



GEOLOGICAL SOCIETY OF NEVADA NEWSLETTER

Geological Society of Nevada, 2175 Raggio Parkway, Room 107, Reno, NV 89512
(775) 323-3500 - Hours Tuesday – Friday, 8 a.m. to 3 p.m. Monday by appointment.
Website: www.gsnv.org • E-mail: gsn@gsnv.org



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CALENDAR OF GSN EVENTS

Dec. 11, 2013
Wednesday



WINNEMUCCA CHAPTER MEETING & SILENT AUCTION FUNDRAISER
The monthly meeting will be held at the Martin Hotel, Winnemucca, NV. Appetizers/drinks at 6:00 PM, 6:30 PM Silent Auction, Talk at 7:30 PM. **Speaker: Karl Lowry.** Title: "Geology, Alteration, Paragenesis, and Geochemistry of the Vortex Zone of the Hycroft Gold-Silver Deposit, Humboldt County, Nevada". **Food & Drinks Sponsored by: TO BE DETERMINED.** Contact Andy Jansen at Andrew.jansen@newmont.com for more information. Abstract on page 7.

Dec. 18, 2013
Wednesday



GSN ANNUAL CHRISTMAS MEETING, ROCK RAFFLE AND AUCTION!
The monthly meeting will be held at the Reno Elks Lodge, 597 Kumle, Reno. Drinks at 6:00 PM, Dinner at 7:00 PM, Talk at 8:00 PM. **Speaker: Peter Dilles, Peter Dilles Consulting Services Inc..** Title: "Going Higher and Deeper in Southern Peru: A Travelog". Sponsors for the evening are: **CGS MULE; KAPPES, CASSIDAY & ASSOCIATES; and TAHOE RESOURCES INC..** Dinner reservations must be made by **NOON FRIDAY Dec. 13th.** Call Laura Ruud at 323-3500; Email: gsn@gsnv.org. DINNER \$25.00. Abstract on pg. 3.

Dec. 19, 2013
Thursday



ELKO CHAPTER MEETING (Every Third Thursday)
The monthly meeting will be held at the Western Folk Life Center, 501 Railroad Street. Refreshments at 6:00 PM, **Entertainment/speaker to be announced.** **Food & Drinks Sponsored by: BOART LONGYEAR.** For more information contact Josh Sovie at jsovie@barrick.com.

NO MEETING DECEMBER!

SOUTHERN NEVADA CHAPTER MEETING (Every Last Thursday)
There will be no So. Nevada Chapter meeting in December due to the holidays. **Possible joint AEG/GSN Christmas party being planned.** Details pending. Contact Wyatt Bain, bainw1@unlv.nevada.edu.

**LAST CHANCE TO RENEW YOUR GSN 2014 MEMBERSHIP!
DEADLINE IS DEC. 31, 2013* TO BE INCLUDED IN 2014 DIRECTORY.
(and to receive the January 2014 newsletter!)**

See form on Page 12 or Renew online at:

<http://gsnv.org/membership/join-gsn.php>

**If possible, please help Laura out by not waiting until the last day!*

G.S.N. DECEMBER MEETING SPONSORS



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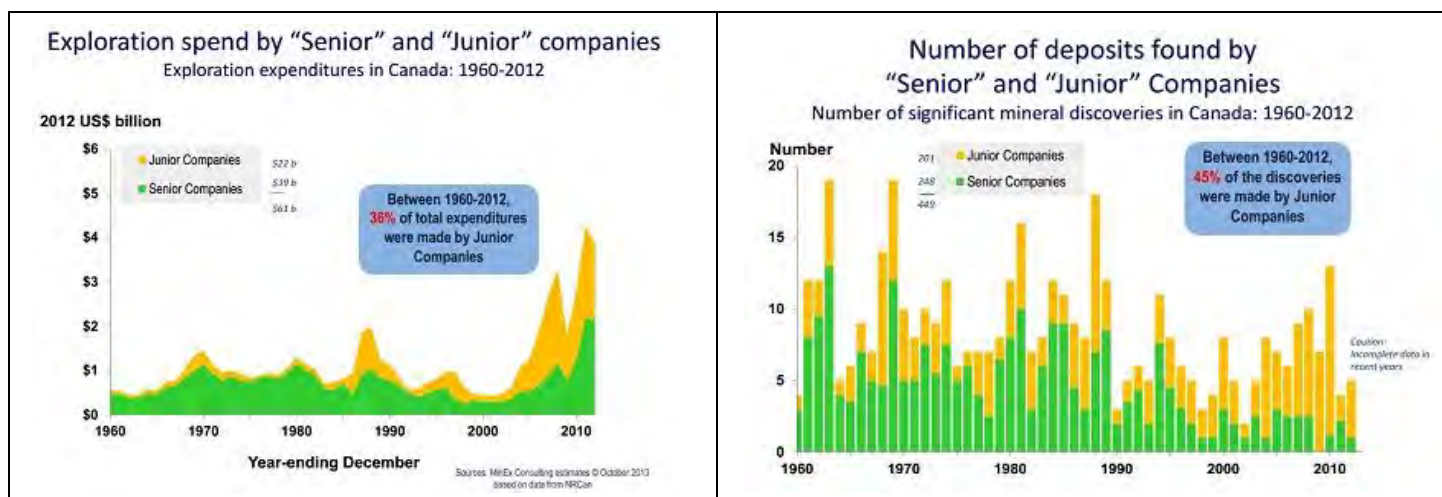
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FROM THE PRESIDENT
Tommy Thompson, G.S.N. President 2013-2014

Our November speaker, Ralph Stegen, demonstrated the complexities of the world-class Mornci porphyry copper system, part of which is presented in the new Society of Economic Geologists Special Publication Number 16 (Hedenquist, J.W., Harris, M., and Camus, F., eds., 2012, *Geology and Genesis of Major Copper Deposits and Districts of the World: A Tribute to Richard H. Sillitoe*). This SEG volume is an excellent summary of major copper deposits of all genetic types.

