



Colorado Scientific Society

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



**Princeton scientific expedition of 1877: the
Florissant, Colorado segment**
Steven W. Veatch, *Emporia State University*

←—————→

**Compiling the new geologic map of North
America----some thoughts and reminiscences**
Jack Reed, *U.S. Geological Survey*

Thursday, March 17, 2005
American Mountaineering Center
710 10th St. (NE corner with Washington), Golden
Social half-hour – 6:30 pm. Meeting time – 7:00 pm.

Abstract

Princeton scientific expedition of 1877: the Florissant, Colorado segment

By Steven W. Veatch, Department of Earth Science, Emporia State University, Emporia, Kansas

Early scientific information and fossil specimens from what is now the Florissant Fossil Beds National Monument came from a group of college students who, in 1877, traveled to the Florissant area from Princeton (then the College of New Jersey). Original expedition documents and photographs from Princeton's Mudd Manuscript Library and other sources provide a clear and complete chronology of the Princeton Scientific Expedition and reveal new details of this early phase in the history of paleontology at Florissant.

While in their junior year (1876), three of Arnold Guyot's students, Henry F. Osborn, William B. Scott, and Francis Speir Jr., envisioned a scientific expedition to the West. They sought advice from the paleontological profession, but because of the feud between E.D. Cope and O.C. Marsh, such information was classified. Undaunted, they organized the expedition throughout their senior year. On June 21, 1877, the Princeton Scientific Expedition left New Jersey for the West. After arriving in Denver four days later, the students spent time buying equipment, wagons, mule teams, and recently captured Indian ponies. The students first explored the Garden of the Gods in Colorado Springs. Upon arriving in Florissant in

mid-July, they camped near what is now the park's visitor center and began their search for fossils.

The insects the students collected filled five trays. The collection of plants comprised 25 trays containing more than 900 specimens. At least 180 of the plant and insect specimens became type specimens. Samuel Scudder and Leo Lesquereux described many of these type specimens. Osborn, Scott, and Speir described a number of fish specimens collected at Florissant, including the new species *Trichophanes copei*.

