May 2022

Promoting public interest and educational support in the geological sciences

Volume 76, No. 2

The Geological Society of Minnesota News

Volunteer opportunities, field trips, lectures, and public service, since 1938

From the President's Desk…

Well, the winter snows can finally be forgotten. Spring took its sweet time in arriving, but it has arrived.

It was great to see so many of you at the Spring Banquet, and I look forward to in-person lectures this fall. We are looking into doing hybrid lectures both in person and online - more to come on this over the summer.

Coming up later this summer is the State Fair!!! We will need your help staffing the booth, and we will send out an email notice when we're ready to start the recruiting. Shifts are 4 hours long, and it's a blast. You do not need to be a geology major to staff the booth. You just need to have an interest in geology and like talking to people of all ages and piquing their interest. We have rock samples in our booth as conversation starters, and it is wonderful if you can identify the rocks; but not to worry, all the samples are labeled and identified. We will have our Fall lecture schedule at the Fair too for you to promote those learning opportunities. At past lectures, we've asked people "how did you learn about GSM?" Many have replied, "the State Fair." Yes, this is one of the most successful ways we recruit new members.

There is at least one field trip scheduled for September - look for more details as the trip shapes up. Next year's lecture schedule is starting to fill up, and it looks like it will be another excellent lecture series. (Thank you, Steve Erickson.) I also want to thank Randy Strobel for hosting and Dave Wilhelm for co-hosting all the Zoom lecturers this past season. They've been excellent.

I can't wait to see all of you at the Fair, and in-person at the fall lectures.

Thank you again, and rock the summer.

Roger Benepe

GSM President, Roger Benepe

Upper photograph, Mark Ryan

Inside this issue:

Visit us on Facebook!

from the GSM archives: Lecture by Dr. Mandell, Taylors Falls, Mn, 1946

GSM

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The Geological Society of Minnesota is a 501(c)3 nonprofit organization.

GSM Mail Address: Send all GSM membership dues, change of address cards, and renewals to: Joanie Furlong, GSM Membership Chair, P.O. Box 141065, Minneapolis, MN 55414-6065

Membership categories and dues:

Student (full time)	$10
Individual	$20
Family	$30
Sustaining	$50
Supporting	$100
Guarantor	$250

Individual and Family memberships can be renewed for 1, 2, or 3 years. Members donating at the Sustaining, Supporting or Guarantor levels will have their names highlighted in the GSM membership directory.

GSM News: The purpose of this newsletter is to inform members and friends of activities of interest to the Geological Society of Minnesota. GSM News is published four times a year during the months of February, May, August and November.

Newsletter contributions welcome:

GSM enthusiasts: Have you seen interesting geology while traveling? If so, please consider sharing your experiences with others through our GSM Newsletter. Write a short article, add a photo or two and send it in. Deadline for submission is the first of the month before the publication date. Send your story to newsletter editor: Kate Clover, kclover@fastmail.fm Thank you in advance.

GSM Board Membership:

The GSM Board consists of members who have a special interest in advancing the goals of the society, including lectures, field trips, and community outreach. The Board currently has ten members, and our bylaws limit terms to four years to encourage turnover, and a change of perspectives and ideas.

The Board meets quarterly, on the second Thursdays of February, May, August, and November, or on a different date if conflicts arise. In-person meetings are from 7-9 PM at the Minnesota Geological Survey at 2609 W. Territorial Rd, St. Paul, MN 55114.

Board meetings are open to all GSM members. If you are a new or long-time member and Board membership is of interest to you, please consider attending a meeting. If you have a topic you would like the Board to consider, please contact Roger Benepe, rbtrilobite@gmail.com

Welcome New Members!