A new summary* demonstrating the importance of the junior sector in the business of finding ore deposits shows (Fig. 1) that in Canada, junior companies have only spent 36% of the total 1960-2012 exploration dollars while actually discovering 45% of new deposits during that same interval. Does this say something about efficiency or risk venturing?



*Figure 1. *BC Junior Mining at a Crossroads: Report commissioned by the British Columbia Securities Commission (published 17 October 2013, 21p.).*

I want to encourage the GSN members to renew their memberships soon rather than waiting to the end of December. In addition, your participation in the December meeting, particularly in donating items for the auctions would be much appreciated. Much of the GSN income from these auction items goes to the support of students.

Finally, most of you have seen an increase in student participation at our monthly meetings. Please introduce yourselves to them; many of them are too shy to initiate conversations. They are primarily graduate students in geology working on a variety of thesis topics, not just ore deposits. We will get a sampling of their research in the April meeting when posters will be available during the social hour. Two of them will present their thesis research during that monthly meeting. Some of these projects deal with careful geologic mapping, both at the surface as well as in underground exposures. Stu Wallace's comments (below) reflect on exploration success in the discovery of the Henderson Mo systems.

"To commune with the rocks is a special privilege; to study beneath the ground is a noble profession!"
 Stewart R. Wallace, 1975 Jackling Lecture (June, 1975 Mining Engineering)

Thanks to SGS, INC.
For Hosting the November 15, 2013 Meeting!



GSN DECEMBER 18, 2013 Membership Meeting



Reservations Are Required - Please Cancel if You Are Unable to Attend

Please call 775-323-3500, Fax 775-323-3599 or e-mail gsv@gsv.org by Noon on FRIDAY, December 13, 2013.

Social Hour: 6:00 PM – Dinner: 7:00 PM – Speaker: 8:00 PM

\$25.00 per person. Location: Elks Lodge, 597 Kumle Lane, Reno, Nevada

Directions: across (W) from the Reno-Sparks Convention Center

(S. Virginia Street, behind the Les Schwab Tire Center)

Going Higher and Deeper in Southern Peru: A Travelog

By Peter Alden Dilles and Jeannette Caillaux Dilles

Take a pictorial tour through the volcanic highlands of southern Peru where we will travel to the mystical ice-capped Coropuna, southern Peru's highest volcán at 6,425m (21,082 feet), and probe the depths of the Cañón del Rio Cotahuasi, considered by many to be the deepest river canyon in the world.

Our family journey began in the city of Arequipa last June from which we drove westward then northward up the river Majes through dairy producing communities perched along the southern slopes of Coropuna. We then traversed upwards through the ancient ruins of the city of Muacallacta, a Wari/Inca era spiritual Mecca, near forests of Puya Raimondi (giant Bromeliads), and then up a wildlife-rich glacial moraine valley to the ice fields of Coropuna.

Coropuna, which means *Temple on the Mountain* in Quechuan, is composed of a ten kilometer long chain of dacitic to andesitic volcanic summits capped by a continuous, thick mantle of smoothly sculpted glacial ice. Multiple episodes of lava outflows and glaciers have been shed down valleys along Coropuna's slopes. Unlike more tempestuous neighbor, Volcán Sabancaya, volcanism became dormant locally about 5,000 years ago, although active fumaroles remain.

We then crossed a nearly 5,000 meter high volcanic plateau past extinct Volcán Solimana (6,093 meters/ 19,994 feet) before dropping on a switchback highway into the broad westerly draining Cañón del Rio Cotahuasi, 3,345 meters (10,972 feet) at its deepest point. Below we navigated through the narrow streets of provincial capital of Cotahuasi, then drove eastward past palm tree lined hot springs and by agricultural pueblos of the upper canyon. Following a good soak and sightseeing, we then reversed course and descended to the west down the Gran Cañón de Cotahuasi to the town of Velinga near the end of the road.

Along this route we peered into the stunning Cataratas de Sipia where the river canyon abruptly narrows and drops 150 meters (492 feet) in less than one kilometer (3,281 feet). Geologically, these water falls mark the point where the present river bed cut through young volcanic mudflows into its ancestral channel in Jurassic sedimentary rocks. From this point westward golden sandstone strata lend Cotahuasi a resemblance to Arizona's Grand Canyon. The recently completed bypass road around the Cataratas de Sipia follows a shale bed high on the south wall of the cañón.

Below the Cataratas de Sipia, the cañón valley widens and the road passes through organ pipe cactus forests. Papaya, mango and avocado orchards are perched precipitously on remnant terraces high above the cascading river. A few dozen locals, including a retired American doctor and a teacher from Lima, enjoy the year-round warm, sunny and dry climate in this incredible setting. Government road construction is on-going below Veliga in an attempt to push the road through the deepest part of the cañón to Ocoña and the Pacific coast highway.

Upon leaving Cotahuasi we visited the Valley of the Volcanos 25 kilometers northeast of Coropuna. Here young basaltic cones and lava flows have damned a river valley and created a subterranean river that resurfaces twenty kilometers away at a quintessential desert oasis called Mamacocha. The last stop was the home town of Jeannette's grandfather: the idyllic and sleepy lakeside pueblo of Chacas.

