

# Wyoming Banded Iron

*Article edited by Stan Strike*



## What is Banded Iron?

**B**anded iron formation (BIF) is a sedimentary rock that was commonly deposited and formed over 3,700 million years ago during the Precambrian. Typical banded iron formation consists of pale silica-rich cherty bands alternating with black to dark red iron-rich bands. Many specific varieties of iron formation are known, and some are given special rock names. For example, jaspilite is an attractive reddish & silvery gray-banded rock consisting of hematite, red chert ("jasper"), and specular hematite or magnetite. Because of their age, most banded iron formations have been around long enough to have been subjected to one or more orogenic (mountain-building) events. As such, most BIFs are folded and/or metamorphosed to varying degrees.



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The Wyoming State Mineral and Gem Society (WSMGS) is a non-profit organization, with the purpose of educating, promoting and developing an interest and understanding in the Earth Sciences, Lapidary Arts, and their related fields for its affiliated members as well as the general public. The WSMGS is a member of the Rocky Mountain Federation of Mineralogical Societies (RMFMS) and the American Federation of Mineralogical Societies (AFMS). WSMGS Member Clubs are located in Casper, Cheyenne, Cody, Powell, Riverton, and Torrington, Wyoming. The WSMGS invites you to explore our website for information about Wyoming's minerals, rocks, fossils, and gemstones as well as for an introduction to the people and places that rockhounds can visit, explore and learn. *You can find us at:*

<http://www.wymineralandgemsociety.org/index.html>

# WSMGS INFORMATION AND UPDATES

by Stan Strike, President



**1. 501(c)(3):** The Wyoming State Mineral and Gem Society is now officially a 501(c)(3) organization. This will allow the WSMGS Board to accept donations and grants to further support the WSMGS affiliated clubs that sponsor the WSMGS Wyoming State Rock Show. The monies received by the WSMGS must be spent such that expenditures support the purposes set forth in the WSMGS' Articles of Incorporation.

Affiliated WSMGS clubs or individual members of these clubs must be authorized by the WSMGS Board in order to apply for grants utilizing the WSMGS 501(c)(3). Authorized clubs or individuals will be provided with the appropriate WSMGS Grant Forms. All grant monies received using the WSMGS 501(c)(3) must be received in the name of the WSMGS and sent to the current WSMGS Treasurer.

The WSMGS Board will then redistribute these monies as to the intent of the grant and in accordance with the WSMGS' stated purposes.

**2. WY State Sales Tax Exemption:** The WSMGS Board applied for and was granted an exemption from WY sales tax on items that are purchased by the WSMGS. Affiliated WSMGS clubs or individual members of these clubs must be authorized by the WSMGS Board in order to purchase items exempt from WY sales tax. Authorized clubs or individuals will be provided with the appropriate WSMGS WY Sales Tax Exemption Forms that are required at the time of purchase.

**3. 2015 RMFMS Convention & WSMGS State Rock Show:** The 2015 RMFMS and WSMGS State Rock Show will be held in Cody on July 16-18, 2015. The RMFMS Convention will be hosted by the WSMGS Board and the Rock Show will be hosted by the Cody 59ers and the Shoshone Rock Club.

**4.** The WSMGS has a new Web Host for the WSMGS website: [www.wymineralandgemsociety.org](http://www.wymineralandgemsociety.org).

The WSMGS Board changed from dotEasy to iPage because usage of our website was exceeding our purchased bandwidth = more people using our website!! With unlimited bandwidth and unlimited accompanying email addresses, iPage was contracted for three years at a cost of under \$75. Our webmaster was excited about this new web hosting, their service representatives, and more freedom to expand the WSMGS website.

**5. Alias Email Addresses:** In order to provide privacy and continued contact with each WSMGS affiliated Club and individuals, with iPage's unlimited email feature, the WSMGS board has established "Alias Email Addresses" for all WSMGS Board members and each WSMGS affiliated rock club's email contacts. These alias Email Addresses will be published in the Jade State News and on our WSMGS website as well as for emails sent from the WSMGS to the WSMGS affiliated clubs or to the RMFMS or the AFMS. It might be compared to the clubs who have a mailbox –the box # address stays the same but the persons receiving the mail can change as new officers change.

Please note that the current contact information for each WSMGS affiliated member club is listed currently on the WSMGS website and in this issue of the May 2014 Jade State News. The use of personal e-mail addresses has been eliminated to avoid spamming by "web spiders and web bots".

**6. Club Contacts have been sent :** monthly Rocky Mountain Federation Newsletters, quarterly Jade State Newsletters, 2014 WSMGS Annual Meeting Delegate Forms. Contacts should make this information available to their club members via email or at meetings. Club members can also view this information on the WSMGS website: [www.wymineralandgemsociety.org](http://www.wymineralandgemsociety.org)

**7. Field Trip Liability:** The WSMGS Board and the RMFMS recognizes that non-members pose a liability risk by participating in a WSMGS affiliated club field trip. It is the WSMGS Board's suggestion that all individuals be asked to join the club sponsoring the field trip OR be asked to sign a WSMGS Informed Consent/Assumption of Risk/Waiver of Liability form PRIOR TO PARTICIPATING IN THE FIELD TRIP. That form can be found on the WSMGS website.

**8. WSMGS Board Meeting:** The WSMGS Board met April 5, 2014. Topics discussed were:

- \* Updated information on requirements and responsibilities for WSMGS as a 501(c)(3) nonprofit
- \* Approval of 501(c)(3) grant forms and discussion of their use.
- \* Approval of WSMGS Board delegate to attend the RMFMS Convention in Tulsa, OK July 11-13,
- \* Submission of application to RMFMS to provide WSMGS liability insurance for 2014 State Show.

Continued on page 5

# HISTORIAN'S REPORT

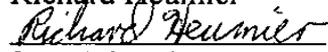
April 5<sup>th</sup>, 2014

## State Historian's Report

- Jan. 17<sup>th</sup>**- Yearly reports came in from Jackie Platt of Cody 59er's club; Linna Beebe of the Shoshone Rock Club; and Joyce Trowbridge of the Rex Young Rock Club. An outstanding yearly manual from Linna Beebe, again. Way to go.
- Feb. 3<sup>rd</sup>**- Had a class on various rocks at our private museum with the Valley Christian School kids, ages K through 5<sup>th</sup> grade.
- Feb. 9<sup>th</sup>**- I picked out 3 flats of rocks for donations to WSM&GS state table at State show.
- Mar. 15<sup>th</sup>**- Inventoried, reinforced, & made cardboard boxes for the State Heritage showcase items. Some of the items needed better protection. Also, found or made some small packing sleeves of bubble wrap, marked them for each item, and replaced in their individual marked boxes. Now each item has a separate marked wrapper and marked box to go into, so it will be easier to inventory and to use at the State shows.
- Mar. 17<sup>th</sup>**- Made a packing layout sheet and showcase item sheet. I had the 2 sheets, plus the showcase floor plan sheet laminated to protect them from damage and placed in the main item box. I had the Heritage Show case front glass fixed.
- Mar. 20<sup>th</sup>**- Applied for a donation with the True Foundation ( an Oil Company). I had an opportunity that came up from a school program. The person giving the program, was connected to this company and I managed to get a few details to apply and did so. I called a some of the State board members to make sure it was okay and then sent in an application. Have not heard from them, yet.
- Mar. 27<sup>th</sup>**- I did a basic Geology class at the Western History Museum. 32 people attended

I will be contacting the State Geologist Association for judging the showcases at the State show.

Richard Heumier

  
State Historian

**WSMGS Information and Updates Continued:**

- \* Updated information concerning WY Exemption of Sales Tax and discussion of its use
- \* 2015 RMFMS Convention/WSMGS State Show in Cody updates and discussion of motel choices.
- \* Update on new WSMGS website host-iPage
- \* Transfer of WSMGS Trailer from Riverton to Casper by George Tillman.
- \* Progress report on 2014 WSMGS State Show
- \* Input for May 2014 Jade State News
- \* Report on number of Club and State Rockhound of the Year applications, judging, & awards
- \* Review of digitized WSMGS logos to be approved at 2014 Annual meeting
- \* Approval of Digitized B&W and color WSMGS Trademark and registration with UW licensing
- \* Discussed recruitment of new WSMGS affiliated clubs in Pinedale and Rock Springs
- \* Report on club field trip liability and suggested membership or Liability Waiver for nonmembers
- \* Approval of Alias Emails for Board and club contacts
- \* Donation by WSMGS Board to AFMS raffle
- \* Donation by WY State Geological Society of 60 Wyomingite for 2015 state show
- \* Donation by UW Geological Library of WY topographic & geologic maps

**9. Important 2014 Dates & Deadlines:**

May 1st- Deadline for Club News to Jade State News Editor-Verne Orcutt

May 17th/18th-Cheyenne Mineral & Gem Show

July 1st- Deadline for WSMGS Annual Meeting Delegate/Alternate Forms to WSMGS president

July 11th -WSMGS Annual Meeting-6:00pm-5211 Rambler-Mills

July 12th/13th-WSMGS State Mineral & Gem Show-Casper, WY

**10. July 16-18, 2015 RMFMS Convention and WSMGS State Show-Cody, WY**



Children ages K through 5<sup>th</sup> grade from Valley Christian School in Torrington attending a class on various rocks presented by Richard Heumier

### Wyoming Banded Iron continued from Page

Banded iron's chemical composition is 50% silicon dioxide (SiO<sub>2</sub>) and 50% iron oxides (Fe<sub>2</sub>O<sub>3</sub> and Fe<sub>3</sub>O<sub>4</sub>), to give a total iron content of about 30%. Banding is produced by the concentration of these two chemical components into layers about 1–5 cm (1/2–2 in.) thick. These contrasting layers are sharply defined, so that the rock has a striped appearance. Banded iron formation is normally a hard, tough rock, highly resistant both to erosion and to breaking with a hammer.

