



# Colorado Scientific Society

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

## **WHY IS MOUNT SOPRIS SO BIG?: A MIDDLE TERTIARY PLUTON CAUGHT WITH ITS PANTS DOWN**

**Randall K. Streufert  
Summit Geology & Consulting, LLC  
Silverthorne, Colorado**

At 12,953 feet, the twin summits of Mount Sopris loom nearly 7000 feet above the confluence of the modern Crystal River with the Roaring Fork River near Carbondale, Colorado. Exposure of this magnitude rivals or exceeds that of some of the 14,000-ft peaks throughout Colorado, and is interpreted to result, in part, from Neogene deformation in the lower Crystal River valley that involves widespread collapse due to dissolution of Pennsylvanian evaporitic rocks. Evidence of collapse occurs 1 mile north of the Mount Sopris stock near Potato Bill Creek where thick Tertiary sediments are in contact with Mesozoic rocks across a normal fault. The collapse area contains thick surficial deposits that cover bedrock and conceal the structure of the collapse margin.

## **ROCK GLACIER HISTORY OF MOUNT SOPRIS, COLORADO**

**Peter Birkeland  
Department of Geological Sciences, University of Colorado  
Boulder, Colorado**

Rock glaciers are prominent in the large valleys facing northwest through east on Mount Sopris. Some are nearly 2 km long, and at least parts of all of the rock glaciers are still moving. Aspect plays a major role in both the length of the rock glaciers and the lower altitude of their moving fronts. Several ages of rock glacier formation can be distinguished on the basis of post-depositional alteration of surfaces of the rock glaciers. Such alteration includes the progressive development of lichen growth on and weathering features of the clasts, and loess thickness and soil development of the rock glacier mantle. It is difficult to date the mantles of the rock glacier deposits, but they seem best correlated with the latter part of the Pinedale Glaciation and several cool episodes within the Holocene. These criteria can be used to suggest ages for rock glaciers in other parts of the Rocky Mountains.

**Wednesday, September 8, 1999**

**American Mountaineering Center  
710 Tenth Street (NE corner with Washington, just north of Clear Creek)  
Golden, Colorado**

**Social Half-hour: 7:00 p.m.  
Meeting Time: 7:30 p.m.**



## **P x 4** (President Pierce's Purple Prose)

I hope your summer season has gone well, and that after the break you are anxious to attend the fall meetings of the Colorado Scientific Society. Starting Sept 8, 1999, we will convene in the nicely remodeled facilities of the American Mountaineering Center, home of the Colorado Mountain and American Alpine Clubs. The meeting place is in Golden, 710 10th St., on the northeast corner of Washington St. (Golden's main street) and 10th St. (just north of Clear Creek). From the outside it looks like a high school, which it was. You can come from the south or north on Washington Street. You can enter from the large parking lot behind the building, and there is an elevator available.

Thanks to Sherm Marsh's excellent organization, our Spring Field trip was a great success with about 35 participants enjoying the wonders of the Arkansas Valley with leaders Glen Scott, Bruce Bryant, and Jack Murphy. We do not plan to run a fall field trip, partly because of GSA scheduling field trips in Colorado in late October. We are lining up people to fill Colorado Scientific Society positions, so if you are interested, please contact President-Elect Mark Hudson (236-7446). I wish to thank all those that helped with the membership drive, and in particular Dean Kleinkopf. We have about 85 new members, (although we lost about 35). Our total membership is just above 400. In our new 300-capacity meeting room, we should not have the overflow problems that I all-to-well remember from our March gathering.

