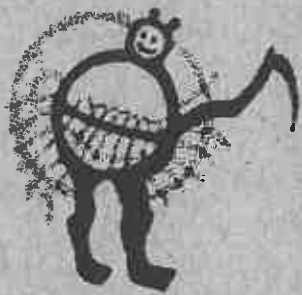


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ARCHAEOLOGY IN MONTANA

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A POSSIBLE 1806 WILLIAM CLARK SITE ON THE YELLOWSTONE

THOMAS C. RUST AND RALPH SAUNDERS

INTRODUCTION

In 1806, William Clark and twelve members of the Corps of the Discovery travelled along the Yellowstone River on their return trip by horseback, and searching for timber large enough to make canoes. Near present-day Park City, Montana, they found such trees and halted four days to construct canoes, let their horses rest, and prepare for the remaining trip. The location of this camp has been in some dispute for some time. Using extensive site-specific channel migration mapping and geo-referencing equipment, William Clark's surveying data, logs, maps and daily journals, in addition to contemporary maps, aerial imagery, and geological analysis, it may be possible to more accurately position Clark's camp with a higher degree of confidence. With financial support from the Lewis and Clark Trail Heritage Foundation, two Foundation Chapters (Rochjhone and Headwaters), the National Park Service, and Montana State University Billings, archaeological surveys and excavations were conducted seasonally at the proposed site from 2011-2014 to test the hypothesis.

HISTORICAL BACKGROUND

The Lewis and Clark Expedition, also known as the Corps of Discovery, was initiated on January 18, 1803 by Thomas Jefferson to explore the Missouri River drainage in hopes of discovering a practicable water route across the continent and establish diplomatic relations with the tribes therein. Secondly, the expedition was to study the geography as well as the flora and fauna of the region. The expedition had a dual command lead by Captain Meriwether Lewis and Captain William Clark, though Clark's full commission was delayed until after the Corps' departure (Ambrose 1996:97-99, 134-6; Fritz 2004:5-7; Woodger and Torpov 2009:270). The overall history of the Expedition is well known and told in many sources and need not be recounted here in any detail save the immediate events surrounding the party's tenure at the proposed site.

After traveling up the Missouri River in 1804-1805, crossing the continental divide and descending the Columbia River to winter on the Pacific Coast, the Corps of Discover began its return trip in March of 1806. After crossing the continental divide again, the party divided into two groups, one led by

Captain Lewis to explore the Marias River tributary of the Missouri and the other by Captain Clark to explore the Yellowstone (Rochjhone) River. They agreed to meet at the confluence of the Missouri and Yellowstone Rivers. Captain Clark further split his party near present-day Three Forks, Montana, sending Sergeant Ordway down the Missouri while Clark proceeded to the Yellowstone River Valley with 12 members (making a total party of 13, including himself) and a herd of 50 horses. The horses would be valuable to trade for supplies at the Mandan villages. When Clark reached the Yellowstone River, he hoped to find cottonwood trees to construct canoes to expedite the journey but had difficulty finding trees that were sufficiently large enough. On July 18, while attempting to mount his horse, a member of the party, George Gibson, fell and impaled his thigh on a snag, causing a deep wound. The wound was extremely painful and made travel difficult. This may have forced Clark to settle for slightly smaller trees than were ideal. On July 19, south of present-day Park City, Montana, he "found some large timber where the grass was tolerably good." They camped at the site from July 19 to 24, 1806 (William Clark 19-24 July 1806 in Moulton 2003, Vol. 8:204-224). The events at the "Canoe Camp" are recounted with more detail below.

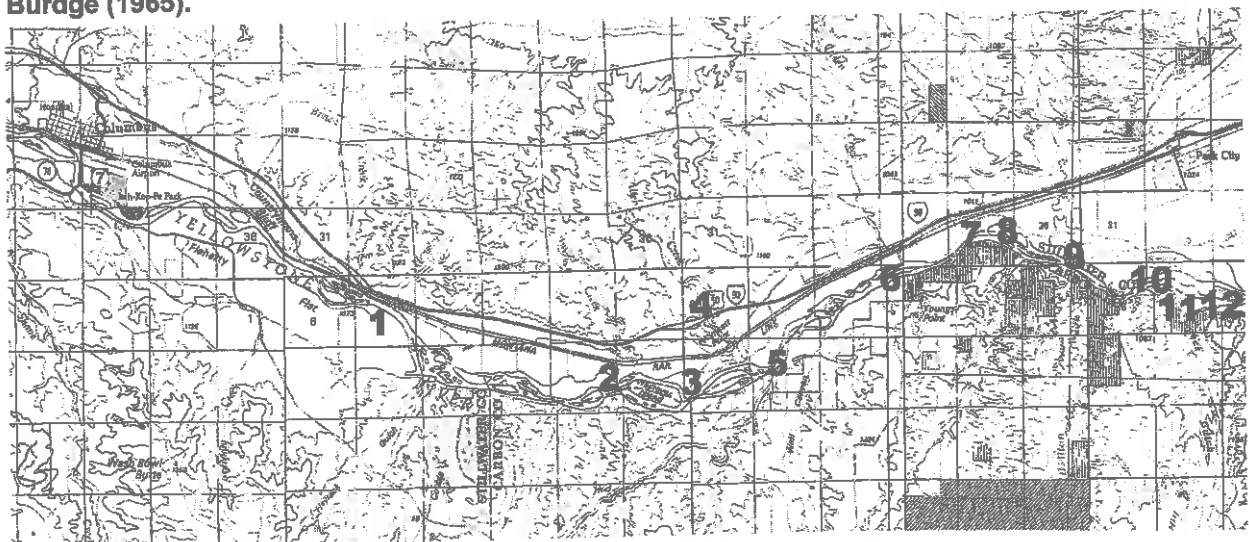
Captains Lewis and Clark reunited below the confluence of the Yellowstone and Missouri River.

They continued swiftly downstream and reached St. Louis on September 23, 1806. The Corps had met their objective of reaching the Pacific Ocean but did not identify a navigable water passage across the continent. Yet, they gained a detailed understanding of the geography of the Missouri and Columbia River drainages. As a result, Clark produced about 140 detailed large-scale maps as well as a small-scale map of the region from St. Louis to the Pacific Ocean. They also established diplomatic contact with two dozen indigenous nations. From these contacts they were able to identify an additional 50 tribes with which they did not come into direct contact. In addition, they also recorded more than 200 plants and animals that were new to science (Bakeless 1996:374-8; Cutright 1969:1; Fritz 2004:33-35, 59-60).

PREVIOUSLY HYPOTHESIZED CAMP LOCATIONS

Lewis and Clark enthusiasts have had differences of opinion regarding the location of Captain Clark's Yellowstone Canoe Camp for over a hundred years. No less than twelve different sites, spread out over twelve miles between Columbus and Park City, Montana have been general in publications or by local legend (Fig. 1). The methodology for each varies considerably, but none have had the specificity of a detailed fluvial geomorphology study.

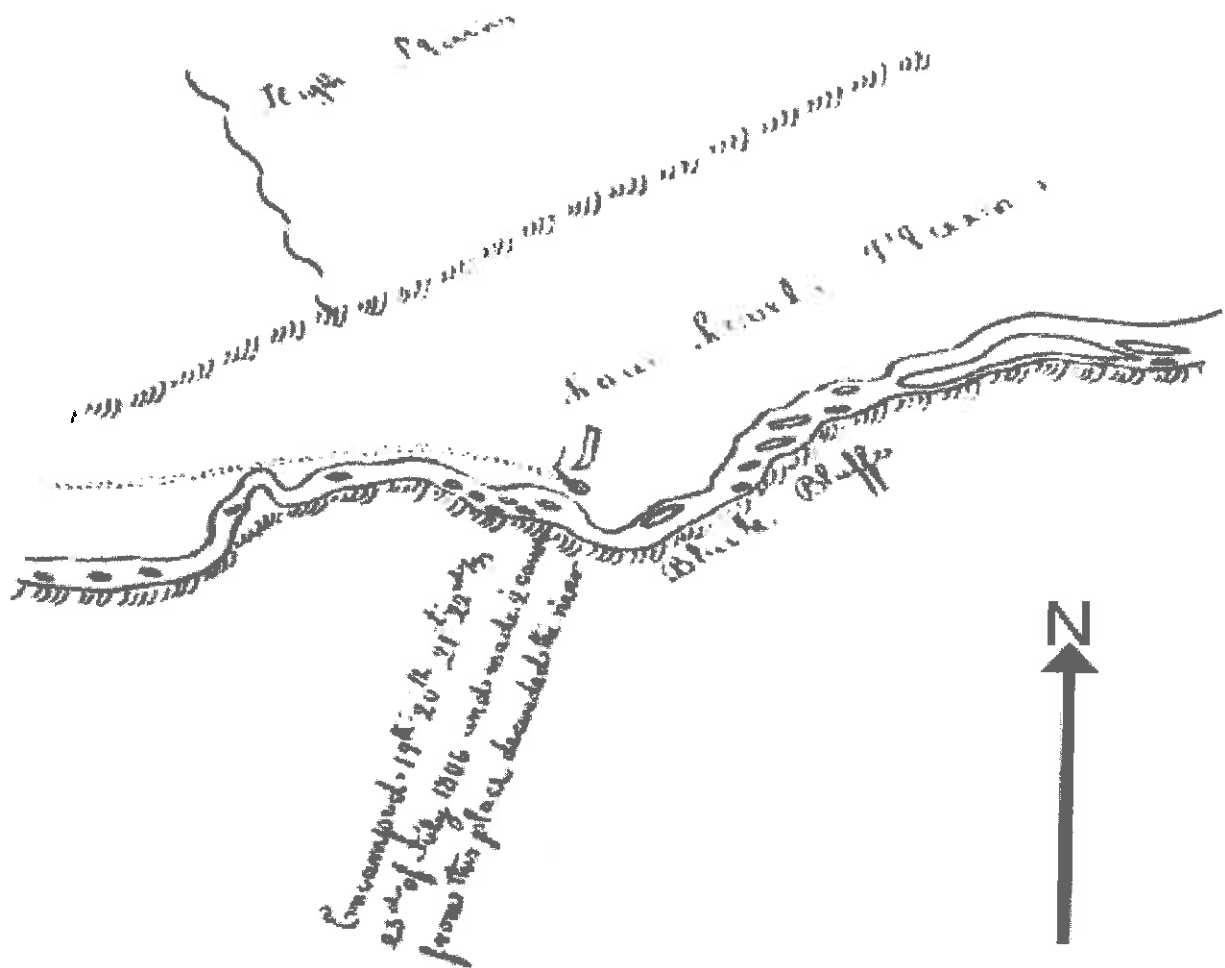
Figure 1: Published and Hypothesized Locations of the Campsite Where William Clark Built His Canoes. The Numbers Corresponded to the Following: 1: Wheeler (1904); 2: Montana Fish, Wildlife, and Parks (undated); 3: Coues (1893); 4, 5 & 6: Local Sources; 7: BLM Map (1992); 8: Western Heritage Center (undated); 9: Plamondon (2004); 10: n.d.), 11: Saunders (2006); 12: Burdge (1965).



Coues (1893:1142-1144) believed Clark advanced only twelve miles on July 19, 1806, instead of the eighteen miles that Clark had recorded in his journals. Coues then determined the location to be a half-mile above the entrance of Allen Creek (No. 3 on Figure 1), which he said matched Clark's notes on the high yellow bluffs and the black bluffs near camp. Much misunderstanding has surrounded what the black bluffs represented or where they existed. The bluffs correspond perfectly to the location notation "Black Bluffs" on the Clark-Maximilian Map (Fig. 2). The Youngs Point location (as believed by Wheeler and Coues) can also be discounted as a Clark campsite because such outcroppings do not exist at/or adjacent to the point. Youngs Point is on the south side of the Yellowstone River at Number 6 on Figure 1.

Wheeler (1904:342) specified that he "made a special effort to locate correctly this particular camp" (No. 1 on Fig. 1) Wheeler's determination was mainly tied to the "black bluffs" that Clark had reported to be east of Canoe Camp, which Wheeler thought was dark timber, not dark-colored outcroppings of Niobrara and Carlile Shale (Moulton 1983:221) (Figs. 3, 4, and 5). Wheeler also used Clark's records of the river miles below the Stillwater River and the miles above the Clarks Fork of the Yellowstone River. The Stillwater River flows into the Yellowstone River south of Columbus, and the Clarks Fork of the Yellowstone River flows into the Yellowstone River east of Park City, south of Laurel, Montana. Wheeler hoped that the distances Clark recorded would help locate the campsite. He positioned the site on the north side

Figure 2: Map Drawn by Clark in the Early 1830s and Given to Alexander Philip Maximilian, Prince of Weid-Neuweid for his Journey up the Missouri River. Notice the Words "Black Bluffs" to the Southeast of the Camp Symbol (Moulton 2003 Vol. 1, Map 11:127).



of the river east of Hensley Creek, identified as Number 1 on the map in Figure 1. Unfortunately, Wheeler did not have access Clark's maps and log notes, which are the fundamental components for finding the approximate location of the campsite.

Idleman (1982: 2), recounting the conclusions of local teacher Clarence Tilden who claimed in the 1930's that Youngs Point was the site of the original Camp (No. 4 on Fig. 1). It is not clear how Mr. Tilden made the determination the campsite was in the area of Youngs Point. Other local sources (Nos. 5 and 6 on Fig. 1) located the camp close to the mouth of Allen Creek, as they believed

the horses were kept up Allen Creek while the rest of the Corps camped nearby along the river (Saunders 2011: 18-20). Allen Creek flows into the Yellowstone from the north at number 4, slightly upstream from number 5.

The Montana Department of Fish, Wildlife, and Parks (MT DFW&P n.d.) located the campsite midway between Columbus and Park City (No. 2 on Fig. 1) based on the assumption that the scale of Clark's Map 108 (Moulton 2003 Vol. 1, Map 108:127) between the Stillwater River and the Clarks Fork of the Yellowstone River was consistent for that entire river stretch. Unfortunately, this does not appear to

Figure 3: Bluffs to the Southeast of the Study Area Contain Niobrara Shale, Which Gives Them a Blackish Appearance. The Bluffs Are Located Across and Down River from the Proposed Campsite.

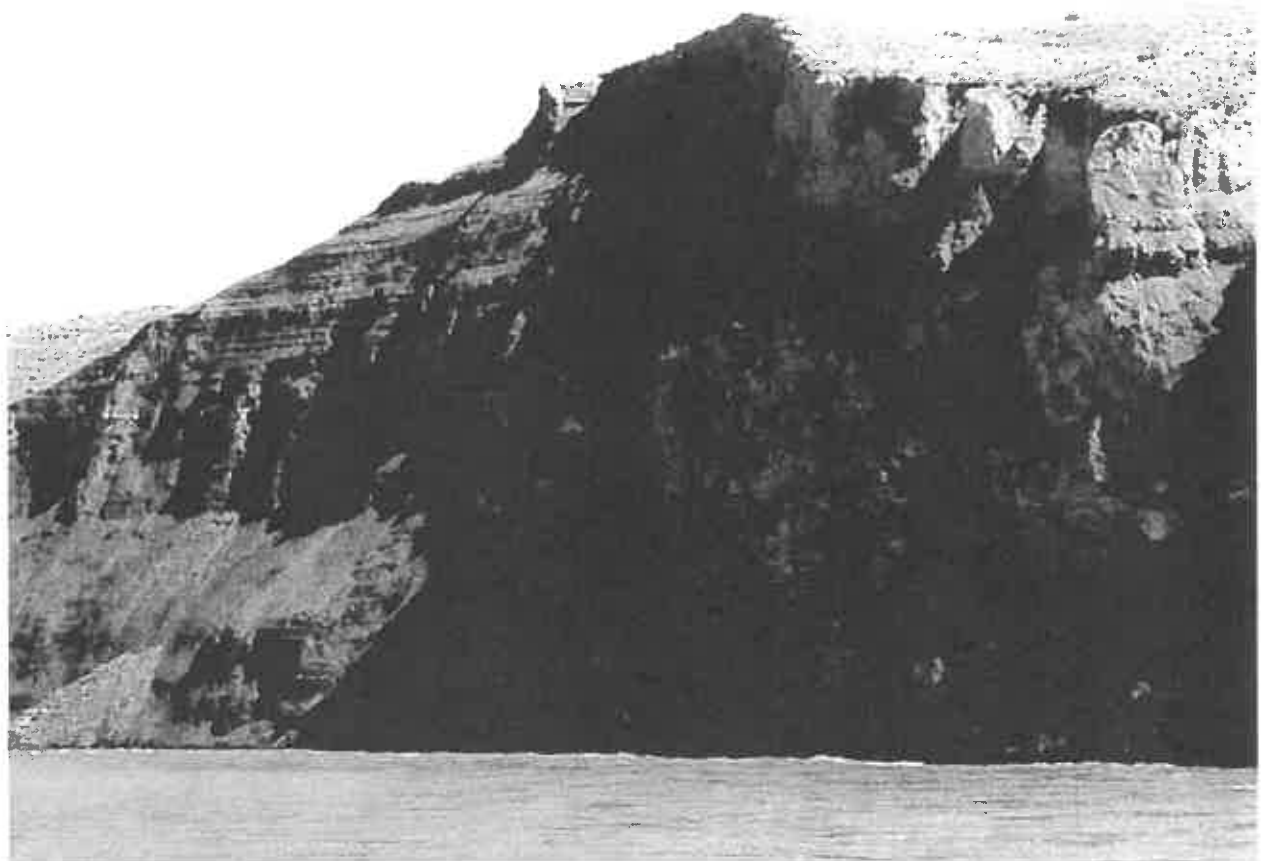


Figure 4: Close-up View of the “Black Bluffs” from the River.



be the case and the issue of Clark's map scale will be discussed in more detail below. The Bureau of Land Management (BLM 1992) and the Western Heritage Center (WHC) (Stovall n.d.) (Nos. 7 and 8 on Fig. 1) have the campsite at the same location between Youngs Point and Park City. Plamondon (2004) (No. 9 on Fig. 1) showed the campsite to be slightly east of the BLM and WHC location. It is not known how the BLM and the WHC made their determinations, but Plamondon did utilize Clark's survey information and notes as he plotted Clark's traverses and distances on his maps.

Bergantino (2004) and Sandau (n.d.) (Nos. 10 and 11 on Fig. 1) used Clark's data and have the site further to the east of Plamondon. Saunders (2006, 2011) completed an independent study with preliminary fluvial studies of the river and put the site further to the east than Bergantino. Burdge (1965) (No. 12 on Fig. 1) located the campsite even further to the east but it is not known how Burdge made his determination.

LOCATING THE CANOE CAMP

It is not well understood how some of the above authors determined their site locations, but the most reliable source of information is from Captain Clark himself (Moulton 1993:198-223). Fortunately, he left sufficient information to determine the approximate location when using all of the information rather than just selective parts. Captain Clark's observations and record keeping were nothing short of amazing and with his persistence and thoroughness. The Corps' location throughout the Expedition's journey from Saint Louis to the coast and back can be closely ascertained when journal entries, survey logs, and maps are all used. The orders given by President Jefferson demanded such precision as he gave specific instructions to the Corps:

... [Y]ou will take careful observations at all remarkable points on the river... and other places and objects distinguished by such

natural marks and characters of a durable kind ... as they may be with certainty be recognized hereafter. The courses of the river between these points of observations may be supplied by the compass, the log-line & by time. Your observations are to be taken with great pain & accuracy, to be entered distinctly and intelligibly for others as well as yourself ... (Thomas Jefferson 20 June 1803, in Jackson 1978:61-66).

Being a military expedition and understanding the importance of thorough and accurate mapping data, it is understandable that these orders from the Commander-in-Chief were taken very seriously.

Throughout the Expedition, Clark maintained survey logs, maps and daily journals. His survey logs and large-scale maps are magnificent products. In fact, as Moulton (1993:iii), editor of the most recent and complete set of the Journals, states: "Their greatest effort – charting the geography of the new land – produced the greatest results." While his maps are visually magnificent and easily understood, a person should not overlook Clark's

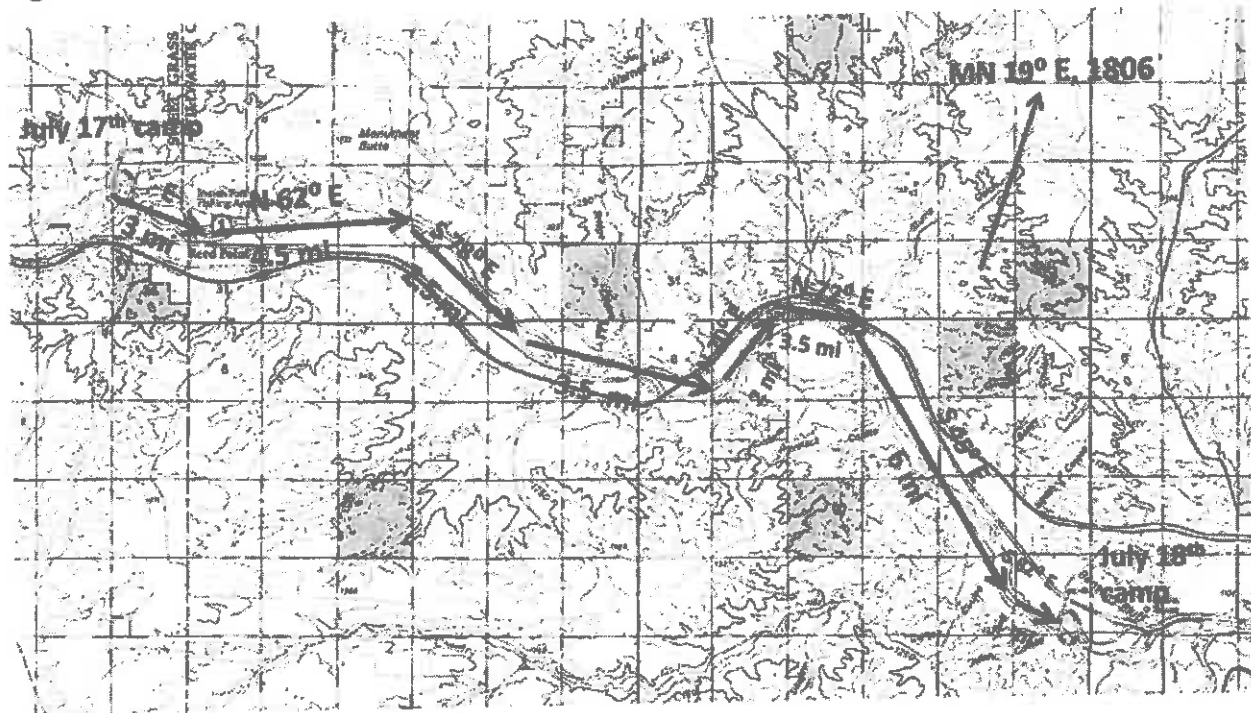
journal entries and survey logs he recorded each day.

