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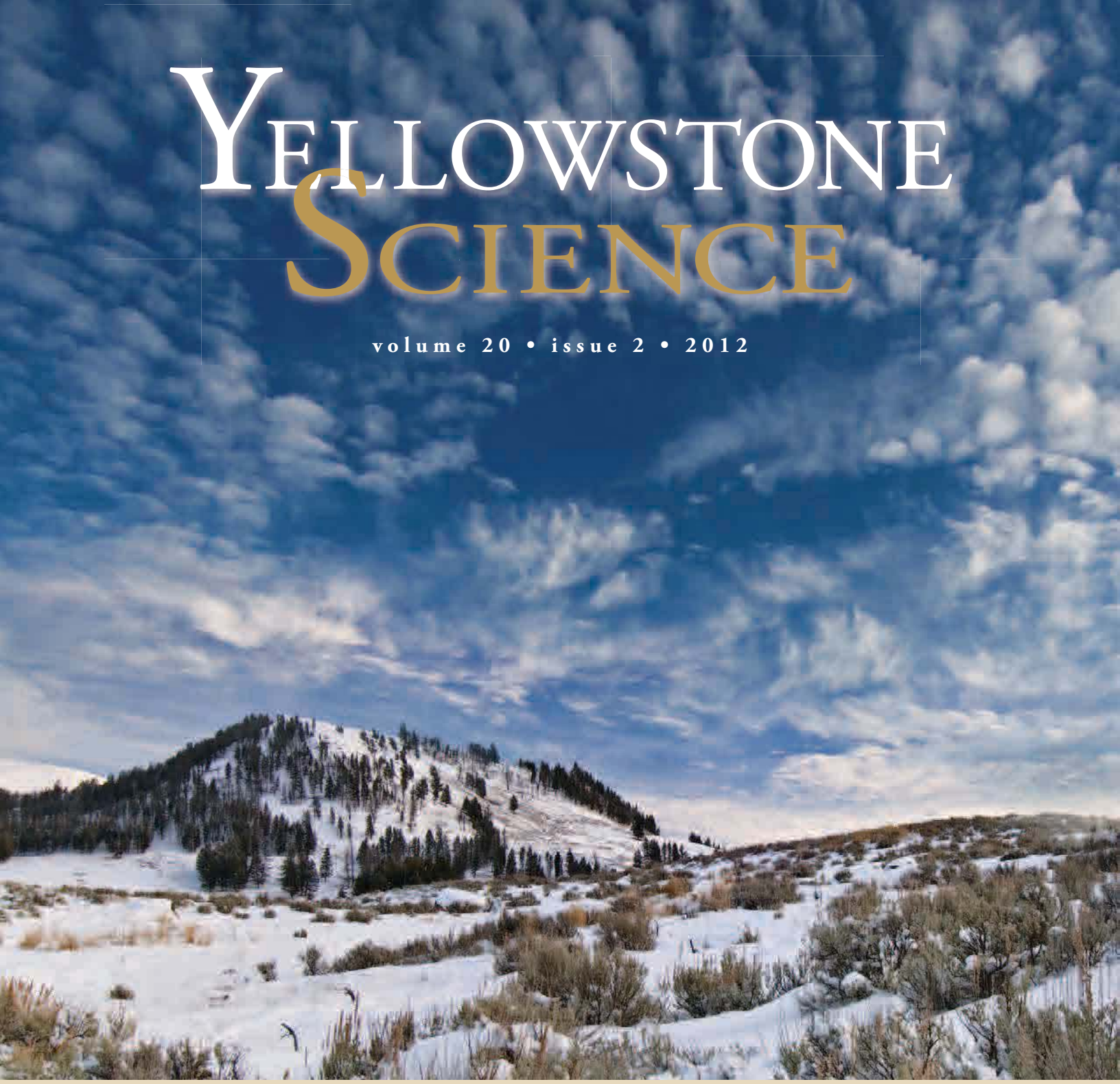

Archeology of the Airport Rings Site

An Interview with Suzanne Lewis

Following the Path of Stone

Origins of a Continent

of Yellowstone National Park and the surrounding landscape from park staff. Yellowstone geologist Cheryl Jaworowski and student technicians Laura Bueter and Emma Reinhart explained the significance and goals of the Mammoth Hot Springs mapping project, as well as how to orient and read maps. The girls learned about a technique to visually estimate the area covered by flowing thermal water and colorful microbial mats at Canary Springs. Along with the two student technicians, each of the girls estimated the flow area of the Mammoth Terraces by using a geologic map as a base and drawing their estimates with a pencil.

