

Colorado Scientific Society

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

November Talks

**Quaternary Life and
Times of Pluvial Lake
Manix, Mojave Desert,
California: Climatic
and Geologic Controls
on a Desert Lake**

*Marith Reheis
U.S. Geological Survey,
Denver*



Reconstruction of pluvial Lake Manix about 25 ka, looking NW.
Image courtesy of Paco Van Sistine, USGS.

**The EarthScope Rio Grande Rift GPS
Experiment: Measuring Active Tectonics in
Colorado and New Mexico**

*Anne Sheehan
University of Colorado at Boulder*



Wednesday, November 17, 2010

**Colorado School of Mines—Dept. of Geology and Geological Sciences
Berthoud Hall, Room 241, Golden, Colorado
Social half-hour – 6:30 p.m. Meeting time – 7:00 p.m.**

NOVEMBER ABSTRACTS

The EarthScope Rio Grande Rift GPS Experiment: Measuring Active Tectonics in Colorado and New Mexico

Anne Sheehan, University of Colorado at Boulder

Using high precision GPS measurements from 25 new GPS monuments in Colorado and New Mexico combined with data from EarthScope-Plate Boundary Observatory, we seek to determine the present-day crustal strain rates associated with the Rio Grande Rift and southern Rocky Mountains. The factors that drive the Rio Grande rift are not well understood, and an accurate set of measurements of crustal motions are a first step towards an improved understanding of earthquake and volcanic hazards within rift zones and why tectonic plates undergo stretching. The low rates of motion in the region make this project especially challenging, and the geodetic monumentation, observing time, and post-processing strategies are designed to optimally resolve deformation at the sub-mm/yr scale. Velocity gradients from 2006–2010 for our east-west profiles across Colorado and New Mexico suggest that deformation may not be concentrated in a narrow zone but distributed broadly across a region spanning from the western edge of the Colorado Plateau to several hundred km east of the Rio Grande Rift. The unexpected broadly distributed deformation has implications for lithospheric strength, fault mechanics, and earthquake hazards in the region.

Quaternary Life and Times of Pluvial Lake Manix, Mojave Desert, California: Climatic and Geologic Controls on a Desert Lake

Marith Reheis, U.S. Geological Survey, Denver

During the middle and late Pleistocene, Lake Manix in south-central California was the terminus for the Mojave River during periods of enhanced runoff from the Transverse Ranges, until it drained east to form Lake Mojave at about 25 ka. The long sedimentary record in outcrop and sediment cores reveals a complex history of fluctuations influenced by paleoclimate, basin configuration (multiple sub-basins), drainage integration events, faulting, and out-of-basin diversions. The relative effects of all these influences must be evaluated using detailed geologic mapping (this is the most fun part), stratigraphy, and sedimentology in order to isolate the paleoclimate signal contained in a 45-m core from the thickest remaining section of lake sediments. Core analyses included particle size, ostracode assemblages, stable isotopes ($\delta^{18}\text{O}$ and $\delta^{13}\text{C}$) on ostracodes, inorganic carbonate, and magnetic properties. Mapping and dating of freshwater *Anodonta* shells (^{14}C) and lake tufa (U-series) from exposures supplemented these analyses. Our studies show that the core is about 500 ka at the base, and it contains a record of lake fluctuations that extends from Marine Isotope Stage (MIS) 12 to early in MIS 2. If the age model is correct, then sedimentologic, ostracode, and isotope data suggest that some episodes of moderately deep water occurred during interglacials and interstadials as well as glacial periods. Further, a well-dated lake-level curve based on outcrop stratigraphy shows multiple highstands during MIS 3 and early MIS 2 (~45–25 ka), at times when the Laurentide ice sheet was well below its maximum height and geographic extent and long before the Great Basin lakes to the north. Thus, the Lake Manix data suggest complex responses to climatic drivers other than jet stream position.



