

Boiling Arch Archaeology

By Nicole Foss

February - Moon of the Boiling Sap

As the calendar turns to February, winter seems to double down in Minnesota, reminding us of its power to strew snow across fields and roads, and send gusts of icy chills through our days. But the days are getting noticeably longer, the sun (when it manages to break through the clouds) shines brighter, and the trees are coming alive beneath the bark.

The Ojibwe name for this time of year, from mid-February to March, translates to the Moon of the Boiling Sap. There is a long and rich cultural tradition among the Dakota and Ojibwe of boiling maple sap into syrup and sugar. When new arrivals settled in Minnesota during the nineteenth century, they too took up maple sugaring to provide carbohydrates in late winter when stored and forageable food was scarce, not to mention infuse foods and drinks with a sweet and unmistakable flavor.

Sap for sugaring is most commonly collected from sugar maple, red maple, and black maple. The sap, which begins with a sugar content of approximately 2.5%, is drastically reduced in volume via boiling. It takes 40 gallons of sap to produce one gallon of syrup – a viscous liquid with a sugar content of 66% or greater. The process for sap collection consists of cutting or drilling holes into the tree's bark; inserting a tap, tube, or spile; and then suspending a container beneath it to collect the sap. Then, the boiling begins. Boiling is done one of two ways – over an open

fire or over an enclosed fire. With the open fire method, the sap is placed in a container suspended over a fire ring or hearth. With the enclosed fire method, sap is placed in a flat pan on a kind of firebox, called a boiling arch.

Discovery of Two Boiling Arches

On a sunny day in May 2017, Jake and I were walking through the woods on an upland terrace above the St. Croix River in Interstate State Park near Taylors Falls. We were in search of a long, rectangular mound of field rubble and a few bricks (Figure 1) that Jake and DNR archaeologist David Radford had identified in a stand of magnificent hardwoods, predominantly maple, a week before. There had been some old metal coffee cans with characteristic nail holes near the rims scattered in the area, evidence of maple sap collection. But the mound of stones was unusual – what purpose did it serve?

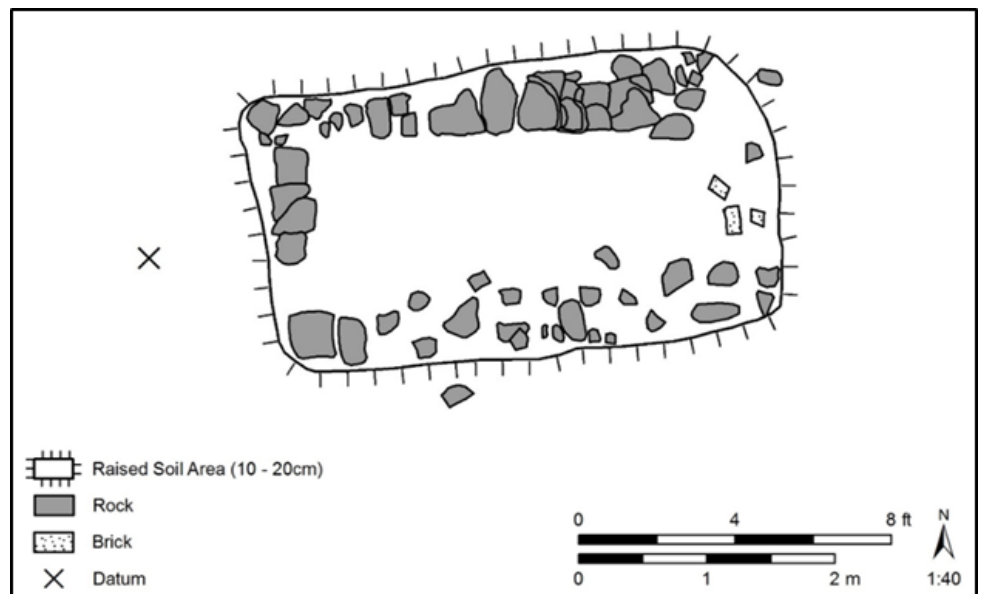


Fig. 1 Rectangular Pile of Stones (Foss and Foss 2018)

(continued on p. 3)

Letter from the President

By Dan Wendt

The letter from the MAS President is intended as a vehicle to inform the general membership of the Minnesota Archaeological Society of recent Board of Directors activities. The following is a brief recap of the events, discussions, and decisions that transpired during the past quarter and future plans.

