EVALUATIVE TESTING AT THE FOUNTAIN CISTERN, TALLGRASS PRAIRIE NATIONAL PRESERVE, CHASE COUNTY, KANSAS

By
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Midwest Archeological Center

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TALLGRASS PRAIRIE

ABSTRACT

Midwest Archeological Center personnel undertook evaluative test excavations at the site of a subterranean cistern at the Spring Hill Ranch Headquarters complex, 14CS106, Tallgrass Prairie National Preserve. The cistern dates to the Stephen F. Jones period of ownership, was probably constructed in the early 1880s, and it stored water to operate a fountain that stood in front of the main ranch house. It is known that the fountain superstructure was removed from the front of the ranch house in the mid-1930s, although it is unclear whether the cistern and fountain itself actually operated that long.

The cistern was inadvertently rediscovered in the 1970s and remained essentially intact until some time post-1989, when it was intentionally collapsed and backfilled for safety reasons. The structure itself was rectangular in shape, built of limestone masonry, and had a vaulted stone roof. Intended to hold an estimated 4,800 gallons of water, it apparently filled via a small diameter iron pipe, although the actual source of the supply water is not clear.

After its roof was intentionally collapsed, the cistern was backfilled with clean soil that was probably obtained from the bottomlands along Fox Creek a short distance to the east. Artifactual material intermixed in the fill dated from as early as the mid-1800s until the early- to mid-1900s. The considerable time span of the artifacts, together with fragments of decorative ironwork specific to the main house at the Spring Hill Ranch, indicate that the soil fill and the trash/artifact deposits in the cistern reflect separate episodes. The soil is from the bottomlands, while the artifacts derive from around the structures at the Spring Hill Ranch Headquarters complex.

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1. INTRODUCTION

Tallgrass Prairie National Preserve (Preserve) lies in the Kansas Flint Hills just north of Strong City at the northern edge of Chase County. Established in 1996, the Preserve operates as a joint partnership between the National Park Service (NPS) and The Nature Conservancy: the Conservancy currently owns most of the approximately 11,000 acres (ac) of limestone hills and stream valleys included in the Preserve, while the NPS may eventually own up to 180 ac in several locales where most visitor activity will occur.

The Preserve was created to protect and interpret a remnant area of prairie—the grasses, wildlife, and seemingly endless rolling vistas—and also to preserve and interpret the Spring Hill Ranch as a part of the story of the Great Plains cattle industry. By popular consensus, the centerpiece of the Preserve is probably the Spring Hill Ranch Headquarters complex, a cluster of impressive limestone structures built by Stephen F. Jones, a former Texas and Colorado cattleman who came to Kansas in the late 1870s intent on establishing a large ranch with close railroad connections to market.

Jones built the Spring Hill Ranch in the early 1880s on the hillside overlooking the west flank of Fox Creek. The ranch buildings* include an ornate main house (Figure 1); a huge three-story barn; a scratch house/chicken house; an icehouse; a subterranean springhouse and above-ground curing room; and a privy, all built of local Cottonwood Limestone.

The architectural details at the Spring Hill Ranch speak of considerable wealth and pride. A fountain once flowed in the front yard of the main ranch house, and beneath its grassy sod roof the chicken house has a vaulted stone ceiling: frontier hens seldom lived in such luxury. The Spring Hill Ranch was clearly intended to be a showplace, and a lithograph of the complex of ranch buildings (Figure 2) appeared in the 1887 Official State Atlas of Kansas (Everts & Co. 1887). The lithograph dates to six years after construction of the main ranch house and one year before Jones sold the property to Strong City businessman Barney Lantry.

Dependable water supplies have always been a major concern for ranchers in the Kansas Flint Hills, and Jones and the subsequent owners of the property put considerable effort into collecting and controlling the flow of water from the seeps and springs on the hillsides across the ranch. A spring box is still visible on the high ground above and west of the main ranch buildings, and a large above-ground cistern on the north side of the barn once stored water for the livestock kept there. Another stone cistern, half-buried in the hill next to HS-126, the icehouse (Figure 3), collected water from a spring on high

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*The standing structures at the ranch, together with subsurface and collapsed structures and other features, both identified and as yet unidentified, have collectively been assigned Kansas archeological site number 14CS106 (Jones 1999), and the Spring Hill Ranch Headquarters complex, including the above standing structures, is a National Historic Landmark.

ground further to the west, and a supply line from that cistern carried the water down to the underground springhouse immediately north of the main ranch house.

Not all of these historic features at the ranch are still visible. A working cattle ranch is a dynamic, practical operation, and the equipment and facilities at Spring Hill were modified or replaced as they wore out or ceased to serve a purpose. Thus it is that several of the features illustrated in the 1887 lithograph are no longer visible, while others which are not depicted—including several more outbuildings and a tunnel that connected the main house and the barn—are either rumored to exist or known to still be present as buried foundations, etc.

Project Background

Given the relatively small amount of systematic archeological research that has thus far been conducted at Tallgrass (Jones 1999, 2007), the best information on such ghost features comes either from former residents of the ranch or from local visitors who were familiar with the property.

One-time ranch resident Colleen Slabaugh (personal communication, November 14 and 20, 2002) recalled that in the mid-1970s while she was cutting the grass atop the terrace (Figure 4) between HS-107, the curing room, and an adjacent high stone retaining wall, a wheel on her mower dropped into a small, deep hole that suddenly opened up in the ground surface. Peering through the hole, she saw what appeared to be a subterranean chamber, the finished floor of which lay seven or eight feet below the ground surface. Colleen stated that she could see a single chicken bone on the floor of the room, but otherwise, the underground space was empty.

Colleen's father-in-law, Gerald Slabaugh, plugged the hole with rock, and the feature was essentially intact when the Slabaughs left the ranch in the late 1980s. However, Tom Pinkston, who worked at the ranch until 1989, also recalled the feature (Tom Pinkston, personal communication, February 11, 2003), as his wife Cheryl nearly fell into it when the ground over the chamber began to collapse under her feet.

At some time post-1989, local resident Gary Scott was hired to backfill the underground cavity. Gary's son, Jay, accompanied his father, and recalled that the feature was still in good condition at that time (Jay Scott, personal communication, February 11 and 12, 2003). The elder Scott collapsed the stone roof of the chamber, and then filled the depression with soil.

The trail of local knowledge about the buried feature almost ended at this time. However, opportunistic discussions between NPS interpreters, National Park Trust personnel, and former ranch occupants and Preserve visitors continued to hint at the presence of such a feature. Eventually, Jay Scott mentioned his father's backfilling job to

an NPS interpreter in the fall of 2001 (Dan Riggs, personal communication, February 11, 2003), though the precise location may not have been specified.

In the dry summer of 2002, a shallow depression formed in the top of the terrace (Figure 5) between the stone masonry retaining wall and the east side of HS-107. Soil cracks around the perimeter of the depression suggested the presence of a generally rectangular underground feature, the horizontal dimensions of which approximated 18 ft north-south by 10 ft east-west. The potential ramifications of the depression prompted concerns for visitor and staff safety, and in July, 2002 Preserve Superintendent Steve Miller contacted the NPS Midwest Archeological Center (Center) to request that the depression be investigated, with the understanding that it was probably the site of the feature described by Colleen Slabaugh, Tom Pinkston, and Jay Scott and perhaps the fountain cistern of ranch lore.

The decision was made that Center personnel should evaluate the depression and expose the feature which likely lay beneath it, recording details relating to its dimensions, method of construction, age, function, and physical condition. It was agreed that the project archeologist would ultimately provide recommendations regarding the significance of the feature, and also suggest future maintenance and/or preservation needs. The details of the evaluation project were summarized in a work plan submitted by the project archeologist to the Preserve prior to the start of the investigations (Jones 2002a).

