



Colorado Scientific Society

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

December Presentation:

“Paleomagnetism as a Structural Tool”

by Mark Hudson

U.S. Geological Survey and CSS President

Thursday, December 7, 2000

American Mountaineering Center

**710 10th Street (NE corner with Washington)
Golden, Colorado**

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

Meeting Time: 7:30 p.m.

Annual Business Meeting followed by Presentation



President's Note

Congratulations to our participants at last month's student-night competitions, particularly our winner—Alan Koenig—from CSU. As we have come to expect, each student gave an excellent presentation, which made the judges' choice very difficult.

I urge you to attend the upcoming meeting on December 7th when we will conduct the annual business for the Society. At this meeting, we will honor the committee chair persons for the past year, receive our treasurer's report, and elect officers and councilors that will serve for the upcoming year. Afterwards, it will be my turn to describe to you the joys of combining paleomagnetism and structural geology!

As this is my final note as president, I once again wish to thank all those members who have helped keep the society running this year. I have enjoyed my service for the Society this year, particularly the opportunity to meet and work with many of our members. I know that the Society will be in good hands next year with incoming president Michelle Tuttle and I look forward to Michelle's January kickoff event – the Emmons Lecture on Snowball Earth by Paul Hoffman. It will be great night.

-Mark R. Hudson, CSS President

Paleomagnetism as a Structural Tool

Abstract of Presentation by Mark R. Hudson, U.S. Geological Survey

Paleomagnetism, the study of ancient Earth magnetic fields trapped in rocks, has long been used in tectonic studies. Initially focused on plate-tectonic-scale reconstructions, technological advances now make paleomagnetism practical at scales of mountain ranges to individual fault blocks, the realm structural geology. General deformation of material is broken into 4 components (rotation, translation, dilation, and distortion), but most strain in the brittle upper crust is accommodated by coordinated block rotation and fault translation. Thus, a major application of paleomagnetism in structural geology is to constrain the three-dimensional geometry of fault block rotations. Paleomagnetic data can be used to detect tilt of igneous plutons and massive lavas that lack field markers of paleohorizontal. Coupled with isotopic dating, such paleomagnetically determined tilts provide tight constraints on styles and ages of upper crustal deformation. Paleomagnetic vectors are particularly useful as structural markers for detection of steep-axis rotations; unambiguous field markers of such rotations are rare. Paleomagnetic data integrated with geologic mapping and fault studies have documented broad, previously unrecognized zones that accommodated distributed strike-slip strain via vertical axis rotation and discontinuous faulting. Case studies from the Basin and Range and Rocky Mountains provinces illustrate these paleomagnetic applications and their tectonic implications.



Dues and Contributions for 2001

In a break with tradition, the CSS will send a separate billing for 2001 dues and fund contributions (by mid December). It was our feeling that prompt payment of dues was being thwarted by including the form within the Newsletter. Any contributions made in 2000 (i.e., checks date before Jan. 1, 2001) will be credited toward the 2000 tax year. Please remember that your *entire* contribution goes towards generating interest for the grants and that your contribution is 100% tax deductible since the Society is a non-profit Section 501 (c)(3) organization.

-Michael Machette, CSS Treasurer

Museums

Friends of Dinosaur Ridge For information call 697-DINO. This month's "Fireside Chat" will be on Thursday December 14 at 7 p.m. Dr. Andrew Taylor of Metro State College will speak on "Colorado Landscapes Through Time". The lecture will be held at the Lutheran Church of the Master, located at the intersection of Jewell, Alameda, and Bear Creek Parkway in Lakewood, Colorado.

Student Night 2000

On Wednesday November 8th at the American Mountaineering Center, the Colorado Scientific Society hosted a special night highlighting the geoscience work of students from Front Range colleges and universities. We were engaged by three excellent talks, each one by the winner of semifinals from CSU, CSM, and CU, so the judges had some difficulty in agreeing to the "best" of these presentations. But unlike the presidential election of the previous day, a winner had to be selected that night. We congratulate and thank each of these speakers.

First Place (\$125): Alan Koenig, Colorado State University:

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

Runner-up (\$75): David R. Pyles, University of Colorado:

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 (\$75): Kerstin Witte Colorado School of Mines:

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

I would like to thank Karl Kellogg, Scott Minor, and Michelle Tuttle for being judges; and Mark Hudson for all of his work to make this meeting so well-run, excellent, and enjoyable, as has been the case for all of our meetings this year.

-Scott Lundstrom, Student Night Chair



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 Michele Tuttle at (303) 236-1944 or mtuttle@usgs.gov

Denver International Petroleum Society (DIPS) meets the 2nd Friday of each month at the Wynkoop Brewing Co., 18th 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 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.