Lyle Jokela, Northfield

GSM Member Profile
Dave Kelso

Q. How long have you been a GSM member? What got you involved?

A. I have been a GSM member for about 5 years. However, I have been aware of the GSM for many years, and I visited the website periodically before joining. I was first exposed to the GSM when I was a student at UMD studying Math and Geology (back in the Cambrian Era). One of my professors had posted some information on his bulletin board about the GSM which I read but never followed up with. Yes back then, information was posted on a bulletin board because the internet had not yet been invented! After graduating with a BS and BA in Geology/ Earth Science, I moved to the Twin Cities where I was employed by the Minnesota Pollution Agency (MPCA). I worked

Dave and Kim Kelso at the Artic Circle in Alaska

there for 34 years; however, none of that work involved geology. My original goal was to teach geology in the Duluth area; however, teaching jobs were hard to come by, so I moved on. While at the MPCA, I got involved with the MPCA's state fair exhibit which then led to renewed exposure to the GSM as I visited the booth several times throughout the years which eventually led me to join the organization.

Q. Have you served on the GSM board or held any offices with GSM?

A. I served on the Board from 2018-2021 where I held the dual position as Secretary and Treasurer. That kept me pretty busy along with learning the ins and outs of the organization.

Q. How did you get interested in geology?

A. When I was in high school in Duluth, my uncle was a metallurgist with US Steel. He dragged me along to his lab and to field trips on the iron range, pointing out various rock formations and mineralization. This exposure kept me interested in Geology and eventually to UMD. While at UMD, I had the opportunity to go to Antarctica for 5 months, where I supervised a kitchen crew and worked in the geology lab. In the geology lab, I learned how to make "thin sections" for microscopic identification. That was really hard work as the technicians in the lab were Japanese, with limited English-speaking ability. I brought those skills back to UMD where I worked in the geology department's lab again cutting rocks and making thin sections.

Q. What do you dig about GSM?

A. I "dig" the lectures and field trips although I have only been on one field trip. I am looking forward to more trips in the future and have kept active by attending lectures.

Q. What is your favorite geology-related travel destination? And why? What field trips have you taken with GSM?

A. Hawaii. I have traveled to Hawaii three times and spent a lot of time in the Volcanoes National Park and Haleakala National Park. Volcanism is extremely interesting and is very explorable in Hawaii. I enjoy general rock collecting around the country in conjunction with my travels.

Q. Do you have a favorite geology related book?

A. One of my favorite books is *Geology on Display (Geology and Scenery of Minnesota's North Shore State Parks)* by Dr. John C. Green. I also have several of the Roadside Geology books for several states that I have visited. They have been extremely interesting to read as we've traveled. Geology is everywhere!

Q. Anything else?

A. My other real interest is photography which has been a hobby of mine for many years, including developing film and printing. My latest project is photographing various rock and mineral samples that I have collected.

Notes from the Past – December 1949

The Contribution of Mr. E. P. Burch
to the Geological Society
By Chas. H. Preston

Part 2 – please see the February 2022 GSM newsletter for Part 1

At the end of that first year an attempt was made toward organization. Officers were elected for 1939, and plans were to incorporate, such incorporation being effected under Minnesota laws before the end of that year. But Mr. Burch continued to be the Society. Junior Hayden became President, officially that is, but Mr. Burch continued to be the leader. I was elected Secretary, but Mr. Burch performed all the duties of the Secretary, except to record the minutes of the meetings. And on more than one occasion Mr. Burch even prepared those minutes in advance of the meetings. A Treasurer was elected but Mr. Burch continued to take responsibility for the finances, preparing the financial reports from time to time under the name of the Treasurer and "digging down" to make up the deficits at the end of the year. A program committee was appointed, but despite its personnel, Mr. Burch was that committee. He just couldn't resist doing all the work of the Society and in taking full responsibility.

Each week he prepared and sent out notices of the meetings including technical data regarding the regions visited or the subject discussed. He was our editor, publisher and mailing clerk.

Never again can this Society expect to have the full time services of any person devoted to our group. His energy in that devotion seemed limitless. And yet, it was his inate desire to develop within the Society, those who could give lectures, prepare reports, and make independent studies of selected regions. His ambition was to develop real students among our members. Any mother, in rearing her child must for some years watch that child, administer to its every need, and see that her child is nourished and fed, made comfortable. She is loath to give up responsibilities. This Society was Mr. Burch's child. He devoted the major part of the last few

years of his life to its care and development. It was his life. He couldn't bear to trust its care and guidance to inexperienced hands nor trust it to walk alone.

Someone has said that every established institution is but the lengthening shadow of some great man. So our Society is but the lengthening shadow of Edward P. Burch. He finally yielded some of its responsibilities to others and let others take some of the leadership. He had so inspired them that they were more than glad to do this.