Field Methodology

Center personnel began work at the Spring Hill Ranch complex on September 9, 2002 and concluded their investigations on September 13 (Jones 2002b). They initially established a pair of intersecting 18 inch-wide trenches across the depression, which were then excavated to a depth of about 12 inches below the surface (inbs) in order to identify any remnant wall outlines and better define the dimensions of the underground feature (Figure 6).

The trenching quickly exposed a concentration of rock rubble at the south end of the depression, a stone masonry wall on the north end, and a dry-laid stone wall along the west, all of limestone. Center personnel then removed the southeast quadrant soil block formed by the intersecting trenches, continuing to a depth of approximately 20-24 inbs, at which point excavation was begun in the southwest and northwest quadrants. The northeast quadrant of the cistern excavation was purposefully left unexcavated below the 12 inbs level.

In a short time, the three quadrant excavations exposed the outline of a stone masonry cistern (Figure 7), together with a separate dry-laid stone wall that ran north and south above the west side of the structure. Midway through the testing, the cistern was designated Feature 1 (F1), while the dry-laid stone wall was designated F2.

Soil and rock from the excavation were removed to an area immediately north of HS-107, and the excavation was backfilled with the same material at the close of the testing.

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Due to time constraints, none of the soil from the cistern excavations was screened, and the recovered artifacts described in this report thus represent a fraction of the cultural debris that was present in the fill, a sample that is probably biased by size. All artifactual materials recovered during the excavation, together with photographs, excavation forms, field notes, and mapping data, are presently curated at the Center as MWAC accession 1001 (TAPR accession 001).

Soils

The cistern fill consisted of dark, fine-grained loam, within which lay scattered limestone slabs ranging in maximum dimension from 10-24 inches (in). The soil matrix most likely represents material that was excavated and brought to the site from elsewhere on the ranch, as the soft fill within the feature contrasts dramatically with the dense, tan clay subsoil exposed above the west wall of the cistern. Jay Scott thought that the fill had been excavated from the west side of Fox Creek, possibly near a shallow water ford 6/10 mile south and east of the Spring Hill Ranch complex. There was no visible stratigraphic evidence of multiple fill episodes in the feature, although such may have occurred as the soil matrix gradually settled and compacted in the collapsed structure.

2. FEATURES

Feature 1

Five days of excavation exposed roughly three-quarters of a rectangular subterranean stone masonry cistern. Designated F1, the cistern was built of limestone slabs bonded with sand and lime mortar. The cistern was buried in the terrace behind (west of) the prominent retaining wall that stands immediately north of the main ranch house, and the long axis of the cistern was oriented north-south to fit the rectangular space that was available between the wall and HS-107 a few feet to the west.

The east wall of the cistern was integrated into the thickened lower and middle courses of the limestone masonry retaining wall. The west wall of the cistern was formed either by the face of a thick limestone bedrock ledge (the lower unit of the Crouse Limestone [Sawin 2004]) or possibly by a vertical exposure excavated in the clay subsoil. The north and south end walls of the cistern, also constructed of limestone masonry, extended perpendicularly from the inside of the retaining wall to the west wall of the feature.

The stone roof of the cistern (Figure 8) was probably vaulted, formed with undressed, edge-set limestone slabs that were mortared in place. Along the east side of the cistern, the curved roof vault sprang from the thickened lower inside face of the retaining wall, with the stone forming the spring line of the vault keyed into the side of that wall (Figure 9). Along the west side of the structure (Figure 10), the stone roof vault appears to have simply rested atop the limestone ledge that forms the west cistern wall.

The roof vault was still intact at the extreme south end of the cistern and atop the north cistern wall, but had elsewhere fallen into the chamber, probably when the roof was intentionally demolished by Gary Scott. The north end of the roof vault actually capped the north end wall of the cistern, while the south end of the vault began just inside the south end wall and neither integrated into nor capped the end wall itself.

The 1887 lithograph of the Spring Hill Ranch complex illustrates a north-south stone wall directly east of the curing room and in the approximate location of the retaining wall that today forms the east side of the cistern. However, the present retaining wall extends further to the north and south than did the wall depicted in the illustration, suggesting that these two extensions post-date the shorter, straight section of wall illustrated in the lithograph. Both the north and south extensions of the retaining wall presently curve to the west. The south end integrates into the stone steps that descend the north side of the ranch house, while the north end of the retaining wall simply disappears in the hillside northeast of the curing room. Several large, vertical cracks in the straight section of the retaining wall suggest that the cistern failed, perhaps because the east wall/retaining wall was not strong enough to contain the volume of water held behind it (see next page).

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The interior dimensions of the cistern proved smaller than the initial estimate (Figure 11), and ultimately measured approximately 17 feet (ft) north-south by 6 ft 2 in-6 ft 10 in east-west (the variation in width reflecting the position of the undercut limestone ledge along the west wall). The floor of the cistern was briefly exposed in a small test in the floor of the excavation, and lay at a depth of about 9 ft 3 in below the ground surface/top of the terrace. The floor and the lowermost 7 ft of the four cistern interior walls were covered by a thin, smooth sand and lime mortar parge coat that probably sealed the masonry to retain water. The parge coat was in good condition on the west wall of the feature, but was fragmented along the cracked east cistern wall, mirroring the large cracks visible in the exterior retaining wall.

No unequivocal evidence was found of a supply line that would have filled the cistern with water. Oral histories have suggested that a small concrete trough around the base of the subterranean springhouse immediately to the west carried spring water east to the cistern, but excavation along and above the west cistern wall failed to expose any evidence of a water source that would have fed into the cistern from that direction.

At the south end of F1, however, a section of 1¼-in iron pipe was exposed that descended through the south end wall (Figure 12), entering the cistern 6 ft 4 in above its floor and 1 ft 2 in below the top of the parge coat. The pipe appeared to dip gradually into the cistern from the south (from the general direction of the main ranch house), and it may have once carried water either from another cistern or from a barrel that collected rainwater runoff from the ranch house roof.

If the vertical position of the iron pipe in the south end of the cistern wall reflects the maximum water level that could be contained within the feature, then the capacity dimensions of the feature become roughly 6 ft 4 in (height) by 6 ft 6 in (average width) by 17 ft (length). The cistern volume then calculates to approximately 644 ft^3 or about 4,835 gallons of water, which would have weighed about 40,000 pounds.

As was mentioned earlier, several oral histories and ranch visitors had indicated that at one time a cistern supplied water to the fountain in the front yard of the ranch house, the latter feature now marked only by a low, circular stone pedestal that contains a flower bed (Figure 13). The floor of the pedestal, within which the fountain would have stood, lies about 7 vertical ft (7 ft 1 in) below the maximum elevation of the water in F1, the latter presumably marked by the 1¼ in iron pipe in the southwest corner of the feature. This difference in height would have generated head pressure for a column of water from the cistern of about 3.0 pounds per square inch (psi), which would be reduced by pipe friction to about 2.5 psi at the base of the fountain (Al O'Bright, personal communication, March 5, 2003). A pressure of 2.5 psi will raise a 1-in column of water roughly 5¾ ft high, and if the fountain orifice stood a hypothetical 3 ft above the top of the pedestal, the fountain would have produced a column of water 2¾ ft high above the orifice.

The cistern could not be completely excavated during the allotted time, and it was not possible to expose any supply line that extended from the cistern to the fountain in the course of the Center investigations. However, workers mapping underground utilities at the Spring Hill Ranch Headquarters complex two months later identified a linear anomaly buried in the yard between the cistern and the fountain pedestal. Using a tone-generating magnetic locator, Kramer Engineering personnel followed the anomaly 30 ft east from the base of the retaining wall near the southeast corner of the cistern, then 70 ft south to the fountain pedestal. This linear anomaly connects the cistern and the fountain, and likely represents the iron pipe supply line from the former to the latter.