The estimates derived from the Project Exploration students' maps ranged from 10,260 to 49,240 square meters, with most between 14,000 and 20,000 square meters, while those of the two Yellowstone geology technicians were 15,900 and 21,300 square meters. This project helped the Yellowstone geology program to assess the usefulness and accuracy of this technique. Even with these variations in area, it can provide a map of hydrothermal activity that complements the photographs and observations of National Park Service interpretive rangers.

COURTESY OF PROJECT EXPLORATION

Kyra W. completes her classroom preparations before heading out to Yellowstone for field work.

—The 2011 All Girls Expedition team: Constance Robinson, Jackie R., Xhaidt T., Kennedy W., Kyra W., Morgan W., Robbie L., Shelby G., and Ana L.

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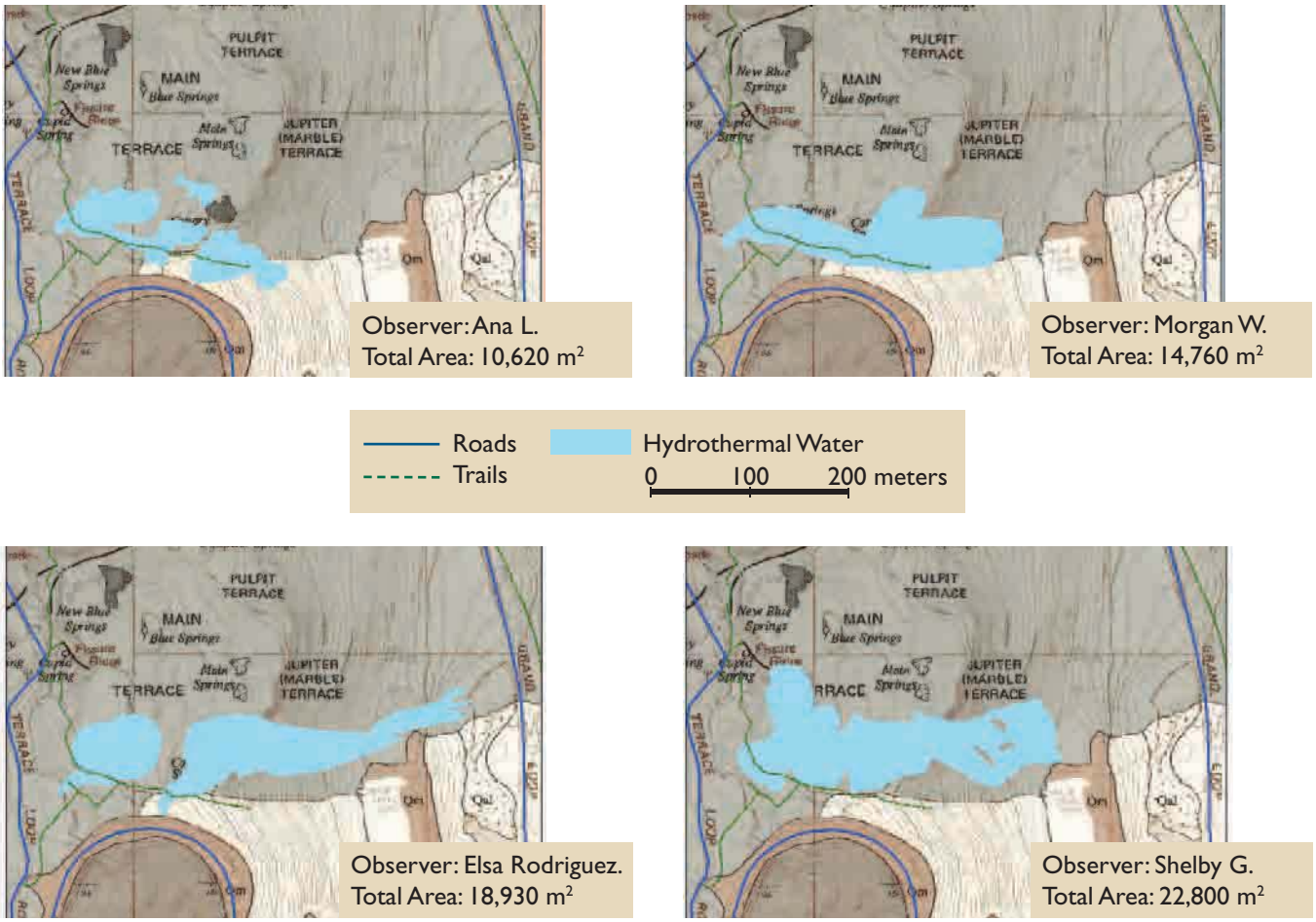

