specific firearm types could not be determined.

The balls were recovered from two general areas. Two were found in the timber above and south of the Siege Area. The others were found in and south of the Village.

SHOT AND SHOTSHELLS

Thirteen pieces of shot from shotguns were found on the battlefield. Three pieces are #000 size shot (FS1081, 1143, 1475), which are approximately .36 inch in diameter. Eight pieces are #0 size shot (675c, FS1475, 1579, 1654, 1691, 1722, 2100, 2101), one shot (FS1726) is a #3 size shot, and the last shot (FS1943) is a size T. Two of the #0 shot are iron.

Three gauges of shotshells were recovered. Only the brass shotshell heads remained. The paper hull had disintegrated. One 410-gauge shell (FS1945) is headstamped "**REM UMC 410 NITRO.**" The headstamp indicates this shell was made by the Remington Union Metallic Cartridge Com-

pany. Since that company came into existence in 1911 (Barber 1987), the shell dates post-1911.

Six 12-gauge shotshells were identified. One has no headstamp (FS1022). One (FS1185) is headstamped "**WINCHESTER LEADER NO. 12.**" This headstamp was used on Winchester-produced shotshells from 1894 to 1943 (Stadt 1984; Iverson 1989). Five shells (FS1399, 1404, 1923, 1944, 2088) are headstamped "**ELEY BROS LONDON.**" This headstamp is for the famed Eley Brothers who were ammunition manufacturers in England throughout the last three-quarters of the nineteenth century. This raised headstamp may date to the 1870s, although its origination date is uncertain (Boothroyd 1958:13). These shells may date from the battle period or later.

Two shells are 10 gauge (FS1356, 1638). One is headstamped "**UMCCO SMOKELESS NO. 10.**" This headstamp indicates a Union Metallic Cartridge Company manufacture dating to the period post-1890 to 1911 (Barber 1987; Iverson 1989:149). The other (FS1638) is headstamped "**UMCCO NO. 10.**" This Union Metallic Cartridge Company shell was made between 1867 and 1911 (Barber 1987). It may date to the period of the battle, but in all probability it post-dates the engagement.

The shells and shot were widely distributed around the battlefield. Five artifacts were found south of the Village, one several hundred yards south of the Village, one on the Trail, two in the timber southwest of the Siege Area, and ten in the Siege Area. While the shot and several shells could have been used in the battle, all the shotgun-related artifacts probably are associated with post-battle activities.

DEFORMED BULLETS, BALLS, AND LEAD SCRAPS

Within the collection are forty-three deformed bullets and balls or scraps of lead which probably represent fragments of bullets. All are too deformed or fragmentary to identify, but they definitely represent bullets that struck something, causing them to become deformed or to splinter. Soft lead or unalloyed bullets are known to deform more on impact than alloyed bullets. And that is the case with these bullets. Soft lead bullets are also known to splinter when they strike bone (DeHaan 1983). Most of these fragmented bullets appear associated with the battle areas. They were often found near clearly identified battle-related bullets. While the context appears to suggest a battle association, later sources of origin cannot be excluded. The deformed bullets and lead scraps are FS1057, 1062, 1303, 1387, 1400, 1416, 1441, 1443, 1450, 1460, 1463, 1553, 1570, 1581, 1639, 1640, 1641, 1657, 1666,

1667, 1671, 1675, 1684, 1689, 1702, 1720, 1752, 1869, 1871, 1873, 1874, 1875, 1900, 1922, 1928, 1959, 1980, 1996, 2005, 2113, 2171, 2190, 2191.

CASE FRAGMENTS

Two fragments of copper cartridge cases are in the collection. They are not identifiable to caliber or weapon.

Post-Battle Ammunition

Randomly scattered across the battlefield, although heavily concentrated in the Siege Area, were hundreds of cartridges, cases, and bullets which are not associated with the battle. They probably represent later hunting activities and incidental shooting activities. The cartridge case headstamps, calibers, and the metal alloys used in manufacturing the components date the artifacts to the post-battle era. A random sample of 111 cases, cartridges, and bullets was collected for reference purposes.

CALIBER .22

There are several varieties of .22-caliber cases in the collection. There are thirty-one .22 short cases, eighteen .22 long cases, one .22 long rifle case, and three .22 magnum cases. There is one .22 long cartridge. Thirty-seven cartridges or cases have an impressed "**H**" for Winchester manufacture dating after 1890 (Barber 1987), nine cases have an impressed "**U**" for Union Metallic Cartridge Company dating 1885 to 1953 (Barber 1987), four cases have an impressed "**P**" for Peters Cartridge Company dating 1895 to 1934 (Barber 1987), two cases are impressed "**Peters H V**" (High Velocity) post-dating 1930, two cases are impressed with an unusual "**C**" design, and one case has an impressed "**M**" over a "**W**" for Montgomery Ward Company. These latter cartridges were made by Federal Cartridge Company for Montgomery Ward from 1927 until recently (Barber 1987). The collection also contains nineteen .22-caliber bullets.

CALIBER .25/20

Three .25/20-caliber bullets were recovered. The .25/20 cartridge first appeared in 1882 and was last commercial loaded in quantity in the mid-1930s (Barnes 1989:102).

CALIBER .30/06

Four copper-jacketed .30/06 bullets were recovered. The .30/06 was first introduced in 1903, with refinements in 1906. It is still a popular cartridge today (Barnes 1989:59).

CALIBER .30/30

Two .30/30 cases were recovered. One is headstamped "**REM-UMC**" and the other "**USC CO.**" The .30/30 was introduced in 1895 and is still loaded today (Barnes 1989:54).

CALIBER .303 SAVAGE

Three .303 Savage cases were found. All three are headstamped "**SA CO 303 Sav.**" The round was introduced in 1899 and continues to be loaded today (Barnes 1989:65).

CALIBER .32

Several cases and one bullet were recovered in .32-caliber. Two cases are for the .32-caliber Automatic Colt pistol. This caliber was introduced in 1899 (Barnes 1989:225). Both cases were fired in the same gun. One case is for the .32/20 Winchester. This cartridge was introduced in 1882 and is still loaded today (Barnes 1989:67). Another .32-caliber case is for the Smith and Wesson revolver. It was introduced 1878 for the Model 1 1/2 (Barnes 1989:226). A single .32-caliber rimfire case is a .32 long with the impressed "**H**" headstamp. This cartridge was introduced in 1861 for the Smith and Wesson Model 2, although many companies chambered their guns for this caliber. The impressed "**H**" dates after 1890 (Barber 1987). The case was fired in a Colt New Line revolver.

CALIBER 9mm

The 9mm cartridge was introduced in 1902 for the German Luger (Barnes 1989:233). It was a popular cartridge, and many foreign manufacturers chambered firearms for the round. Few American weapons were made in 9mm until recently. Six bullets in 9mm were recovered during the investigations. The land and groove impressions suggest the bullets were fired in a German Luger.

CALIBER .38

Two cases for the .38-caliber Smith and Wesson pistol were recovered. One case is headstamped "**WRACO**," while the other is not headstamped. Both were fired in the same gun. The .38 S & W was introduced in 1877 (Barnes 1989:239), although the headstamp (Winchester Repeating Arms Company) dates the case from about 1880 to 1939 (Stadt 1984).

Two cases for the .38-caliber Automatic Colt pistol are headstamped with "**WRACO**" as well. The .38-caliber automatic was introduced in 1900 (Barnes 1989:239).

Clothing and Personal Items

The personal items recovered are associated with both the Nez Perce and the soldiers. All the items are of Euroamerican manufacture and demonstrate how pervasive the dominate culture's goods had become.

TRADE BEADS, by Lester Ross

Test excavations at the battlefield included two 1-x-1-m units on a possible tepee site, from which were recovered 46 trade beads and a number of British .360-caliber express rifle cartridge cases and explosive bullets. The beads assemblage includes 45 glass beads (Tables 10, 11; Figure 43) and one brass bead (Table 12; Figure 44).