The banded iron layers were formed in sea water as the result of oxygen being released by photosynthetic blue-green algae (cyanobacteria). This oxygen then combined with dissolved iron in the Earth's oceans to form insoluble iron oxides, which settled to the bottom as a thin layer. These iron oxides alternated with the deposition of (anoxic mud) that formed shale and chert. Each band is similar to a glacial varve, to the extent that the banding is assumed to result from cyclic variations in available oxygen.

The world's iron and steel industry is based almost exclusively on iron ores associated with banded iron formation. Banded iron formation itself may be the primary ore, from which hematite or magnetite is concentrated after crushing. But the main ore now mined globally is high-grade (greater than 60% iron) material that formed within banded iron formation by natural leaching of its silica content.

(Adapted from: <http://www.answers.com/topic/banded-iron-formation>, )(<http://www.answers.com/topic/banded-iron-formation#ixzz2rSiDqVBN>

<http://www.newark.osu.edu/facultystaff/personal/jstjohn/Documents/Cool-Rocks/Banded-iron-formations.htm>)

## Wyoming's Historical Iron Ore Mining Sites

There are no active iron ore mines in Wyoming today. The Sunshine Mine was recently purchased by a private company to provide aggregate materials for a regional cement redi-mix plant. As Wyoming rockhounds in search of banded iron, the following listed areas should provide some remnants of banded iron. It is important to check the current land ownership of these sites to secure permission if needed.

### Sunrise Mine

The Sunrise Mining District of southeastern Wyoming has provided resources for people for thousands of years. Prospectors have dug hundreds of exploration pits and shafts seeking copper-bearing minerals. One of these early copper seekers followed a crevice into an underground chamber which Native Americans had excavated as they mined ochre, or soft hematite. The chamber still contained the stone hammers that were used to break out the soft hematite rock. This ochre excavation was the embryonic beginning of the Sunrise Iron Ore Mine.

Sunrise was a company mining town of the Colorado Fuel and Iron Company located in Platte County, Wyoming. In

1890, Charles A. Guernsey, after whom the nearby town of Guernsey, Wyoming is named, founded the Wyoming Railway and Iron Company to exploit iron mining in the area. Because of decreasing ore quality and problems in the domestic steel market, the town and mine were closed by Colorado Fuel and Iron in 1980. Over the lifetime of the mine 40 million tons of iron ore were produced. The district was added to the National Register of Historic Places in 2005.

The ore is a very pure hematite known as a Bessemer ore, running about sixty-two per cent to sixty-six per cent metallic iron, and from one per cent to two per cent silica, being free from phosphorous and sulphur. Geologically it occurs mainly in the schist and also in the dolomite and along the contact of the two, as Precambrian rocks.

(Adapted from: <https://www.mineraleducationcoalition.org/reclamation-stories/metals/other-metals/sunrise-mining-district-wyoming>, [http://en.wikipedia.org/wiki/Sunrise,\\_Wyoming](http://en.wikipedia.org/wiki/Sunrise,_Wyoming),

<http://www.rootsweb.ancestry.com/~wytttp/history/bartlett/chapter25.htm>)

### South Pass-Atlantic City

In 1842 significant iron ore deposits were found along the northern edge of the South Pass greenstone belt as part of the Wind River mountain range. Development of the large taconite (iron ore) deposits in the 1950s led to the opening of the Atlantic City iron mine, which produced more than 90 million tons of iron ore (taconite) between 1962 and 1983 from banded iron in the Goldman Meadows Formation. Some minor copper, silver, tungsten, asbestos, beryl (aquamarine), ruby including a diamond have also been reported within the region.

The Goldman Meadows Formation overlies the Diamond Springs Formation and contains two distinct lithologies: a schist member that includes pelitic schists, quartzites and massive to schistose amphibolites; and iron formation members composed of banded quartz-magnetite-amphibolite iron formation. The iron formation consists of laminated dark gray to black, fine-grained, hard, dense alternating 0.1-to-2-inch-thick (2.5 to 50.8 mm) layers of magnetite and metachert and varying amounts of amphibole. The average iron content in the Atlantic City area is about 33.5% and ranges as high as 56.23%.

(Adapted from: [http://en.wikipedia.org/wiki/South\\_Pass\\_greenstone\\_belt](http://en.wikipedia.org/wiki/South_Pass_greenstone_belt))

### Iron Mountain

Farthing (also known as Iron Mountain) was a railroad station and post office in the U.S. state of Wyoming. Farthing is located southwest of Chugwater in the Chugwater Creek valley. The region was originally named Iron Mountain due to iron deposits discovered on a nearby ridge in 1850 and briefly mined in 1870. The mountain is more than a mile in length with the iron-bearing ridge about 600 feet in width. The ore is in a volcanic dike varying from 40 to 300 feet in width. In several localities the ground was strewn with fragments of white quartz, and jasper of a blood-red colour. In

the bed of the Chugwater, and on the sides of the adjacent hills were found immense numbers of rounded black nodules of magnetic iron-ore, which seemed of unusual richness.

**T**he Iron Mountain deposit is very unique, the ore being a titaniferous magnetite of great purity, assaying about eighty-two per cent oxide of iron and about seventeen per cent titanitic acid. That this ore can be smelted with other ore for the purpose of producing a titanium steel of very superior merit. The deposit is located only nine miles from the Colorado and Southern Railroad at Iron Mountain station.

(Adapted from: <http://www.rootsweb.ancestry.com/~wyttt/history/bartlett/chapter25.htm>,

[http://en.wikipedia.org/wiki/Farthing,\\_Wyoming](http://en.wikipedia.org/wiki/Farthing,_Wyoming), <http://www.wyomingtalesandtrails.com/ironmountain.html>)

### **Seminole Mountains**

**Beautiful specimens of jasperized iron formation** are found in the Seminole Mountains several miles northwest of Saratoga, and north of Sinclair. These rocks are magnetic and have alternating bands of black magnetite, dark gray quartz, and tawny to brown layers of jasper and grunerite. Some of the silicified grunerite bands are a beautiful form of "tiger's eye" that would yield attractive specimens.

The source of this material is banded iron formation from Bradley Peak in the Seminole Mountains gold district. Much of the jasperized material is found as cobbles and pebbles downstream along Deeweese Creek and in alluvium along the north flank of the range near the Miracle Mile on the North Platte River. The area is known for its iron ore and gold deposits, but also hosts some copper, silver, serpentine, asbestos, jasper, jade and leopard rock.

The Seminole Mountains are surrounded by private land to the south. Along the north, there is public land and the area can be accessed by way of Sunday Morning Creek on the north - a very rough road. However Timberline Minerals has staked all of the public land and kept all other companies out of the area.

(Adapted from: Dan Hausel's -GOLD IN THE SEMINOLE MOUNTAINS, WY-OCT.22,2013, Jasperized banded iron formation, Seminole Mountains, WY/ <http://seminole.blogspot.com/>)

The gravels also contain abundant clasts of dark colored banded iron formation derived from the western end of the Seminole Mountains in the Seminole Greenstone Belt. Some of the banded iron cobbles are beautiful lapidary-grade material containing alternating bands of red jasper, hematite, and silicified grunerite commonly called "tiger iron".

### **Rawlins**

As early as 1870 the paint-rock deposits near Rawlins were opened. The Rawlins" paint-rock " ores are 1 1/2 miles north of Rawlins.

### **Shirley Mountains**

The Shirley iron-bearing veins are 25 miles due north of Hanna and may be reached from either Hanna or Medicine Bow.

(Adapted from: <http://minelistings.com/mines-for-sale/diamondback-placer-gold-mine-for-sale>)

### **Bridger Mountains**

The Bridger Mountains are located in the northeast part of Fremont County, 15 miles northeast of Shoshoni and about 20 miles southeast of Thermopolis. The central area of pre-Cambrian rocks in the Bridger Range consists predominantly of black hornblende schist. The schist has been invaded by large masses of coarsely crystalline granite. The granite invasion was followed by two distinct intrusions of granite pegmatite. The intrusion of the older dikes was followed by an invasion of silica-rich and potash-rich hydrothermal solutions which replaced the black schist with quartz and sericite. The intrusion of the younger dikes was followed by an invasion of hydrothermal solutions which partially replaced the original dike minerals and precipitated cleavelandite, muscovite, tourmaline, beryl, garnet, columbite, tantalite, chalcopyrite, lepidolite and petalite.

The black Pre-Cambrian rock is a fine grained schist composed dominantly of hornblende and labradorite. Hornblende constitutes 70 to 85 per cent of the schist. The labradorite variety of plagioclase feldspar constitutes 10 to 20 per cent of the black Pre-Cambrian rock. Common accessory minerals are magnetite, chlorite, quartz, actinolite and zircon. None of these minerals ever constitute over two per cent of the rock.

Magnetite forms very irregular masses of banded iron which are subrounded, tabular, or trellis-like. It is often slightly altered to hematite and limonite, which are nearly opaque to transmitted light, but are reddish brown to ochre yellow in reflected light.

(Adapted from: [http://www.minsocam.org/msa/collectors\\_corner/arc/wybridgermts.htm](http://www.minsocam.org/msa/collectors_corner/arc/wybridgermts.htm))

#### **Ol' Fred**

Ol' Fred had been a faithful Christian and was in the hospital, near death. The family called their preacher to stand with them.

As the preacher stood next to the bed, Ol' Fred's condition appeared to deteriorate and he motioned frantically for something to write on. The pastor lovingly handed him a pen and a piece of paper, and Ol' Fred used his last bit of energy to scribble a note, then suddenly died. The preacher thought it best not to look at the note at that time, so he placed it in his jacket pocket.

At the funeral, as he was finishing the message, he realized that he was wearing the same jacket that he was wearing when Ol' Fred died. He said, "You know, Ol' Fred handed me a note just before he died. I haven't looked at it, but knowing Fred, I'm sure there's a word of inspiration there for us all."

He opened the note, and read, "Please step to your left -- you're standing on my oxygen tube!"

