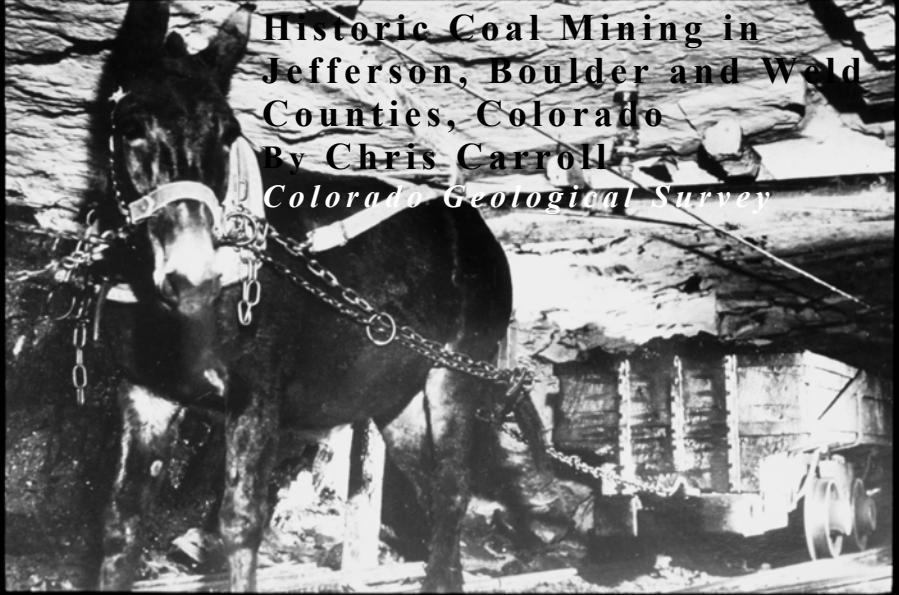




Colorado Scientific Society

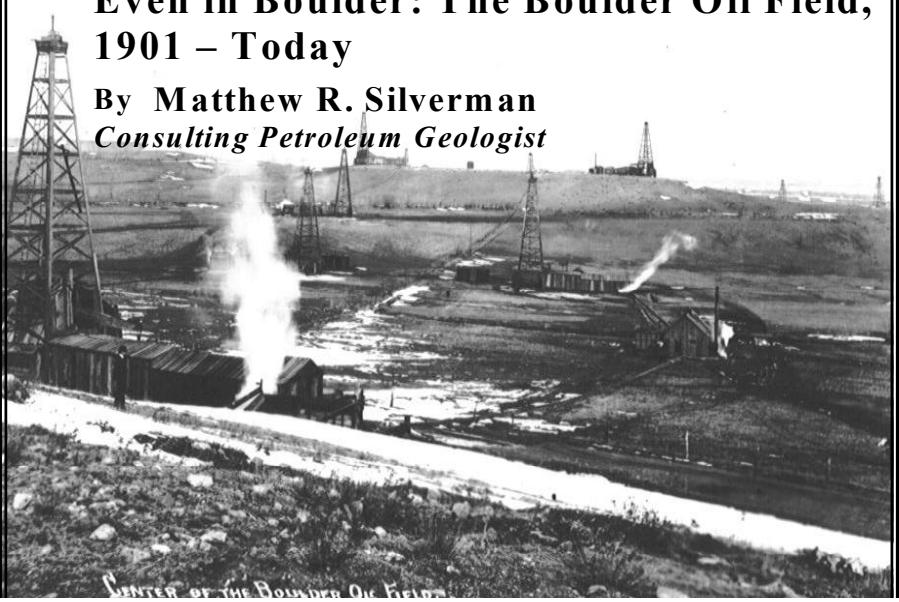
*The objective of the Society is to promote
the knowledge and understanding of Earth science
and its application to human needs.*

**Historic Coal Mining in
Jefferson, Boulder and Weld
Counties, Colorado**
By Chris Carroll
Colorado Geological Survey



**Even in Boulder: The Boulder Oil Field,
1901 – Today**

By Matthew R. Silverman
Consulting Petroleum Geologist



Center of the Boulder Oil Field

Thursday, October 16, 2003
American Mountaineering Center
710 10th St. (NE corner with Washington), Golden
Social half-hour – 7:00 pm. Meeting time – 7:30 pm.

