Newsletter of the Society **September 1995**

Colorado Scientific Society

In pursuit of the promotion of knowledge,
the understanding of science,
and its application to human needs.

Geology of Maya Mountains Archeological Project Sites, Belize

by
William E. Brooks, USGS, Denver
Peter S. Dunham and Keith M. Prufer, Cleveland State University

Geologic mapping of Cenozoic to Paleozoic plutonic, volcanic, and sedimentary rocks and comparative study of building materials at several recently discovered Mayan ruins in the Maya Mountains, southern Belize, were carried out under informal agreement between the USGS and the Maya Mountains Archeological Project (MMAP), a multidisciplinary research project funded by the National Geographic Society.

Triassic Cockscomb Granite is the source of ruin material at two sites in the Cockscomb Basin. Euhedral 2-3-cm alkali feldspar megacrysts give both the source granite and ruin material a distinctive porphyritic texture. In the Cockscomb Granite, intersection of N-S and E-W joints with exfoliation planes permits easy quarrying of ~20 _ ~60 cm blocks. A meter-sized stream-rounded granite boulder was used as plaza decoration at one site, and stream-rounded, centimeter-sized cobbles of Paleozoic phyllite, quartzite, and vein quartz provided other construction fill. Sparse outcrops of ferricrete along drainages provided a nearby source of iron oxides for pigment.

A regionally distributed, pink-tan, micritic Cretaceous limestone is the source of most building material at the Esperanza-Snake Creek ruins. Intersection of vertical joints with thick (>1 m) to thin (20-30 cm) limestone beds provided easily quarried building material from nearby outcrops. Sparse, 2-3-cm chert lenses in the limestone may have provided material for cutting tools. Paleozoic phyllite mapped nearby and in float is a likely source for millimeter- to centimeter-sized pyrite used for dental inlay or other decoration.

Ruin material at two sites near the Bladen Branch of the Monkey River was also quarried mainly from nearby outcrops of the jointed, thick- to thin-bedded Cretaceous limestone. At one site, however, limestone and stream-rounded centimeter-sized cobbles, chiefly of volcanic origin, were used in about equal proportions. The NE-trending Bladen fault extends from the Esperanza-Snake Creek area into the Bladen Branch study area and downdrops Cretaceous limestone against silicified Triassic rhyolite. On the basis of composition and proximity to Bladen Branch ruins, this rhyolite is a possible source for obsidian blades found at the ruins; however, obsidian of Triassic age is likely to have devitrified, making the Bladen rhyolite an unlikely source for obsidian at Bladen Branch ruins. It is more likely that obsidian at Bladen Branch ruins was obtained from more distant sources with Cenozoic volcanic terrane.

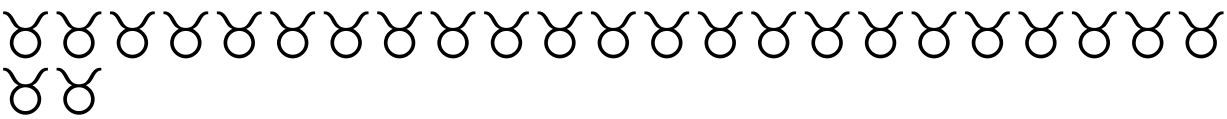
Pleistocene Fossils and Origin of Porcupine Cave, Central Colorado

by
Don Rasmussen
RMGD, 410 17th St., Denver, CO 80202

Porcupine Cave is located in Ordovician carbonates in a remote part of South Park at an elevation of 9,500 ft (2,900 m). There is evidence that the origin of the cave is very ancient and formed prior to the Laramide Orogeny which tilted the Paleozoic rocks in the area. Porcupine Cave is the highest Pleistocene vertebrate site in North America and contains the richest and most diverse Irvingtonian (medial Pleistocene) vertebrate fauna in North America. During the Irvingtonian, Porcupine Cave had numerous entrances and all were receiving debris which was washed deep down into the cave. Some of the larger entrances were used by carnivores for dens, some

