

Colorado Scientific Society

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

49th Annual S.F. Emmons Lecture

Crete before the Cretans: Palaeolithic Mariners in the Mediterranean

by

Dr. Thomas F. Strasser

Providence College, Rhode Island



Photo credit: Nicholas Thompson and Chad DiGregorio



Thursday, April 21, 2011

Golden High School Auditorium

701 24th St., Golden, CO (see map inside)

Social half-hour—7:30 p.m. Meeting time—8:00 p.m.

Surprise!!

2011 Colorado Scientific Society Emmons Lecture

Abstract

Crete before the Cretans: Palaeolithic Mariners in the Mediterranean

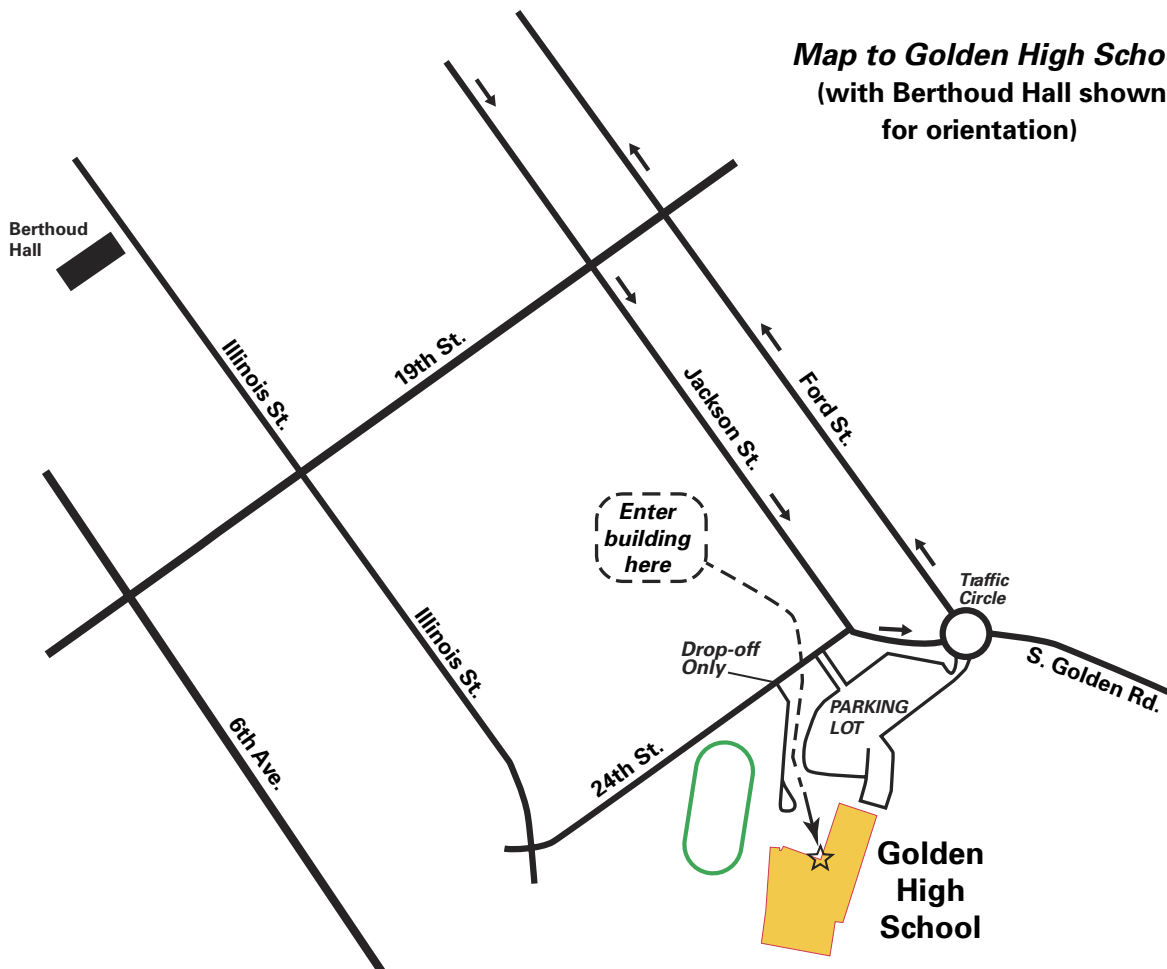
by

Dr. Thomas F. Strasser
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A survey in 2008 and 2009 on the southwestern coast of Crete in the region of Plakias documented 28 preceramic lithic sites. Sites were identified with artifacts of Mesolithic type similar to assemblages from the Greek mainland and islands, and some had evidence of Lower Palaeolithic occupation dated by geological context to at least 130,000 years ago. The long period of separation (more than 5,000,000 years) of Crete from any landmass implies that the early inhabitants of Crete reached the island using seacraft capable of open-sea navigation and multiple journeys—a finding that pushes the history of seafaring in the Mediterranean back by more than 100,000 years and has important implications for the dispersal of early humans. (taken from Thomas F. Strasser and others, 2010, *Stone Age Seafaring in the Mediterranean—Evidence from the Plakias Region for Lower Palaeolithic and Mesolithic Habitation of Crete: Hesperia*, v. 79, p. 145–190.)



Map to Golden High School
(with Berthoud Hall shown for orientation)



President's Message from Lisa R. Fisher



Thanks again for another good attendance at our March 24 Peru Night! Between Earl Brooks's ancient mines, and Ruth Wright's fabulous photos and presentation of Machu Picchu, I believe everyone is ready to fly on down there. Now, we just need that free jet....

Don't forget that Thursday April 21 is our rescheduled Emmons Lecture! Let's hope we don't get one of our April blizzards. I am certainly looking forward to Dr. Strasser's new archeological finds in Crete, and the resulting implications for early man's seafaring and other capabilities. This research should certainly spark discussions and further research into the evolution of human intelligence. In my opinion, our ancestors have been short-changed in terms of estimations of what they were able to accomplish.

Dr. Strasser will be here Wednesday evening through Friday noon, so there will be opportunities for those interested to talk or host/share meals with him. Please contact me if you would like to meet Dr. Strasser by either hosting or attending a meal or daytime tour. I think it would be proper to show him a nice Colorado welcome—and an opportunity for fascinating discussion!