Geology technicians converted each student's illustrations into digital shapes, then produced maps of their estimations of the thermal waters of the Trail/Canary springs area.

Stone Circles in Yellowstone

Archeology of the Airport Rings Site

Michael Livers

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Overview of the project area at the Airport Rings Site.

The upper Yellowstone River Valley was occupied for thousands of years by hunter-gatherer populations prior to the twentieth century. The river provides a natural corridor for the migration of animals and people obtaining resources along the valley (Hale 2003). This is evident from archeological sites such as the Carbella buffalo jump, which shows stratified occupation going back more than 6,000 years, and Larry Lahren's Myers-Hindman site, with over 7,000 years of continuous occupation. Lahren's Anzick site, located north of the upper Yellowstone River Valley, is the only Clovis-age burial that has been documented in North America, dating to 10,680±50 BP (Lahren 2006).

Within Yellowstone National Park, the Osprey Beach site (Shortt 2001) and others at Yellowstone Lake provide evidence of use that began more than 8,000 years ago. However, life in the valley differed from that in the park's upland interior. One form of cultural remains left by early inhabitants that changes with the transition from the valley to the interior are the stone rings they used to hold their tipis in place, going back at least 3,000 years. Although nearly nonexistent at higher elevations of the Greater Yellowstone area, probably because of a lack of rocks, stone rings have been documented in lower, glaciated areas on the park's periphery.

Stone circle sites have been recorded on both public and private land in the upper Yellowstone River Valley. Nearly all of them have been found within six miles of a buffalo jump site, but that may simply reflect a bias in survey practices. Records at the Montana State Historic Preservation Office show that more than 100 tipi ring or stone circle sites have been identified in Park County. Although some Plains Indians sites have been documented with hundreds of rings, indicating large communal gatherings or repeated visits to the locations, the stone circles found in and near Yellowstone have generally been single rings or a few rings clustered together, suggesting seasonal use of the area by small groups of foragers.

The University of Montana Yellowstone Archaeological Project (MYAP), which provides field work opportunities for students and information about the park's archeological resources for the National Park Service, identified five sites with a total of 32 stone circles northwest of Gardiner, Montana, during the 2007 and 2008 field seasons. All of the sites are in well-protected settings, generally with water and a good view on one side and a hill or enclosed valley on the other. The one referred to as Airport Rings contains the oldest recorded evidence of human use at the five sites, with radiocarbon dating of a charcoal sample from a hearth indicating occupation about 4,500 years ago.

YELL-02738

A tipi interior showing cooking and sleeping areas set out in a circular arrangement. Unknown photographer, 1870.

Prehistoric Stone Circles

The conical tipis once found on the Great Plains in great numbers were constructed from cured animal hides sewn together and stretched around wooden poles that had been lashed together at a central point. Not all tipis were anchored by rocks and not all stone circles found today were left behind from tipi use. A stone circle may be evidence that an area was used for a hide boiling pit, a sweat lodge, a medicine wheel, or an animal corral. Rocks have sometimes been found around the base of wikiups, which were conical lodges constructed entirely of wood poles and have been documented in the park much more frequently than stone circles (Malouf 1958). However, all of the stone circles referred to in this paper are considered tipi rings because of their size and the presence of a central hearth and domestic artifacts found nearby.

