



Colorado Scientific Society

The objective of the Society is to promote the knowledge and understanding of Earth science, and its application to human needs

***Thursday, Oct. 15 meeting, 7:00 p.m. (social time 6:30)
Shepherd of the Hills Church, 11500 W. 20th Ave., Lakewood CO
All are Welcome! Program:***

Field Methods Past and Present, by Jim Reed, Director of Research and Development, Rockware Incorporated.



Abstract: *Field Methods - Past, Present, & Future. A geological exploration project conducted in 1983 was duplicated in 2013. A comparison of these two projects shows that two-years of work in 1983 can now be performed in two-weeks. This dramatic increase in productivity is due to technological changes that have revolutionized field methods. These changes include GPS, GIS, and tablet computers. The accelerating pace of technological innovation promise even greater improvements. Drones, LIDAR, and augmented reality will fundamentally change how we collect and analyze data in the future.*

Speaker's Bio: *Jim Reed has served as the Director of R&D at RockWare Incorporated since 1983. Prior to that, he worked as a field geologist for Freeport, AMAX, and Wold Nuclear. He received a BA in Earth & Planetary Sciences from Washington University in St. Louis, Missouri in 1979.*

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President's October message – Paul Morgan, Colorado Geological Survey



As we move into October the National Weather Service in Boulder has just announced that this September was the warmest on record, destroying the previous record average September temperature in 1948 of 68.3°F by 0.1°F. The official explanation for the record warm temperatures is that there were not many cold days with rain during the month. October is starting with three days in which rain is in the forecast and partly cloudy for the first five days. Denver will probably not be breaking any warm records this month.

This month is an anticlimax in Colorado after the Gem and Mineral shows, but the weather still good for fieldwork at most elevations. I was fortunate in taking a tour of the Henderson Mine a few weeks ago and was very impressed with the scale, mechanization and safety precautions underground. The Henderson mine is a long way from the days of a pick and shovel, and the coal mines that I visited in the late 1960s as a student in northern England where pit ponies were still in use.

On the subject of how things are and how things were, our speaker this month is Jim Reed and the title of his talk is “Field Methods Past and Present”. Jim is a local (Golden) resident but travels widely with Rockware International. This company not only sells Earth Science and GIS software, but also trains users of the software, supports the software, and consults with use of the software. Jim has a long history in this field and has an excellent background to be talking about the impact of software on field methods. I understand that this background comes with a considerable sense of humor that is often required when dealing with “progress”. Personally I still have a slide rule and know how to use it, and a set of log tables are on my bookshelf at home.

Potential earthquakes associated with oil and gas activities are back in the news with new BLM rules having been put on hold by several states, including Colorado, taking the BLM to court. With the polarized rhetoric that is usually propounded, even in some scientific publications, confirming or denying a link between seismicity and hydraulic fracturing and/or disposal of waste water from hydraulic fracturing or other hydrocarbon production operations, I am pleased by the refreshing conclusions of a just published report on the subject from StatesFirst. This publication, “Potential Injection-Induced Seismicity Associated with Oil & Gas Development: A Primer on technical and regulatory Consideration Informing Risk Management and Mitigation”, is available for free download at:

http://media.wix.com/ugd/d3e01e_7a12408392f240c89943d3f500039004.pdf.

The key message from the 121-page report is that the problem is complex, and that there is no “one-size-fits-all” regulatory approach for managing the risk. I think that we would all be out of work if Mother Earth were simple, and there would be no barren or dry holes drilled if the Earth were predictable.

I hope to see as many of you as possible at the October meeting. Please bring your preconceived notions of how field methods have changed through time. Is it the field methods or the geologists that have changed?



September's Where is this Rock? --

CSS members Chris Morrison and Vince Matthews both correctly recognized this as the granite quarry near Gunnison, CO, where the gray granite used in the exterior of the Colorado State Capitol was quarried. It's called the Aberdeen Quarry, and it was opened specifically to produce granite only for the Capitol, from 1889-1892. There's a lot of interesting history behind it—you can read some of it here, at

www.mininghistoryassociation.org/Journal/MHJ-v9-2002-Myers.pdf

No One Stayed: Quarrying Granite in Aberdeen, Colorado, 1889-1892, by Rex C. Myers.