Clark's surveys constituted a bearing and distance of every river stretch (traverse leg) and two sets of logs (Fig. 6). The logs serve as notes for his bearings and distances, but they also provide a wealth of additional terrain and river descriptions that help support his survey information. He used a quadrant compass to survey the direction of each river stretch and then estimated a distance. All bearings were recorded as a foresight (direction of travel), but it is evident that he also took advantage of a backsight (direction previously traveled) where necessary. It is unknown as to when he recorded each log, but he likely would have recorded the first log at approximately the same time he performed his compass shot, and the second log may have been recorded during the mid-day break, in the evening, or even later. The second log often includes more detail than the first log. Unfortunately, his traverse surveys are not easy to understand by those without a working knowledge of surveying, and therefore Clark's surveys are

Figure 5: Excavations in April 2011. Notice the "Black Bluffs" in the Background, Right Center. View to Southeast.



Figure 6: Clark's Traverses for 18 July 1806 imposed on a 2004 BLM Edition Quad Map.



overlooked or not utilized to the extent they should be in previous studies.

One of the first drawbacks to using Clark's survey logs, however, is the ever-changing magnetic declination. In Stillwater County, the magnetic declination was about 19 degrees east of true north in 1806, while it is currently just less than 12 degrees to the east. Based on those values, the variation of declination in Stillwater County has changed almost 7 degrees in the last two hundred years (Saunders 2006:4). Clark strictly used only magnetic north-compass readings while performing his surveys. (Plamondon 2004:6)

The U.S. Geological Survey (USGS) National Geomagnetism Center provided a geomagnetism model that helped in the computation of the 1800 era historic declination and variation of declination (NGDC-NOAA, Historic Declination Calculator 1750-present). The variation aspect of that model computed the 1806 declination of 19 degrees East in Stillwater County and allowed the historic river channels be identified with greater confidence. Clark's compass accuracy was remarkable. A good example is shown in Figure 6, which describes Clark's traverse surveys for 18 July 1806 between what is now Reed Point and Columbus, Montana. Fortunately, in this region, channel changes are

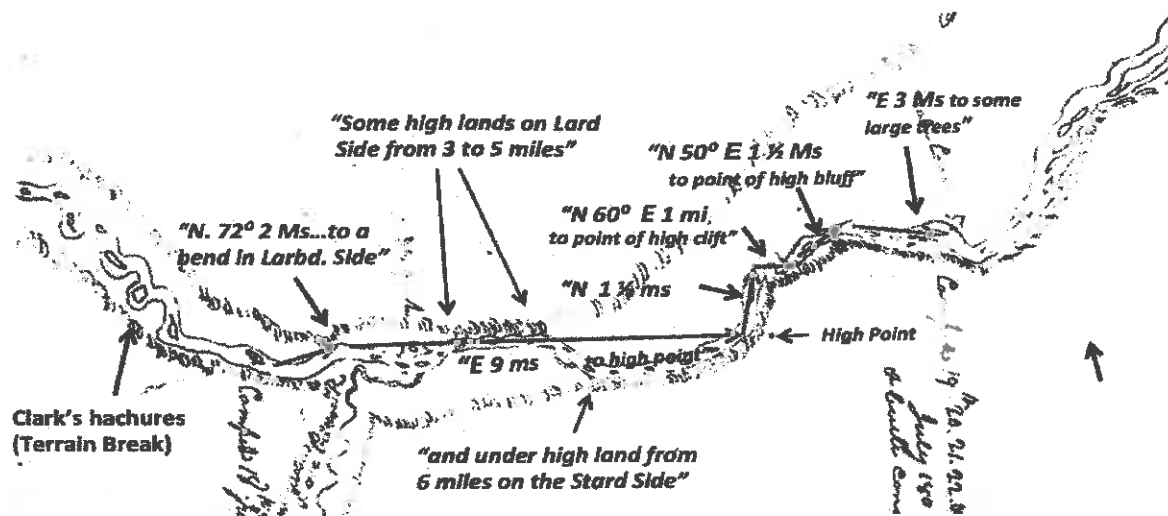
not as significant as they are on more mature flood plains, and therefore a current small-scale map can be utilized quite successfully to visualize the accuracy of his survey bearings.

Clark's large-scale maps include surrounding terrain and identifiable landmarks, along with the course and direction of the rivers. Very important elements on Clark's maps were his short line etchings, called hachures, which he drew to graphically illustrate the major terrain breaks along the river. Differentiating between a wide flood plain adjacent to the river and where steep hills are adjacent to the river, the easier it is to "geo-reference" a given river stretch or landmark. Notice how important they are on Figure 2.

Clark appears to be taking his survey bearings into account when he drew this map. Notice the long 9 mile traverse (Fig. 7). Within that traverse notice how the additional log information matches his map. Within his 9 mile traverse, "Some high lands on the Lard Side from 3-5 miles." Also with the same traverse Clark recorded, "under high land from 6 miles on the Stard Side." His distance estimations were very close to their actual distances.

Clark's maps are generally excellent but map scale can vary significantly, even on the same

Figure 7: Clark's Six Traverses for 19 July 1806, East of Columbus, on a Segment of Clark's Map 108.



map. Map 108 (Fig. 7) is a good illustration. Some of the previous studies did not take that into account. The scale of Clark's map 108 up-river of the Canoe Camp is much smaller than the scale from Canoe Camp to the mouth of the Clarks Fork. He drew the portion of the map above canoe camp on 19 July, while on horseback, and the portion of the map below canoe camp on 24 July, while in canoes. Clark surveyed 6 traverses on 19 July (over a distance of approximately 20 miles) but he surveyed 15 traverses on 24 July (over a distance of approximately 10 miles). To complicate matters more, he surveyed 50 percent more traverses on the segment below Canoe Camp than he did on the remainder of his travel by water down the entire Yellowstone River. His exaggerated (170%) map scale below Canoe Camp therefore appears to have been influenced by the greater number of traverses he surveyed in that river segment.

To help confirm this supposition, refer to Figure 8. Map B on Figure 8 is a channel migration study of what the river would have been in 1806 superimposed on a modern water resources map. Note how the course of the Yellowstone River on Clark's scale adjusted map (Map C), better corresponds to the real world than the un-adjusted Map A, and also where they strongly deviate from each other (noted by Nos. 1, 2, and 3). Also, it is beneficial to compare how the traverses (Map D) better correspond to both the adjusted scale map and channel migration study.

Despite the scale issue, Clark's Map 108, when adjusted, is nonetheless another tool for verifying the location of where to perform the more detailed channel migration analyses. Clark located his campsite symbol on a specific bend of the river on the north side (to east of the No. 3 vertical line on Maps C and D on Fig. 8). Adjacent to that symbol, Clark mapped an island as well as terrain hachures on the south side of the river. The proximate locations of these three features were the valuable ingredients of the forthcoming channel migration study. When the location was selected for the channel migration study, all available historic maps and aerial photos were used to reconstruct the river's fluvial history.

In Figure 8, Map A is Clark's unadjusted map (Map 108) of the Yellowstone River showing the two segments above and below Canoe Camp that he mapped on 19 July and 24 July. The map essentially covers the area between the mouth of the Stillwater River on the west and the mouth of the Clarks Fork River on the east used as the two anchor points. Map B is a geofluvial analysis superimposed on a 1946 Stillwater County Water Resources Survey Map of the Yellowstone River estimating the 1806 course. Map C is Clark's river map adjusted after determining the location of the canoe camp by working backward (westward) with his traverses starting at the confluence with the Clark's Fork River. Using that as an anchor point, his map shows a different scale between the canoe camp and the Clark's Fork than between the Stillwater River and the canoe camp. Map D

Figure 9: 1878 GLO Map of the Yellowstone River Adjacent to the Potential Site. The Site Is Located on the Mainland to the East of the Island (Below Number 57.48) Located to Left of Center in the River.

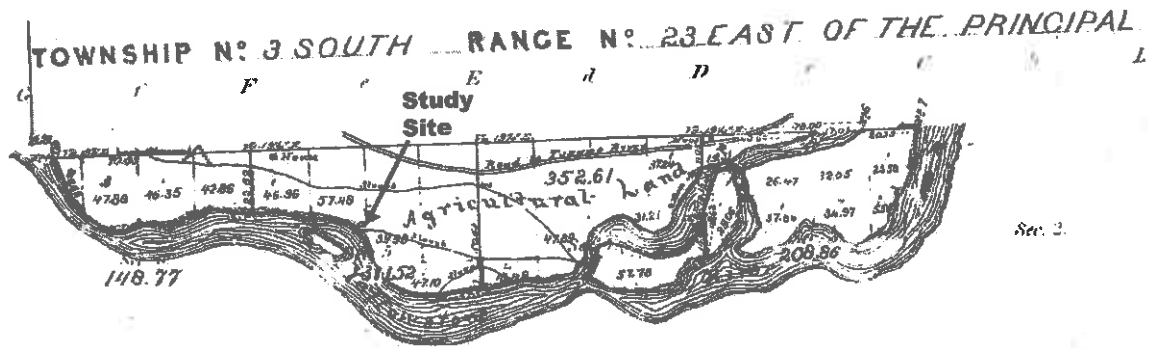
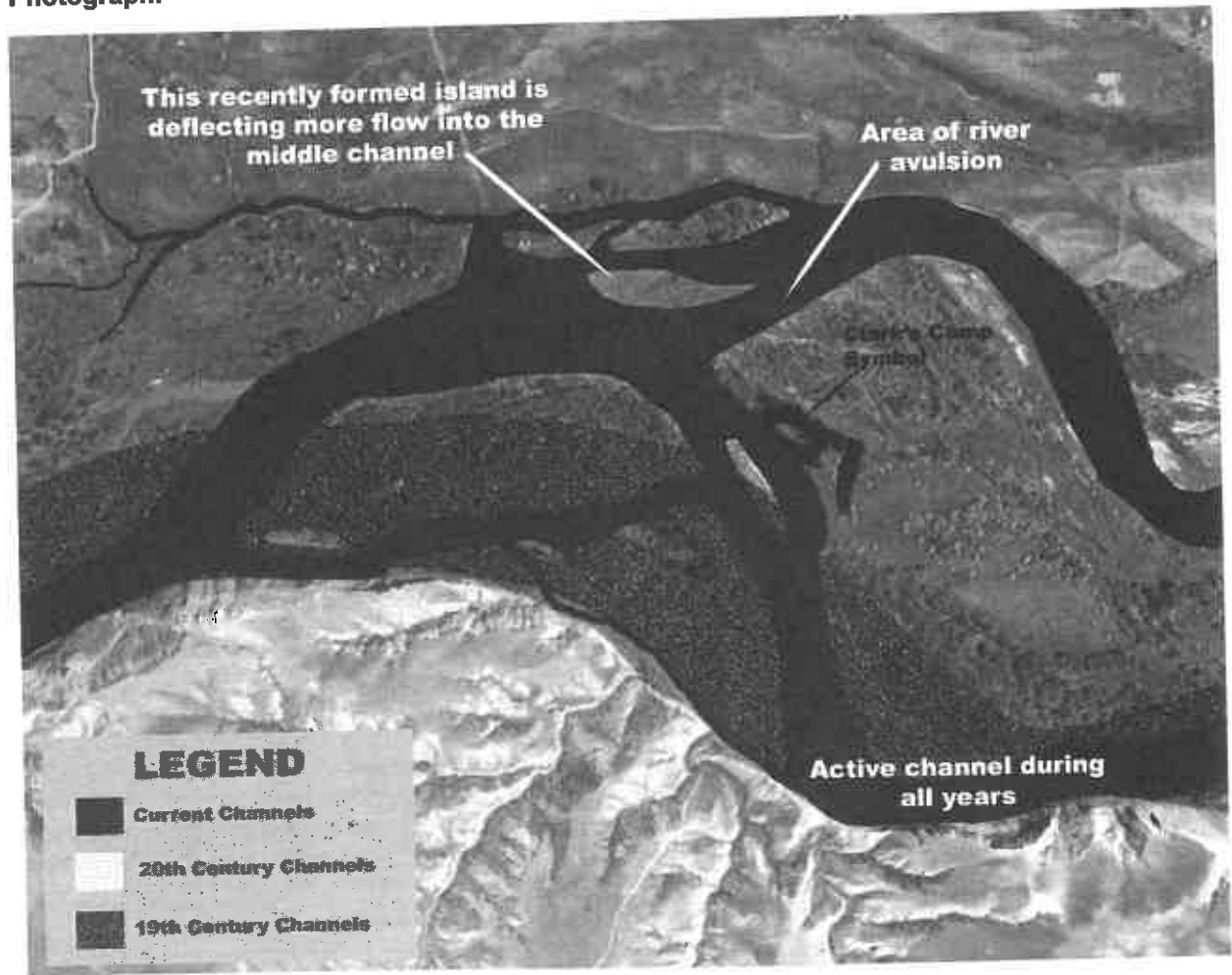


Figure 10: Channel History near the Proposed Camp Imposed upon a 2009 Google Aerial Photograph.



at that location would then have made it extremely difficult, if not impossible, to put their canoes in the river the night before and safely keep them there as Clark described.

Sometime after 1878, immediately west of the proposed campsite, the northern channel experienced a sudden change to a new channel, or what is known as an avulsion. The river's flow moved even further to the north. The new northern channel then helped to protect the possible campsite from the erosive forces of the river until sometime between 1979 and 1991 when water again started flowing in the old northern channel (now the middle channel) (Fig. 10).

By 1996, the flow in the current middle channel significantly increased. The main cause was a new and growing island in the northern-most channel that was, and still is, deflecting the flow into the middle channel. By 2009, the middle channel has become the prominent channel of the river, and the main kinetic energy of the river is now impacting the

bank adjacent to the proposed campsite. Figure 10 shows the 1806, 1878, twentieth century, and 2009 river channels superimposed over a Google 2009 image. Notice the many channel changes during those time periods. It is quite remarkable that the suspected campsite has had the river on all sides of the proposed campsite, but its integrity appears to have remained largely intact. The river has narrowly missed the site in the last two hundred years. Fortunately, the proposed campsite was on higher ground and more resistant to channel migration flood damage (Fig. 11).

ENVIRONMENTAL SETTING

The study area is located in an open area with a cottonwood canopy and a meadow along the western shore of an island in the Yellowstone River south of Park City, Montana. It currently encompasses a ranch and recreational property. The Yellowstone River dominates the landscape. Clark's 1806 map and the 1878 GLO map (Fig. 9)

Figure 11: Aerial Photo of the Site in 1997 During a 100+ Year Flood Event. Note That the Study Site Is on Higher Ground and Not As Much Inundated with Water As the Rest of the Island.

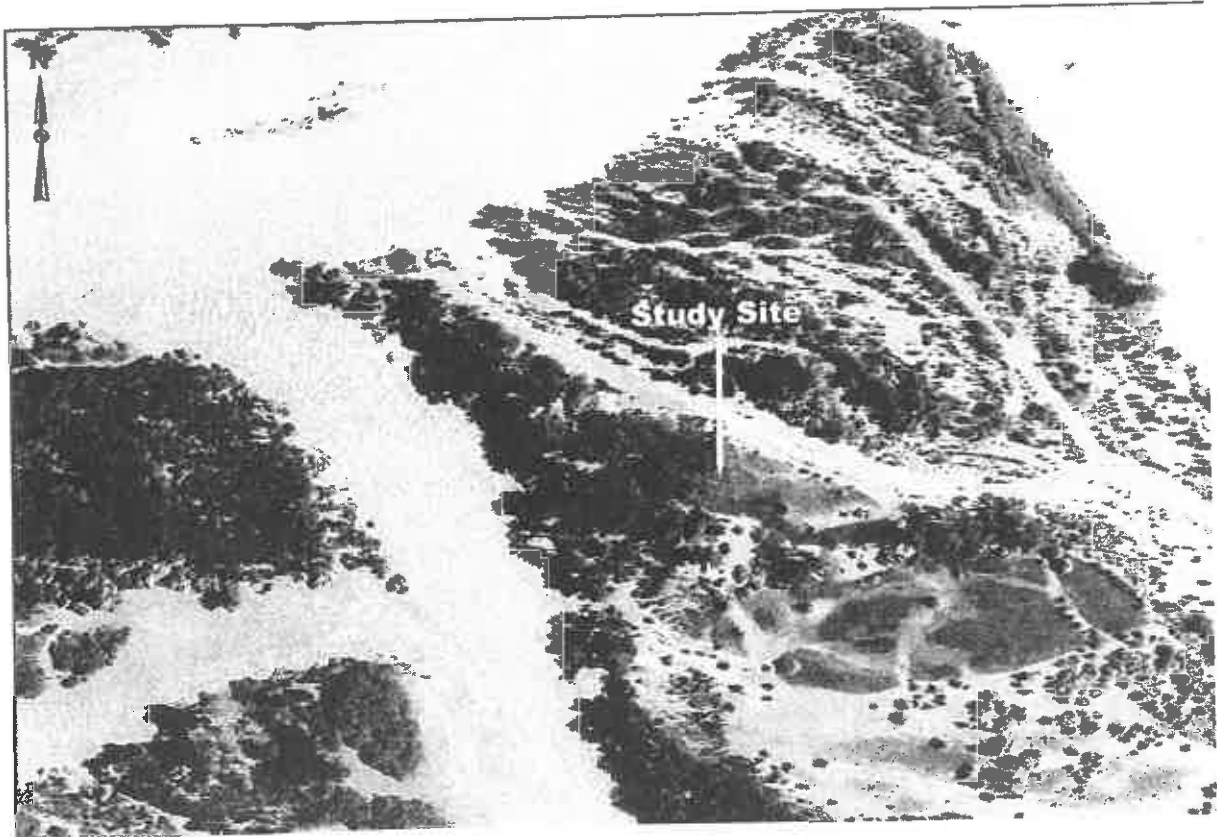
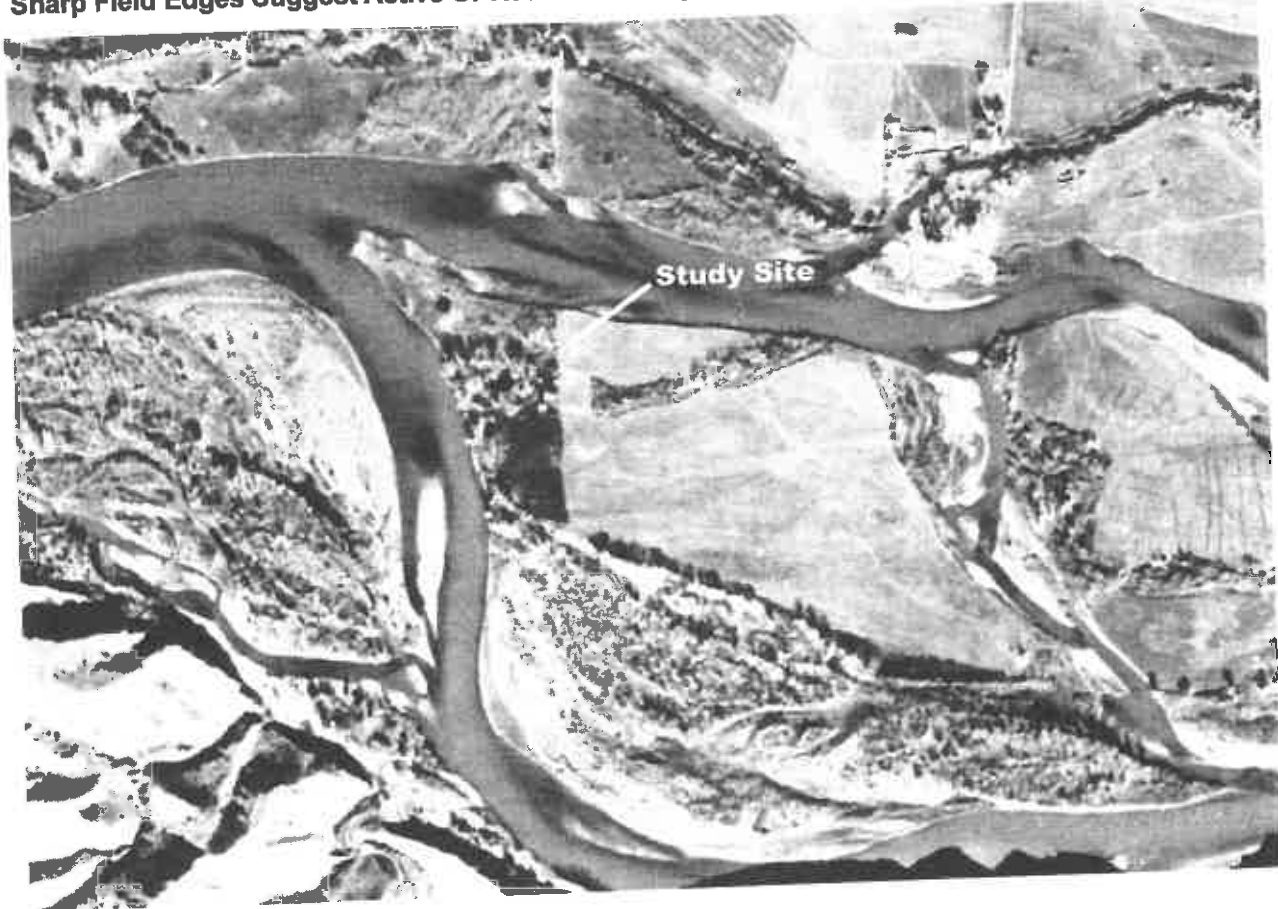


Figure 12: 1941 Aerial Photograph. Notice the Large Open Field in the Center of the Island. The Sharp Field Edges Suggest Active Or Recent Farming Practices, Probably Haying.



indicate the island was part of the mainland to the north and east of the Yellowstone River until at least 1900. Up to that time, the eastern part of the site was known to have been plowed for agricultural usage and the western part for livestock grazing. An aerial photograph from 1941 shows that the eastern portion of the island was still being hayed, as dump-rake windrows are evident on the aerial image and the sharp field boundaries on the eastern part indicate recent cropping (Fig. 12).

