GSN Newsletter is published monthly except June and July.
Geological Society of Nevada, PO Box 13375, Reno, NV 89507 USA, 775/323-3500

FROM THE PRESIDENT
Bob Thomas, GSN President 2002-2003

GSN continues to be fortunate to have a diversity of subjects for presentation, and our January dinner meeting was no exception. Mark Coolbaugh gave an excellent presentation entitled “Regional Geologic Controls, Geochemical Characteristics, and Thermal Infrared Signatures of Geothermal Systems in the Great Basin.” He made a distinction between magmatic and extensional geothermal

continued

CALENDAR OF EVENTS

Feb 6th
Thursday
WINNEMUCCA CHAPTER MEETING: Humboldt Room, Red Lion Hotel and Casino, Winnemucca, NV. Speaker: To be announced. Social: 6:30 pm, meeting: 7:00 pm.
Contact Sheila Bunch, 775/623-0202, sbunch@lambdacom.com.

Feb 21st
Friday
GSN MEMBERSHIP MEETING: Reno Elks Lodge, Reno, NV. Speaker: Eric Jensen, Center for Mineral Resources, Department of Geosciences, University of Arizona, “Magmatic and Hydrothermal Evolution of the Cripple Creek Gold Deposit, Colorado.” Social 6pm, dinner 7pm, talk 8pm. Call Shannon Fitzpatrick for dinner reservations, 775/323-3500 or email at gsn@mines.unr.edu.

Feb 27th
Thursday
ELKO CHAPTER MEETING: Western Folklife Center, Elko, NV. Speaker: Bob Jachens along with Jeff Phelps of the USGS; they will be presenting state-of-the-art, truly 3D modeling software, complete with special 3D glasses that allow the audience to become one with the model. Refreshments at 6:30pm, presentation at 7:00pm. Contact Marcus Johnston for more information, 775/778-4036.

Feb 27th
Thursday
SOUTHERN NEVADA CHAPTER MEETING: Room 102, Lily Fong Geoscience Building, UNLV, Las Vegas, NV. Speaker: Maxwell Blanchard, Astronomy Instructor, CCSN, “A Discussion of Some Common Marian Features.” Social with food and drink at 5:30pm; talk at 6:30pm. Contact Jean Cline, 702/895-1091 for information.

GSN has a new mailing address:
P.O. Box 13375, Reno, NV 89507

Calendar of Student Posters
February 21, 2003, GSN Meeting

Andy Ten Brink*, Pat Cashman, and Jim Trexler
Folded Tertiary Sediments in the Basin and Range-Sierra Nevada Transition Zone

Weston Thelen*, Shane Smith, John Louie, and Aline Concha-Dimas
Developing a Geothermal Index for the Western Great Basin

*Presenter
FROM THE PRESIDENT (continued)

systems, and also demonstrated the effectiveness of ASTER satellite imagery as a tool for better characterization of existing systems and even exploring for new ones. Thanks, Mark, for the excellent talk. I noticed a crowd of people hanging around the poster sessions also, and thanks to Alicia Fallacaro ("Lake Superior Type Banded Iron Formations as an Analog to Mars") and Shane Smith ("Ages of Submarine Landslides in Puget Sound"). Thanks also to Earl Abbott for continuing to organize these poster presentations – we look forward to more, Earl! Finally, a big thanks goes to Connors Drilling and MI Drilling Fluids for co-sponsoring the social hour. Our organization continues to be the beneficiaries of the generosity of groups like Connors and MIDF.

Clancy Wendt has already been working hard organizing the spring field trip. The theme will be precious metal deposits in south-central Nevada. There has been a lot of exploration activity in this area lately, and so far Clancy has lined up a tour of the Goldfield district, courtesy of Metallic Ventures. There may be other localities, so stay tuned for more details and dates.