Mr. Burch died in May 1945. He collapsed on the street in Boston, intent on spending a few hours between trains at the Boston Museum of Natural History.

This event brought to a close the first phase in the history of our Society. The work had to be divided among many, for there was no one member who could devote a major part of his time to its needs. Even before he left us, we had begun to function as an organization through our Board of Directors and appointed committees. We were now obliged to take over and make it truly autonomous. Its principal officers have been in rotation so as to develop new blood every few years. To develop a wider basis of leadership. If he could see us today I'm sure he would be pleased to note this continued interest in the objectives he was trying to accomplish, to spread a more general appreciation of the works of nature as manifested in earth formations, the interesting trips we have enjoyed, the instructive lectures we have had, and indeed, at this meeting here today. For he had long dreamed of establishing markers at spots of Geological interest in the State, where hundreds could stop, read, and learn. However he might have been somewhat disappointed as well elated. He would have hoped that more of us had made a more intensive study of Geological processes, instead of being content to appreciate their beauties and merely to listen to lectures.

We are here today to pay tribute to that leader. To dedicate this tablet to his memory. To do him honor. In the words of the immortal Lincoln, "It is altogether fitting and proper that we should do this." But it is beyond our power to add to, or detract from the devotion which Mr. Burch gave to the cause for which our Society was founded.

We can best dedicate this tablet to his memory in the only way that Mr. Burch would have wished it, not by gathering here and giving him words of praise, not by featuring Mr. Burch at all.

But by resolving here and now each to do our bit to help perpetuate this Society which be founded. I have long had a belief that God Almighty gave each of us some potential talent which, if cultivated would enable each to excel in some on thing. That thing may be small, it may be great. But some distinctive thing. Each of us can, if he will, do some one thing to help this Society maintain its position as the outstanding amateur Geological Society in America.

To paraphrase the immortal Lincoln once again: "It is for us rather, to be dedicated to the task of continuing the unfinished work to which he gave his last years of devotion. That we here and now highly resolve that those years shall not have been lived in vain." That we continue to make this institution an instrument for bringing to the public an appreciation of nature as revealed in its topography, and appreciation heretofore enjoyed only by the professionals. So that it may continue as the outstanding Society of America for making Geology a cultural study as well as a professional study.

In so doing, we can not only incur personal satisfaction, but we can help erect a monument which he would have revered above all else, to the name of Edward P. Burch.

Zalusky's Masterpiece: FOUND in Moorhead, Minnesota

Kate Clover

You might recall reading Greg Brick's article "*Joseph W. Zalusky, longtime GSM member and his 1952 descent into the Loop Cave*" in the May 2021 *GSM News.* Greg Brick told of scouring the archives of the Hennepin County Library and Hennepin County Historical Society, looking in particular for a large map depicting Earth History that Zalusky had drawn, "his masterpiece." However, it was nowhere to be found.

Fast forward to February 2022. An email from Allison Koster in Moorhead, Minnesota arrived in my email inbox. She wrote, " *I am in possession of something I believe you (the GSM) are interested in — a large (8-1/2 ft x 2-1/2 ft) handmade chart by Joseph W. Zalusky of "The Main Divisions and Events of Geologic Time."*