Colleen Slabaugh (personal communication, November 14 and 20, 2002) believed that the interior of the cistern was accessed via the underground corridor that connects the basement of the main ranch house with the subterranean springhouse. The corridor lies immediately to the southwest of the cistern feature. However, no trace of any entryway was visible in the east wall of that corridor, nor was evidence of an entry observed along the west side of the cistern. Likewise, no indication of access ports was seen in either end of the cistern, through which the structure might have been inspected or maintained.

It is possible that access to the cistern was through the top of the vault (O'Bright 2002), and if it also functioned as a reservoir for domestic, garden, or other needs, water may have been drawn from the top of the cistern with a chain and cup lift or a hand pump (O'Bright 2002). Unfortunately, no evidence of any access through the vaulted roof survived its demolition.

Feature 2

This feature is the dry-laid stone wall that was exposed just below the surface of the terrace when topsoil was first stripped off the cistern, and which extended north and south between the east wall of HS-107 and the west wall of F2 (Figures 11,14). The wall measured roughly 18-19 in wide and approximately 1½–2 ft high. The bottom course of flat limestone slabs appeared to simply rest on basal clay, probably in a narrow builder's trench that could no longer be identified. The wall was exposed along the entire length of the excavation (about 21 ft), but its middle section had partially collapsed to the east, perhaps into the cistern.

It is unclear how much farther south F2 extended, but a linear pattern of flat limestone slabs visible on the ground surface a few feet north of the excavation may represent the continuation of the top of the wall. While it appeared to represent a retaining wall because of its height, F2 was nowhere as massive or well-constructed as the stone masonry walls that formed the north, south, and east sides of the cistern. In fact, based upon its stratigraphic position, F2 may not be contemporaneous with the cistern at all. In character, F2 was much more similar to the dry-laid stone walls that form the perimeter of the front yard of the main ranch house. It appears to post-date the cistern by an unknown number of years, and its function remains uncertain.

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3. ARTIFACTUAL MATERIALS

A small amount of artifactual material was observed in the upper fill of the collapsed cistern, and was recovered in greatest quantity at depths of roughly 6-36 inbs. Except for the presence of limestone roof fall, the earthen fill in the lower two-thirds of the feature appeared to contain far fewer artifacts than did the uppermost one-third. There was little variation, however, in the earthen material observed throughout the cistern—a soft, homogenous dark brown clay loam that contained no discernible vertical stratigraphy to suggest that it derived from multiple sources.

Based upon Jay Scott's recollection, the soil material was obtained from a location along the west side of Fox Creek a short distance to the southeast of the Spring Hill Ranch complex. Alternatively, Colleen Slabaugh recalled that during her time at the ranch, fill dirt was typically excavated from a location on the left bank of Fox Creek roughly one-half mile above its confluence with the Cottonwood River (and 2¼ miles south of the ranch headquarters complex).

Construction Materials

Decorative Ironwork

The cistern excavation produced five fragments of decorative ironwork. These materials include two identical mounting pieces, two possible fragmentary mounting brackets, and part of a stylized cross, all made of ferrous metal. The first two pieces (i.e., Figure 15:a) are complete and hourglass-shaped, and each has a single stamped, raised rib that extends along its midline for strength. Each piece was attached to other frame parts via three fastener holes, two of which on each artifact contain remnant rivets. These two pieces measure 2½ inches long by 1⅞ inches wide.

The cross-shaped fragment (Figure 15:b), which has been broken at the base, was either made of puddled cast iron—molten iron poured into a shallow mold cavity in an open sand casting (Atlas Foundry Company, Inc. 2006) or in a flat-backed two-piece cope-and-drag type mold (Scott Lammers, personal communication, July 6, 2006; American Foundry Society 2006). The fragment has a slightly convex front face with rounded edges, and a flat reverse or pour face, the edges of which are ragged due to some mold overflow. The fragment is about 6 in tall, and has an intact 4 in-wide crossbar.

This piece is now known to be part of a panel or section of decorative iron cresting (Al O'Bright, personal communication, July 5, 2006) which once stood atop the roof of the main ranch house a few feet away from where the cistern lies. A partial section of intact cresting, which has fortunately survived (Figure 16: Heather Brown, personal communication, July 5, 2006), measures 25 in tall from the base to the top, with taller pieces attached to at least one end of each panel. As Figure 16 illustrates, the cross is in

fact the upper design component of a two-part element on the larger panel, the lower half of which, sharing the same vertical piece, forms a fleur-de-lis.

This roof cresting is faintly visible in the 1887 lithograph (Figure 2) which depicts the main ranch house during the Stephen Jones period of ownership. It is also visible in a 1900 photograph of the structure (taken during the time in which the Barney Lantry family owned the property), but is not visible in photographs of the ranch house taken during the Benninghoven era, which began in the 1920s (Heather Brown, personal communication, July 5, 2006). This contextual information indicates that the cresting dates from as early as 1881 and remained on the roof for forty years before it was removed. At some point post-1989, the cistern was filled with a mixture of soil and trash deposits which contained a fragment of the cresting.

Flat Glass

Sixty-nine pieces of flat glass, most likely window pane fragments, were collected from the cistern fill. This assemblage ranges in thickness from 1.51 to 3.03 millimeters (mm) and averages 2.29 mm. However, based upon recent Great Plains window glass research (Schoen 1985), the plot of these flat glass thickness measurements has a bimodal or possibly trimodal distribution. The thinnest fragments (n = 9) may date as early as 1830-1840, while an intermediate but similarly small number of fragments (n = 9) probably date to the period 1870-1880, just prior to the episode of construction of most of the stone buildings at the ranch. The thickest fragments (> 2.43 mm), which also occur in the largest numbers (n = 30), probably post-date 1890 (Schoen 1985:89). Twenty of these latter fragments exceed 2.59 mm in thickness and likely date after the turn of the twentieth century.

Fasteners

Four hundred fifty-five complete and fragmentary ferrous nails were recovered from the cistern fill. Complete and fragmentary cut nails (probably all machine-cut) totaled 282. The complete cut nails range in size from 2d to 30d, but the 6d, 8d, 10d, and 20d sizes (2 - 4 in) account for 67 percent of the total.

One hundred seventy-three complete and fragmentary wire nails were collected. These latter fasteners had a somewhat greater size range (1d-50d) than did the cut nails, but as before, more than 70 percent of the wire nail total are sized 8d to 20d (2½- 4 in).

Neither cut nails nor wire nails are particularly precise temporal indicators in archeological deposits. Cut nails appear in the archeological record as early as the late 1700s, while modern machine-cut nails were manufactured from roughly 1835 until 1890-1900 and are still being made and used in small quantities today. Although wire nails were first manufactured in Europe in 1819, they “were not produced [in North America] in significant quantities until the mid-1880s” (Adams 2002:69), and of course are still the primary fastener type today for wood construction.

Recent research on late nineteenth and early twentieth century sites (Adams 2002) has used nail data from dated archeological deposits to compute the ratio of machine-cut to wire nails as a more precise time indicator. The ratio of complete and fragmentary cut nails to complete and fragmentary wire nails in the fountain cistern assemblage is 282:173, or expressed as a percentage of the total complete and fragmentary nail assemblage (n = 455), about 62:38 per cent. If the nails found in the Tallgrass cistern fill actually reflected a random sample of debris from a single historic site, their ratio suggests a date of about 1891 for that component, and thus for the other archeological materials in the cistern fill.