The expedition diaries, journals, and photographs document a remarkable expedition and contribute to the history of paleontology in America. The fossils of the Princeton expedition have allowed researchers in the past, and will allow those in the future, to better understand the paleontology and paleoecology of the Florissant fossil beds.

~~~~~  
Steven Veatch is the author of a number of articles on earth science topics. He is an adjunct professor at Emporia State University and lectures extensively on Colorado's geology and paleontology. He lives next to the Florissant Fossil Beds National Monument where he is a volunteer.

## **Abstract**

---

### **Compiling the new geologic map of North America----some thoughts and reminiscences**

By Jack Reed, U.S. Geological Survey

The new Geologic Map of North America, the final product of the DNAG project, portrays the grand architecture of the continent as we understood it in the closing years of the 20<sup>th</sup> century. It was

compiled by Jack Reed (USGS), John Wheeler (GSC), and Brian Tucholke (Woods Hole Oceanographic Institution). The map is at a scale of 1:5M and covers about 15 % of the earth's surface.

The previous geologic map of North America was published in 1965, before general acceptance of plate tectonic, before radiometric dates were widely available, and when the geology of the sea floors was largely unknown. The old map distinguished about 100 rock units, all of them onshore. The new map distinguishes 939 units, of which 142 are offshore. It also depicts many geologic features not shown on the previous map, including volcanoes, calderas, impact structures, axes of submarine canyons, spreading centers, transform faults, magnetic isochrons, and subduction zones. For the first time it portrays the relationships between the geology of the continent and the geology of the ocean basins that flank it. The map was compiled over an interval of almost 25 years and its assembly spanned the technological

change from tradition cartography to digital cartography. Although the map is not yet available in digital form, plans are underway for construction of a digital database and ultimately for the release of GIS compatible files.

No map of this kind is ever really “finished”; the best the compilers can hope for is to produce a map raises new questions and encourages new work in critical areas. We hope that this new map will help promote new ideas and fresh discussions, and play a role in the training of a new generation of earth scientists. Perhaps it may even help guide prudent political decisions about management of the lands, waters, and resources of our continent and the seas that surround it.

## **Colorado Scientific Society President’s Note—March 2005**

*By Vince Matthews*

HELP! Please help us reduce costs and volunteer time by subscribing to the newsletter online. Here are the advantages to you: 1.) Faster receipt of the newsletter, 2.) Color images instead of black and white, and 3.) A warm-fuzzy feeling that you are reducing the workload on our volunteer staff and saving a few trees over the lifetime of your membership. Here are the advantages to the

society: 1.) We can use the money we spend on postage for more useful ends, 2.) Volunteers won’t have to spend soul-less hours before the copy machine and the mail table, stapling... folding... addressing... stamping... Please help by emailing the newsletter editor at [celia.greenman@state.co.us](mailto:celia.greenman@state.co.us) and let her know that you are willing to switch to email.

## **2004 Contributions to Memorial & Endowment Funds**

*By Don Sweetkind, CSS Treasurer*

The Society thanks its members & friends who contributed a total of \$5,580 to our Memorial and Endowment Funds during 2004. The total value of our Memorial Funds investments is \$220,000 (the interest generated by these funds is used for the student research grants); the balance of