Abstracts

Historic Coal Mining in Jefferson, Boulder and Weld Counties, Colorado

By Chris Carroll, Colorado Geological Survey

Colorado's coal mining history began in the early 1860s near Marshall, Colorado. Originally produced as home heating fuel, coal and coke quickly became important commodities for Front Range industries and transportation. From 500 short tons produced in 1864 for home heating fuel, the annual coal production grew to over 13 million short tons by 1918. By the end of the nineteenth century more than 50 million short tons of coal were produced statewide.

The early supply of coal was mined from the Cretaceous Laramie Formation coal that crops out between Golden and Erie along the northwestern rim of the Denver Basin. Coal was produced from the Foothills coal field to supply the nearby gold mining industry and a growing metropolis in Golden. Mining vertical coal seams brought many challenges for the early miners, such as poor ventilation, vertical haulages, fires, and groundwater flooding. By 1900 local coal mining moved on to more conventional methods of room and pillar mining on flatter strata. The Leyden Mine produced more than 5 million short tons of coal to 1950; part of the production supplied the Denver trolley service.

The Northern coal fields, or the Boulder-Weld coal field, produced 112 million short tons of coal between 1864 and 1988. This subbituminous A and B coal supplied Denver with home heating fuel, fuel for coal-fired power plants, and transportation purposes. Mined mostly in the winter owing to increased demand and lack of an ability to maintain high-slacking coal stockpiles, this coal was produced from up to seven coal seams in the Laramie Formation. Most of the mining was underground at depths ranging from 20 to more than 500 feet deep. Typical coal quality from one large mine, the Rocky Mountain Fuel Company's Columbine Mine near Erie, was 9,800 Btu/lb heat value, 5.6% ash, 0.4% sulfur. The last underground mines to close were the Lincoln and Eagle Mines, which Longwall mined until the late 1970s.

Even in Boulder: The Boulder Oil Field, 1901 – Today

By Matthew R. Silverman, Consulting petroleum geologist

An oil field in Boulder? Tofu and granola, yes. Sandals and love beads, sure. Even *Mork and Mindy*. But an oil field?

Over one hundred years ago, in 1901, the Boulder Oil Field was discovered just northeast of the eponymous Colorado town. It is the second oldest field in the state and one of the oldest producing anticlines in the Rockies. The field was discovered the same year as Spindletop, and its early development shares some of that boomtown atmosphere and scandal. An effort is now underway to get landmark designation at the Boulder discovery, now the site of the only well still producing in the field.

Wells had been drilled in the area to follow up oily odors and seeps as early as 1892. Dowsing by a group associated with Isaac Canfield, one of the pioneers of Colorado's oil industry at Florence, led to the Boulder discovery, the McKenzie Well. Early wells were drilled with cable tools, and production generally came from depths of 800 to 3,000 feet. Most wells were shot with nitroglycerin to improve production. About 100 wells were drilled in the first few years; nearly 200 have been drilled in all.

Boulder was the focus of a forgotten boom. Over a hundred oil companies sprouted up, and promoters promised "Oil or money refunded." One University of Colorado professor (later to become the State Geologist) raised \$500,000, equivalent to several million dollars today. A now-venerated pioneer photographer used doctored pictures to promote investment. Wells were drilled with "other people's money" and with little or no financial reward for most investors. The wily Canfield got out early, in 1902.

Located at the western margin of the Denver Basin, the field is associated with one of the en echelon anticlines near the foothills of the Front Range. A nose and small closure, whose axes are roughly parallel to the mountains, control the field structurally. Production is from sand lenses and fold-related fracture porosity in the Late Cretaceous Pierre Shale, which is also the source rock. Fractures have contributed most of the production.