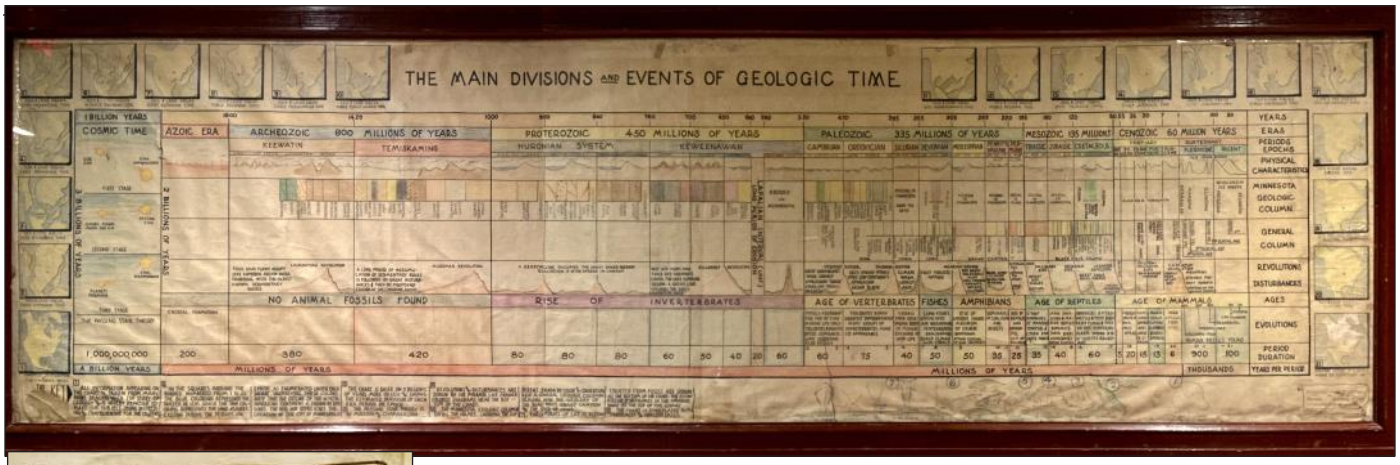
I acquired this framed piece in August 2021 via my local "Buy Nothing" Facebook page here in Moorhead. The giver said she bought the work at an auction several years ago, and never did anything with it; it was sitting in an extra bedroom or storage room in her house, and she was looking to give it away to a good home.

I work in the science facility at Concordia College in Moorhead, and thought it looked like an interesting "antique." Currently I have it hanging in a short hallway near my work area.

This morning [Feb. 15, 2022], I decided it was finally time to see if I could find out anything about "Jos. W. Zalusky" using Google. One of the hits was the May 2021 GSM newsletter, where an article about Mr. Zalusky happened to mention the large timescale which, the article author, Greg Brick, reported, didn't appear to be in the holdings of either Hennepin County Library or Hennepin History Museum."

Eureka!! Zalusky's map has been found. That was the map she had purchased and was hanging outside her office. Allison says, that when she retires, she intends to bequeath this piece to the Hennepin County Historical Society.

How did the chart end up in Moorhead? According to Zalusky's biography, he lived in South Dakota at some



Joseph Zalusky hand drew this information-dense "map" depicting Earth History in the Summer of 1942; he revised it in October 1943. It is meticulously hand-lettered and colored with colored pencils.

Zalusky's byline and creation date as they appear on his geological timeline

point. Maybe that's how it got "out west."

As you scan this map, remember — our knowledge of the earth has changed exponentially since Zalusky drew this; we now know about plate tectonics and the age of the earth and universe. The time periods have also changed significantly.

To Allison: Thank you for finding GSM's Newsletter on the web and for contacting us. Thanks, too, for sharing your story of recognizing the significance of Zalusky's map.

GSM Lecture Recap 2021-2022

As you know, due to the COVID-19 pandemic, GSM's lectures have been online-only for a second year, with the notable exception of the Spring Banquet at U Garden Restaurant, which was upcoming as I wrote this.

Once again, our Program Chair Steve Erickson put together an outstanding lineup of online lectures. Most of these were from presenters outside the Twin Cities, since virtual lectures allow us to tap talented geologists from far and wide. This past year, we have had presenters from Missouri, Colorado, North Carolina, South Dakota, Oregon, Nevada, Arizona, and Ontario, as well as Minnesota. So you can see that Steve did a great job getting us informed about geology throughout North America. Randy Strobel once again set up all the Zoom webinars; we are very thankful for his contribution.

We continued to get good attendance for our online lectures. Excluding the Spring Banquet, our total attendance for 14 lectures was 1017 persons, for an average of 73 persons per lecture. The average attendance for fall versus winter/spring was almost identical. By comparison, for 2020-2021, average online attendance was 83 persons, so we have dropped off a bit (Zoom fatigue perhaps?), but still very respectable numbers. And we continue to attract non-members to our lectures, averaging around six (8%) per lecture. Our most popular lecture was our first on Sept 20, *Geology of Minnehaha Falls Park* by Randy Strobel, when 101 attended. We had two others with over 90 attending.