Courtesy "Joke of the Day" by: Poonam Aggarwal from India

# RMFMS: GEOLOGY OF WYOMING III

by Dr. Mike Nelson [csrockguy@yahoo.com](mailto:csrockguy@yahoo.com) [www.csmsgeologypost.blogspot.com](http://www.csmsgeologypost.blogspot.com)

(Adapted with author's permission by Stan Strike-WSMGS from RMFMS Newsletter-December 2013)

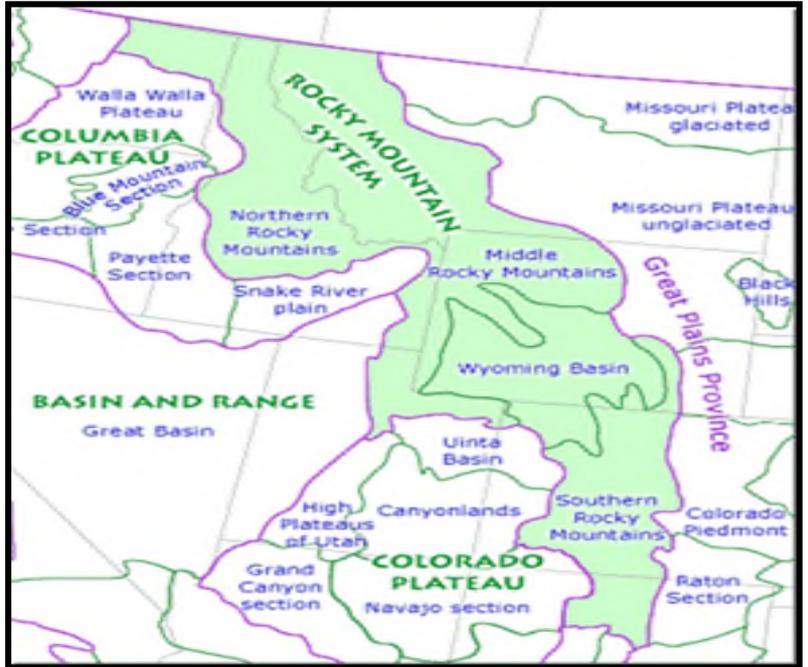
Dr. Mike Nelson is in the process of writing about the geology of all of the states that are members of the Rocky Mountain Federation of Mineralogical Societies. Part I-Geology of Wyoming was printed in the October 2013 RMFMS Newsletter with Part II-Geology of Wyoming printed in the November 2013 issue of the RMFMS Newsletter. This column is the final part of the Geology of Wyoming- part III.

As previously noted, Wyoming has two major physiographic provinces (refer to Fig. 1): 1) the Interior Plains east of the mountain fronts; and 2) the Rocky Mountains occupying the western two thirds of the state. Many generalists like to lump the mountains into one all-encompassing term—"The Rockies."

Although the Rockies do have a somewhat common geologic history, there are distinct differences between the several subdivisions. For this discussion (refer to Fig. 2), the Southern Rocky Mountains include the southeastern mountains—Laramie (LR), Medicine Bow (MB), and Sierra Madre Ranges (SM)—all closely related to the mountains of Colorado and northern New Mexico.

The Central Rocky Mountains include the major anticlinal ranges in the central and northern parts of the state, such as the Wind River (WRM), Bighorn (BH), and Granite Mountains (GM). It also includes the thrust-belt mountains (OB) on the west and the volcanic terrane around Yellowstone (YP).

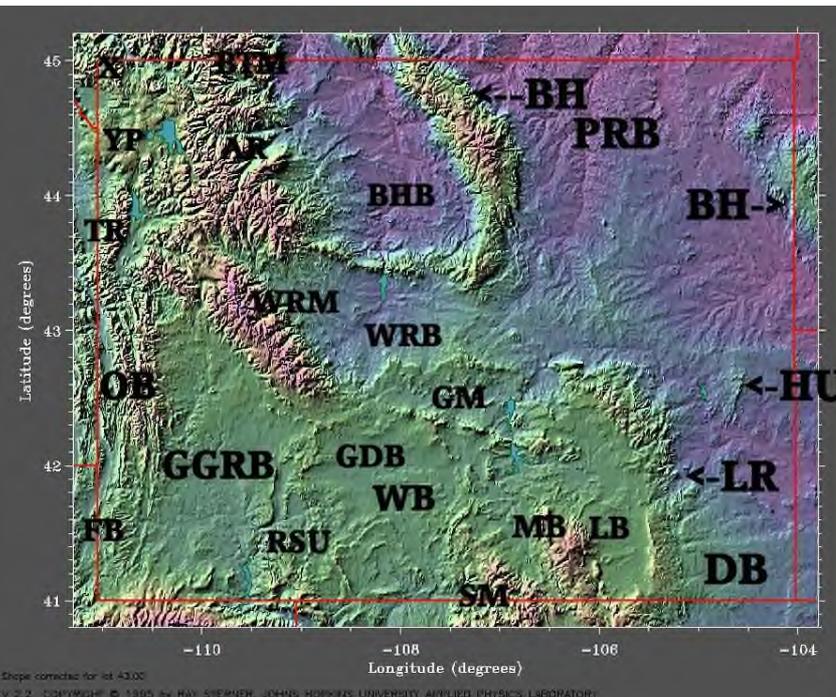
The Northern Rocky Mountains, the other major component, encompass parts of Montana and Idaho and may or may not extend into Wyoming. Some authors include the Gallatin/Madison Ranges (X), of extreme northwestern Yellowstone, in the Northern Rockies.



**Fig. 1. Map, from USGS, showing major physiographic provinces of Wyoming.**

In addition to the ranges and their accompanying basins, a large segment of the south-central part of the state is composed of the Wyoming Basin (WB), an area that encompasses the Greater Green River Basin (GGRB) that for a time back in the early Tertiary held a large, tropical fresh water lake that has produced all of those wonderful fish fossils that are on display at virtually every major museum in the world (Fossil Basin subdivision, FB). The Wyoming Basin also holds an area of internal drainage, the Great Divide Basin (GDB) that the Continental Divide simply skips around, actually the Divide encircles the Basin.

Like the Colorado Rockies to the south, the large anticlinal mountains of Wyoming generally are cored by Precambrian rocks (Refer to Fig. 3). So, this might be a good time to talk about the Precambrian, the ancient rocks of the earth's crust. What I probably have failed to indicate is that the Precambrian represents a very, very long time span, perhaps the first 4.5 billion years of geologic time—the vast amount of time before the appearance of hard-bodied animals (animals with shells or bones). In contrast to the length of time in the Precambrian, these animals with "hard bodies" have only been around for about 0.5 billion years. So, life and fossils as we generally know it, is only about 12% of geologic time. For additional information on geologic time see the Geological Society of America time scale at: [www.geosociety.org/science/timescale/timescl.pdf](http://www.geosociety.org/science/timescale/timescl.pdf).



**Fig. 2. Satellite map of Wyoming (by permission from Sterner, Johns Hopkins University) with major landforms**

The Precambrian, and it is formally called a Supereon, is divided into three Eons (remember the Paleozoic, Mesozoic, and Cenozoic are Eons): the **Hadean** (4.5-3.95 Ga), **Archean** (3.95-2.5 Ga) and **Proterozoic** (2.5-.542 Ga) with the abbreviation Ga referring billions. The .542 Ga or 542 Ma (542 million) is the base of the Cambrian and the time when geologists begin to find hard-bodied animals such as trilobites and brachiopods. Since these shelled fossils, commonly preserved, are often used to date rocks, the time since the Precambrian has been subdivided into quite small units of time and is easier to understand. Another mitigating factor is that many/most Precambrian rocks have been subjected to episodes of metamorphism and igneous activity, both in the Precambrian and in later eons. It is easy to go out and locate a post-Precambrian sandstone or limestone with a nice array of fossils. However, very few sedimentary rocks are preserved as such in the Precambrian record. Most have been metamorphosed to quartzite or schist or gneiss or marble or actually re-melted and turned into igneous granite.

The Precambrian rocks of Wyoming consist mainly of three major geologic terrains: the Archean *Wyoming Province*, the Proterozoic *Trans-Hudson Orogen*, and the Proterozoic *Colorado Orogen*. In this usage orogen refers to a belt of deformed rocks commonly metamorphosed and intruded by igneous bodies—the rocks associated with a tectonic or mountain building event and usually accreted (stuck onto) to the continent.

The oldest rocks in the Wyoming Craton, perhaps as old as 4.0 Ga (but most are dated ~2.5-2.8 Ga), include intrusive igneous and granite-like rocks as well as some metamorphic rocks. The Wyoming Province is often called the Wyoming Craton since it represents a very stable part of the ancient Precambrian “North American continent”. Most of the Wyoming’s mountain ranges, where the Precambrian crops out, have rocks of this age--Archean. For example, Stueber and Heimlich (1977) described a Rb-Sr dating analyses of several rock types in the core of the Bighorn Mountains and came up with several dates ~2.85 Ga that was interpreted as the time of metamorphism. In other words, older rocks were present before metamorphism.

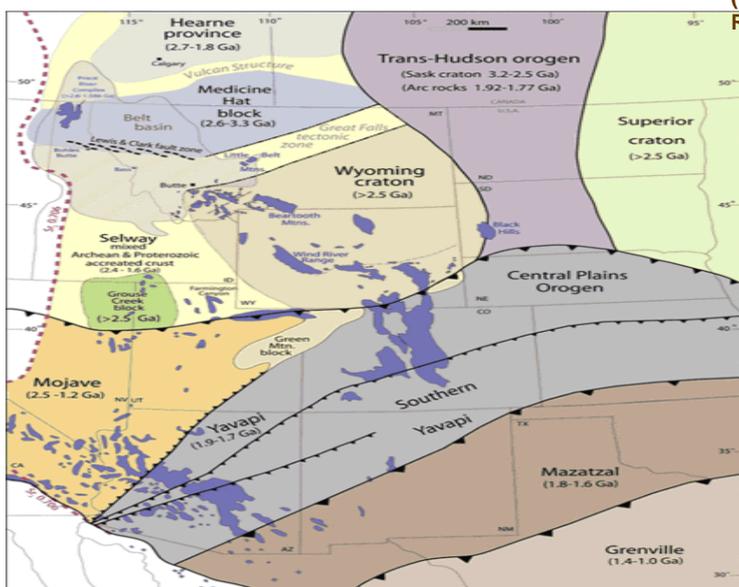
The Wyoming Craton (Archean rocks) was sutured to the Superior Province (Craton) by an event known as the Trans-Hudson Orogeny. Precambrian outcrops (usually Archean in age) in most of Wyoming belong to the Craton. Proterozoic rocks of the Central Plains Orogen-Colorado Orogen (not noted on map) helped the Craton grow to the south.