CSS President's Message *by Scott Minor*

I am fortunate to be president of our Society in 2010! Since taking office, I witnessed how just the right mix of human dedication and energy and financial resources gradually came together, along with the coincidence of a Denver meeting venue allowing CSS to have a strong, unprecedented presence and participation in the recent GSA national meeting and convention. Lisa Fisher, in her role as principal planner and convener of the CSS topical session at the meeting, certainly demonstrated dedication and energy. Lisa did a stellar job planning and organizing what turned out to be a most successful topical session sponsored by CSS and the Colorado Geological Survey (CGS). She did the lion's share of the ground work for the session for which I (and no doubt others) am most appreciative and grateful. (See Lisa's article on the GSA-CSS events elsewhere in the newsletter.) The Fisher accolades do not end there. As CSS "booth chair and manager," Thom Fisher did a fantastic and professional job of conceiving, planning, and implementing what turned out to be a most attractive and striking booth. More kudos to Lisa for pulling together

...continued on next page...

the attractive graphics and imagery for the booth banner and posters. The booth was somewhat of an experiment for CSS. The Society, together with several individual donors (names listed elsewhere), invested more than \$2,000 to create a booth that would promote and increase awareness of our Society and serve as a focal point for recruitment of new members both young and “experienced.” As Thom’s separate newsletter article on the booth attests, mission accomplished!! Thank you Lisa and Thom for jobs exceedingly well done!

I would be remiss if I didn’t also personally thank Libby Prueher, Beth Simmons, Sue Hirschfeld, and Lee Shropshire for their critical efforts and roles in the CSS topical session, booth, and field trip. Also, a huge round of applause to all of you who helped out with the booth, both with the manning of it and with the set-up /take-down tasks! Finally, thanks to all of the generous CSS members who made monetary contributions that helped make the CSS booth materialize. All of you who contributed in one form or another to the CSS-GSA events are exemplary of what makes our Society tick and thrive. Thank you!

Consistent with my “words of thanks” theme, I want to also express my gratitude to Don Sweetkind for successfully organizing and running the Student Night competition at last month’s CSS meeting. I’m sure the six deserving student speakers who received cash awards at the competition (see Don’s report below) will agree that Don did a most commendable job. He seems to have a real knack for organizing things to do with money—a good skill to have! Thanks Don! Happy THANKSgiving to everyone!!



Results from the CSS 2010 Student Night Competition—by *Don Sweetkind*

On Wednesday night, October 20th, a relatively small CSS audience listened to six fine talks presented by graduate students from regional schools. Each year the Colorado Scientific Society invites students to present talks at our Student Night. Announcements were sent to all Colorado 2-year and 4-year schools that offer a geology major or that offer geology classes, plus select NM and WY schools. The students that presented in October were selected from a larger group of potential speakers who submitted abstracts to us; we selected the top six abstracts.

We had three speakers from the University of Colorado, two from Colorado State University, and one from the Colorado School of Mines. Our speakers consisted of five females and one male. At least two of these students were using the meeting to practice their talks for the upcoming GSA and AGU meetings. Two of the students were awarded CSS research grants from our Memorial Funds grants program and reported on their findings.

Each of the speakers received a cash prize—a total of \$750 was distributed in prize money—and free membership in the Society for 2011. We congratulate all student speakers on a job well done and encourage faculty members to promote this competition and send students to next year’s event!

Speakers were ranked in the following order, based on judging conducted by a four-person panel:

1st place: Ulyana Nadia Horodyskyj, Ph.D. candidate at the University of Colorado

2nd place: Melissa Foster, Ph.D. candidate at the University of Colorado

3rd place: Kristin Jacob, Ph.D. candidate at the University of Colorado

[Recipient of 2010 CSS Memorial Funds research grant from Tweto and Oriel funds]

4th place: Melinda A. Solomon, M.S. program, Colorado State University

5th place: Natalie Kramer, M.S. candidate at Colorado State University

[Recipient of 2010 CSS Memorial Funds research grant from the Eckel fund]

6th place: Nicholas Silvis, M.S. program at Colorado School of Mines

CSS Participation in the GSA Annual Meeting, 2010

by Lisa R. Fisher, CSS President Elect, Chair GSA Meeting Committee



Whew, what a whirlwind! The CSS presence at the annual GSA meeting in Denver this past week was marvelous! It was a lot of work for the people involved, and I'd like to thank Libby Prueher, Scott Minor, and Thom Fisher for co-organizing the events. Also thanks to Lee Shropshire and Sue Hirschfeld for organizing the panel discussion, and Beth Simmons for her excellent ideas and historical information. The speakers at the topical session did a wonderful job, and kept the audience interested. The volunteers for running the booth (see list in separate article by Thom Fisher) deserve great credit for representing our Society to the national (and international!) geological community. And many thanks to the members who donated to the "booth fund," Jeremy McCreary, Celia Greenman, Sue Hirschfeld, David McKenzie, Warren Hamilton, Robert Weimer, Ben Duke, Val Freeman, Ben Harrison, Mary Miller, Dana Willis, and Escalante Mines, Inc. Thanks to Emily Taylor for printing the CSS brochures. I've been asked if I'd ever do it again. Yes, but thankfully GSA is held in Denver only every three years! We learned a lot and are now more experienced in what needs to be done. But now it's time to catch up on business, sleep, and dirty dishes!