Boulder Field opened the oil industry of the northern Denver Basin. It has produced about 800,000 barrels of oil, but the lone remaining well—one of the longest continuously producing wells in the country—may be slated for the salvage yard of history. Efforts are underway to preserve the McKenzie Well as an historic landmark, safeguarding a rich chapter in the development of oil and gas in the Rockies.

Matt Silverman is a consulting petroleum geologist with over 25 years of experience. He was previously employed by major and independent oil companies and by an international consulting group. Silverman's professional experience is in oil, gas, and coalbed methane exploration, production, and appraisal throughout the Rockies, in the Midcontinent, and overseas, principally in Eastern Europe, the Middle East and China. He is a past president of the Denver International Petroleum Society and an Honorary Member of the Rocky Mountain Association of Geologists.



Colorado Scientific Society President's Note, October 2003

By Jim Cappa

The Colorado Scientific Society Fall field trip, September 19–22, to the San Juan Mountains and the Central Colorado volcanic field, was surely one of the best field trips I have ever been on. The first day of the trip to the central Colorado volcanic field was led by Chuck Chapin and Bill McIntosh of the New Mexico Bureau of Geology and Mineral Resources. We looked at a newly recognized tuff unit underlying the Wall Mountain Tuff, the tuff of Triad Ridge dated at 37.5 Ma. This unit was mapped by Chester Wallace and John Keller of the Colorado Geological Survey on the Castle Rock Gulch quadrangle at about the same time as Chuck and Bill were gathering age dates from this unit. Any field trip to the Central Colorado volcanic field would not be complete without visiting the 36.7 Ma Wall Mountain Tuff. We looked at some incredible structures in the Wall mountain tuff in Gribbles Run and had a spectacular overlook of the paleovalley of the Wall Mountain Tuff from a later stop.

The second and third days of the field trip were led by Peter Lipman of the U.S. Geological Survey. Peter and several other U.S. Geological Survey scientists have been working in the San Juan volcanic field trying to unravel the complex volcanic stratigraphy since the 1960s. We visited outcrops of various tuff units in the northeastern San Juan Mountains and ended up the day visiting the area around Cochetopa Dome, a spectacular geographic feature composed of rhyolite flows with no identified ash-flow eruptive events. The next day we looked at various ash-flow tuff units associated with the La Garita Caldera and other calderas and ended up in the evening at Lake City.

The final day we investigated tuffs and tuff breccias of a newly recognized caldera, the Marshall Creek Caldera, a few miles south of Sargent in the northeastern San Juan volcanic field.

Emmett Evanoff did a great job of organizing the field trip leaders and the logistics of the trip. The lunches were, as always, excellent, and the accommodations were good. Thanks so much to Emmett for his tireless work as field trip chairman this year. And thanks so much to Peter Lipman, Chuck Chapin, and Bill McIntosh for their work in leading the field trip. And, oh yes, did I mention that the weather was spectacular—crisp mornings and warm afternoons. There was hardly a cloud in the sky and the aspens were just starting to turn.



Figure Caption: Fall field trip Participants. Mount Ouray in the Background. Missing are Peter Lipman and Vince Matthews.



10th Dibblee Medal for Geological Mapping Awarded to Dr. Thomas L. T. Grose

Dr. Thomas L.T. (Trobe) Grose, Professor of Geology and Geological Engineering at Colorado School of Mines since 1964, has been awarded the prestigious Dibblee Medal for 2003. Dr. Grose has had a distinguished career in geological education and research, with much of his research involving geological mapping, and has made a significant and outstanding contribution to the science of geology through his geological mapping activities over the past four decades.

Trobe took his BS and MS in geology at the University of Washington in 1948 and 1949, and in 1955 took his PhD from Stanford University. He returned to academia immediately as an associate professor of geology at Colorado College from 1955 to 1964 and as a professor of geology and geological engineering at the Colorado School of Mines beginning in 1964.