Zoom provides the opportunity to record lectures. We used that capability for every presenter who gave us permission, then sent the links for these recordings to all GSM members and to non-members who had registered. These are temporary recordings that will disappear after a year. Longer term, Patrick Pfundstein is transferring these to the GSM YouTube channel, where they will live indefinitely. Check out this channel to view lectures you might have missed originally or want to see again.

Dave Wilhelm

2022 MESTA Conference

On February 4th, 2022, the 35th Annual Minnesota Earth Science Teachers Association (MESTA) Conference was held at the District 287 Conference Center in Plymouth. Science teachers from around the greater Twin Cities area came together to hear professionals in the earth sciences talk about their field of study.

With the Thursday night activity being canceled, the event began Friday morning. This year's keynote speaker was Dr. Alex Hastings, Fitzpatrick Chair of Paleontology, Science Museum of Minnesota, whose presentation was "Exploring Minnesota's Fossil Record & Museum Collections."

Several concurrent sessions followed the keynote presentation. Dr. Carrie Jennings, Research and Policy Director at Freshwater spoke on "The Minnesota River and the Muddy Water Blues." Alesia Arlandson, Science Teacher and Instructional Coach from the Lakeville Area Public Schools presented her talk titled, "Break down the Three Dimensions to Intentionally Empower Learning." Another presentation titled "Building the Periodic Table Out of Stardust" was given by Dr. Jennifer Anderson, Associate Professor, at Winona State University. Rachel Humphrey, Assistant Professor at St.

Earth Science teachers eagerly perused the tables at the February 2022 MESTA conference

Cloud State University, spoke about "Infrared Radiation and the Greenhouse Effect."

The Geological Society of Minnesota has been privileged to be a part of this event for many years, providing information on the organization, pamphlets, rock boxes, and assorted donations for the drawing held at the end of the Conference. This year we raffled off twenty copies of the National Park Service (NPS) "Prehistoric Life in the National Parks" coloring books donated to the Conference by Justin Tweet. These books are not available for purchase, but the individual coloring sheets can be downloaded from the following link: https://www.nps.gov/subjects/fossils/coloring-book.htm

Those of you in the field of education can check out the MESTA web page containing the above-listed events, past MESTA Conferences, and the Teacher Resources link at https://www.mnearthscience.org/2022-mesta-conference.html

The 2023 MESTA Conference will be held the first Friday in February. See the website and sign up!

On-hand for this year's Conference were event organizers Kate Rosok, Brian Allison, Kent Gordon, Brandi Gordon, Jeff Lynum, Mick Hamilton, Beth Keskey, Jess Strom, Sarah Niemeyer, Christian Waage, Denine Voegeli, Rachel Humphrey, Anna Schoeneberger, and a good number of teachers, vendors, and other interesting people.

Social distancing protocols were followed, conference participants wore masks, there was an additional lunch room, and vendors' tables were separated.

Theresa Tweet

Bob Ebsen, Wildlife Science Center Director talks to our group about the Wildlife Center and its animals

GSM Wildlife Science Center Visit

On Saturday, February 26, 2022, GSM sponsored a field trip to the Wildlife Science Center (WSC) in Stacy, Minnesota. We had an enthusiastic group of 38 people eager to see and hear the residents of the Center. The WSC has a population of over 100 wolves, including gray, red, and Mexican grays. To that mix, add a cougar, bobcat, lynx, black bear, coyote, red and gray fox, plus a collection of hawks and owls.

Our tour began with an introductory talk by Education Director Bob Ebsen in the Education Center. While he was talking, we were entertained by a giant tortoise who has the run of the building.

Wildlife Science Center tortoise

Introductory talk: Note the tortoise

Outdoor talk by the wolf pens and two wolves

Once outside, we visited the many wolf pens and listened to talks about each of the occupants. Different strains of wolf are kept apart, and new litters are a frequent occurrence. Wolf breeding is regulated by a federal agency to avoid interbreeding and overpopulation of certain varieties. On a couple occasions, we were greeted by groups of wolves howling, a surreal experience….primeval!