We were saddened by the passing of Guy Gibbon in January. Guy was a Professor of Anthropology and Archaeology at the University of Minnesota, Twin Cities Campus. He educated and mentored a generation of archaeologists in Minnesota. He was a frequent contributor of both papers and lectures for the Minnesota Archaeological Society. In his retirement, Guy had the chance to write several books that framed his legacy to Minnesota archaeology and the study of archaeology more generally. His 2012 book, *Archaeology of Minnesota: The Prehistory of the Upper Mississippi River Region*, is an outstanding perspective on why the study archaeology is relevant to every Minnesotan living today.

We are excited to announce that April 27 will be the premier of our made-for-public-television documentary; ***Bound By Earth: Archaeology in Minnesota***. This prime time premier will be shown on the 9pm, **Minnesota Experience Series**, on Twin Cities Public Television. The documentary focuses on the science and technology archaeologists use to uncover and preserve archaeological resources in a non-invasive way and how the cultural landscape, such as Native American burial mounds, are significant to all peoples today. Produced in partnership between TPT and the Minnesota Archaeological Society, and financed in part with funds provided by the State of Minnesota from the Arts and Cultural Heritage Fund through the Minnesota Historical Society.

The 2017 issue of the *Minnesota Archaeologist* will be shipped in May. Thank you for your patience. We are working to catch up. Thank you to our authors who provide the content that makes the journal possible. Please consider publishing your papers with us. We have some content but need more for our 2018 issue.

Our MAS Annual Dinner Meeting will be Friday May 8th at Hamline University. Please see the announcement in this newsletter. We will have a brief meeting to elect the board and officers then we share our documentary with the society. Thank you to Hamline University for the wonderful venue.

MAS Board

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Boiling Arch Archaeology *(continued from p. 1)*

After locating and examining the heaped pile of rocks, we fanned out, picking our way through the forest in search of clues to explain its purpose. Approximately 800 feet to the east, partway down a ravine, was a collapsed rectangular structure made of three walls of concrete with a concrete floor. In terms of length, width, and height (approximately 12 ft. x 4.5 ft. x 1.5 ft.), it was oddly similar to the dimensions of the rubble pile. It was readily apparent that this concrete structure had been built for use with fire. There was a circular opening for a chimney pipe – quickly located on the ground nearby – at one of the short ends of the structure, while the other end contained part of a hinge that previously supported a door, allowing for loading fuel and controlling the amount of oxygen in what was

soon identified as the firebox.

With the help of local oral histories identifying this maple stand as a sugaring site during the late nineteenth and early twentieth centuries, and historical descriptions of sorghum and maple sap processing equipment in use during this time period, we were able to identify the concrete structure as a type of boiling arch. A **boiling arch** is an elongated U-shaped structure which forms a firebox over which a flat pan containing sap is placed for reduction into a syrup. After identification of this concrete boiling arch, which likely dated from the early-to-mid-twentieth century, it became apparent that the rubble pile was in fact a boiling arch as well, one that very likely predated the concrete arch.