His field activities have taken him over most of the western U.S. and to Peru, Australia, Puerto Rico, and the Hawaiian and Somoan Islands. He led field mapping summer courses for CSM in Colorado and Utah. As a Texaco hand, he explored for oil in Wyoming and Montana. He explored for coal in Utah for the US Bureau of Mines. He evaluated the earthquake risk at nuclear sites in California, Arizona, Colorado, and Puerto Rico for Westinghouse, Fugro, and the Department of Energy. As an exploration geologist, he sought Au, Cr, Ni, Pt, Hg, W, U, asbestos, and rare earths in Western USA for Cordero and other mining companies; phosphate and metalliferous shale in Peru, Australia, California, Idaho, Utah, and Wyoming for Cerro de Pasco and other companies; geothermal energy in the western US, Hawaii, and Samoan Islands for Sun Oil Co. and other companies; and oil and gas in the western US for Petroleum Research Corp. and other oil companies. He did geological field mapping in California and Nevada for the USGS, California Division of Mines and Geology, and Nevada Bureau of Mines and Geology.

Congratulations, Trobe!



Field Trip and Fall Symposium Information

By Emmett Evanoff

One-Day Field Trip, 11 October 2003, to the Kremmling Giant Ammonite Site

Leader Emmett Evanoff, University of Colorado Museum

The Kremmling Giant Ammonite Site is one of the most remarkable paleontologic sites in Colorado. It is the source of many dozens of shells of the ammonite *Placenticeras costatum* that are as much as 30 inches in maximum diameter. The fauna at the site includes dozens of other creatures, mostly clams and ammonoids, but also snails, nautiloids, tusk shells, and crabs. All of the easily collected shells are now gone, but the external molds of the ammonites are easily seen in giant split concretions. The site was offshore from a delta complex in northwest Colorado, and the site may have been a brooding ground for the ammonites. The shells have an interesting taphonomic history that will also be discussed at the site.

We will car pool to and from the site. Meet by 8:15 AM for an 8:30 AM departure on Saturday, October 11, at the Cold Spring Park and Ride station on the southeast corner of the intersection of 6th Avenue and Union Boulevard. Park on the east side of the parking lot on the near side to the Denver Federal Center. The trip will be a brown-bag trip, so bring your lunch

The trip is cosponsored by the Colorado Scientific Society and the Western Interior Paleontological Society. The cost of the trip is \$5. Nothing can be collected on this trip, because we will be visiting a BLM area where the fossils are protected. The site is at a high elevation (8000 feet) and will require an initial climb up a steep ridge to get to the site. Bring boots, a camera, water and warm clothes for the trip. We will depart only if the weather is dry, because the road to the site is impassable when wet.

Send your \$5 along with your name, phone number, and or e-mail address to Emmett Evanoff, Department of Geological Sciences, 399 UCB, University of Colorado, Boulder, CO, 80309-0399. For more information, please contact me at 303-444-2644 or at emmettevanoff@earthlink.net.

CSS “Fall” Symposium: Postponed until April 2004

The proposed one-day symposium and field trip on the geology of the Front Range will be postponed until the weekend of April 3, 2004, in order to accommodate speakers’ schedules. The symposium will be held at the University of Colorado, and there will be no charge to attend talks. The field trip will have a moderate cost. If you are interested in giving a talk in the symposium, please contact me: Emmett Evanoff, Department of Geological Sciences, 399 UCB, University of Colorado, Boulder, CO 800309-0399. Phone, 303-444-2644. Email, emmettevanoff@earthlink.net

It is my hope that this symposium will be a biennial event (we’ll skip the years that GSA meets in Denver) that will present topics of regional interest. Please attend and help make this event a success so that future symposia are possible.



