



# Colorado Scientific Society

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

## ***CSS Student Night November Presentations:***

**“Stratigraphic anomalies associated with a tectonically active embayment in the  
Cretaceous Western Interior Seaway:  
A story of the Lewis Shale and Fox Hills Sandstone, Wyoming”**

**by David R. Pyles,**

Department of Geological Sciences, University of Colorado at Boulder

**“Preliminary Assessment of the suitability of Laser Ablation ICPMS and  
Engelman Spruce as a technique to Determine Trends in Trace Metal Movement”**

**by Kerstin Witte,**

Department of Geology and Geological Engineering, Colorado School of Mines

**“Inclusions and Chemical Heterogeneities in Garnet: Problems, Pitfalls, and  
Potential for Sm-Nd- Geochronology”**

**by Alan Koenig,**

Department of Earth Resources, Colorado State University

**Wednesday !!!!!, Nov 8, 2000**

**American Mountaineering Center**

**710 10<sup>th</sup> Street (NE corner with Washington), Golden, Colorado**

**Social Half-hour: 7:00 p.m.**

**Meeting Time: 7:30 p.m.**





## President's Note

We are fortunate this month to have three talented young scientists from our front-range universities and colleges who will be giving presentations for the annual Society Student Night competition on Wednesday, November 8th. Our presenters are all winners from previous weeks' regional competitions held at CU, CSU, and CSM and thus you may count on them all giving excellent talks. I strongly encourage you to attend Student Night to hear the talks and support these fine students. We owe thanks to CSS councilor Scott Lundstrom for taking the lead in organizing this year's event.

Elsewhere in the newsletter, please take a moment to respond to the questionnaire created by our field-trip chairman Sherm Marsh about future Society field trips. Spring and fall field trips are a long-standing tradition for the Society, but of late we have had only limited participation from our membership. Is this a sign of the frenetic pace of our modern society? Are there ways we can change the field trips to make them more appealing? Please help the CSS council make informed decisions about the future of field trips by returning the questionnaire to Sherm.

Thanks to our current president elect, Michele Tuttle, for heading the heading a recent nomination committee that has generated a strong suite of candidates for your Society officers and councilors for the 2001 year. See the ballot elsewhere in the newsletter.

**Mark Hudson**

## Stratigraphic Anomalies Associated with a Tectonically Active Embayment in the Cretaceous Western Interior Seaway: A Story of the Lewis Shale and Fox Hills Sandstone, Wyoming

### Abstract of Presentation by David R. Pyles:

The lower Maastrichtian Lewis Shale and Fox Hills Sandstone were deposited in a tectonically active embayment during the final major transgression and regression of the Cretaceous Western Interior seaway. Localized uplifts along the margins of the embayment, coupled with changes in sediment supply into the embayment, had a profound effect on basin physiography, water depths, stacking patterns, facies and sediment accumulation rates. Four uplift events impacted Lewis/Fox Hills deposition. The first three occurred at the ancestral Lost Soldier anticline, creating a shelf-slope-basin physiography, which would remain through Lewis time. The fourth uplift occurred at the Sierra Madre uplift. Sediment supply from the north



increased during late Lewis and Fox Hills time. The combination of localized uplifts at the ancestral Lost Soldier anticline and increasing sediment supply into the depositional basin resulted in aggradational/progradational stacking patterns. High-density turbidites and debrites, which punctuate the pelagic and hemipelagic mudstones in the slope and basin facies tracts, began with the development of the shelf-slope-basin physiography. Compacted sediment accumulation rates in the depositional basin range from 0.15 mm/year during non-tectonically active times and up to 1.2 mm/year during tectonically active times. The shelf-slope-basin physiography and high-density turbidites and debris flows are anomalous to all other Cretaceous Western Interior deposits.

These interpretations were formulated from a seventy mile long, north-south trending, depositional dip-oriented, chronostratigraphic cross section that runs along the eastern margins of the Great Divide and Washakie basins. The data incorporated into the chronostratigraphic cross section consists of outcrop data comprising facies descriptions, ammonite localities and gamma ray logs; subsurface data consisting of well logs and cores; and published stratigraphic cross sections.