The topical session, centered on the founding and development of Colorado Geology and the Colorado Scientific Society, was standing room only for the peak morning and afternoon hours. It was obvious that most speakers enjoyed their topic. We received countless compliments, mostly pertaining to the organization and quality of the talks. It was even suggested that we put the presented papers into a GSA Memoir. We will be looking into this in the near future with GSA. Some of our members also suggested we do a symposium with expanded talks.



The exhibit booth was lovely, and also received multiple compliments. Over 200 people took our brochure and membership form, and several paid and submitted their memberships right there! Included were a few renewals from people who "just hadn't gotten around to it" and liked that they could do it "now." I think we surprised a lot of people with the professional image conveyed at the CSS booth. For a more in-depth report on the booth see Thom Fisher's write-up.

The most common question we received at the booth was "what and when is the next field trip(s)?" Everyone, especially the younger crowd, was excited to hear about our planned spring Glenwood Canyon Bike Field Trip. The other important discussions centered around what students and young professionals need from a Society like ours—workshops (on new tools, technical areas, how to make a presentation, speaker training, etc.), mentorships, teaching, and networking. We will be looking into this shortly, and asking for volunteers to go to schools to carry these out.

The meeting of the GSA Associated Societies was very interesting, and I look forward to working further with these people. The first item of business was the 125th anniversary meeting, which will be in Denver in 2013. The local Societies are being asked to come up with ideas for field trips and other special activities to celebrate that meeting. GSA was especially interested in Beth's talk on the 1901 CSS-GSA-AAAS field trip, and wondered whether we could logistically put it together. Hmmmm, everyone think about that. It would be grueling done in the "old" way (e.g., ~20 mile hikes), but perhaps we could come up with a version utilizing modern conveyances! The other main order of business (apart from announcements of new Associated Societies, fun field trips and meetings, etc.) was a discussion of how the Associated Societies could or should be involved in various levels of education (primary, secondary, and university). This is certainly a way in which CSS could become involved in an effort that could really make a difference! We will be calling for volunteers and ideas in the near future. For a more in-depth report on the GSA Associated Societies meeting see Thom Fisher's write-up.

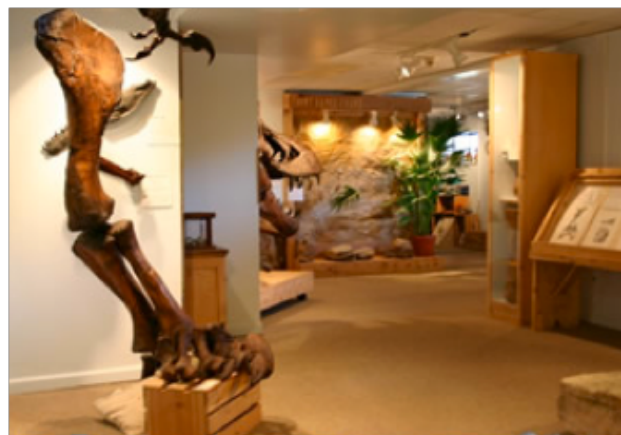
CSS-Sponsored Field Trip

by Libby Prueher, Echotech Institute, Aurora, CO

CSS, along with the Morrison Natural History Museum, Colorado Geological Survey, GSA History of Geology Division, GSA Sedimentary Geology Division, and Escalante Mines, Inc., co-sponsored two field trips to the Dinosaur Quarries of Morrison. There were enough participants that the trip was offered twice.

For the first trip on Saturday, October 30, the weather was sunny and the temperature just right. We drove to the Morrison Natural History Museum before journeying to Quarry 10, one of the original dinosaur quarries located on the Dakota hogback above the Town of Morrison. Led by Bob Bakker and Matt Mossbucker, the trail to the quarry was a bit challenging, but all of the attendees made the hike. At the Quarry, we enjoyed a lovely view of Red Rocks Park and the Morrison area, and discussed the rocks of the area. We also learned about discoveries by Arthur Lakes and current discoveries by the Morrison Natural History Museum.