University of Northern Colorado, Greeley, Earth Science Seminar

Fridays, 4:00-5:00 p.m., Ross Hall, Rm. 3310.

For a schedule, call UNC Dept. of Earth Sciences: 970-351-2647.

U. S. Geological Survey, Geologic Division Colloquium

December 7, Thursday, 1:30-2:30 p.m., Foord Conference Room, Bldg, 20, Denver Federal Center.

Speaker: Marty Parris (WRD); Title: "Syntectonic fluid flow and fracturing, Eastern Brooks Range, Alaska"

For more information contact Laura Strickland: (303) 236-5302.



Memorial and Endowment Funds

Endowment Funds. The Endowment Fund was started in 1990 at the suggestion of Barney Poole (1987 CSS President) in order to cover unanticipated increases in our operating expenses or to fund special activities. This past year we used the fund mainly to balance shortfalls in our operating budget.

Memorial Funds. The Memorial Fund Scholarship Program was started in 1984 with the Ogden Tweto Fund and has grown to include five funds. As a result of generous contributions by family members, friends, and Society members, each of these funds have grown substantially since their inception. As of December 1, 2000, the total value of our Memorial Fund investments was about \$179,100 (this includes about \$10,000 in interest reserved for the 2001 Memorial Fund awards and \$30,000 in year 2000 contributions from the Bill and Ida Pierce Trust). The Memorial Funds honor the following individuals and primary objectives:

- Ogden Tweto (1984) Field-based earth-science research in Colorado and adjacent areas;
- Stephen Oriel (1986) Geologic studies of the Idaho-Wyoming thrust belt and associated topics;
- Edwin Eckel (1990) Engineering geologic studies in the United States;
- William-Pierce (1994) Studies of the Heart Mountain Fault, Wyoming, and associated problems;
- George Snyder (1998) Studies of Precambrian igneous/metamorphic geology and basement tectonics in the Rocky Mountain region.

Over the past 16 years, the Society has awarded 121 scholarship grants for a total of almost \$90,000 (see table below). As a result of your fund contributions, the number and dollar amount of awards have generally increased each year (see table below). However, our long-term goal is to increase the average amount of individual grants to at least the \$1000 level (it was \$900 in 2000). Therefore, your continued support of this important and highly visible program will be much appreciated. Contributions to any or all funds can be made during payment of dues, which will be by invoice this year.

-Michael Machette, CSS Treasurer

Number of Awards
(Partial grants co-sponsored by 2 funds)

Year	Tweto	Oriel	Eckel	Pierce	Snyder	Total
1984	3					3
1985	3					3
1986	2	0				2
1987	2	1				3
1988	1	1				2
1989	2	1				3
1990	3.5	1.5	0			5
1991	4	2	1			7
1992	5	2	2			9
1993	4.5	1.5	2			8
1994	5	2.5	2.5	0		10
1995	5	2	2	1		10
1996	4	3	2	2		11
1997	4	3	2	1		10
1998	5	3	3	0		11
1999	5	3	1	2	1	12
2000	4	3	2	1	2	12
Total	62	29.5	19.5	7	3	121

Amount of Awards (\$)
(* No research proposals received this year)

Year	Tweto	Oriel	Eckel	Pierce	Snyder	Total (aver. per grant)
1984	1,300					1,300 (433)
1985	1,050					1,050 (350)
1986	650	0				650 (325)
1987	1,700	400				2,100 (700)
1988	900	450				1,350 (675)
1989	1,940	530				2,470 (823)
1990	2,910	1,190	*0			4,100 (820)
1991	3,100	1,500	650			5,250 (750)
1992	3,500	1,890	1,270			6,660 (740)
1993	3,030	1,290	1,000			5,320 (665)
1994	3,590	1,600	1,450	*0		6,640 (664)
1995	2,900	1,400	1,200	850		6,350 (635)
1996	2,900	1,800	1,300	1,900		7,900 (718)
1997	3,900	2,400	1,750	1,700		9,750 (905)
1998	3,545	2,100	1,972	*0	*0	7,617 (692)
1999	3,975	2,500	1,500	2,465	750	11,190 (933)
2000	2,710	2,900	1,550	1,200	1,250	9,610 (800)
Total	43,600	21,950	13,642	8,115	2,000	89,307 (738)



Colorado Scientific Society Officers, Councilors, and Chairpersons

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President: Mark Hudson, USGS, 236-7446
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Treasurer: Michael N. Machette, USGS, 273-8612
Secretary: Stephen F. Personius, USGS, 273-8611
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1998-2000: Eric Nelson, CSM, 273-3811
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1999-2001: Emmett Evanoff, CU, 492-8069
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2000-2002: Paul Welmer, CU, 492-3809
2000-2002: Scott Lundstrom, USGS, 236-7944

COMMITTEE CHAIRPERSONS

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