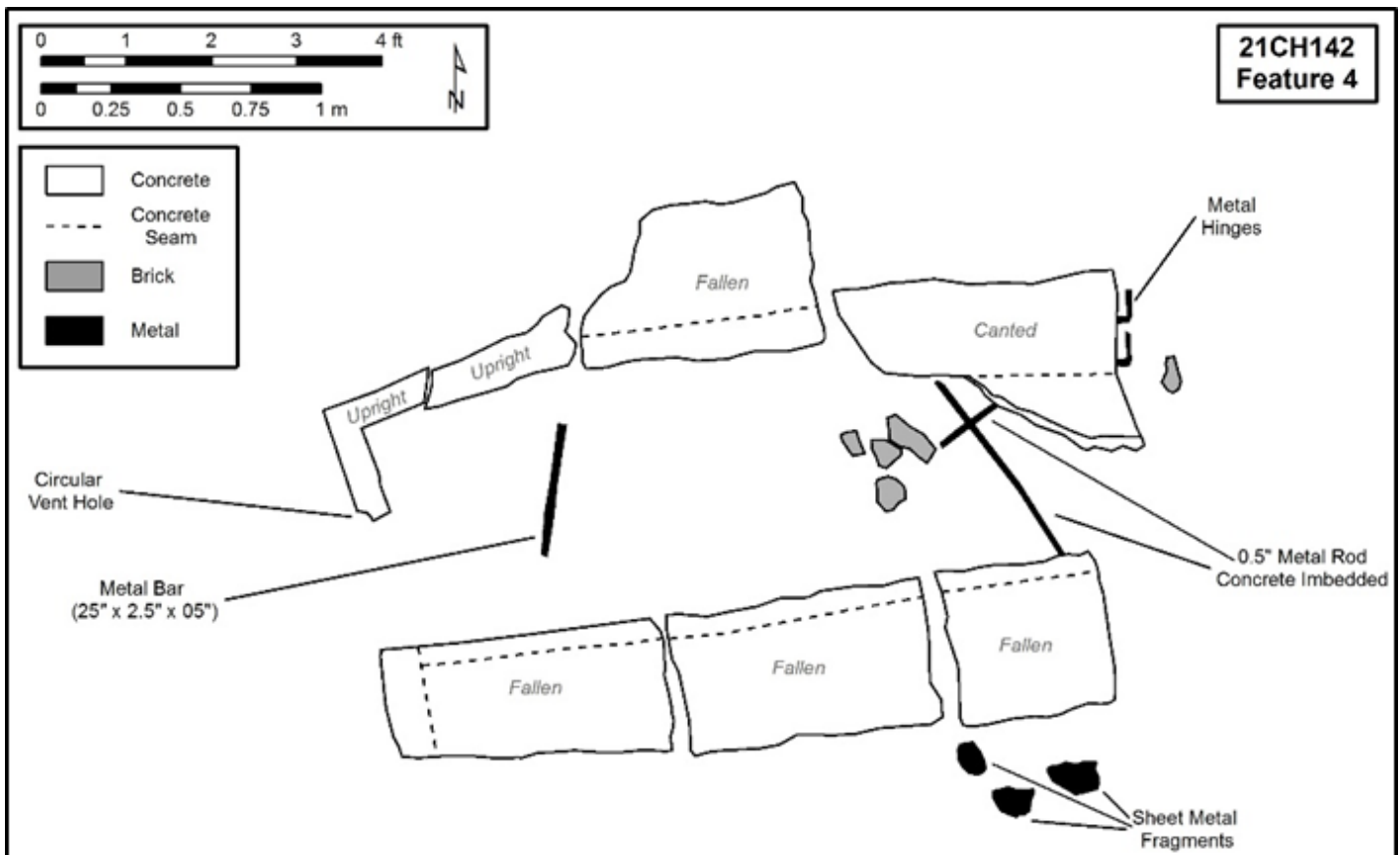


Fig. 2 Concrete Structure (Foss and Foss 2018)

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Share your thoughts on Minnesota archaeology and find out what is happening right now across the state and region on our page.

Boiling Arch Archaeology *(continued from p. 3)*

The stone arch contained many of the boiling arch features identified by Matthew M. Thomas, PhD, an independent researcher who has published prolifically on the history of maple sugaring in the Upper Midwest. These features include heaped stone walls, an adjacent borrow pit, and an opening at one end for insertion of fuel and removal of ash. Figure 3 (below) is an illustration of a stone boiling arch from one of Thomas's publications. Compare it to the stone structure illustrated in Figure 1, above. A schematic recreation of the concrete arch confirmed its identification as a boiling arch as well (Figure 4).

