



History Center News

Belle Creek

Belvidere

Cannon Falls

Central Point

Cherry Grove

Featherstone

Florence

Goodhue

Hay Creek

Holden

Kenyon

Leon

Minneola

Pine Island

Red Wing

Roscoe

Stanton

Vasa

Wacouta

Wanamingo

Warsaw

Welch

Zumbrota

Volume 47 No. 3 - Summer 2013

Newsletter of the Goodhue County Historical Society

French Saltpeter Caves: Goodhue County's 300-Year Old Secret

By Greg Brick, Department of Earth Sciences, University of Minnesota

Since the early seventeenth century there was an extended French presence in the Upper Mississippi Valley (UMV) that required gunpowder and the traditional assumption is that all of it was imported. But it's also possible that French fur traders manufactured their own gunpowder, as they are known to have done in Missouri at a later date. Gunpowder is composed of 75 percent saltpeter (potassium nitrate) combined with sulfur (10%) and charcoal (15%). Charcoal is readily available in the wilderness, but where would the saltpeter and sulfur have come from?

In 1700, the French fur trader Pierre-Charles Le Sueur (1657-1704), while ascending the Mississippi River, reported saltpeter caves along the west side of Lake Pepin, in Minnesota. According to one translation of Le Sueur's Journal, under the dates September 10 to September 14, 1700, we read that:

In these regions, a league and a half to the northwest, there is a lake named "Pein" [Pepin] which is six leagues long and more than a league wide. It is bordered on the west by a chain of mountains; on the other side, to the east, there is a prairie, and to the northwest of the lake a second prairie two leagues long and wide. Near by there is a chain of mountains which must be two hundred feet high and more than a half league in length. Many caves are found there in which bears hibernate in winter. Most of these caverns are more than forty feet deep and between three and four feet high. A few have very narrow entrances, and all of them contain saltpeter. It is dangerous to enter them in summer because they are filled with rattlesnakes, whose bite is very dangerous. M. Le Sueur saw some of these snakes that were six feet long, although usually they are only about four feet.

Le Sueur's comments about the caves being inhabited by bears in winter and rattlesnakes in summer suggests that they were visited (by someone) throughout the year and presumably there would have been a reason for this.

Geological Detective Work

Historically, caves were not the only source of saltpeter, but they played a critical role in some of our early wars. Most American saltpeter caves are found in the southeastern United States, providing the vital ingredients for gunpowder during the War of 1812 and the Civil War. Minnesota lies far outside this classic "saltpeter belt" running from the Appalachians west to the Ozarks, so Le Sueur's description of saltpeter caves merited further scrutiny. There was no record of anyone searching for this seemingly unusual occurrence before the present endeavor, conducted as part of doctoral research at the Department of Earth Sciences, University of Minnesota.

The location of Le Sueur's saltpeter caves is not identified on historic maps. Franquelin's 1697 map of the Upper Mississippi region, which had Le Sueur's input, predates the cave visit, and although a five-part map of the Mississippi River was compiled by the famous French cartographer Guillaume Delisle from Le Sueur's notes in 1702, and this map does label some mineral resources such as copper and lead mines, it does not depict the saltpeter caves (**Fig. 1**). Indeed, perhaps Le Sueur's best known exploit was the establishment of "Fort Green" at the site of a supposed copper mine on the Blue Earth River, in 1700, shortly after visiting the saltpeter caves.

Cont'd. page 3

The mission of the Goodhue County Historical Society is to serve as the steward for county history by collecting, preserving, and promoting the natural and cultural history of Goodhue County and its people.

GCHS Directors

Scott Adkisson, Red Wing, **Vice-chair**
Ron Allen, Red Wing, **Commissioner**
Howard Burfeind, Lake City
Janet Daley, Welch
Keith Fossen, Red Wing
Roseanne Grosso, Red Wing, **Chair**
Roger Hand, Red Wing, **Treasurer**
Marilyn Lawrence, Red Wing
Ruth Nerhaugen, Red Wing, **Secretary**
Ann Nibbe, Lake City
Fran O'Connell, Red Wing
Todd Prink, Cannon Falls
Bonnie Roach, Kenyon
Dennis Schultz, White Rock

History Center:

1166 Oak Street
Red Wing, Minnesota, 55066
Phone 651-388-6024

Website: www.goodhuehistory.mus.mn.us
General information via email:
goodhuecountyhis@qwestoffice.net

Open Tuesday through Friday
10:00 a.m. - 5:00 p.m.
Saturday and Sunday
1:00 p.m. - 5:00 p.m.
Closed Mondays and Holidays

Director/CEO: Char Henn
Collections Manager: Johanna Grothe
Outreach Coordinator: Diane Buganski
Visitor Service Associates: Nancy Enevold,
LaVergne Dickerson

Historical News Editor: Diane Buganski

Historical News is produced quarterly by the Goodhue County Historical Society. Opinions expressed by authors or in quotations do not necessarily represent those of the Society, its Directors or staff. The Society welcomes your comments and suggestions. Except otherwise noted, all photos are from the GCHS Photograph Collection.