Miscellaneous Construction Materials

Other construction materials recovered from the cistern fill included drain tile, mortar, and bricks, all of which were fragmentary. The mortar sample represents soft portland cement mortar (Wikipedia 2006; Al O'Bright, personal communication, September 10, 2002), which had completely replaced lime mortar in the U.S. by about 1930. The ten brick fragments are all small, soft, and red-orange in color, but include no complete sides or ends, and their intact dimensions thus cannot be estimated. Finally, seven drain tile fragments recovered from the excavation include unglazed redware (n = 2), redware with a dark red interior glaze (n = 1), and three fragments of heavier earthenware drain tile with a dark brown interior and exterior glaze. The latter materials include two fitting fragments of the bell (upper) end of a drain tile that was otherwise six inches in outside (o.d.) diameter. The redware tile was probably 4 in interior (i.d.) diameter.

Domestic Materials

Curved Glass

Seventy-four fragments of curved glass—usually bottles but sometimes other glass containers and dinnerware—recovered from the cistern fill consisted of four vessel/container bases, a ring- or oil-style bottle finish fragment, and a probable glass plate rim. The assemblage includes colorless, amber, olive, and light green glass colors, and all are heavily patinated.

Two sherds in the collection bear raised ribs and appear to represent part of a large, rectangular panel bottle. Two other fitted fragments (Figure 15:c) include a faceted colorless glass container base and one body sherd, the latter bearing distinct vertical scallops. Fitted together, these sherds represent the constructed 2½ in diameter base and partial side of a heavy, ten-sided tumbler with flaring sides. The intact container would have been taller than 4 in.

Whiteware

Twenty-nine whiteware fragments were recovered from the cistern fill, most of which are undecorated body and base sherds, the latter with remnant foot rings but no

makers' marks. The collection includes one strap handle, probably from a cup, that has an applied vertical hand-painted brown line down its exterior. The finger hole on this loop is small, measuring roughly 0.58-0.68 inch in diameter. One other strap handle was also recovered, and is perhaps from a casserole lid.

Porcelain

The cistern excavation produced 24 porcelain fragments, most of which (n = 22) probably represent pieces of plates or bowls. One of the fragments bears an applied multiple-color decal, the complete pattern or depiction of which is unclear. The colors used in the transfer include fuschia/pink, medium blue, and green. There are no makers' marks visible on any of the plate/bowl fragments.

The two remaining porcelain fragments (Figure 15:d-e) represent part of a medium- to large-sized figurine or console centerpiece, and probably depict either human hair on a porcelain bust, or perhaps part of an elaborate dress/costume on a human figure. The two fragments fit, but it is unclear just what part of the figurine/centerpiece they represent. Both bear traces of black and blue paint.

Miscellaneous Artifacts

Weapons/Ammunition

Six complete and fragmentary expended brass cartridge cases were recovered from the cistern excavations, two of which represent rifle or pistol ammunition. One of these, an expended .22 cal. Winchester Rimfire case bearing an "H" headstamp, reflects a round that was first introduced by Winchester for their Model 1890 pump action rifle (Barnes 1980: 290), but which was still being manufactured as late as 1980, as it may be used in pistols and rifles chambered for .22 cal. Magnum cartridges.

The second cartridge case is the base of a 32 Extra Long centerfire round. This particular cartridge type was first produced in 1883 for the J.M. Marlin No. 2 Ballard Sporting Rifle (Barnes 1980:95; Logan 1959:121-122), although other single shot rifles also became available in this caliber. The cistern cartridge case bears an "REM-UMC 32 WCF" headstamp, however, which did not appear until the merger of Remington and the Union Metallic Cartridge Company in 1911 (Huntington and Dunn 1977). The Tallgrass cartridge case thus cannot pre-date that year. Barnes (1980:95) notes that most companies had stopped manufacturing the 32 Extra Long round by 1920.

The remaining case fragments are represented by the brass bases of expended paper shot shells. The first of these, a low brass 16 gauge casing, bears a "WESTERN FIELD" headstamp and could have been manufactured by the Western Cartridge Company from as early as 1898 (when the company came into being) until 1931-1932 (Logan 1959:191; Steinauer 2006) when Western (Olin) purchased Winchester. The Western brand of

cartridges was discontinued at that time, and the Winchester-Western name was used thereafter (Standler 2006).

The remaining three shot shell bases all represent ammunition for 12 gauge shotguns. One of the three, with a high brass base, bears a “PETERS IDEAL” headstamp, and could conceivably have been manufactured by the Peters Cartridge Company from as early as 1887 until 1934, when Peters was acquired by Remington (Standler 2006). However, Peters shot shells continued to be sold under the Peters brand name until the late 1960s.

The other two shell bases are both of the low brass type. One of these bears a UMC-REM NITRO CLUB” headstamp, and would have been manufactured by the Union Metallic Cartridge Company (owned by Remington) between 1911 and 1934, while the other, bearing a “WINCHESTER NUBLACK” headstamp, would have been produced by the Winchester Repeating Arms Company until 1931-1932.

Animal Bone

Twelve animal bone fragments were recovered from the cistern fill. Two of these probably reflect avian species local to the area, while eight others represent small- to large-sized mammals, i.e., cottontail rabbit (n = 3) and cow (n = 3). One of the latter fragments, a short section of long bone diaphysis, has saw marks on both ends.

Clothing

Clothing-related artifacts recovered from the fill in the collapsed cistern are limited to three buttons (Figure 17:a-c) and a small piece of sheet leather which lacks any diagnostic stitching or eyelet holes.

All three buttons are disc-shaped and ½ in (20 ligne) in diameter. As such, they are probably shirt fasteners. One of the three is white glass, while the other two have been made from shell or mother-of-pearl. Pearl buttons manufactured in the U.S. appear in the late 1800s, and were typically made from South Pacific marine shell. By the turn of the century, abalone shells from California were being used in button manufacture, but freshwater shells from the Mississippi still accounted for roughly half the total output of American-made shell buttons at that time (Peacock 1972:44).

Toys

Parts of two toys were recovered from the cistern fill. The first of these is a ferrous stamped metal manure scoop or shovel (Figure 17:d) that would have attached to the front end of a toy tractor. The scoop has simple bent wire arms that would have inserted into the sides of the larger toy. It measures 2½ in wide by 1½ in deep, and has a small amount of remnant green paint adhering to the inside of the bucket.

The second possible toy remains are two pieces of thin, blue plastic that are fragments of a globe or ball that was 6-8 inches in diameter. There is no visible illustration or decoration on the fragment exteriors.

Discussion

The source(s) of the historic artifactual materials in the upper cistern fill remain unclear. The artifactual materials include a mixture of late nineteenth century artifacts, but there are also artifacts in the collection that date slightly later than the construction date of the main ranch house (1881), together with more recent artifacts that post-date the early twentieth century.

Much of this material represents construction debris rather than domestic trash, and it is possible that some of the older artifactual materials found in the cistern fill were already present in the bottomland soil as the remains of a residence of other structure, while the later debris simply represented contemporary trash thrown into the depression. However, the presence of artifactual materials specific to the main ranch house (the decorative ironwork) suggests instead that relatively clean soil fill was dumped into the collapsed cistern, and then some additional trash and more soil were added post-1989 as the original fill settled. The latter explanation makes somewhat more sense given the fact that the fill in the lower part of the cistern contained less artifactual material than did the upper portion.

The streamside corridor along Fox Creek east of the Spring Hill Ranch complex has not been intensively inventoried for archeological resources, but could conceivably contain a late-1800s historic site. The location farther to the south described by Colleen Slabaugh as a fill source is known to contain evidence of mid-twentieth century use—the remains of two galvanized stock tanks are visible in the brush, and there is probably more artifactual material beneath the heavy leaf litter.