Our Family Night will be on Friday, October 15th at the Colorado School of Mines Museum. We can tour the museum and converse over drinks, enjoy dinner, and then enjoy a family-oriented talk. We're delighted that Kirk Johnson is available to speak on new geologic discoveries in the Denver area. Kirk is a great speaker for this kind of mixed audience. His work has been featured in the Denver Post. We look forward to welcoming members, new and old, their spouses, and kids. Be reminded that our web site address "evolved" to <http://home.rmi.net/~css/>

## **1999 STUDENT NIGHT**

On Wednesday November 3, the Colorado Scientific Society will host a special night highlighting the geoscience work of students from Front Range colleges and universities. The program will consist of three 15-minute talks and will be held at the American Mountaineering Center. Cash prizes will be given to all students chosen to participate. All participants will also receive complimentary one-year membership in the Society. This student night provides a fine opportunity for students to showcase their research before a knowledgeable yet friendly audience. Students are welcome to repeat talks from the GSA national meeting of October. Interested students can contact Eric Erslev (Department of Earth Resources, Colorado State University, Fort Collins, CO 80523; [erslev@cnr.colostate.edu](mailto:erslev@cnr.colostate.edu); 970-491-6375) to be included in preliminary sessions to be run at CSU, CSM, and CU.



# 1999 SPRING-SUMMER FIELD TRIP

The Colorado Scientific Society went on a two-day field trip to the Arkansas Valley on June 19 and 20 under the leadership of Glen Scott, Bruce Bryant, and Jack Murphy. The field trip was split into two parts; an exciting river float trip through the Browns Canyon of the Arkansas and, for those less adventurous, a geologic tour up the Arkansas Valley to look at the Cenozoic geology, especially the massive boulder fields that are outwash from glacial flooding.

We started from the Coal Creek "park-and-ride" at about 7:00 AM with 32 participants and 3 vans. Bruce Bryant gave us a running commentary as we drove up US 285 through Bailey, over Kenosha Pass, through South Park, and on to the River Runners headquarters near the mouth of Browns Canyon. Here we had coffee and doughnuts and split into our two groups. The raft trip was an all-day affair with a stop for lunch. The remaining 17 of us then toured up the Arkansas Valley, through Buena Vista, stopping to observe and hear Glen's interpretation of the dramatic events that produced the immense boulder fields you can see on both sides of the highway. On our way back through Buena Vista we stopped in the city park for our picnic lunch. After lunch we continued south down the Arkansas Valley and turned west at Nathrop going through Mount Princeton Hot Springs and on to the old "ghost town" of Tincup. We spent some time looking around Tincup, now a budding tourist attraction, and were entertained with recollections and stories of geologic mapping in the area in the 1940's by several of our colleagues. We returned to the River Runners headquarters at 4:00 PM to pick up our slightly damp and chilled "river rats". We retreated to our motel in Salida where everyone dried out, cleaned up, and got ready for our barbecue dinner in the city park. We had rented the park for the evening so we had sole access to a covered pavilion and a number of charcoal grills. About 9:30, when everyone had their fill of steak, chicken, beans, and potato salad we adjourned to the motel where a conference room was available for those who wanted to discuss geology and geologic maps of the area with Glen and Bruce.

The next morning, after a continental breakfast, we boarded our vans and traveled down the Arkansas River towards Canon City. Lead by Jack Murphy, our first stop was a visit to an abandoned quarry along Kerr Gulch in an ashflow tuff. Stone from this quarry was used for buildings in Denver. The view of the Sangre de Cristo Mountains from here was incredible.

A few miles west of Canon City, Jack pointed out several abandoned travertine quarries where a cream and red banded "colorosa" travertine was mined. Polished slabs of this material was used on the outside of the old Denver Post building and other buildings in Denver and Colorado Springs. We stopped at another abandoned quarry, this time in the Fremont cobble conglomerate. This material was used as decorative stone in the Fremont County Court House.

As we neared Canon City we turned onto the Skyline Drive that climbs up onto a hogback of Dakota Sandstone. Spectacular views of Canon City and the surrounding area can be seen from this narrow road that plunges steeply on both sides. Descending into Canon City we had our picnic lunch in the city park and then went on to the Dinosaur Depot. We spent some time in the little museum and then went out to the dinosaur fossil digs at Garden Park made famous by Cope and Marsh (no relation). We left Canon City late in the afternoon for our return to Denver and all arrived back at the "park-and-ride" in the early evening.