By 1954, farming had been discontinued altogether. Notice in Figure 13 how the river channels have changed and that the previously plowed field, while still open, does not appear to be actively used to grow crops. The site has since reverted to a semi-natural riparian state.

Presently, local vegetation consists mostly of mature cottonwood, juniper, and invasive Russian olive trees common in Yellowstone River bottoms. Open areas consist of tall grasses. Soils are a fine Sandy clay loam combination and are listed by

the USDA in the National Cooperative Soil Survey (2010) as a Glendive Complex. The extreme southern portion of the island has a silty clay loam of Haverson-Glenberg complex.

LITERARY SOURCES AND THE ARCHAEOLOGICAL RECORD

Literary sources provide an important string of information in the discovery and interpretation of the site. Clark's journal entries provide valuable information about the activities of the site, although not to the detail often desired. The important events described by Clark are summarized in Table 1.

While at the camp, the party had three main activities: (1) constructing the canoes and oars, (2) hunting and processing of food, and (3) finding the stolen horses. The last of the three appears to have been very important to Clark and should not be underemphasized. The horses were extremely

valuable as trade goods for supplies on the final leg of their journey. Clark was clearly upset about the loss of such a large number. The fact that he committed men to their recovery every day required removing them from the construction of the canoes or the acquisition of food.

Rock Art

One possible source of information about the expedition comes from a rock art panel north of present-day Billings, MT. Cramer (1974:18) believed this Indian rock art represent Clark and his canoes and that the panel might be a native account of stealing Clark's horses either while at the camp or possibly later from Sgt. Pryor on the night of July 25/26. It may also be the only contemporary portrait of Sacagawea, presumed to the center left figure in the boat with her son, Little Pomp, standing next to her. The larger figure to the right of the boat may be York, considered to be "Big Medicine," (Fig. 14).

It is interesting to note the firearms figure prominently in the imagery. Both firearms depicted indicate a flintlock type with a hammer and a frizzen located above the trigger area. Indian rock art of the contact period often emphasized the introduction of new material goods (Keyser and Klassen 2001: 234-5).

Alternatively, some local enthusiasts believe that the scene actually depicts Lewis and Clark's journey up the Missouri River in 1805. However, this hypothesis is complicated by the fact that Pomp, presumably the smallest figure standing next to Sacagawea, would have been too young to stand on his own when the Corps was on the Missouri but could have been standing a year later on the Yellowstone in 1806. Likewise, if all figures in the rock art were drawn at the same time, then the prominent depiction of horses further undermines the assignment of this panel to 1805 as Lewis and Clark did not travel with any horses on the Missouri.

Figure 13: Aerial Photograph Showing the Yellowstone River Channels, Landforms, and Vegetation in 1954.

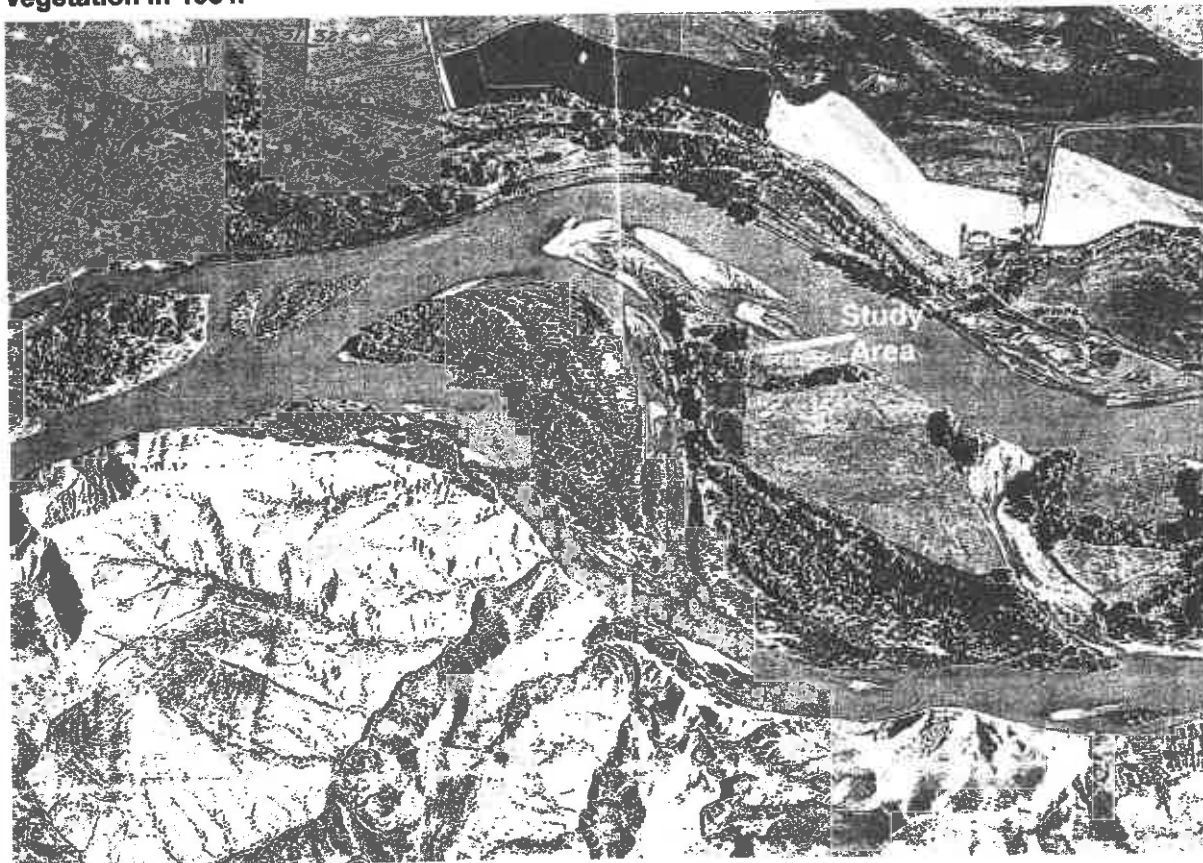


Table 1. Clark Expedition Events Between July 18, 1806 and July 24, 1806.

Date	Clark's Recorded Events
July 18, 1806	<ul style="list-style-type: none"> • While mounting his horse, George Gibson falls and impales his leg on snag. • Travel is difficult because of Gibson's wound.
July 19, 1806	<ul style="list-style-type: none"> • Travel is difficult with Gibson's wound. • Clark finds some "large timber" and makes camp. • Charbonneau sees an Indian on the bluffs across the river from the camp. • Smoke seen in the distance – Clark presumed it to be Indian.
July 20, 1806	<ul style="list-style-type: none"> • Clark sends people down river to find even larger timber to no avail. • Clark has party make ax handles from local choke cherry trees. • Clark has some members of party hunt "and make themselves clothes ... as they are nearly naked."
July 21, 1806	<ul style="list-style-type: none"> • Clark is informed that over the night 24 of the 50 horses are missing. He assumes they were stolen by Indians. He sends men to look for them. • Clark notes men working "diligently" on canoes with one nearly finished. • Some members of the party continue to hunt.
July 22, 1806	<ul style="list-style-type: none"> • Clark is deeply concerned about the loss of the horses and sends men to search for them again. He expresses his deep conviction that they must have been stolen by the Indians because of "the improbability of the horses leaving the grass and rushes of the river bottoms which they are very fond and taking immediately out into the open dry plains where the grass is but short and dry."
July 23, 1806	<ul style="list-style-type: none"> • Clark is informed that during the night wolves or dogs had come into camp and eaten most of the meat drying on a scaffold. • Sgt. Pryor found a "mockerson" he presumed had "been worn but a few hours before." • The second canoe was finished around noon and men start to construct oars and poles while others are sent out to hunt. • Clark gives Sgt. Pryor his orders to proceed overland with the rest of the pony herd.
July 24, 1806	<ul style="list-style-type: none"> • The party departs at 8 am and proceeded down river. • Sgt. Pryor departs with the horses.

The Blue Book

The other literary source that is particularly helpful in understanding the site are the military protocols in use by the Corps of Discovery written in 1777 for the Continental Army by Baron von Steuben, *Regulations for the Order and Discipline of the Troops of the United States*, also known as the "Blue Book" because of its blue cover. Von Steuben prepared the "Blue Book" at the behest of George Washington, whose Continental Army

lacked sufficient training, supplies, and suffered from exceptionally low morale. Von Steuben's training, including the "Blue Book," significantly improved the Continental Army's professionalism and fighting ability (Danckert 1994:34; Whitridge 1976:430). The "Blue Book" remained the primary U.S. military manual for tactics and administration through the War of 1812 (Armstrong 1976:62; Beckham et al. 2003:30; Skelton 1992:38).

It is evident that both Clark and Lewis were familiar with regulations and referred to them in their actions, if not their words in the journals (Ambrose 1996:42; Beckham et al. 2003:29; Jackson 1981:134). Even though there is not an explicit reference to the "Blue Book" in the Lewis and Clark journals, Donald Jackson (1981:134). believed that "the expedition . . . carried at least one medical treatise and the current edition of the rules and articles of war." The closest direct reference is John Ordway's description of John Collins' court-martial on May 17, 1814 for "the breach of rules & articles of War" (Beckham 2003:30). Other incidents indirectly suggest at least familiarity with the journals as does the archaeology at other sites, particularly Traveler's Rest, which conform to regulations in the journals (Hall 2003:56).

At Travelers Rest, near Lolo, MT, the regulations combined with the geophysical surveys helped identify several key pieces of information to locate and identify areas for subsurface exploration (Hall 2003:49). The book details how a camp of regimental size was to be set up with very exact spacing for the various elements. How the Corps of Discovery interpreted the regulations is a matter of conjecture, especially after dividing into three smaller groups on their return trip and after such an extended period in the field.

One key element that has proven useful at other Lewis and Clark archaeology sites near Great Falls and Lolo, Montana is the requirement that "sinks" or latrines are to be dug 300 feet from the "kitchen" or cooking hearth. Since the Corps used mercury as medicine, the latrines are more easily identified by trace mercury in the soil. At Traveler's Rest (Lolo) and Lower Portage Camp (Great Falls), the

latrines were identified and located approximately 300 feet from fire hearths (Hall et al. 2003:134-43, Karsmizki 1990:8-11). Von Steuben (1985 [1779]: 83-84) also noted that the quartermaster of the unit was "answerable that the parade and environs of the encampment are kept clean; that the sinks [latrines] are filled up, and new ones dug every four days, and oftener in warm weather." Given the heat of July and the length of their stay, more than one latrine may be present at the Canoe Camp.

Since hunting was a primary activity at the camp, the processing of animals may also be expected. Von Steuben (1985 [1779]:83-84) noted that "The place where cattle are killed must be at least fifty paces in the rear of the wagons; and the entrails and other filth immediately buried; for which the commissaries are to be answerable. The quartermaster general must take care that all dead animals, and every other nuisance in the environs of the camp, be removed." It may be expected, therefore, that animal processing may have been done some distance from the main portion of the camp. However, at Portage Camp near Great Falls, bones were wide scattered around the fire hearths indicating selective interpretation of Blue Book (Karsmizki 1990:40).

METHODS AND ANALYSIS

The initial steps were a review of appropriate maps and identification of a probable location for the Clark camp. Then further investigations were undertaken, which resulted in identification of an archaeological site designated as 24ST0720.

Figure 14: Explorer Petroglyph Site (24ML402) (Cramer 1974).

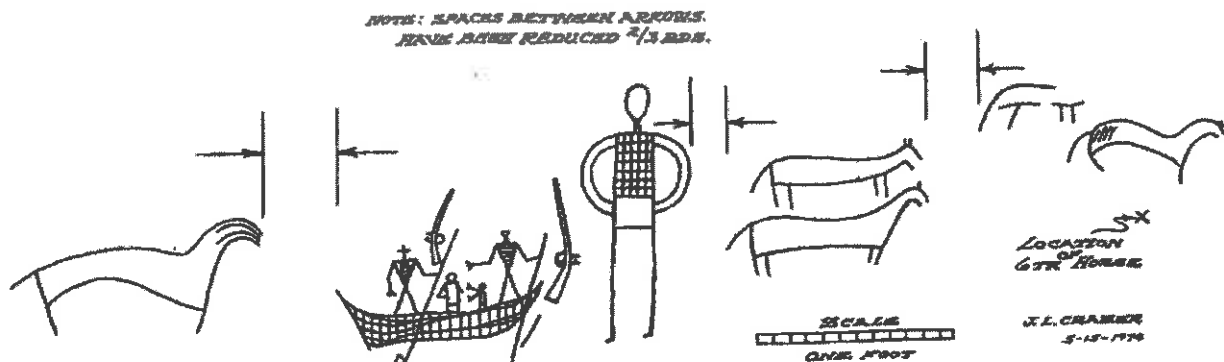
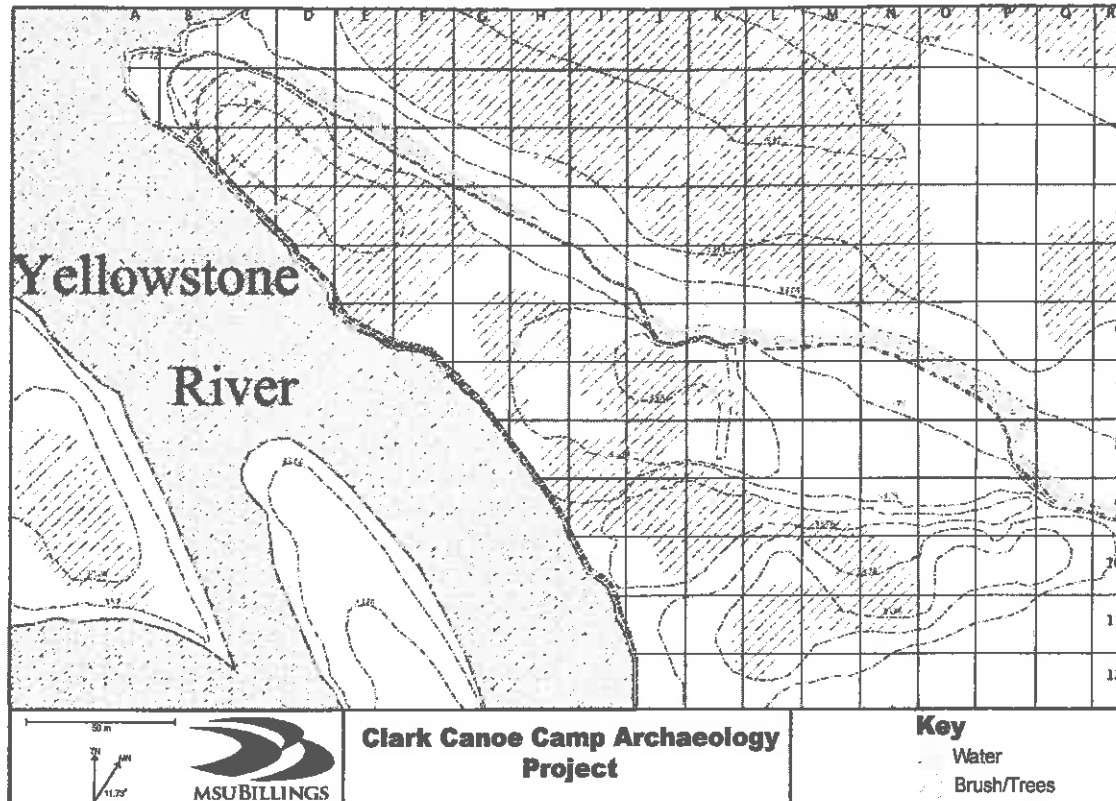


Figure 15: Site Map and Grid. Note Contours in Center Indicating Higher Ground.



Site Survey

A 20 meter grid was laid over the proposed site to provide horizontal control and facilitate the use of geophysical equipment. The grid was aligned with true north, which is -11.73 degrees from magnetic north. The X-axis of the map was given an alpha label and the Y-axis a numeric label. Thus, each grid has a unique alpha-numeric designation (Fig. 15). Pedestrian, metal detector, magnetic, and electrical resistivity surveys were conducted before subsurface excavations.

Geophysical Survey

A magnetic survey was completed using a Geonics EM38 RT (Fig. 16). Magnetic surveys have proven invaluable at other Lewis and Clark sites. In 1996 and 1997, a magnetic survey at Fort Clatsop (Oregon) covered two areas totaling 800 square meters and identified several historic anomalies, though none proved to be associated with the Corps of Discovery (Weymouth 1998). In 1990, magnetic surveys at Lower Portage Camp, another Lewis and Clark site, produced archaeologically

significant materials, both artifacts and features, that helped identify and confirm the site as one used by the Corps of Discovery (Karsmizki 1990). In 2001, magnetic surveys at Travelers Rest State Park revealed 60 anomalies including features believed to be identified with the Corps including the central hearth and localized mercury interpreted as the latrine (Hall et al. 2003:99-106).

Data were collected by two person teams with one person moving the instrument along a straight line across each 20 m grid and the other manually recording the results. Teams moved on a north/south axis as suggested by the instrument documentation. The survey pattern was bi-direction in order to reduce walking times. Guides of nylon masonry string, marked every meter, were used to ensure that each grid was surveyed accurately and that each square meter was recorded, using the instrument. Guidelines were secured using non-magnetic wooden stakes. Physical obstructions, such as undergrowth and deadfall, created some problems resulting in incomplete grid units or small areas where it was impossible to take a reading.

Readings were entered into Snuffler Geophysical Software created by the University of Sussex School of Archaeology. The program interpolated data from 1 meter readings to .25 meter readings. It then analyzed the readings (measured in nano-tesla or nT) to determine the mean for the site and measured standard deviations from that to plot two-dimensional isopleth drawings for each 20 m grid unit, which can be connected into a map layer that was imported into a CAD program. Sixteen full and eight partial grid units were magnetically surveyed. Eighteen of the units were contiguous, but particularly thick undergrowth limited the ability to move south. Based on early results, two non-contiguous units (J11 and K11) were added because of an apparent anomaly that appeared to move beyond the initial survey.

The second geophysical survey conducted was a soil electrical resistivity survey. Unlike magnetic

surveys, which are passive, resistivity surveys are an active geophysical technique that passes a small electrical current through the soil and measures the resistance to that current caused by natural or cultural modifications. Resistivity can be affected by soil physical properties such as density, structure, water content, or from natural or cultural obstructions such as rock, building foundations, or debris. A CEM DT-5300 Earth Ground Resistance Tester in a di-pole formation was used. The di-pole formation uses four probes, two of which are placed between 15 and 30 m away from the survey grid and the other two probes spaced 0.5 m apart on a framed array. The di-pole formation was chosen because it provides greater depth (up to 2 meters) than the Wenner Array formation that places all four of the probes in closer formation (typically 1 meter) on a single array, giving an effective depth reading of approximately .75 to 1 m. Because the instrument took longer to take a reading, the time

Figure 16: Magnetic Survey Results Superimposed Over a 2013 Aerial Photograph and Clark's Symbol, Which Was Geo-referenced to the Earth during the Site Study.