the Endowment Fund (used to cover Society expenses) is \$19,500. Thanks to your generous contributions, we have accumulated \$9,400 of the \$10,000 needed to start a new Charles Pillmore Memorial Fund.

**Memorial Fund  
(date established)**

**Primary research objective**

|                           |                                                                             |
|---------------------------|-----------------------------------------------------------------------------|
| Ogden Tweto (1984):       | Field-based earth-science research in Colorado & adjacent areas             |
| Stephen Oriel (1986):     | Geologic studies of the Idaho-Wyoming thrust belt & associated topics       |
| Edwin Eckel (1990):       | Engineering geologic studies in the United States                           |
| William Pierce (1994):    | Studies of the Heart Mountain fault, Wyoming, & associated problems         |
| George Snyder (1998):     | Studies of Precambrian geology & basement tectonics, Rocky Mountain region. |
| Charles Pillmore (future) | Student participation in field trips.                                       |

Since the Memorial Fund Program started in 1984, the Society has awarded student research grants in Earth Sciences with an aggregate value of over \$125,000. Please remember that your entire contribution goes towards generating interest for the grants and that your contribution is 100% tax

deductible (the Society is a non-profit Section 501 (c)(3) organization).

In the table of contributors below, Memorial or Endowment Fund contributions in the memory of others are shown in brackets, whereas an asterisk indicates those contributing \$100 or more.

Frank J. Adler\*  
 Donald R. Baker  
 C. S. Venable Barclay\*(Richard B. Taylor)  
 Peter W. Birkeland  
 Maeve A. Boland  
 Theodore R. Brandt  
 Katherine Brannan  
 Bruce H. Bryant\*  
 Lorraine B. Burgin  
 Alfred L. Bush (Richard P. Fischer)  
 William S. Calkin  
 Wilfred J. Carr  
 Hazel I. Chisholm\*  
 Cory Conrad  
 Anthony J. Crone  
 Claire B. Davidson  
 Robert E. Davis\*  
 Warren C. Day  
 Harald Drewes  
 Edward G. Duckworth  
 H. Benjamin Duke, III  
 Mary C. Eberle  
 Warren I. Finch  
 Robert W. Fleming\*  
 Irving Friedman\*  
 Celia Greenman

Benjamin Harrison  
 John D. Haun  
 David C. Hedlund  
 Don Hembre  
 John W. Hess  
 Terence G. Hiester  
 Sue E. Hirschfeld  
 Robert A. Kinkel  
 Robert M. Kirkham  
 M. Dean Kleinkopf  
 Wendell A. Koontz  
 J. Peter Laux  
 B. F. Leonard III\*  
 Scott C. Lundstrom  
 Michael N. Machette\*  
 David B. Mackenzie\*  
 David G. Majewski\*  
 Anson Mark  
 Malcolm E. McCallum\*  
 Jeremy A. McCreary  
 Robert H. Moench\*  
 Roger B. Morrison\*  
 Chris Morrison  
 James W. Mytton  
 Charles W. Naeser  
 Nancy D. Naeser  
 Douglas J. Nichols\*  
 Richard L. Nielsen\*  
 Allison R. Palmer\*

Frank J. Pazzaglia\*  
 Stephen F. Personius  
 Mark A. Petersen  
 Fred Peterson  
 William T. Phelps  
 Forrest G. Poole\*  
 John M. Rakowski  
 Marith C. Reheis  
 Richard L. Reynolds  
 Cynthia Rice  
 Jacques F. Robertson\*  
 Charles S. Robinson  
 Edward T. Ruppel  
 Michael B. Sawyer  
 Dwight L. Schmidt\*  
 Henry R. Schmoll  
 Richard. A. Sheppard  
 Betty A. Skipp  
 Marjorie C. Smith\*  
 Mark R. Stanton  
 Bradley S. Van Gosen  
 Susan R. Wager  
 Alan R. Wallace  
 John E. Warme  
 Timothy F. Wawrzyniec  
 Joseph L. Weitz  
 Paul L. Williams  
 Reinhard A. Wobus  
 Robert A. Zielinski

## Where have you gone, Joe DiMaggio?

---

No, we are not really looking for Joe, but we are looking for CSS members whose mail and/or e-mail has been returned to us. Please help us keep our database up-to-date – if you know the whereabouts, current address or e-mail address for the following members, please send this information to Cory Conrad, database manager, at [cconrad@knightpiesold.com](mailto:cconrad@knightpiesold.com)