Rocks of the Trans-Hudson Orogeny, ~1.9 Ga, represent a suturing of the Wyoming Craton to another stable craton to the east (current direction) termed the Superior. Sims and others (2001) describe Trans-Hudson rocks as being “composed mainly of oceanic-arc rocks (1.9-1.84 Ga), but including substantial volumes of Archean rocks.” Rocks of this age are found only in the subsurface in the eastern part of the state, but are exposed in the nearby Black Hills.

The Colorado Orogen (known as the Central Plains Orogen to the east), also an accretionary zone, “is a >500-km-wide belt of oceanic arc rock (1.78-1.65 Ga) that extends southward into New Mexico, and composes a major part of the Transcontinental Proterozoic provinces of southwestern United States.” In Wyoming these rocks are exposed in the Laramie, Snowy and Sierra Madre Ranges and in some localities also include the 1.4 Ga intruded granites such as the Sherman Granite. (above from Sims and others, 2001).

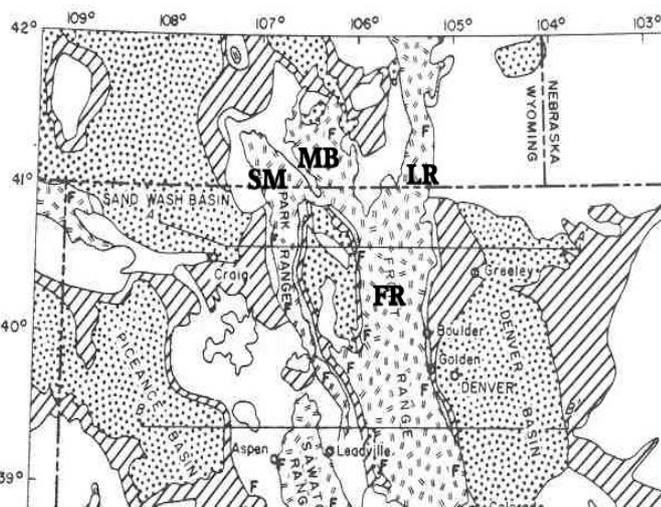
I have always been sort of fascinated, for a number of reasons, by the mountainous highlands in southeastern Wyoming (refer to Fig. 2). They seem to be somewhat isolated and do not attract the number of visitors as say the Bighorns or Tetons. In addition, the area contains an array of interesting geological features including several mountain ranges that extend north from Colorado. The mighty Front Range in Colorado begins to do some “strange things” as it trends north and approaches the Wyoming state line—it splits into two different ranges (refer to Fig. 4). The best place to observe this split is near Cameron Pass on CO 14 west of Ft. Collins where Larimer Co Rd 103 takes off north and follows the Laramie River to the WY-CO state line (refer to

**Fig. 4.** The Front Range (FR) in Colorado splits into two ranges as it nears Wyoming, the Laramie Range (LR) and the Medicine Bow (MB). The Park Range in Colorado continues as the Sierra Madre Range (SM).



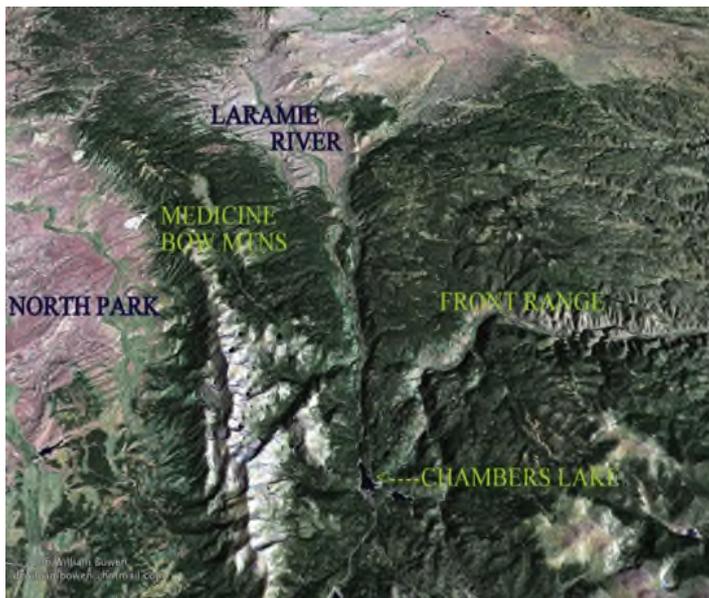
**Fig. 3.** Map, showing Precambrian Provinces of the western U.S.

Maps displayed in Fig. 3 and 4 above and right courtesy USGS



**Fig. 5.** The narrow river valley is the center of the split and is bordered on the west by the Medicine Bow Mountains and on the east by the Front Range. Both of these ranges have bounding thrust faults.

Article continued at top of page 10



**Fig. 5. Digital satellite image looking north from Chambers Lake along the course of the Laramie River.**

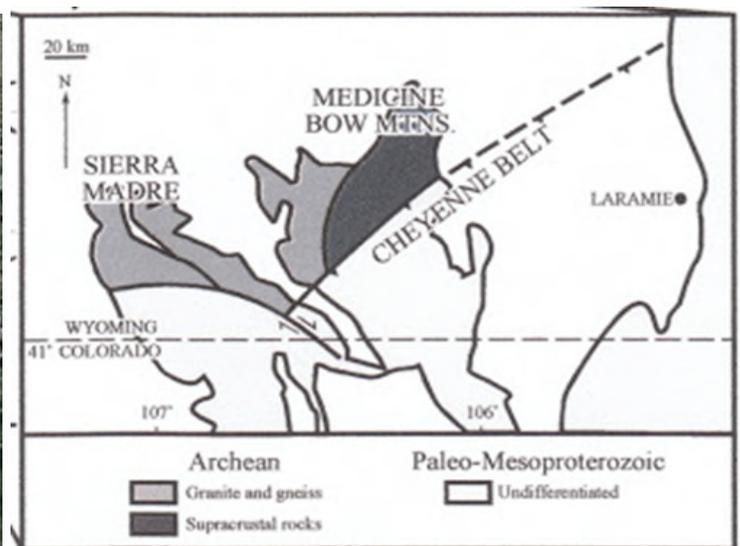
The Front Range continues into Wyoming where it is known as the Laramie Mountains (**Refer to Fig. 4**), extends almost to Casper, and is bounded on the east by the Great Plains/Denver Basin and on the west by three intermontane basins: Laramie, Shirley and Hanna. Laramie Peak, at 10,274 feet, is at the north end of the Range but can be seen for many miles across the flat plains and basins. The Laramie Range is perhaps best known for lending its name to the defining mountain building event of the Rocky Mountains---the Laramide Orogeny.

The western range that splits off near Cameron Pass is the Medicine Bow Mountains (**Refer to Figs. 4, 5**)

cored by Precambrian rocks---mostly granites and gneisses. They seem to rise directly up from the valley of the Laramie River and it is often tough to spot the high peaks (highest peak is Clark Peak at 12,951 feet). No roads cross the Colorado Medicine Bows and much of the land is tied up in the Rawah Wilderness Area. As the Medicine Bows move into Wyoming they are locally known as the Snowy Range and dominate the scenery west of Laramie. The Saratoga Valley in Wyoming, carrying the North Platte River, then separates the Snowy Range from the western Sierra Madre Range. That Range is actually a northern continuation of the Colorado Park Range.

All of these small prongs, the southern Laramie Range, the Snowy Range, and the Sierra Madre Range are part of the Southern Rocky Mountains and contain Precambrian rocks (part of the Colorado Orogen) that are dated about 1.75 Ga (mostly metamorphic rocks) and intruded granites that have dates of about 1.4 Ga---in their southern parts.

One of the amazing features associated with the exposed Precambrian rocks in southern Wyoming is a narrow belt of highly deformed and tectonically disturbed rocks termed the Cheyenne Belt (**Refer to Fig. 6 below**). This zone represents the tectonic suture between two Precambrian provinces, a place where the older Archean rocks (Wyoming Craton) collided (plate tectonics) with the younger rocks of the Colorado Orogen. This is an amazing site, at least for a geologist, as it illustrates how the ancient North America continent grew in size.



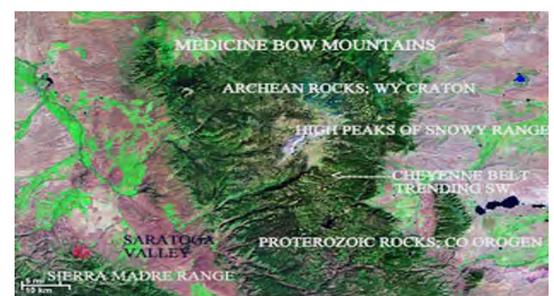
**Fig. 6. Sketch map showing location of Cheyenne Belt in southeastern Wyoming. From Ward, 2010, [www.colorado.edu](http://www.colorado.edu).**

One of the best places to see the suture zone up close is to travel WY 130 west from Laramie through Centennial over the Medicine Bow Mountains to Saratoga. (**Refer to Fig. 7**) Popularly known as the Snowy Range Scenic Byway, the highway travels through some of the most fantastic scenery in Wyoming. At the Nash Fork Campground, about eight miles west of Centennial, the road crosses the suture line and travelers may observe slate and phyllite that is complexly folded and crinkled (Hausel, 1993).