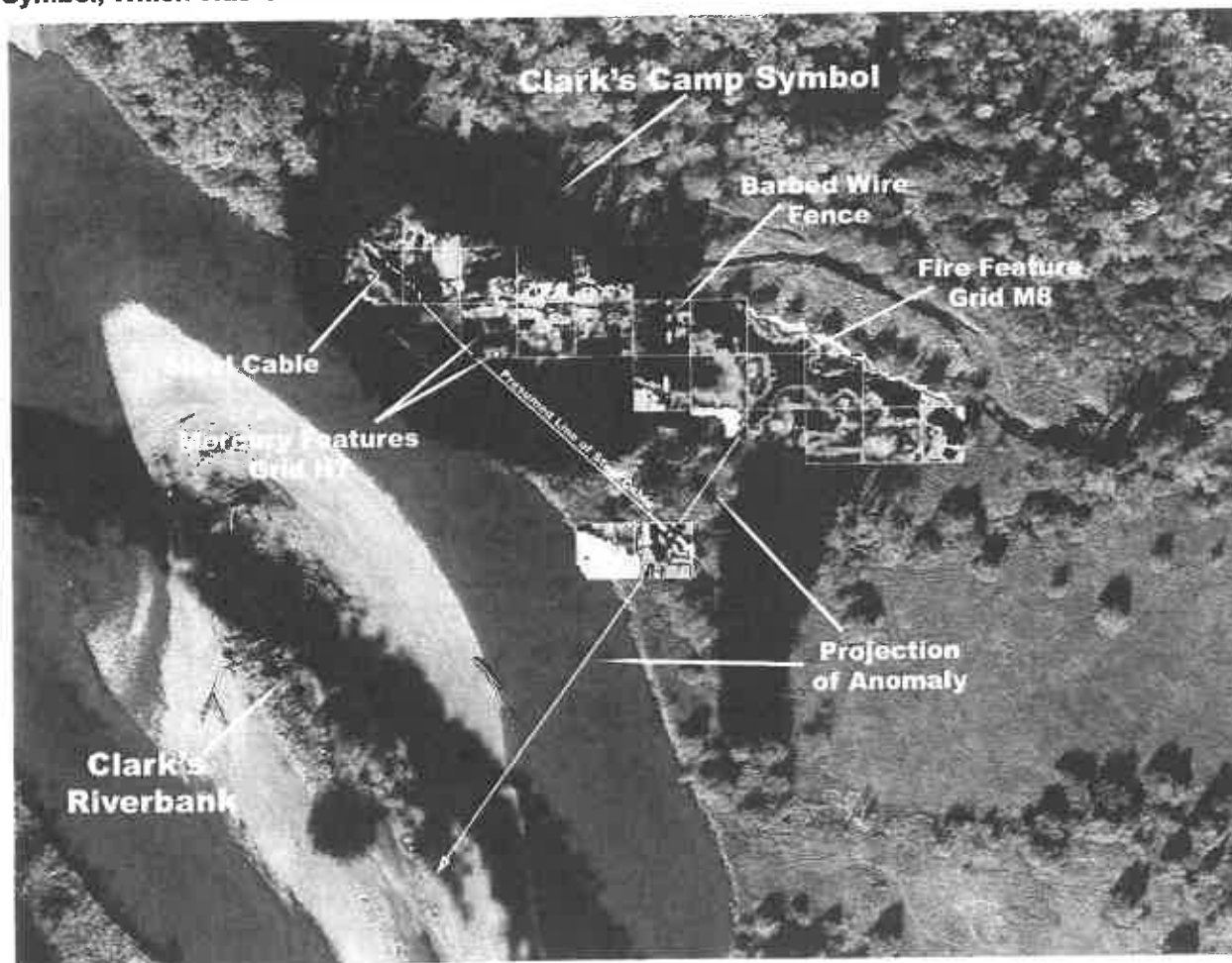


Figure 17: Steel Cable Discovered in Grid G6.



to survey a grid unit was significantly longer than the magnetic survey. Therefore, soil resistivity at the proposed Yellowstone Canoe Camp was conducted only on grids where excavation was imminent.

The method of data collection is effectively the same as the magnetic survey. Two-person teams recorded information along transects across individual 20 m grid units using a guiding string to ensure linear accuracy. One person operated the instrument while another recorded the results. Only three full grid units (H7, M8, and F6) and two partial units (M7 and H6) were surveyed. Like the magnetic survey, readings were entered into the Snuffler Geophysical Software, which extrapolated the readings down to .25 m, analyzed the data for the mean, and determined the standard deviations in order to produce an isopleth drawing for the unit. While the results look similar, the readings are measured in ohms.

Subsurface Testing Methods

Subsurface testing was conducted in three ways: shovel probes, 1 x 1 m excavation units, and soil probes. Shovel probes were 30 cm in diameter and taken to a minimum depth of 50 cm below ground surface. Twenty-five shovel probes were completed. Excavation units of 1 x 1 m were used. All soil from shovel probes and excavation units

was sifted with .25 in mesh screens. Arbitrary levels of 10 cm were used to provide vertical control. Twenty subsurface excavation units were completed to a minimum depth of 50 cm BGS. After identifying low levels of mercury in and around two isolated magnetometer and soil resistivity anomalies, a soil probe of approximately 5 cm in diameter was used to sample soils and test for mercury up to 70 cm BGS with measurements taken every 10 cm and tested for mercury vapor. Forty-five soil probe samples were completed.

Mercury Vapor Analysis

Magnetic and resistivity surveys revealed several anomalies in grid unit H7. These anomalies were distances of 294 and 298 feet from a fire feature found in Grid M8 (see below). These distances closely correspond to the military regulations used by the Corps of Discovery as the required distance between the "kitchen" (or hearth) and the "sink" (latrine). The Corps of Discovery used at least two forms of mercury as medicine. Dr. Rush's "Thunderclappers" were patented oral pills that consisted of calomel (mercury and chlorine) and jalap used as a diarrhetic to bring humors back into balance. The pills apparently were used as a general analgesic for many maladies. The Corps carried 1300 pills at the start of the expedition. The Corps also used mercury in the form of a salve on the gums, arm pits, groin, or, more painfully, using one of the four penal syringes exclusively used to treat venereal diseases (Paton 2001:50-51; Peck 2002: 117-119, 207-208). As mercury moves through the body it is deposited in the latrine and has been identified at both Traveler's Rest and Portage Camp excavations (Fresonke and Spence 2004:247; Hall et al. 2003:110-28; Paton 2001). Therefore, the anomalies merited testing for mercury.

Using a modified methodology developed at the Traveler's Rest site (Hall et al. 2003:110-112), samples were taken from excavation units both

in situ and ex situ. Samples were tested using a Jerome 431-X Mercury Vapor Analyzer (MVA). In situ testing consisted of making holes in the floor and sidewalls of excavation units and the instrument's intake probe inserted and a measurement taken. Ex situ testing required removing samples from excavation units, shovel probes, or soil probes and placed in new and unused sealed bags to agitate and vaporize any potential mercury in the sample. The instrument's intake probe was then inserted and measurements taken.

RESULTS

Geophysical Results

The magnetic survey identified several anomalies (Fig. 16). Linear readings running north-south

in Grid K8 that continued into K7 were a buried barbed wire fence visible in the high water channel at the north end of this anomaly (Grid K6). The fence also approximately corresponds with the section line. Note the erosion of the bank since 2011 when the survey was conducted.

A similar anomaly runs roughly parallel to the river. This anomaly was found in Grids F6, G6, H7, and appears to continue to at least K11. Subsurface testing in Grid F6 revealed that the anomaly was a 1 in diameter steel cable located 11 cm BGS (Fig. 17). It appears that the cable is over 100 m long and its use not clear. Based on metal detector results and the magnetic survey, the cable presumably continues roughly parallel to the riverbank to at least Grid J10. Inquiries with the landowners and engineers from the Army Corps of

Figure 18: Magnetic Survey, Grid Unit M8, Showing Two Apparent Anomalies.

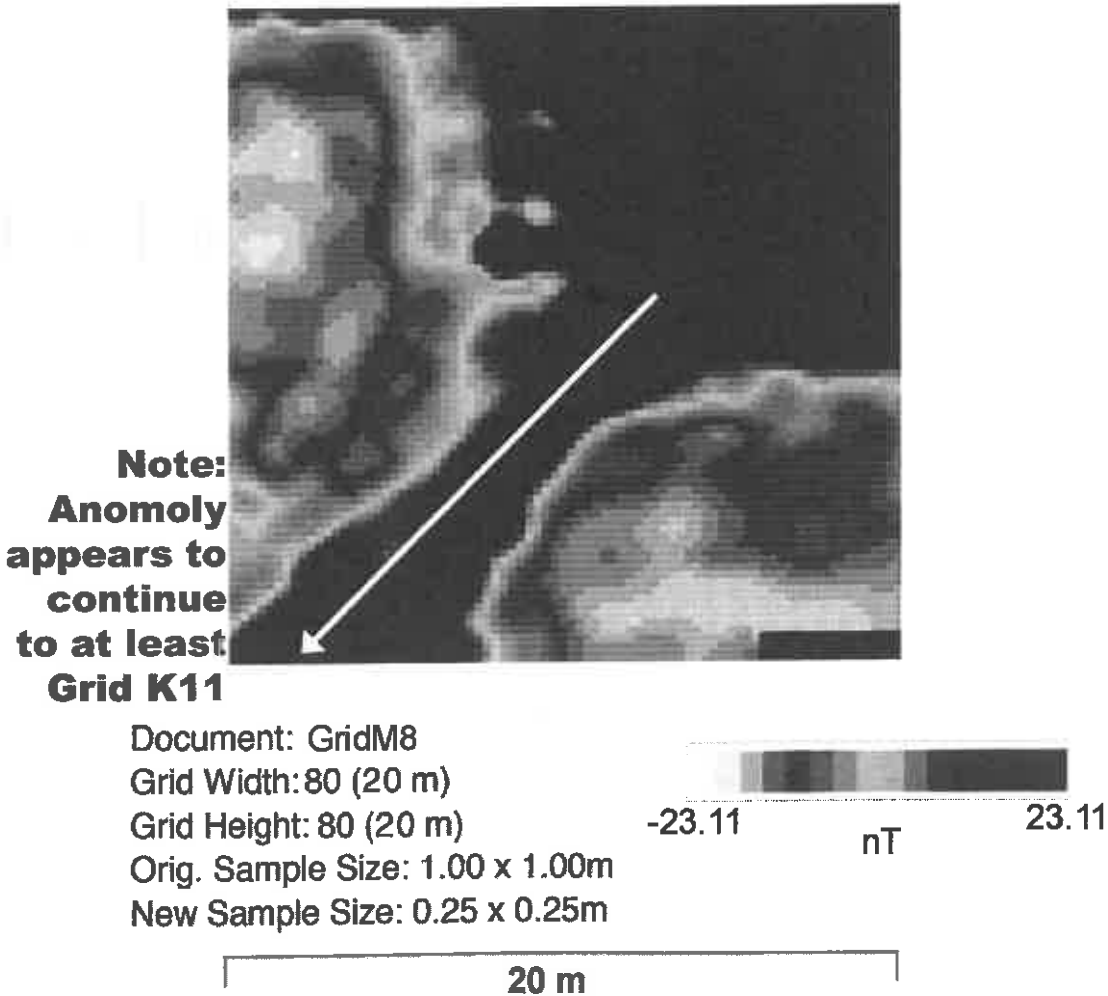
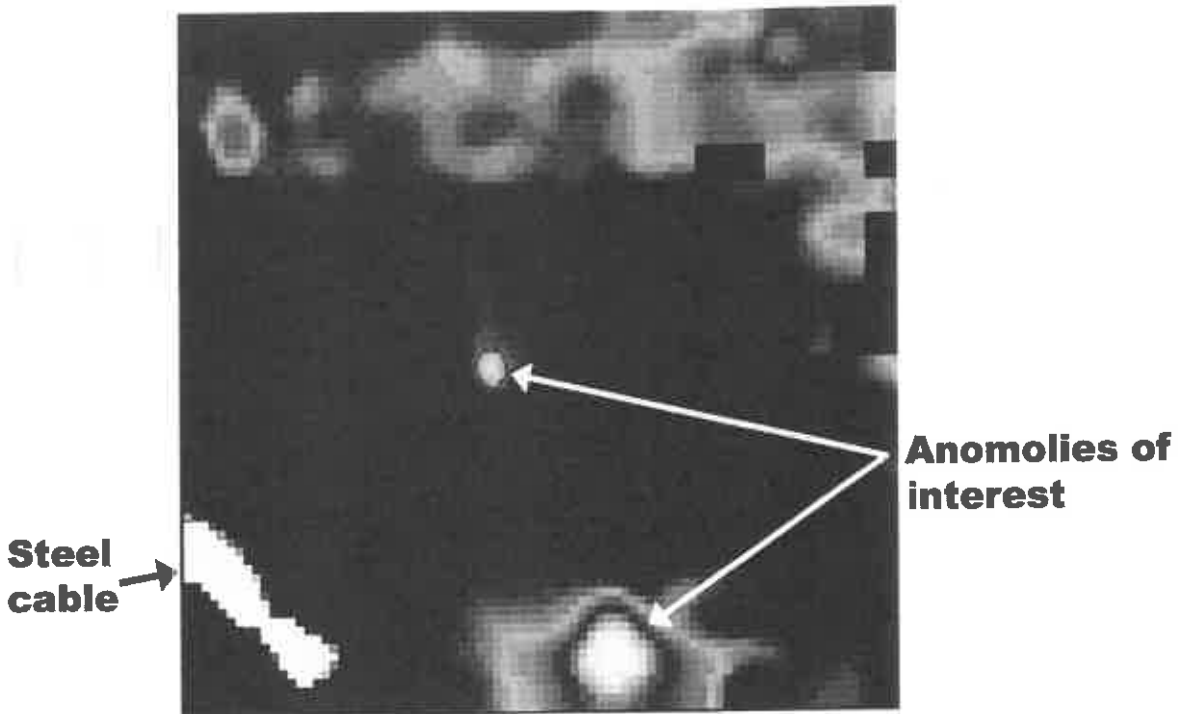


Figure 19: Soil Resistivity Survey of Grid Unit H7.



Document: GridH7
 Grid Width: 80 (20 m)
 Grid Height: 80 (20 m)
 Orig. Sample Size: 1.00 x 1.00m
 New Sample Size: 0.25 x 0.25m



Engineers and the Tennessee Valley Authority did not produce any definite interpretation of the cable.

The most promising anomalies, however, were on the eastern portion of the surveyed area. This is an open meadow broken with only sporadic Russian olive trees. In that area, several anomalies of extremely low magnetic readings can be seen running approximately northwest to southeast. From the center anomaly, another smaller linear anomaly runs southwest to northeast and intersects the NW-SE anomaly at nearly a right angle in grid unit M8. The SW-NE anomaly appears to continue toward the river (Fig. 18). The anomaly was

intriguing since it appears to not only be oriented with the NW-SE anomaly but also the Yellowstone River as oriented in 1806, but not currently. If Clark's mapping was accurate and it is correctly placed with the geofluvial methodology, the SW-NE anomaly would be nearly perpendicular to the 1806 river. It was necessary to determine if the anomaly continued to the southwest. Because of the thick Russian olive undergrowth, it was impossible to follow it in a contiguous fashion. In order to see if the anomaly continued toward the river, two additional units were surveyed on the southern side of the undergrowth. The anomaly did appear to continue along the same trajectory in grid K11. As

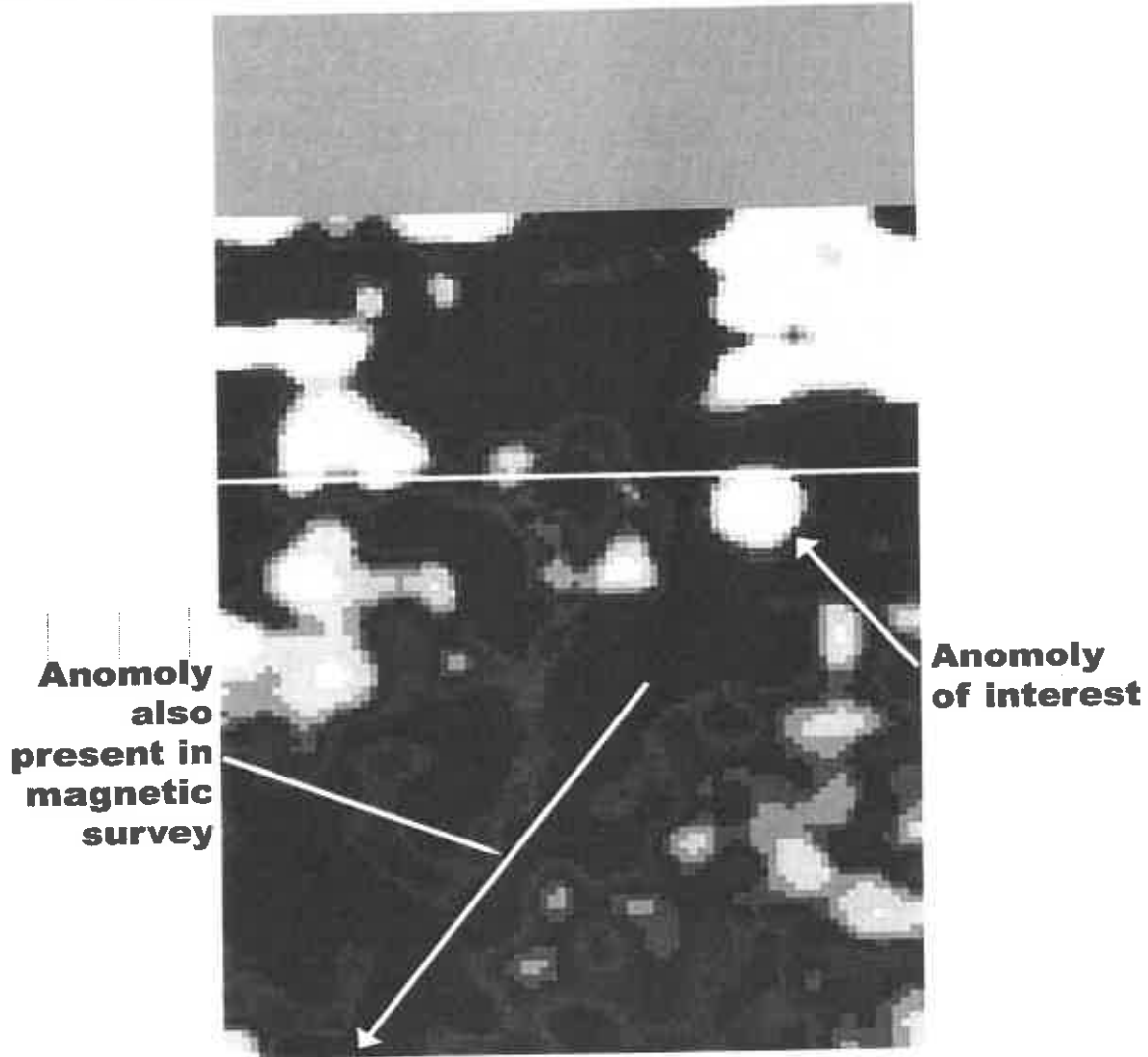
the rental agreement of the instrument expired, it was impossible to survey additional units.

Grid Unit H7 also revealed several interesting results. Readings of the subsurface steel cable were evidence in the southwest corner of the grid. Just off center on the south central part of the unit

was an area of high magnetic readings. Another was evident near the center of the unit (Fig. 19).

The magnetic readings indicated that Grids F6, M8 and H7 in particular merited further investigation. In those units, a soil resistivity survey was conducted before subsurface testing. In Grid M8 where the two apparent anomalies intersected, the results

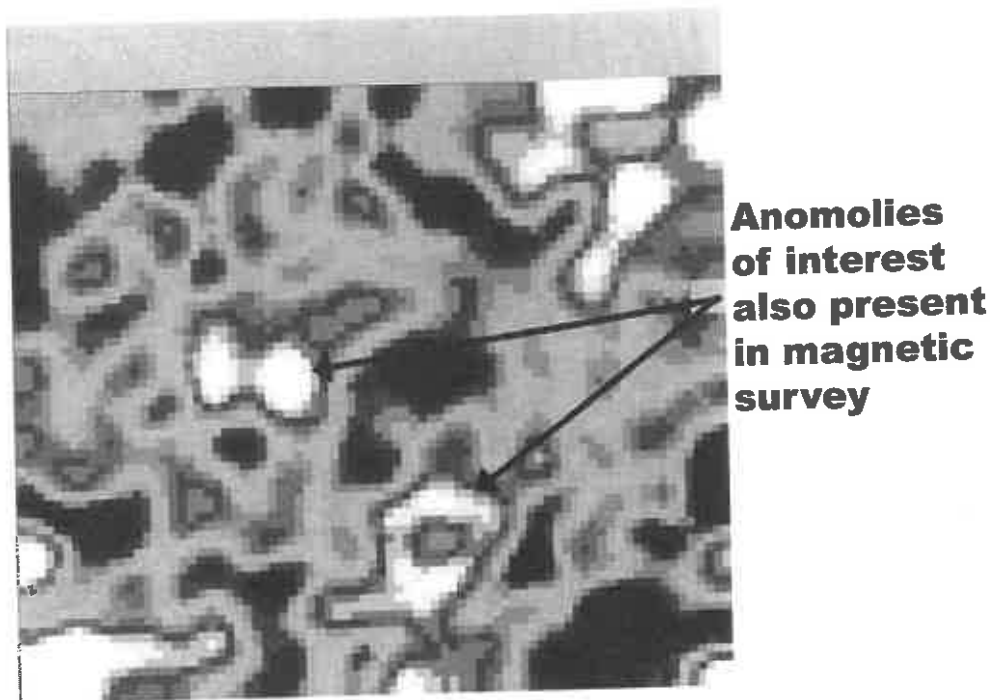
Figure 20: Soil Resistivity of Grid M8 and Part of M7. Measurement in Ohms.



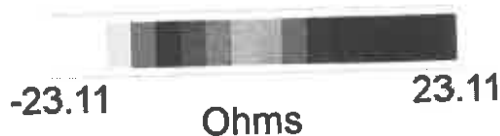
Document: GridM8
Grid Width: 80 (20 m)
Grid Height: 80 (20 m)
Orig. Sample Size: 1.00 x 1.00m
New Sample Size: 0.25 x 0.25m



Figure 21: Soil Resistivity of Grid H7. Measurement in Ohms.