Jane and I visited the quarry (or rather, nearly visited it) while we were in Gunnison in July for the symposium on mining & minerals of the Gunnison area. It's located along South Beaver Creek, "a few miles" (more like 10) southwest of Gunnison, at the end of a rather long gravel and then rough 4WD road. We found that, although there is a long train of waste rock debris leading downstream from the quarry, without wading the stream and forcing one's way through a nasty tangle of willows, or scrambling over & around a lot of boulders at the base of the cliffs, there was no easy way to get to the quarry. So, we were on top the cliffs above it, across the creek from it, and a ways downstream on the correct bank of the creek, but never actually got to the quarry itself. I'm sure there's a good way to get to it—we just haven't found it (sunset and running out of time, and I was wearing "nice clothes" and dress shoes after a banquet at the symposium). Next time--if there is one!

The granite is part of the ring dike intrusion that makes up Hartman Rocks south of Gunnison, a popular rock climbing area. Thanks to some help from Allen Stork, Western State Colorado University, I'm able to report that the granite has been mapped simply as the Granite of South Beaver Creek (Hedlund & Olson, USGS GQ-1134, Iris NW Quadrangle, 1974). And, "Bickford and others (1989) determined an age of 1721 +/- 10 Ma which is probably the age of intrusion although they did find some older Archean zircon cores.". Thank you, Allen!

Where is this Rock? -- October



This will be a bit different! We'll give you two pictures to "chew on" this month. Write to or call Pete Modreski, pmodreski@usgs.gov or 303-202-4766, if you think you have an answer to "where and what" these are.



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CSS Laramie Mountains Field Trip, Sept. 12-13: Oh, we promised, but it looks like a report on the trip with some pictures, will have to wait until *next* month! We'll all have something to look forward to read, then. :) –ed.

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Calendar of Coming Events



Oct. 11-17 is annual “Earth Science Week”, sponsored by the American Geosciences Institute. For educators, the USGS will have available, complimentary copies of an Earth Science Week Teachers Packet. USGS geologist Pete Modreski will lead a public geology hike on Saturday, Oct. 17. For full info about ESW public & educational resources see <http://www.earthsciweek.org/> .

Note for educators: Each Fall, a new **Earth Science Week Teachers’ Packet** (“Toolkit”) is prepared by the American Geosciences Institute, AGI. “**Visualizing Earth Systems**”, the theme of Earth Science Week 2015, “Explores what it means to see our planet through eyes informed by the geosciences, using technologies ranging from on-site data collection to satellite-based remote sensing.” You may order a Teachers’ Packet (contains posters, booklets, calendar, DVD, etc.) through AGI for \$7.95 at the above link; but the USGS has a supply of the packets, just received, for complimentary distribution. Pete will bring a box to give out to any educators who may come on the Oct. 17 hike; they will also have the packets at the USGS booth at the Colorado Science Teachers Conference, Friday Nov. 20 at the Denver Mart; see <http://coloradoscience.org/> . You may also pick up copies at the Information Desk of the USGS Library, open to the public and located in Building 20 on the Denver Federal Center, Lakewood. Library hours are 8 a.m. – 4 p.m. weekdays only; you may call them at 303-236-1015 for directions or questions. Sorry, we at USGS are not able to mail Teachers Packets to you; for that, you must go through AGI.

October 9-12, Geology and Paleontology events in Cañon City, part of the Fremont Fall Heritage Festival. For details about all of these events, click on PDF downloads at: <http://www.fremontheritage.com/fc-heritage-festival/heritage-days-schedule/> Some of these will have already taken place by the time you read this, but here is the whole list so you can see what has been going on:

Oct. 9 (9:00 - 11:30 pm) **Fossil Boot Camp**, BLM Royal Gorge Office, 3028 E. Main St. A fossil class for beginners, age 12 to adult. Hands on understanding and identification of fossils.