Rocks north of the Cheyenne Zone in the Medicine Bow Mountains contain the very old Archean crystalline rocks overlain by several tens of thousands of feet of late Archean and early Proterozoic metavolcanics, metasediments (last two terms refer to lightly metamorphosed sediments and volcanics), quartzite, conglomerate and various other rocks that were deposited in rivers, braided streams and shallow marine waters in this ancient Precambrian environment---perhaps an environment similar to the Atlantic coast of North America.

The best known geologic unit is the Snowy Pass Supergroup that includes the Medicine Peak Quartzite, the almost white sugar sand quartzite that forms the high peaks of the Snowy Range. Also included in the Snowy Pass Supergroup are other sedimentary rocks containing some of the most beautiful stromatolites in the U. S. These features are composed of calcium carbonate (calcite), cabbage-like domes deposited in shallow marine waters by cyanobacteria (aka blue-green algae). They may be seen near the Sugarloaf Recreation Area.

For a very good description of the Snowy Range, complete with road log stops, see the Wyoming Geological Survey Information Circular No. 32 (author: Dan Hausel) at: [www.wsgs.uwyo.edu/Publications/OnlinePubs/docs/PIC/PIC-32.pdf](http://www.wsgs.uwyo.edu/Publications/OnlinePubs/docs/PIC/PIC-32.pdf)



**Fig. 7. (Lower left) Landsat satellite image Medicine Bow Mountains, Wyoming. Cheyenne Belt trending NE-SW below high peaks of the Snowy Range (compare with Fig. 6). Image from [www.geology.com](http://www.geology.com)**

Rocks south of the Cheyenne Belt have been described previously—metamorphic rocks (~1.75 Ga) intruded by granitic plutons (~1.4 Ga). The Cheyenne Belt extends southwest and barely clips north-western Colorado where the Owiuyukuts Complex is part of the old Archean Wyoming Craton and represents the oldest rocks exposed in Colorado. (Refer to Figure 8) To the east the Belt is buried under the Great Plains. Chamberlain (1998) believes the Cheyenne Belt may extend west to northeastern Nevada.



**Fig. 8. Owiuyukuts Complex (Archean) exposed in north-western Colorado overlain by the Proterozoic Uinta Mountain Group. Photo cropped from Matthews, 2009.**

Another feature that I find interesting in the southeastern mountains is the presence of a rock termed anorthosite, a rather strange igneous rock that is composed almost entirely (at least 90%) of the feldspar mineral plagioclase, but especially common is the variety labradorite (Refer to Fig. 9). Geologists have determined that the igneous magma forming the rock could not have been 90% enriched with plagioclase. Therefore, the mineral must have somehow segregated from the main magma mass (Lindsley and others, 2010). The Laramie Anorthosite was emplaced in the Laramie Range during the 1.4 Ga igneous event and is contemporaneous with emplacement of the Sherman Granite (well-exposed along I-80 between Laramie and Cheyenne) to the south. Perhaps the easiest place to observe the anorthosite is north of Laramie where WY 34 trends east from the small community of Bosler. Outcrops along this road often contain the labradorite variety of plagioclase that displays the characteristic labradorescence of the mineral (iridescent play of colors).



**Fig. 9. (Lower left) Hand specimen of anorthosite showing labradorescence.**

And finally, the Front/Laramie Range has a mineral/mining area that is unique in the U.S.—the State Line Diamond District (Refer to Fig. 10). In the summer of 1965 I enrolled in Summer Field Camp, a “rite of passage” for any aspiring geologist. Since my undergraduate institution did not have such a course I enrolled at Colorado State University. That summer was unique for a number of reasons including the great flood of Denver and surrounding areas. However, the more interesting geological aspect was our mapping of the Sloan Diatreme north of Fort Collins. At that time in my life I didn’t have the slightest idea what a diatreme looked like other than remembering a few textbook photos of structures in South Africa. But off we went in the almost constant rain to “plane table” (only ‘senior’ geologists remember about constructing topographic maps via an alidade and plane table) and geologically map this strange structure. The diatreme was an exposure of igneous rock called kimberlite containing rare minerals like chrome diopside, that had been “shot up” from great depths in the earth’s mantle. After mapping the diatreme our final project was to submit a report on the economic geology of the area after diamonds were discovered in the kimberlite. The students, being the brightest of the bunch, laughed at that possibility as diamonds were only mined in Africa. Ten years later our instructor discovered diamonds and the Kelesy Lake Mine was the first commercial diamond mine in North America. As I understand the current situation, there are no active mines in the District.

Geologists have mapped nearly 100 of these diatremes in the District from near Boulder, Colorado, to the north end of the Laramie Range. I have always wanted to revisit the area; however, I believe all are off limits to rockhounds.



**Fig. 10. Location map showing State Line Diamond District. Map courtesy of Colorado Geological Survey.**

In summary, Wyoming has some fascinating and diverse geology—from high mountain ranges to basins with internal drainage to great volcanic plateaus. This small offering could only cover a few areas of interest; however, as I mentioned in Wyoming I, there are a number of publications and web offerings available for rockhounds.

**REFERENCES CITED**

Due to the number of references for this article they are shown at the top of page 12

*Thank you for your interest*

## Wyoming Geology—Part III

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## A not so hidden gem



*Photo and article by Emily Siegel, Photos and article courtesy of the The Torrington Telegram,, Torrington, WY*

The Torrington Rock Shop recently celebrated its 50th anniversary this spring, and rocks ranging from fossils to black jade can be found stacked from the floor to the ceiling.

Originally, owners Dale and Wanda Miller moved to the area from South Dakota in 1961. The following year, they began building the rock shop from salvaged material they gathered at a demolished building in Casper, which they brought back with them to Torrington.

The shop was open for business by 1963, and Wanda said it started with a very small collection.

"Oh yea, we've been here for quite a while. Longer than some of the natives," Dale said laughing.

"Well, we started out slow, and then we built up over the years," Wanda added.

Once referred to by a local businessman as the center of Goshen County, the Millers poured most of their finances in to get it started. Because money was tight, they had a family member's friend build the saws they used to cut and polish the stones they would buy or find.

"I think we had \$14 in the bank. So we built it up from there. Even the equipment we had, my brother was good with a welder, so he built the equipment...we used to do practically all of the cutting," she said.

Before they built the shop, Dale's brother knew where they could find and mine jade, which is the state stone of Wyoming, and that was what really started the business.

With a loyal following of customers, from all over the country, the rock shop is renowned for the variety of stones available for purchase. One woman from California goes to the shop every year when she comes to the area.

"But we hear that constantly. They like the shop, 'It's the best there is around' and, we constantly hear that. We try to not to let it go to our head," Wanda said.

A lot of the stones that adorn the shop were found throughout Wyoming. But after countries across the world opened up for trading, stones and other items were bought from shows, which came from places like Mexico, Pakistan, Russia and Morocco.

"When we first started, most of it was local materials. We would trade, buy some and hunt some ...we had the mine of Edwards black jade which is the best jade there is. We have sold a lot of that

*A not so hidden gem continued on Page 14*

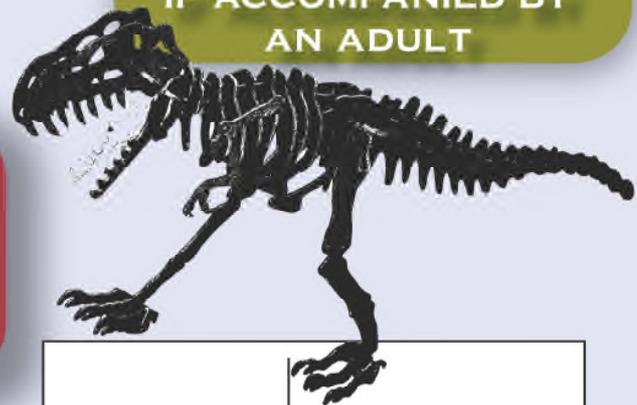
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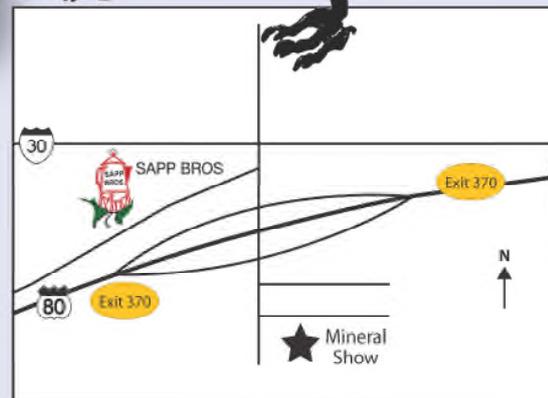
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*A not so hidden gem continued from Page 12*

black jade," she said, later adding, "As time went on, and the countries opened up like Europe and other places, we could go to rock shows."

The most popular items that sell have been jade and agate, she said. Brazilian agate can be found hanging in the windows, sliced and polished.

"We have sold a lot of good Brazilian agates, and he (Dale) has sold a lot of this jade. Both Edwards jade and other jade in Wyoming," she said.

Another popular and well-known part of the shop lies on the outside. It is the big yellow swirling sign that signifies when the shop is open. Although, when it is windy, Wanda said they turn the sign off to keep it from being damaged.

"It's to draw attention to our place. It's a landmark. Everybody knows about it," she said.

In all their years of being married and working together, the Millers remain at the front of the shop with every customer that walks through the door. With no plans of retirement anytime too soon, people can visit the shop, which is open year round.

"I don't know if he's ever gotten tired of me or not, but I haven't gotten tired of him...but, we've been here a long time; this is our home for us," Wanda said with a laugh.



Viewing one aisle of the Torrington Rock Shop.

Fossils, agates and other stones cover the shop from the floor to the ceiling. All of the fossilized fish were found throughout the state.