Boiling arches, which are used for the enclosed-fire method of maple sap reduction, have some benefits over the open-fire method. The fire within a boiling arch is better protected and controlled than a fire in an open hearth, and therefore burns more efficiently. In addition, the use of a long, flat pan over a boiling arch results in a larger surface area of sap exposed to the heat source than a kettle or caldron, allowing evaporation to occur more quickly and evenly. The enclosed fire method was first in use among Euroamericans in the Northeastern U.S. in the 1820s. It was adopted later by American Indians, who did not have the same market access or resources to invest as Euroamericans, and gradually its use spread to the Upper Midwest.

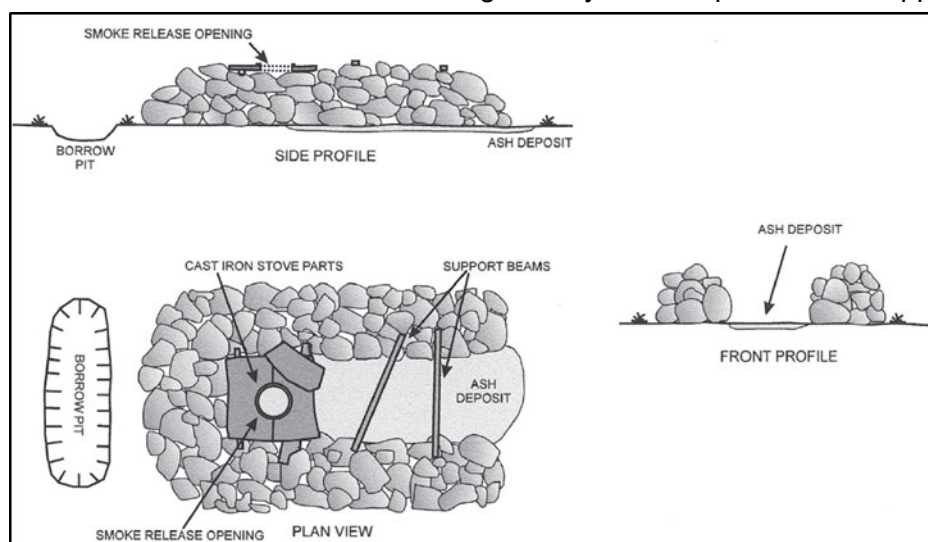


Fig. 3 Schematic of a boiling arch with associated material remains and features (Thomas 2005)

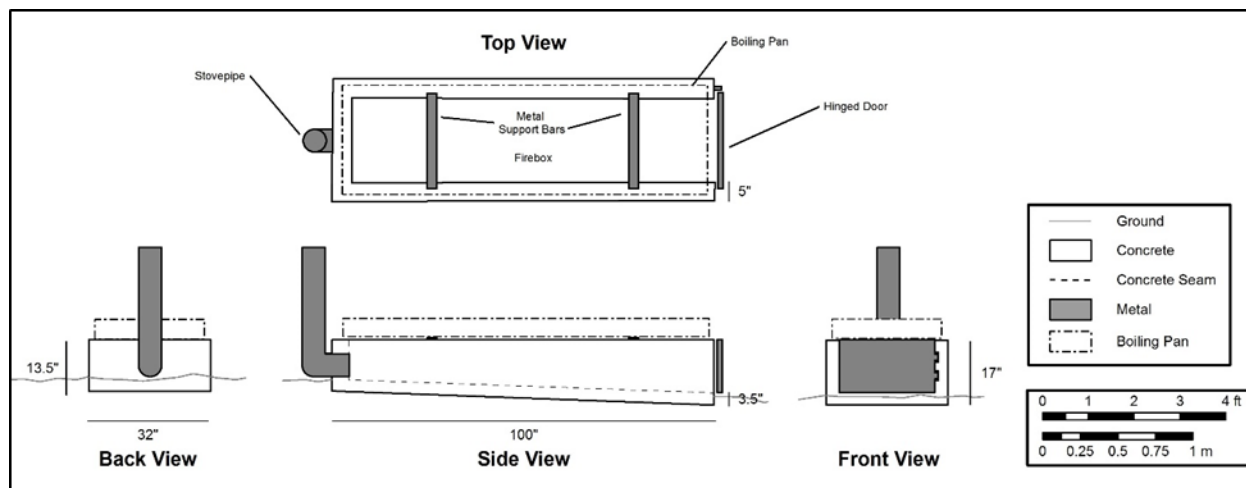


Fig. 4 Schematic reconstruction of the concrete boiling arch identified at Interstate State Park (Foss and Foss 2018)