After the outdoor tour, we returned to the Education Center for a Q & A session. It was a most rewarding experience, and many said they would like to return. Normal visiting hours are Wednesday from 10-12 and Saturday from 11-2. Tours can be arranged outside of those hours at a rate of $10 per person (minimum of 10). For more info, visit their website: https://www.wildlifesciencecenter.org/

Fun trip!!

Story and photos-Joe Newberg

Historic Platteville Limestone Architecture in Saint Paul: Holman Field, The Downtown Airport Terminal

Continuing the stories of historic buildings constructed with Platteville Limestone, here's the story of the 1939 airport terminal building at Saint Paul's Downtown Airport, also known as Holman Field. Beyond the stonework, the building has an interesting history.

The Holman Field terminal building was designed by Clarence W. Wigington (1883-1967) and was constructed between 1938 and 1941 in cooperation with the Works Progress Administration (WPA). Wigington, was the nation's first African-American registered engineer and was the senior architectural designer for the City of St. Paul, a career that spanned from 1915 to 1949. (Wigington also designed the Harriet Island Pavilion in Saint Paul for whom the pavilion is named.) According to Jeffery Hess and Paul Larson in their book, *St. Paul's Architecture*, the Holman Field Terminal was one of the last

The terminal at Saint Paul's downtown Airport, also known as Holman Field, was erected in 1939. The building is faced with Platteville Limestone.

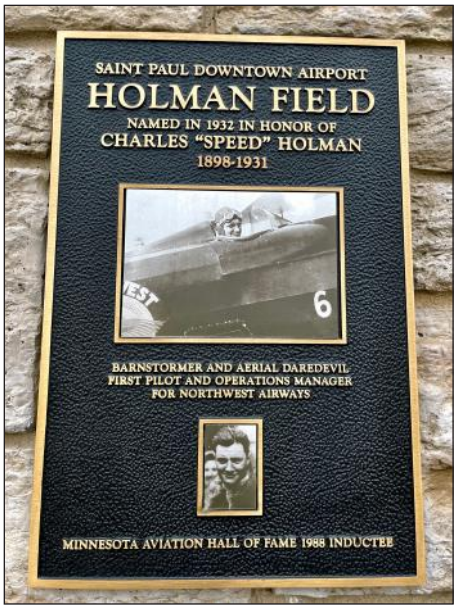
buildings built and faced with Platteville Limestone. The building is listed on the National Register of Historic Places.

The cornerstone at the Saint Paul Airport terminal

What quarry supplied the stone for this building? That's a good question. I'll report back when I figure that out.

The Holman Field Terminal building today houses the airport's control tower, the passenger terminal and Holman's Table, a restaurant where you can enjoy a tasty meal and watch planes land and take off. The interior of the building has been restored. The terrazzo floor of the entry includes a large mosaic depicting North America and the hub cities for Northwest Airlines in the early years. The interior walls of the terminal are travertine. In addition to the exterior of the building, both the travertine walls and terrazzo floor were cleaned and renovated in 2018. It's a robust building and illustrates the great craftsmanship of stone masons and our local Platteville Limestone.

Mankato-Kasota Limestone runs along the base of the building. Irregular-sized blocks of Platteville Limestone face the building's exterior. Note how the stacked stone blocks frame the windows.



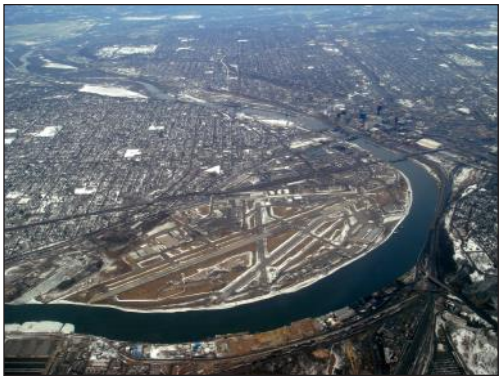
Plaque honoring Charles "Speed" Holman

Established by the city of Saint Paul in 1926, the airport, was built to provide passenger air service and to fulfill the US Post Office's contract to deliver airmail. Northwest Airways (later Airlines) began passenger service to Chicago in 1927.