Document: GridH7
Grid Width: 80 (20 m)
Grid Height: 80 (20 m)
Orig. Sample Size: 1.00 x 1.00m
New Sample Size: 0.25 x 0.25m



were revealing (Fig. 20). The anomalies continued to be evident with the resistivity through a circular feature approximately 2 m across. This feature had very low resistance at the intersection point.

The resistivity survey included part of the unit to the north, Grid H7 (Fig. 21), up to a point where high water channel and Russian olive trees made further survey impossible. In Grid H7, the anomalies again continued to be present in the resistivity survey as areas of very low electrical resistance. The southern-most anomaly was more of a donut-shaped reading with the resistivity. When taken together, the anomalies' measurements were intriguing. Von Steuben dictated that the distance between the kitchens and the sinks should be

300 feet and the more southern anomaly in Grid H7 (Fig. 19) is 294 feet and the more northern in Grid H7 is 298 feet away (Fig. 20) from the circular anomaly in Grid M8 (Figs. 18 and 20). These features became high priority targets for subsurface investigation.

Subsurface Testing

Testing was carried out in six grids: F6, M8, O8, O9, P9, and H7.

Grid F6

Metal detector hits and the magnetic survey indicated that Grid F6 had potential for further exploration. A 1 m X 1 m unit was excavated over the magnetic anomaly with a linear northwest-southeast orientation. At 11 cm BGS, the modern steel cable described above was discovered. A number of detector hits were associated with the cable. Another two metal detector hits were associated with more modern artifacts, a hubcap and barbed wire, that were both less than 8 cm BGS (Fig. 22).

Grid M8

The initial subsurface testing focused on the intersection of the two anomalies in Grid M8,

particularly the circular feature identified in the resistivity survey (Fig. 23). At approximately 23-38 cm BGS, there was a significant amount of charcoal inclusions. This fire feature was approximately 2 m in diameter and irregular in shape but generally circular (Fig. 24). The charcoal was small in size with most pieces being smaller than 1 cm in diameter. The feature did not have stones enclosing it as at other known Lewis and Clark sites (Fig. 25). In Unit M8-3C, seven pieces of flat lead with irregular shape and thickness were found approximately 25 cm BGS amid the charcoal inclusions on the western part of the fire feature (Fig. 26). A piece of rolled copper came from Grid M8-14C at approximately 21 cm BGS (Fig. 27).

In Units M8-10C, M8-10D, and M8-13C near the fire feature, relatively small lenses of charcoal were observed approximately 23-40 cm BGS (Fig. 28). Three lenses were discovered in two units. The origin of these lenses is unclear but, given their depth, they appear to be related to the main fire feature. According to the journals

Figure 22: Plan View of Grid F6 Showing Grid F6 and Metal Detector Hits from the Metal Cable.

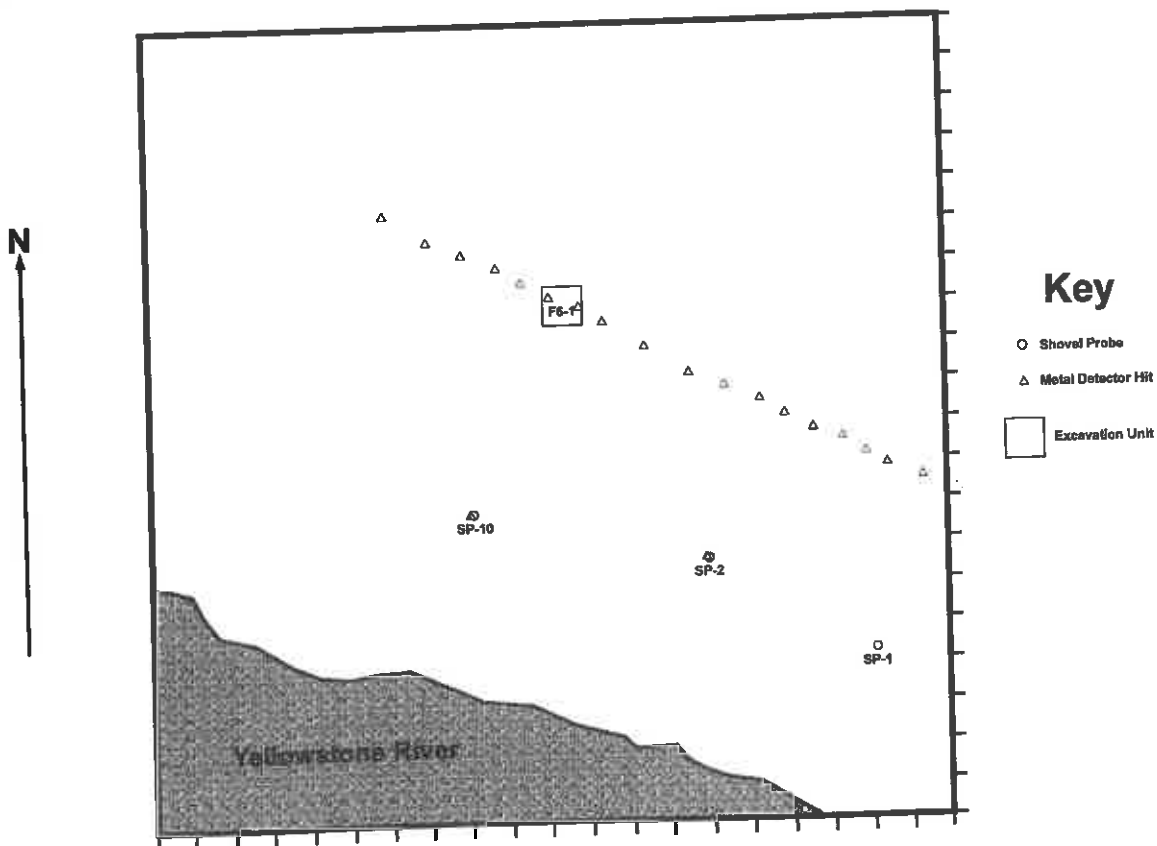
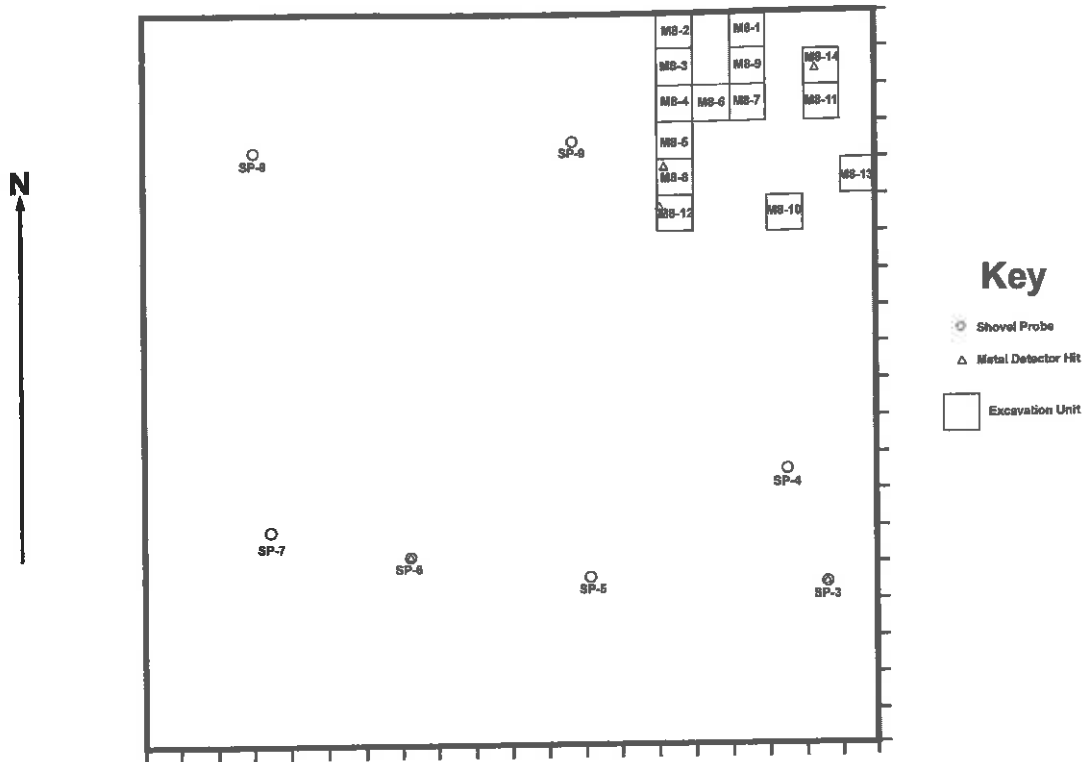


Figure 23: Plan View of Grid M8 Showing Shovel Probes, Metal Detector Hits, and Excavation Units.



of expedition, the Nez Perce Indians had shown the Corps of Discovery how to use fire to construct canoes from cedar for their descent of the Columbia River. It is unknown if the Corps attempted to use this technique on the cottonwoods of Yellowstone River. Walt Martin is a Lewis and Clark expert, who has constructed several canoes including ones for the Ken Burns documentary on Lewis and Clark. Martin does not believe that the Corps could or would have used fire on the cottonwood trees to hollow them out given the amount of water they contain. However, when backfilling our excavation units, some dirt was accidentally spilled from the shovels on the unexcavated surface. The resulting pattern was similar in size and shape to the lens in the excavation units. It is therefore entirely possible, though speculative, that the Corps was attempting to use fire regardless of its efficacy as a technique on cottonwoods, taking coals out of the main fire and putting them into the trees. Alternate activities undoubtedly can also explain the lenses.

Additional shovel probes in Grid M8 were exploratory or focused on metal detector hits to gain a better understanding of the stratigraphy of the site. Most of those focusing on metal detector hits revealed modern artifacts associated with agriculture at a depth of less than 20 cm, commonly pieces of barbed wire. Some were corroded beyond recognition. Others were false positive readings where no metal was discovered. Fourteen meters to the southwest of the circular anomaly in Grid M8, a large mechanical bolt was discovered approximately 15-18 cm below ground surface giving a relative date, which for the agricultural level. Another modern machined nut was discovered 2 m to the south of the fire feature at 17 cm BGS. Since there is good evidence grid M8 was plowed in the late nineteenth and early twentieth centuries, it is reasonable to assume that the plow zone may have reached 15-25 cm below that depending upon the equipment used. If so, at least part of the fire feature would likely have been disturbed by the plow, accounting for the irregular shape and the small size of the charcoal inclusions

of both the fire feature and lens in close proximity. It may also account for lack of stones around the feature if the farmer chose to remove them from the area. That remains conjecture, however.

A buckle was discovered in excavation unit M8-8C just over 23 cm BGS (Fig. 29). The buckle is comparable to ones found in Revolutionary War contexts. Regrettably, this buckle is not sufficiently diagnostic as buckles have not changed much since the Bronze Age. It is entirely possible that it could be associated with the Corps of Discovery, especially since it was found in a context 5-7 cm below that of the machined bolt and nut in an adjacent grid unit (M8-11B). However, it is equally possible that it could be associated with the agricultural use of the site at a time when animals provided labor. Given that its context was within the speculated plow zone, it may also have been disturbed vertically.

Analysis for Grid M8

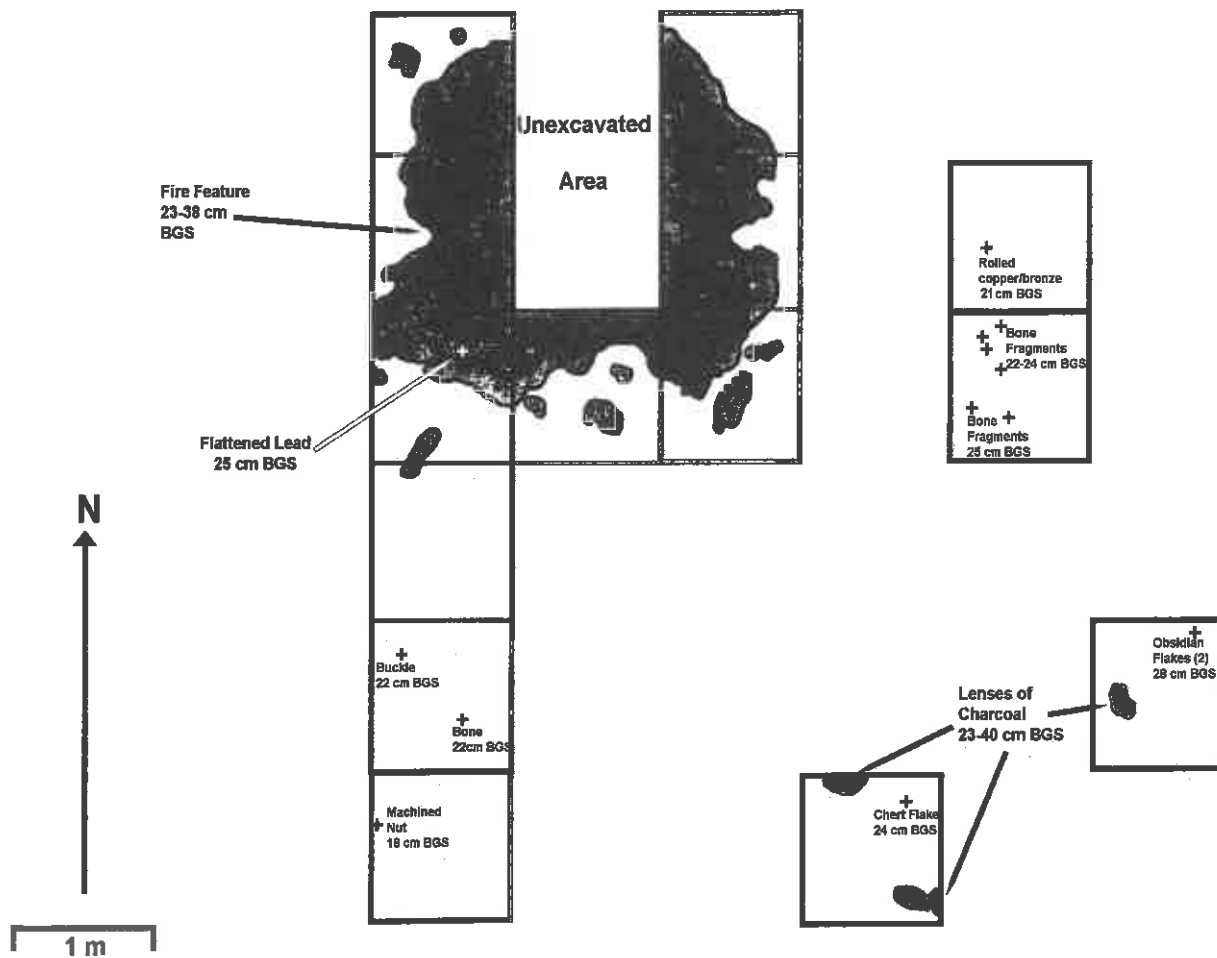
Specialized analysis included radiocarbon dating, and testing of lead artifacts, soil mercury, and animal bone identification.

Radiocarbon Dating

With support from the National Park Service, selective samples were radiocarbon dated to provide contextual dating (Table 2). Samples were submitted to NSF Accelerated Mass Spectrometry Laboratory at the University of Arizona, which provided testing and statistical analysis.

Samples of charcoal from the Grid M8 fire feature and adjacent lenses (Fig. 24) as well as selections from the bone fragments were sent for C14 dating at the University of Arizona's AMS facility (Table 2). Four samples were submitted with the results

Figure 24: Plan View of Grid M8 Showing the Fire Feature, Charcoal Distribution, and Artifacts.



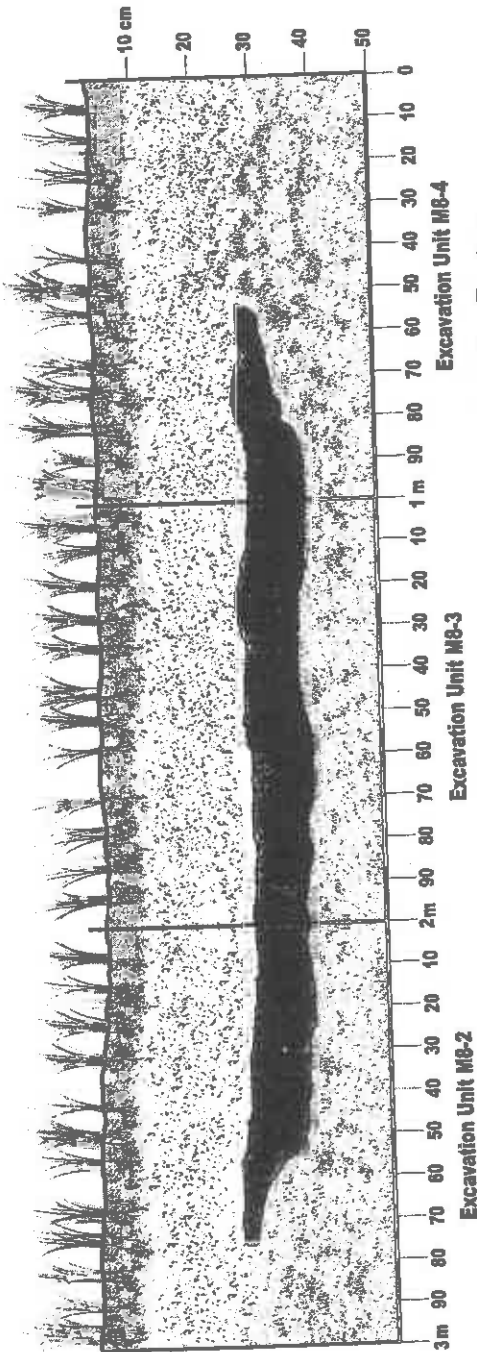


Figure 25: Profile of South Walls of Units M8-2, M8-3, M8-4 Showing the Buried Fire Feature.

providing broad date range when calibrated for atmospheric carbon. Dates in radiocarbon years of less than 200 years fall into a period of fluctuations in the C-14 level in the atmosphere due to competing effects of fossil fuels from the industrial revolution in addition to "dead" carbon and increased industrial production in the eighteenth century was well as low solar activity. Results of approximately less than 200 radiocarbon years before present give

values with multiple intercepts to the calibration curve and, therefore, often just the entire range is quoted. All the samples from Unit M8 fall within this range and the calibrated age indicate that, while difficult to narrow down more exactly, are nonetheless within an acceptable range to be associated with the Corps of Discovery. At the same time, the range is so broad that the dating is not in any way conclusive.

Lead Isotope Analysis

Eight lead artifacts were found (seven in one group and one lead ball). With the aid of the National Park Service, one of the seven and the lead ball were analyzed by Geocron Laboratories in Chelmsford, MA, for their isotope signatures (Table 3). Lead provides a chemical isotope signature that can be compared with other samples to determine relation to or even the location of the original mine. The isotopes are extraordinarily stable and little can be done to alter the signature. Samples can be melted and cooled an unlimited number of times and the isotope ratio will remain constant. The only use that may alter the signature would be to mix the molten lead with another lead sample with a different signature.

Figure 26: Flatten Lead Fragments Found in Unit M8-3C Approximately 25 cm BGS.

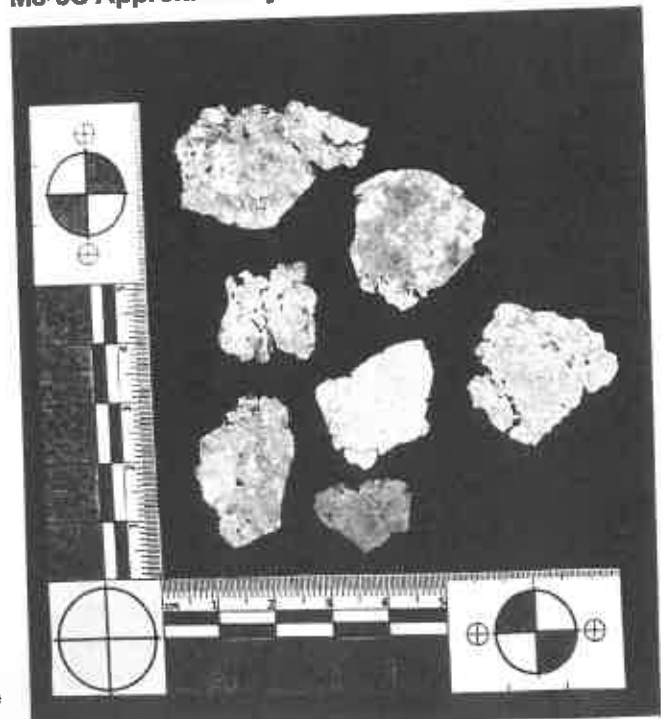


Figure 27: Rolled Piece of Copper Found in Excavation Unit M8-14C.



The lead samples were analyzed and compared to lead artifacts from Traveler's Rest (near Lolo, Montana, a known and confirmed campsite of the Lewis and Clark Expedition) and Fort Clatsop (a known site of the Lewis and Clark Expedition, though the exact location of the latter camp remains unknown). The results were also compared to the most complete database of 3,458 lead isotope signatures collected by Bruce Doe and Randal Rohrborough of the United States Geological Service (USGS) and referred to as the Doe Database (Doe and Rohrborough 1977).

Lead isotope testing was performed to determine the chemical signature of the lead in comparison with other artifacts from Traveler's Rest and Fort Clatsop (Table 3). The instrument used to measure the lead-isotope ratios has a margin of error of 0.1. The isotope signature of these fragments had no correlation with any known lead artifacts from other known or presumed Lewis and Clark sites. Its origin and use remains unknown. Its association with the Corps of Discovery cannot be definitively made at this time. If lead artifacts are found in the future at other Lewis and Clark sites, that may change. But at this time, any association with the expedition must be rejected.