Wednesday May 18 is our final spring meeting, at Berthoud Hall room 241—CSM campus. One of our speakers will be Timothy Wawrzyniec, the Moncrief Chair of Petroleum Geology at Western State College, Gunnison. His talk is entitled, "Cenozoic Rotation of the Colorado Plateau: Regional analysis of proposed Euler Pole Rotations from modeling and fault kinematic analysis."

Field Trip—CSS has another great field trip coming up—see the announcement for details! There is an optional bicycle trip *downhill* (!) through Glenwood Canyon on the Sunday following the main Friday and Saturday activities. I hope you will spread the word to the students and young professionals you know who would be interested. I think it's a great way to provide interesting and exciting activities to attract new members. (And some of us slightly older members can use the exercise too....)

Meeting Refreshments—Refreshments at our meetings have been kindly donated by the same few individuals for the last several months. If you have been enjoying this, please either drop a contribution into the jar, or contact Ben Harrison if you'd like to take your turn to bring refreshments for a meeting.

CSS Logo Items—CSS has glass steins with the CSS logo on order. For every donation of \$7.00 you make to the Society, you will receive one of these steins as our thank you gift! We are also considering ordering other logo items, send in your ideas. And for those of you with an artistic bent, send in t-shirt designs!

Save the Date!—Friday April 29 will be our Annual Past Presidents' Dinner at the Golden Hotel. More details will follow—watch for our upcoming announcement! At this annual dinner, we honor our past presidents and volunteers of the Society, have some fun with earth science, and also enjoy a chance to just sit back and catch up with each other over a nice meal.

Volunteer Opportunities—There are several avenues for volunteering in the Society. One of the great needs is in education and outreach. We are looking for mentors at all levels, K-12, college, and for young professionals. It's time for CSS to become more active in this endeavor. Contact me! (see p. 8 for contact info.)



2011 Past-President's Dinner—Friday, April 29 at the Golden Hotel

We are still working out the details for the dinner, and we will send out a separate announcement when everything is confirmed. Please note, for the first time, we are opening the dinner to the general membership. We hope you will take this opportunity to visit with colleagues and friends, and if you're feeling generous, sponsor a student to attend. Stay tuned for details!