“FACES OF GSN”

Ted Wilton Spanish Springs, Nevada

So, how [or why] does a kid from the apple orchards of Hillsborough County, New Hampshire end up working as a uranium geologist in the Grants Mineral Belt of New Mexico and the South Texas uranium district?

My name is Ted Wilton. I am the Chief Geologist for Uranium Resources, Inc. and I am from the apple orchards of southern New Hampshire. Over the 66 years between being born to Dean and Ruth Wilton and today I have travelled the world searching [and sometimes finding] metal deposits, and enjoying just about every minute of it.

It all started with a trip to the school library and a chance encounter with “Earthquake Country”, a book that I just happened upon. This was my first conscious encounter with our science, and I have never lost my fascination with it. Being a bit of a contrarian, I was happy to say that ‘I want to be a geologist when I grow up’ even though this is not a very common goal for a kid from New England. I graduated from Bartlett High School and ventured off to Socorro, New Mexico to “study” [more about that later]. The folks in the town my parents lived in [Webster Massachusetts] were somewhat amazed by such a trek – the two questions that I most commonly faced when I came home at Christmas were “are your classes in English or Spanish?” and “do you need a passport to go to school there?” Both are the kinds of questions that one reads in the “One of Our Fifty is Missing” column on the back page of New Mexico Magazine.

I am a graduate of the New Mexico School of Mines, where I majored in geology and minored in mining engineering and civil war history. My academic career was nothing to brag about – I failed the first geology class I took. During my senior year I was in the ore microscopy lab [only student in the class]; the door to the lab opened and a group of high school students were escorted in, along with the Director of Admissions and the Chairman of the Geology Department, Dr. Clay Smith. The visitors were told a bit about what the lab was all about, and then Dr. Smith introduced me as “one of my students” to which the Director of Admissions retorted “excuse me Dr. Smith, but Mr. Wilton is a pupil, not a student.” I may have overcome this pattern of ‘attending’ rather than ‘learning’ - I was deeply honored to be chosen as the 2011 recipient of the Distinguished Alumni Achievement Award from New Mexico Institute of Mining and Technology.

I worked as an un-degreed uranium geologist for almost four years, before one of my mentors, Kelsey Boltz paid me to go back to school and finish my degree. Over those four or so years I worked for the exploration departments of Petro-Nuclear, Cleveland-Cliffs Iron Company and Nuclear Dynamics. During that time I fell in love with the geology of the Colorado Plateau, and Wyoming – a love affair that exists to this very day. While working for Nuclear Dynamics I fell in love with Debbie Price, and that love affair continues to this very day. We have been married for 43 years, have a son and four daughters, and twelve grandchildren. Because of the amount of travel I do Debbie was recently heard to say “we have really have been married only twenty years.” I think there is a bit of a message here?

Graduation led me back to the uranium business, and I worked for Rocky Mountain Energy for a year, meeting another of my mentors, Jim Davis, who gave me my first job after university. After a year with RMEC I joined the Freeport Exploration Company, a group that I was to be associated with for the next twenty years. My time with Freeport was a profound event not just in my career, but in my life as well. I had the distinct privilege and honor to work with one of the finest groups of geologists and group of people that I could ever imagine. Amongst those people was the next of my mentors, the late Doug Cook. Doug stressed to me (cont. page 5)



(Wilton, cont.) that in addition to the need to excel in the pursuit of science there is a real place and need for honor and integrity in our business, and he was both a great teacher and manager. He taught me much about geology, exploration, managing people, and integrity – I will never forget his lessons! When the Three Mile Island nuclear reactor incident happened Freeport was in the process of shutting down its uranium exploration program [which I was managing]. Unlike many other companies, Freeport assimilated those of us in the uranium group into other segments of the Company's exploration program. I spent about two years as the Chief Geologist for another Freeport subsidiary, National Potash. Doug then determined that it was time to "continue the re-education of Ted Wilton", and we moved to Reno and I started to learn about gold exploration. In early 1984 I was transferred to Perth, Western Australia as exploration manager, focusing on gold, with a bit of placer diamonds, native sulphur and trona thrown in. At the same time my geographic horizons were also expanded to include work in Fiji, Guadalcanal [Solomon Islands], Palau and New Zealand. I still have a clear memory of standing in the airport terminal in Kalgoorlie [just after arriving in Australia] – in the center of the Yilgarn Shield - and thinking that all of my experience in Permian evaporates and Cenozoic and Mesozoic continental clastics in the Colorado Plateau and Wyoming basins made me eminently qualified to work in the Archaean-aged greenstone belts of Western Australia. In spite of my lack of experience in the Archaean, it was a very successful assignment, and I had the opportunity to participate in the discovery of the Karonie gold deposits – one of the first grass-roots gold discoveries in Western Australia in quite a number of years. Karonie and Bow River, a placer diamond discovery that Freeport made in Western Australia about the same time were later sold to the Normandy Poseidon for about US\$165 million.