GSN has an exhibitor’s booth reserved at the Prospectors and Developers Convention, to be held in Toronto March 9-12. We are currently looking for volunteers to help cover booth-sitting duties. So if you are planning to attend this meeting, and would be willing to spend some volunteer time, please contact Shannon at the GSN office. The more folks we have to do this, the easier it will be for everyone and no one will be stuck with a lot of work. Look at it as an excuse to sit down for a while, meet some people, and rest!

Finally, because the GSN-sponsored MSHA training course was so successful last summer, we are considering doing it again this year. Mineral exploration activity is picking up, which is good news to much of our membership. I have been told that yes, even geologists sitting on exploration drill rigs need their MSHA papers. We would like to put on the same free, three day New Surface Miner training that we had last July, or just the one day annual refresher course, or, depending on the interest level, both. Like last year, we will need a minimum number of attendees to have a state MSHA instructor travel to our locality to give the course for free. We’re thinking about sometime in May, before field season starts, and will keep people informed on the dates as we learn more. In the meantime, interested parties should contact Shannon in the GSN office to specify their preference for either the three-day New Surface Miner course or the one-day refresher course. By the way, the state conducts free training throughout the state on a periodic basis. For schedule information, go to http://www.dirweb.nv.us

GSN apologizes to MI Drilling Fluids for the computer error in the January newsletter sponsor advertisement.

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SCIENCE FAIR JUDGES WANTED

The Western Nevada Regional Science and Engineering Fair will be held the evening of March 13, 2003 at the Lawlor Events Center.

Judges will be looking at science projects and inventions from students K through 8th grade. The Science Fair Committee is always looking for interested scientists to participate as judges. The more judges we have participating, the easier the task. You will have the added benefit of seeing science through the eyes of a child! If you are interested and available this year, please send an email to Melody Hefner at mlhefner@gbis.com. She will then send announcements and details to you via email. Previous year’s judges should have already received an email - if not, please feel free to email Melody also. Call Melody at 775/425-2808 with any questions.

MEMBERSHIP RENEWAL AND DIRECTORY UPDATE

Gregory French, GSN Membership Chairman

I wish to apologize to those members who received the renewal postcard with postage due or did not receive the notice at all. Many notices were returned to the GSN office. There was a mix up with the Postal Service regarding mailing sizes. In order to accommodate the late renewals, the Membership Directory will be delayed until the end of February.

Thanks to Connors Drilling Inc. and MI Drilling Fluids for hosting the January meeting.
The Cripple Creek district has produced ~22 Moz of gold since it was discovered in 1891, with an additional resource of ~7 Moz. These figures make Cripple Creek one of the most prolific producers of gold in U.S. history, and one of the largest volcanic-hosted gold deposits in the world. In addition to its size, Cripple Creek is renowned for its unusual styles of mineralization (veins rich in gold tellurides and fluorite) and its association with strongly alkaline volcanic rocks. The complex evolution of the deposit will be the subject of this talk; starting with the dynamic emplacement of mantle-derived alkaline rocks, and culminating with the generation of veins rich in gold telluride minerals.

A century of geologic work has accompanied the history of mining in Cripple Creek, including numerous government reports and theses. Several recent investigations (including this one) have been prompted by the renewal of mining activity in the Cripple Creek district, and build upon the earlier efforts. New exposures and a wealth of information from recent exploration and mining programs have led to re-interpretation of the district’s geology. My work has focussed on deciphering the time-space evolution of the magmatic and hydrothermal systems, and how they relate to gold mineralization. This was accomplished through several years of detailed field mapping, drill core logging, petrography and geochemical analyses. Also addressed by this study were broader questions; what characteristics does Cripple Creek share with other alkaline-related gold deposits, and how would you explore for these deposits?