2011 CSS Spring Field Trip
Late Cenozoic Evolution of the Colorado Rockies:
Evidence for Neogene Uplift and Drainage Integration and New Insights into the
Cambrian-Devonian Depositional Systems and Paleoenvironments of Western North America

When: May 6–7, 2011

Leaders: Andres Aslan, Mesa State College, Grand Junction, Colo.

Paul Myrow, Colorado College, Colorado Springs, Colo.

Where: Glenwood Springs and the Colorado River corridor

**with optional
Bike Trip down
Glenwood Canyon!!

This Spring's field trip will involve exploring the late Miocene to present geomorphic evolution of the Colorado River system as well as take a look into paleoenvironments of much greater antiquity of the Cambrian to Devonian record. The Colorado River system, as the single river system that drains the western slope of the Colorado Rocky Mountains, is a sensitive gauge of the uplift history and landscape evolution of the western U.S. The first part of this trip focuses on the Upper Colorado River basin and evaluates the hypothesis that the river system and modern Colorado Rockies are being shaped by neotectonic epeirogenic uplift, interacting with climatic and geomorphic forcings. The view presented here is that this epeirogenic uplift is primarily related to mantle buoyancy and, to a lesser extent, isostatic adjustments, caused by regional denudation.

Andres will lead us to stops in the upper Colorado River basin. These will include 1) Lookout Mtn. to view the remnants of the late Miocene paleo-land surface that records the start of regional denudation in the Colorado Rockies, as well as river gravels interpreted to represent a ca. 10 Ma ancestral Colorado River, 2) Glenwood Canyon to discuss the canyon's incision history, and 3) Dotsero to view the Lava Creek B tephra associated with ca. 640 ka ancestral Colorado River gravels. This last stop involves a short hike with about 350 ft of elevation gain.

Together with Paul, we will first visit a section that exposes rocks of the Upper Cambrian Dotsero Formation. It includes a variety of shallow marine facies typical of the Cambrian inner detrital belt of North America, namely shale, pelloidal grainstone, and flat-pebble conglomerate. The grainstone contains evidence for traction transport and deposition under storm-generated oscillatory currents (e.g., small-scale hummocky cross-bedding). The flat-pebble conglomerate is also considered to be a product of storm deposition. We will examine a variety of unusual and enigmatic synsedimentary deformation structures in these facies and discuss their possible origins. In addition, we will look at a regionally extensive stromatolite bed, the Clinetop Stromatolite, and associated features. Conodont and trilobite data on these deposits will be presented, as well as evidence for a disconformity in the vicinity of the Clinetop bed. We will then walk through the lowermost Ordovician Manitou Formation, a unit dominated by fine grainstone. At the top of the unit, there is a prominent disconformity with Upper Devonian strata of the Chaffee Group, the lower Parting Formation. This part of the section contains quartz sandstone, shale, and minor limestone beds, as well as many unique features including halite casts, early fish fossils, and a variety of different types of cross stratification. A conspicuous transgressive sandstone with dune-scale cross stratification and abundant *Skolithos* trace fossils is overlain by a paleo flooding surface that underlies muddy open marine carbonate of the Dyer Formation. We will examine a paleokarst higher in the unit that may represent the Late Devonian Hangenberg Event. Carbon isotopic data on the section will be provided that show a major positive isotopic excursion associated with this bed.

Details: Departure will be Friday afternoon, May 6, at 1:00 pm. Check in time at the hotel is 3 pm, after which you can roam Glenwood Springs or visit the famous hot springs for a soak. Saturday morning we will depart at 7:30 to begin our day with Andres and Paul. We plan on returning to Denver on Saturday evening by 5:30 pm. Depending on the number of attendees who cannot depart at 1:00 pm on Friday, we possibly will have a later departure with another van, or those folks could carpool and come at their own leisure. **In addition, we have a BONUS BIKE RIDE!!** For those who would like to stay another day and ride the bike path through the canyon, please make reservations for a second night and we can arrange a shuttle drop off for you at Dotsero on Sunday morning.

Lodging: Rooms have been reserved at the Holiday Inn in Glenwood Springs. Roommates can be arranged beforehand or when checking in at the hotel. Those who would like to camp and meet up with the trip on Saturday can do so at their own discretion. In order to speed up the check-in process at the Holiday Inn, attendees should call and reserve their rooms, at (970) 928-7800 stating that they are with the CSS field trip.