We returned to Reno in 1987 and I later took over as VP - US Exploration for Freeport McMoRan Gold and remained in that position until the sale of the Company to Minorco in 1990. Off we went to Spring Creek, where I managed the geologic activities at the Jerritt Canyon Joint Venture, the Big Springs mine, and regional exploration. This was another of those profound "turning points" in my career. I had the distinct privilege and honor to work with the best group of explorationists and ore-finders that I have ever been associated with! During the 1990-1994 period our group discovered the Murray, West Generator underground, MCE, Steer Canyon, SSX, DASH and Smith deposits, each of which were developed as mines; in fact, Smith, SSX and Steer are still in operation to this day. It was a great place to be a geologist – seeking new gold deposits below the Upper Plate of the Antler thrust complex, developing a strong understanding of the role of N 70° W faults as feeders for much of the ore at Jerritt Canyon, and working with the aforementioned wonderful group of geologists. This "heyday" of Jerritt could perhaps be characterized by the 1992 drilling program, when we had 37 core and RC drills running, spending a \$27 million budget and drilling about 1.6 million feet of hole. Jerritt was also the place that I was really introduced to the operational aspects of

our business, a learning experience that I really needed.

Jerritt Canyon left me in 1995 and I worked for Granges [now Vista Gold] for about eighteen months before Bob Schafer enticed me to join Kinross Gold. Over the nearly seven years with Kinross I served as their Exploration Manager – South America and South Pacific [other than being able to ask for a beer I don't speak a lick of Spanish], Managing Director of Kinross Gold Australia [a return to Perth for another four years], Technical Services Manager at the Fort Knox mine, and Group Chief Geologist for the parent Company.

After four years in Australia and the subsequent two more in the Interior of Alaska it was time for Debbie and I to get back to similar time zones with the rest of our family, and I accepted a position as District Exploration Manager for Queenstake, returning to Jerritt Canyon. In addition to renewing my relationships with several of the staff I had worked with previously, Buster Hunsacker and I had the privilege of participating in the discovery of the Starvation Canyon deposit, which was brought in to production earlier this year.

At the time of the 2005 PDAC my boss, Dusty Nicol, asked me to take his place in the Queenstake booth [those of us who know Dusty know he has an aversion to booths]. I had a chance encounter with my first mentor, Kelsey Boltz, who was in the process of forming a new uranium company, Neutron Energy. For the next six years Kelsey and I, along with a really good group of folks [Gary Huber, Dan Dowers, Mark Ludwig, Rick Karlson, Jim Davis, Al Stoick and Cindy Newton, among others] put together an impressive portfolio of high quality uranium projects in New Mexico, but the markets were not kind to us.

Victoria Gold came calling in late 2010 and I joined them, with the opportunity to work on the Eagle deposit [Fort Knox junior] in the Yukon and the Cove-Helen deposit. Again, I had the distinct privilege to work with an outstanding group of geologists – Brad Cantor, Ryan Bresnahan, Juan Parraga, Rich Eliason and John Norby. After a short stop at Klondex I returned to my "roots" and joined Uranium Resources, where you can find me now.

Some of you might know me as a bit of an activist for the public's access to their lands in the West, and a [sometimes self-appointed] advocate for the rights of the US mining industry. That chapter in my career started in 1990, when Susie Mason asked me to serve as the President of the Minerals Exploration Coalition. Little did I know that saying "yes" would lead me to Washington, DC a few months later to testify on the 1990 edition of Congressman Nick Joe Rahal's "mining reform act". That was my first real exposure to the likes of Phil Hocker, Ralph Nader, Congressman George Miller, and a whole host of others who were trying to take our jobs from us and make us American exports. Since that September, 1990 day I have testified before Congress on subsequent versions of the same "reform" legislation in 1992, 1994, and twice in 2007 – and I have come to have a real appreciation (cont. pg. 6)



G.S.N. ELKO CHAPTER MEETING

Thursday, December 19, 2013,
Refreshments begin at 6:00 p.m.



Western Folklife Center

501 Railroad Street, Elko, Nevada

Sponsor for the evening is **BOART LONGYEAR!**



(Wilton, cont. from pg. 5) for the statement that 'one should not watch sausage or law being made'. Amen to that! That trip also led me down the trail of fighting for continued access to Public Lands in Nevada as a long-time Chair of the Public Lands Committees of the Nevada Mining Association and the Northwest Mining Association. Multiple trips to Washington to again testify before the House and Senate on proposed wilderness withdrawals, the Spring Mountain National Recreation Area, the Emigrant Trail NCA and a bunch of other proposed mineral withdrawals did nothing to change my views about sausage and laws. Those of us who are exploration geologists tend to shy away from such expressions of public involvement, but if we don't speak up for our industry nobody else will, so I took that to heart and went forth into the swamp of public policy. I am not as involved in that theater as I used to be, but I am pleased to have most recently served as the first President of the Nevada Minerals Exploration Coalition – born of the Nevada mining claim tax. Trying to suggest common sense [not as common as the phrase implies] in the political rhetoric in Carson City from a motel room in Grants, New Mexico would have been an incredibly difficult task if it had not been for then-Assemblyman John Carpenter [R-Elko] and then-Elko County Commissioner Sheri Eklund-Brown, two very good friends of mine, and two great friends of our industry! In 2006 the Northwest Mining Association afforded me as an Honorary Life Member - I am very appreciative of their honor.

Over the forty plus years I have been in the mining industry I have had a continuum of experiences that a kid from the apple orchards of Hillsborough County could never have imagined. I have searched for metal deposits in Australia, New Zealand, Yukon, Russian Far East, Solomon Islands, Fiji, Palau, Papua New Guinea, Argentina, Columbia, Guatemala, Mexico, Alaska, and the western United States, and have been involved in the finding of some. As I told a student once, "it has been a forty plus year paid vacation." And maybe it was because a fifth grader found "Earthquake Country" in the library of a school in Mont Vernon, New Hampshire.