## **Preliminary Assessment of the suitability of Laser Ablation ICPMS and Engelmann Spruce as a technique to Determine Trends in Trace Metal Movement**

### **Abstract for Presentation by Kerstin Witte**

Abandoned mine lands throughout the Rocky Mountains are potential sources of acid, metal-rich drainage. This drainage potentially impacts flora and fauna that utilize affected ground and surface waters. Such is the case for the abandoned mine tailings at the Waldorf mine, approximately 6 miles southwest of Georgetown, Colorado. Conifers (Engelmann Spruce) are the dominant tree species growing in many areas covered with transported mill tailings. Cores taken from Engelmann spruce were analyzed with laser ablation inductively coupled plasma mass spectrometry (LA-ICPMS) to determine suitability of this species and this technique to monitor trace metal movement related to mill tailings deposition. Development of spiked cellulose standard was undertaken to accurately determine concentrations of metals within individual tree rings. Tree cores analyzed using LA-ICPMS indicated distinct differences in Zn, Fe, Mn, and Sr uptake by a tree growing in the transported tailings vs a control tree. Both cores had similar concentrations of As, Pb, Cd, Bi, and Mg.



## **Inclusions and Chemical Heterogeneities in Garnet: Problems, Pitfalls, and Potential for Sm-Nd- Geochronology**

### **Abstract for Presentation by Alan Koenig**

Garnet is one of the most important minerals used for deciphering the thermal and chemical history of metamorphic rocks. Based on a favorable Sm/Nd ratio, dating of garnets by Sm-Nd geochronology has proven possible for rocks from numerous settings. Advances in in-situ techniques have shown that the systematics of Sm and Nd in garnet are complex. Our work investigates the complexities introduced by inclusions and REE heterogeneities in garnet.

It has been demonstrated that the actual levels of Sm and Nd hosted in the garnet lattice are often quite low and numerous microscopic to submicroscopic inclusions can contain many times those levels of REEs. Not only does the presence of inclusions lower the  $^{147}\text{Sm}/^{144}\text{Nd}$  ratio, thereby lowering the precision of the isochron date, but the presence of inclusions may also reduce the accuracy of the date. Breakdown of REE-rich xenotime during garnet growth may account for such zoning. If such zoning produces heterogeneities in the isotopic signature, the Sm-Nd isochron may be erroneous. The above factors all may need to be examined closely before any Sm-Nd garnet date or closure temperature estimate is considered.

## **Museums**

### **Friends of Dinosaur Ridge and the Morrison Natural History Museum**

Presents a free fireside chat lecture: “Dinosaur Tacks and Technology- Interesting Interpretations” by Neffra Mathews, Bureau of Land Management, Tuesday, November 14 at 7 p.m. at the Lutheran Church of the Master, at the intersection of Jewell, Alameda & Bear Creek. For more information call (303) 697-DINO.



## CSS Student Presentations: Report on October semifinal events

I had the privilege of attending (and judging) two of CSS student semifinals, and had the pleasure of hearing excellent talks from all of the speakers. As this program promotes quality scientific interchange between our society and area campuses, we are very appreciative of the participating departments at CU, CSM, and CU and the respective chairs Chuck Stern (CU Boulder), Greg Holden (CSM), and Eric Erslev (CSU) for arranging and hosting these semifinals. On behalf of CSS, I would especially like to thank all of the students who contributed talks and discussed their research. Kudos and thanks as well to Parker Calkin, Emmett Evanoff, and Keenan Lee for their participation as judges. Those who attend our Student Night (Wed., November 8, at the American Mountaineering Center, starting at 7:00 PM) should be in for great talks.