The volcanism at Cripple Creek was part of a regionally extensive episode of Oligocene alkaline magmatism. Contemporaneous alkaline magmatism was active throughout the Front Range of Colorado, extending southward along the axis of the Rio Grande rift through central New Mexico and the Trans Pecos region of Texas, and into northern Chihuahua/Coahuila. Amongst these mid-Tertiary alkaline intrusive centers, only Cripple Creek is associated with a giant gold deposit. Significant, but much smaller economic gold deposits are associated with alkaline magmatic centers at Ortiz, New Mexico, Lincoln County, New Mexico, Rosita-Silver Cliff (-Bassick-pipe), Colorado, and the Boulder County, Colorado telluride districts. Many other alkaline complexes show localized zones of weak gold mineralization, some of which have minor historic production. Further attention to the magmatic and hydrothermal evolution of these systems will be necessary to explain this apparent disparity in gold enrichment.

Details of Cripple Creek’s geology

The gold deposit is associated with an ~30 Ma alkaline diatreme complex emplaced at the junction of four Precambrian units along the western margin of the Pikes Peak batholith in Central Colorado. The diatreme is elliptical in shape and roughly 5km in diameter. Within the diatreme are a complex series of alkaline intrusions, with perhaps hundreds of individual intrusive bodies. These form composite flows, dikes, sills, laccoliths, and dome-shaped features intruding diatremal volcanic breccias and the surrounding Precambrian country rock. All intrusive phases within the diatreme are silica undersaturated, and span a wide range of compositions from felsic phonolites to ultramafic lamprophyres and silicocarbonatites. An unusual aspect of the magmatic system is that it evolved towards more mafic compositions with time, culminating with the intrusion of ultramafic lamprophyres and silicocarbonatites as the last intrusive event. Episodes of hydrothermal alteration and metasomatism have been linked to specific intrusive events, but gold mineralization post dates all known igneous events.

The alkaline intrusions at Cripple Creek belong to an unusual and rare class of rocks based upon their distinctive geochemical properties. These include high alkali concentrations for their given levels of silica, and high concentrations of HFSE, LILE LREE and CO2 (carbonate minerals). Voluminous K-metasomatism has affected most of the diatremal rocks, altering the rocks to potassic and ultrapotassic chemistries. Although commonly cited as an example of gold mineralization associated with high-K rocks, it should be noted that Cripple Creek’s igneous rocks are distinctly sodic, with most rocks having molar Na/K~2.5. Potassic chemistries are a result of alteration, and are not original igneous signatures. New isotopic data suggest a link to an enriched mantle source region for the magmatism, possibly in the athenospheric mantle.

Hydrothermal alteration began with the earliest known igneous rocks and continued past the last, lamprophyre-dominated intrusive events. Extensive and diverse styles of hydrothermal alteration include both high and low temperature types. Low temperature K-silicate stable assemblages predominate, but other alteration types (pyroxene, biotite, feldspathoid, sulfate, carbonate, etc.) are also present. Gold mineralization post-dates all known intrusions, but shows closest spatial and temporal relationships with lamprophyres and mafic/ultramafic rocks. Gold is intimately associated with large volumes of late stage K-feldspar-pyrite alteration developed in >5 km3 of the explored portion (upper 1 km) of the complex. A notable characteristic of the K-metasomatism is its cryptic nature, as it is not readily apparent in thin section or in hand specimen.
Mineralization and related alteration tend to be localized along igneous contacts, in fractures and small displacement faults, but are more pervasively developed in porous volcanic breccias. Most veins, from high-T biotite stable veins to low temperature Au-rich types, are quartz-poor; fluorite, carbonate, sulfates, base metals, and Au-tellurides are the main accessory minerals in the thin, high-grade quartz-bearing seams that produced >90% of the district’s Au. Also present are mineralized bodies of hydrothermal breccias, rich in Mn-carbonate, fluorite and sulfate minerals (celestite, barite and anhydrite).

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ABSTRACT (continued from page 3)

Mineralization and related alteration tend to be localized along igneous contacts, in fractures and small displacement faults, but are more pervasively developed in porous volcanic breccias. Most veins, from high-T biotite stable veins to low temperature Au-rich types, are quartz-poor; fluorite, carbonate, sulfates, base metals, and Au-tellurides are the main accessory minerals in the thin, high-grade quartz-bearing seams that produced >90% of the district’s Au. Also present are mineralized bodies of hydrothermal breccias, rich in Mn-carbonate, fluorite and sulfate minerals (celestite, barite and anhydrite).