**WINNEMUCCA CHAPTER
NOVEMBER SPONSOR**

**ELKO CHAPTER
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**Thanks to
NEWMONT MINING CORP.
for sponsoring the
Winnemucca Chapter
meeting in November**

**Thanks to
BARRICK GOLD
for sponsoring the
Elko Chapter meeting
in November**



G.S.N. WINNEMUCCA CHAPTER MEETING
& SILENT AUCTION FUNDRAISER!!

WEDNESDAY, DECEMBER 11, 2013,

Location: The Martin Hotel, Winnemucca, Nevada

6:00 p.m. Appetizers/Drinks; 6:30 P.M. SILENT AUCTION

7:30 p.m.—Talk begins

Food and Drinks Sponsored by: TO BE DETERMINED

SPEAKER: KARL LOWRY

“Geology, Alteration, Paragenesis, and Geochemistry of the Vortex Zone of the Hycroft Gold-Silver Deposit, Humboldt County, Nevada”

The Hycroft gold-silver mine is a low sulfidation epithermal hot spring deposit located 55 miles west of Winnemucca, NV near the Blackrock desert. It is located in the historic Sulphur district which has had mining on and off since the late 1800's. Sulphur was the main commodity initially, with the later discovery and mining of silver, alunite, and mercury through the first half of the 20th century. Gold was discovered in the district in 1974 by the Duvall Corporation. The first gold mining and recovery by heap leach was conducted in 1983 by Standard Slag. Allied Nevada acquired the property in 2008 and discovered the Vortex zone through induced polarization and resistivity surveys.

The oldest rocks in the region are the probably Permian Happy Creek volcanic series. These are overlain by the Auld Lang Syne group of metamorphosed argillaceous to sandy sedimentary rock. Tertiary volcanic and volcanoclastic rocks overlie the basement rocks. The region underwent folding and regional metamorphism in the Jurassic and Late Cenozoic basin and range normal faulting.

The Auld Lang Syne rocks make up the basement in the Vortex area and are mostly in fault contact with overlying Kamma Mountains volcanic and volcanoclastic rocks. Previously undifferentiated, the Kamma Mountains rocks consists, from bottom to top, of (1) a lower flow-banded rhyolite, (2) ash-fall and lithic-rich tuffs, (3) a massive rhyolite flow, and (4), a clast to matrix supported angular clastic unit. The youngest Tertiary unit is the Sulphur rocks which consist only of a rounded to subangular clast-to-matrix-supported conglomerate in the Vortex area. The upper parts of the Kamma Mountains and the Sulphur rocks are lithified only where hydrothermally altered. All rocks are cut by a series of north-northeast-striking normal faults, the most important of which is the East fault.

Hydrothermal alteration in the Vortex zone is extensive and focused in layers due to the high permeability of most rock types. There are five types of alteration. An argillic alteration made up of kaolinite + smectite + anhedral quartz + sericite + marcasite + pyrite dominates the deposit. Argillic alteration is distinctly zoned from lower, kaolinite-dominated levels to upper smectite-dominated levels. Argillic alteration has been dated to 4.0 ± 0.1 ma. Argillic alteration interfingers with propylitic alteration that consists of chalcedony + chlorite + pyrite + sericite + smectite + marcasite \pm carbonates and occurs in veinlets and flooded into groundmass. Silicic alteration that consists of chalcedony \pm granular quartz + pyrite + marcasite \pm sericite formed above propylitic alteration in the middle part of the Kamma Mountains rocks. Opal or chalcedony + adularia + pyrite alteration locally occurs above the smectite alteration. Adularia from this alteration has been dated to 3.8 ± 0.09 Ma. Steam-heated acid-sulfate alteration overprints all alteration types at the top of the system. Most elements except immobile elements were leached and native sulfur added to the upper part of the steam-heated zone. Alunite from this alteration type has been dated to 2.4 ± 0.1 Ma. The lower part is silica cemented and has accumulated iron oxides leached from the upper part. Paragenetic study shows that pervasive hydrothermal alteration occurred early in the system. Pervasive argillic alteration was overprinted with propylitic in the lower parts of the deposit, then silicic in the middle portion, then opal – adularia and acid leach in the upper portions. This was followed by several events of brecciation and veining. Silver mineralization occurs late in brecciation events and locally in veins as pyrrargyrite, proustite, tennantite- tetrahedrite, and acanthite.

Geochemistry in the zone shows some typical epithermal zonation. Mercury and antimony show classical volatile zonation, occurring in the upper portions of the system. Arsenic appears to have reverse zoning with higher levels lower in the system, due to inclusion in silver sulfosalts rather than in arsenic sulfides. The base metals occur at very low levels overall and do not show clear zonation, except copper, which has a bi-modal zonation with a horizon of copper occurring in chalcopyrite lower in the system, and one occurring in tennantite-tetrahedrite higher in the system. Correlation of elements shows that gold and silver mineralization is often associated with arsenic, selenium, and antimony deposition, though this is variable throughout different levels of the system.

The volcanic rocks in the system were likely deposited between 28 and ~ 16 Ma and cut by Basin and Range normal faulting at around 16 Ma. Normal faulting created the necessary conditions to form the volcanoclastic and Camel Conglomerates near the top of the deposit. Hydrothermal alteration began around 4 Ma and lithified these rocks, partially sealing the system. This led to the widespread creation of breccia dikes which roughly coincide with the boundary between the upper rhyolite and volcanoclastic units. Precious metal mineralization occurred in these breccia dikes and later veining. Hydrothermal activity continued after precious metal deposition with late overprints of acid leach.