Parenthetically, the earliest known historic occupation in the area lay 4 miles further to the west of the present site of Strong City at the mouth of Diamond Creek, and dates to 1854 (Starkey 1940:49). The original house structure occupied by Stephen Jones in the late 1870s is believed to lie only a short distance east of the present Spring Hill Ranch complex, and there may be other structural remains along Fox Creek that could also be the source of the cistern fill. At the present time, however, the simplest explanation for the source of the historic materials in the cistern fill is that the artifacts simply reflect Spring Hill Ranch trash that was periodically disposed of in the depression after 1989 as the cistern fill settled.

4. CONCLUSIONS

Summary

The 2002 Center archeological investigations immediately east of HS-107, the curing room, at the Spring Hill Ranch Headquarters complex (14CS106) exposed the remains of the rectangular subterranean cistern that once supplied water to a fountain in the front of the main ranch house. The construction of the cistern almost certainly dates to the initial Stephen Jones era at the Spring Hill Ranch, that is, between 1881 and 1888.

The cistern is positioned in the narrow space between a prominent, high limestone masonry retaining wall that is illustrated in the 1887 lithograph of the Spring Hill Ranch Headquarters complex, and HS-107 18 ft to the west. The retaining wall in fact forms the east wall of the cistern: the construction of the north and south ends of the feature, together with the long west side wall, is unclear but may have been either limestone masonry, bedrock, or intact soil covered with a parge coat. The roof of the feature was of vaulted, undressed limestone which was keyed into the retaining wall on the east. On the west side, the roof vault may have simply rested on a bedrock ledge.

The cistern measured 17 by approximately 7 ft, and would have held an estimated 4,800 gallons of water when filled to the level of an iron pipe inlet exposed in the south end of the feature. It was probably supplied with runoff water from the nearby main ranch house roof via that pipe: the testing exposed no evidence to indicate that the cistern was filled with water from the spring house, which lay beneath the adjacent curing room and received water from HS-126, another cistern a short distance further uphill to the west.

Curiously, the inside parge coat on the fountain cistern did not bear a carbonate stain or ring that would indicate a consistent high water line, and it appears unlikely that the cistern was routinely filled to capacity. In fact, large vertical cracks in the stone retaining wall suggest that the structure was not strong enough to hold the estimated 20 tons of water that would have been impounded within it if it was ever filled to the inlet pipe.

There are no data to indicate how well the fountain functioned, although the water pressure generated by the higher elevation of the cistern would have been sufficient for a moderate vertical stream. There is also little information about just how long the fountain was used: it was reportedly dismantled in the mid-1930s, and only the base remains today, used as a soil-filled flower bed.

The source of the dirt material used to fill the collapsed cistern is of archeological interest, for the artifacts contained in the soil matrix appear to reflect late nineteenth and early twentieth century debris. The various artifactual materials recovered from the cistern fill together indicate manufacture and use dates ranging from as early as 1830-1840 until approximately 1930, but the majority of the materials probably date between 1890 and 1925. The types of recovered artifactual materials are considerable: construction-related

artifacts such as nails, bolts, screws, bricks, mortar, and window glass; kitchen-related artifacts such as whiteware, glassware, etc.; and miscellaneous artifacts including expended rifle and shotgun ammunition, part of a child's toy tractor, and possible porcelain figurine fragments. Together, these document a range of activities, and suggest deposits from around a domestic structure, i.e., a homestead or farmstead.

According to his son's recollection, Gary Scott obtained the earthen fill material from a nearby location along Fox Creek. Based upon the estimated ages of the artifacts recovered from the cistern excavation, some of those materials would have come from a late nineteenth century house site. While there are currently no recorded historic sites along the west side of Fox Creek north of 14CS113, the complex of cattle pens, scale house, and loading chutes 2.3 mi to the south of the main ranch house, additional archeological inventory may eventually identify such locations in closer proximity to the main ranch complex.

Again, however, the simplest explanation—supported by the presence of the site-specific decorative ironwork and the potential 100-year span of artifact ages—would be that the artifacts in the cistern fill came from the Spring Hill Ranch Headquarters complex itself: the pattern of super-local trash disposal at the ranch has been noted in prior and subsequent archeological investigation of historic sheet trash deposits found immediately north of the smokehouse (Jones 2000; 2007.), just outside a Quonset storage hut and adjacent stone welding shop/ice house (Jones 2007.), and adjacent to a corral wall north and west of the barn (Jones 2004), all at the Spring Hill Ranch Headquarters complex itself.

Recommendations

The fountain cistern was completely backfilled following the 2002 investigations and poses no further safety hazard to Preserve visitors or staff. The soil replaced in the feature will continue to settle, and will probably require a small amount of additional soil fill. Because the walls and perhaps the floor of the cistern have fractured, the cistern will gradually drain itself of any natural moisture such as rainfall. The feature is thus stable, and should require no additional maintenance.

The significance of the fountain cistern relates to its further documentation of the length that Stephen Jones went to ensure that his ranch complex would be a showpiece in the community. The structure would have been neither simple nor inexpensive to build, particularly with its vaulted stone roof, but the fountain and cistern were part of a larger issue of demonstrated wealth and success for the owner. It mattered little that the cistern could not be filled to capacity. It fed a fountain, after all, and nobody else had such a grand feature.

The cistern still contains significant historic artifactual material that, if the feature is ever re-investigated, should be more systematically recovered in order to better answer the questions of sourcing and dating the fill material. Further investigation might also

shed light on the connection between the cistern and the fountain, the location of shutoff valves, and the mechanics of the cistern filling process. Fully one-quarter of the feature was purposefully left intact for such future work, and the lower 2 ft of the cistern are likewise unexcavated.

Acknowledgements

National Park Service and other personnel who participated in the cistern excavations included Midwest Regional Office Historical Architect Al O'Bright, four Center staff—Museum Technician Lisa Stanley, Museum Aids Ricci Soto and Seth Lambert, and the writer—and two Center volunteers, Joan and Neal Westphal (Figure 18). Al's expertise proved particularly valuable to understanding the construction of the cistern and how the feature might have integrated into the water delivery system and fountain operation at the ranch.

Additional support was graciously provided by the National Park Service staff at Tallgrass, which included Superintendent Steve Miller, Chief Interpreter Heather Brown and her staff, and Facility Manager Robert King. Information on casting was provided by Mr. Scott Lammers of the American Foundry Society. The assistance of all of these individuals is gratefully acknowledged.

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FIGURES

Figure 1. The main ranch house at the Spring Hill Ranch Headquarters complex. View to the northwest.