Oct. 10 (10:00 - 4:00 pm) **Fossil Collections on Display**, Royal Gorge Museum, 612 Royal Gorge Blvd.

Oct. 10 (10:30-11:15 am) **C.D. Walcott Fish Fossils**. Royal Gorge Museum, 612 Royal Gorge Blvd. Jack Null speaks on Charles Walcott and his 1890 discovery of the earliest vertebrates found in Cañon City.

Oct. 10 (1:00 - 3:00 pm) **Garden Park Fossil Area tour**; Cleveland Quarry, Garden Park. Dan Grenard leads this National Natural Landmark tour of the Marsh-Felch and Cleveland Quarries.

Oct. 10 (3:00 - 4:00 pm) **F.C. Kessler and the Colorado State Fossil**; Royal Gorge Museum, 612 Royal Gorge Blvd. Professor Kessler excavated dinosaurs from Garden Park with the help of CCHS students. Dan

Grenard speaks on Kessler's Stegosaurus on display in DMNS, found in 1936 and subsequently named the Colorado state fossil.

Oct. 10 (8:00 am - 5:00 pm) **Bighorn Sheep Canyon geology tour:** "Up the River" is a bus tour led by Bob Hickey, of the Arkansas Headwaters Recreation Area, who will explain the geology along US 50 west of Cañon City, including the Rio Grande rift and the folds of Wellsville, Reservations required. See link above for details.

Oct. 11 (1:00 - 4:30 pm) **Tour of the Royal Gorge Loop.** Colorado Jeep Tours, 2315 E. Main St., Cañon City. Geology Jeep tour. Reservations required. See link above for details.

Oct. 11 (1:00 - 3:00 pm) **Indian Springs Trace Fossil Site walking tour.** Indian Springs, a National Natural Landmark, is North America's premier site for Ordovician trace fossils. Ranch owner Carly Thorson will guide you through the site, which includes paleontology, geology, archeology, Civil War history, and botany. Reservations required. See link above for details.

Oct. 12 (8:30 - 12:30 am) **Tunnel Drive geology hike.** Bob Hickey, Arkansas Headwaters Recreation Area, will lead an easy 4 mile round trip geology hike along the Tunnel Drive trail, describing the geology of the Royal Gorge in a scenic location above the Arkansas River.

Oct. 12 (10:00 - 11:30 am) **What is a Fossil?** Rec & Park District Office, 575 Ash Street, Cañon City. Introduction to fossils for 1st-3rd graders.

Oct. 12 (11:00 - 1:00 pm) **Geology tour of Skyline Drive.** Pueblo Community College - Fremont Campus. Dan Grenard and Harold Taylor lead a geology and paleontology tour of Skyline Drive.

Oct. 12 (1:00 pm) **Jeep tour of Red Canyon Park.** Colorado Jeep Tours, 2315 E. Main St., Cañon City. Geology Jeep tour. Reservations required. See link above for details.

Oct. 12 (1:00 - 2:30 pm) **Stegosaurus Celebration & Geology Time Trail,** Pueblo Community College - Fremont Campus. Dedication of the initial phase of the Crossroads Through Time Geology Time Trail and celebration of the Stegosaurus sculpture adoption.

Oct. 12 (6:00 - 7:00 pm) Cañon City Geology Club business meeting, followed by (7:00 - 8:00 pm) Dr. Pete Modreski, USGS, will speak on "**Carbonatites and their Minerals in Colorado, including the Cañon City New Hope Amethyst Claim**". First United Methodist Church Fellowship Hall on the northwest corner of 9th St and Main St., Cañon City.

Wed., Oct. 14, 3:00 p.m., Denver Museum of Nature & Science, Earth Science Seminar, "**Conodonts: Deep time clue to mass extinctions in Colorado**", by Jeff Over, SUNY-Geneseo, VIP Room at DMNS. Free lecture, museum admission not required.