A View Through the Brown Cloud

by Lisa Ramirez Rukstales

Welcome back from another field season, albeit a hotter than usual one. Hopefully everyone wore his or her dorky hats, bug juice, and sunscreen. Mosquito repellent has taken on a whole new meaning thanks to the West Nile virus. It just seems wrong to worry about something so teensy, but worry is what mommies do best! My “little” Scott Diego is seven months old now and I have the biceps to prove it. Mosquitoes aside, my big worry now is if he’s getting enough stimulation and education so he can keep up with the 21st century techno-infant. Daddy lets him

bang on the keyboard, but mommy is doing the basics that will help him succeed in life in Colorado. You know, math: uno, dos, tres...; colors: Red neck, Green card, White trash; music: Shake your Groove Thang! The good news is that Scott Diego's diverse background will allow him to be a part of our melting pot's majority and/or minority depending on which is more convenient for "la universidad" scholarships in 2021!! Our memorial funds for Eduardo Eckel, Jorge Snyder, and Estévan Oriel have a nice "north and south of the border" ring to them. ¡Olé!



More Minerals Named for (or by) Coloradans

Cahnite was named for an outstanding crystallographer and mineralogist, Lazard Cahn, who served as vice-president of the Mineralogical Society of America in 1928. He died at Colorado Springs on May 22, 1940. Cahnite is a white hydrous boroarsenate of calcium, an entirely new type of natural chemical compound when it was first observed about 1913 in crystalline form at the zinc deposits at Franklin, New Jersey. Cahn sketched the crystals and gave them to Harvard University, where Professor Charles Palache believed them to be a new mineral, though there was not enough material to analyze. Palache proposed the name to recognize Cahn's "indefatigable efforts to preserve and make known to science the rare Franklin minerals." The name appeared in 1921 and later in 1926. Cahnite does not occur in Colorado.

Warrenite was named for E. R. Warren of Crested Butte who sent to Denver some samples of "mineral wool," needle-like matting of crystals, from the Domingo Mine on the ridge between Dark Canyon and Baxter Basin in Gunnison County. In June 1888, the results of the chemical analysis of these fibers were announced at the CSS meeting, but it was not named Warrenite until 1890. It is now known that Warrenite (also called domingite) has been shown by tests to be either boulangerite, jamesonite, or owyheeite. From one mineral with two names came three others!

Emmonsite was named for the great geologist Samuel F. Emmons, the first president of the CSS, by Hillebrand at the meeting of the CSS on June 1, 1885. R.C. Hills sent the original material from an uncertain locale near Tombstone, Arizona. It is a compound of iron and tellurium occurring in clear yellow-green scales. In Colorado, emmonsite is found in the W.P.H., Moose, and Deadwood mines at Cripple Creek.



Earth Science Week Short Hikes – October 14, 15

By Pete Modreski, U.S. Geological Survey

To help celebrate Earth Science Week, I'll lead two short, late afternoon field trips, each meeting at 4 p.m. and lasting until about 6:30 p.m.

On Tuesday, Oct. 14, we'll meet at the Green Mountain Park trailhead on Rooney Road, between Lakewood and Golden (1/2 mile north of Alameda Parkway, and about 1 mile south of Colfax Ave/U.S. 40), for a short hike to explore geology and ecology around the west base of Green Mountain.

On Wednesday, Oct. 15, we'll meet at Anderson Park, Wheat Ridge (south side of 44th Ave., opposite Field St.) to explore Clear Creek, including geologic and human history, ecology, and water quality.

No charge and anyone is welcome; for more information please call me at 303-202-4766 or email pmodreski@usgs.gov



Earth Science Meetings and Talks

Newsletter items must be received by the 4th 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 7:00 p.m. and talks start at 7:30 p.m. For information, contact Jim Cappa at (303) 866-3393, jim.cappa@state.co.us

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. October 6, **The Mystery of the Millsite Opinion: A Potential Major Threat to the U.S. Mining Industry**, Randy Hubbard, Attorney, Davis, Graham and Stubbs. October 13, No meeting. Columbus Day Holiday. October 20, **Recent Activity of Colorado's Number Two Company (Denver Post Top 100 Listing)**. Stan Dempsey, Chairman and CEO, Royal Gold Inc. October 27, **Recent CGS Activity, Including Regional Geologic Mapping**, Jim Cappa, Chief, Mineral and Mineral Fuels Section, Colorado Geological Survey. For additional information contact Dick Beach, (303) 986-6535 .