Director's Column

By Char Henn

The past several days here have been sad ones. Miriam Johnston of Red Wing, a long-time volunteer, passed away on May 8. For years, Miriam led the immigration station at our DASH program with her friend, Bernard Anderson. A former schoolteacher, Miriam knew how to engage the students and get them thinking about pioneer life. As Miriam's health declined, her husband, Philip, made sure that she met her commitments by driving her to events, including DASH. Philip passed away on May 12. We will miss their dedication.

On May 17, we heard that John Cole of Kenyon had died. John was an enthusiastic booster of Kenyon and local history. A long-time board member, John was the man behind the idea to mark Goodhue County's "ghost towns" with road signs. Although John had stepped back from active volunteering at the history center, he kept busy on the Kenyon Historic Preservation Commission and adding items to our collections of Kenyon materials. John's excitement was infectious and we will miss his zest for local history.

On to other things—keep your calendars open for Saturday, September 14! We will be having our second hangar dance fundraiser at the Red Wing Regional Airport. The plans are coming together and it will be a lot of fun.

Thrivent has authorized us to be a recipient of funds through their Thrivent Choice Dollars program. If you are a Thrivent member and qualify for a distribution, you can request that your distributed funds come to support our work of telling your stories.

From the Chair

By Roseanne Grosso

Barry Dosedall, our building supervisor for the past 12 years has resigned from his position

at the History Center. We called him a maintenance man, but he really was the jack-of-all-trades



and kept the facility running. You didn't know if you would see him on the roof cleaning out drains or in the basement working on other equipment. He kept the temperature constant as needed to preserve our stored artifacts of important Goodhue County History by repairing humidifiers and dehumidifiers.

I would see him on a ladder changing a light bulb high up on the ceiling that gave me butterflies just to see him up there. Or painting outside and inside on the same ladder. He worked outside in often not the best of conditions both winter and summer. And yet, when we needed help with events he was always there to set up and tear down chairs, tables, etc. The one memory that sticks in my mind is the sight of Barry in his tuxedo serving 90 women at Bling and Chocolate, our February fund raiser. The tuxedo was a far cry from his work clothes and he carried it off well.

So we wish Barry all the luck in his future endeavors. And we appreciate him for his years of hard work. Thank you Barry, you will be missed.

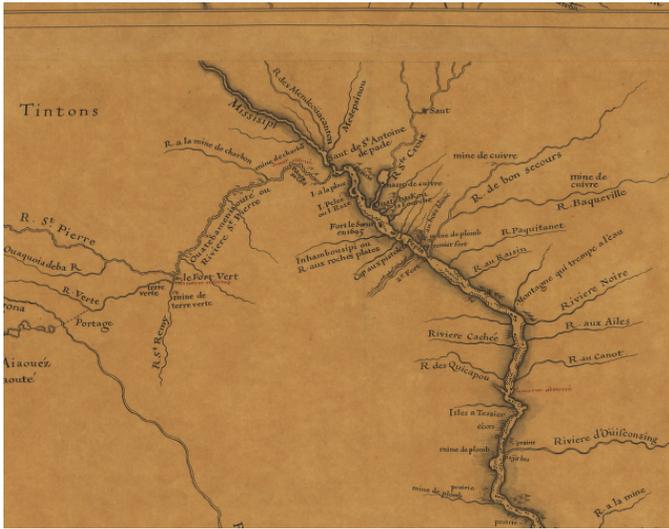


Figure 1. Delisle's 1702 map, based on Le Sueur's notes, showing the Upper Mississippi River. While depicting copper and lead mines, it does not show the saltpeter caves described in the latter's journal.

At this point we fall back on the narrative. The "chain of mountains" mentioned in the quotation from Le Sueur above tallies reasonably well with former islands in the ancestral Mississippi River in Goodhue County, of which Barn Bluff in Red Wing is the best known example. This series of east-west ridges were once mesa-like islands in the river, huge slices of bluff cut off by stream erosion, composed of bedrock, and not to be confused with the low, sandy islands with which we are familiar today, such as nearby Prairie Island. Of the several possible Goodhue County "islands", the one that best matched Le Sueur's narrative is the bluff towering over the 1856 logging ghost town of Sevastopol, along the modern Sevastopol Road.