of the smaller openings were used by marmots and rabbits, and all openings were used by packrats who built extensive middens and nests deep within the cave. Carnivores left the chewed bones of their prey and even their own bones in areas close to the surface; marmots, rabbits, and other small animals left their skeletons when they fell into the cave and were unable to get back out; but most of the bones and teeth, many of which were gnawed, were hauled in by the packrats. The packrats even carried in carnivore scat and raptor pellets which were loaded with small jaws, bones and teeth. In July a partial skeleton of a large camel was found indicating that at least one entrance trapped large mammals. At about 350,000 years ago, all of the entrances became completely plugged and Porcupine Cave was isolated from the outside, even from the packrats. Porcupine Cave remained sealed like a sacred tomb until the late 1800's when it was inadvertently opened by prospectors. Pleistocene fossils were not recognized in the cave until almost a century later.

Society Notes



A Note From the President

For those of you not able to attend the Spring Field Trip to South Park and Porcupine Cave, it was great! The weather was gloomy as we gathered at the Dinosaur Ridge Visitor Center but, as we gained altitude, the sun came out and the day was beautiful. I thank the field trip leaders, Don Rasmussen and Steve Sonnenberg, for a well-organized and interesting day. Our Field Trip Committee Chairman, Bob Raynolds, provided excellent logistical support and served a gourmet picnic lunch with a view.

Don Rasmussen, petroleum geologist and vertebrate paleontologist, has been involved with excavations at Porcupine Cave from the beginning. The cave, in the Ordovician Manitou Formation, is the site of a Pleistocene mammal locality (35,000 to 1,200,000 years before present) actively under excavation by the Denver Natural History Museum. As Don guided us through the unimproved cave with our flashlights and hard hats (we quickly learned why we were wearing hard hats), he described the origin and history of the cave and picked rabbit bones out of the material on the cave floor. I quickly learned why I am not a mining geologist or spelunker.

Special thanks to Eric Erslev, the Science Fair Chairman, and his committee. Thank you notes from recipients of our awards are reprinted on page 4.

In October, we will have a special treat for Family Night. We will meet during the last week of October at the Colorado School of Mines Museum for a buffet dinner and tour of the new cave exhibit followed by a presentation by Dr. John Ostrom, Yale Peabody Museum, on the relationship of dinosaurs to birds. Look for the formal announcement in the October newsletter.

I hope that everyone had a great summer and field season. See you all at the September meeting.

NEW MEETING LOCATION

The Colorado Scientific Society will be meeting in a new location this fall. We have not been satisfied with the expense and lack of service at the Sheraton and have been examining several options. Earlier this summer, President Landon and President-Elect Madole met with the staff at the Colorado Mountain Club and toured their new facility (the old high school in Golden). There is a very comfortable auditorium that is well suited to our functions and other meeting rooms are also available. Parking is available behind the building (corner of Washington and 10th). The American Alpine Club Library is located in the same building. It is an impressive collection of publications regarding mountains and mountaineering....worth a visit.

The CMC is a healthy, active organization with a membership that appreciates the out-of-doors and geology, although they may not think of scenery in those terms. This is an opportunity to forge a relationship between organizations to the benefit of both groups. The CMC will begin remodelling the building this fall and we may experience some inconveniences. Setting meeting dates for this fall was complicated by the existing CMC schedule and we will not be able to meet on the same evening of the month. In the long run, however, the CSS will have a very comfortable home.

Colorado Mountain Club Auditorium
710 10th Street
Golden, Colorado

September Meeting
Wednesday, September 13, 1995

November Meeting
Monday, November 13, 1995

December Meeting_Annual Meeting
Wednesday, December 13, 1995

CSS DONATES TO THE WESTERN INTERIOR PALEONTOLOGICAL SOCIETY

The Western Interior Paleontological Society is conducting one week of paleontologic research at Porcupine Cave (see President's note), the foremost Irvingtonian locality in North America. The Council voted a $200.00 donation to support this volunteer effort. The donation will help to provide food and equipment for approximately 40 individuals working in and at the Cave this summer.