G.S.N.'S ANNUAL CHRISTMAS MEETING

ROCK RAFFLE & AUCTION

WEDNESDAY, DECEMBER 18, 2013

RENO ELKS LODGE, RENO, NEVADA

6 p.m. - Raffle & Silent Auction

7 p.m. - Dinner, 7:45 p.m. - Live Auction, 8 p.m. - Pete Dilles Presentation

The Geological Society of Nevada Foundation's fundraiser "Rock Raffle and Silent Auction" will be held at our annual Christmas meeting on December 18. We are still seeking donations of any items suitable for the raffle or silent auction: gift baskets, attractive rock or mineral samples, gems or gemstones, jewelry, wine or other spirits, logo items, geological equipment or publications, commemorative coins, GOLD, or any geology or mining-related items will be gratefully accepted.

Raffle proceeds support GSN Foundation's educational projects, which include grants to Nevada K-12 classes for transportation on earth science related field trips, scholarships to Nevada geology students, grants to the UNR DeLaMare Library, and grants for geologic mapping in Nevada.

Donors will have their names displayed on signs at the event as well as having their names listed in the January newsletter. The GSN Foundation is a 501(c)(3) public charity.

Please contact D.D. LaPointe to drop off donated items with her or to arrange pick-up of donated items if you are in the Reno-Sparks-Carson City area. We need to have all items in hand by Monday, December 16, 2013 in order to prepare labels and make bid sheets. Thank you for your support!

D.D.'s phone # is 775-682-8772 and email is dlapoint@unr.edu. OR drop donations off at NuLegacy Gold, 5450 Riggins Court, Suite 1B. Reno, NV. See JoAnn Newbury, Mon-Wed between 10 am and 3 pm. You can drop off at GSN office too!

GSN WINNEMUCCA & ELKO CHAPTER JOINT MEETING—A RESOUNDING SUCCESS!

Battle Mountain, Nevada

By Laura Ruud

On November 14, 2013 over 110 members of the GSN's Elko and Winnemucca Chapters "met in the middle" for the third annual Joint Chapters Meeting. The Hideaway Steakhouse in Battle Mountain, NV was the private venue for the extra large group of GSN members.

We were happy to have Justin Milliard, with Klondex Gold & Silver Mining Co. give his talk on the exploration and geology of the Fire Creek Deposit in Lander County, NV. According to Justin, the Fire Creek is Nevada's newest bonanza-grade deposit currently in development. It is a low-sulfidation deposit and occurs along a series of north-west trending Tectono-magmatic extensional structures.

Justin was enthusiastic about the project and was happy to show off some very nice samples that he brought along. Overall it was a very successful and fun meeting.

Thanks again to the co-sponsors for the evening,
Newmont Mining Corporation and Barrick Gold!



GSN Elko “Great Basin and Western Cordillera Mining Geophysics Symposium”

A Wrap-Up

By Brendan Howe

On November 23 members of the GSN Elko Chapter (locally referred to as the “EGG” or Elko Geophysical Group) organized an inaugural geophysical symposium. The symposium was aimed at providing a forum to predominantly present discovery case histories from the Great Basin and Western Cordillera to local geoscientists. The symposium was very well attended with 91 delegates from Ontario, Colorado, Arizona, Utah, California and Nevada arriving in town. The Western Folklife Center, as usual, provided a fantastic menu for the event and subsequent libations.



The symposium was divided into 4 four sessions; Sediment Hosted Deposits (Carlin Type), Geophysical Inversion and Application, Porphyry Deposits, and Epithermal Deposits. Highlights from the first session include Kyle Gray’s (UNR) presentation on seismic data and processing over a Carlin Type Deposit. The second session delved more into some of the background theory with Yaoguo Li’s (Colorado School of Mines) discussion on using geophysical inversion to aid mine tonnage calculations. Session three highlight was Don Hinks (Rio Tinto) presentation on the geophysical response of Bingham Canyon (see photo). Session four rounded out the event with Nevada based geophysicists Chet Lide (Zonge) and Jim

Wright (Wright Geophysics) presenting exciting CSAMT and IP results from the Cahuilla epithermal deposit (California) and the geophysical discovery of the Vortex zone at the Hycroft mine near the Blackrock Desert in Nevada.

The organizing committee would like to acknowledge all delegates for their attendance and participation and also would like to thank the event sponsors that included Condor Consulting, Wright Geophysics, Zonge International, and Magee Geophysical Services. Lastly a special thanks to Laura Ruud (GSN) for her organizational expertise!



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The most valuable part of GSN may be the intangible part. Meeting up with colleagues, potential employees, potential employers, making new friends, attending the presentations, and finding out what is going on in our fast paced industry doesn't have a direct dollar value. The free drinks aren't really free as they are paid for by our generous sponsors every month along with the refreshments at the Elko, Winnemucca and Southern Nevada Chapter meetings.

In addition, the dedication of GSN volunteers makes the organization run. Take a few minutes to think about the role that GSN plays in your career and take time to thank all of the volunteers and sponsors that provide the venue for your GSN experience. For only \$50/year, GSN continues to be one of the best bargains around!

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2014

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Walk-in Office hours: Tuesday through Friday, 8:00 AM - 3:00 PM. Mondays - Call or email for appointment.

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The membership year begins on January 1. Annual dues of \$50.00 (\$25.00 for full time students) are due prior to December 31. The GSN conducts a Field Trip in the Fall and one in the Spring of each year. Monthly meetings are held in Reno, Winnemucca, and Las Vegas (Southern Nevada Chapter) September through May. The Elko Chapter holds meetings January through December.