When Plains groups began using stones to hold their tipis in place is not known. In their report on Paleoindian campsites in the Hell Gap Valley of southeastern Wyoming, Irwin-Williams et al. (1973) suggest that the arrangement of nine rocks in the Frederick component of the excavation (6,400–6,000 BP) was similar to the stone rings found in later Plains sites. This could indicate tipi use occurring during the Early Archaic Period (7,000–5,000 BP); however, archeologists generally associate stone circles with tipi adaptations that occurred during the Late Archaic Period (3,000–1,500 BP) (Frison 1991) because of the wealth of artifacts occurring in the later cultural periods. The research results presented in this paper suggest that use of tipis, or some other structure that needed rock weights, may have begun much earlier.

Some of the oldest verified stone circle sites are located on the Northern Plains (i.e., Montana, Wyoming, North Dakota, and Alberta, Canada), but only a few from before 2,000–3,000 BP have been identified. The Cactus Flower site, which is considered the oldest documented tipi ring on the Great Plains, was discovered in 1969 and excavated by John Brumley on the Suffield Military Reserve in southeastern Alberta. Occupation during the McKean Phase is indicated by diagnostic artifacts and radiocarbon dates around 4,200 BP (Brumley 1975), but based on the span of the McKean Complex (5,000–3,000 BP), most archeologists generally accept that the site could be as old as 5,000 BP.

The oldest dated stone circle site in Montana (site 24BH2317) is located in Big Horn County and associated with a similar period. It was tested in 1984 by Steve Aaberg and in 1998 by John Brumley and Ken Dickerson. A charcoal

. . . the stone circles found in and near Yellowstone have generally been single rings or a few rings clustered together, suggesting seasonal use of the area by small groups of foragers.

YELL 8166/W.H. JACKSON

The conical tipis of the Great Plains were sometimes anchored by rocks, leaving behind the stone circles we find today. Those circles may indicate the location of temporary encampments like this one, of the Washakie band of Shoshone in August 1870, located near Camp Brown (present-day Lander, WY).

YELL-33367-2/A.L. HAINES

An unidentified man points to a stone cooking circle unearthed near Corwin Springs and the park's northern boundary in 1962.

sample from a hearth feature within one of the rings had an uncalibrated AMS (accelerator mass spectometry) date of 3,940±60 BP and a one sigma calibrated date of 4,275–4,430 BP (Brumley and Dickerson 2000). Archeologists compiling known dates from these sites have concluded that stone circle formation increased after 2,000 BP as a result of shifting subsistence strategies for bison hunting.

Even with the documentation that now exists on stone circle interpretation and history (Livers and MacDonald 2009), these features often pose interpretive challenges. The circles themselves do not always provide the information needed to understand the contextual and temporal association of the mobile groups that used tipis. As anthropologist Fred Schneider pointed out:

> *"Past investigations of tipi rings usually focused on excavation of ring interiors, and they commonly placed a test unit over the center of the ring. Literature published prior to 1970 shows that many early investigators did not make use of screens but simply chunked out or skimmed the soil with shovels. It is no wonder that many archeologists reported a paucity of artifacts and became disenchanted with tipi rings and their excavation" (Schneider 1983).*

Boundary Lands Project Area

With an average elevation of 5,270 feet, the boundary lands are in the lowest and driest portion of the park. The area has sloping alluvial fans and flat terraces with beds of silt and sand that were deposited about 10,000 years ago when the adjacent Yellowstone River was dammed by a landslide at Yankee Jim Canyon. Surrounded by the Rocky Mountains, the river valley itself is in a High Plains setting where a sagebrush and short-grass prairie developed around 5,000 years ago. The surface vegetation remains predominantly sagebrush grassland community, with stands of sagebrush up to eight feet tall, indicating the relatively dry and unchanging nature of the area. Limited pine growth marks the adjacent slopes and drainages, while a few riparian tree varieties grow along the river.

The archeological record of the region depicts seasonal hunter-gatherer movements based on subsistence and procurement of plants. The wide variety of flora and fauna would have provided potential subsistence during different times of the year (MacDonald and Hale 2011). However, the plant resources available in the upper Yellowstone River Valley are poor compared to those of higher elevations in the park and other intermountain regions. The first people in the area would have also relied on animals for food. The ecosystem is currently home to many large mammals (bison, elk, moose, bighorn sheep, deer, antelope, grizzly and black bear, mountain lions, coyotes, and wolves), as well as a variety of birds and other small animals, but these population distributions may have been different in the past (Frison 1991).