The volunteers are a diverse group ranging from forensic experts to nurses to zoo keepers to geologists to strong backs. The expertise that exists within the group is frequently put to use interpreting new finds. Significant contributions are made by all. This summer a 10 year old girl noticed bone material in a piece of basalt being used to hold down canvas for drying sieved material. No one else had paid much attention to this rock until that moment. The bone was identified as an oreodont ankle that had been hit by a volcanic bomb about 30 million years ago. Although not related to the older Cave site, this find created excitement in the camp. A major find in the Cave this summer was a camel jaw. Next summer, excavation will hopefully reveal the rest of the skull.

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State Science Fair Award Winners Say Thank You

Dear Colorado Scientific Society Members,

I just want to tell you that I think it is really nice of you to participate in the State Science Fair. It was an honor for me to be selected for your awards. Thank you very much for recognizing my project on wind erosion and giving me $75 and a special paper weight.

I am in 7th grade and this is the 1st time I ever went to state. I had a fun experience and learned a lot. THANKS AGAIN!

Sincerely,
Sonja Skovsted

To the Colorado Scientific Society,

It was an honor to be chosen as the Jr. Division winner of your award at the Colorado State Science Fair! I was extremely pleased and excited. Thank you for the $75, beautiful paperweight, and certificate. The money will help with my trip to the International Science Fair. Your encouragement and support mean a lot.

Thank you again,
Sara McDonnall

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New members of the Colorado Scientific Society

Welcome!! Rhonda L. Driscoll_student, Metropolitan State College, Denver
Mary Ann Short_student, Colorado School of Mines
William Ross Moore_retired from the Dow Chemical Co., Lake Jackson, Texas
M. Ray Thomasson_President, Thomasson Partner Associates, Inc.

1995 Memorial Fund Student Research Grants

The Colorado Scientific Society Memorial Funds Committee, comprised of Michael Machette (Chairman), Ken Pierce (1994-95), Stephen Sonnenberg (1994-95), Charles Pillmore (1995-96), and George Snyder (1995-96) met on May 1st to award research grants from the Pierce, Eckel, Oriel, and Tweto Memorial Funds. One grant ($850) was awarded from the Pierce Fund, two grants ($1,200 total) were awarded from Eckel Fund, two grants ($1,400 total) were awarded from the Oriel Fund, and five grants ($2,900 total) were awarded from the Tweto Fund. Altogether, the Colorado Scientific Society Memorial Funds awarded 10 grants in 1995 for a total of $6,350 versus 10 grants in 1994 for a total of $6,640.

The committee solicited applications from graduate students at about 200 U.S. universities and colleges that award M.S. or Ph.D. degrees in earth science and engineering geology. A total of 48 applications were received by the April 8th, 1995 deadline. About 56% of the applications were for M.S. theses and 44% for Ph.D. theses, while 29% were from female students and 71% were from male students. Applications were received from 36 different colleges and universities distributed across the U.S., and about 35% came from the Rocky Mountain region (Colorado, Wyoming, Montana, Idaho, Utah, and New Mexico).

These applications were reviewed and ranked on the basis of scientific merit, feasibility, and appropriateness with the guidelines of each of the Memorial Funds. As for the awards, 70% went to M.S. theses and 30% went to Ph.D. theses; 30% went to female students and 70% went to male students; and colleges in the Rocky Mountain region collected 60% of the awards. We are confident that these 10 research projects are of the highest quality and fulfill the intentions of the many donors of the Colorado Scientific Society Memorial Funds.

Bill Pierce/Heart Mountain Fund

Kristina C. Sprietzer ($850), A paleomagnetic test of rotation of the Heart Mountain thrust/slide block. Western Michigan University, M.S. thesis.

Edwin Eckel Fund

William H. Schulz ($600), Pryoclastic-flow mechanics and deposits. Purdue University, M.S. thesis.

Merri Lisa Formento-Trigilio ($600), Post-Laramide tectonic history and neotectonic deformation of the Nacimiento Uplift, northern New Mexico. University of New Mexico, M.S. thesis.