Bead Classification Systems

Identification and description of the bead assemblage is based on the classification system developed for archeologists by Kenneth and Martha Kidd (1970), as modified and expanded by Karlis Karklins (1982, 1985). Additional descriptive nomenclature follows various authors who have addressed specific bead groups and classes (Allen 1983; Ross and Pflanz 1989; Sprague 1983, 1985). Colors are identified using Munsell notations (Munsell Color Company 1966). Bead colors were read using a Munsell Book of Color and a 60-watt incandescent light source. Prior to reading, bead surfaces were moistened to reduce frosted appearances caused by glass deterioration. Beads were analyzed for a variety of attributes, following a four-fold, hierarchic classification scheme:

1) material and manufacturing techniques;
2) stylistic class and type attributes, including monochrome vs. polychrome, unfinished vs. finished, and undecorated vs. decorated;
3) stylistic variety attributes, including color, diaphaneity, relative length and shape, and type of decoration; and
4) bead sizes as defined from measurements of bead least diameter (LD) and length (L).

In an attempt to conform to the Kidds' revised system of classification, codes for the Kidds' major bead groups are employed to identify beads types (e.g., IIa, WIIIb). However, use of these codes is not completely satisfactory because many attributes are lumped under a single code. To identify types clearly, and to discriminate specific attributes, letter modifiers have been employed to indicate such attributes as shape, type of decoration, and subtle manufacturing techniques (e.g., Mb-**b** to indicate a barrel-shaped bead). Finally, to further distinguish relevant attributes at the variety level, additional letter modifiers and variety numbers are employed to signify diaphaneity, short vs. long bead forms, orientation of decoration, and to identify the number of variations of a single bead type or subtype (e.g., IIa-**op-2** to identify the second variation of an opaque drawn bead variety). This allows types, their varieties and their attributes to be identified by a unique code, yet preserves the Kidds' codes for comparative purposes.

Bead descriptions have been organized to present relatively precise information within a tabular format. Thus, the variety descriptions are given in tables, with general technical information provided, when required, in the text. Archeological sizes are defined on the basis of a correlation of least bead diameter to length.

Opinions regarding historic values, temporal ascriptions and the frequency of occurrence at archeological sites are based upon the personal knowledge of the author. Published literature documenting the precise temporal placement of beads in the nineteenth century for western North America is limited. This does not imply a lack of documentary reports (e.g., see Karklins and Sprague 1980, 1987), but rather the lack of comparable bead classifications and descriptions used by various authors who have written descriptive reports, combined with the lack of tightly dated contexts.

Description of Bead Assemblage

Of the 46 beads found, 45 were drawn glass beads, i.e., beads manufactured from hollow canes drawn from a molten gather of glass. The canes

were chopped into bead-length segments for subsequent finishing, sorting, and packaging. They are the most common beads, making up 97.8% of the bead assemblage; and they are grouped into two major classes based on the attributes of monochrome vs. polychrome and unfinished vs. finished.

The first class, Dtfm, consists of monochrome beads with a hot-tumbled finish. After the drawn canes were cut into bead-length segments, these segments were tumbled over a fire in a rotating container which, during the mid-nineteenth century, may have contained ash and sand (Hoppe and Hornschuch 1818), lime and charcoal (Bussolin 1847; Karklins with Adams 1990:72), plaster and graphite, or clay and charcoal dust (Francis 1979:10).

Forty of the beads found on the battlefield were assigned to the Dtfm class, and all were of Type IIa, undecorated "cylindrical" beads. This type of bead is the simplest type of finished, drawn bead and is described as undecorated with a circular cross section. It is the most common type at western archeological sites; and at this site it represents 87% of the bead assemblage, exists in one form — short, with a torus to round shape — and was manufactured from transparent and opaque glass. Three varieties are recorded (Table 10: Figure 43a-c).

From the analysis of beads from other archeological sites (e.g., Ross 1990), it has been ascertained that sizes can occur at regular intervals (e.g., 0.45-0.56 and 0.8-mm intervals). For beadmakers to obtain sizes measured to such fine intervals, they sorted beads by sieving, using stacked, graded wire screens (Bussolin 1847; Karklins with Adams 1990:73) with mesh openings decreasing 0.4 to 0.8 mm per screen. Hand-sorting might have resulted in the creation of these subtle and regular sizes, but it would have been labor intensive, more costly, and perhaps not as accurate.

The second class, Dtfp, consists of polychrome beads with a hot-tumbled finish. Beads of this class have multi-colored layers produced in at least two manners: 1) one or more layers of glass were applied to a central core, and 2) layers were fortuitously created. Beads with applied layers were drawn from a gather of glass of one color, covered with one or more layers of differently colored glass. Beads with fortuitous layers appear to have been produced from a gather of one color, which upon cooling created multi-colored layers (generally of the same color hue, but with a different chroma, color value, and/or diaphaneity). Once cooled, the polychrome canes were chopped into bead-length segments and were tumbled over a fire in a rotating container, as described above. Only applied-layer polychromes are recorded.

Table 10. Tepee site tubular drawn glass beads. Class Dtfm — monochrome beads with a hot-tumbled finish; Type IIa - undecorated "cylindrical" beads (n = 40).

Variety	Decoration	Opacity	Color	Length & Shape	Least Diam. x Length Size (mm)	Kidds' No.	Quantity	Catalog Number
IIa-tps-1	Undec.	Trans	Dark Purple (7.5 PB 2/10)	Short Cylinder	1.8 x 1.0	IIa567	1	2146M
IIa-ops-1	Undec.	Opaque	Light Blue (5 B 5/8)	Short Cylinder	1.7-2.0 x 0.9-1.5	—	26	
					1.6 x 1.1		1	2137C
					1.8 x 0.9		1	2138E
					1.8 x 1.0		1	2139F
					1.9 x 1.3		1	2140G
					1.8 x 1.3		1	2145L
							18	2146M
					1.8 x 1.3, 2.0 x 1.5, 1.9 x 1.3, 1.9 x 1.2, 1.8 x 1.2, 2.0 x 1.1, 2.0 x 1.3, 2.0 x 1.1, 1.8 x 1.1, 1.8 x 1.0, 1.9 x 1.2, 2.0 x 1.3, 1.9 x 1.2, 1.8 x 1.1, 2.0 x 1.1, 1.7 x 1.1, 1.8 x 1.4, 1.8 x 1.1			
					1.8 x 1.2		1	2147N
					1.8 x 1.1		1	2152X
					——		1 (3 frags.)	2153BB
IIa-ops-2	Undec.	Opaque	Pink (7.5 RP 5/8)	Short Cylinder	1.7-2.0 x 1.1-1.4	—	13	
					1.9 x 1.3		1	2135A
					1.9 x 1.2		1	2136B
					1.9 x 1.4		1	2143J
					1.9 x 1.1		1	2144K[1]
					1.7 x 1.3		1	2144K[2]
					2.0 x 1.3		8	2146M
					1.9 x 1.2			
					1.8 x 1.3			
					1.9 x 1.3			
					1.8 x 1.3			
					1.9 x 1.4			
					1.8 x 1.2			
					1.9 x 1.1			

Table 11. Tepee site tubular drawn glass beads. Class Dtfp — polychrome beads with a hot-tumbled finish (n=5); Type IVa - undecorated "cylindrical" beads (n=3) and Type IVb - "cylindrical" beads with simple straight stripes (n = 2).