We would expect to find evidence that lowland valley areas like the boundary lands were occupied during winter, when human movements were more restricted and the need for shelter greater (Madsen and Metcalf 2000; Larson

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Montana Yellowstone Archeological Project participants excavate a stone circle in Feature 6 at Airport Rings.

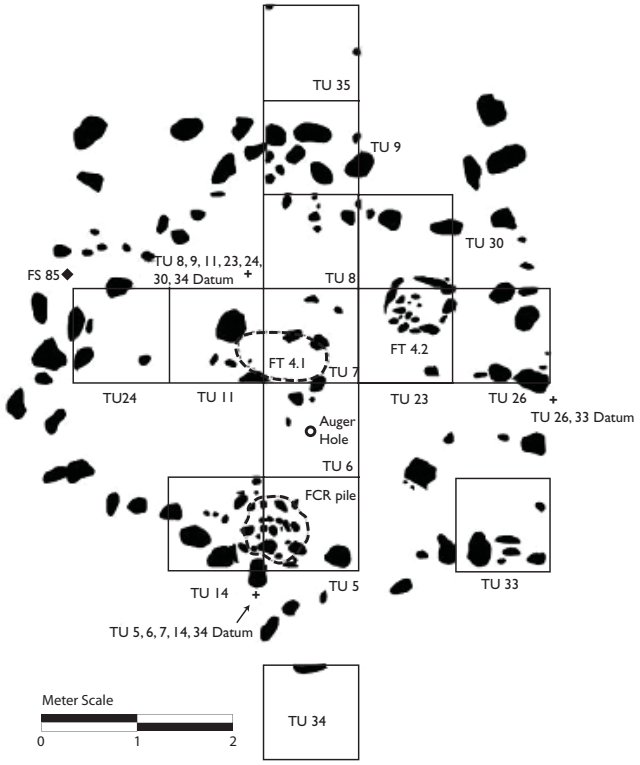

Figure 1. Final excavation planview for Feature 4.

and Francis 1997). Given the evidence of more than 10,500 years of human occupation in the Greater Yellowstone Area (GYA), we would also expect to find cultural and technological innovations representing all periods of prehistory.

First identified in 1986 by avocational archeologist Tom Jerde, the Airport Rings (site 24YE357) is on a glacial bench that would have been protected by a high rocky ridge, a stream, and its view down the steep slope to the Yellowstone River valley as it extends northward. A large historic trash scatter encroaches minimally into the prehistoric component, which is located on a heavily cobble-strewn, Late Pleistocene glacial outwash channel and includes a sparse lithic debris scatter around 11 stone circles.

The MYAP survey recovered from the surface scatter several scraping tools and a Late Prehistoric tri-notched projectile point that has been chemically sourced to Obsidian Cliff. To assess eligibility for the National Register of Historic Places, we used 39 test units, each one square meter to obtain excavation samples. In an attempt to uncover a central hearth feature that would support our hypotheses about the site's function, we excavated longitudinal cross-sections in three of the stone circles, two of them roughly 25m^2, and the third, half as large. We excavated other test units to the north and south of each stone circle so that we could evaluate how the area outside the circles may have been used (fig. 1).

Results of the lithic sourcing demonstrate a well-established Late Prehistoric trend toward use of material from Obsidian Cliff … but also raw stone from more than 100 miles away.

Artifact and Sample Analysis

Results of site excavation proved rewarding, with the recovery of 10 projectile points, over 600 flake artifacts and tools, and faunal remains and floral specimens from soil test-samples (table 1). We sent the botanical remains to PaleoResearch, Inc., of Colorado for analysis, charcoal samples for radiocarbon dating to Beta Analytic, Inc., of Miami, Florida, and select volcanic artifacts to Richard Hughes for chemical sourcing.

