



Colorado Scientific Society

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



Eureka Sound Group
(Eocene)
Ellesmere Island

**Paleontology, Paleoecology, and Climate
in an Early Eocene, High Arctic Swamp Forest**
Jaelyn Eberle, University of Colorado, Boulder



Arenal, an
Active composite
volcano.

Costa Rica: Geology, Sea Turtles, and Leafcutter Ants
John Lufkin, Ph.D.

Thursday, September 18, 2008

American Mountaineering Center

710 10th St. (NE corner 10th and Washington), Golden
Social half-hour – 6:30 p.m. Meeting time – 7:00 p.m.

Abstract

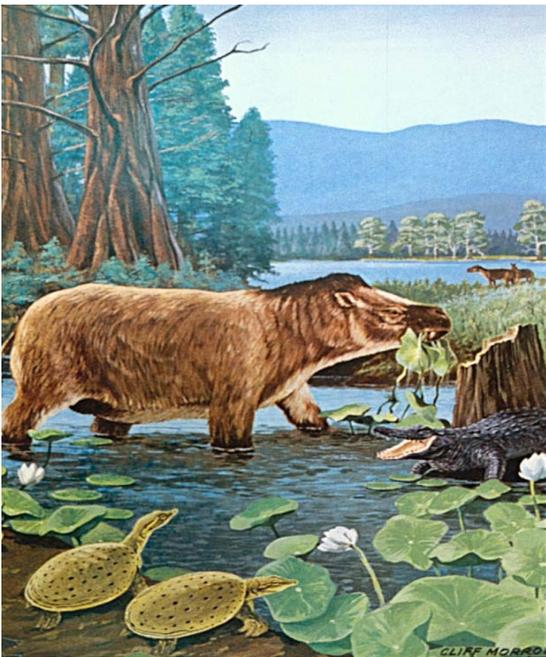
Paleontology, Paleoecology, and Climate in an Early Eocene, High Arctic Swamp Forest

By Jaelyn J. Eberle, University of Colorado Museum of Natural History and Dept. of Geological Sciences, Boulder, CO.

The Early Eocene marked the peak of global warming since onset of the Cenozoic Era (ca. the last 65.5 million years), when mid-latitude mean annual temperatures soared, and the High Arctic was home to lush swamp forests inhabited by alligators, giant tortoises, and a diverse mammalian fauna that included primates and tapirs. As the relevant fossil-bearing rocks of the Eureka Sound Group on central Ellesmere Island were well above the Arctic Circle during Eocene time and only 1–2° degrees farther south than today (~77° N.), this environment experienced months of continuous sunlight and darkness, the Arctic summer and winter, respectively.

After three decades of paleontological field research, the early Eocene (Wasatchian) mammalian fauna from the Eureka Sound Group on Ellesmere Island comprises over 20 genera, ranging

from tiny rodents and insectivorans to tapirs, brontotheres and hippo-like *Coryphodon*. Complementing the paleontology, stable isotope geochemistry, in particular oxygen and carbon isotope analyses of bone and tooth enamel, indicate a warm temperate paleoclimate and provide valuable paleoecologic insight into the early Eocene High Arctic vertebrate fauna. More specifically, $\delta^{18}\text{O}$ values from co-occurring mammals, turtle, and fish estimate mean annual temperature (MAT) at ~8–13°C, with a warm month mean temperature of up to ~24°C. Analyses of both carbon and oxygen isotope ratios of mammalian tooth enamel suggest that the large herbivorous mammals were year-round inhabitants in the Eocene High Arctic, which was a probable prerequisite to dispersal across northern high latitude land bridges.



The Eocene of Ellesmere Island

(painting by Cliff Morrow, Carnegie Museum of Natural History)