I want to thank all those who helped make this a successful and outstanding trip, especially our leaders Glen Scott, Bruce Bryant, and Jack Murphy. I also want thank Chuck Pillmore who arranged all the transport for us, even though he couldn't go on the field trip. Glen and Bruce put together a very nice field



trip guide for those attending and, although there are no copies left, we could make additional copies at a nominal cost for those members who are interested

Due to some scheduling problems and the up-coming GSA meetings in October we couldn't put together a fall field trip but we will have one next spring. For those of you who couldn't be with us this time, we're sorry you couldn't make it; you missed a really good time.

Sherman Marsh, Field Trip Chairman  
Ph: 303-986-0939  
email: [spmarsh@earthlink.net](mailto:spmarsh@earthlink.net)

## **Denver Museum of Natural History Lectures: The Making of the Rocky Mountains**

All lectures are 7:00-9:00 p.m., Ricketson Auditorium, DMNH, Individual lectures: \$7 member, \$10 nonmember. For tickets, call DMNH Reservations at 303-322-7009, 9:00 a.m.-5:00 p.m. daily. This series is cosponsored by the National Science Foundation.

### **Modern Uplift of the Southern Rocky Mountains: Real or Imaginary?**

**Dr. Emmett Evanoff, DMNH Research Associate, University of Colorado Museum, Boulder**

Thursday, September 23

Has regional uplift or climate change caused the deep canyons in the Colorado Rockies to be cut during the past 3 million years? If uplift is important, how large an area is affected and what is the evidence? If climate change is the major factor, what types of changes caused the rivers to cut their valleys? Geologists are currently debating these questions. The distribution of river systems in Colorado starting 35 million years ago and ending with the modern rivers provides important clues to answering these questions. A review of the climatic history of the region during this time also adds to the debate. This talk will provide information concerning the complexities of the development of the Colorado Rocky Mountain landscape.

### **Geology of Wyoming and Environs—Nearly 4 Billion Years of Earth History**

**Arthur W. Snoke, Department of Geology and Geophysics, University of Wyoming, Laramie**

Friday, October 8

The Central Rocky Mountains preserve a remarkably diverse and complex geologic history. Although exploration for oil and gas as well as metallic and nonmetallic deposits have spurred much of the research on the geologic history of the Central Rockies, there are many geologic features and phenomena in the region that have been studied simply to improve the understanding of basic Earth processes. The prime purpose of this lecture is to introduce the nonspecialist to aspects of this fascinating record of Earth history. However, you'll find the individuals who have documented this record to be truly interesting in their own right.

### **When did Colorado become the highest state? – the fossils know...**

**Kathryn Gregory, Lamont-doherty Earth Observatory, Columbia University**

Saturday, October 23



## New Members

The Colorado Scientific Society would like to welcome the following new members!!!!

*Howard Bachman*  
*Theresa Cookro*  
*John Curchin*  
*Rodney Hammond*  
*Joachim Hans Heinicke*

*Jon Kirkpatrick*  
*John Macaluso*  
*Gary Myers*  
*Ric Page*  
*Richard Pearl*

*A. Wayne Powell*  
*Samuel Romberger*  
*Thomas L. Thompson*

## Association for Women Geoscientists Chrysalis Awards

The Association for Women Geoscientists has announced their 1999 Chrysalis Scholarship winners. They are Natalia Bryxina, Institute of Mineralogy and Petrology, Russia; Connie Knight, Colorado School of Mines; Rachael Grover, East Carolina University; Maryanne Malinconico, Columbia University; and Jennifer Pierce, University of Oregon. All are pursuing graduate studies in the earth sciences. Information about the AWG Chrysalis Scholarships may be obtained by writing to: Chrysalis Scholarships, Association for Women Geoscientists, c/o G & H Production Company, LLC, # 930, 518 17<sup>th</sup> Street, Denver, CO 80202; ph. 303-534-0708, fax 303-623-0708, email: [gandh@idt.net](mailto:gandh@idt.net)