Results of the lithic sourcing demonstrate a well-established Late Prehistoric trend toward use of material from Obsidian Cliff (Davis et al. 1995), but also raw stone from more than 100 miles away. Sourcing results for the exotic stone tool artifacts matched the poorly known Grasshopper Knob dacite source in west-central Montana and the Bear Gulch obsidian source in Idaho. The presence of materials at the site from these sources is indicative of a system of trade with neighboring groups, domestic mobility, or both.

Table 1. Summary of excavation results, Airport Rings (24YE357).

Feature ID #	Size (m^2)	Sample size	Feature (% excavated)	Artifacts	Lithics/m^2	Interior	Faunal	Botanical
4	19.6	14	71.4	350	25	2 hearths	Bison, large mammal	Juniper, sagebrush
6	19.6	12	61.2	178	14.8	none	Unidentified	N/A
8	22.9	13	56.7	155	11.9	1 hearth	Large, medium mammal	Willow, sagebrush
Total	62.1	39	62.8 (avg.)	683	17.5 (avg.)	3 hearths	Bison, other unknown mammals	3 fuel sources


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Fire features from stone circle Feature 4: FT 4.1 (foreground, next to photo board) and FT 4.2 (top). View east from western edge of stone circle.

Analysis of the faunal samples indicated that site occupants fit the highly mobile, Plains bison, hunter-gatherer model, subsisting on bison and other large- to medium-sized mammals. Macrofloral analysis of soil samples obtained from the fire features in the stone circles pointed to the use of locally available plants (e.g., juniper, sagebrush, willow) as fuel sources, but did not produce substantial evidence of plant processing at the site.

The overall lack of lithic artifact diversity and low volume of artifacts suggest that the campsite received only short-term use. Analysis of the lithic flaking debris indicates that the late stages of tool manufacturing occurred most often during site occupation, while obsidian, likely from Obsidian Cliff, was the favored stone. The relative absence of tools in the recovered assemblage suggests that while site occupants likely performed daily tasks, this campsite was not designated for a specific task such as hide processing or tool manufacturing. Analysis of the diagnostic projectile points provided relative chronological dates and strong evidence of subsistence activities focused on hunting.

The excavations at the three stone circle features provide evidence for Middle Archaic, Late Archaic, and Late Prehistoric occupation episodes. Radiocarbon analysis of charcoal samples from the three hearths provided one date around the beginning of the Middle Archaic Period and two for the Late Prehistoric Period that were within 100 years of each other, supporting the trend of increased occupation and use of the GYA over the last 1,000 years.

None of the recovered projectile points were complete, having been damaged in some way during their use. Although the points were likely associated with use of the hearths, their chronology covers periods not supported by the hearths' radiocarbon dates, suggesting a possible alternative interpretation. The best type affiliations associated with these point fragments put the seven diagnostic artifacts into five possible phases covering the range of dates from 5,000 BP to 400 BP.

Explored Features

One of the stone circles that was tested (Feature 4) appears to have been occupied on at least two and probably three occasions beginning as early as about 4,500 years ago. More lithic artifacts were excavated from Feature 4 than from the other two stone circles combined.

The presence of two hearths within the roughly 25m^2 circle indicates that the site was probably used during late fall to winter. The more recent of the hearths (Feature 4.1), located 10 cm below the surface at the center of the circle, yielded a conventional radiocarbon date of 340±40 BP (Beta-251175). The three projectile points found in association with this hearth were also of probable Late Prehistoric age and


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Overview of the Feature 6 stone circle excavation site.

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Examples of Late Prehistoric projectile points, including a tri-notched obsidian point (left) and a side-notched point recovered from Feature 6 (right).


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Moving the stones (arrows) of Feature 8 indicates that they were covered by a layer of ash that is absent from the soil below them (dotted lines). The ash indicates a hearth site.

support an occupation approximately 500–1,500 years ago. Short-term use is suggested by the hearth's shallow maximum depth (~5 cm), the small number of rocks lining the hearth, and the low density of fire-cracked rock, charcoal, and artifacts. However, the low density of artifacts could be a result of the feature having been cleaned out after use. The stones used in cooking pits were often placed on a bed of hot coals, and if the rocks cracked from overheating, they may have been removed or a new pit would be dug (Francis 2000; Frison 1991).