Variety	Decoration	Diaphaneity	Color	Length & Shape	Least Diam. x Length (mm)	Kidds' No.	Quantity	Catalog Number
IVa-tp/ops-1	Undec.	Trans. on Opaque	Red (5 R 3/10) on White (N 9/)	Short Cylinder	1.9 x 1.2-1.4	—	3	
					1.9 x 1.2		2	2146M
					1.9 x 1.2			
					1.9 x 1.4		1 (2 frags.)	2149P
IVb-op/ocs/l-1	4 stripes of 2 alternating colors	Opaque? stripes on Opaque on Opaque	Red (—) and Green (—) stripes on White (N 8/) on Dark Blue (10 B 5/4)	Short to Long Cylinder	2.4-2.6 x 1.6-2.4	—	2	
					2.6 x 1.6		1	2141H
					2.4 x 2.4		1	2146M

Table 12. Tepee site metal bead. Class Mbs — simple brass beads; Type Mb-b - undecorated barrel-shaped bead (n=1).

Variety	Decoration	Diaphaneity	Color	Length & Shape	Least Diam. x Length (mm)	Kidds' No.	Quantity	Catalog Number
Mb-bl-1	Undec.	Opaque	Brown (originally shiny yellow)	Long Barrel	8.1 x 8.8	—	1	1988

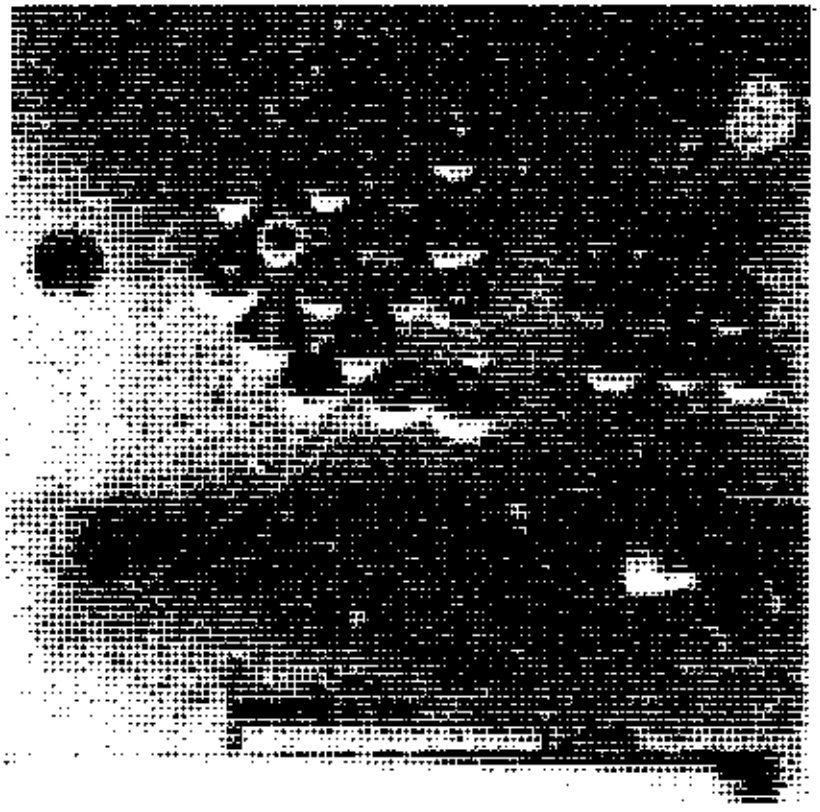

Figure 43. Glass beads from the presumed Tepee Site at Big Hole National Battlefield. a. Variety IIa-tps-1 (#2146M), b. Variety IIa-ops-1 (#2146M), c. Variety IIa-ops-2 (#2146M), d. Variety IVa-tp/ops-1 (#2146M), e. Variety IVb-op/ops/1-1 (#2141H and #2146M).

The five Class Dtfp beads found on the battlefield can be divided into two types: Type IVa, undecorated "cylindrical" beads (n = 3), and Type IVb, "cylindrical" beads with simple, straight stripes (n = 2). Type IVa is the second most common bead type recovered from western archeological sites. 6.5% of the bead assemblage consists of red-on-white varieties (Table 11; Figure 43d), which are often termed "cornaline d'Aleppo" or "Hudson's Bay Company" beads (e.g., Jer[illegible]75; Mille 1975).

Type IVb beads have four simple stripes with only a single variety recorded (Table 11; Figure 43e).

Only one metal bead was found, a hollow, barrel-shaped brass bead (Table 12; Figure 44) which may be classified as Class Mbs (Simple brass bead) and Type Mb-b (undecorated barrel-shaped).

Temporal and Ethnic Affiliations of the Trade Beads

Figure 44. Brass bead from Big Hole National Battlefield, Variety Mb-bl-1 (#1988).

Beads manufactured by Native Americans in North America prior to the arrival of Europeans were white (e.g., clam and dentalia), purple (e.g., mussel), and colored (e.g., olivella and abalone) shell beads; and buff to red (e.g., magnesite and catlinite), black (e.g., steatite and argilite), and blue (e.g., turquoise) stone beads. The predominant color was white.

With the arrival of Europeans and their trade beads, initial color of choice among Native Americans appear to have been white, with blue being preferred secondly. Later, perhaps within one generation of contact, Native Americans began accepting red, green, red-on-green, red-on-yellow, red-on-white, and purple colors. Pastel colors, decorated beads and faceted beads also became accepted within perhaps one to two generations. In western North America, this pattern of acceptance represents a working hypothesis for bead color preference among Native Americans, and until a major study of bead colors is completed, any conclusions are speculative. The glass bead assemblage from the tepee site is dominated by the presence of two pastel colors — light blue and pink embroidery beads (84.8% of the entire assemblage) — with light blue predominant (56.5% of the entire assemblage).

Monochrome and undecorated embroidery beads were often the least expensive beads available during the nineteenth century, and were used to adorn most items of clothing.

FINGER RINGS

Thirteen finger rings were found, six in the Village Area and seven in the Siege Area. The rings are all undecorated brass, and five sizes are apparent as measured as an inside diameter (FS1748 .83 inch; 1038, 2012 .74 inch; 1716, 1718, 1719, 2103 .70 inch; 1717, 2001, 2002 .685 inch; and 1122, 2014, 2015 .666 inch). Six of the seven found in the Siege Area were in close association near the edge of the fan and in proximity to a modern wooden feather interpretive device. The association may be fortuitous, indicating only where a Nez Perce woman may have cached her rings when cutting lodge poles on

the alluvial fan, where a soldier or volunteer may have decided to dispose of some souvenirs, or the rings may represent a later Nez Perce offering to commemorate a specific battle event.

The rings are definitely of the period and not twentieth century in origin. A battle association seems more likely, given their context and date. Finger rings were a common trade item throughout the nineteenth century and are ubiquitous in Native American sites of the era (Hanson 1975:77-79).

TROUSER BUCKLE

One trouser or vest buckle (FS1517) (Figure 45d) was recovered in the Siege Area. The buckle is iron and measures 1 1/2 by 1 inch. Buckles of this type were known to have been introduced as early as 1875 by the Quartermaster Department, although they may have been in use prior to that date (Herskovitz 1978:37). Buckles of this size were also used on vests.

SUSPENDER GRIP

Five complete or partial suspender grips (Figure 45e) were recovered. In addition, six suspender rings, and three garter or sock hooks were also recovered. One grip fragment is stamped brass (FS1357) with a curvilinear design. One is a complete suspender snap (FS1569). It is brass, with "**Victor**" stamped on one side and "**Patented**" on the other. Fragments of the leather suspender tabs are still attached to the snap. The tabs are folded construction with a single hollow rivet holding each tab to the snap. One grip fragment is iron, (FS1739) as are two 1 1/4-inch-diameter suspender rings (FS1104, 1343). A single brass ring (FS1807) has two leather tab fragments still attached.