The airport was later renamed to honor Charles "Speed" Holman, the first Northwest Airways pilot and operations manager. Holman flew the first flight from Saint Paul to Chicago in 1926, delivering airmail. He was a daredevil. He jumped from planes and was a wing-walker. His world-record stunt was flying 1433 consecutive loops in five hours over the Saint Paul Airport. He won multiple air races, including one from New York to Spokane, Washington. Holman died tragically at age 32 while performing stunts at an airshow at the opening of the airport in Omaha, Nebraska. Holman's 1927 Federation Aeronautique Internationale Sporting License was signed by Orville Wright.

Plaque reads: "In memory of Charles W. Holman. He belonged to the heights, and the heights claimed him. Erected by the St. Paul Aviation Club 1932."

Located on a flood plain section of the Mississippi across the river from downtown Saint Paul and Mounds Park, the airport has flooded a number of times over the years and forced the closing of the airfield. In 2009, a flood-wall with removable sections was built to protect the airport. The open sections allow views of the river. When flood waters threaten, the planks are removed from storage and stacked between posts to form a barrier to the rising water. The flood protection walls were deployed in 2010, 2011 and 2014.



Arial view of the Saint Paul Airport/ Holman Field. Photo CC Wikimedia Commons

If you visit Holman Field, continue driving along the river past the terminal building; there are numerous historical plaques; and at the end, a platform to view the river. Watch for soaring eagles too.

References:

https://www.rrauction.com/auctions/lot-detail/32308870368473-charles-speed-holman/?cat=0#mz-expanded-view-155333610772

Photos and story by Kate Clover

The Copper Basin and Burra Burra Mine

Where the common borders of North Carolina, Tennessee and Georgia meet in the southern Appalachian Mountains lies the Copper Basin, also known as the Ducktown Basin, an area of about 60,000 acres mostly within Polk County, Tennessee. I recently traveled to this area which was the former site of the largest metal mining operation in the Southeastern US. In the center of the Basin, in Ducktown, Tennessee, is the Burra Burra Mine from which over 15 million tons of copper ore were extracted during its 60 years of operation from 1899-1959. The Burra Burra Mine was one of a number of mining operations in the Ducktown Basin where ore bodies contained iron sulfides, copper sulfides and zinc sulfides.

When mining began in the Basin in 1850, only the copper was recovered. Later milling operations recovered the iron and zinc contained in the ore. In 1904, a smelting method was developed that allowed recovery of the sulfur which made it possible to manufacture sulfuric acid. Over time, the acid portion of the operation became the most profitable.

History of the Copper Basin

The Copper Basin is located mostly within Polk County, Tennessee which contains extensive deposits of copper ore, as well as many other minerals. It was part of Cherokee lands until 1836, when most Cherokees in the area were forced out as part of the Indian Removal Act of 1838. Some members of the tribe managed to avoid detection and would later aide in road construction and mining operations.

Copper was first discovered in the Basin in 1843 on a hill immediately southwest of what would eventually become the Burra Burra Mine. In 1860, several small-scale mining operations were consolidated to form the Burra Burra Copper Company. In 1899, the Tennessee Copper Company, which had bought most of the mining operations in the Copper Basin, constructed a smelter at Copperhill and began work on the Burra Burra Mine at Ducktown. The Burra Burra Mine eventually became the most-productive mine in the Copper Basin. Mining activities began to decline in the mid-1950s, and by the time the Burra Burra Mine closed in 1958, its vertical shaft was over 3,200 feet deep, making it one of the deepest vertical mine shafts in the North America. After the mine's closure, operations continued at other deposits within the Basin.

Copper Basin Geology, Mining and Processing

The geology and mining processes of the Copper Basin are described in detail in an article written by Kim Cochran titled, "Minerals and Mining of the Copper Basin," and published by the Georgia Mineral Society, Inc. (https://www.gamineral.org/writings/copperbasin-cochran.html). Early processing of ore was done in open smelters which produced large amounts of sulfur dioxide (SO_2) gas which killed off all of the vegetation in the central basin and denuded the landscape including trees used as fuel for the smelters. In the Basin without trees and undergrowth, the topsoil began to erode and huge gullies formed. Georgia took legal action and the mining companies proposed condensing the acid gas to produce sulfuric acid rather than discontinuing mining operations. This resulted in several acid plants being built in the Basin to produce sulfuric acid.