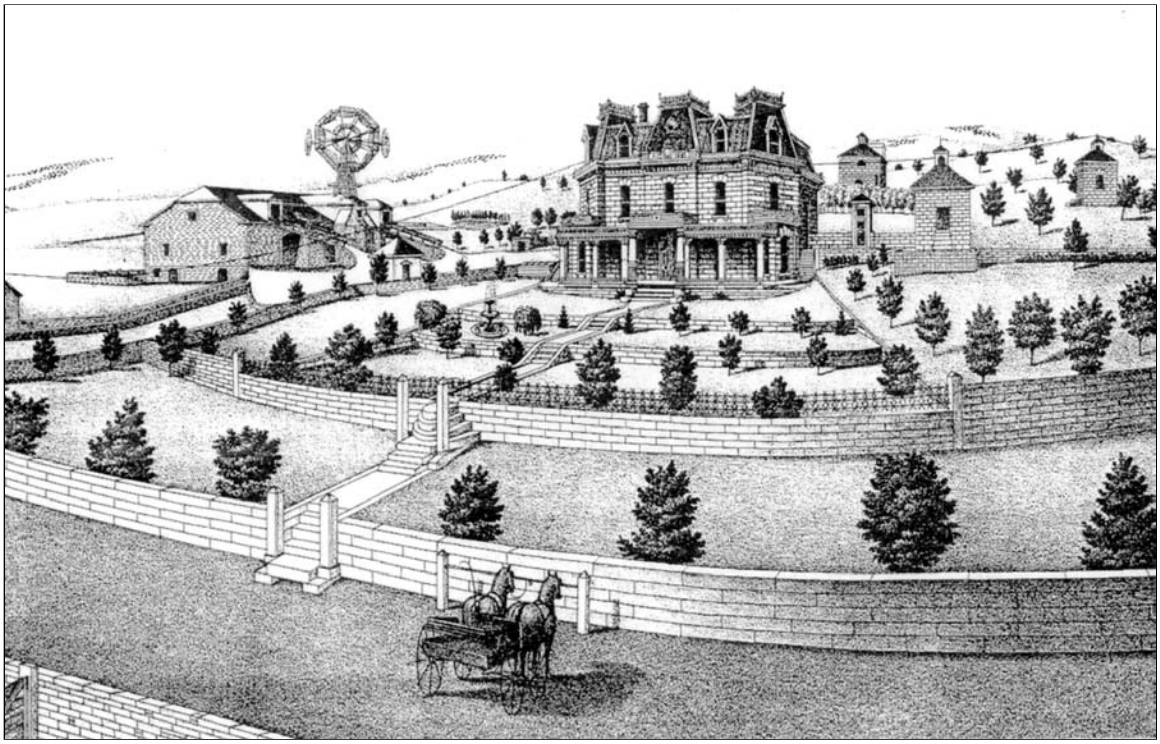

Figure 2. Lithograph of the Spring Hill Ranch from the Official State Atlas of Kansas (L.H. Everts & Co.). The fountain cistern would lie in front of the second small structure to the right of the main ranch house. The fountain is shown on the second terrace below the ranch house porch.

Figure 3. Cistern below the east side of the ice house, Spring Hill Ranch Headquarters complex. View to west from behind the main ranch house.

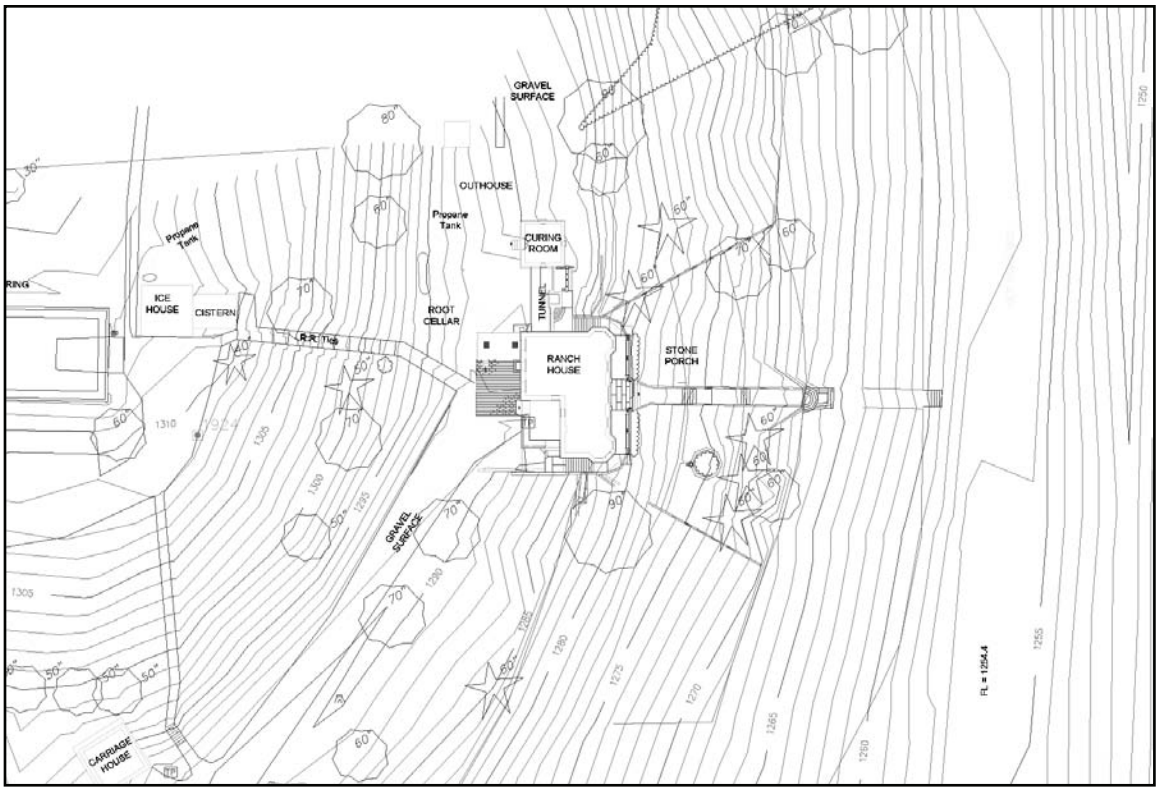

Figure 4. Topographic map, Spring Hill Ranch Headquarters Complex.

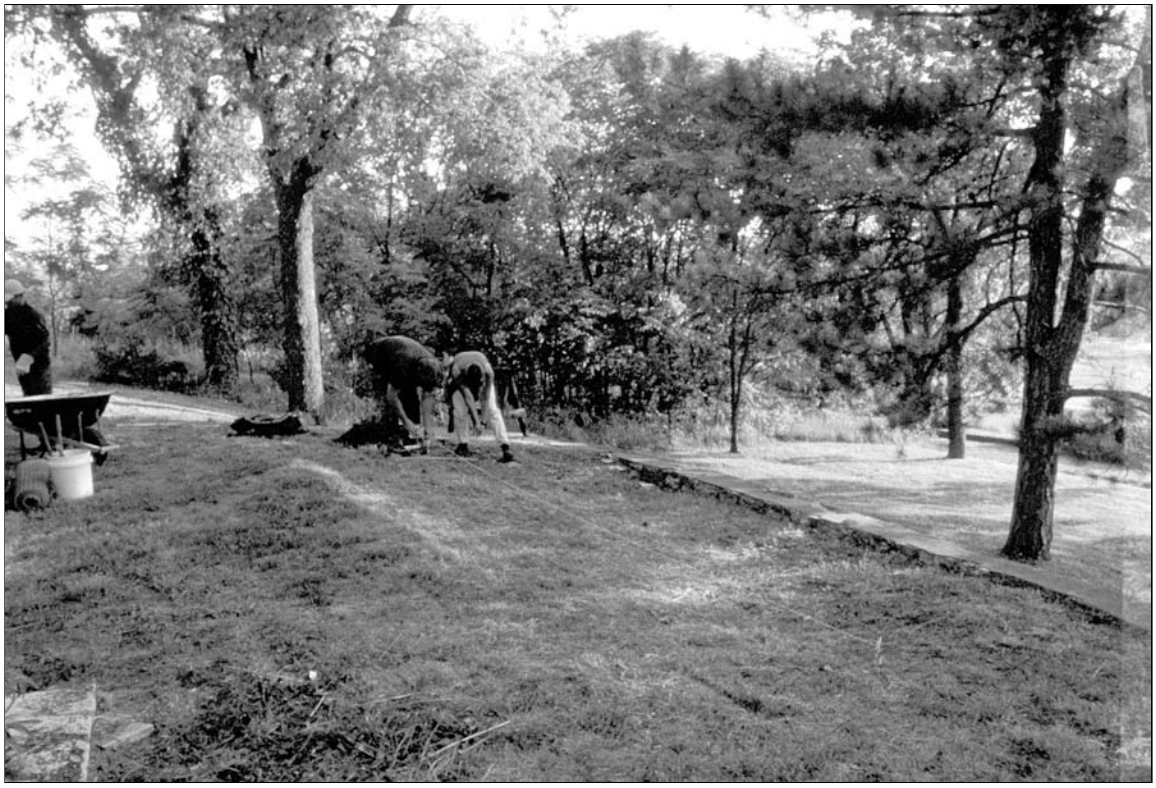

Figure 5. Depression atop the fountain cistern. The right side of the depression is bounded by the high retaining wall.