A group of suspender parts comprising the hardware for a single suspender set was found in the Willows Area. They were in proximity and associated with a bootee fragment. Undoubtedly these belong to the same suspender set. Present are two stamped-brass grips with a rope border design. One grip (FS1827) still has the brass suspender ring and two leather tabs attached. The tabs are fixed to the ring by hollow rivets. The other grip (FS1828) has remnants of the cloth suspender in the fastening teeth. The ring loop is torn in such a manner as to suggest it may have been struck by something. Two brass suspender rings (FS1830, 1848) are associated with the grips. One ring (FS1848) is apparently a rear ring, as it has three leather tab remains still attached.

The suspender parts are private purchase styles 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).

Three iron garter or sock adjustment hooks were recovered. Two are loop fragments (FS1688, 1975) and one is a complete loop (FS1489). All are bent wire styles and could be battle era. They could also be post-battle era as well, and they can be either male or female associated.

BUTTONS

There were fourteen buttons recovered during the archeological investigations. The most distinctive buttons are the military general service button (Bazelon and McGuinn 1990). These brass line eagle buttons are represented in two sizes. The smaller are 5/8 inch in diameter. There are five of

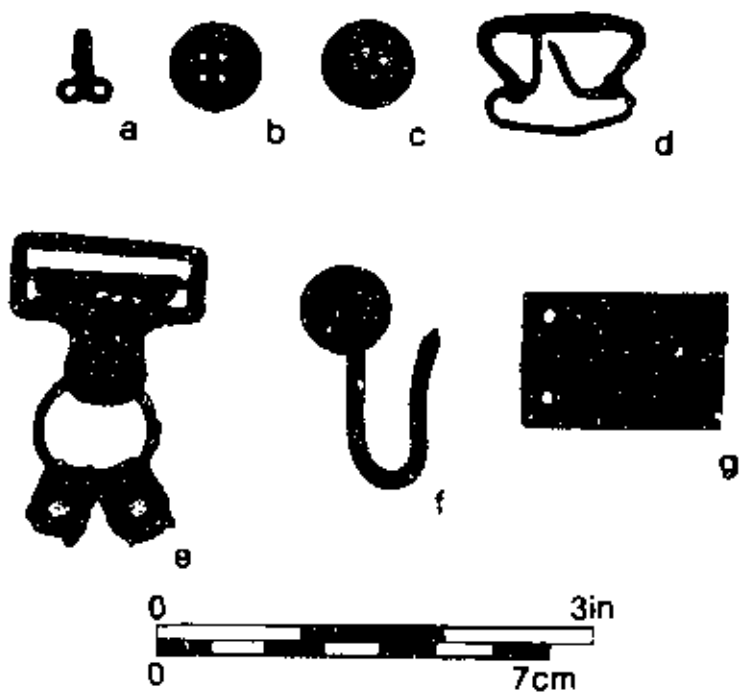

Figure 45. Miscellaneous clothing and personal items, a. iron hook from hook and eye, b.-c. trouser buttons, d. trouser or vest buckle, e. suspender hook and ring, f. haversack adjustment hook, g. harmonica reed plate fragment.

this size. One (FS1464) has an "I" in the shield indicating it is an infantry button. It is backmarked "**Scovill's Mfg. Co. Waterbury.**" The other four (FS2059, 2060, 2061, 2062) have no letter and are backmarked "**Scovill's Co. Extra.**" These four buttons were found within a few inches of each other in the village.

The remaining general service buttons (FS1120, 1493, 1825, 1826, 1829, 1847) are 3/4 inch in diameter. Five are backmarked "**Waterbury Button Co.**" and one (FS1120) is backmarked "**Horstman & Allien NY.**" With the exception of FS1120, which was found in the Siege Area, the others were found in the Willows. They were associated with several suspender clips and a military shoe.

There are two button types (Figure 45b, c) which can be associated with soldiers' trousers, although their use on many other clothing types is also known. Two are two-piece four-hole iron buttons. The larger (FS1462) is 5/8 inch in diameter and was used to support suspenders and to close the fly. One (FS1947) is 9/16 inch in diameter and was also used to close the trouser fly.

A single four-hole, pressed white-metal button with a stippled front pattern (FS1523) was recovered. It is 5/8 inch in diameter and was also used on military trousers for attaching suspenders and as a closure.

CLOTHING FASTENERS

Two hooks (Figure 45a) from iron hook and eye assemblies were recovered. These hooks (FS1406, 1942) were used on military uniforms to fasten collars and blouse skirts. They were also used on overcoats and the 1872 campaign hat. The hook and eye assembly was not used on the campaign blouse of the period. It was used on older style blouses and on the campaign hat. The hooks and eyes found probably represent the presence of either the older uniform blouses or the campaign hat at the battle. They probably represent the hook from campaign hats.

MILITARY SHOES OR BOOTEES

Portions of four pre-1872 infantry shoes or bootees (Figure 46a) were found during the archeological project. Fragments of another shoe were recovered by Kermit Edmonds in 1964 in the Willows northwest of the Village. Two remains (FS1824, 1868) are portions of leather heels. The heels are comprised of fragments of several leather heel counters. Heel FS1824 was found associated with several blouse buttons and suspender grips. The other bootee

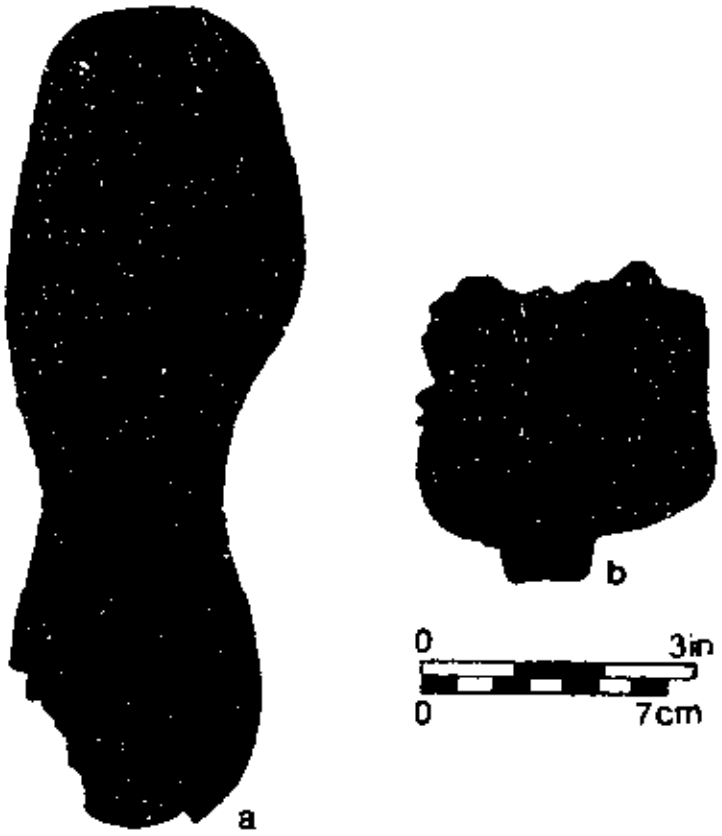

Figure 46. A military shoe sole and percussion cap pouch. a. sole of a military shoe, b. the back of the percussion cap pouch.

remains are soles (FS1921, 2099) The bootee and heel fragments conform to the pre-1872 pattern (Brinkerhoff 1976) in their construction. They may be Civil War–era shoes, as many pairs were produced and the army continued issuing them until the stock was exhausted during the mid-1870s.

COINS

Four coins were found during the field investigations. Three had twentieth-century dates and were undoubtedly dropped by visitors or Battlefield staff. One coin was recovered which may date to the battle era. The coin is a five-cent piece of the shield variety. Unfortunately, the date is too oxidized to determine. The coin was found along the river bank and in the Willows along the known line of the soldiers' retreat. The coin could date to the battle period, as the type was minted from 1866 to 1883.

TOBACCO TAGS

Two round tobacco tags (FS1699, 1985) and one oval tag (FS1977) were recovered in the Siege Area. Tobacco tags were developed about 1870 (Campbell 1964:100-104) to identify specific brands of retail plug tobacco as a genuine product. Tags were used by retailers to identify their products for at least seventy years. The context in which all three were found suggests a battle-related association, but this is not certain.