In 2004, a cave matching Le Sueur's description, but somewhat shorter, was discovered by the author on private land along the Sevastopol bluffs. While there is no way of knowing whether this was one of Le Sueur's caves, it became conceptually important by revealing that the caves he described match a particular type of bluff crevice commonly found among these rock outcrops. They form where the bluff is slumping away from the main rock mass along a rock joint, leaving a long, narrow, bluff-parallel crevice. But crevices 40 feet long, such as Le Sueur described, would represent serious lines of weakness in the bluffs. With this insight, it was surmised that the actual historic crevice(s) might no longer exist, having fallen down the bluff at some point during the past 300 years, to be replaced by a subsequent generation of newly-widened rock joints as the Lake Pepin bluffs undergo erosion.

Chemical Fingerprints

When floor sediments from the Sevastopol crevice were tested they contained elevated levels of nitrate compounds,

consistent with Le Sueur's narrative, because saltpeter is potassium nitrate. This became the inspiration for a wider sampling program, involving caves along both sides of the Mississippi River as far south as Illinois, not merely those in the immediate area suggested by Le Sueur's Journal. But the most heavily prospected area, because of the public accessibility of the rock outcrops and the abundance of voids, was Frontenac State Park (**Fig. 2**).

Of the nearly one hundred caves sampled in the UMV, about two-thirds had elevated levels of nitrate. High nitrate concentrations, up to 35,000 parts per million (ppm)—equivalent to 3.5 weight-percent—were widespread among the Lake Pepin caves and further south. By contrast, none of the surrounding surface soils showed more than 10 ppm nitrate, because nitrate is highly soluble and thus quickly leached from soil by rainwater, or absorbed by plants as a nutrient. The nitrate content of cave sediments at a classic saltpeter mining locality in Kentucky "range between 0.01% and 4% [by weight]," according to Dr. Carol Hill, a leading authority. Many of the Minnesota cave sediments are thus sufficiently enriched in nitrate to be worth extraction.



Figure 2. Lake Pepin vista framed by a saltpeter cave in Rattlesnake Bluff, Frontenac State Park. Photo by author, 2004.

The formation of high-nitrate Le Sueur-type caves can be summarized as follows: the long, narrow crevices form by the widening of bluff-parallel rock joints, where the bluff is pulling away from the main rock mass. Over time, the crevices fill with sediment derived from surface soil descending through rock joints from above. Animal traffic and plant debris add nitrogenous organic matter that undergoes bacterial breakdown, forming nitrate, which then accumulates because the cave roof protects the sediment from leaching by rainwater and by shutting out sunlight, permits this plant nutrient to remain in the sediment.

Although it's theoretically possible to manufacture saltpeter from the UMV cave sediments based on the high

nitrate concentration, a serious problem is presented by the small amount of sediment available, especially considering that Kentucky cave sediments historically yielded only several pounds of saltpeter per bushel. Moreover, the Lake Pepin crevices are small, narrow, widely separated, and often difficult to get to, being located at the top of steep scree slopes at a considerable elevation above the lake, so that even if a sufficient number of them were available, the amount of human labor involved would be enormous.

Any consideration of wilderness gunpowder manufacture must also address the possible sources of sulfur used in the gunpowder formula. In Europe, sulfur was often obtained from the volcanic deposits of southern Italy. In America, French miners in Missouri in the 1720s had access to saltpeter from the caves there, made charcoal from willow trees, and probably used sulfur that was generated as a by-product of smelting galena (lead sulfide). However, no local source of sulfur was identified for potential use in the Lake Pepin area. Sulfur plays a complex role in the gunpowder formulation but some modern researchers concluded that "the sulphur and carbon could be replaced by other readily oxidized materials such as wood flour."

Although no mining tools or indications of mining were observed in any of the UMW caves, nearby archeological sites have the potential to contain mining artifacts. In 1727, Fort Beauharnois was established, traditionally assumed to have been located at Sand Point near the town of Old Frontenac, but during a systematic archeological excavation by the Minnesota Historical Society in 1976, no French cultural remains were found. This unfortunately precluded the possible identification of potential gunpowder-related implements in artifact inventories.