Figure 6. Initial excavation of shallow trenches across the cistern depression. View to the north.

Figure 7. View to northwest across excavation.

Figure 8. South end of the partially excavated cistern showing the intact vaulted roof. Parge coat is visible on the face of the end wall.

Figure 9. East wall of the cistern showing the spring line of the roof vault, which is tied into the inner face of the retaining wall.

Figure 10. West wall of the cistern. The bucket rests on the Crouse Limestone ledge.

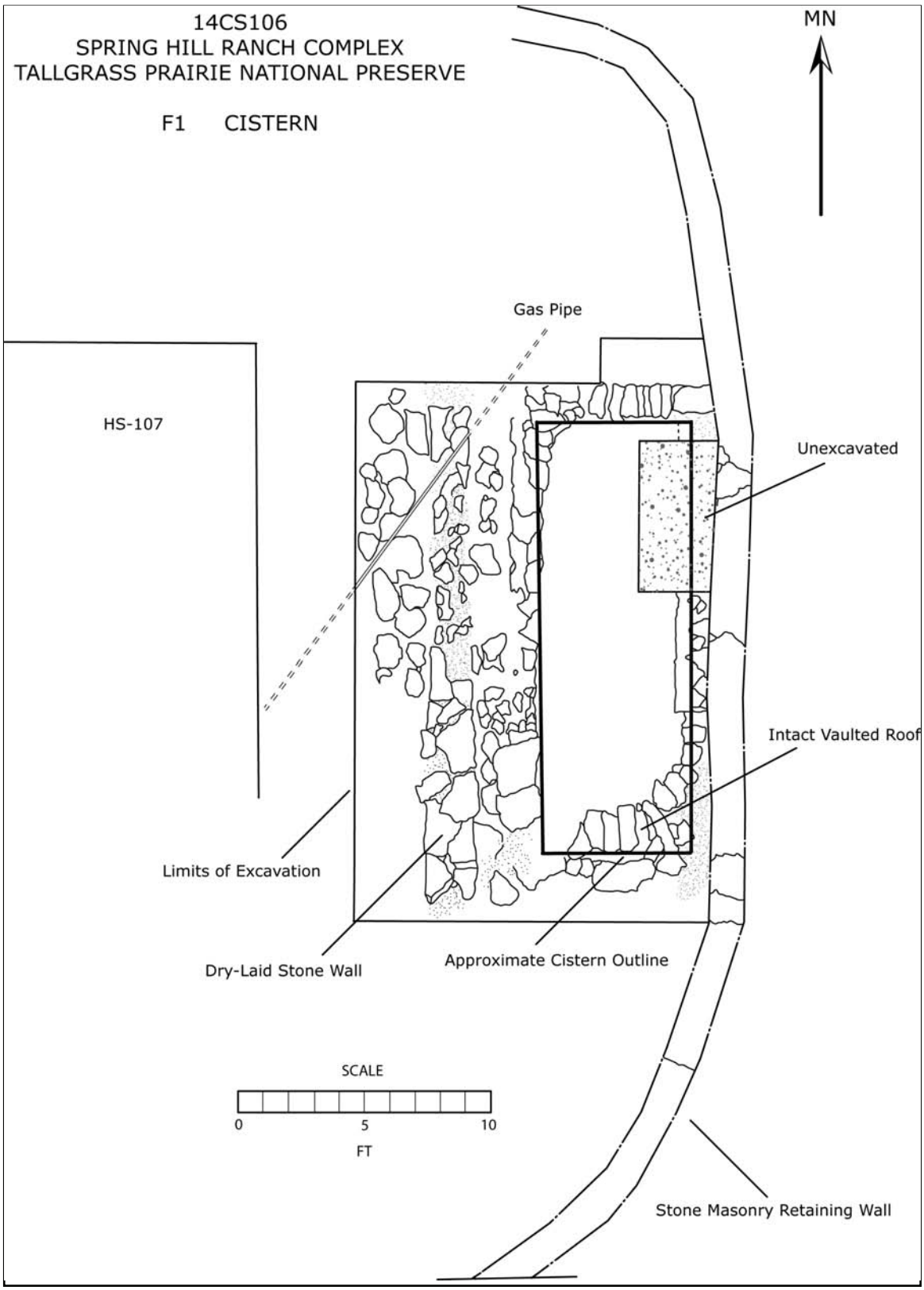

Figure 11. Feature 1 (F1) plan view map.

Figure 12. Close-up of the south interior cistern wall. The probable iron inlet pipe is visible at the lower right.

Figure 13. Excavated fountain pedestal in front of the main ranch house. View to the east.

Figure 14. Completed test excavation of the fountain cistern at the Spring Hill Ranch Headquarters complex, Tallgrass Prairie National Preserve. View to the south toward the main ranch house.

Figure 15. Artifact photographs.

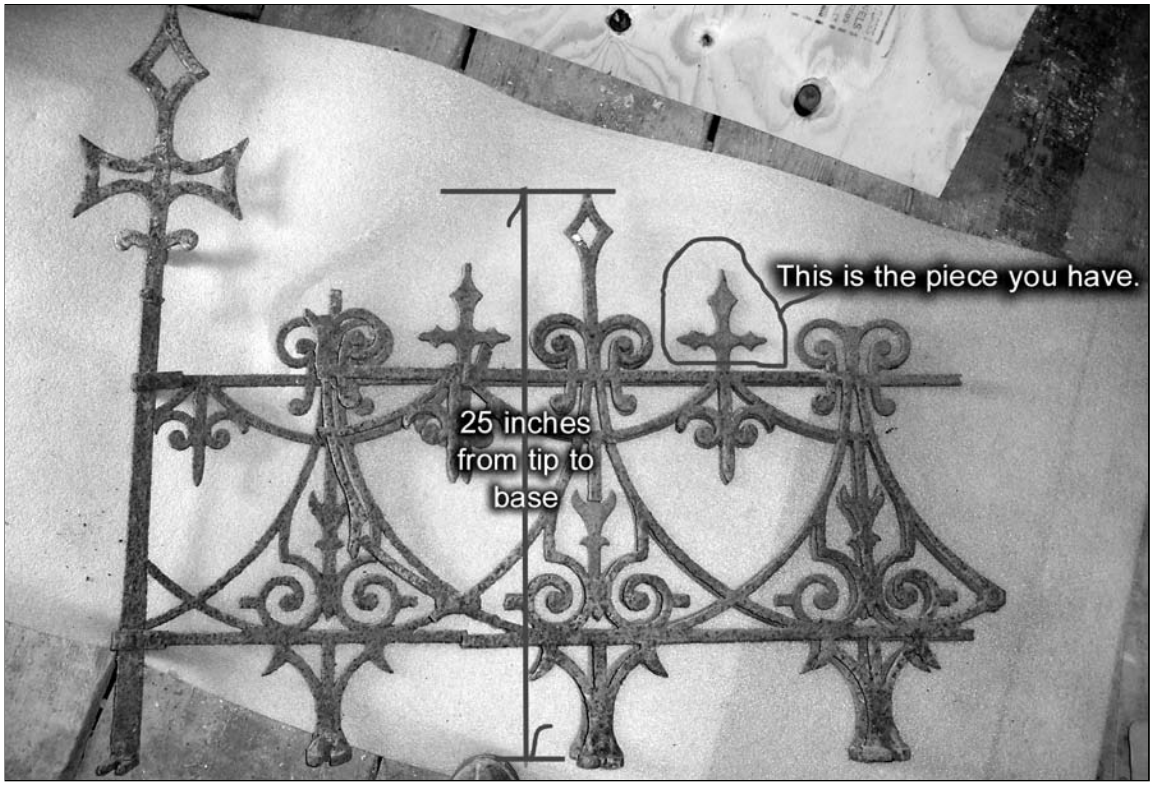

Figure 16. Intact cresting panel from the main ranch house.