HARMONICA REED

The harmonica reed fragment (FS1529) is brass and unmarked (Figure 45g). Harmonica parts are not an unusual find in military sites (Herskovitz 1978:76). This fragment is 1 inch wide, with an incomplete length of 1 1/2 inches.

TINKLERS

Two tinkler cones (Figure 47a), one of brass (FS1630) and one of iron (FS1680), were recovered. The brass cone is 1 1/2 inches long and made of thin sheet brass. The iron cone is 1 3/4 inches long and may be made of what was once a tinned iron. Tinkler cones are common decorative items in Native American sites of the nineteenth century. They were used as decoration on both men's and women's clothing.

AWLS

Two offset or double-pointed awls (Figure 47b), one complete (FS1451) and one incomplete (FS1405), were fonnd in the Siege Area. The complete example is three inches long, with each end approximately 1 1/2 inches long. The incomplete example is broken just beyond the step. It appears to be of the same size as the complete artifact. Offset awls were common trade items, and were usually hafted on one point with a wooden or bone handle.

DECORATIVE DEVICES

A brass concha (FS1029) and an unidentified brass object (FS2126) were found in the Village Area. The concha (Figure 47c) is 1 3/4 inches in diameter. It has a center bar with a fragment of rawhide still knotted to it. The concha appears to be handmade of sheet brass with a D-shaped sec-

tion cut from the center to form the attachment bar. The cut-outs are not symmetrical. The concha is probably a decorative item from some piece of clothing. Pouliot (1962:12) describes a nearly identical concha he found near the center of the Village. Pouliot believed his concha may have been struck by a bullet.

The unidentified object is roughly the shape of a pocket watch cover (Figure 47f). It is made of very thin brass and is 2 inches in diameter. At least three 1/16-inch-diameter holes are found on the item's edge, suggesting it may have been attached by small brads to a more solid backing. The object's function is conjectural, but it may be a brass backing to a wooden-mounted hand mirror or some type of decorative object.

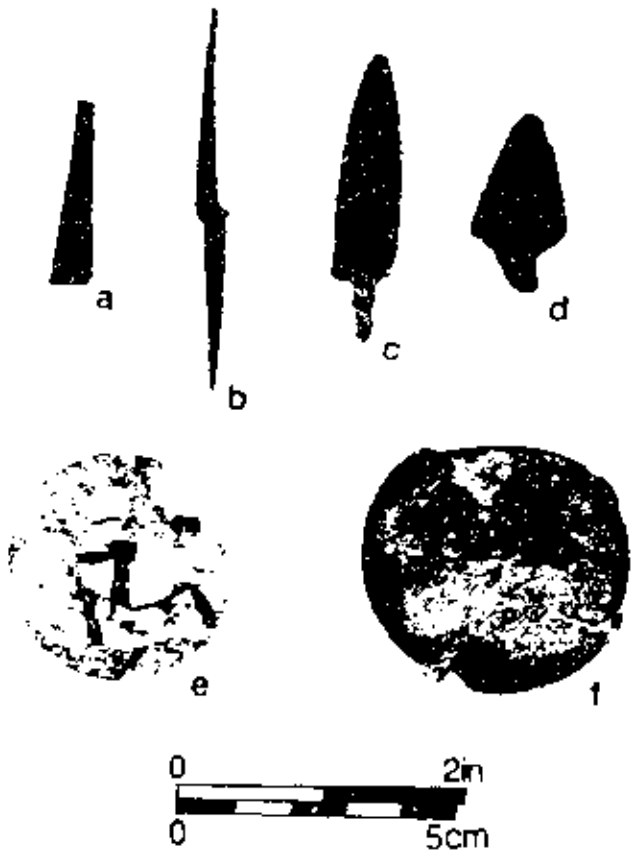

Figure 47. Miscellaneous Nez Perce items lost in the battle. a. brass tinkler. b. offset awl. c. brass arrowhead. d. iron arrowhead. e. brass concha and remains of buckskin thong. f. unidentified brass backing, possibly for a mirror.

UTENSILS

A number of spoons, forks, and table knives were recovered in different contexts. Most do not appear to date to the battle period. Two fiddleback-style iron spoons, one complete (FS1359) and one fragmentary (FS1769), were recovered. The pattern post-dates the battle, so these table spoons may be related to picnicking or homesteading activities at the site.

The bowl of a large brass serving spoon (FS2025) was found at the north end of the Village. It was broken into fourteen pieces and appears to have been bent and crushed. The handle is missing. Large brass spoons of this type are common mid-nineteenth century items and were often silver plated. Brass spoons are well known in fur trade sites (Hunt 1986) and brass spoons of similar size and design were recovered from the 1856 wreck of the Missouri River Steamboat *Arabia*.

A complete silver-plated spoon (92-10) was recovered in the Willows Retreat Area near an old downed tree by Kermit Edmonds. It is a large table spoon and is backmarked **1847 Rogers Bros. XII**. This mark is attributed to the well-known Meriden Britannia Company and was used after 1882 (Kovel and Kovel 1961:340).

Three table forks were recovered. One (FS1263) is a four-tined fiddleback style iron table fork. This style post-dates the battle. The other two forks are both three-tined varieties. One (FS2028) is a very fragmentary iron fork shank and tines. This fork was found in the Village and is probably contemporaneous with the battle. The last fork (FS1740) is iron and complete except for its wooden or bone slab handles. This fork was found at the edge of the fan in the Siege Area. It is not a regulation army-style mess fork of the 1870s, but it is of a contemporary style. The style was common in the nineteenth century, so it may have belonged to a pre-battle visitor, a soldier, a volunteer, or even a post-battle picnicker.

A fragment of an iron utensil handle or tang (FS2187) was recovered in the possible tepee excavation. The tang is flat iron with three brass rivets and with holes for two additional rivets present. Bone or wooden slab handles or grips may have once been present on the tang. The tang's size suggests it was once part of a small spoon or fork.

Two table knives, three pocket knives, and two sheath or belt knives were found (Figure 40). One table knife (FS1039) is fragmentary. It is the remnants of the iron tang, bolster, and blade. The handle grips may have been bone or wood slabs. The other table knife (FS1793) is also incom-

plete. A portion of the blade, tang, wood grips, and iron securing rivets are present. Both table knives are of styles that date to the nineteenth century. Both could have been in use during the battle as well as much later. Neither of them is a regulation army mess knife.

The three pocketknives were all found with one blade in the open position. In each case the blades and most iron parts had nearly disintegrated. FS1289 is 3 1/4 inches long with iron bolsters and two iron blades. The shorter blade is closed and the longer open, although little remains. A brass escutcheon plate remains riveted to one side. The grips are missing, although they were likely wooden. Pocketknife FS1749 is 3 3/4 inches long with squared brass bolsters. It was also a two-bladed folding knife. The grips are nearly intact and are made of antler. A brass shield-shaped escutcheon is present on one side. The final pocketknife (FS1782) has rounded brass bolsters and is 3 1/2 inches long. It is also a two-bladed knife. A portion of a wooden grip remains, and there is the outline of a shield-shaped escutcheon on one side. Stylistically the knives could date to the battle. However, they could just as easily post-date the battle. The context in which they were found does not provide sufficient supporting information to draw a conclusion regarding their association; however, similar pocketknives have been recovered at the site of Fort Bowie, Arizona (Herskovitz 1978:76-78), and from the 1856 wreck of the Steamboat *Arabia*.

The two belt or sheath knives on the other hand are undoubtedly battle associated. These knives were commonly called sheath, belt, camp, or scalping knives (Russell 1967; Peterson 1958; Hanson 1987). Neither retains its grip, which may have been wood.