Wed., Oct. 14, 4:00 p.m., CU Geological Sciences Seminar, Boulder, *change*, Joe Kirschvink will not be able to speak as planned. Clark Johnson has graciously agreed to give the colloquium talk and details are below. "**Evolution of the Archean Biosphere as Seen through Isotope Geochemistry**" by Clark Johnson, University of Wisconsin-Madison. Abstract: *The Earth 3 billion years ago was much different than today - the atmosphere was devoid of oxygen and the oceans were filled with dissolved iron. Massive deposits of iron in the form of "banded iron formations" occurred then, and today, mining of these deposits provides almost all of the iron we use in modern society. New studies are showing that much of this iron formed a key component to the metabolisms of microbes that lived in the oceans in the Archean. In this talk, we will explore the evidence for*

this ancient “iron world”, which helps us understand the evolution of early life on Earth, including development of oxygenic photosynthesis, as well as exploring for life on other worlds such as Mars.

Thurs., Oct. 15, 7:00 p.m., Colorado Scientific Society, “**Field Methods Past and Present**”, by Jim Reed, Director of Research and Development, Rockware Incorporated. Shepherd of the Hills Presbyterian Church, 11500 W. 20th Ave., Lakewood.

Friday, Oct. 16, 8:00 p.m., at the monthly meeting of the Mile Hi RAMS (Rock And Mineral Society), **Denver and its Water: Groundwater Availability in the Denver Basin Aquifer System**, by Gary L. Rowe, Regional NAWQA Program Officer, Central Region, USGS, Denver CO. Meeting is in Berthoud Hall (corner of Illinois & 18th St.), Room BE 108-109, Colorado School of Mines campus, Golden, CO; the society business meeting begins at 7:30 p.m. All are welcome to attend. See www.milehirams.com for more information.

Sat., Oct. 17, 8:30 a.m., for the public, all are invited to join in a **Geology & Natural History Hike on North Table Mountain, Golden, CO for Earth Science Week**. Led by USGS geologist Pete Modreski, we will meet at the Jeffco Open Space trailhead on the southeast side of North Table Mountain at the intersection of Easley Way, Ridge Road, and Ulysses Way (located 1 block west of Easley Road, about 0.5 miles north of the intersection of W. 44th Ave. and Easley Road). There is no parking at the trailhead itself, so park curbside on any of the adjoining residential side streets. A trail walk of about 1.5 miles total, uphill to the North Table Loop Trail and then left (west) on that trail will take us to the site of a former stone quarry where paving stones for Denver streetcar tracks were once quarried (piles of old paving blocks remain). We’ll see the two 64-million-year-old lava flows that make up the cliffs on the Table Mountains, as well as the sedimentary rocks of the Denver Formation that lie beneath them, and you’ll be able to see & collect samples of the zeolite minerals that occur in the lavas. Elevation gain on the trail is about 475’; a climb of an additional 100-150’ above the quarry (optional!) will take us to the top rim of the mesa. See a trail map at <http://jeffco.us/open-space/parks/north-table-mountain-park/>. There is no charge, and reservations are not necessary, but you may write or call Pete at pmodreski@usgs.gov, 303-202-4766 (office), 720-205-2553 (cell) to say you are coming or with any questions. We should finish the hike and return by about 1 p.m.; anyone needing to head down earlier can do so.

Tues., Oct. 20, 5:30 p.m., Rocky Mountain Map Society monthly meeting, featuring **Examining 100 Years of USGS Topographic Maps in a Web-Based Platform**, by Dr. Joseph Kerski, ESRI. Denver Public Library, Gates Room, Fifth Floor; public welcome. See <http://rmmaps.org/> for more info.

Sat.-Sun., Oct. 24-25, Fall Mineral, Book, and Fossil Sale at the Colorado School of Mines Geology Museum, 9 a.m. – 4 p.m. each day. “Most prices will be reduced during the course of the event.” 1310 Maple St., CSM campus, Golden CO.