Boiling Arch Archaeology *(continued from p. 4)*

The Archaeology of Boiling Arches in Minnesota

In the second half of the nineteenth century, Minnesota was a big producer of maple syrup, both commercially and for home use. However, as of February 2019, there are only 60 recorded maple sap processing archaeological sites in the state. All of these sites date to the Historic period, and half of them are based on historic documentation alone. The sites are predominantly located in the north and northeast parts of the state, with a few in southeastern Minnesota. Not surprisingly, these site concentrations overlap with the distribution of maple trees, specifically sugar maples, and are commonly found in extant maple stands. Artifacts commonly found at these sites consist primarily of metal cans and buckets, along with crockery and glass jars. Several of the sites have circular pits (likely firepits) that are probably associated with sap processing. Of these sites, only one – the site described above – has documented Historic period boiling arch features.



As there is a dearth of documentation on boiling arches, we hope this article will draw attention to a feature type that is under-recorded in the state. The next time you find yourself walking through a maple stand, look for can scatters, keeping an eye out for tell-tale cans with hanging holes, numerous large pails of the same size, or dense collections of cached cans or buckets. If there are indications that maple sugaring has occurred in that location, seek out the processing loci, such as hearths or boiling arches. Sap is heavy and was processed onsite where it was collected. If we can identify and document these processing features, we can better understand timing, intensity, scale, and duration of maple syrup and sugar production in Minnesota.

For more on boiling arches and maple processing history see Matthew Thomas' website: <http://maplesyruphistory.com>

Bibliography

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2017 21CH0142 Hobbs Woods Site Form. On file at the Office of the State Archaeologist, St. Paul, MN.
- Foss, Jacob and Nicole Foss
2018 21CH0142 Hobbs Woods Site Form Update. On file at the Office of the State Archaeologist, St. Paul, MN.
- Thomas, Matthew M.
2005 Historic American Indian Maple Sugar & Syrup Production: Boiling Arches in Michigan and Wisconsin. *Midcontinental Journal of Archaeology* 10(2):299-326.

Boiling arch (ca. 1950)
Courtesy of the Wisconsin Historical Society

Minnesota Archaeology Events

History Matters Day

March 5

Minnesota State Capital Building

L'Etoile du Nord Room from 9am – noon

Free and open to the public

Join the Minnesota Historical Society and members of the state's history community at the Minnesota State Capitol. MAS will have a table to promote our organization and mission. Advocate for history while meeting with legislators. Learn about state and local history resources. Network with members of the history community. Take a free guided tour of the Minnesota State Capitol.



*Minnesota State Capitol, courtesy of
Wikimedia Commons*

Mississippi Valley Archaeology Center Artifact Show

March 7

Valley View Mall in La Crosse, Wisconsin from
10am to 5pm

Free and open to the public

Come to Valley View Mall and see artifacts representing the area's long history. Local collectors will display their personal collections, and MVAC staff will bring artifacts recovered from local excavations. Archaeologists will be on hand to answer questions. Bring in your own artifacts

for help in their identification. Call MVAC at 608.785.8454 or e-mail Jean Dowiasch (jdowiasch@uwlax.edu) if you would like to display your artifacts.

Lake Superior Basin Workshop

March 20 & 21

Lakehead University (Thunder Bay, Ontario)

Braun Building (BB) Room 2002 from noon to 5 pm on Friday and 9 am to 5 pm on Saturday

Free and open to the public

The emphasis of the workshop is on face-to-face interactions between exhibitors and attendees, demos, and displays/examples of artifacts (e.g., your latest find, a puzzling artifact for which opinions are sought, unique or good examples of artifact types, site collections). Exhibits can be on any archaeological or related topic: anthropology, Native American studies, geology, etc. Posters are welcomed but please check with one of the organizers, Jill Taylor-Hollings (jstaylo1@lakeheadu.ca), if you will need poster space. Formal "papers" are sometimes included during the workshop but this is not a typical conference of paper after paper. So come prepared to observe and discuss!