Please help support the GSN Foundation when renewing. Foundation dollars are used for the Kindergarten through 12th grade Field Trip Grant Program, Nevada Mapping Grants and University of Nevada scholarships.

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Yes No

Optional Chapter Affiliation (to be eligible for chapter voting and emails from those Chapter Officers)

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Activity Update

Mike Brady, October 2013

www.activityupdate.com

NEVADA

Rodina Lithium Corp. announced that it abandoned its Clayton Valley lithium brine project. *N.M.:* September 30

International Millennium Mining Corp. announced that it terminated a purchase option with Silver Reserve Corp. that would have increased its interest in the Nivloc Property. (resource = 2,176,000 tonnes @ 0.67 gpt Au, 87.2 gpt Ag inferred) *Press Release:* October 4

South American Silver Corp. announced that it offered to acquire an additional 81.5% interest (to hold 100%) in High Desert Gold Corp. through a 0.275 share South American/1.0 share High Desert exchange basis. (resource @ Gold Springs = 19,373,000 tonnes @ 0.48 gpt Au, 10.4 gpt Ag inferred) *Press Release:* October 21

Columbus Gold Corp. announced that recent drill results at the Eastside Project include 35.1-77.7 meters @ 0.41 gpt Au (ES-13); 97.6-150.9 meters @ 1.11 gpt Au (ES-14); 82.3-100.6 meters @ 0.15 gpt Au (ES-15) and 204.3-234.8 meters @ 0.78 gpt Au (ES-19). *Press Release:* October 17

Columbus Gold Corp. announced that recent drill results at the Bolo Project include 42.7-144.8 meters @ 0.60 gpt Au (BL-35); 35.1-42.7 meters @ 0.75 gpt Au (BL-36); 18.3-30.5 meters @ 0.67 gpt Au (BL-37) and 0-132.6 meters @ 1.28 gpt Au (BL-38). *Press Release:* September 25

Miranda Gold Corp. announced that recent drill results at the Angel Wing Project include 195.1-208.8 meters @ 0.36 gpt Au (AW13-05); 225.6-286.5 meters @ 0.61 gpt Au (AW13-06); 248.4-275.8 meters @ 0.65 gpt Au (AW13-08) and 260.6-266.7 meters @ 3.83 gpt Au (AW13-12). *Press Release:* September 30

Klondex Mines Ltd. announced that recent underground drill results at the Fire Creek Project include 8.8-11.9 meters @ 23.1 gpt Au (FC13-089U); 8.1-10.3 meters @ 11.7 gpt Au (FC13-092U) and 7.5-9.5 meters @ 8.4 gpt Au (FC13-093U). (resource = 206,400 tonnes @ 44.7 gpt Au measured+indicated) *Press Release:* October 8

Osisko Mining Corp. announced that it terminated its interest in 5 exploration properties (including the Tokop, Excelsior and Lone Mountain properties) of Global Geoscience Ltd. *Press Release:* October 23

Gold Standard Ventures Corp. announced that recent drill results at the Railroad Project include 206.4-262.5 meters @ 1.47 gpt Au (RRB13-01). *Press Release:* October 2

Entrée Gold Inc. announced that recent drill results at the Ann Mason Project include 262-482 meters @ 0.30% Cu, 0.07 gpt Au (AM13-035); 396-432 meters @ 0.13% Cu, 0.01 gpt Au (AM13-036) and 22.9-29.0 meters @ 0.16% Cu, 0.01 gpt Au (AM13-038). (resource = 581,800,000 tonnes @ 0.38% Cu, 0.24 gpt Au indicated) *Press Release:* September 25

Corvus Gold Inc. announced that recent drill results at the North Bullfrog/Sierra Blanca Project include 0-103.6 meters @ 0.27 gpt Au (NB13-241); 0-41.2 meters @ 0.68 gpt Au (NB13-242) and 32.0-89.9 meters @ 0.28 gpt Au (NB13-243). (resource @ North Bullfrog = 15,230,000 tonnes @ 0.37 gpt Au, 0.4 gpt Ag indicated) *Press Release:* October 24



Tax Deduction



If you are thinking about replacing your field vehicle this year and have thought about donating it, please consider donating your used truck to the Sky Tavern Jr. Ski Program. This is a non-profit local program located in Reno, NV and it teaches thousands of K-12 children how to ski each year. The program is run by an all volunteer group and are always in need of a truck to do work on the mountain.

If you need a tax deduction and have a vehicle that is past its prime, you can contact Bill Henderson at 775-530-6266 or for more information about the Sky Tavern Program you can visit the website: www.skytavern.com.

posed of a mixture of the two minerals *Anorthite* and *Albite*. Thanks to new electric ovens, high-temperature resistant probes and new analysis-methods Bowen finally published in 1913 one of the most famous diagrams in petrology – the phase diagram of plagioclase:

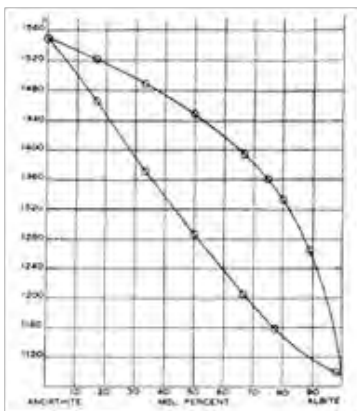


Fig.3. Phase diagram of plagioclase feldspar from Bowen’s “*The Melting Phenomena of the Plagioclase Feldspars*” (1913) . This diagram shows how crystals form from a cooling melt, note how the composition from the crystals (lower line) differs from the composition of the residual melt (upper line). The crystals continue to react with the cooling melt, following the respective line. However if the crystals are removed from the system the starting point of the system will change. Cooling this melt will now produce another variety of feldspar with the chemical composition of the residual melt. This mechanism is known (and feared) by

Bowen was convinced that alone fractional crystallization could explain the observed variety of igneous rocks. However there was one great weakness with this model – fractional crystallization is very inefficient; you need a volume of source-magma nine times greater than the observed granitic rocks, also fractional crystallization should occur all over the planet, but granitic rocks are concentrated in continental crust. Something was missing...