Steven Oriel Fund

Susan Dougherty ($700), Relations between thrust evolution and conglomerate deposition in the Upper Cretaceous Beaverhead Group, Red Conglomerate Peaks, southwestern Montana-Idaho. Montana State University, M.S. thesis.

Casey E. Kipf ($700), Characterization of basement-involved thrust faulting in the Beaverhead Mountains, Sevier orogenic belt, southwest Montana and east-central Idaho. Montana State University, M.S. thesis.

Ogden Tweto Fund

Joe Denny Gregson ($750), Laramide kinematics across the Colorado Plateau/Rocky Mountain Foreland boundary [Colorado-Wyoming]. Colorado State University, Ph.D. thesis. (Also awarded a Wyoming Geological Society_J.D. Love scholarship for 1995).

James R. Rougvie ($600), Metamorphic fluid flow in the northernmost Park Range of Colorado: Regional significance and effects on porphyroblast nucleation and growth kinetics. University of Texas at Austin, Ph.D. thesis.

Roland Rueber ($500), Volcanic stratigraphy of the Iron Mountain region, north-central Colorado. Colorado State University, M.S. thesis.

Tim F. Wawrzyniec ($550), Transpressional kinematics of the Elk Range thrust sheet and the Castle Creek structural zone, Pitkin and Gunnison Counties, Colorado. University of New Mexico, Ph.D. thesis.

Andro K. Wohlgenant ($500), Investigation of the Reef Creek detachment fault, northwestern Wyoming, in light of new evidence for a debris-avalanche origin. University of Wisconsin_Madison, M.S. thesis.

COLORADO SCIENTIFIC SOCIETY FALL FIELD TRIP

Friday, October 27, 1:00 p.m. to Sunday, October 29, 6:00 p.m.

Leaders: Bob Diffendal, Lincoln, Nebraska; Jim Swinehart, Lincoln, Nebraska; Emmett Evanoff, U. of Colorado at Boulder; Rich Madole, U.S.G.S, Denver

Trip Objectives: To get a sense of the sedimentary processes active on the High Plains since the end of the Laramide. To examine the modern record as an element of the rock record, to contemplate variations in sediment supply and accommodation through time as controllers of the stratigraphic record. To become acquainted with dating techniques ranging from vertebrate paleontology, paleomagnetics, tephrachronology, thermoluminescence, and any other techniques that are presently used to calibrate the system. We will visit a series of type localities illustrating the geometry and character of sedimentary accumulations on the High Plains.

Trip Logistics: We will travel by bus, spending two nights in Nebraska. Trip costs will include transportation, double occupancy accommodations and selected meals. Registration limit is 40 and cost will be about $150. Call Bob Raynolds at 762-9379 for details.

Earth Science Meetings

Colorado Scientific Society. The next regular meeting will be held on September 13, 1995, in the Colorado Mountain Club Auditorium, 710 10th St., Golden, Colorado. Social time is 7:00 p.m., meeting starts at 7:30 p.m.

Rocky Mountain Association of Geologists. Regular meetings, normally held on the first and third Fridays of each month, consist of a lunch at 11:55 a.m. and a lecture at 12:25 p.m. in the Bluebell Room of the Denver Petroleum Club in the Anaconda Towers, 555 17th St., downtown Denver. Cost of the luncheon is $12. Reservations are taken on a recording line (303-623-5396) until 10:30 a.m. on the Wednesday before the luncheon. Reservations are **not** necessary to attend the talk only; however, there will be a $2 charge at the door.

Sept. 8 "Historical Public Exposures Studies on Rocky Flats" by James V. LaVelle, Colorado Health Advisory Panel

Sept. 22 "Understanding the New Colorado Oil and Gas Conservation Commission (COGCC) Groundwater Protection Regulations: Meeting the Requirements with Low-Tech, Low-Cost Solutions" by Linda M.G. Lehrer & Todd H. Wiedemeier, Project Manager, Parsons Engineering Science, Inc.