## **CLUB NEWS AND ANNOUNCEMENTS**

### ***Fifty Niners Rock Club Volunteers April 11, 2014***

***Cody 59ers Rock Club volunteers sorting purchased rocks for their monthly club meeting silent auctions. They were also sorting rocks for the 2015 RMFMS/WSMGS Mineral and Gem show July 16—18, 2015 which is to be hosted here in Cody.***



***Time to warm up and relax with refreshments!***

*Club News and Announcements continued on page 22*

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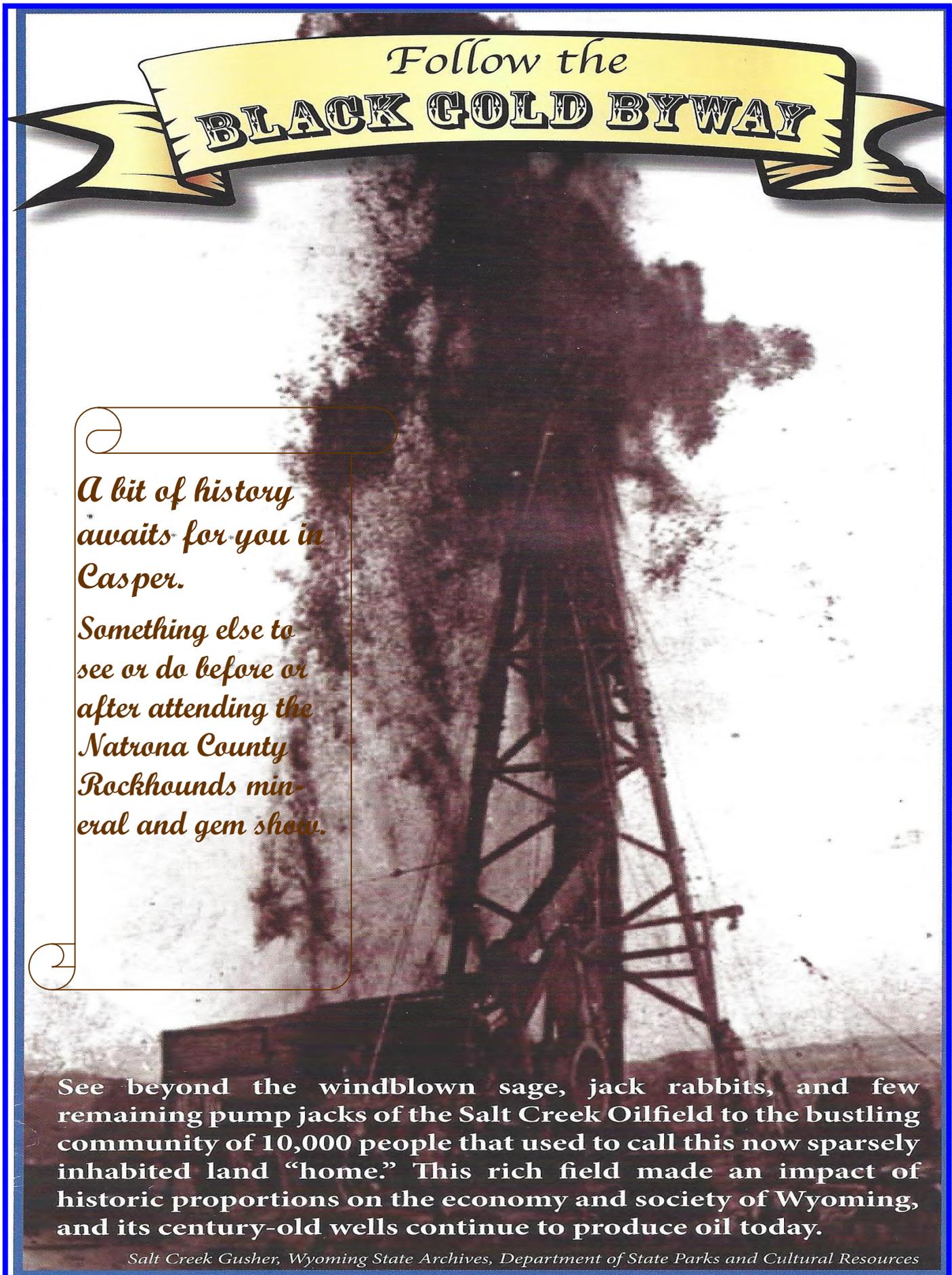
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Follow the  
**BLACK GOLD BYWAY**

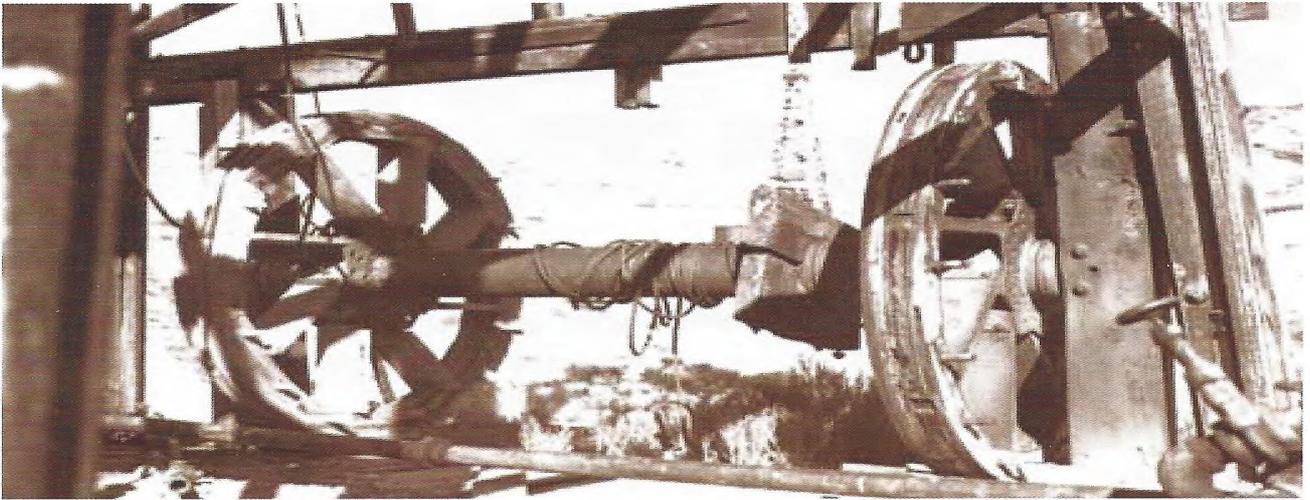
*A bit of history  
awaits for you in  
Casper.*

*Something else to  
see or do before or  
after attending the  
Natrona County  
Rockhounds min-  
eral and gem show.*

See beyond the windblown sage, jack rabbits, and few remaining pump jacks of the Salt Creek Oilfield to the bustling community of 10,000 people that used to call this now sparsely inhabited land “home.” This rich field made an impact of historic proportions on the economy and society of Wyoming, and its century-old wells continue to produce oil today.

*Salt Creek Gusher, Wyoming State Archives, Department of State Parks and Cultural Resources*

# Black Gold Byway

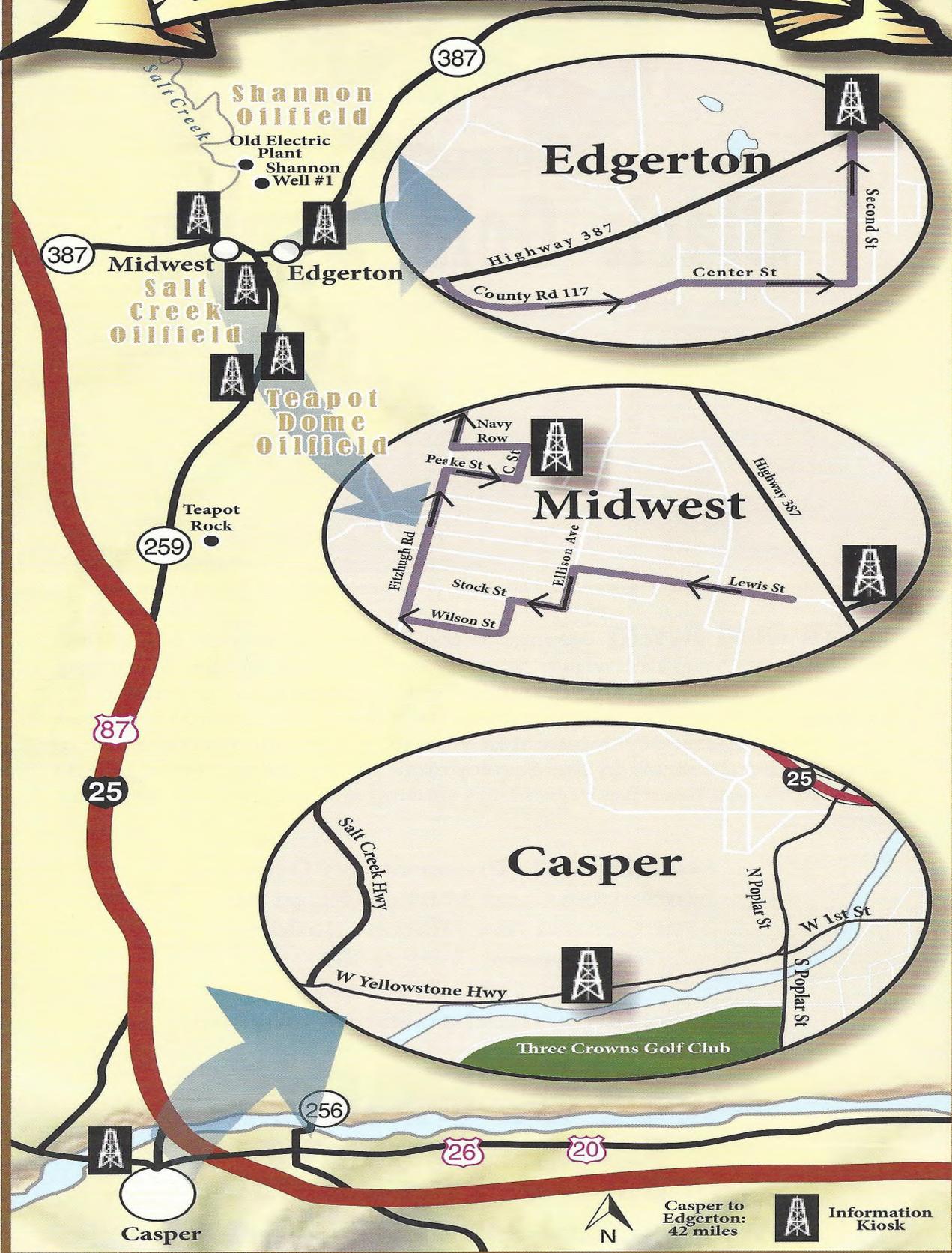


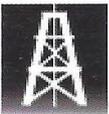
*Oil rigs, Salt Creek, Sheffner-McFadden Collection, Casper College Western History Center*

**Black Gold Byway** takes visitors through the Salt Creek Oilfield and alongside Shannon and Teapot Dome oilfields. The intertwined development of these fields spurred Casper's growth and the founding of Wyoming's energy industry. Known for many years as "the Greatest Light Oil Field in the World," Salt Creek launched Wyoming onto the national scene of energy producers. Meanwhile, Teapot Dome shook the nation with the biggest political scandal of its time and has impacted corporate law since the 1920s.