The Late Prehistoric occupation at Feature 4 may have been the first since the older hearth (Feature 4.2) was created. The older hearth was found off-center within the stone circle, close to Feature 4.1, and 12–14 centimeters below the surface [Photo 3]. Wood charcoal from Feature 4.2 yielded a conventional radiocarbon date of 4,520±40 BP (Beta-250333) with a 2 sigma calibrated result of CAL BP 5,310–5,040. With large rocks placed around the hearth walls and several sandstone pieces lining the pit's northern interior, it resembles the Archaic Period rock or sandstone slab-lined roasting pits recorded in the northwest uplands of Wyoming. Soil samples and projectile points found at the site, including a possible Middle Archaic Oxbow point base of translucent obsidian, substantiate terminal Early Archaic to early Middle Archaic use of the hearth and possibly of the stone circle itself.

The interior of Feature 6, the smallest of the stone circles, was completely excavated. This enabled researchers to address potential sampling bias in the excavation methods used at the other two stone circles. The small number of lithic artifacts recovered during excavation of Feature 6, which suggest a single occupation episode, include a nicely worked Late Prehistoric arrow point from a tan, fine-grained orthoquartzite and a fragment of a possible Avonlea or other Late Prehistoric arrow point. Both of these projectile points indicate a Late Prehistoric occupation, perhaps 1,000 to 1,500 years ago, although researchers were unable to identify fire features that might corroborate the period of use.

At the center of the third stone circle (Feature 8), a hearth (Feature 8.1) packed with charcoal and fire-cracked rock was excavated, indicating an intensive and hot fire. Charcoal from the hearth yielded a conventional radiocarbon age of 270±50 BP or AD 1630–1730 (BETA-250334). The 2 sigma calibrated radiocarbon age is CAL AD 1480 to 1680 and CAL AD 1770 to 1800. In association with the hearth, excavation revealed at least two large cobbles atop an ash layer up to 15 centimeters thick, indicating that the layer formed during site occupation. The radiocarbon data from the charcoal sample and the distribution of ash in association with the hearth suggest that this stone circle likely experienced a single winter occupation during the terminal Late Prehistoric to Contact period, approximately AD 1480 to

Although the accurate association of buried cultural materials with surface materials is difficult, the overall chronological trend … leaves open the possibility that the Airport Rings site contains the oldest known stone circle on the Northern Plains by several hundred years…


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Michael Livers and MYAP participant Jacob Adams during the survey in Yellowstone.

1630. The lack of stratification within the hearth and low artifact count from the stone circle excavation also suggest a single occupation rather than multiple uses over time.

Conclusion

The University of Montana field work at the Airport Rings site included the first intensive excavations of stone circles within Yellowstone National Park as well as within the upper Yellowstone River Valley. The goal of the project was exploratory and allowed for the interpretation of archeological data that helps paint a picture of daily life at the site during multiple prehistoric occupations. Results of the data analyses have provided preliminary explanations regarding period of use, probable seasonality, intersite patterning, the subsistence strategies used by hunter-gatherers in the area, and mobility patterns associated with stone raw material procurement.

Although the accurate association of buried cultural materials with surface materials is difficult, the overall chronological trend in the upper Yellowstone River Valley supports long-term use of stone circles in the boundary lands area, where circles have been dated from the Late Archaic to the Late Prehistoric, with the latter also yielding a Middle Archaic hearth. While this leaves open the possibility that the Airport Rings site contains the oldest known stone circle on the Northern Plains by several hundred years, it is highly likely that the Late Prehistoric stone circles overlay an early Middle Archaic occupation on the landform. Establishing an association of the Middle Archaic hearth with the stone circle formation now found on the surface may be impossible, but future research at the site could attempt to identify additional subsurface rocks and artifacts arranged in a circular pattern to confirm use of a stone circle structure about 4,500 years ago.

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COURTESY OF THE AUTHOR

Michael Livers has a master's degree in Cultural Heritage Studies from the University of Montana. He is a Research Archaeologist for the Department of Anthropology. His research emphasis includes spatial patterning, landform use and occupation in the Intermountain Region, and expanding on the culture history of the Yellowstone region. His work is included in *Contributions to Anthropology*, Volume 13(1), Yellowstone Archaeology: Northern Yellowstone, and Volume 13(2) on Southern Yellowstone.

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