*Scott Lundstrom*

## Student Presentations: semifinal results

The following talks and the resulting rankings took place at semifinals held at three graduate earth science departments of the Front Range area:

*University of Colorado, Boulder, Department of Geological Sciences,  
October 25*

**Finalist: David R. Pyles:** Stratigraphic anomalies associated with a tectonically active embayment in the Cretaceous Western Interior Seaway: a story of the Lewis Shale and Fox Hills Sandstone, Wyoming

**Runner-up:** Eric C. Cannon: Holocene fault offset rates of the Hilina fault system, Kilauea volcano, Hawaii



*Honorable mention:* **Stephanie B. Gaswirth:** Maturation of a regional dolomite body by mixing-zone cementation, Suwannee Formation, west-central Florida

*Honorable mention:* **Lynda A. Lastowka:** Seismic evidence for partial lithospheric delamination model of Colorado Plateau uplift

***Colorado School of Mines, Golden, Department of Geology,  
October 26***

*Finalist:* **Kerstin Witte:** Preliminary Assessment of the suitability of Laser Ablation ICPMS and Engelmann spruce as a technique to Determine Trends in Trace Metal Movement

*Runner-up:* **Eric Dillenbeck:** Identification of mineral extraction waste products using the SFSL and CASI hyperspectral imagers at the Bauer Mill tailings site, central Utah

*Honorable mention:* **Craig McClung:** Wall rock alteration surrounding the Pen Oreille Zn-Pb deposit, Metaline District, Washington, USA

***Colorado State University, Fort Collins, Department of Earth Resources,  
October 30***

*Finalist:* **Alan Koenig,** Inclusions and Chemical Heterogeneities in Garnet: Problems, Pitfalls and Potential for Sm-Nd Geochronology

*Honorable mention:* **Amanda DiUlio,** Section 6C, Coalinga Field, CA: Reevaluation, Optimization and Expansion

*Honorable mention:* **Molly C. McCutcheon,** Volcanic and Anthropogenic Pollution in Coatepeque Lake, El Salvador, Central America

*Honorable mention:* **Stephanie J. Phippen,** An assessment of land uses and other factors that affect sediment yields in the Rio Puerco watershed, Sandoval County, New Mexico



# Colorado Scientific Society Field Trips Should They Be Continued?

Sherman Marsh, Field Trip Chairman

We have just completed a successful 2.5 day fall field trip to southern Colorado stopping in Fairplay to see the South Park Museum, the Great Sand Dunes National Monument, and taking the narrow gauge railroad trip from Antonito, CO to Chama, NM. For the 16 people who went on the trip, it was an unforgettable experience.

However, as Field Trip Chairman the last 2 years there are several trends that disturb me. The first, and most telling, is the lack of CSS membership support. Fewer than 4-5% of the CSS membership (16-20 of 400) go on the field trips. Secondly, most of the people who attend the field trips are retired, usually retired USGS. This leads me to ask some important questions;

Should the CSS have field trips?

Is there something wrong with the objectives or timing of our field trips?

Why don't more members go on field trips?

What can we do to attract larger attendance and more CSS involvement in our trips?

Several suggestions were made at the last Council Meeting. The CSS could sponsor a long (multiple day) field trip once a year or possibly every-other year with advance notice of 6 months to a year. In addition the society would organize several one-day "brown-bag" trips that would cost nothing, but would require the participants to car pool and bring their own lunch.



Please help us address these issues by completing the questionnaire below. I know you all are busy, but please take a few minutes to answer the questions so we can serve you better and provide the sort of field trips you will support.

### CSS FIELD TRIP QUESTIONNAIRE

	YES	NO
1. Should the Colorado Scientific Society have field trips?	_____	_____
2. Are the current field trips too long?	_____	_____
A. Would you attend more often if the trips were 1 day?	_____	_____
B. Do you prefer a mix of short and longer trips?	_____	_____
3. Are the trips too expensive?	_____	_____
A. If so, should we give up the food?	_____	_____
B. Should we give up transportation (go by car-pool)?	_____	_____
C. Eliminate over-nite trips?	_____	_____
4. Are there too many or too few field trips?	_____	_____
A. too few? _____ too many? _____ just right? _____	_____	_____
6. Are the field trips interesting or appealing	_____	_____
A. Should there be more “science” on the trips?	_____	_____
B. Should there be more discussion (narration) on the trips?	_____	_____
C. Should trips be more narrowly focused on a single topic or area?	_____	_____
D. Should trips be more broadly focused on regional topics or areas?	_____	_____
7. Would a major field trip (3-5 days) every 2 years alternating with short, one day trips, to local areas be more appealing to you?	_____	_____



8. Would you go on the field trips if they were scheduled at different times? \_\_\_\_\_
- A. Spring \_\_\_\_\_
  - B. Summer \_\_\_\_\_
  - C. Fall \_\_\_\_\_
  - D. Winter \_\_\_\_\_

Now comes the hard part, we need your input. Do you have any additional comments about the field trips?