Members for whom we need a current e-mail address:

Paul Belanger; Paul Orkild; Donal Mullineaux; and William T. Phelps

Members for whom we need a current regular mail address:

Paul Belanger; Richard Pratt; Reuben Ross, Jr.; Rodney Stromberg; Daniel Kile; and Ulli Limpitlaw

## Mark Your Calendars!

---

Family Night is on April 15<sup>th</sup>! We will start with a social hour at the beautiful, new mineral museum at CSM, followed by a buffet dinner at the Student Center. After dinner, Bob Bakker, author of *Dinosaur Heresies*, and Matt Mossbrucker, Director of the Morrison Museum, will regale us with dinosaur talk. Bob is a superb artist and will sketch dinosaurs for the kids while he talks. Save that date for your whole family!

The following field trips have been scheduled:

**April 23--** North Table Mountain, Harald Drewes, trip leader

**May 14—**Spanish Peaks, Brian Penn, trip leader

## New Interpretive Geology Signs in Golden

---

By Sue E. Hirschfeld, CSS Outreach Committee Chair

The Colorado Scientific Society Outreach Committee has created four new interpretive geologic signs in Golden, Colorado that have been erected at the "Triceratops Trail" and the overlook patio at the Buffalo Bill Museum on Lookout Mountain. Two signs at each location cover the geologic history of the Golden area and Front Range from 80 million years ago to the present. They complement the signs already posted along Dinosaur Ridge, at Red Rocks Park, and the I-70 road cut.

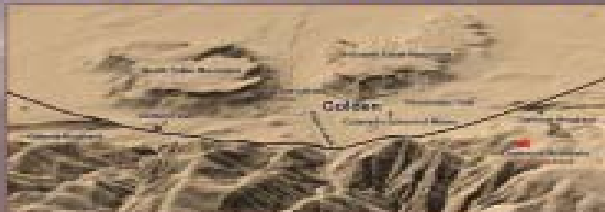
The "Triceratops Trail" is a self-guided, 1/4 mile loop trail that crosses part of the Laramie Formation. Along the trail are well-preserved dinosaur, bird, mammal, and beetle tracks, exquisite palm fronds, other plant remains, and indications of former clay mining operations. The trail is just south of 19th Street, adjacent to the northwest corner of Golden's Fossil Trace golf course. It can be reached from the paved bike path that parallels Highway 6. Stop at Dinosaur Ridge Visitor's Center 16831 W. Alameda Parkway to pick up a free descriptive brochure to the trail or follow the interpretive signs along the trail.

To see the signs at the Buffalo Bill Museum overlook, follow the Lariat Loop up Lookout Mountain Road. The sign are on the patio just the north of the Museum.

My thanks to the CSS Outreach Committee members, Paul Belanger, Bruce Bryant, Jim Cappa, Emmett Evanoff, Lisa Fisher, Thom Fisher, Clare Marshall, Vince Matthews, Eric Nelson, and Bob Weimer, who put in many hours at meetings over two years taking the signs through numerous


recreations and revisions. Special thanks to Bob Weimer for allowing us to use his graphics and Clare Marshall for revising the graphics. Thanks also to Joe Temple, Matt Carey, and T. Caner from Friends of Dinosaur Ridge for their assistance, and to Kimary Marchese of the Buffalo Bill Museum. Financial support came from SCFD, American Association of Petroleum Geologists, Rocky Mountain Association of Geologists, Colorado School of Mines, and Colorado Geological Survey.

### WHAT YOU CAN SEE FROM HERE TODAY



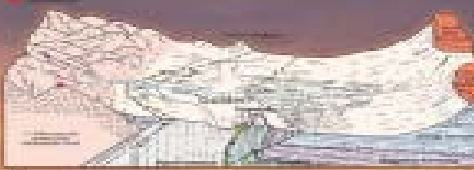
Golden

**Southwest Colorado's Map**



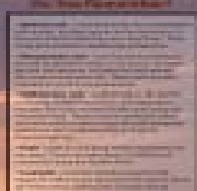
Geological features shown include the Front Range, Teton Range, and various basins and plateaus.

**Geological Cross-section**



The landscape is a result of tectonic forces that have compressed the rocks into the folds and faults you see today. The rocks are made of sedimentary rocks that were deposited in a shallow sea that once covered the area. The rocks are made of sedimentary rocks that were deposited in a shallow sea that once covered the area.

**The Front Range Basin**




The Front Range Basin is a large, elongated basin that stretches from the north to the south. It is bounded by the Front Range to the north and the Teton Range to the south. The basin is filled with sedimentary rocks that were deposited in a shallow sea that once covered the area.