Tree in the Arctic

Abstract

Costa Rica: Geology, Sea Turtles, and Leafcutter Ants

By John Lufkin, Ph.D., consulting geologist

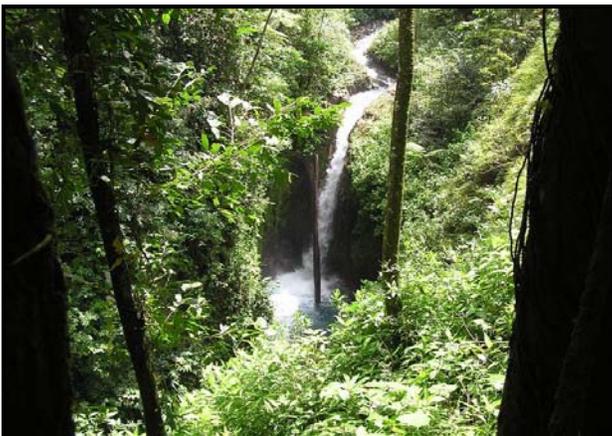
Costa Rica is located in Central America, bordered by Nicaragua on the north and Panama on the south. It is the second-smallest nation after El Salvador, and composed of almost 51,000 sq km. It is situated in the tropics, between 8 and 11 degrees north latitude. Most of the people of the country of over 3 million live in and around San Jose, the capital, located in the central part of the country. Liberia, with a population of 40,000, is the largest city in the north. I have made two visits to Costa Rica in the past two years, and have become particularly interested in the geology, sea turtles, and leaf cutter ants residing there.

Costa Rica lies at the junction of the Cocos and Caribbean plates. Consisting of heavier basaltic rock, the Cocos plate is being subducted eastward underneath the Caribbean plate. The process of subduction is widespread around the Pacific basin, where linear volcanic chains of andesitic rock are produced. The geology of northern Costa Rica is underlain by Cretaceous, Tertiary, and Quaternary rocks. Rocks of Cretaceous age include mostly shales, graywacke, conglomerate, limestone, and chert. The Santa Elena Peninsula, however, is underlain by ultramafic rock. The coastal area north of Santa Elena Peninsula is composed of sedimentary and volcanic rocks. The interior lowland is underlain by lacustrine sediments, tuffs, and dacitic lavas. The backbone of Costa Rica,

forming the dominant mountain range, or Cordillera, is volcanic in origin, and consists of pyroclastic rocks, tuffs, and lava flows of andesitic and basaltic composition. Thick deposits of pyroclastic mudflows, or lahars, flank the Cordillera. The greatest tourist attraction in Costa Rica is the majestic and active volcano, Arenal, a 5-hour drive ESE of Liberia. The eruptive history of Arenal spans about 7,000 years, and includes both explosive eruptions and more effusive, lava outpourings. Over the past 4,000 years Arenal has produced tephra layers roughly every 300 years.

There are seven species of sea turtles worldwide, and the Green, Leatherback, and Olive Ridley are common visitors to the beaches of Costa Rica. The Leatherback is the largest known sea turtle, and also the one without a solid shell. On the West Coast, the Leatherback has a protected nesting site in the vicinity of Playa Grande and Tamarindo. To the south, the Olive Ridley turtle nests on the beaches of Ostional.

The Leafcutter ants form huge colonies, and can be found throughout Costa Rica. They march single file through the rainforests on trails 1 foot wide, carrying leaf sections at least twice as large as the ants themselves. The life and importance of these interesting creatures will also be discussed briefly.



One of many waterfalls at Finca La Anita.



Leafcutter ant mound. Some of these critters form underground communities the size of a football field!

President's Notes, September 2008

By Matt Morgan

It is the time of year when field season is coming to an end and the feeling of fall is in the air. It is the time when I reflect upon what I did this summer and start to put together another geologic quadrangle map and report. For me, this past mapping season was one of the most memorable. Working east of Castle Rock, just south of the Town of Elizabeth, I gained a first-hand perspective of what geology means to people outside of the typical "ranks." These were the ranchers, farmers, artists, coffee shop clerks, and stay-at-home parents that have a keen interest in what I was doing for the Colorado Geological Survey ("THEIR" Geological Survey as our State Geologist often says). They wanted to know "where is the water?" or "is that stuff good for putting on my road?" or "how do YOU know how old that rock is?"

I found myself challenged, almost daily, and was enlightened that the folks, who effectively pay my salary, were eager to know what I was doing and why I was doing it. On a couple of occasions, I spent half a day giving interested landowners an impromptu geologic tour of their property. It is this type of close interaction makes my job worthwhile and also made me realize the responsibilities we have as geologists to educate the public. Not only does the future of our science rely upon such education, but the vitality of our society depends upon it.

Several members volunteered their time to help the CSS co-sponsor the August 2nd Dinosaur Discovery Day with the Friends of Dinosaur Ridge. The CSS members helped at the various stations along the Ridge, and food for all of the volunteers was provided by the

CSS. Hopefully, the CSS will continue co-sponsoring this event in the future.

I have also been getting very positive feedback for our outreach events. The turnout was excellent for the "New Insights into the Geologic and Geomorphic Evolution of the South Park Basin" field trip that was held on May 17th. Those that were in attendance were treated to a very well-run and informative trip. Thanks to Cal Ruleman, Bob Bohannon, Bob Kirkham, and Karl Kellogg for taking us on a wonderful geologic tour! And...both young and old(er) turned out for the chance to pound on rocks at the rescheduled Family Day at Harris Park on June 7. Some nice amazonite specimens went home. Thanks to Pete Modreski.