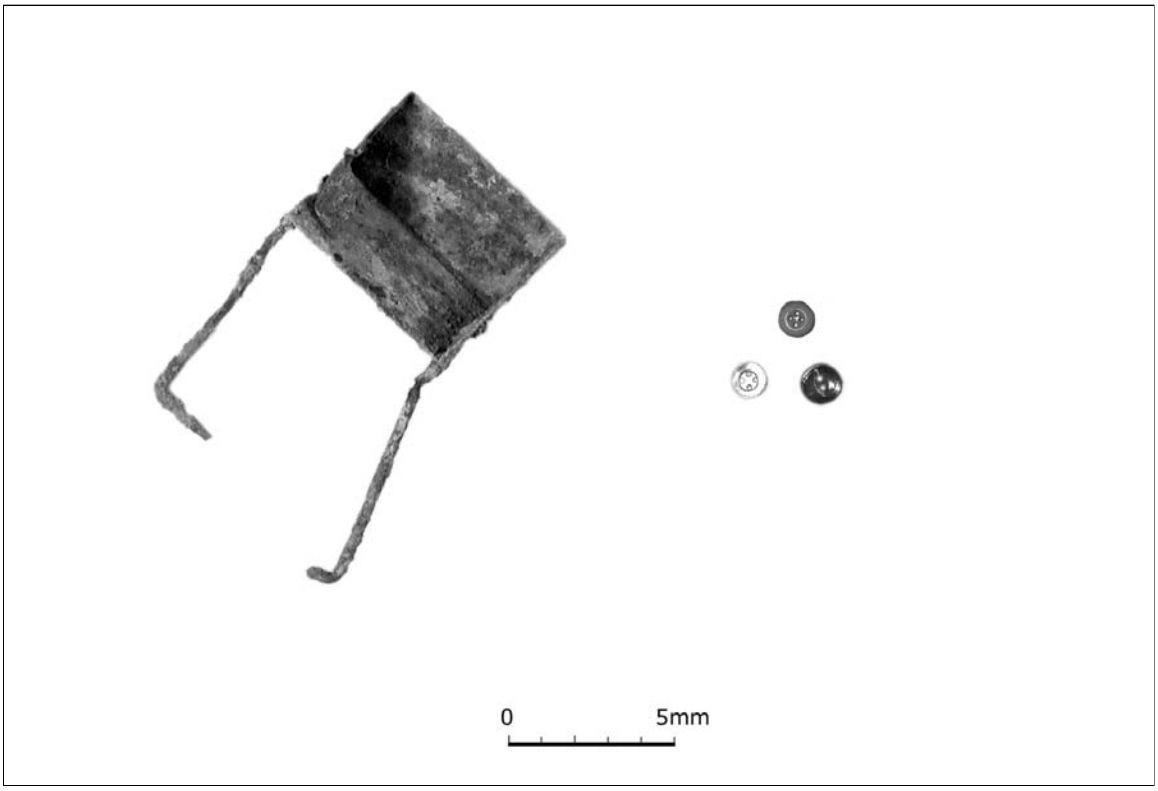

Figure 17. Artifact photographs.

Figure 18. Crew photograph: Left to right, Neal Westphal, Al O'Bright, Joan Westphal, Ricci Soto, Seth Lambert, Robert King, and Lisa Stanley.

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REFERENCES CITED

Adams, William Hampton
2002 Machine Cut Nails and Wire Nails: American Production and Use for Dating 19th Century and Early 20th Century Sites. Historical Archaeology 36(4):66-88)

American Foundry Society
2006 Home Page. <http://www.afsinc.org>, accessed June 30, 2006. Schaumburg, Illinois.

Atlas Foundry Company, Inc.
2006 Glossary. <http://www.atlasfdry.com/glossary.htm>, accessed June 30, 2006. Marion, Indiana.

Barnes, Frank C.
1980 Cartridges of the World (4th Edition). DBI Books, Northfield, Illinois.

Everts, L.H., & Co.
1887 The Official State Atlas of Kansas. Philadelphia, Pennsylvania.

Huntington, R.T., and D. R. Dunn
1977 Cartridge Headstamp Guide (First Revision). H.P. White Laboratory, Inc., Street, Maryland.

Jones, Bruce A.
1999 Archeological Overview and Assessment for Tallgrass Prairie National Preserve, Chase County, Kansas. Midwest Archeological Center Technical Report No. 61. Lincoln, Nebraska.

2000 Trip Report: Travel to Tallgrass Prairie National Preserve, Chase County, Kansas, October 22-25, October 29-31, 2000 (dated November 2, 2000). On file, Midwest Archeological Center, Lincoln, Nebraska.

2002a Archeological Work Plan: Evaluative Testing at the Spring Hill Ranch Complex: HS-9. On file, Midwest Archeological Center, Lincoln, Nebraska.

2002b Trip Report: Travel to Tallgrass Prairie National Preserve, Kansas, September 8-13, 2002 (dated September 17, 2002). On file, Midwest Archeological Center, Lincoln, Nebraska.

2004 Trip Report: Travel to Tallgrass Prairie National Preserve, August 2-3, 2004 (dated August 5, 2004). On file, Midwest Archeological Center, Lincoln, Nebraska.

2007 Archeological Construction Monitoring for the Water and Fire Suppression Systems, Tallgrass Prairie National Preserve, Chase County, Kansas. Midwest Archeological Center Technical Report No. 96, Lincoln, Nebraska.

Logan, Herschel C.
1959 Cartridges. Bonanza Books, New York.

O'Bright, Al
2002 Trip Report: Tallgrass Prairie, September 9-13 (dated October 1, 2002). On file, Midwest Archeological Center, Lincoln, Nebraska.

Peacock, Primrose
1972 Antique Buttons. Drake Publishers, New York.

Sawin, Robert S.
2004 Bedrock Associated with the Ranch House at the Tallgrass Prairie National Preserve, Chase County, Kansas. Kansas Geological Survey, Lawrence, Kansas.

Schoen, Christopher
1985 Windows on the Plains: Flat Glass from the Nineteenth Century Plains Frontier. Master's Thesis, Department of Anthropology, University of Nebraska-Lincoln.

Standler, Ronald B.
2006 Shotshell Cartridge History. <http://www.rbs0.com/shotshell.,htm>, accessed June 27, 2006.

Starkey, George W.
1940 The Kaw Trail. In Chase County Historical Sketches, Vol. 1. Chase County Historical Society, Cottonwood Falls, Kansas.

Steinauer, Curtis
2006 Centerfire Shot Shells: Shot Shell Headstamp Identification. <http://members.shaw.ca/cartridge-corner/shotgun.htm>, accessed June 20, 2996. Calgary, Alberta, Canada.

Wikipedia.org
2006 Mortar (Masonry). <http://en.wikipedia.org/wiki/Mortar_%28masonry%29>, accessed June 21, 2006.

Cover: View to northwest across excavation.