Conclusion

As late as World War I, American prospectors, in search of nitrates to make explosives, sought out natural deposits in a tradition stretching all the way back to Le Sueur. The prospector's days were numbered, however, owing to the development of atmospheric nitrogen fixation, which involved converting the abundant nitrogen of the atmosphere into ammonia, which could be converted to nitrate. In 1913 the Haber-Bosch process became the first really successful nitrogen fixation method, being put into commercial operation in Germany and then around the world. Modern agriculture, with its dependence on nitrogen fertilizers, and the world's present large population, could not exist without this industrial process.

The occurrence of high nitrate concentrations in the sediments of UMW caves revealed by this study is enough to show that Le Sueur's claim of finding saltpeter (more likely, a saltpeter precursor such as calcium nitrate) in caves along the shores of Lake Pepin in 1700 for making gunpowder in the wilderness is credible, but practical considerations raise serious doubts. Nonetheless it's the earliest report of cave saltpeter from America, predating more probable French saltpeter manufacture from Missouri caves in 1720. For the author's full report with complete references see his article in THE MINNESOTA ARCHAEOLOGIST (2012 issue).

Further Reading

Greg Brick (2012). Le Sueur's Saltpeter Caves at Lake Pepin, Minnesota, and Wilderness Gunpowder Manufacture. *Minnesota Archaeologist* Volume 71, pages 7-20. If you would like to contact Greg, email him at: bric0004@umn.edu. ☺



Goodhue County Fair August 6-11, 2013 Zumbrota

Time to get your cheese curds and mini donuts! We will be staffing the Rural School building and the booth. The school building was once located in Belvidere Township as School Dist. #30 and now has a permanent home at the fair. The school will be staffed on Wednesday, Thursday, Friday and Saturday from 11-3 during fair week. The school building is air conditioned as well!

We will also have our booth in the Commercial Building selling books, postcards, memberships, promoting the Hangar Dance, visiting with the public, and having a good time. Call the history center at 651-388-6024 if you would like to volunteer at either the school building or the booth to represent the GCHS.

Battle of Vicksburg Commemoration & Civil War Soldier Grave Rededication

Thursday July 4, 2013 at 10:00 a.m.
Oakwood Cemetery, Red Wing, MN
Sponsored by the Civil War Commemorative Task Force & City of Red Wing



On Thursday, July 4, 2013 at 10:00 a.m., the Governor's Civil War Commemoration Task Force and City of Red Wing, as part of July 4th activities in Red Wing, will host the only Minnesota sesquicentennial event celebrating the historical surrender of the City of Vicksburg by Confederate forces to Union General Grant at Vicksburg 150 years ago on July 4, 1863. This remembrance event at Oakwood Cemetery in Red Wing will include dedication ceremonies by Civil War reenactors honoring two of Minnesota's great Civil War heroes Major Abraham Welch and General Lucius Hubbard, including the dedication of a new grave marker for Major Welch. The event will also include presentations by Secretary of State Mark Ritchie, Mitch Rubinstein, President of the Twin Cities Civil War Roundtable, Joseph Fitzharris, Professor Emeritus of History at the University of St. Thomas, and Red Wing native and historian/author, Fred Johnson. This event is part of this year's sesquicentennial ceremonies to commemorate and remember the participation of Minnesota Civil War soldiers by dedicating the gravesites of comrades who were killed and returned for burial in Minnesota.

This commemorative event is open to the public and will be held rain or shine. Enter the main gate in Oakwood Cemetery and follow Oakwood Drive to Summit. Go left on Summit and then left on Wilson to the gravesite of Major Welch.

For more information, go to www.mncivilwar150.com or Minnesota Civil War 150 on Facebook, or contact the City of Red Wing, the Red Wing Visitor & Convention Bureau or the Goodhue County Historical Society.

World War II U.S. Cadet Nurse Corps in Goodhue County

By Johanna Grothe, Collections and Exhibits Manager

While the fighting was raging across seas during World War II, people were participating in a variety of war efforts on the U.S. home front. One such effort involved the nursing field. To help ensure that enough nurses were available for medical service, the federal government established the U.S. Cadet Nurse Corps in 1943. This program trained nurses to serve in the military and on the home front. Cadet students received free tuition, room and board, and uniforms in exchange for serving in an essential nursing capacity during the war. Students attended a two and a half year training program and spent the next half year as a Senior Cadet in a hospital or other nursing field. St. John's School of Nursing in Red Wing joined the program in 1943. From 1943 until the end of the program in 1948, approximately 60 St. John's School of Nursing students were in the Cadet Nurse Corps.