Bibliography:HÖLDER, H. (1989): Kurze Geschichte der Geologie und Paläontologie – Ein Lesebuch. Springer Verlag, Heidelberg: 243
 YOUNG, D.A. (2002): Norman Levi Bowen (187-1956) and igneous rock diversity. From OLDROYD, D.R. (ed.); The Earth Inside and Out: Some Major Contributions to Geology in the Twentieth Century. Geological Society, London, Special Publications Nr. 192: 99-111.



Upcoming Events

Dec. 2-6, 2013—NWMA 119th Annual Meeting, Expo and Short Courses.

John Ascuaga’s Nugget, Sparks, Nevada. Website: www.nwma.org Email: nwma_info@nwma.org

Come visit us at the GSN and shop for geologic publications or a hat & T-shirt at Booth #307!!

Dec. 6, 2013—Nevada Petroleum & Geothermal Society Annual Christmas Party—*Raffle and Gift Exchange*.

Ramada Reno Hotel, 1000 East 6th Street, Reno, NV. Cocktail Reception 6:30, Skyline Bar, 14th Floor.

Buffet Dinner 7:15 PM. NPS Members & Guests \$25/person. RSVP by December 3rd at the following link:

https://docs.google.com/forms/d/18NFN66H_2WNdvdlleBP8rDNPf2_FHTpndGjGjmQ4b5og/viewform

Reservations required.

Dec 7-8, 2013—Holabird’s Western American Collections December Auction. Western Bonanza. Stocks Bonds,

Checks Postcards, Art, Photographs, Bottels Books, Maps, Mining, Postal, & Rail History.

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Dec. 10, 2013—21st AIPG Exploration Roundup will be held December 10, 2013 at the Ramada Inn, 14th Floor,

1000 E. 6th St., Reno NV beginning at 6:00 PM. Boart Longyear will host the bar and Mark Stock, Global Hydro-

logic Services, is donating mineral specimens for the Raffle. The program will feature eight speakers. Reservations

due by Dec. 6th to Kel Buchanan, 775-786-4515 or summitcrk@aol.com.

Dec. 14, 2013—SME Northern Nevada Section Annual Christmas Party & Annual Silent and Live Auctions.

Cocktails & Hors d’oeuvres @ 6pm, Dinner @ 7 pm; Live Auction & Dancing 8:30 pm

Circus-Circus Mandalay Room, Reno, Nevada.

Cost: \$70 per person. Menu: Prime Rib or King Salmon

Please make reservations with dinner preference by Monday, December 9th.

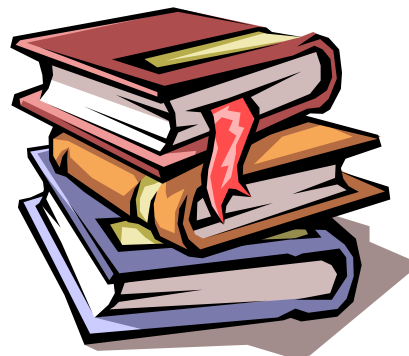
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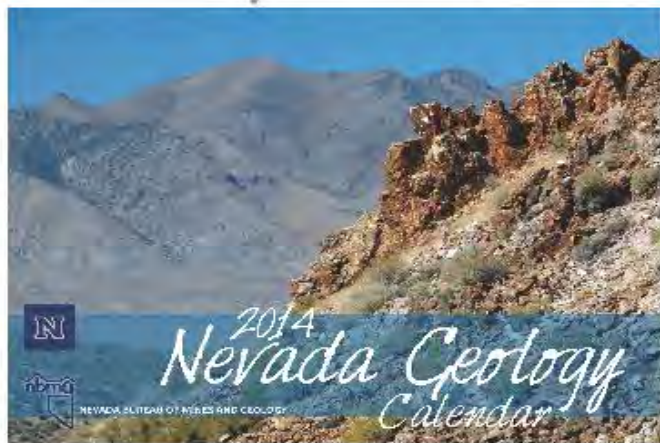
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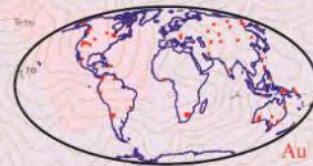
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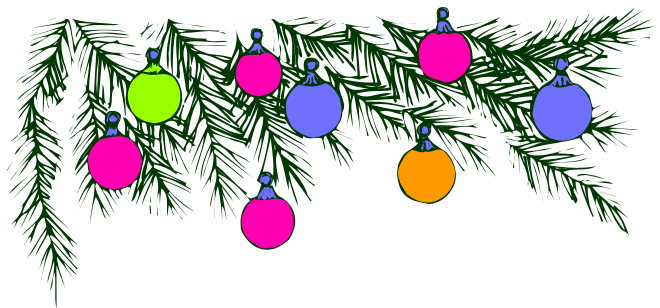


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