Trace Mercury Analysis

To independently verify the field results for trace mercury in the laboratory, soil samples were taken to the Montana State University

Billings Science Department for additional testing as a blinded control study as well to measure background mercury in the soil. At Travelers Rest, samples were submitted to Energy Laboratories in Billings, MT to evaluate for total mercury through high temperature testing. However, the method required more mercury than was present in the soil, thus not providing viable results (Hall et al. 2003:127). At the proposed Canoe Camp site, positive samples were taken to the campus' electron microscope, which can measure all the elements of any sample. Once a sample is placed into the chamber, a vacuum is created before readings can be taken. Unfortunately, the results were inconclusive given the volatile state of mercury. In such trace amounts, the mercury was likely removed during the process of creating the vacuum. The amount of mercury measured with the MVA was therefore not sufficient to produce a detectable reading in the microscope. As at Travelers Rest, MVA seems to be the best method for measuring positive trace mercury at Lewis and Clark Sites.

Faunal Material

Excavation units adjacent to and in proximity to the Grid M8 fire feature (Fig. 24) revealed several bone fragments, one with butcher marks. All were found within four meters of the fire feature. The bone fragments were taken to the Montana State University Billings Science Department's vertebrate zoology and human/animal physiology specialists. The small nature of the fragments

Figure 28: Oblong Lens of Charcoal in Excavation Unit M8-10D.

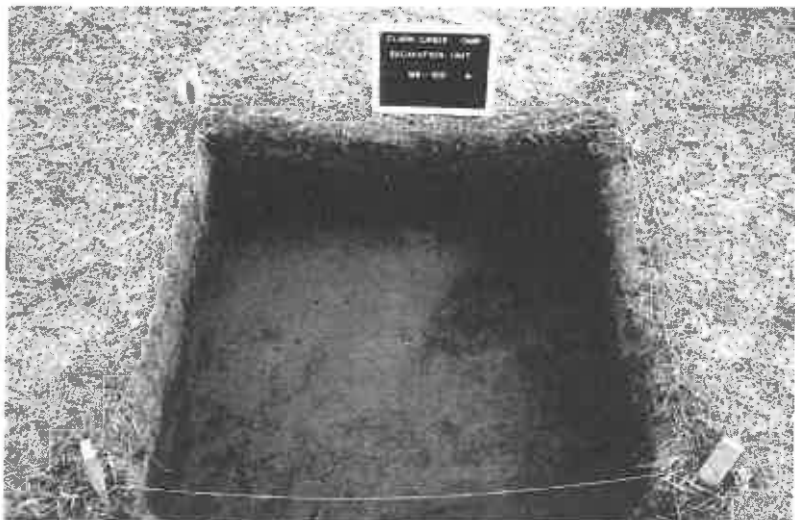
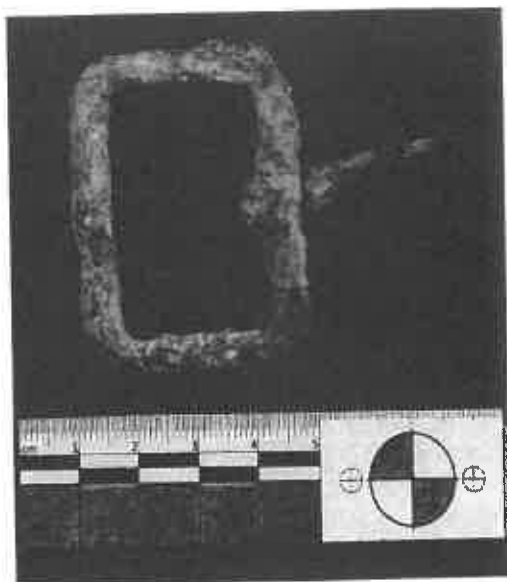


Figure 29: A Plain Buckle Found in Unit M8-8C.



prevented positive identification. The two narrow pieces (Figs. 30 and 31), possibly related, were identified as possibly either a radius or alternatively rib bones of a small to medium sized mammal, possibly fox, coyote, or beaver. One bone (Fig. 31) has at least one straight edged butcher mark near several small indentations indicating cultural modification. There are butcher marks near the mid-point of the extant shaft. A larger long bone, perhaps a humerus or femur of a larger mammal (deer, antelope, or small elk) had a reconstructed bone diameter of the bone of 3.4 cm. Another fragment has a protrusion on one side around a rough or "spongy" area, common with skull

fragments. The rest were unidentifiable given their fragmentary natures.

A fragment of bone from Unit M8-8C was approximately 52 cm from the corroded buckle (see Fig. 29). Given its association with the artifact, a sample was sent for radiocarbon testing and returned a date of 218±30 B.P. and a date of A.D. 1767 to 1827 was found in Unit M8-11C. When calibrated to the atmospheric carbon curve the date range is much larger with a 95 percent probability of A.D. 1669-1944.

Another bone was identified as a fragment from a long bone of a medium to larger mammal, perhaps deer, antelope or possibly a small elk or bison calf. Since the marrow cavity was evident, the internal radius could be extrapolated to determine the circumference of the bone. The marrow cavity had a radius of 1.3 cm with a total diameter of 2.6 cm. Since the bone fragment had a thickness of 0.8 cm, the total diameter of the bone would have been 3.4 cm.

Subsurface Testing Grids O8, O9, and P9

One of the main activities at the Canoe Camp as recorded in the journals was the gathering and processing of meat. The military regulations used by the Corps stated that animals were to be butchered and waste disposed of 50 paces from the kitchen. Assuming that the fire feature is the kitchen, the processing site could be identified with relative ease. West of the fire feature seemed

Table 2. Radiocarbon Dates from Clark's Canoe Camp (24ST0720).

Excavation Unit	Description	C14 Age Before Present	Calibrated Age 1 Sigma (68% probability of date range)	Calibrated Age 2 Sigma (95% probability of date range)
M8-1C	Charcoal from fire feature 28 cm BGS	169±30	A.D. 1668 to 1951	A.D. 1660 to 1953
M8-10C	Bone fragment found 20 cm BGS	218±30	A.D. 1649 to 1950	A.D. 1643 to 1950
M8-11D	Charcoal fragment from lens found 25 cm BGS	137±30	A.D. 1679 to 1939	A.D. 1669 to 1944
M8-8C	Bone fragment found 22 cm BGS	147±30	A.D. 1671 to 1943	A.D. 1667 to 1950

Table 3. Lead Isotope Signature Analysis in Relation to Artifacts from Other Lewis and Clark Sites and the Closest Signatures from the USGS Doe Databank.

Location	Locality Name	206/204Pb	207/204Pb	208/204Pb	Reference
Montana	Canoe Camp M84C	15.908	15.459	35.617	Doe Data Bank (1977)
New Hampshire	Ruggles Mine	18.55	15.8	38.34	Doe Data Bank (1977)
North Carolina	Unknown	18.43	15.71	38.4	Doe Data Bank (1977)
Arkansas	Montgomery County	18.36	15.61	38.56	Doe Data Bank (1977)
Connecticut	Roxbury	18.38	15.7	35.5	Doe Data Bank (1977)
Maine	Denboe Point	18.4	15.7	38.5	Doe Data Bank (1977)
Massachusetts	Quarry	18.41	15.75	38.43	Doe Data Bank (1977)
Utah	Deer Trail Mine	18.37	15.75	38.51	Doe Data Bank (1977)
North Carolina	Yancey County	18.34	15.61	38.2	Doe Data Bank (1977)
Kentucky	Clover	18.38	15.59	38.2	Doe Data Bank (1977)
Montana	Canoe Camp SP18	18.395	15.641	38.407	Geochron Laboratories (2013)
Montana	Travelers Rest #324	18.535	15.632	38.457	Geochron Laboratories (Hall et al. 2003)
Kentucky	Olive Hill	18.55	15.65	38.47	Doe Data Bank (1977)
Kentucky	Olive Hill	18.55	15.65	38.54	Doe Data Bank (1977)
England	Isle of Man	18.3	15.52	38.22	Doe Data Bank (1977)
England	Lake District	18.3	15.6	38.36	Doe Data Bank (1977)
England	Shropshire	18.38	15.61	38.32	Doe Data Bank (1977)
England	North Midlands	18.48	15.62	38.48	Doe Data Bank (1977)
Canada	Kootenay	18.37	15.69	38.42	Doe Data Bank (1977)
Canada	Kootenay	18.48	15.72	38.42	Doe Data Bank (1977)
Oregon	Fort Clatsop	20.368	15.792	39.399	Geospec Consultants Ltd. (Hall et al. 2003)

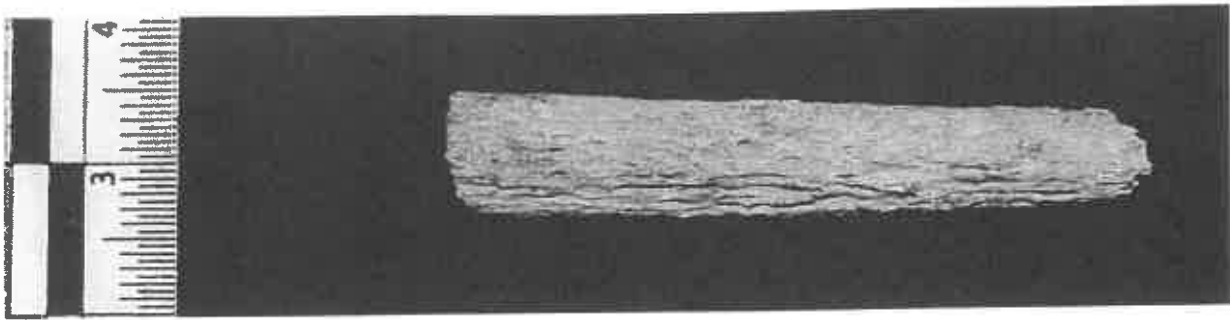
unlikely given that 50 paces put the site within 20 feet of the speculated latrine. If the processing site was to the north of the fire feature it would have been destroyed by the erosion of the Yellowstone River as the area is heavily scarred from numerous flood events and at one time contained the main channel of the River. The south had minor flooding damage and was also covered by a thick cover of Russian olive undergrowth. Therefore, 50 paces were marked off in an arc to the east. In total, seven exploratory shovel probes were dug in Grid O8, O9, and P9 to a depth of 70 cm BGS (Fig. 32). Only one of the shovel probes yielded an artifact. Shovel Probe 21 had a small bent metal artifact located in situ at 23 cm BGS (Fig. 33). Given the level of corrosion, its identification is impossible. All of the shovel probes in this area had silty clay for up to approximately 30 cm +6 cm BGS and then changed to sandy loam.

However, the Corps may not have been processing game according to the regulations. Excavations at Lower Portage Camp near Great Falls, MT revealed that faunal material was not localized in one area but rather distributed widely throughout the excavations (Karsmizki 1990:40). No bones were found in Grids O8, O9, and P9 but several were found near the fire feature in M8. If the bones are associated with the Corps, the same pattern appears to be replicated here. This would further suggest that the party did not butcher animals at one specific location as suggested by the military regulations and confirm the conclusions drawn at Lower Portage Camp.

Subsurface Testing Grid H7

The anomalies in Grid H7 were the other main focus of attention. Excavations focused on the two anomalies noted in the magnetometer

Figure 30: Possible Rib Fragment from Grid M8.



and resistivity surveys. The features left only very slight traces visible during excavation. At approximately 28 cm the soils produced modeling of slightly darker colors that became more distinct with depth, producing a type of calico coloring (Fig. 34).

In excavation unit H7-6C in the more northern anomaly, a piece of strap metal was discovered approximately 23 cm BGS. The strap metal was approximately 9 cm long and 1.75 cm wide. The artifact was pointed at one end and broken at the other. It had at least one machined hole approximately 0.45 cm in diameter near the pointed end and possibly another through the broken end. The large machined hole appears to have been created at the time of manufacture (Fig. 35).

The broken end had a partial circular cut through the metal almost the full width of the object. Along the length of the artifact a small indentation appears to have been filed into the object. The modification is rougher and newer than the holes and circular depression. One of the long sides has been filed after its production, seen as the notch on lower part of Figure 35.

Neither the artifact's identification nor its possible association with the Corps of Discovery is certain, despite it being found near the same depth as the musket ball approximately 5 meters away. It may be a piece of a strap hinge or possible agricultural equipment. It does share similarities with the tail of the trigger guard of a reproduction 1795 musket (Fig. 36) and could be related to another type of firearm of the Corps, but that is speculative at best. The large screw seat on the trigger guard is similar,

but not exact, in size to the large screw holding the original trigger guard in place. Examples from other weapons were not available.

The identification of this artifact is difficult to ascertain given its fragmentary nature and the fact that it appears to have been modified at least once. If it were part of a 1795 musket, an association with Clark and his men could be made but would admittedly be conjectural at best. Yet, it is entirely possible that it may also be of more modern origin and not associated with the Corps of Discovery despite being found at a similar depth to a musket ball approximately 5 meters away that has a greater confidence of being associated with the Corps based on its chemical signature.

The two features (Fig. 37) noted in the magnetic and resistivity survey in Grid H7 merited further exploration. Both were found near a number of what initially appeared to be false positive metal detector

Figure 31: Close-up of Bone found in Unit M8-11C. Note the Butcher Marks.

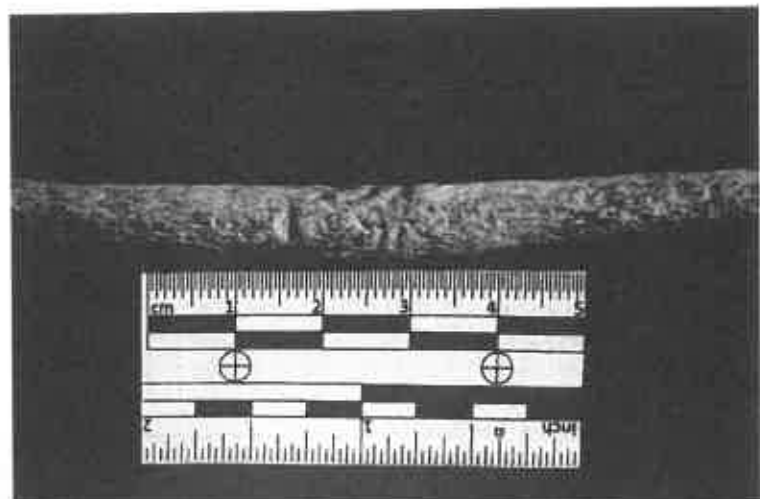
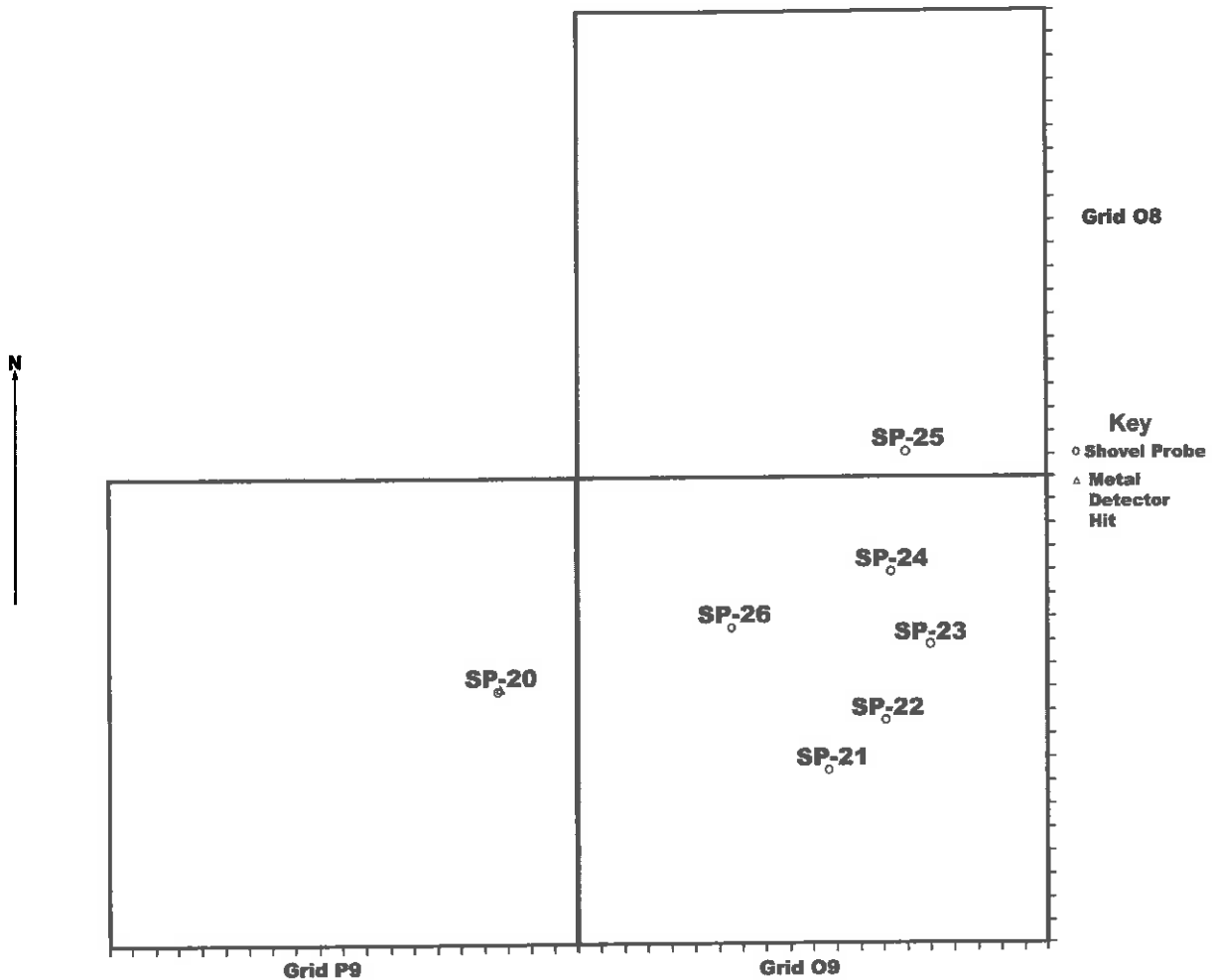


Figure 32: Plan view of Grids O8, O9, and P9 Showing Shovel Probes.



hits. Subsurface excavations revealed modeling approximately 30 cm BGS resulting in a type of calico colored features. The color is exaggerated for clarity. These units were systematically tested for traces of elemental mercury in a grid design.

A two-phase methodology was borrowed from excavations done at Travelers Rest near Lolo, MT. Soil was tested every 10 cm in situ by creating a hole in the unit floor and the sensor entered into the hole as a reading was taken. Given the early date and the low temperature of the ground soil (approximately 43 degrees), the temperature was not sufficient to vaporize the mercury for detection by the instrument. Positive mercury samples did not always correspond to the features.

However, the second phase of the methodology compensated for this through an ex situ method.

Samples were taken from the floor of each unit level and placed directly into a clean ziplock bag and sealed. The sample was then warmed with a field crewmembers hands. The instrument's sensor was then placed in the bag and the bag sealed as readings were taken. At depths between 30 and 50 cm BGS, samples returned positive readings of between 0.003 and 0.014 milligrams of mercury per cubic meter in the excavation units. Given the time pressures, the methodology was modified to economically determine the complete horizontal extent of the mercury readings. Additional samples were taken in an ex situ manner from shovel probes and small soil probes. Samples were taken every 10 cm depth, placed in a new ziplock bag, agitated, and read with the instrument (Fig. 38). Positive readings between 30 and 50 cm BGS were located roughly corresponding with the

Figure 33: Piece of Metal with Unknown Function Found in SP 21.



anomalies identified in both geophysical surveys (Fig. 39).

The discovery of the localized mercury, almost exactly 300 feet from a fire feature, would lend itself to interpreting the site as associated with the Corps of Discovery since it conforms to the military regulations and other Lewis and Clarks sites excavated at Lower Portage Camp and Traveler's Rest (Hall et al. 2003; Karzminski 1990). Unlike Traveler's Rest, the localized mercury is not located in a feature that has a distinctly linear orientation (Hall et al., 2003: 110-126). Rather it would appear to be in an irregular modeling of the soil.