Of greatest significance to the local community, however, is Salt Creek's social history, still much alive in the memories of residents. Many of their families moved to this area in response to the oil boom in the early 1900s. Although only about 600 people today live in the two oilfield towns of Midwest and Edgerton, in the 1920s–30s the field supported 10,000 or more residents in eight towns and hundreds of camps. Serviced by a railroad and highway, the towns had shops, banks, theaters, dance halls, a heated swimming pool, tennis courts, ball fields, eateries, hotels, community halls, local newspapers, an American Legion Clubhouse, libraries, schools, car dealerships, garages—and, of course, saloons, gambling houses, and brothels. The wind-swept sage prairie seen today belies the lively society that flourished here from 1908 to 1929.

# Follow the BLACK GOLD BYWAY



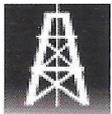


## **SOCIETY** In an Oil Patch



*Salt Creek Jazz Band, Casper Journal Collection, Casper College Western History Center*

Oil companies built “camps” next to their wells to house employees. Some camps developed into towns with businesses, civic institutions, and entertainment. The Midwest Refining Company turned Home Camp into the respectable company town of Midwest, which survives independently today with rows of identical houses, playing fields, and community buildings. Nearby Edgerton provided the nightlife that Midwest lacked, and its good eats still draw crowds.



## **SALT CREEK: Producing Oil for over a Century**

While the region’s first oil strike dates to 1889, 1908 marks the gusher that attracted thousands of prospectors and jobseekers, resulting in Wyoming’s first oil boom. By the 1920s, Salt Creek was producing its maximum output, making it one of the most important oilfields in the U.S. Its oil was even shipped to Europe. Connecting Salt Creek to Casper and the nation were many pipelines, a railroad, and a paved highway that still stretches north from Casper along Interstate-25 and Highway 259.



*Shannon Well No. 1, 1889, Amoco Refining Co. Collection, Casper College Western History Center*



## **CASPER: “The Oil Capital of the Rockies”**



*Casper refineries, Wyoming State Archives, Department of State Parks and Cultural Resources*

Housing myriad oil companies, oilfield services, and their employees, Casper grew extensively from its proximity to Salt Creek. Evidence of this relationship can be seen today in the pump house on the North Platte River, the Three Crowns Golf Club (site of Amoco Refinery), the Amoco tank farm, the old Salt Creek Highway, and the extensive historic downtown, all built with oil money.



## **GEOLOGY: Reading Salt Creek's Landscape**

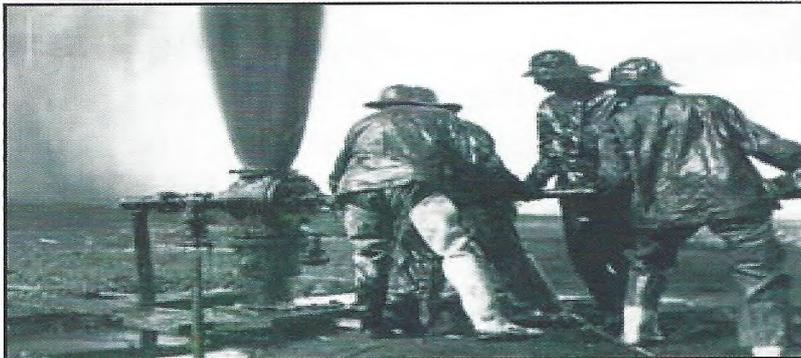


*Teapot Dome anticline, 1927, USGS*

Located in a mineral-rich region called the Powder River Basin, Salt Creek and Teapot Dome oilfields are classic “anticlines.” They are hills that are flat on top where impermeable shale is ringed by an escarpment of soft, porous sandstone, a remnant of what eroded from the top of the domes. Geologists know that oil and gas accumulate under anticlines. You can drill anywhere in the Salt Creek field and hit oil.



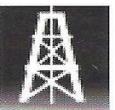
## **GUSHERS, Gas, & Growing Technologies**



*Shutting control head after Salt Creek well was shot, American Heritage Center, University of Wyoming*

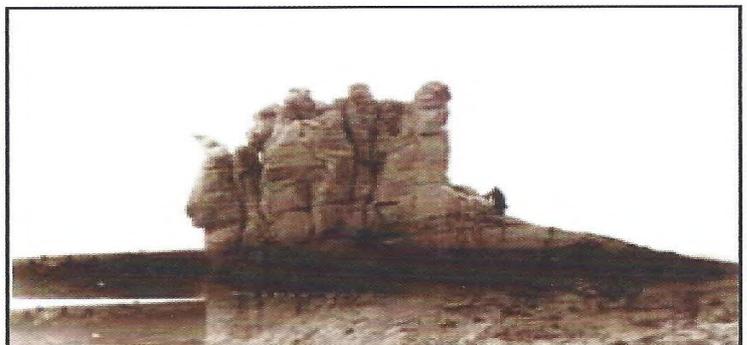
In the early years, Salt Creek oil wells flowed naturally—some of them being gushers. By 1924, however, underground pressure decreased, and wells had to be pumped. To power the pumps, a massive, gas-fired, steam-turbine electric plant was built near Midwest. Salt Creek was one of the first and largest electrified fields in the U.S. Still coaxing oil from

century-old wells, Salt Creek remains a leader today as the world's largest carbon-dioxide flooding operation.



## **SCANDAL! Tempest at the Teapot**

Visible from Highway 259 is the outcropping known as Teapot Rock, named for its shape in years past. Its namesakes are the Teapot Dome Oilfield, which neighbors Salt Creek on the southeast, and the Teapot Dome Scandal, which emotionally charged the nation during the 1920s. This event led to the fall of President Warren G. Harding's administration and placed his Secretary of the Interior, Albert Fall, in prison for accepting bribes and illegally leasing Navy property. The scandal nearly caused a Democratic victory in 1924.



*Teapot Rock, Wyoming State Archives, Department of State Parks and Cultural Resources*



# Black Gold Byway



*String team of horses hauling goods to Salt Creek, American Heritage Center, University of Wyoming*

**Black Gold Byway** belongs to the Wyoming Historic Mine Trail and Byway Program, which was created in 2005 by the Wyoming legislature to identify and designate historic mine locations and trails within the state. The program objectives are: 1) to provide a precise history of mineral development in Wyoming; 2) to interpret the role of mining and minerals in the development of Wyoming's economy; 3) to identify and describe Wyoming's mining and mineral development heritage.

**State Historic Preservation Office**  
Monuments and Markers Program  
2301 Central Ave., Barrett Building  
Cheyenne, WY 82002  
Phone: (307) 777-7697

Website: <http://wyoshpo.state.wy.us/mm/>

**ARTS. PARKS.  
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Wyoming State Parks & Cultural Resources

## Jade State News Report – Shoshone Rock Club

February and March 2014

### February 4, 2014

New yearbooks were handed out to 16 members, made by Art and Judy Schatz. Field trip chairman, Mary Vogel arranged for a field trip/open house for Linda Thomas and her shop, Eternal Ice, for March, and Linna Beebe will have one in April for Stone Age Industries. The Boys and Girls Club program in late January made valentine cards with small tumbled rocks filling a heart shape design. Students took home small bags of tumbled stones. Stan Strike reported that the 501C-3 permit the WSMGS had applied for had finally been approved.. Nominations were brought to the floor for ROY and Stan Strike and Linna Beebe were nominated. Stan declined to be a nominee. Linna was named 2013 ROY for the club and she thanked the members. A fun program was arranged by Linda Thomas. Linda and members were to bring in items to be identified by the group. Approximately 40 items were brought in and we were to name the items. Some of the items were Herkimer diamond, tourmaline, hematite, copper, amazonite, ammonite, selenite rose, malachite, amethyst, etc. The winner with 25 correct answers was Mary Ann Northrup. Linda donated a zoisite and ruby tumbled stone and Linna donated a Herkimer diamond in matrix. Linna was thanked for being host.

### March 4, 2014

Twenty members and guests attend ed. Guests were Jo Nickels, Jim Ulmer, Phyllis Preator, David Nyffler, and Lisa Marks and Patricia Hatle from the BLM. Letters from Northwest College Foundation thanked the club for the \$400 donated in 2013 for the scholarship fund. Powell Library wants a program in June on the SRC club and what the club is about and also want two display cases to be shown for the month of June. A B & G Club form was passed around for members to give a program, and Stan Strike offered to give one in March. Linda Thomas will have an open house on Saturday, March 8 from 1-4 PM. Linna will have an open house for her shop on Saturday, April 26 from 1-4PM. A potluck is planned for Tuesday, April 1, the 63<sup>rd</sup> anniversary of SRC, 6:30 PM at Garland Comm. Church at 900 Sheridan Ave, Garland. Ham will be provided by the club. Lynette Kelley won the door

prize of Lysite agate and petrified wood provided by Roger Lyons. Members learned of a Rock & Gem offer for subscriptions to the magazine and the club will get a nice rebate per subscription; \$6.00 for a one year subscription and \$12.00 for a two years. The slide program by Lisa Marks was Do's and Don'ts of rock hunting on BLM land and geology of our area, and Patricia Hatle discussed the wild horses of the McCullough Peaks, apparently all 148 horses are named. Both were very interesting ladies who appeared to love their job. Mary Ann Northrup was thanked for being host.