Wed., Oct. 28, 7:00-8:30 p.m., **Bone-Headed Dinosaurs**, at the Dinosaur Ridge Visitor Center (16831 W. Alameda Parkway, Morrison, C-470 and Alameda Parkway). A free evening lecture on thick-skulled dinosaurs, the pachycephalosaurs (pack-ee-seff-uh-low-sores). Kids have been able to say that dinosaur name for eons, yet it always tricks up us older folks. Learn not only how to pronounce this and other awkward dino names, but also everything about these strange-looking, bone-headed dinosaurs! Come on over this evening to see a presentation done by Erin LaCount on critters that butted heads like rams. Recommended for adults only (12 years and older). Call 303-697-3466 x107 for more information.

Nov. 1-4, Geological Society of American Annual Meeting, Baltimore, MD.

Wed., Nov. 11, 3:00 p.m., Denver Museum of Nature & Science, Earth Science Seminar, "**The Southern Alberta Dinosaur Project: A decade of discoveries**" by David Evans, Royal Ontario Museum. Ricketson Auditorium; free lecture, no RSVP required.

Nov. 14-15, New Mexico Mineral Symposium, Socorro, NM; see <https://geoinfo.nmt.edu/museum/minsymp/home.cfml> for details.

Nov. 19, 7:30 p.m., Friends of Mineralogy, Colorado Chapter bimonthly meeting; speaker, Dan Wray, **Cave Minerals in 3-D.** Denver Museum of Nature & Science, Africa Room (3rd floor, next to the Konavalenko Gem Carvings; security guard will give directions); no charge and all are welcome.

Thurs., Nov. 19, 7:00 p.m., Colorado Scientific Society, “**Geology of Ore Deposits**” (general topic—exact title to be announced), by John Ridley, Colorado State University. Shepherd of the Hills Presbyterian Church, 11500 W. 20th Ave., Lakewood.

Fri., Nov. 20, Colorado Science Conference for Professional Development (a.k.a. Colorado Science Teachers’ Conference), held at the Denver Mart, 58th Ave. at I-25. The year’s major educational conference for all fields of science teachers in Colorado. See <http://coloradoscience.org/> for full information about registration and presentations. The keynote presentation will be by Dr. Scott Sampson of the Denver Museum of Nature and Science, author of “How to Raise a Wild Child” as well as “Dinosaur Odyssey: Fossil Threads in the Web of Life”. Anyone interested in science education topics is welcome to attend the conference, whether or not they are involved in formal education. Reduced rate preregistration is available until Nov. 6.

Nov. 20-22, Denver Area Mineral Dealers Show, Jefferson County Fairgrounds. No admission charge; all are welcome.

Special exhibits continuing in 2015:

The Mining Art of Buck O’Donnell, special exhibit at the Western Museum of Mining & Industry. “JC (Buck) O’Donnell created a series of pen and ink drawings for various mining related supply and informational magazines during the early to mid-20th century. His work appeared in magazines like Shaft and Development Machines and Machinery Center, Inc. O’Donnell’s works served to provide visual evidence of how miners lived, how they worked, and what the western mining boom looked like to those who lived it.” The exhibit opened on Sept. 10; regular admission charge. See www.wmmi.org for more details.

Steps in Stone: Walking Through Time, at the University of Colorado Museum of Natural History, CU campus, Boulder. “A new exhibition that features real fossil tracks and trackways from the University of Colorado Museum of Natural History collections”. Open 9-5 weekdays, 9-4 Saturdays, 10-4 Sundays; closed on university holidays. Exhibit runs through December 2015; see <http://cumuseum.colorado.edu/>.