### OUR CHANGING LANDSCAPE - FROM SEA FLOOR TO MOUNTAIN TOP


Colorado's geologic history goes back nearly two billion years. Several mountain ranges have been uplifted and eroded away twice the size of today's Rocky Mountains. The landscape you see in front of you has undergone many dramatic changes. This story starts at an earlier time ago.

**The sea covers Colorado: 670 million years ago**



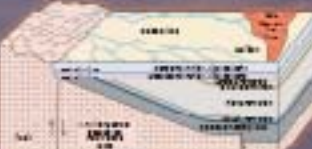
Today's Rocky Mountains did not exist. Most of the area was covered by a shallow sea. The sea was shallow and warm. The sea was shallow and warm. The sea was shallow and warm.

**Sea retreats and mountains begin to rise: 470 million years ago**




The sea was shallow and warm. The sea was shallow and warm. The sea was shallow and warm. The sea was shallow and warm.

**The mountains rise again: 400-300 million years ago**



The mountains were rising. The mountains were rising. The mountains were rising. The mountains were rising.

**The Rockies today: 67 million years ago**



The Rockies were rising. The Rockies were rising. The Rockies were rising. The Rockies were rising.



# Earth Science Meetings and Talks



Newsletter items must be received by the 25th of each month. Items may include special events, open houses, etc...thanks!

**Colorado Scientific Society's** regular meetings are held the 3rd Thursday of the month at the American Mountaineering Center 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 Vince Matthews at 303-866-3028 or [vince.matthews@state.co.us](mailto:vince.matthews@state.co.us)

**Western Interior Paleontological Society Founders Symposium 2005, *Extinctions: Punctuations in Time***. Mar 12,13, 2005, Green Center, Colorado School of Mines. 303-795-0077.

**Denver Mining Club** meets every Monday (except when noted) at Country Buffet near Bowles and Wadsworth (at 8100 W. Crestline Ave.) 11:30 a.m.-1:00 p.m. <http://china-resources.net>. Mar 14, Peter Spina, "The gold bull market hasn't started, yet." Mar 28, Mary Henry, "Mining activities can coexist with mining regulations."

**Denver International Petroleum Society** meets the second 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) 932-0137, or the website <http://www.dregs.org>. Mar 14, Murray Hitzman, "Uranium in iron oxide Cu-Au deposits".

**Denver Well Logging Society (DWLS)** meets on the third Tuesday of each month, Sept. through May. Lunch and a technical talk at the Wynkoop Brewery begins at 11:30 a.m., 18th and Wynkoop Sts. in Denver. Subject matter usually deals with the application of well logs to oil and gas exploration. Call Elice Wickham at 303-573-2781 for reservations. Web page: <http://dwls.spwla.org>.

**Rocky Mountain Association of Geologists (RMAG)** Reception at 11:30 a.m., lunch at noon, talk at 12:30 p.m. Reservations are taken by recording at 303-623-5396 until 10:30 a.m., Wed. before the luncheon. Cancellations are taken until 11:00 a.m. on Wed. at 303-573-8621. Luncheon cost is \$20 payable to RMAG at the door. Talk only (no res)—cost is \$3. Meeting location: Denver Petroleum Club, Anaconda Tower, 555-17th St, 37th floor. Web page: <http://www.rmag.org>.

**Rocky Mountain SEPM** Reception at 11:30, lunch at noon, speaker at 12:30. Reservations, Dave Uhl:303-389-5092 before noon of preceding Friday. \$15.00 lunch, \$3 talk only. Wynkoop Brewing Company, 1634 18<sup>th</sup> St., Denver. [David.uhl@EnCana.com](mailto:David.uhl@EnCana.com). Mar 29, Jane Estes-Jackson, "Reservoir characterization of the Wasatch Formation in the Hanging Rock development area, se Uinta Basin."

**University of Colorado at Boulder, Geological Sciences Colloquium** Wednesdays, 4:00-5:30 p.m., Rm. 180.Refreshments at 3:30 pm on the 3rd floor. For more information, call 303-492-8141. Web page: <http://www.colorado.edu/GeolSci>.