## Denver Gem and Mineral Show, Sep. 17-19

The 32nd annual Denver Gem and Mineral Show, sponsored by the Greater Denver Area Gem and Mineral Council, will be held September 17th - 19th at the Denver Merchandise Mart Expo Hall, 451 East 58th Ave., Denver. The featured mineral this year is sphalerite. The Denver Show includes 130 wholesale and retail dealers, individual and museum exhibits, demonstrations, and lectures. There will be free gold panning, free mineral and gem identification, and jewelry-making classes. The Colorado Fossil Expo, with an additional 50 fossil dealers, is held in conjunction with the club-sponsored show, in the adjacent Mart Plaza. Show hours are Friday, 9 am - 6 pm; Saturday, 10 am - 6 pm; and Sunday, 10 am - 5 pm. Admission (includes the Fossil Expo) is \$4.00 for adults, \$3.00 for senior citizens and teens, and free for children under 13. The Denver Show is sponsored by a non-profit association of 10 area mineral, fossil, and gem clubs. All proceeds of the show are used to support museums, education and research in the earth sciences. Please contact Regina Aumente (RAumente@aol.com) if you have any questions.

## Museums

**Friends of Dinosaur Ridge** For information call 697-DINO. Visitors' Center is located at 16831 West Alameda Parkway (north side of Alameda, just west of the C-470 overpass). Open 9 a.m. to 4 p.m. weekdays and weekends. Fireside chats are held at the Red Rocks Elementary School Cafe, in Morrison starting at 7 p.m.



# Earth Science Meetings and Talks

**Colorado Scientific Society's** regular meetings are held the 2<sup>nd</sup> Wednesday of the month (unless otherwise advertised). Social time begins at 7:00 p.m. and presentations start at 7:30 p.m. For information, contact Ken Pierce at (303) 236-1244 or [kpierce@usgs.gov](mailto:kpierce@usgs.gov)

**Denver International Petroleum Society (DIPS)** meets the 2<sup>nd</sup> Friday of each month at the Wynkoop Brewing Co., 18<sup>th</sup> and Wynkoop Streets. Reception begins at 11:30 a.m., luncheon at 12 p.m., program at 12:30 p.m. Make reservations (required) by leaving message at (303) 623-5396. Reservations accepted after 8 a.m. on Friday until 10:30 a.m. on Wednesday prior to the meeting. Cancellations accepted until 11:00 am Wednesday prior to the meeting. Cost: \$15 for lunches; talk only is available for \$2 (make checks payable to "D.I.P.S."). Contact Keith Murray at (303) 986-8554 for information.

**Denver Region Exploration Geologists' Society (DREGS)** meets in the Mutual Consolidated Water Building, 12700 West 27th Avenue, Lakewood. Social hour 6:00-7:00 p.m. Technical presentation at 7:00 p.m. Meetings are normally scheduled for the first Monday of each month. For information contact Don Bryant, (303) 733-2358, or the website <http://www.qadas.com/dregs>

**Colorado School of Mines Lectures** For Heiland Lectures at 4:00 p.m. on Fridays, contact Michelle Szobody (303) 273-3451. For information on Van Tuyl Lectures, call the Dept. of Geology at (303) 273-3800

**Colorado State University Geology Lectures** Mondays, 4:10 p.m. in room 109 or 316 of the Natural Resources Building. Call the Dept. of Earth Resources at (970) 491-5661 for further details.

**University of Colorado at Boulder, Geological Sciences Colloquium**  
Wednesdays, 4:00-5:30 p.m., Rm. 180. For schedule, contact Kathy Madsen 303-492-8141

## **USGS Geologic Division Colloquium**

Thursdays, 1:30 p.m., Foord Room, Building 20, Federal Center. For information, contact Pat Poole at [ppoole@usgs.gov](mailto:ppoole@usgs.gov)

## **The Geological Society of Nevada**

will be convening a Symposium on *GEOLOGY AND ORE DEPOSITS 2000: the Great Basin and Beyond* on May 15-18, 2000 in Reno/Sparks, Nevada. Thirteen field trips are offered in Nevada and China. Abstracts and papers are to be submitted by Oct. 1, with revision by April 1. For more information contact GSN (775) 323-4569, PO Box 12021, Reno, NV 89510 or visit the website <http://www.seismo.unr.edu/GSN>





# Invitation to Join the Colorado Scientific Society

The Society is dedicated to the advancement of science through open forums and activities. We sponsor lectures, field trips, student scholarship grants, and discussions of scientific matters of public concern. Please help us enlist new members.