Explore Colorado's Mining and Mineral Heritage: Colorado minerals, gemstones, and mining history material from the Colorado School of Mines Geology Museum and Colorado's State Mineral Collection continues on display on the third floor of the Colorado State Capital Building in Denver, at least through the end of the year. You can explore this online by following this link to the Friends of the CSM Geology Museum facebook page (you don't need to have a personal Facebook account to view this information.): <https://www.facebook.com/pages/Colorado-Mining-and-Mineral-History-on-Display/358587847669017>

For more lecture series during the year see:

CU Geological Science Colloquium (Wednesdays, 4 p.m.) see <http://www.colorado.edu/geolsci/colloquium.htm>
CSU Dept. of Geoscience Seminars (Fridays, 4 p.m.), see <http://warnercnr.colostate.edu/geo-news-and-events/department-seminars>

Van Tuyl Lecture Series, Colorado School of Mines, (Tuesdays, 4 p.m.) see http://inside.mines.edu/GE_Lecture-Series

Denver Mining Club (Mondays, noon), see <http://www.denverminingclub.org/>

Denver Region Exploration Geologists Society (DREGS; 1st Monday, 7 p.m.), <http://www.dregs.org/index.html>

Rocky Mountain Map Society (RMMS; Denver Public Library, Gates Room, 3rd Tuesday, 5:30 p.m.),

<http://rmmaps.org/>

Western Interior Paleontology Society (WIPS; Denver Museum of Nature & Science, 1st Monday, 7 p.m.),

<http://westernpaleo.org/> .

2015 CSS Elected Officers

President.....Paul Morgan, 303-384-2648, morgan@mines.edu
President Elect.....Peter Barkman, 303-384-2642, barkmann@mines.edu
Treasurer.....Don Sweetkind, 303-236-1828, dsweetkind@usgs.gov
Secretary.....Lisa Fisher, 303-215-0480, lisa.fisher@escalantemines.com
Past President..... Scott Lundstrom, 303-917-2849, pslundstrom@msn.com

Councilors

2013-2015: Marieke Dechesne, 303-236-1289, mariekedechesne@gmail.com

2013-2015: Liz Pesce, pesce.e@gmail.com

2014-2016: Celia Greenman, celia.greenman@earthlink.net

2014-2016: Chris Morrison, chris-morrison@comcast.net

2015-2017: Bruce Geller, 303-273-3823, bgeller@mines.edu

2015-2017 Pete Modreski, 303-202-4766, pmodreski@aol.com

Committee Chairpersons

Best Student Paper Competition:

Database Manager: Don Sweetkind, 303-236-1828, dsweetkind@usgs.gov

Field Trips: Cal Ruleman, 303-236-7804, cruleman@usgs.gov

History: Beth Simmons, cloverknoll@comcast.net

Hospitality: Jack Krajewski, gijack08@gmail.com

Membership/Mentor: Liz Pesce, pesce.e@gmail.com

Student Research Grants: Scott Lundstrom, 303-917-2849; csslund15@gmail.com

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Publicity: Open

State Science Fair: Chuck Weisenberg, 303-238-8806, cweisnrg@msn.com

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Colorado Scientific Society, P.O. Box 150495, Lakewood CO 80215-0495 <http://www.coloscisoc.org>

Upcoming CSS meetings (all planned for Shepherd of the Hills Church, 11500 W. 20th Ave., Lakewood):

October 15 – “Field Methods Past and Present”, by Jim Reed, Rockware Incorporated.

November 19 - “Geology of Ore Deposits”, by John Ridley, Colorado State University.

December 17 – CSS Annual Meeting and Presidential Address (and potluck dinner!)

Colorado Scientific Society dues are \$20 for regular members, \$10 for corresponding members (outside the Colorado Front Range area) and only \$5 for students. Mail a check to the CSS or pay with a credit card using PayPal on the CSS website. Contact CSS Treasurer Don Sweetkind at 303-236-1828 or dsweetkind@usgs.gov if you are uncertain of your dues and membership status. Extra payments to contribute to our Memorial Funds or Endowment Fund are always most welcome (you’ll see a list of them on the membership form). See our website for a membership form, <http://www.coloscisoc.org/membership/dues.html>.