Mineral and whole rock compositions vary systematically with alteration types and can be used to demonstrate changes in fluid composition and massive changes in the chemical composition of the diatreme. Hydrothermal alteration at Cripple Creek resembles that reported in other alkaline gold districts, and suggests links to common processes. Although similar to other gold deposits related to alkaline magmatism, Cripple Creek differs markedly from most other epithermal systems in the large volume of K-feldspar added and the relative scarcity of quartz and acid alteration.
UP-COMING EVENTS

Feb 6th, Thursday — WINNEMUCCA CHAPTER MEETING: Humboldt Room, Red Lion Hotel and Casino, Winnemucca, NV. Speaker: To be announced. Refreshments start at 6:30pm and the meeting starts at 7:00pm. Contact Sheila Bunch, 775/623-0202, sbunch@lambdacom.com.

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Feb 14th, Friday — SME; Business Luncheon Meeting of the Northern Nevada Section of SME, Bonanza Casino, 4720 N. Virginia St., Reno, NV. Speaker: Robert Kistler, Exploration Manager (retired) US Borax of the Rio Tinto Org., “U.S. Borax-From Humble Nevada Beginning to World Class Mineral Supplier.” Lunch is $15 and begins at 12pm, program at 12:30pm. Reservations are not required.

Feb 24th-26th — SME Annual Meeting and Exhibit, Cincinnati, Ohio. Phone Society for Mining, Metallurgy and Exploration at 303/973-9550 Email sme@smenet.org.

Feb 27th, Thursday — SOUTHERN NEVADA CHAPTER MEETING: Room 102, Lily Fong Geoscience Building, UNLV, Las Vegas, NV. Speaker: Maxwell Blanchard, Astronomy Instructor, CCSN, “A Discussion Of Some Common Marian Features.” Social with food and drink at 5:30pm; talk at 6:30pm. Contact Jean Cline, 702/895-1091 for information.

Mar 9-12th — PDAC Annual Convention, Metro Toronto Convention Centre. Phone Prospectors & Developers Association of Canada 416/362-0101. Email: hsklarz@pdac.ca.

THE SECRETS OF THE EXPLORATION BUSINESS REVEALED II

As part of our ongoing Yardley lecture series, Dr. Roger Steininger will conduct a second series of three seminars dealing with additional practical aspects of the mineral exploration business. This spring’s seminar will deal with the practical aspects of developing an exploration program, leading to the discovery of economic mineral deposits. Topics to be covered include:

- How to identify commodities that may be in demand in the future.
- What parts of the world are best to conduct exploration?
- Area selection and developing background information to identify properties.
- Ideas on how to explore properties and drill out resources.

Throughout the seminar exploration philosophies, techniques, and geological models will be examined. Judging from last fall’s seminar there will be participants with a wide variety of experiences, which should add greatly to the discussions. The seminar will meet on Monday February 24 and March 3 and 10 from 6 to 8 PM. There is no cost for attending, but you must register before February 17 so that we can arrange appropriate space. For more information and to register contact Greg Arehart at UNR at 775/784-6470 or arehart@unr.edu

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<http://www.nbmg.unr.edu/sales.htm>

or by calling Charlotte Stock at (775) 784-6691 x2.

Please note that our prices for many NBMG publications will be decreased on February 1, 2003. Budget cutbacks coupled with increasing costs prompted an evaluation of our pricing structure and led to increases on many of our publications on July 1, 2002. Unfortunately, price increases on some publications were excessive. The new price revisions are an attempt to keep our publications affordable while covering our increased expenses. The revised prices will be, for the most part, lower than our current prices but about 23% higher than our prices were in June 2002. Many of our slow-selling and overstocked items will be reduced in price as much as 80%. We regret any inconvenience caused by our fluctuating prices and appreciate your comments and support during these tight fiscal times.

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