Meals: There are many restaurants to choose from in Glenwood Springs for Friday night. A continental breakfast will be provided free of charge at the Holiday Inn on Saturday morning. Please bring lunches for yourselves on Saturday afternoon, drinks will be provided, and we will be back in Denver by the early evening.

Cost: \$79/ double room, plus van fee, which will be announced once it is determined (approx. \$35).

Registration Deadline: April 27, 2011

Contact: For reservations, payment info., or other questions contact Cal Ruleman, (303) 236-7804 or (303) 859-0911, cruleman@usgs.gov or calruleman@yahoo.com if there is a government shutdown.

****Student Scholarships Available**** Scholarships from the Pillmore Fund to cover expenses are available for qualifying students. Contact Cal Ruleman to RSVP, (303) 236-7804 or (303) 859-0911, cruleman@usgs.gov or calruleman@yahoo.com.



Glenwood Canyon, eroded by downcutting of Colorado River into east flank of the White River Uplift. View is eastward, upstream. Road is old US 6, before construction of I-70. Exposed at this location in left (north) canyon wall are lower Paleozoic strata, from Cambrian Sawatch “Quartzite” at bend of highway up to Mississippian Leadville Limestone at top. (*Photograph taken by Lee Shropshire in 1961.*)



View SW over Colorado River near Burns, Colorado. Near axis of Burns Syncline. Standing on Cretaceous Dakota Formation, which also caps much higher surface in distance, right side of picture. Kd underlain by Jurassic strata, including Morrison Formation (under mostly tree-covered slope) and Entrada Sandstone (whitish, ledgey beds), and below Je, red beds of the Triassic Chinle and State Bridge Fms. at river level. Red hill in left distance composed of Permian Maroon Fm. and Pennsylvanian Minturn Fm. Also shown are some high and low-level terraces marking

various stages of downcutting and stability of the river as the area intermittently uplifted. (*Photograph taken by Lee Shropshire in 1964.*)

Tohoku Earthquake Affects Mineral Supplies—from 3/28/2011 USGS News Release

In addition to its other effects, the magnitude 9.0 Tohoku earthquake that struck northeast Japan on March 11, 2011, will affect Japan’s and the world’s supply of some minerals, at least temporarily. Up to one-quarter of the world’s iodine and one-third of Japan’s cement production may be affected, according to a recently released U.S. Geological Survey (USGS) report. The USGS report indicates that the area affected by the earthquake is home to eight iodine plants and nine cement plants, as well as 15 other nonfuel mineral processing facilities and four limestone mines.

Factors that affect these mines and mineral processing plants include not only the physical damage inflicted on them by the earthquake, but also the damage done to the surrounding infrastructure. Mineral extraction and processing facilities require large quantities of electricity, and much of Japan’s electrical power capability in the affected area was severely damaged. Some mineral facilities that sustained no damage from the earthquake have been forced to shut down because of limits placed on electricity usage.

Transportation infrastructure is also important to mineral processing and extraction, as highways, railroads, and ports are required both to supply raw materials and to ship finished products. Japanese media outlets have reported damage to 12 ports in area, as well as widespread railroad damage.

Japan is the world’s second leading iodine producer, after Chile, with roughly 33 percent of the world’s total. The eight affected refineries alone have the capacity to produce 25 percent of the world’s iodine. Iodine is used primarily in liquid-crystal displays for electronic devices and x-ray contrast media. High doses of nonradioactive iodine (usually as potassium iodide) can protect people exposed to high levels of radiation from health problems later in life.

In addition to iodine, Japan is a leading source of titanium metal, and its facilities in the affected area have the ability to produce 10 percent of the world’s titanium metal. The new report, *Mines and Mineral Processing Facilities in the Vicinity of the March 11, 2011, Earthquake in Northern Honshu, Japan*, is available online at: <http://pubs.usgs.gov/of/2011/1069/>




Our March speaker, Earl Brooks, has received a Fulbright award and will be teaching at the *Universidad Nacional de Colombia, Bogota*, in 2011 or early 2012. As part of the award, he will be continuing his research into ancient and modern small-scale gold mining and the use of mercury in Colombia. Congratulations to Earl!!