Respectfully submitted, Linna Beebe, Sec.

### April 2014

SRC celebrated their 63<sup>rd</sup> anniversary meeting with a potluck at the Garland church on April 1. Mary Ann Northrup volunteered to be acting secretary until Linna Beebe is well. Curt Talbot gave a program on fossils from around the world. Fossils from the USA were from Green River, WY: rare skull of an alligator ancestor, palm frond, a fish, pinna clam, sting ray, and a tip of a shark fin from shale east of Lovell, WY, the only one in the US that had been found and had to be identified in Oxford, England. Other fossils were opalized clam and baculite from Australia, open curled ammonites from Madagascar, trilobites from Africa, ammonites from Morocco, pine cone from Argentina, horn coral from China, and teeth of a herring almost two inches long, and ammonites of various kinds and amber from the Baltic. Curt gave all present red horn coral samples from UT, also samples of WY, Big Horn Mountain algae that had been named after Curt. They are Ordovician age, 425-450 million years old and called Dimorphosiphon talbotorum.

### Tate Geological Museum in Casper annual summer field conference

For club members who might be interested. The Tate Geological Museum in Casper has a summer field conference each year that is focused on different parts of Paleontology. This year they are focusing on predators in the fossil record. The conference also has two fossil collecting club members. trips that allows participants to keep the fossils they find. I thought you might

<http://www.caspercollege.edu/tate/conference/index.html>

# RIVERTON ROCK CLUB

## FIELD TRIP SCHEDULE

2014 Field Trip Schedule			Riverton Mineral and Gem Society, Inc.		
Date	Where	For	Leader	Vehicle	Comments
04/19/14					
04/26/14	Jeffrey City	Sweetwater Agates	Linda Richendifer 856-1532	High Clearance	Surface to Shallow digging
05/03/14					
05/10-14	Eden Valley	Petrified Wood	Linda Richendifer 856-1532	High Clearance	Surface to shallow digging
5/17-18	Blue Forest (2 day trip)	Wood & Limb Casts	Louie Gillette 330-4555 or 332-5642	Any Vehicle + Camping	Surface to Deep Digging 5-6 ft.
05/24/14					
05/31/14	Dry Creek	Fossils, Wood, Jasper	Mel Gustin 856-3699	Any Vehicle	Surface to Shallow Digging
06/07/14					
06/14/14					
06/21/14	Worland	Fossils Snails, Clams	Looking for a Leader	Any	Surface to deep digging
06/28/14					
07/05/14					
07/12/14					
07/19/14	Wyoming State Mineral	And Gem Society	Show in Casper	Parkway Plaza	
07/26/14	Kemmerer	Fish Fossils	Bob Carlson 856-2589 or 851-6781	Any Vehicle	Tools Provided (Private Quarry)
08/02/14					
08/09/14	Lysite	Lysite Agate	Bob Carlson 856-2589 or 851-6781	High Clearance	Surface to Hard Rock Mining
08/16/14	Wiggins Fork	Wood & Limb Casts	Richard Shelatz 851-6726	High Clearance 4x4	Surface & wading in river
08/23/14					
08/30/14					
09/14/14	Club Picnic	To be announced			
09/21/14	South Pass	Tons of Small Garnets	Jim McGarvey 856-6188	Any Vehicle	Wading & digging in the river

### ADDITIONAL CONTACT INFORMATION

Normally, for all trips, meet at 7:30 am at the northwest corner of the Riverton Wal-Mart parking lot. Contact the leader to let them know you will be participating and to get particulars about the trip. Then, the Friday before the trip, contact them again to ensure the trip is still on. This is especially important if there is inclement weather predicted in the area or there is a different meeting place.

For more information about the trip, [contact the leader](#). Contact Bob Carlson about leading a trip or suggesting a trip.

#### WYOMING STATE MINERAL AND GEM SOCIETY, INC.

##### CLUB ROCKHOUNDS OF THE YEAR

- **CLUB ROCKHOUND OF THE YEAR—Cody 59ers Rock Club/ Cody, WY**  
Jim and Jackie Platt joined the 59ers in 1976 and have been very active members, serving in numerous club office positions during their 38 years of membership.
- **CLUB ROCKHOUND OF THE YEAR—Natrona County Rockhounds Club/ Casper, WY**  
Martin (Mac) Goss became a member of the club in 1955. He has been instrumental in leading the club on field trips to his family's favorite collecting spots. Mac also teaches "I will cause no willful damage to collecting material and will take home only what I can reasonably use."
- **CLUB ROCKHOUND OF THE YEAR—Shoshone Rock Club/ Powell, WY**  
Linna Beebe has held all of the offices in the club and presently is the club secretary, historian, Jade State News reporter, and liaison with the local Boys and Girls Club.

## Wyoming State Mineral and Gem Society

### INFORMED CONSENT/ASSUMPTION OF RISK/WAIVER OF LIABILITY

\*\*\*\*\*

Trip Host: \_\_\_\_\_

Trip Date(s): \_\_\_\_\_

Trip Location(s): \_\_\_\_\_

\*\*\*\*\*

**Please read the following information before beginning the field trip or activity. Sign and date the accompanying sign-in sheet to acknowledge that you have read and understand the information presented below.**

I understand that the field trip/activity that I am participating in, of the above named Society, may include one or more of the following hazard(s) that may result in personal harm:

Unpredictable and Dangerous Environmental Conditions/Hazards, including but not limited to, snow, rain, wind, very cold and very hot temperatures, lightning, altitude, loose rock, falling rock, rock slides, avalanches, river hazards, mud slides, mud, ice, other slippery conditions and contact with poisonous reptiles, wild fauna and toxic plants.

I understand the risks inherent in all outdoor activities (including high altitude activities) existing in the environment, either natural or man-made.

I understand that I am required to use appropriate safety equipment pertinent to the field trip activity in which I will be participating. I accept full responsibility for my actions and accept liability for any resulting damages or injuries.

By participating, I am assuming the risks inherent in this field trip or activity and I am releasing the above named societies, their officers, directors and individual members, from any liability for claims or lawsuits by the undersigned participant, arising out of this field trip activity. By signing this waiver of liability I understand that I release all property owners (private land owners and mining claimants) and lessees of any liability or responsibility for any accidents, injuries, problems or any other unfortunate incidents that may occur during this activity on their property. I have read all of the aforementioned information and understand any and all of it. Any questions, which have occurred to me, have been answered to my satisfaction. I am participating in these activities of my own free choice.

If I am unable to clearly communicate in any way, or a minor child for whom I am giving consent is involved, I authorize the trip leader to consent on my part to any emergency medical procedure deemed necessary by a treating physician.

If the participant is under 18 years of age, this form must be read and signed by a parent or legal guardian before participating in this field trip or activity.

\*\* Form adapted from documents of California Federation of Mineralogical Societies, Inc.



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**VISIT US ON OUR WEBSITE**

**WWW.WYMINERALANDGEMSOCIETY.ORG**



### *A note from your editor*

#### **ATTENTION ALL CLUB REPRESENTATIVES**

I WOULD LIKE TO THANK ALL OF YOU WHO HAVE CONTRIBUTED ARTICLES TO THE NEWSLETTER. IT IS WITH YOUR HELP THAT WE ARE ABLE TO PRODUCE A SOURCE OF INFORMATION FOR OUR MEMBERS AND OTHERS FROM AROUND THE WORLD THAT MAY FIND OUR WEB SITE. THIS TOO IS A GREAT MEANS OF STAYING IN TOUCH WITH OLD FRIENDS AND MAKING NEW FRIENDS AS WELL AS DISCOVERING NEW SITES IN AN EFFORT TO EXPAND OUR EXPLORATION.

AS YOUR EDITOR, I WOULD LIKE TO ASK THAT WHEN YOU SUBMIT YOUR ARTICLES, PLEASE KEEP THEM SIMPLE BUT INFORMATIVE. WITH THE CONSTANT EVOLUTION OF NEW TECHNOLOGY COMES THE TASK OF TRYING TO KEEP UP.

WHEN ASSEMBLING THE ARTICLES WHICH ARE SUBMITTED, THERE ARE NEWER VERSIONS OF SOFTWARE, AS WELL AS A MULTITUDE OF FORMATS WHICH I AM SEEING. THESE NEW FORMATS ARE SOMETIMES DIFFICULT TO RE-FORMAT INTO EDITABLE TEXT, AND IN MANY INSTANCES REQUIRES A GREAT AMOUNT OF TIME AND EFFORT TO FIND AN INTERPRETIVE APPLICATION ON THE INTERNET TO ACCOMPLISH THE TASK.

WHAT I WOULD ASK OF YOU WHEN YOU PREPARE AND/OR SUBMIT YOUR ARTICLES, IS THAT YOU USE A PLAIN TEXT SUCH AS TIMES NEW ROMAN, VERDANA, plain ARIAL AND USE A #10 SIZE FONT. PLEASE DO NOT USE BULLETS, NUMBERS OR SPECIAL SPACING IN THE COPY WHICH YOU SEND, I WILL RECREATE THOSE SPECIAL EFFECTS WHEN I SET THE ARTICLES.

IF YOU DO HAVE ARTICLES WHICH ARE OUTLINE FORMS WITH SPECIAL EFFECTS, PLEASE SEND BOTH YOUR ORIGINAL COPY AND A PLAIN TEXT COPY IN ANY ONE OF THE AFOREMENTIONED FONT, AND I WILL REPRODUCE IT IN MICROSOFT PUBLISHER. IF THERE ARE ANY QUESTIONS, CALL ME AND I CAN ASSIST YOU SO THAT IT CAN BE LESS TIME CONSUMING FOR BOTH OF US. THANK YOU!

**VERNE**