Denver International Petroleum Society ("D.I.P.S."). Meetings held on 2nd Friday of the month at the Wynkoop Brewing Co., 18th and Wynkoop Streets, lower downtown Denver. Reception at 11:30 a.m., luncheon at 12:00, program at 12:30 p.m. Reservations required by calling RMAG recording line (303-623-5396). Reservations accepted after 2:00 p.m. on Friday and before 10:30 a.m. on Wednesday before the meeting. Cost: $13.00. Contact Keith Murray, 303-986-8554, for information.

Sept. 8 John Gustavson, President of Gustavson Associates in Boulder, will give a presentation on Production-Sharing Contracts.

Denver Mining Club. All regular meetings are on Thursdays, from 11:30 a.m. to 1:00 p.m. at the Denver Federal Center, Building 41 Cafeteria (south entrance), Lakewood. For more information contact Doris Smith, Program Chairperson (303-456-5428).

The presentations for their September meetings had not been finalized by press time.

Colorado School of Mines_Department of Geology and Geological Engineering, Golden: Van Tuyl Lecture Series. Lectures are on Thursdays at 4:30 p.m. in Berthoud Hall, Room 108. Lectures are preceded by refreshments served at 4:00 p.m. and followed by a social hour in the Fireside Lounge at the Student Center. For further information, call Greg Holden (303-273-3855) or the Geology Department (303-273-3800).

Lectures are on Thursdays at 4:30 p.m. in Berthoud Hall, Room 108. Lectures are preceded by refreshments served at 4:00 p.m. and followed by a social hour in the Fireside Lounge at the Student Center. For further information, call Greg Holden (303-273-3855) or the Geology Department (303-273-3800).

Aug. 31 "Geological ore body modelling in the Witwatersrand basin for mining and exploration" by Dr. Morris Viljoen, U. of the Witwatersrand, Johannesburg, South Africa

Sept. 7 "Economic geology of the Irish Zn-Pb orefield and a Proterozoic analogue in central Brazil" by Dr. Murray Hitzman, White House Office of Science and Technology Policy, Washington, D.C.

Sept. 21 "Pliocene supergiant porphyry-skarn Cu-Au deposits in an active continental margin orogenic belt, Ertsberg District, Irian Jaya, Indonesia" by Dr. Richard Kyle, U. of Texas at Austin

Sept. 28 "Assessing an exploration barrier: Is there a 'methane deadline' in the Arkoma basin and Ouachita thrust belt?" by Dr. David Houseknecht, U.S. Geological Survey, Reston, Va.

Oct. 5 "Petroleum exploration concepts for thrust belts" by Dr. James Helwig, Mobil Oil Co., Dallas, Texas

Association for Women Geoscientists. New and prospective members are encouraged to find out more about AWG. For information contact Peggy Ganse, AWG President, 303-832-9636; fax 303-832-9616.

Friends of Dinosaur Ridge. Friends of Dinosaur Ridge and cooperating institutions conduct guided tours for visitors to the Ridge, and many people visit on their own. In all, at least 38,000 people visited Dinosaur Ridge during 1994. Friends wishes to spread the word that they plan to accommodate all groups interested in a tour, but do need to schedule groups in advance to avoid conflict. Groups can call Friends at **303-697-DINO** to schedule a tour or for information about Dinosaur Ridge activities and location of lectures. In addition to tours of the Ridge, Friends can provide talks, lectures, and slide shows. Call Bob Kosiba at 303-399-7556 and he'll arrange a trained volunteer to speak to your group.

"Open Ridge" tours of Dinosaur Ridge will continue on the following Saturdays during 1995_September 23 and October 14. On each of these days, Alameda Parkway will be closed to traffic, tour guides will be posted all along the Ridge, and a bus will be available to give rides one-way for a fee of $2 per person (over age 3).

Rocky Mountain Section-SEPM (Society for Sedimentary Geology). Monthly meetings are held on the fourth Tuesday of the month from September through May, excluding December. All lectures held at the Denver Press Club, downtown Denver, 1330 Glenarm Pl., 2nd floor, unless otherwise noted. Cash bar at 11:30 a.m., lunch at 12:00, speaker at 12:30 p.m. For reservations, call and leave message at 303-697-6698 by 5:00 p.m. of the Friday prior to the luncheon. For further information, call Dave Eby at 303-738-9697. Lunch reservation **not** required to attend lecture.