I hereby apply for \_\_\_\_\_ membership in the Colorado Scientific Society.  
 (Regular, Corresponding, Student)

\_\_\_\_\_  
 (Last Name) (First Name) (Middle)

\_\_\_\_\_  
 (Address) (Telephone, with area code) (e-mail)

\_\_\_\_\_  
 (City) (State) (Zip)

\_\_\_\_\_  
 (Company/Agency/University)

\_\_\_\_\_  
 (Mailing address if different than above)

\_\_\_\_\_  
 School Degree Year Major

**Main Scientific Interests**

**DUES**—Your dues are for the calendar year and help support the newsletter, monthly meetings, two field trips each year, family night, and the Emmons Lecture.

Regular Member (\$15) \_\_\_\_\_  
 Corresponding (outside Denver metro area) Member (\$10) \_\_\_\_\_  
 Student Member (\$5) \_\_\_\_\_

Please make your dues payable to Colorado Scientific Society. Thank you!!

**T**he success of certain Colorado Scientific activities depend on your volunteer help. Please circle those activities for which you can provide assistance. We will pass your name on to the appropriate Committee Chairperson.

- |                         |                     |                   |                      |
|-------------------------|---------------------|-------------------|----------------------|
| <i>Arrangements</i>     | <i>Fund Raising</i> | <i>Newsletter</i> | <i>Publicity</i>     |
| <i>Best Paper Award</i> | <i>History</i>      | <i>Outreach</i>   | <i>Science Fairs</i> |
| <i>Field Trips</i>      | <i>Membership</i>   | <i>Program</i>    | <i>Web Site</i>      |

I certify that all statements in this application are correct and, I agree to promote the objectives of the Society and to abide by its Constitution, Bylaws, and Rules.

\_\_\_\_\_  
**Applicant's signature**

\_\_\_\_\_  
**Date**

**Colorado Scientific Society, P.O. Box 150495, Lakewood, CO 80215-0495**



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## Colorado Scientific Society Officers, Councilors, and Chairpersons

### OFFICERS

**President:** Ken Pierce, USGS, 236-1244  
**President-Elect:** Mark Hudson, USGS, 236-7446  
**Treasurer:** Michael N. Machette, USGS, 273-8612  
**Secretary:** Stephen F. Personius, USGS, 273-8611  
**Past President:** Eric Erslev, CSU, (970) 491-6375

### COUNCILORS

**1997-1999:** Michelle L. Tuttle, USGS, 273-8626  
**1997-1999:** William D. Nesse, UNC, (970) 351-2830  
**1998-2000:** Eric Nelson, CSM, 273-3811  
**1998-2000:** Ted Ball, Consultant  
**1999-2001:** Emmett Evanoff, CU, 492-8069  
**1999-2001:** Vacant,, 236-6447

### COMMITTEE CHAIRPERSONS

<b>Database Manager:</b>	<b>Robert C. Bucknam, USGS, 273-8566</b>
<b>Best Paper Award:</b>	<b>Bruce Bryant, USGS-retired, 236-1234</b>
<b>Field Trips:</b>	<b>Sherm Marsh, (303) 986-0939</b>
<b>History:</b>	<b>Marjorie E. MacLachlan, USGS-retired, 986-7192</b>
<b>Membership:</b>	<b>Dean Kleinkopf, USGS, 236-1412</b>
<b>Memorial Funds:</b>	<b>Eric Erslev, CSU, (970) 491-6375</b>
<b>Memorial Funds Treasurer:</b>	<b>Michael N. Machette, USGS, 273-8612</b>
<b>Newsletter Editor:</b>	<b>Scott Lundstrom, USGS, 236-7944</b>
<b>Outreach (signs):</b>	<b>Peter J. Modreski, USGS, 236-5639</b>
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<b>Publicity:</b>	<b>David Moore, USGS, 236-1271</b>
<b>Webmaster</b>	<b>Randy Schumann, USGS, 236-1525</b>

**\*\* NOTE: Please help us with publicity by posting copies of the Newsletter on bulletin boards.**