For more information or to get on the email list, see Sue Mulholland, tel: 218-355-0153, email: suemulholland@aol.com.



*Projectile Points Found Near
Thunder Bay, courtesy of
Western Heritage Services, Inc.*

Minnesota Archaeology Events

Gopher State Archaeological Society Show

March 28

Steele County Historical Society in Owatonna, MN

Free and open to the public

Many collections will feature personally found artifacts from Steele County and around the state. There will displays covering all time periods and a wide range of items from arrowheads to Native American Beadwork.

Contact Gregg Nelson

(greggnelsonnorthfield@gmail.com or 507-676-1095) for more information.

Bound by Earth: Archaeology in Minnesota

World Premier!

April 26@ 7am (TPT MN Channel 2-2)

April 27@ 9pm (TPT Channel 2-1)

Bound by Earth focuses on the science and technology archaeologists use to uncover and preserve archaeological resources in a non-invasive way and how the cultural landscape, such as Native American burial mounds, are significant to all peoples today. Produced in partnership between Twin Cities Public Television and the Minnesota Archaeological Society



Images from Bound by Earth: Archaeology in Minnesota



and financed in part with funds provided by the state of Minnesota from the Arts and Cultural Heritage Fund through the Minnesota Historical Society.

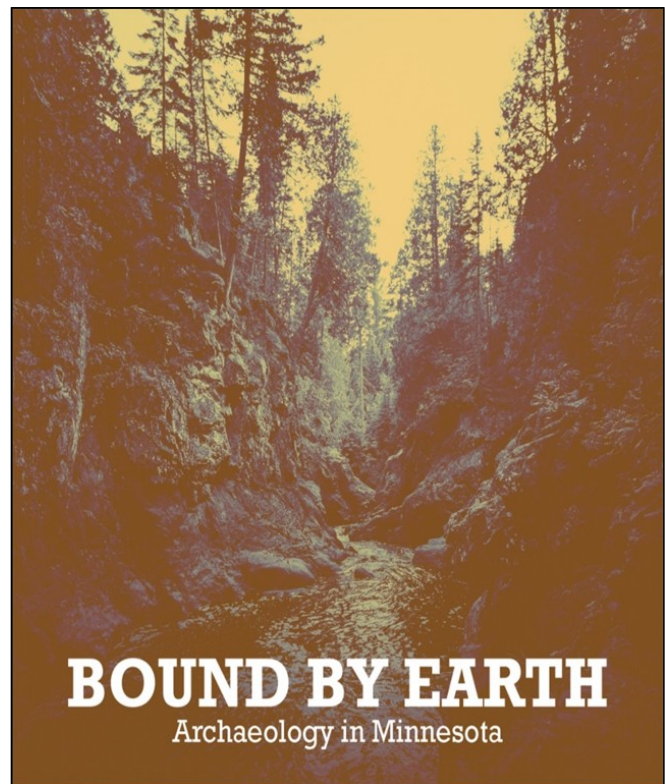
Minnesota Archaeological Society Annual Dinner and Meeting

May 8

Hamline University, Room 304 & 305

Cost: \$30 (please RSVP by April 21)

Come to our annual dinner and meeting for delicious food and archaeological fellowship! The presentation will be a viewing of Bound by Earth, the new documentary produced in partnership between the Minnesota Archaeological Society and Twin Cities Public Television, utilizing funds from the Arts and Cultural Heritage Fund through the Minnesota Historical Society.



Minnesota Archaeological Society
Kellogg Center, Archaeology Dept.
328 Kellogg Blvd. W.
St. Paul, Minnesota 55102

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Join the Minnesota Archaeological Society

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**New Benefactors will receive a free copy of the Minnesota Archaeologist 1935—2005 Compendium on a flash drive, and a seat as an Honored Guest at the Annual Dinner Meeting.

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