And, where would you like to go on a CSS field trip?

I have 2 proposals for next year; (1) a one day tour of the Sweet Home mine above Alma, CO, where the spectacular red rhodochrosite comes from and (2) a 3 day trip to tour the fossil fish locality near Kemmerer, WY.

Would you go on trip 1? \_\_\_\_\_

Would you go on trip 2? \_\_\_\_\_

**Please send the completed form, or email your answers, to:**

Sherman Marsh  
 8384 W. Iliff Ave  
 Lakewood, CO 80227

Tel: 303-986-0939  
 Fax: 303-986-5433  
 email: spmarsh@earthlink.net



# Election Ballot

The Society will elect its officers for 2001 at the December 7<sup>th</sup> business meeting. If you cannot attend the business meeting, please clip the election ballot below and return it by November 30<sup>th</sup> to: Colorado Scientific Society, P.O. Box 150495, Lakewood, CO 80215-0495.

President-Elect:

\_\_\_\_\_ Eric Nelson  
\_\_\_\_\_ (write in)

Councilors, 2001-2003

\_\_\_\_\_ :  
\_\_\_\_\_ Parker Calkin  
\_\_\_\_\_ Graham Closs  
\_\_\_\_\_ (write in)  
\_\_\_\_\_ (write in)

Treasurer:

\_\_\_\_\_ Michael Machette  
\_\_\_\_\_ (write in)

Secretary:

\_\_\_\_\_ Steve Personious  
\_\_\_\_\_ (write in)



# Earth Science Meetings and Talks

**Colorado Scientific Society's** regular meetings are held the third Thursday 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 Mark Hudson at (303) 236-7446 or [mhudson@usgs.gov](mailto:mhudson@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 Jim Piper, (303) 932-0134, or the website <http://www.dregs.org>.

## 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.

## U. S. Geological Survey, Geologic Division Colloquium

Bldg 20, Denver Federal Center, Thursdays, 1:30-2:30 p.m., Foord Conference Room. For a more information contact Laura Strickland: (303) 236-5302.



## Colorado Scientific Society Officers, Councilors, and Chairpersons

### OFFICERS

**President:** Mark Hudson, USGS, 236-7446  
**President-Elect:** Michele Tuttle, USGS, 236-1944  
**Treasurer:** Michael N. Machette, USGS, 273-8612  
**Secretary:** Stephen F. Personius, USGS, 273-8611  
**Past President:** Ken Pierce, USGS, 236-1244

### COUNCILORS

**1998-2000:** Eric Nelson, CSM, 273-3811  
**1998-2000:** Parker Calkin, CU, 442-2184  
**1999-2001:** Emmett Evanoff, CU, 492-8069  
**1999-2001:** Steve Sonnenberg, consultant, 839-3012  
**2000-2002:** Robert Fleming, USGS – ret., 279-8122  
**2000-2002:** Scott Lundstrom, USGS, 236-7944

### COMMITTEE CHAIRPERSONS

**Database Manager:**  
**Best Paper Award:**  
**Field Trips:**  
**History:**  
**Membership:**  
**Memorial Funds:**  
**Memorial Funds Treasurer:**  
**Newsletter Editor:**  
**Program:**  
**Publicity:**  
**Webmaster:**  
**Graphics:**

Cynthia Rice, USGS, 236-1989  
Karl Kellogg, USGS, 236-1305  
Sherm Marsh, (303) 986-0939  
Marjorie E. MacLachlan, USGS-retired, 986-7192  
Jim Yount, USGS, 236-5397  
Ken Pierce, USGS, 236-1244  
Michael N. Machette, USGS, 273-8612  
Margaret Hiza, USGS, 236-0075  
Eric Nelson, CSM, 273-3811  
David Moore, USGS, 236-1271  
Bill Wingle, CSM, 273-3905  
Lee-Ann Bradley, USGS, 273-8613

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