We also gained a few new members from the CSS booth at the Denver Gem and Mineral Club's show back in February. Thanks to Lisa Rukstales, Lisa Fisher, and Sue Hirschfeld for designing the display and attending the event.

Our website is undergoing a facelift. John Ghist is working hard on making the site more user-friendly by reorganizing and simplifying the pages. John is also working with Beth Simmons on creating new CSS history pages that are very informative. Be sure to check out these pages on our website.

The CSS will have a presence at the 2008 Denver Gem and Mineral Show, which takes place September 12-14 at the Merchandise Mart. Beth Simmons will be giving a presentation about the history of the CSS and our mineral collection on Saturday the 13th at 2:00 PM in the main lecture hall. She is also setting up a display case with the 10 most unusual mineral specimens in the CSS collection along with the famed "silver gavel". Come on out and enjoy the festivities!

2008 CSS Science Fair Awards

By Chuck Weisenberg

Every year, the Colorado Scientific Society presents special awards for the best earth Science projects at the state-wide Colorado State Science Fair, held in the Lory Student Center at Colorado State University.

On Thursday, April 10, 2008, CSM members Chuck Weisenberg and Tom Sutton judged the projects and awarded the following prizes:

Senior division:

First Prize: \$100 Gwyneth Glissman, 11th Grade, Peak to Peak Charter School, Lafayette
"Analyzing Arctic Solar Flux and Ice Extent Loss Projections"
Gwyneth did an amazing job gathering data and modeling the use of floating reflectors on the equatorial seas to reduce global warming. A creative idea and very well done.

Second Prize: \$75 Jeffrey Hibbert, 9th grade, Lone Star School, Otis
"Qualitative Assay of Radionuclide Species in Ash from Coal Combustion"
Jeffrey looked for radioactivity around a coal-fired power plant near his home. Impressive work for a 9th grader.

Junior Division:

First Prize: \$75 Isaac Beverlin, 6th grade, Dolores Middle School, Dolores
"ARCHES: Solid Rock to Windows in Time"
Isaac studied the frequency of natural arches within the different formations in Arches National Monument.

Second prize: \$50 Jennifer Bushnell & Kelsey Rohlfiing, 7th grade, Irving middle School, Colorado Springs
"Do your rocks need sunscreen?"
The girls studied the effects of sunscreens, etc. on florescent minerals. Unusual idea.

Fall Field Trip to Braddock's Caldera

By Karl Kellogg

The search for Braddock's Caldera: Field trip to the northern Never Summer Range volcanic field, September 6-7.

On September 6 and 7 CSS will visit the 29-27 Ma volcanic field of the northern Never Summer Range. Early basaltic to dacitic flows were followed by two major ignimbrite eruptions that originated from near Mt. Richthofen, now underlain by a granodiorite stock. These relationships led the late William Braddock to suggest that Mount Richthofen is the root of a deeply eroded caldera. This trip may include hikes of as much as about 3 miles. We'll stay overnight in Walden. As a sidelight, we'll also visit glacial features

of the upper Poudre River Valley. Trip leaders are Ed Larson, Mike O'Neill, Jim Cole, Karl Kellogg, and perhaps others. Student grants from the Pillmore Fund are available to cover expenses.

Registration is closed but Karl might have had some cancellations.

Contact Karl Kellogg (kkellogg@usgs.gov; (303) 236-1305) for questions or additional information.

CSS News

U.S. Geological Survey has published, "Table Mountain shoshonite porphyry lava flows and their vents, Golden, Colorado", by Harald Drewes, U.S. Geological Survey Scientific Investigations Report

2006-5242. Harald Drewes has led CSS and other field trips to Table Mountain. Now you can read, "the rest of the story."

Welcome new member, Ron Yamiolkoski. Ron lives in Monument, so may not make every meeting, but you might see him on our field trips.

Dinosaur Ridge is hiring Docents/Drivers

If you are interested in leading outside bus tours and indoor exhibit tours at Dinosaur Ridge, please contact Joe Tempel at 720-971-9649 or

Joe_Tempel@Dinoridge.org. Full-time or Part-time work; Hourly Wage: \$10.

Newsletter Help!