Sat., May 7, Dinosaur Discovery Day at Dinosaur Ridge, Morrison, CO, featuring Boy Scout/Cub Scout Day, 9 a.m. to 3 p.m. Special activities are planned for Scouts but the public are welcome too. Please use off-site parking (\$5 charge) at Thunder Valley, north of the Dino Ridge Visitors Center on Rooney Road; a free shuttle bus will take you to the Visitors Center.

As always, we need volunteers! The shifts will be from 9 a.m.–12:30 p.m. and 12:30–3:00 p.m. If you'd like to help, please contact Clare Marshall at dino-discovery@dinoridge.org, 303.697.3466 ext. 15.



“Earth scientists and paleontologists will present fossil, mineral and rock ID, fossil sieving, fossil scribing, fossil digging, gold panning, metal detecting, map reading, analyzing ground water, dinosaur storytime, and dinosaur puppet shows at the Visitor Center. More scientists will speak at the world-famous track site and bone site and another 10 sites on the Dinosaur Ridge Trail. Astronomy Day will also be celebrated with door prizes and activities such as solar observing, searching for iron meteorites, a meteorite collection, finding the North Star in daytime, a K-T Boundary Layer Specimen and understanding Milankovitch cycles. Admission and hiking the trail are free. An optional shuttle bus costs \$3 with ages 4 & 5 half price and 3 and under free. Activities are designed for Cub Scouts and Webelos to earn astronomy and geology awards and for Boy Scouts to earn the Geology Merit Badge. Participating Scouts must register using a form on www.dinoridge.org/scoutdays.html.” Dinosaur Ridge is located just west of the C-470 exit at Alameda Parkway.



Fri.-Sun., Apr. 22–24, Colorado Mineral and Fossil Spring Show, Holiday Inn-Denver Central, 4849 Bannock St, Denver, CO 80216; free admission & parking. For more info see http://www.mzexpos.com/colorado_spring.htm

Sat., Apr. 23, 10 a.m.–2 p.m., Colorado Springs Mineralogical Society Second Annual Silent Auction & Bake Sale, at the Western Museum of Mining & Industry, 225 North Gate Blvd. (I-25 Exit 156A), Colorado Springs, CO. “Lots of fun for the entire family! Mineral specimens, slabs for lapidary work, fossils, and finished pieces; come see the Museum, have fun bidding on favorite items, and take home a few goodies to eat later. Standard WMMI admissions apply; CSMS and WMMI members admitted free.”

Fri., Apr. 22, Earth Day! Earth Day Geology/Nature Hike on South Table Mountain, 4:00 until 7:00 p.m., led by USGS geologist Pete Modreski; a late afternoon walk to the top of South Table Mountain, up on to “Castle Rock” overlooking Golden. Meet at 4:00 p.m. at the trail-head near the intersection of 19th St. and Belvedere St. in Golden (follow 19th St. east until it ends at the base of South Table Mountain). The hike follows a good but steep trail to the top, about 2 miles round trip and about 500 feet elevation gain. All are welcome, no fee or registration needed, but please contact Pete Modreski, pmodreski@usgs.gov, 303-202-4766 or 720-205-2553 with questions or in case of inclement weather.





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 Thursday of the month at the Colorado School of Mines 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 Lisa Fisher, at 303-215-0480, lisa.fisher@escalantemines.com

Colorado School of Mines, Van Tuyl Lectures Thursdays from 4–5 p.m. in Berthoud Hall room 241. **Apr. 14** *Dr. Mark Williams, University of Colorado—Boulder, "TBA."* http://geology.mines.edu/calendar/Van_Tuyl.html

Colorado State University, Dept of Geosciences, Rm 320 Warner College of Natural Resources Bldg., Mondays, 4:00 pm. 970-491-5661. **Apr. 11**, *Dr. Ye Zhang, Univ. of Wyoming, "Upscaling & Model Complexity in Subsurface Flow Simulation: Insights Gained & On-going Research."* **Apr. 18**, *Dr. Lisa Morgan, USGS, "The track of the Yellowstone Hot Spot: Past, Present, and Future."* **Apr. 25**, *Fred L. Ogden, Univ. of Wyoming, "The search for analogs to Martian gullies in Antarctica."* **May 2**, *Dr. Carl Legleiter, Univ. of Wyoming, "Measurement and mapping of riverine environments via optical remote sensing."* <http://warnercnr.colostate.edu/geo-training/>