**Colorado State University, Dept of Geosciences**, Rm 320 Natural Resources Bldg, 4:10 pm. 3/28 Bill Sanford, CSU; Apr 4, Greg Tucker, CU, "Modeling drainage basin evolution". 970-491-5661. <http://www.cnr.colostate.edu/geo/seminars/spring2005.html>

**Friends of Dinosaur Ridge** meets at 7:00 pm at Red Rocks Elementary School in Morrison, Colorado. Join now. Web page: <http://www.dinoridge.org>. Admission is free, but donations are welcome. Fireside chats resume in the fall. For more information please contact the FODR Visitor Center at (303) 697-3466 .

**Colorado School of Mines, Van Tuyl Lectures** Fridays from 3:00-4:00 p.m. in Berthoud Hall room 108. Mar 11, Marta Torres, "Marine sediments: where, how and why we study these deposits." <http://www.mines.edu/academic/geology.html>

**USGS Geologic Division Colloquium**. Thursdays, 1:30 p.m., Foord Room, Building 20, Denver Federal Center. For more information contact: Peter J. Modreski, U.S. Geological Survey, Denver, Colorado tel. 303-202-4766, fax 303-202-4767 email [pmodreski@usgs.gov](mailto:pmodreski@usgs.gov).

**Colorado School of Mines Spring Break Session**, Mar 19-27, "Exploration and Mining Law" GEGN 598B. Contact Dr. Graham Cross, CSM, 303-273-3856.

**For a constantly updated, online geo-calendar, visit the Colorado Geological Survey at**  
<http://geosurvey.state.co.us>

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

<http://www.coloscisoc.org>



## OFFICERS

President: Vince Matthews, CGS, 866-3028, [vince.matthews@state.co.us](mailto:vince.matthews@state.co.us)  
President-Elect: Chuck Kluth, CSM, 904-2939, [kluth@earthlink.net](mailto:kluth@earthlink.net)  
Treasurer: Don Sweetkind, USGS, 236-1828, [dsweetkind@usgs.gov](mailto:dsweetkind@usgs.gov)  
Secretary: Lisa Fisher, CSM, 567-2403, [lfisher@mines.edu](mailto:lfisher@mines.edu)  
Past President: Emmett Evanoff, CU-B, 444-2644, [emmettevanoff@earthlink.net](mailto:emmettevanoff@earthlink.net)

## COUNCILORS

2003-2005: John Lufkin, Cons., 216-1076, [Lufk3@aol.com](mailto:Lufk3@aol.com)  
2003-2005: Matt Morgan, CGS, 866-2066, [matt.morgan@state.co.us](mailto:matt.morgan@state.co.us)  
2004-2005: Celia Greenman, CGS, 866-2811, [celia.greenman@state.co.us](mailto:celia.greenman@state.co.us)  
2004-2006: Sue Hirschfeld, Cons., 720-565-9302, [egdoc@ix.netcom.com](mailto:egdoc@ix.netcom.com)  
2004-2006: Lee Shropshire, UNC, 970-352-8778, [leeshrop@att.net](mailto:leeshrop@att.net)

## COMMITTEE CHAIRPERSONS

Best Paper Award: Mark Hudson, USGS, 236-7446, [mhudson@usgs.gov](mailto:mhudson@usgs.gov)  
Database Manager: Cory Conrad, USGS, 629-8788, [cconrad@knightpiesold.com](mailto:cconrad@knightpiesold.com)  
Field Trips: Emmett Evanoff, UCB, 492-8069, [evanoff@colorado.edu](mailto:evanoff@colorado.edu)  
Graphics: Karen Morgan, CGS, 866-3529, [karen.morgan@state.co.us](mailto:karen.morgan@state.co.us)  
History: Marjorie E. MacLachlan, USGS-retired, 986-7192, [jcmemaclachlan@aol.com](mailto:jcmemaclachlan@aol.com)  
Membership: Cory Conrad, 629-8788, [cconrad@knightpiesold.com](mailto:cconrad@knightpiesold.com)  
Memorial Funds: Emmett Evanoff, 444-2644, [emmettevanoff@earthlink.net](mailto:emmettevanoff@earthlink.net)  
Newsletter Editor: Celia Greenman, CGS, 866-2811, [celia.greenman@state.co.us](mailto:celia.greenman@state.co.us)  
Outreach: Sue Hirschfeld, 720-565-9302, [egdoc@ix.netcom.com](mailto:egdoc@ix.netcom.com)  
Program: Vince Matthews, CGS, 866-3028, [vince.matthews@state.co.us](mailto:vince.matthews@state.co.us)  
Publicity: Mearl Webb, 810-1296, [mf\\_webb@msn.com](mailto:mf_webb@msn.com)  
Science Fair: Chuck Weisenberg, 238-8806, [cweisnbrg@aol.com](mailto:cweisnbrg@aol.com)  
Webmaster: John M. Ghist, 303-875-9671 [jmghistcss@msn.com](mailto:jmghistcss@msn.com)

**\*\* STOP!** Don't 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!*