CSS is seeking a person to assume newsletter responsibilities. This is a fun job! Be among the first to learn of upcoming talks and fact-filled field trips. Attend council meetings and enjoy free pizza! Most importantly, you would have satisfaction in knowing

you are contributing to a valuable and enduring organization. If interested, please contact Celia Greenman at 303-291-7327, celia.greenman@state.co.us.

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 Matt Morgan, at 303-866-2066, matt.morgan@state.co.us



Denver Gem and Mineral Show Sep 12-14, Denver Merchandise Mart, 58th Ave. at I-25. Admission fee.

<http://www.denvermineralshow.com/>

Denver Mining Club meets every Monday at Country Buffet near Bowles and Wadsworth (at 8100 W. Crestline Ave., in the shopping center) 11:30-1:00. <http://china-resources.net>.

Denver Region Exploration Geologists' Society (DREGS) meets in the Mutual Consolidated Water Building, 12700 West 27th Avenue, Lakewood. Social 6:00-7:00 p.m. Presentation at 7:00 p.m. Meetings are normally scheduled for the first Monday of each month. Sep 8, Bill Bond, Paul Bartos, Esperanza Silver Corp, "The discovery of the Cerro Jumil gold skarn, Morelos, Mexico". For information contact Jim Piper, (303) 932-0137, or the website <http://www.dregs.org>.

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. Sep 16, John Webb, "Searching for lithofacies and reservoir information using petrophysical properties of Mesaverde tight-gas sandstones in western U.S. basins". Call Sarah Voight at 720-946-1374 by prior Thursday for reservations. Web page: <http://dwls.spwla.org>.

Rocky Mountain Association of Geologists (RMAG) Reception at 11:30, lunch at noon, talk at 12:30. Reservations by recording at 303-623-5396 until 10:30 a.m., prior Wed. Luncheon \$30. Talk only (no res)—\$5. Location: Denver Marriott, 17th & California. Sep 19, Kurt Reinecke, "Review of the southern exploration division of Bill Barrett Corp". <http://www.rmag.org>.

Rocky Mountain SEPM Reception at 11:30, lunch at noon, speaker at 12:30. Reservations: luncheons@rmssepm.org, before noon of preceding Friday. \$15.00 lunch, \$3 talk only. Wynkoop Brewing Company, 1634 18th St., Denver. <http://www.rmssepm.org>.

University of Colorado at Boulder, Geological Sciences Colloquium Weds, 4:00-5:30, Rm. 380. Refreshments at 3:30 on the 3rd floor. Sep 10, Jason Neff, "Manifest dust—the environmental legacy of the settlement of the western U.S." Sep 17, Karen Chin, "Using fossil feces to decipher ancient diets and trophic pathways." <http://www.colorado.edu/GeolSci>.

Colorado State University, Dept of Geosciences, Rm 320 Warner College of Natural Resources Bldg, Fridays, 4:10 pm. 970-491-5661. Sep 29, Samuel Akande, "Petroleum potential of the Nigerian inland basins." <http://welcome.warnercnr.colostate.edu/geo-training/index.php>

Friends of Dinosaur Ridge. Web page: <http://www.dinoridge.org>. Admission is free, but donations are welcome. Visitor's center, 16831 W. Alameda Parkway. Talks at 7:00 p.m. Sep 24, Toni Culver, UC Boulder, "Jumping tracks and other fossil tracks." FODR Visitor Center (303) 697-3466 or contact Beth Simmons at cloverknoll@comcast.net for information.

Denver Museum Nature and Science Sep 11, 7 p.m. David Montgomery, "Dirt, the erosion of civilizations" Gates planetarium, use Ricketson entrance. Sep 28, 4 p.m., Rob Mies, Organization for bat conservation, "Live bats!" (as seen on the Today Show). \$12 member, \$15 non-member. <http://www.dmns.org/main/en/General/Education/AdultProgram/Lectures/>

Colorado School of Mines, Van Tuyl Lectures Thursdays from 4-5 p.m. in Berthoud Hall room 108. Sep 20, Charles Paull, "Monitoring on-going sediment transport in Monterey Canyon." Sep 27, Roger Slatt, U of OK, "Application of outcrops to oil and gas exploration and production". <http://www.mines.edu/academic/geology>

USGS Geologic Division Colloquium. Thursdays, 1:30, 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.

Café Scientifique, Wynkoop Brewery, Sep 23, 6:30-8:00, "John Cohen, M.D., PhD. "The hygiene hypothesis, better living through dirt." Free, except for beer. <http://www.cafescolorado.org>

For a constantly updated, online geo-calendar, visit the Colorado Geological Survey at

<http://geosurvey.state.co.us>

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