Next meeting to be held on September 26.

Piceance Creek and Eastern Uinta Basins field trip. Western Colorado, Eastern Utah. October 7-8. Sponsored by the Grand Junction Geological Society and Dinamation International Society (DIS), 550 Crossroads Court, Fruita, CO 81521 (1-800-344-3466; FAX (303-858-3532).

Denver Gem & Mineral Show

September 15-17

Travel to exotic places in search of treasures_or find them close to home at the 28th annual Denver Gem and Mineral Show, September 15-17, at the Denver Merchandise Mart. More than 100 dealers from around the world have assembled an array of minerals, fossils, gems, jewelry, books, tools, and lapidary supplies to appeal to any taste or budget. Selections from world-renowned collections can be viewed in displays from more than three dozen museums and another hundred individuals. You can watch crafters and hobbyists cut and polish gems, create jewelry, crack geodes, shape stone spheres, and prepare fossils for display; or you can get your hands wet panning for gold, have that mystery mineral identified, or find out just what is that red stone in the brooch inherited from Aunt Martha. Other special features include an International Room of dealers from foreign countries, and a Geological Art Exposition. A Saturday Night Social, with refreshments, is open to the public, and features a silent auction to benefit *Rocks & Minerals* magazine, and a talk by author Dr. John Sinkankis, on "The History of Mineralogical Illustration." See the show program for a complete schedule of lectures.

The show is open from 9:00 am to 8:00 pm Friday; 10:00 am to 6:00 pm Saturday; and 10:00 am to 5:00 pm Sunday. Admission is $3.00 for adults, $2.00 for teens and senior citizens, and free for children under 12 accompanied by an adult. The Denver Merchandise Mart is conveniently located just east of I-25, Exit 215, at 451 East 58th Ave., and has free parking.

Don't confuse this show with any of the other shows in town at the same time. The Denver Gem and Mineral Show is sponsored by a local association of 10 mineral, gem, and fossil hobby clubs in the Denver area. All work on the show is done by volunteers, and show proceeds are used to further education and research in the earth sciences. In recent years, proceeds have helped support Science Olympiad participants from Dunstan Middle School, construction of the "bone ramp" at Dinosaur Ridge, and exhibit preparation at numerous local museums such as the Adams County Museum, Hiwan Homestead, Frisco Historical Society, Ouray County Museum, and the Colorado School of Mines. This is also the only show in September that has exhibits, lectures, demonstrations, and hands-on kids' activities, and not just dealers. We encourage you to support your community by attending the Denver Show at the Merchandise Mart.

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"The Real Jurassic Park"

World-renowned paleontologist Dr. Robert Bakker will present a lecture on "The Real Jurassic Park" on Friday, September 15, 7:00 pm, at Bunker Auditorium on the Colorado School of Mines campus. Bakker will also be signing copies of his newly-released novel *Raptor Red*. The talk is presented by the Western Interior Paleontological Society. Tickets are available from TeleSeat (1-800-444-SEAT) for $17 plus handling for adults.

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1995 Rocky Mountain Symposium on Environmental Issues in Oil and Gas Operations

Practical Solutions for the '90s

October 16-18

Sponsored by the Colorado School of Mines Office of Special Programs and Continuing Education, and U.S. Bureau of Land Management. Contact CSM Office of Special Programs and Continuing Education. Phone (303) 273-3321; FAX (303) 273-3314.

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♉ Items for Newsletter ♉

We would like to include any items of general interest regarding members, new programs, scientific meetings, etc., in future newsletters. Please submit materials (hardcopies and/or computer disk) to Brad Van Gosen, USGS, Box 25046, M.S. 905, Denver Federal Center, Denver, CO 80225,

or call (303-236-1566) or fax (303-236-5603). Please send items to the editor before the 20th of the month to ensure inclusion in the next newsletter.[--- Unable To Translate Box ---]

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Colorado Scientific Society

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