The first (FS1352) is iron (Figure 48c). The back is straight and extends into the short iron tang. The knife is 9 1/4 inches overall, with a blade 7 1/4 inches long. The two-inch tang has two holes for grip-retention rivets. One iron rivet, 3/4 inch long, remains. The blade is stamped with a cross over an "L." This is the mark of Lockwood Brothers of Sheffield, England. They are known to have been in business from 1849 to 1921 (Woodhead 1991:143). The Lockwoods made many types of cutlery. Lockwood knives are known from fur trade sites of the mid-nineteenth century (Wheeler et al. 1975:92-93).

The other belt knife (FS1779) was found in the Willows along the soldiers' Retreat Line and in general association with a percussion cap pouch. The knife is iron (Figure 48b). The tip and tang have disintegrated. The overall remaining length is 8 inches. The tang retains two large brass rivets which indicate the handle was about 1 1/4 inches thick. The general con-

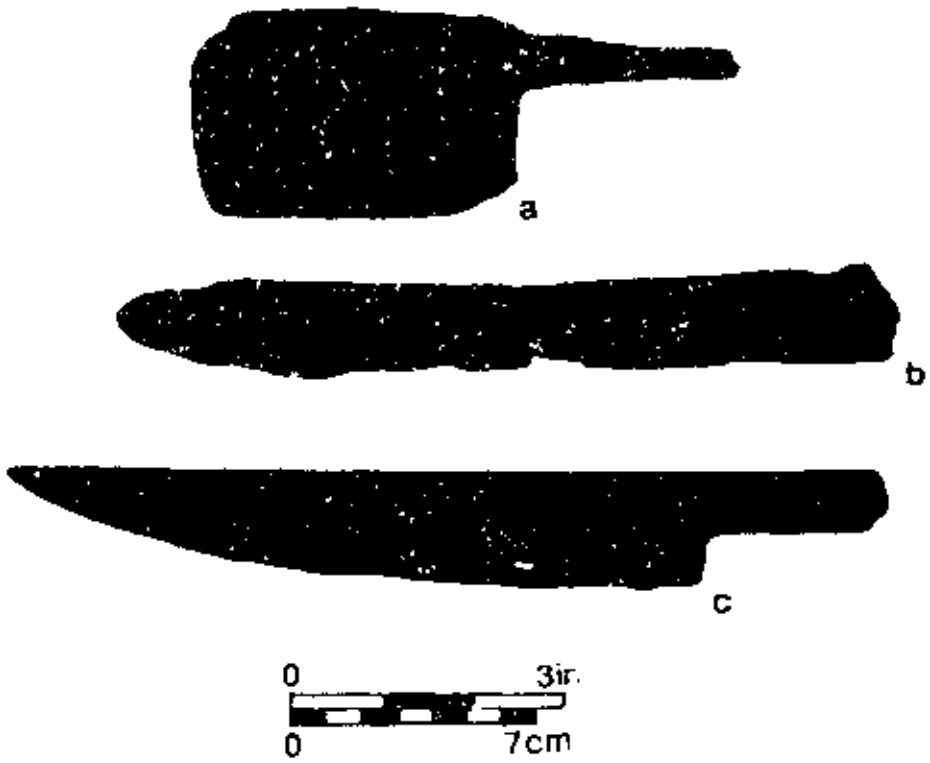

Figure 48. Cutting implements, a. iron cleaver, b. iron belt knife with brass tang rivets, c. iron belt knife with Lockwood logo on blade.

figuration suggests a butcher knife or so-called scalping knife with a blade about six to seven inches long.

A small iron cleaver (FS1106) was also found in the village. The blade (Figure 48a) is about 3 1/4 inches long by 2 1/4 inches wide. The iron rattail tang for a wooden handle is 2 1/4 inches long.

An iron skillet handle (FS1037) was found at the north end of the Nez Perce Village. The handle fragment is slightly curved and 9 1/2 inches remain of its original length. It tapers from 1 1/2 inches wide at one end to about 1 1/4 inches wide.

FISHING SPEAR

A large iron fork or two-pronged fishing spear was found in the Village. It is handmade, probably by a home blacksmith since it is very crudely done. The piece was cut from 3/8-inch flat iron stock and is 7 inches in

length. The rat-tail tang is 3 3/4 inches long with the fork segment making up the remainder. It is 1 1/2 inches wide with about 1 inch between tines. The spear is meant to be mounted in a wooden handle.

ARROWHEADS

Specifically Indian-associated arms recovered archeologically are two metal arrowheads found in the Siege Area. Iron or other 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 fall into two manufacturing types, mass-produced and handmade.

The handmade specimen (FS2115) is brass and somewhat crudely formed (Figure 47c). It is a stemmed or tanged point made from brass stock. The brass arrowhead is 2.36 inches long and .56 inches wide at the base. The tang is .56 long and .20 inches wide. One side is flat and clean, while the other bears a scratch mark roughly along the center length. This scratch probably originated with the maker, as it appears to be a guide line for determining the center of the point's axis.

The other specimen (FS1401) is an iron triangular stemmed or tanged point (Figure 47d). It is 1.437 inches long and .786 inch wide at the base. The tang is .35 inch long and .30 inch wide. Another metal arrowhead (537c) was found several years ago at the base of a rock in the Siege Area. It is described in the park's museum catalog card as a diamond-shaped point of iron.

These arrowheads are typical of those available for trade or sale to various Indian groups during the latter part of the nineteenth century. The arrowheads were neither endemic to the West, nor to the Nez Perce. Use of these arrowhead types is documented by the Surgeon General (War Department 1871). The types were reported to have been found in wounds of soldiers and civilians from Texas and Arizona to the Northern Plains.

Accouterments

The quantity of military equipment is relatively small, but it is representative of the types in common use during the 1870s. The reason for the small quantity is probably twofold. First the soldiers who fought at the Siege Area were there only a short period of time, so the amount of equipment lost

would be small. Second, the Nez Perce may have stripped the dead for the most usable and interesting items.

PERCUSSION CAP POUCH

A Civil War–type percussion cap pouch (FS1780) was found in the Willows along the Retreat Line and near a belt knife. The leather pouch (Figure 46b) with a brass closing stud was found in a sand pocket, which contributed to its preservation.

The pouch is a standard Civil War style with a leather body, leather inner or dust flap, and a leather cover with tab for fastening to the closing stud. Two leather belt loops are on the rear of the pouch. The interior of the pouch was lined with lamb's wool to protect the percussion cap. The archeological specimen was nearly complete. The pouch was empty, but retained some lamb's wool lining. The outer cover had disintegrated, although the closing tab was still in place on the stud. One leather belt loop had become detached, but is present.

TROWEL BAYONET

The Model 1873 trowel bayonet, or more properly accouterment, holds the distinction of being the first truly American bayonet design. Although it was wholly an experimental concept, it was issued for field trials. It was those trials that saw its use in the Big Hole battle. About 10,000 of the Model 1868, 1869, and 1873 entrenching bayonets were manufactured for experimental and field trials (Reilly 1990:121). A single trowel bayonet (Figure 21) and a fragmented scabbard (FS1833) were recovered along the Retreat Line in the Willows.

The Model 1873 trowel bayonet was originally 13 1/2 inches long, which included a 10-inch-long socket and 3 1/2-inch-wide curved trowel-shaped blade. The rear half of the blade's upper edge was ground to a sharp cutting edge for slashing and cutting purposes. The socket, for mounting it to the rifle, also served as the handle for digging purposes. It is 3 1/2 inches long with a bore diameter of .733 inch. The socket has six knurled lines cut longitudally around the handle to maintain a non-slip grip. The socket is actually two pieces of iron. The upper segment rotates ninety degrees, allowing the socket segment with an internal mortise to slip over the rifle barrel. The segment would then be rotated back into alignment, securing the bayonet to the barrel (Reilly 1990:122).