We then visited Quarry 5, located along Dinosaur Ridge. The tour there was lead by Erin Fair of Dinosaur Ridge. Erin discussed the Bone Wars of the 1870's, the paleoenvironment of the area, and told us about the dinosaurs that lived in Morrison. We then returned to the Museum for lunch and a tour. Participants were able to view samples of rocks of the area and try removing dinosaur bones from a block of sandstone. Our last stop was at the I-70 road-cut, viewing the geologic strata exposed there that provides clues of the Mesozoic history of the area.



CSS-GSA 2010: GSA Associated Societies Breakfast by Thomas R. Fisher, Escalante Mines, Inc.

One morning during the GSA meeting, the Associated Societies of the GSA met for breakfast at the Hyatt Hotel literally at the crack of dawn. About 50 representatives of the different societies were present. The meeting was hosted and chaired by Dr. John Geissmann, Vice President of GSA and Chair of the Dept. of Earth and Planetary Sciences at the Univ. of New Mexico, Albuquerque. Attending on behalf of CSS were President Scott Minor, President-Elect Lisa Fisher, and Thom Fisher, newly appointed CSS representative to the GSA Associated Societies. We were treated to a great breakfast and some excellent conversation with representatives of the other societies.

A number of topics were discussed, including plans for the GSA's 125th Anniversary at the 2013 GSA Annual Meeting in Denver. Chairs of the upcoming International Geological Congress to be held in Cape Town, South Africa, and Lisbon, Portugal, and the "Fragile Earth" joint GSA-Geologische Vereinigung-Deutsche Geologische Gesellschaft Conference in Munich were introduced. GSA Executive Director Jack Hess announced the estimated attendance for this year's GSA meeting was 6,500 attendees, just short of the record. It's important to note that 35% of those attending were students and younger geoscientists, our "target" group for new members in the CSS.

Considerable discussion focused on standing committees on Geology and Public Policy, Public Education and Outreach, and Publications of the GSA. The Technical Chair for the 2011 Minneapolis GSA meeting also spoke and invited ideas for topical sessions, special sessions, and field trips. Discussed for this meeting is a move towards the digital age with plans for digital poster sessions using HD large format flat screen monitors for live digital presentations rather than the traditional paper formats. Considerable discussion was had on K-12 and higher education and education of the general public about geology. This led to a very productive discussion on the current state of geological curriculum in U.S. and international universities and the apparent attrition of geology departments, loss of field-based programs, and a move away from basic geology courses (e.g., physical and historical geology, paleontology, mineralogy, and geologic mapping) in favor of becoming more "socially responsible," and the resulting inadequacies of the current programs. This has led to fewer geology grads available for industry and fewer that are properly trained to take on the jobs needed in industry. The conversation on curriculum led to the planning of a tentative session at Minneapolis presenting papers on industry and other sectors' needs for basic geologic education and focused instruction on geologic field methods and mapping. Warfield Hobbs IV (American Geological Institute), Richard Spruill (Association of State Boards of Geologists), James Walters (Sigma Gamma Epsilon National Honor Society and University of Northern Iowa), and Thom Fisher (CSS representative for the GSA Associated Societies) will hold further meetings regarding this important future session in the upcoming weeks.

The next GSA Associated Societies meeting is planned for late April 2011 in Boulder. I plan to attend on behalf of CSS.

CSS-GSA 2010: Exhibit Booth Highlights

by Thomas R. Fisher, CSS Booth Manager

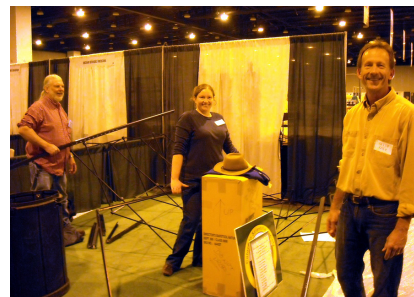
Thanks to the generous contributions from many of our members and funding by the CSS, the Society hosted for the first-time ever an exhibit booth at the GSA Annual Convention. Graphics, including some of the photography, prepared by Lisa Fisher were outstanding. These graphics were mounted on heavy PVC and will be useable in CSS booths for many years to come. The booth equipment was rented from a firm in St. George, Utah, and all rental fees can be applied (for up to one year) to actual purchase of similar equipment for displays at future meetings and events. The booth went up early Sunday morning prior to the GSA Exhibitor's Ice Breaker Party. All went smoothly due to the efforts of Scott Minor, Liz Pesce, and Lisa Fisher. Building it was sort of like assembling a giant Tinker Toy or Erector Set. All were amazed at what goes on behind the scenes in the Exhibit Hall prior to a show and what lies hidden behind the walls as there is a warren of freight elevators, ramps, warehouse areas, and not a few tunnels that seem to lead everywhere. "Organized chaos" would be the most descriptive term for the scene before the show. Thanks to the helpfulness, courtesy, and good humor of the Colorado Convention Center personnel, all went very smoothly.