Karna Diercks Johnson wore this cadet uniform when she attended Cadet Nurse Corps training. She graduated from St. John's School of Nursing in 1947.

This uniform is only one of the World War II military and home front artifacts in the Goodhue County Historical Society's collections. To get a feel of what life was like on the home front in Goodhue County during World War II, attend GCHS's Hangar Dance on Saturday, September 14 at the Red Wing Airport.

**GOODHUE COUNTY HISTORICAL SOCIETY
Presents the Second Annual WWII Era**

HANGAR DANCE!



Saturday, September 14, 2013

5:30 - 10:30

featuring

★ **GENERATION II BIG BAND** ★

*Dance to the music that rallied the troops and
lifted the spirits of those on the home front!*

Tickets \$30 in advance or at the door



**Red Wing Airport
Hwy 35 ♦ Bay City, WI**

**Doors open at 5:30
Dance at 6:30**

★ Fun ★ Food ★ Dancing ★ Cash Bar ★ Entertainment
★ Canteen ★ Silent Auction ★ Costume Contest
★ Veterans Observance

**Tickets on sale at the Goodhue County History Center
or call 651-388-6024 ♦ Follow us on Facebook **



GCHS Membership Application

Name _____

Address _____

Phone (____) _____

E-mail _____

Would you like to receive the GCHS newsletter by email? _____

New Renew

My check is enclosed Please debit my credit card

Acct. Number _____

Expiration Date _____

Authorized Signature _____

Yes! I want to be a member of the Goodhue County Historical Society at the following level (please check one):

- Basic \$35
- Family \$50
- Supporting \$100
- Sustaining \$250
- Business \$500
- Life (one-time membership) \$1,000

Please make checks payable to:

Goodhue County Historical Society

Mail applications to:

**Goodhue County Historical Society
1166 Oak Street
Red Wing, MN 55066**

A sampling of some of the artifacts that were donated to the GCHS in recent months. If you have an item that is connected to Goodhue County and would like to donate it, please give us a call or bring it in. We are especially looking for items that are post-WWII to current.

We would like to thank the following townships for their continued support of the GCHS:

- Cannon Falls \$100
- Featherstone \$250
- Florence \$500
- Minneola \$200
- Warsaw \$100
- Wanamingo \$400
- Pine Island \$100
- Zumbrota \$300

Thank you!

Memorials were received in memory of...

- | | |
|-----------------|----------------------|
| Arnold Betcher | Miriam Johnston |
| Roger Birk | Philip Johnston |
| Berdine Clement | Mary Lee |
| John Cole | Vernon Mandelkow |
| Donna Edquist | John Ross |
| Harry J. Exner | Lilymarie (Mia) Safe |
| Marvin Jech | Bertha Santelman |



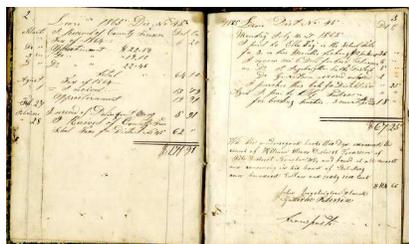
1917 Chautauqua program, Kenyon Township



Minnesota National Guard items, Red Wing



Pillsbury Dough Boy toy, Welch Township



1865-1877 School District #45, Olson Lone Pine School, treasurer and account ledger, Leon Township.



Goodhue County
Historical Society
*Minnesota's oldest county
historical society est. 1869*

1166 Oak Street • Red Wing, MN 55066



Nonprofit
Organization
U.S. Postage
PAID
Permit No. 305
Red Wing, MN

ADDRESS SERVICE REQUESTED

Don't miss...

Goodhue County Passport - Now through Labor Day. Visit all nine Goodhue County museums, and have your passport stamped for the grand prize drawing on September 14. Passports available at every site.

Battle of Vicksburg Commemoration & Civil War Soldier Grave Rededication - Thursday July 4, at 10:00 a.m., Oakwood Cemetery, Red Wing.

Burnside Township Exhibit Open House - Saturday, July 27, 1-4 p.m. If you have an item connected to Burnside Township that you would like to have on display for this exhibit, please give us a call before July 15.

Goodhue County Fair - August 6 -11. Stop in to say HI! at our booth or the Rural School building.

WWII Era Hangar Dance - Saturday, September 14, 5:30 -10:30 p.m., Red Wing Airport. Dance to the music that rallied the troops and lifted the spirits of those on the home front!

Please check our website and Facebook page often for details of these and other events as they become available.