The socket was also originally stamped along its axis with "**PAT APR 16 18-72,**" but this is obscured by pitting on the archeological specimen. The socket was also fitted with a walnut handle. The socket was rotated in the same manner to fit it to the rifle barrel, and the walnut handle inserted. A steel pin or stud in the handle retained it in the socket. The archeological specimen's dimensions are nearly the same as the specifications noted above. The differences can be attributed to loss of metal due to oxidation. Remnants of the walnut handle are in place in the socket, indicating the bayonet was being carried in its entrenching tool configuration.

When recovered, the bayonet was encased in the remnants of a scabbard. A brass tip covered the bayonet point and the whole tool lay on the oxidized remains of a iron scabbard liner. Above the socket lay the remnants of the leather belt loop, held in place by a brass "**US**" rosette or escutcheon. The original scabbard consisted of two pieces of bridle leather covering sewed over the iron liner form, secured at the base with a brass finial with a flat tip. The finial was secured to the scabbard with two small rivets. A vertical leather-covered sheet-iron tab was riveted to the liner. This tab attached to a leather belt loop by means of a cast-brass rosette or escutcheon with a "US" cast in the center. Reilly (1990:184) believes about 10,000 scabbards were produced in fiscal year 1875, although he may mean fiscal year 1876 (July 1, 1875 to June 30, 1876). Production was complete by February 1876, and issuance for field trials halted by the end of 1876.

HAVERSACK HOOK

A single brass adjustment hook (FS1701) for the Civil War–era knapsack was found in the Siege Area in a riflepit. This adjustment hook (Figure 45f) was also used on the Model 1872 haversack (Douglas McChristian, personal communication August 14, 1991). The hook probably represents the use of a haversack rather than the obsolete knapsack.

CARTRIDGE BOX ESCUTCHEON

A possible 1874-pattern McKeever cartridge box escutcheon (FS1743) was found in the Siege Area. It is iron and brass plated, and still retains its three attachment rivets. Most McKeever cartridge box metal parts were solid brass, although there are known variations. It is also possible this escutcheon is part of a later lady's purse catch or closing device.

PICKET PIN

A single picket pin (FS2098), found in place in the Willows immediately below the Siege Area, is a Model 1859 army-issue style (Figure 49). Picket pins were issued to picket horses and mules. Since only one horse was in the Siege Area until the arrival of the wagon trains and later of General Howard's forces, the pin is probably not an immediate battle relic. It is more likely it is associated with the post-battle relief.

IRON STRAPPING

Seven pieces of iron strapping were recovered in vicinity of the Howitzer Area. A number of pieces of howitzer ammunition sabot strapping found in this same area are in the Big Hole collection. Three pieces recovered during the archeological investigations are definitely not sabot strapping

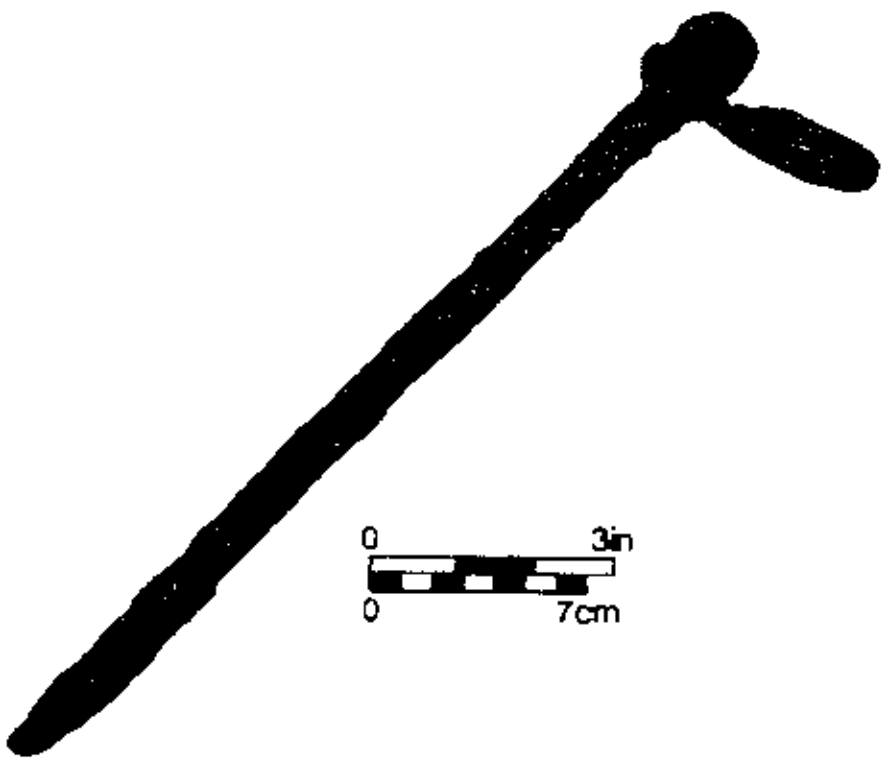

Figure 49. A Model 1859 picket pin.

These three are of two different widths, each too wide to be sabot strapping. FS1454 is 1 inch wide and contains numerous nail holes. FS1472 is also 1 inch wide and rolled on one edge. FS1877 is 1/2 inch wide. Many trees in the Howitzer Area have iron strapping nailed around the trunk. This was done in 1928 in order to provide a dam for chemical application to destroy an insect infestation. The remnant strapping recovered appears to be related to those activities.

Four pieces of strapping (FS1887, 1888, 1886, 1936) are 3/8 inch wide, which is the appropriate width for sabot strapping (Gibbon 1970). One (FS1888) has an iron brad in one end. These three strap fragments were found in a context appropriate to identify them as sabot strapping; however, without more direct association with truly diagnostic cannon artifacts, this identification is speculative.

Probable Non-Battle Artifacts

The remaining categories of artifacts either clearly post-date the battle or are probably not associated with the events of August 9 and 10, 1877.

HARNESS BUCKLES

Thirteen harness buckles were recovered. Six are roller buckles (FS1098, 1174, 1686, 1706, 1747, 1751), and one is a roller fragment (FS1676). Six are center-bar buckles (FS1026, 1049, 1178, 1360, 2007, 2095). The iron roller buckles were probably used on a variety of harness. They are styles which were used throughout the horse era and cannot be attributed to the battle. The center-bar buckles are of the size used on bridle cheek pieces, link straps, hames, sidelines, and other saddle and harness items. Like the roller buckles none can be definitely battle associated.

HARNESS RIVETS AND TACKS

Two copper rivets (FS1264, 2072), one copper 'star' rivet (FS1358), and two iron rivets (1685, 1897) could have been used on a variety of equipment such as the halter, nose bag, girth straps, safes, billets, hames, collars, and reins. None have a definite battle association. A single decorative brass harness tack with a rosette head (FS1885) was found in the Howitzer Area. Its association with the howitzer fight is doubtful.

HARNESS AND TACK PARTS

A variety of saddle parts and other items of tack were recovered. A single iron foot staple (FS1377) was found in the Siege Area. It is not regulation army size. It could be a private purchase piece for an officer's saddle or a later civilian saddle part.

Halters are represented by a draft horse–sized halter square (FS1837). Two iron rings of the type used in girthing were recovered. One ring (FS1103) with a 4-inch inside diameter is a non-military type that probably represents a civilian piece. Two iron rings (FS1144) of 2 inches and 2 1/2 inches inside diameter respectively may represent rigging rings for draft horse harness. A single hame ring (FS1173) also represents a draft horse harness, as does a hame strap fastener (FS1298). Eleven non-military snap hooks or fragments (FS1090, 1136, 1140, 1166, 1203, 1262, 1270, 1580, 1745, 1755, 1760) were also found.