One shovel probe (SP16), just over 2 m to the west of the southern-most mercury laden feature, contained a spherical piece of lead measuring .375 inches on one axis and .376 on the other (Fig. 40). It appears to be a musket ball of approximately .375 caliber. The caliber does not match any of the known weapons of the expedition, though

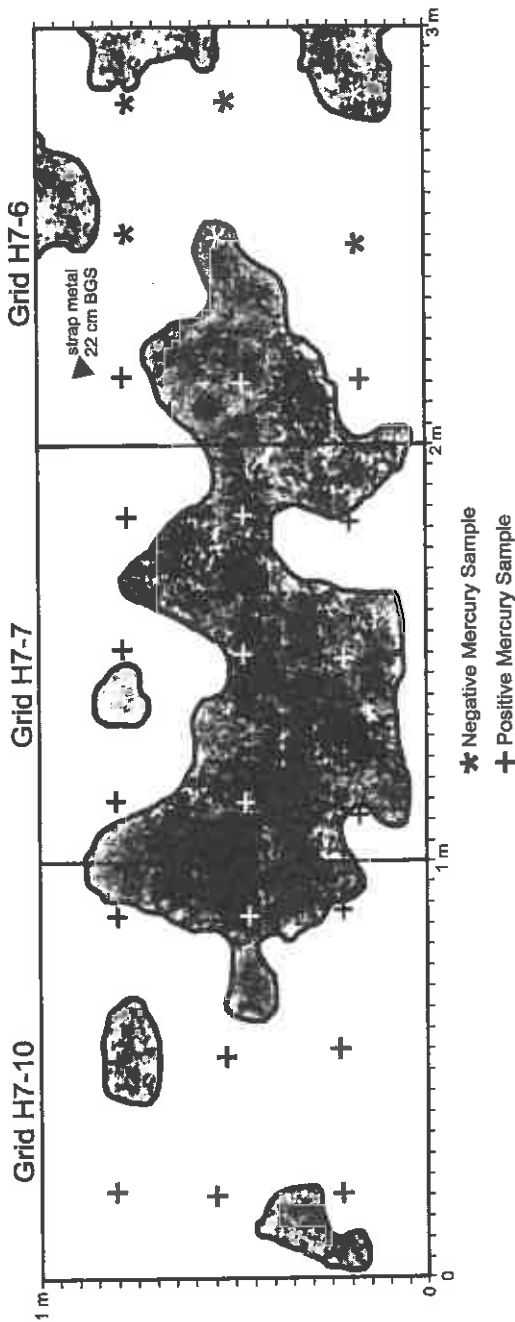
admittedly there is not a comprehensive list (Garry 2012: 33). Initially given its ambiguous caliber, much like the buckle, it was not diagnostic enough to build an argument for the site being the actual site where Clark built the canoes. However, in 2013 the National Park Service paid for laboratory analysis to be done on it as well as another sample of found near the fire feature. The lead ball is designated Canoe Camp SP18 (Table 3; Figs. 41 and 42). The results indicate that the lead ball has an isotope signature that is consistent with Artifact #324 at Traveler's Rest (Lockman 2006). In Figure 42, the crosses indicate the artifacts found near Lewis and Clark contexts. The circles indicate other samples from the Doe Data Bank (USGS 1997). The circles represent the closest signatures to Artifact #324 from Traveler's Rest and the lead ball from the Canoe Camp.

Artifact Depth Analysis

The depth of the artifacts across the site was presumably affected by agricultural use in the eastern portion of the site but not the western. Still, it is worth examining the effects that plowing may have had on the distribution of the artifacts. Up to 18 cm BGS, in the plowed area (Grid Units M8, P8, O8, and O9) and 15 cm BGS in the unplowed areas (Grid Units H7 and F6), clearly modern debris was uncovered. It is not clear if the modern debris was itself in the plow zone. Two potential plow zones could exist, one slightly higher than the other. Taking the shallowest clearly modern artifact as the first potential surface and projecting 15 cm below that gives the first plow zone. Using the bottom-most modern artifact as the second marker and projecting 15 cm below that gives a second potential plow zone.

Both zones overlap between 18 and 25 cm BGS (Fig. 43). Only the eastern portion of the site was known to have been plowed until at least the early 1940s. Where the two potential plow zones overlap (shown in dark grey), there is a higher probability that artifacts were affected by plowing. In this high probability zone are found nearly all the artifacts around the fire feature including the buckle, the rolled copper, the chert flake and the

Figure 34: The Smaller of the Localized Mercury Features Located Just West of Center of Grid H7 at Approximately 30 cm BGS. Note the Strap Metal Location in Grid H7-6.



bone fragments, one of which radiocarbon dates to 218±30 BP. The higher plow zone would also include the clearly modern debris but only affect the upper portions of the fire feature and lenses. The lower plow zone, however, would have greatly affected the fire feature and all of the charcoal

lenses as well as the obsidian artifacts. Yet, the stratigraphy of the excavation units in Grid M8 suggests a soil interface of the plow zones at approximately 24 cm BGS and thus the higher plow zone seems more likely. All the potential Clark artifacts in the eastern part of the site (which was plowed) are where the two hypothetical plow zones overlap and so have a high probability of disturbance. At the same time, they are also more or less at the same depth as the less ambiguous lead ball in the western part of the site.

Despite the high probability that the artifacts found near the fire feature have been affected by plowing, it is interesting to note that the definitively modern artifacts are found no lower than 18 cm BGS in both the plowed and unplowed areas. The more ambiguous artifacts are located 22 cm BGS or lower in all units. In the unplowed Grid Unit H7, the musket ball, whose chemical signature implies a high level of confidence of being associated with the Corps of discovery, was found at nearly the same depth as the buckle, the copper, and the bone fragment with an uncalibrated date of 218±30 B.P. in Grid M8.

NATIVE AMERICAN COMPONENT

Two units revealed reduction flakes. In Unit M8-10C, a pink, 3.4 cm long chert flake was found approximately 24 cm BGS. In Unit M8-13C, two pieces of obsidian shatter came from 28 cm BGS approximately 2 m from the fire feature. These artifacts suggest there was a Native American component to the site. The journals noted the presence of Indians including Charbonneau seeing an individual on a bluff across the river, the stealing of a significant part of the pony herd, and Sergeant Shields finding a piece of "roab" and a worn out "mockerson" that he assumed was worn shortly before (William Clark 23 July 1806 in Moulton 2003 Vol. 8:211). It is therefore very likely indigenous people visited the site near the time, before, or after the Corps would have been there if the site has an association with it. If no association can be made, then the only conclusion that can be drawn is that there is a Native component.

DISCUSSION

Archaeological evidence from site 24ST0720 is evaluated first by what we can learn from the written records, both from the Lewis and Clark

Figure 35: Strap Metal Artifact Showing Filed Indentation and Drilled Hole.

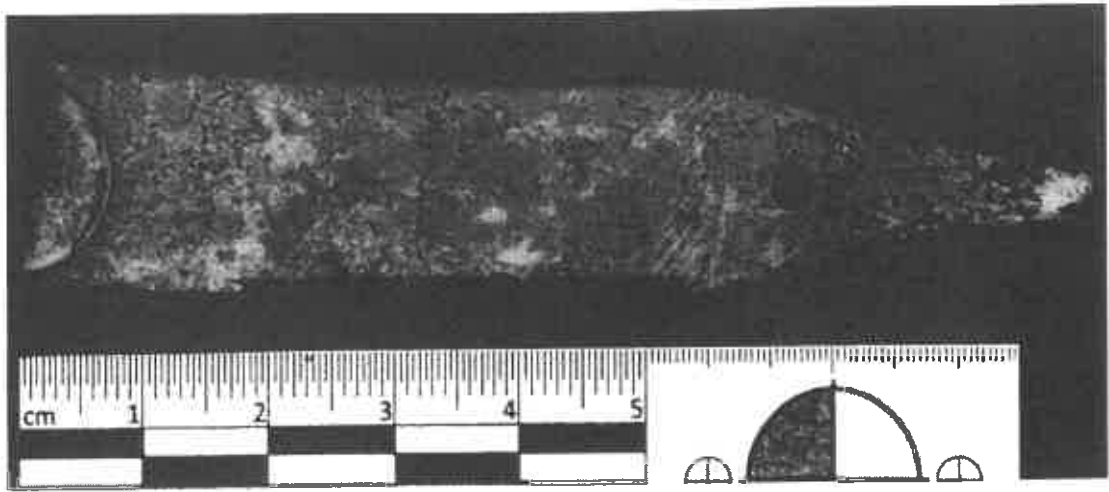
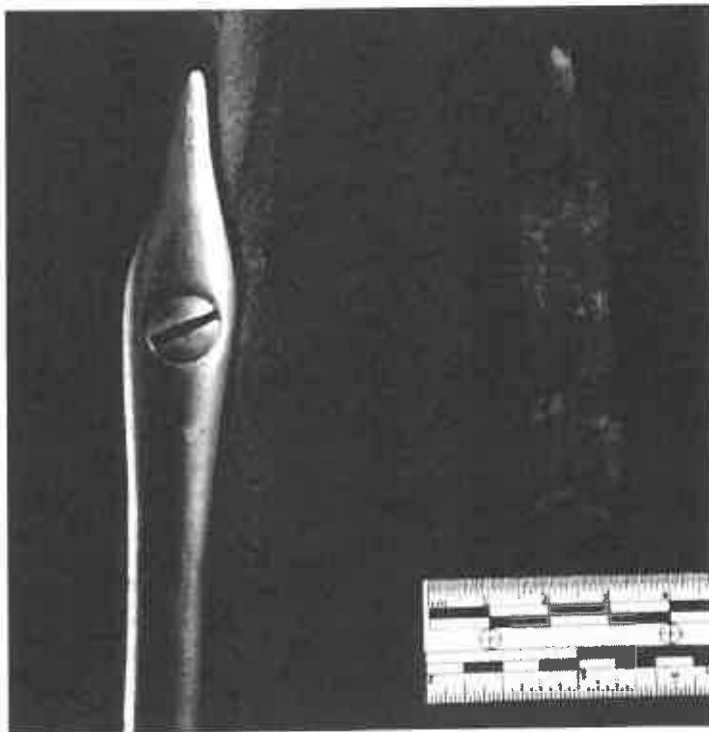


Figure 36: Strap Metal Artifact from Unit H7-6C Beside the Trigger Guard Tail on a Reproduction 1795 Musket.

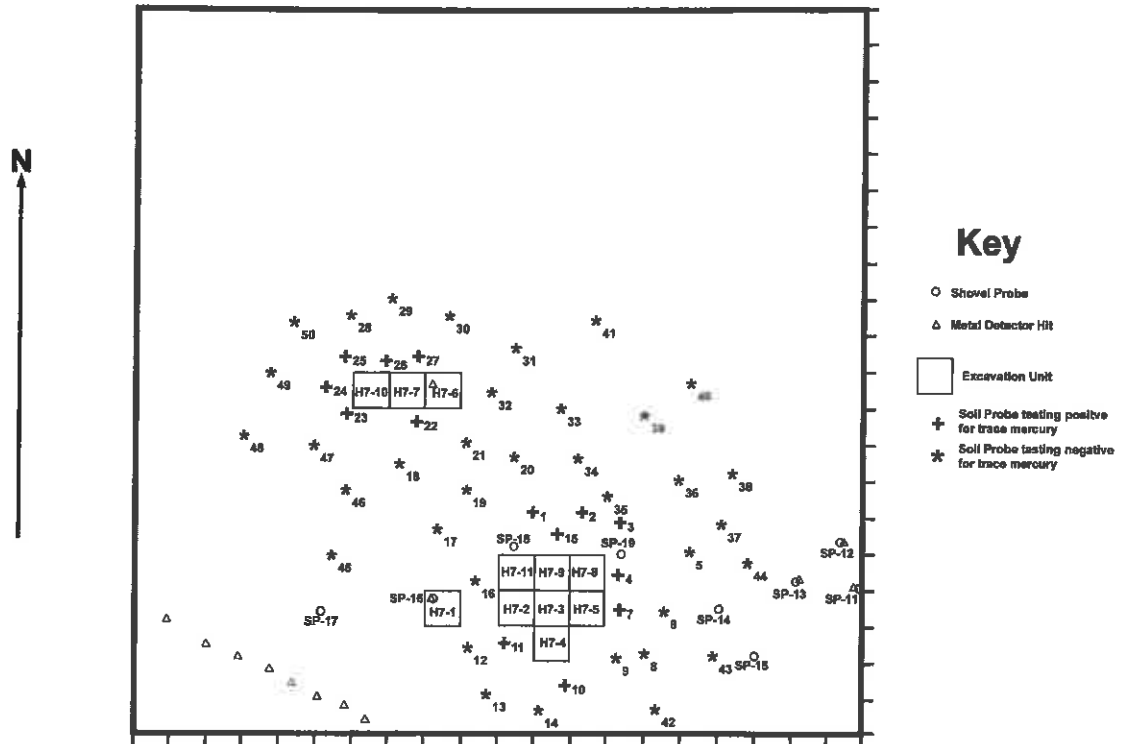


expedition and other sites of the period. Then the results of the current investigation are compared to what we have learned about the expedition from identified Lewis and Clark sites.

Correlation with the Journals and Other Literary Evidence

The features and artifacts found at the site have a striking resemblance to the literary evidence of the expedition. The site matches both the location and geographic descriptions, such as the “black bluffs,” as determined from the data in Clark’s maps and survey logs. Both mercury and lead were found where Clark’s camp symbol was geo-referenced to the earth. The presence of mercury in features approximately 300 feet from a fire feature corresponds to the military regulations of the time and other known Lewis and Clark sites. The fact that there are two features with mercury corresponds to the military regulations that latrines “are to be filled up and new one dug every four days, and oftener in warm weather” (Steuben 1985:83-84). Given that they would have been on site in July, the weather can reasonably be expected to be warm with the average daily high temperature being 30 degrees Celsius or 87 degrees Fahrenheit (2010 U.S. National Climatic Data Center). The presence of

Figure 37: Plan View of the Entire Grid H7 with Soil Probes Tested for Mercury Noted. Note the Positive Mercury Samples near the Features Identified in the Magnetic and Resistivity Surveys.



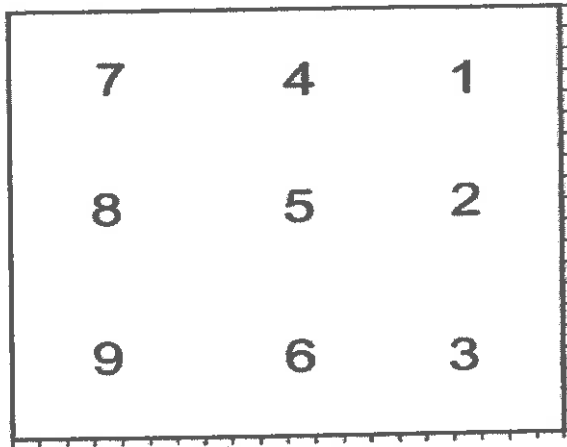
mercury in and of itself is significant as mercury is generally considered positive proof for the Corps' presence. The lead ball with a chemical signature statistically identical to an artifact from a context that is believed to be associated with a Lewis and Clark context at another site, is even more significant. Taken together, there are a number of correlations that seem more than coincidental. That being said, the problem with historical "program archaeology" is the tendency to look for what is in the text and interpret the "finds" only in light of the text, and thus have a built-in bias.

However, at the same time, the material and literary record can compliment each other and, for this project, every effort was made to try and mitigate any bias of program archaeology. The discovery of the lead ball with a high probability of being associated with the Corps perhaps requires reexamination of the journals and other sources in ways not done before. Despite increased confidence that the lead ball was associated with the expedition, the question still remained as to its caliber. It still seems most logical that the ball was made

to be used in a firearm not previously recorded, presumably of private ownership. However, lead balls of the same caliber are commonly found on Revolutionary War sites as part of a shot called "buck and ball," which consisted of between three and six small balls and one large ball placed in an unrifled musket (Sprouse 1978:37). This led to a re-examination of the evidence and the journals and other historical literature in order to explore the data even further.

The use of shotguns for military purposes has a uniquely American background given their usefulness in hunting on the frontier. Their transition to military uses was only natural and is well documented (Moller 2011:10). The most common military use was the blunderbuss, a weapon also known to have been taken by the Lewis and Clark Expedition but not present with Clark at the proposed campsite in 1806. However, in relation to muskets, the historic sources and archaeological literature significantly more reference to buck shot in a load known as "buck and ball" than simply buckshot. Buck and ball was

Figure 38: Mercury Sampling Pattern for Excavation Units.



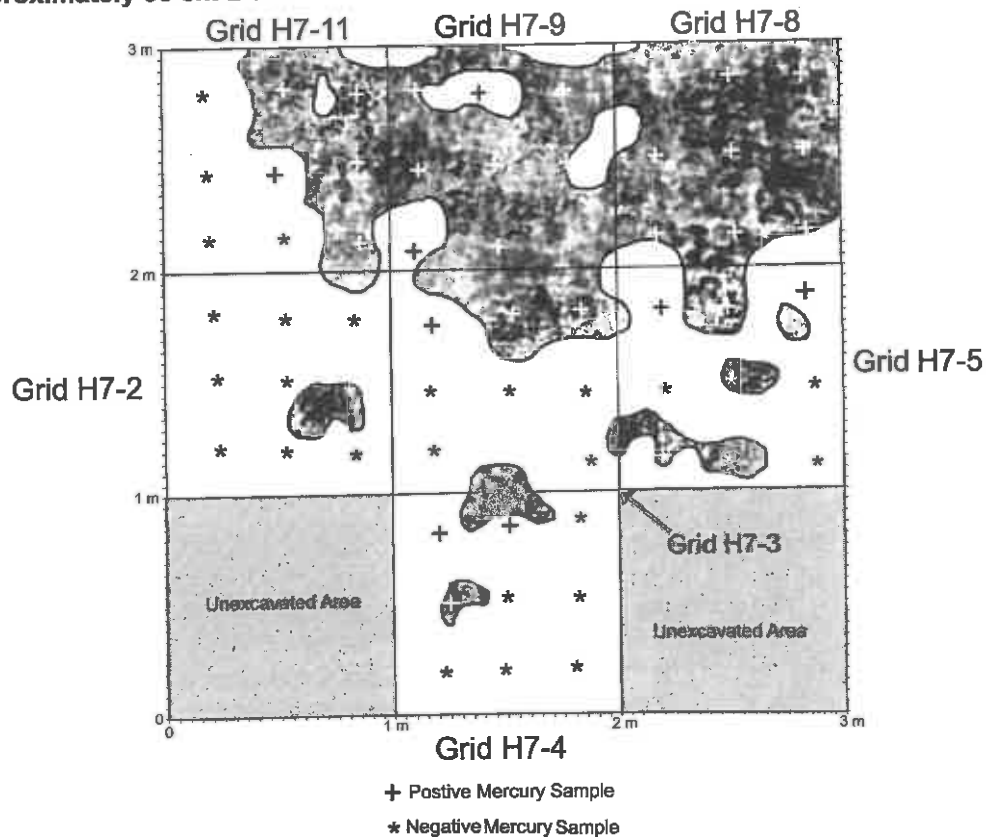
a common tactic used by American troops from the Revolutionary War through the Civil War. The concept is relatively simple. Using a smoothbore musket of large caliber, usually .69 or .75 cal, buckshot of between .30 and .38 cal were placed behind a larger musket ball that acted as a gas

seal. Alternately, with premade paper cartridges, the small balls could be placed in front of the larger ball. Either method provided the same result. Since smoothbore muskets were remarkably inaccurate, this method was designed to compensate by firing a larger number of projectiles at the target. The intent of the buck and ball load was to combine the devastating impact of the full-size ball with the spread pattern of a shotgun and improved the hit probability of the smoothbore musket (Moller 2011:488). The average range of Revolutionary War buckshot found at archaeology sites is between .330 and .380 cal. (Sprouse 1978:37).

George Washington was strong proponent of the buck and ball loads. From his field Headquarters in New York on 29 June 1776, Washington issued an order that he:

... expects that all soldiers, who are entrusted with the defense of any work, will behave with great coolness and bravery, and will be particularly careful not to throw away their fire--he recommends to them

Figure 39: The Smaller of the Localized Mercury Features Located Just West of Center of Grid H7 at Approximately 30 cm BGS.



to load for their first fire, with one musket ball and four or eight buck shot, according to the size and strength of their pieces; if the enemy is received with such a fire at not more than twenty or thirty yards distance, he has no doubt of their being repulsed (General Orders, 29 June 1776 in Fitzpatrick 1933 Vol. 5:198).

By 1777, the buck and ball method became standard. Washington issued orders from his General Headquarters that "buckshot are to be put into all cartridges which shall hereafter be made" (George Washington to Brig. General Alexander McDougall, 18 April 1777 in Fitzpatrick 1933 Vol. 7:431). The resulting cartridge would appear something like Figure 44.

The practice became wide spread. A recruit to the Continental Army reported in 1777 that he was issued 64 rounds of ammunition. Each round would include three buckshot in addition to the main ball. The three shot/one ball type of load became the standard after the turn of the 19th century (Peterson 1968:60).

Archaeology elsewhere has discovered the use of buck and ball in several contexts. Most clearly, in 2012, a shipwreck off the coast of Florida was excavated and believed to be a British ship that foundered in a storm on New Years Eve in 1782. One of the artifacts found on board included a Brown Bess musket that when x-rayed showed it was still loaded with buck and ball, indicating that the method was in use by the British as well as the Americans (Fig. 45).

Post-dating the Lewis and Clark Expedition, the U.S. military continued to use buck and ball load in combat. During the Seminole Indian Wars in Florida (1815-1845), buck and ball was standard issue for smoothbore military muskets (Parks 1997, 17). U.S. Army Quartermaster ordinance survey of 1838 during the Seminole Wars listed 2,344,535 cartridges "purchased or fabricated" with 2,061,446 (or 87.9%) of those being "musket ball and buckshot cartridges" (Russell 1957:247).

The load had continual use through the early phases of the Civil War by units with smoothbore weapons, including by the famed 69th New York Infantry (aka - Irish Brigade) in the Battle of Fredericksburg and Gettysburg (Bilby 2008:148; Callaghan 2006:188; Craughwell 2011:135; Pfanz

1987:245). As late as 1862, the U.S. Military Academy textbook, *A Course of Instruction in Ordnance and Gunnery*, instructed cadets in the art of using these loads, stating that they "are principally used in Indian warfare, and especially in night-fighting" (Benton 1862:349). In the later stages the Civil War, smoothbore muskets fell out of use and the buck and ball method disappeared but was replaced by the combat shotgun around the turn of the century (Parks 1997:17).

There is no explicit or direct evidence that the Corps of Discovery used buck and ball loads. However, before the expedition departed, William Clark ordered "every man to have 100 Balls for their Rifles & 2 lb. Of Buck Shot for those with mussquets and F[uzee]s" (Clark 10 May 1804 in Moulton 1983 Vol. 2:213). Buckshot was considered a viable anti-personnel load in muskets and James Garry speculates that during the tense confrontation with the Teton Sioux, several members of the expedition may have had buckshot loaded in their muskets (Garry 2012:31). The caliber of the buckshot was not specified but it could realistically have been similar to the ball found at the site, though that is uncertain.