Restoration of the Copper Basin

As part of re-greening efforts, 16 million trees have been planted and the basin has been seeded with acid-tolerant

This 1939 photo shows a train bringing copper ore out of the Ducktown, Tennessee mine. Fumes from smelting copper for sulfuric acid destroyed all vegetation and eroded the land. Photo: Creative Commons

grass. The Burra Burra Mine was part of a 300-acre (1.2 km²) stretch of land near the center of the Basin selected to be exempted from the reclamation efforts to serve as a reminder of how the entire central basin once appeared.

Site of the mine collapse at the Burra Burra Mine site in Ducktown. Through recent soil reclamation efforts the land has partially re-vegetated, although effects of the smelting and mining operations are still visible. Photo by Brian Stansberry / Creative Commons

The Burra Burra Mine Today

The Tennessee Chemical Company (Tennessee Copper's successor) filed for bankruptcy and sold off its holdings in 1987. The Ducktown Museum and Burra Burra Mine were purchased by the state of Tennessee in 1988. The old engineers' office building now houses the Ducktown Basin Museum. Ten of the mine's structures remain, including its hoist house, boiler building, powder house, and machine shops. Various machine parts, tools, and other artifacts used in the basin's mining operations are displayed on the museum's grounds.

Ducktown Basin Museum, formerly the engineer's office building. Photo by Brian Stansberry, Creative Commons

The first exhibit in the museum is a geological overview of the Ducktown Basin, A 15 minute video explains the history of the mining and sulfuric acid production activities in the Basin. The museum includes many artifacts from the mining activities as well as local culture, and includes an exhibit about the environmental problems that resulted from the mining activities in the basin, and the subsequent cleanup and restoration efforts.

Copper ore from Ducktown Basin, Ducktown, Tennessee. Photo by Brian Stansberry / Creative Commons

The museum's parking lot overlooks the massive sinkhole (now filled with water) created when part of the Burra Burra Mine collapsed. It is not possible to enter the mine today as it has been allowed to flood with groundwater.

Machine parts and tools are scattered about the grounds of the Burra Burra Mine site in Ducktown, Tennessee. Photo by Brian Stansberry, Creative Commons

The museum's establishment and assembly is due in large part to the basin's residents. We visited with the Museum's Executive Director, Sarah Mickens, who has been instrumental in establishing and maintaining the site.

Today, the Burra Burra Mine Historic District is on the National Register of Historic Places. The State of Tennessee purchased the site in 1983, making it the first state-owned historic industrial site. See the website: https://ducktownbasinmuseum.com/exhibits or information about the mining history, location of the museum, hours of operation, admission fees and more.

Craig Moody

Louisville Swamp Boulder

An interesting area in the Twin Cities region is the Louisville Swamp near Shakopee, a unit of the Minnesota Valley National Wildlife Refuge. Louisville Swamp is one of the largest and most diverse sections in this whole refuge. It includes a 2.4-mile loop trail, which is a fairly easy route and takes about an hour to complete. This trail is great for birding, hiking, and snowshoeing, and it's unlikely you'll encounter many other people while exploring. The best times to visit this trail are March through October. Dogs are welcome, but must be on a leash.

A cool attraction along the trail is an immense glacial erratic knows as the Louisville Swamp Boulder. As you know, a glacial erratic is a glacially deposited rock differing from the type of rock native to the area in which it rests. Erratics, which take their name from the Latin word *errare* (to wander), are carried by glacial ice, often over distances of hundreds of miles. Erratics can range in size from pebbles to large boulders, such as this one in the Louisville Swamp. This big granite rock, a gray and black bulk, larger than a city bus and approximately the same shape, sits out in the open along the trail. It is popular with rock climbers, as it offers a number of interesting challenges on its various faces.

In August, 2010, Randy Strobel led some GSMers along the Louisville Swamp Trail. I took this photo of the boulder during this outing. See more photos of this boulder and the trail at https://tinyurl.com/LouisvilleSwampAug2010

Dave Wilhelm

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P.O. Box 141065, Minneapolis, MN
55414-6065

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