Denver Mining Club **Apr. 11**. *Tony Hammond, Mining Engineer and GIS Analyst, "The State of Mining in Peru."* **Apr. 18**. *Tara Davis, Membership and Marketing Manager, Society for Mining, Metallurgy and Exploration, "The New SME."* **Apr. 25**. *Robert E. Hartzell, Executive Director, NMHF&M, "The National Mining Hall of Fame & Museum in Leadville."* The DMC meets every Monday at the Littleton Country Buffet near Bowles and Wadsworth (8100 W. Crestline Ave., in the shopping center) 11:30–1:00. Purchase of lunch required. <http://www.denverminingclub.org>

Denver Museum of Nature and Science **Wed., May 4, 12:15 p.m.**, Curator's Lunchtime Lecture, "Mars Explorer update," by *Dr. Steve Lee, Curator of Planetary Science and chair, Space Sciences Dept.*, Ricketson Auditorium. Free with Museum admission. <http://www.dmns.org/learn/adults/lunchtime-lectures>

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. Call Sarah Voight at 720-946-1374 by prior Thursday for reservations. <http://dwls.spwla.org> **Apr. 19**. *Brian Pluemer and Mark McCallum, Schlumberger, "Microseismic and Crosswell seismic case study from the Piceance Basin."* **May 14–19, 2011**—SPWLA Symposium, Colorado Springs, CO, <http://www.spwla2011.com/>

Rocky Mountain Association of Geologists (RMAG) **May 4**. *Janell Edman, "Geochemical evaluation of Eagle Ford Group source rocks and oils from the First Shot Field, Texas: Implications and applications for appraisal of Eagle Ford resource plays."* Reservations by recording at 303-623-5396 until 10:30 a.m., prior Wed. Luncheon \$30. Talk only (no reservation)—\$5. Denver Marriott City Ctr., 17th & California. <http://www.rmag.org/events/index.asp#upcoming>

Rocky Mountain SEPM **Apr. 26** *Andres Aslan, Mesa State University, "The role of avulsion during valley filling: examples from the Louisiana and Texas Gulf Coast."* Reception at 11:30 p.m., lunch at 11:45 a.m., speaker at 12:15 p.m. Reservations: luncheons@rmssep.org, before noon of preceding Friday. \$20.00 lunch, \$5 talk only. (or call Peter Bucknam at 303-895-4698) Wynkoop Brewing Company, 1634 18th St., Denver. <http://www.rmssep.org/luncheons.shtml>

USGS Rocky Mountain Area Seminar Series **Apr. 19** *Sky Briston, USGS, "Oil Budget Calculator for the Deepwater Horizon Gulf Incident."* Tuesdays at 10:30 a.m., Building 25 Lecture Hall, Denver Federal Center (Kipling St. & 6th Ave., Lakewood, CO; use the lg. parking lot east of Bldg. 25, and enter near center of building via main entrance on east side). Contact: Peter J. Modreski, USGS, 303-202-4766, pmodreski@usgs.gov

Univ. of Colorado, Boulder, Geol. Sciences Colloquium **Apr. 13**. *Vasilli V. Petrenko, INSTAAR, "TBA."* **Apr. 20**. *Steve Mojzsis, Univ. of Colorado, "Trace elements, sulfides, and the rise in atmospheric oxygen."* **Apr. 27**. *Demian Safer, Penn State, "IODP Distinguished Lecture."* Weds., 4:00 p.m., Benson Earth Sci. Auditorium, Rm. 180. Refreshments at 3:30 p.m. on the 3rd floor. <http://www.colorado.edu/geolsci/>

Western Interior Paleontological Society **Mon., May 2** *Toni Culver, Collections Manager, Univ. of Colorado Museum of Natural History, "The conundrums of private paleontological collections."* Doors open at 6:30 p.m., talk at 7 p.m., Ricketson Auditorium, Denver Museum of Nature & Science (all welcome, no admission charge). <http://www.westernpaleo.org/events.php>

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