The lack of written evidence for buck and ball loads in the Journals is perhaps not surprising but may not necessarily indicate that the method was not used and a case can be made circumstantially

Figure 40: Spherical Lead Found in A Shovel Probe (SP-16) 28 cm BGS Approximately Two Meters from the Southern-most Feature with Trace Mercury in Grid H7.

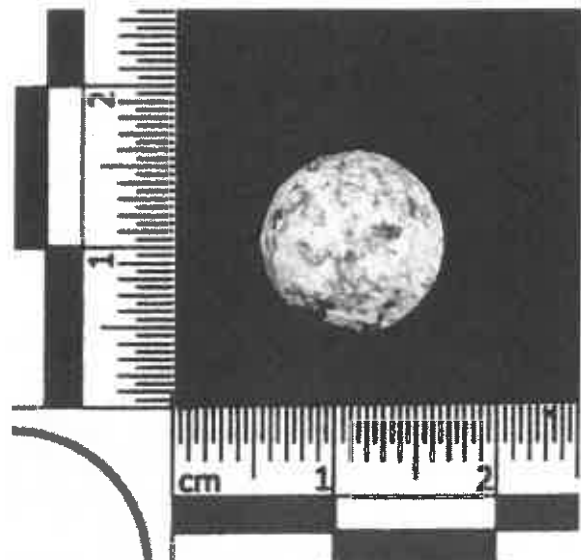
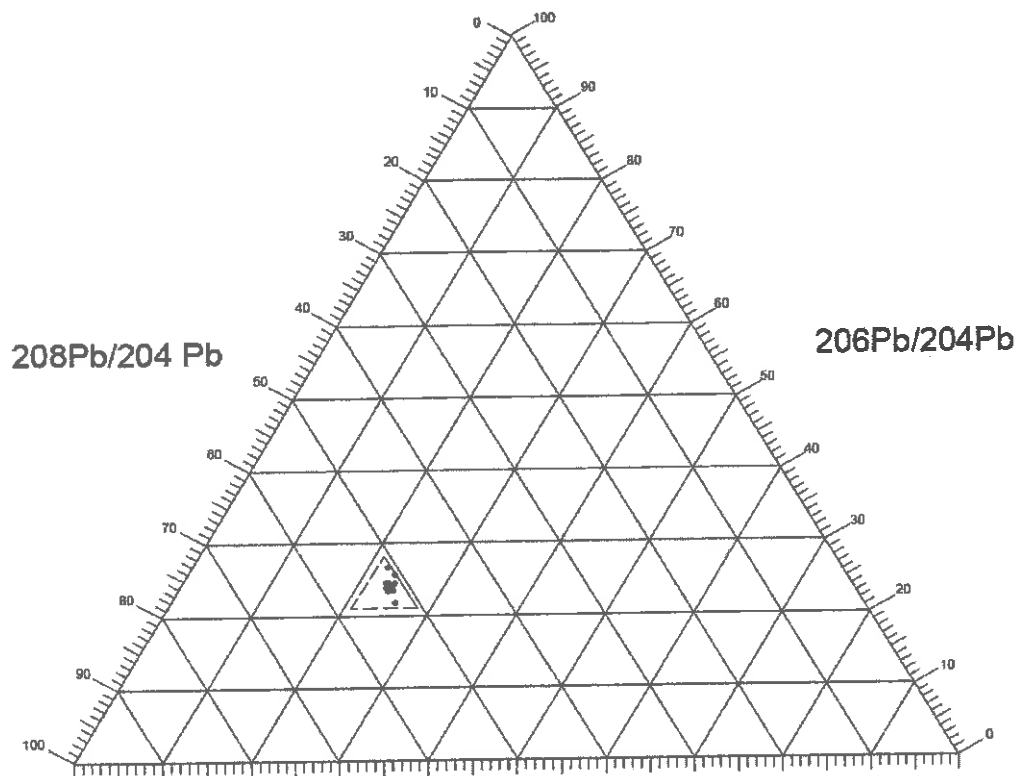


Figure 41: A Ternary Graph Plotting the Three Isotope Ratios to Samples from Table 3. The Hashed Triangle Is Brought into More Detail in Fig. 42.



that it may indeed have been used at times during their journey. Given that in the years before the expedition, the General of the Continental Army ordered that the buck and ball loads were to be standard with muskets as early as 1777 and that less than a decade after the expedition it was again the standard load during the War of 1812 and then the Seminole Wars, their use may have been so commonplace that it was unworthy of note. Several decades later, U.S. Military Academy Cadets were trained as late as the 1862 that buck and ball was considered effective in night combat with Indians. This may well fit with the situation Clark found himself in July of 1806.

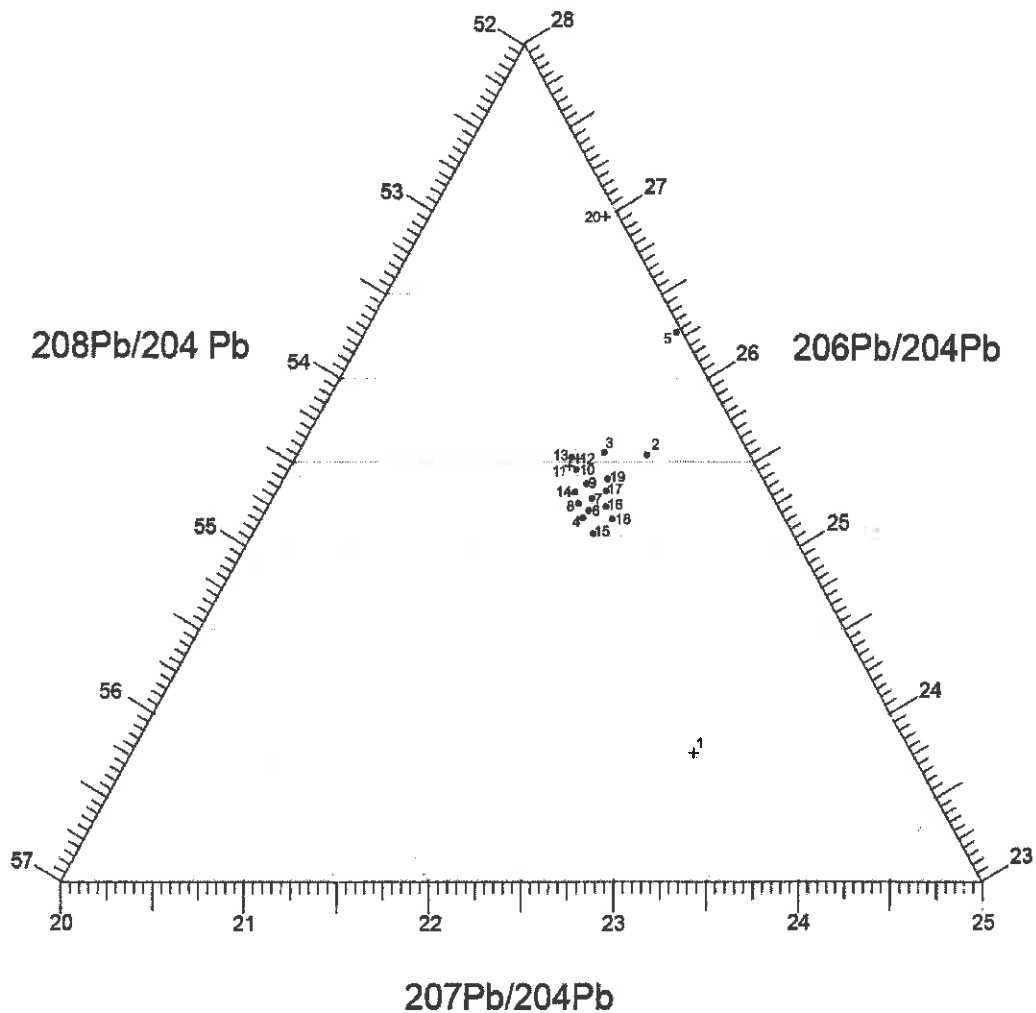
On the morning of July 21, a day after beginning the construction of the canoes, Clark awoke and found nearly half of the horses, important trade goods, missing. He was convinced that they were stolen and certainly he would have been concerned about the possible return of the Indians since the Corps still had 26 horses. Clark could easily have been following the procedure that

would be taught to cadets four decades later at the U.S. Military Academy: using buckshot or buck and ball loads to guard against Indians, likely at night, which was the time that the horses were reported to have been stolen. While it is not conclusive that the Corps did use a buck and ball system, it is very possible that they could have used it.

CORRELATION WITH OTHER LEWIS AND CLARK SITES

Beyond the literary record, comparing the site to other Lewis and Clark sites can help understand the finds. The results do seem to correlate in many ways with other campsites believed to be associated with the Corps at Traveler's Rest near Lolo, MT and Lower Portage Camp near Great Falls, MT. In both cases, localized trace mercury in the soil has been seen as evidence for the expedition's presence given its use as a medicine. Particularly when compared to Traveler's Rest, the layout of the site is very similar. The localized mercury, being almost exactly 300 feet from a fire

Figure 42: Enlarged Plot Showing Detail of the Data from Figure 41.

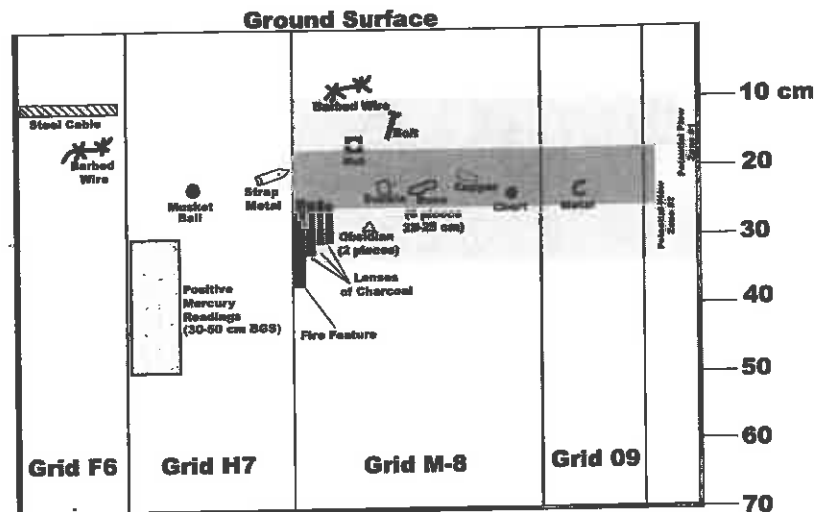


feature, not only relates to the layout of that site but also the military regulations of the time.

Perhaps the greatest correlation is the chemical signature of the lead ball found near the latrine. The ratio of the three isotopes gives a signature that is not only consistent with #324 found at Traveler's Rest in a context believed to be associated with Lewis and Clark, but it also correlates with localized mercury deposits at the same depth nearby. In addition, the signature of both artifacts is also consistent with two geological samples collected in Kentucky which had historic mining during period that the expedition was procuring its supplies, though the records of that time period were likely destroyed in the War of 1812 (Hall and

Lockman 2003:54-55, 59). Still, the confidence that the ball and the site are related to the Lewis and Clark Expedition rises significantly. The lead isotope signature of the lead ball further adds to case that site is indeed the site that William Clark used to construct canoes. That it was found near and at a similar depth to the features with localized trace mercury only further strengthens the case, especially since that part of the site had not been plowed as the more eastern part had. The context therefore seems more intact. It is easy to image given the military nature of the expedition and the fact that Clark "determined to guard the rest of the horses" (William Clark 21 July 1806 in Moulton 2003 Vol. 8:209), a sentry going relieve himself

Figure 43: A Graph Showing the Depth of Artifacts Found in Each Excavation Unit as Well As the Two Hypothesized Plow Zones Using the Upper and Lower- most Definitively Modern Artifacts As a Base.



and perhaps put his cartridge case on the ground, spilling some of the contents and was unable to find all of them in the tall July river bottom grass.

The flattened lead from the Grid M8, on the other hand, does not appear to be related to either the lead ball or other known lead artifacts from the expedition. The same is true for a lead ball found at Fort Clatsop. It is not to say that these artifacts are not related to the expedition, but only that they do not correlate with other known samples at this time. Given the scarcity of artifacts discovered on this site, little can be done to prove the relationship between these artifacts and the Expedition, at least until other sites provide a greater sample to compare them against. The artifacts may be associated with the Corps but they may be associated with prior or later use as well, perhaps by Indians, fur traders, or agriculturalists.

Admittedly, there is at least one other difference with this site as compared to other known sites. A striking element of the the main fire feature was that it lacked an enclosure of stones found at both Traveler's Rest and the 12 hearths found at Lower Portage Camp. While it is possible that such stone may have been intentionally removed during the period that the land was plowed and used for agriculture, that is entirely speculative. In addition, the presence of obsidian indicates that there is a

Native American component to the site. Clearly local tribes were aware of the Corps' presence at the site if they stole the horses and were observed on the bluffs across the river. They may have used the site after the Corps departed, either immediately or significantly later. It is also possible that the site may have been used before the time period the Corps would have been there, especially since the obsidian was found stratigraphically below the other artifacts.

CONCLUSIONS

Taking the evidence together, a case both for and against the site being associated with the William Clark and the Corps of Discovery can be made. Even removing from discussion the artifacts that are of ambiguous nature, such as the strap metal, bones, and buckle, the case for a Lewis and Clark association is strong. It can be summarized as follows:

1. The site is where Clark's survey logs and mapping data describe the location.
2. The site matches Clark's descriptions, particularly in reference to the "black bluffs" slightly down stream but clearly visible from the site.

3. All artifacts and features have been found at the location where Clark's symbol had been georeferenced to the earth.

4. The features discovered at the site, when taken together, appear to conform not only to the military protocols used by the Corps of Discovery but also other sites believed to be associated with the Expedition, particularly Traveler's Rest. In addition, localized traces of mercury are found in features just under 300 feet from a fire feature that radiocarbon dates to an acceptable timeframe.

5. The localized traces of mercury found in features are found in similar quantities as those at Traveler's Rest. Mercury has also been found at Lower Portage Camp, another site believed to be associated with the Corps.

6. A lead ball found two meters from one mercury feature and in a similar stratigraphic context has a chemical signature that is statistically identical to an artifact found at Traveler's Rest in a context believed to be associated with the Corps of Discovery.

If the more ambiguous artifacts are included, the case becomes stronger. A buckle and piece of strap metal are certainly things the Corps could have used and they were found in a context that may be associated with the Expedition. Given their relatively small size, they could be, to borrow the phrase from James Deetz (1977), "small things forgotten," lost in the tall and lush river bottom grass. The bones found around the fire feature add to the case as well as they are distributed much as bone fragments were at Lower Portage Camp.

While the case for the site being associated with the Corps of Discover is strong, it may not be entirely convincing to all. The evidence is imperfect and a case can be made that the site should not be associated with the Lewis and Clark Expedition. Negative argumentation is often easier than positive argumentation as it only needs to raise doubts and requires no internal consistency. The case against the site being associated with the Lewis and Clark Expedition can be summarized as follows:

1. The dating of the site, particularly through C14 testing is imprecise at best, giving too broad range to be useful, once calibrated for atmospheric carbon. Though typical with samples of about 200 years old, the range provides little usable data upon which to base any positive conclusions.

2. The fire feature does not have a stone enclosure or associate FCR as found at other sites believed to be associated with the Expedition at Lower Portage Camp and Travelers Rest.

3. The artifacts found (other than the lead ball) are often extremely ambiguous and not diagnostic enough to be associated with the Corps of Discovery. Buckles have not changed significantly for over almost three millennia and there is no positive evidence the bones near the fire feature were associated with the members of the Expedition rather than someone not associated with the Expedition.

4. The lack of artifacts, especially diagnostic artifacts, is problematic. Other than the remains of mercury and the lead ball, little evidence points conclusively to the Corps of Discovery.

Figure 44: Example of a Pre-made "Buck and Ball" Cartridge Load Typical from the Revolutionary War Through the Civil War (from Russell 1957: 246).

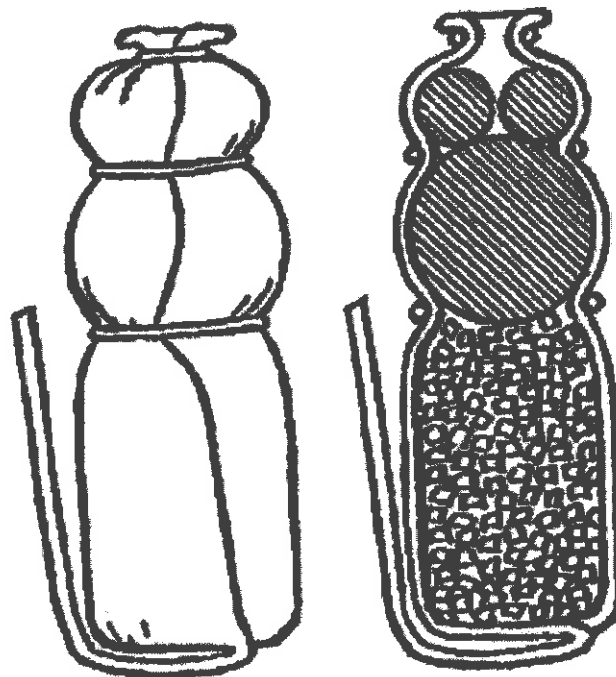
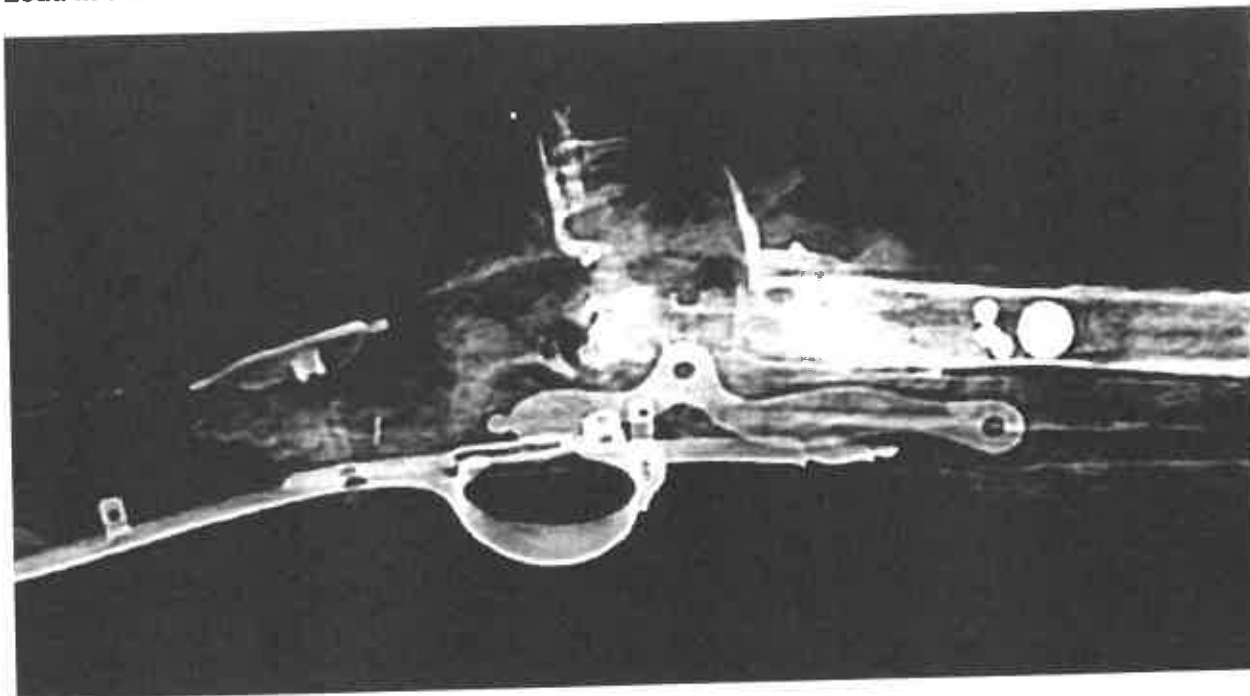


Figure 45: A CT Scan X-ray Image of a British Brown Bess Musket from a Ship off the Florida Coast Believed to Have Sunk in 1782 and Excavated in 2012. The Musket Still Has a Buck and Ball Load in the Chamber with Three Smaller Buck Shot Behind a Larger Musket Ball (Meide n.d.).



5. The metal artifacts found at the site may indicate the site is not associated with the Corps since metal was a high premium for personal use and trade goods with the Indians. Therefore a goal would have been to save every scrap for their anticipated arrival at the Mandan villages later that summer. Clark was obviously highly concerned about having enough trade goods, given his reaction to losing half of their horses, which he intended to use for trade.

The strength of the negative argument does not appear to be as convincing as the argument for the site being associated with the Corps of Discovery. While one, two, or maybe even three corresponding pieces of evidence can be dismissed as coincidence, given the cumulative number of correlations found at the site, the case for the site being associated with the Corps is very strong. The strength of some of the evidence is hard to dismiss, especially the chemical signature of the lead ball and the presence of mercury in localized deposits 300 feet from a fire feature. While not everyone will be convinced that the site is associated with the Lewis and Clark Expedition, there is more evidence, and more convincing evidence, that it is than any of the other potential sites for the camp, at least at this time.

END NOTE

Figure 1 is BLM's map 36, which is a 1992 map that is actually a combination of three BLM maps. The map used was the "1992 BLM Montana Special Edition Recreation Access Guide, Billings, Bridger, Powell, WY."

The base map for Map B (middle map) on Figure 8 is the 1946 Montana State Engineer's Stillwater County Water Resources Survey Map.

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