Placing a booth at GSA this year was great timing on the part of the CSS, as this year's meeting nearly set a record for attendance. We made well over 200 direct contacts with prospective members and other interested parties. Many signed up and paid their dues on the spot. We received many compliments on the booth as being one of the best in the Exhibit Hall. The booth was "manned" over the four-day time span by no less than 13 CSS members including Sue Hirschfeld, Scott Minor, Ben Harrison, Mary Miller, Susie Morton, Julia Fraser, Val Freeman, Liz Pesce, Mitch Reese, Jeremy McCreary, Lisa Fisher, Libby Prueher, and Thom Fisher. Thom, acting as "booth manager," designed the booth and did the logistics of getting everything to and from the Convention Center. Ben Harrison, Liz Pesce, Mary Miller, and Thom helped take down the booth and pack up at the end of the show.

In addition to the many membership inquiries, we had many come by to volunteer talks for future CSS meetings. Among them was William Earl Brooks, author of the new GSA Special Paper 467 "Mining and Metallurgy in Ancient Peru," a combined archeology and geology of that region and the mining methods from the time.

Representatives from Subaru North America also visited our booth and offered to sponsor certain types of field trips for the CSS. Subaru is an official sponsor of the GSA, as you may have noticed by their presence in the Exhibit Hall with their brightly painted Outbacks with the GSA logos. We will be following up on this offer in the near future to determine the details and requirements. We were also visited by Adrift Adventures and River Runners regarding possible sponsored raft trips down the Yampa and/or Green Rivers through Dinosaur National Monument. These are the same trips you often see offered on Rocky Mountain PBS. The trips last 5 to 6 days with all amenities provided including river guides. Up to 25 people can be accommodated on the trips and one-third of the cost is refunded to the sponsoring organization (e.g., CSS)—so the trips are essentially run as fund raisers. We can bring our own geologist/guides and interpreters. The next possible openings for such trips for CSS would be in 2012, so we will be investigating those possibilities further. We also had several invitations to jointly participate with other societies and groups, such as WIPS and the Denver Gem and Mineral Show. Our presence in the Exhibit Hall allowed us to make new contacts of this type and continue old and valued friendships and relations with these societies.

So, a big round of thanks to all who contributed to the success of the booth and exhibit! We could not have done it without you! To echo CSS President Scott Minor's words: *"The booth was a bold, bright statement to the local and greater earth science community of what we (CSS) are and what we aspire to be!"*



It's like a giant "Tinker Toy!"



Who let out the Boa Constrictor?



All done and in action!



And it all fit back into the little boxes.



Earth Science Meetings and Talks

Newsletter items must be received by the 25th of each month.



Colorado Scientific Society's regular meetings are held the 3rd Wednesday of the month at the Colorado School of Mines Geology Building in Golden (unless otherwise advertised). Social time begins at 6:30 p.m. and talks start at 7:00 p.m. For more information, contact Scott Minor, at 303-236-0303, sminor@usgs.gov

Café Scientifique Wynkoop Brewery, evening science talks at 6:30 in the Mercantile Room. Free, except for beer. **Nov. 16** Jaelyn J. Eberle, *U.C. Boulder Museum of Natl. History*, "Long Hot Nights in the Eocene Arctic: What they tell us about global temperature change." For upcoming schedule go to: <http://www.cafescolorado.org/Upcoming.htm>

CO-AIPG (American Institute of Professional Geologists, Colorado Section) 11:30 a.m. social gathering; Noon luncheon and subsequent speaker presentation. **Nov. 16** Dr. Thomas Monecke, *Colorado School of Mines*, "Modern Seafloor Sulfides." 2010 luncheons held at the Petroleum Club (in the Denver Athletic Club building), 1325 Glenarm Street, Denver. Please make an advance reservation. Cost is \$25 w/ advance reservation and \$30 at the door. Paid parking available along street (metered) or in adjacent parking lots and parking structure. Contact Jim Russell by Noon on Nov. 12 for reservations: 303-278-4456 (hm), 303-815-3901 (cel), or e-mail summitdatasvcs@msn.com