HORSESHOES AND HORSESHOE NAILS

There were seventeen horseshoes or horseshoe fragments recovered during the archeological project. The shoes were found in the Village Area, the Siege Area, and the majority were found in the Willows near a post-battle homestead site. Horses were used for many years in the area, and the method of construction and attachment of shoes varies little through time. Nevertheless, manufacturing techniques and the context in which the shoes were found are clues to their origin. All shoe identification and nomenclature follow Rick Morris (personal communication January 8, 1987), Spivey (1979), and Berge (1980:237-249).

The shoes were found in three types: a blacksmith- or farrier-made shoe, Burden pattern, and unidentified late commercially made shoes. The late commercial specimens have applied caulks. This shoe and caulk type was not manufactured until the end of the nineteenth century and definitely postdates the battle.

There are seven large draft horse–style shoes. Five have toe or heel caulks that were utilized for a surer grip on muddy or wet ground. The remaining horseshoes are the light riding style. Only four of the riding shoes have toe or heel caulks. One riding shoe appears to be blacksmith made. The riding shoes could date to the battle era, but given that only two or three horses were in use by the soldiers during the battle, the possibility of a battle associa-

tion appears unlikely. It is not known how many Nez Perce horses may have been shod. However, the context of most horseshoes (in the Willows) suggests a homestead or later era association.

Fourteen horseshoe nails or fragments were recovered. Generally, the nails were in poor and fragmentary condition due to the acidic soil environment. Most were found in the Willows Area, and probably post-date the battle.

NAILS, TACKS, AND FASTENERS

Square-cut nails and wire nails were found throughout the battlefield. Many were clearly associated with old fences and fence lines. As the nails were ubiquitous and their function was often obvious, only a sample was collected. Seventy-two cut nails, four wire nails, and eight tacks were collected. The cut nail categories are three 2d, one 3d, twenty-two 4d, sixteen 6d, one 8d, two 10d, one 20d, one 5 1/2-inch spike, and twenty-five fragments. The four wire nails are categorized as two 16d and two fragments. Eight brads and tacks were also recovered and include one 1/4-inch brad, two 1/2-inch brads, a brad fragment, three 3/4-inch tacks, and one 1-inch brad.

Square-cut nails in the 4d through 8d nail sizes were often used by the army in the construction of boxes. Hard-cracker ration boxes and ammunition boxes were constructed of wood, nailed and screwed together. No period ration boxes are known to have survived, although their construction is known to have been lighter than the ammunition box. Period ammunition boxes do survive (Anon. 1979).

The majority of nails collected were found in the Siege Area. It is possible the 4d and 5d cut nails are related to ration boxes left behind in the Siege Area after the battle. The 6d, 7d, and 8d cut nails could represent remnants of ammunition boxes also left behind in the Siege Area. However, the myriad uses and associated features the Siege Area saw after the battle could also account for the various nail sizes present. None of the nails can be unequivocally associated with the battle era.

Other fasteners included one grommet, one 3/8-inch washer, one 1/2-inch hex nut, one 3/8-inch square nut, one 3/4-inch number 8 flathead woodscrew, and one 1 1/2-inch number 10 flathead woodscrew. None of these fasteners can be definitively associated with the battle. They all appear to be of more recent origin, based on the method of machine manufacture.

TIN CANS

Tin can manufacturing technology changed through time, and those changes are well documented and dated. The various tin can manufacturing methods have established date ranges for the various features present on a can. This allows archeologists to date the period of manufacture for almost any can recovered on an archeological site. The Big Hole can fragments were analyzed based on the criteria provided in Fontana and Greenleaf (1962) and Rock (1984).

Cans manufactured at the time of the battle would be hole-in-cap types with stamped ends and simple side seam overlap. Most side seams would have been hand soldered, although machine soldering was developed in 1876.

Twenty can fragments or related artifacts were collected. The majority are probably post-1877 manufacture. Eleven fragments are from tin can rims or sides. These are unfortunately not diagnostic pieces. There is one can, in a very fragmentary condition, that is a hole-in top variety. It is about a number 2 1/2-size can. One end exhibits pie-shaped cuts. This configuration often indicates the can was opened with a sharp object like a knife.

There are four can-opening keys or key and strips. The key-wind method of can opening was developed about 1866 but did not become popular until after 1906. The keys recovered are more consistent with the style common in the late nineteenth or early twentieth century. These sardine or meat can keys are probably associated with the U. S. Forest Service picnic and campground operation. The collected can artifacts also contain one press-on lid fragment. The press-on lid was developed for resealable cans with non-perishable or dry contents. The style dates sometime after the mid-nineteenth century.

The can fragments from the Big Hole battlefield are not temporally diagnostic. Although they could date to the battle, they probably are associated with the memorial and leisure activities that occurred at the site for many years afterward.

GLASS

A single piece of aqua colored bottle base was recovered with an animal bone fragment. The type of bottle could not be determined from the small fragment. The bone and bottle glass were found in a U.S. Forest Service firepit. The firepit location appears on a 1917 Forest Service plan illustrating camp and picnic sites. The artifacts undoubtedly post-date the battle.

CUP

A single tinned, late nineteenth- or early twentieth-century drinking cup was found in the siege area. It is four inches in diameter and tapers to 2 1.2 inches at its flat bottom. It has a narrow strap handle that is attached at the top by rivets. The cup is typical of picnic or camping set cups. Similar style aluminum cups are available today at camping supply stores.

HAT PIN

Two fragments of one hat pin (FS1410, 1932) were found in the Siege Area. The pin is iron, with a cast-whitemetal decorative device attached to one end. The device is set with paste jewels. It undoubtedly post-dates the battle.

BARRETTE

The barrette (FS1338) is nickel-plated iron in a flower design. The petal centers were enameled black. The barrette probably dates to the 1950s.

MISCELLANEOUS AND UNIDENTIFIED ARTIFACTS

A number of artifacts such as machinery parts, wire, scrap iron, and other items that are associated with the post-battle occupations and activities were recovered. These artifacts are listed and only briefly discussed.

Machinery and wagon parts include a dilapidated hay rake which was not collected. It was found south of the Village Area, nearly grown over by brush and grasses. Several other machinery or wagon parts were recovered, including a 6-inch pulley (FS1005), a small fifth wheel (FS1027), two box rod nuts (FS1094, 1745), a wagon box end rod fragment (FS1930), and a transmission plate cover (FS2116).

Several iron rod fragments were recovered (FS1014, 1121, 1170, 1176, 1679) which cannot be identified further. A few pieces of wire were identified (FS1261, 1265, 1511, 2189), as were several chain links or repair links (FS1164, 1494, 1899, 2087). Near the purported site of the blacksmith shop, several pieces of hot-cut, but otherwise unrecognized, iron fragments were found (FS1032, 1171, 1172). Scattered over the site area were pieces of scrap iron (FS1052, 1084, 1100, 1337, 1435, 1438, 1713, 1753, 2022).

One piece (FS1438) is tinned iron and a second (FS1753) is a fragment of a hollow piece of cast iron.

The remainder of the miscellaneous items are truly diverse. They include an unidentified brass shim found in two parts (FS1034, 1035), a 1 1/4-inch-diameter round paint brush head (FS1252), an iron ferrule (FS1322), a brass ferrule (FS1699), a brass grommet (FS1376), a flat bradded washer or shim (FS1481), a 1-inch-diameter iron ring (FS1663), a portion of a Farber writing pen (FS1741), a nickel-plated iron nut pick (FS1499), a cow bell clapper (FS1714), a hair pin (FS1789), an eared nut (FS1762), an unidentified iron cover (FS1683), a small cabinet lock catch (FS1439), a squeeze tube cap (FS1907), two heavy iron hooks (FS1386, 1872) from door-type book and eye assemblies, a 2 3/4-inch-long wire handle from a tinware bakepan (FS1834), and a D-shaped pull ring (FS1934) from a tinware lid. This last item could be from a camp boiler or coffee pot. It is possible it is military in origin. However, since the army acquired their camp mess items from civilian manufacturers this identification is speculative. This type of tinware was made into the early twentieth century.

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