Colorado School of Mines, Van Tuyl Lectures **Dec. 9** Dr. Robert J. Weimer, *Professor Emeritus, Colo. School of Mines*, "Hearings before State Engineer confirms that water produced with Oil and Gas in Colorado is classed as non-tributary to streams: Example—Geology of the D-J Basin." Thursdays from 4–5 p.m. in Berthoud Hall room 241. <http://www.mines.edu/academic/geology>

Colorado State University, Dept of Geosciences **Nov. 15** Dr. Clifford Riebe, *Univ. of Wyoming*, "How Coarse is Too Coarse for Salmon Spawning Substrates?" **Nov. 29** Dr. Jorg Maletz, "TBA." **Dec. 6** Dr. Kevin Mahan, *CU Boulder*, "TBA." Rm 320 Warner College of Natural Resources Bldg., Mondays, 4:00 p.m. 970-491-5661. <http://warnercnr.colostate.edu/geo-training/>

Denver Mining Club, Ltd. **Nov. 15** John Akal, *Chairman, White Ash Memorial Committee*, "The White Ash Coal Mine Disaster, Golden, Colorado." **Nov. 22** Samuel B. Romberger, *Professor Emeritus, Colorado School of Mines*, "Water Quality Issues Arising from In Situ Recovery of Uranium." **Nov. 29** Victoria Miller, *Curator, Steelworks Museum of Industry and Culture*, "Building a Museum from the Colorado Fuel & Iron Archives." Country Buffet, 8100 W. Crestline Ave., SE corner at Wadsworth, Littleton, (Purchase of buffet lunch required) Every Monday, except when noted, 11:30a–1:00p (+/-) VISITORS ALWAYS WELCOME! <http://www.denverminingclub.org>

Desk and Derrick Club of Denver **Dec. 14** "2010 Holiday Party" 6:30pm–9:30pm at the Curtis Hotel, 1405 Curtis St., Denver. <http://www.deskandderrick.org/>

Rocky Mountain Association of Geologists (RMAG) **Nov. 19** Andrew M. Govert, "Pinedale Field." **Nov. 20 (Sat.)** "Rockbusters Ball" at Columbine Country Club, 5:30 p.m. **Dec. 3** Rick Fritz, "Arbuckle play of Kansas. Luncheons are in Denver at the Marriott City Center at California and 17th St. Lunch is at Noon and the Program begins around 12:20 pm. All lunch attendees must pay prior to the lunch with a credit card, Paypal, Check, or Cash. If you do not make the \$30 payment by Thursday prior to the lunch, your lunch will be canceled or sold. Reservations are not accepted after 10:30 a.m. on Wednesday, prior to the luncheon. No reservation is required for the talk only and the cost is \$5.00. <http://www.rmag.org/events/index.asp>

Univ. of Colorado, Boulder, Geol. Sciences Colloquium Weds., 4:00 p.m., Rm. 380. Refreshments at 3:30 p.m. on the 3rd floor. **Nov. 17** Susan Hough, *USGS–Pasadena*, "Echoes of Disaster: Lessons from Aftershocks of the Mw7.0 12 January 2010 Haiti Earthquake." **Dec. 1** Steve Nerem, *Univ. of Colorado*, "Applications of Satellite Gravity Data to Studying the Earth's Water Reservoirs." <http://www.colorado.edu/GeolSci/>

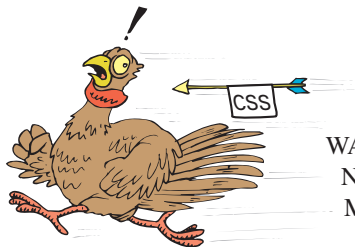
Upcoming CSS Events:

Dec. 8th (Weds.) – CSS Annual Business Meeting and President's Address

Jan., 2011 (date TBA) – Annual Emmons Lecture tentative speaker: Professor Thomas Strasser, Ph.D., Providence College, talk title TBA. He specializes in Greek archaeology, with special reference to Minoan (Cretan) prehistory.

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WANTED:
New CSS
Members

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Treasurer: Don Sweetkind, USGS, 303-236-1828, dsweetkind@usgs.gov
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Past President: Don Sweetkind, USGS, 303-236-1828, dsweetkind@usgs.gov

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2008–2011: Sue Ellen Hirschfeld, eqdoc@ix.netcom.com
2009–2012: Jim Burnell, CGS, 303–866–2611, jim.burnell@state.co.us
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**** STOP! Do NOT recycle this until after the talk! Please help us with publicity by posting at least the front page of this Newsletter on a bulletin board. Thank you!**