Denver International Petroleum Society 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) 932-0137, or the website <http://www.dregs.org>. **Notice of Combined Meeting:** October 8, 4-9 p.m. **Sediment-hosted Copper Deposits, and the Role of Salt Tectonics in Mineralization**—A mini symposium sponsored by the student chapter of the Society of Economic Geologists at Colorado School of Mines and co- sponsored by Denver Region Exploration Geologists: Room 108, Berthoud Hall, Colorado School of Mines, Golden.

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. Web page: <http://dwls.spwla.org>.

Rocky Mountain Association of Geologists (RMAG) Reception at 11:30 a.m., lunch at 12:00 p.m., 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. Reservations are not required for talk only—cost is \$3. Meeting location: Denver Petroleum Club, Anaconda Tower, 555-17th St, 37th floor. Web page: <http://www.rmag.org>.

University of Colorado at Boulder, Geological Sciences Colloquium Wednesdays, 4:00-5:30 p.m., Rm. 180. Refreshments at 3:30 p.m. on the 3rd floor. For info., call 303-492-8141. Web page: <http://www.colorado.edu/GeolSci>. October 1, **When a tree falls (or burns) in the forest: Climatic and biological controls on sediment production and landscape evolution**, Joshua Roering, University of Oregon. October 8, **Dating the rise of atmospheric oxygen**, Andrey Bekker, Harvard University. October 15, **Multiple sulfur isotope records in Archean Australia and their implications for early Earth's atmosphere and biosphere**, Shuhei Ono, Carnegie Institution of Washington. October 22, **TBA**, Shari Kelley New Mexico Tech. October 29, **Visualization and Volume Interpretation in Geoscience: 3-D Seismic and Beyond**, Steven May, ExxonMobil Upstream Research Company.

Friends of Dinosaur Ridge 7:00 pm at Red Rocks Elementary School in Morrison, CO. Web: <http://www.dinoridge.org>. October 7, **Dinosaurs That Did Not Die: Dinosaurs that Survived the K/T Extinction Episode**, Jim Fassett, USGS, Santa Fe, NM.

Colorado School of Mines, Van Tuyl Lectures Fridays from 3:00 pm to 4:00 pm in Berthoud Hall room 108. Web page: <http://www.mines.edu/academic/geology/calendar/vantuyl.html>. October 6., **Lacustrine Source Rocks in the Early Cretaceous West African Rift Basins: Implications for Models and Hydrocarbon Exploration**, Nick Harris, Pennsylvania State University, PA. October 10, **The Technology Cycle in Mining Through Space and Time: Implications for Sustainability**, Paul Bartos, Director, CSM Museum. October 17, Ben Kneller, University of California, Santa Barbara, CA. October 24, Keith Shanley, Stone Energy, Denver, CO. October 31, **Induced Seismicity Associated With Long-term Injection, Paradox Valley, Colorado**, John Ake, US Bureau of Reclamation, Denver, CO.

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

<http://www.coloscisoc.org>



WANTED:
New CSS
Members

OFFICERS

President: Jim Cappa, CGS, 866-3293, jim.cappa@state.co.us
President-Elect: Emmett Evanoff, UCB, 492-8069, evanoff@colorado.edu
Treasurer: Don Sweetkind, USGS, 236-1828, dsweetkind@usgs.gov
Secretary: Lisa Finiol, CSM, 567-2403, finiol@mines.edu
Past President: Eric Nelson, CSM, 273-3811, enelson@mines.edu

COUNCILORS

2001-2003: Graham Closs, CSM, 273-3856, lcloss@mines.edu
2001-2003: Parker Calkin, UCB, 442-2184, calkin@spot.colorado.edu
2002-2004: Jim White, UCB, 492-5494, jwhite@colorado.edu
2002-2004: John McCray, CSM, 384-2181, jmcrray@mines.edu
2003-2005: Chuck Kluth, CSM, 303-904-2939, kluth@earthlink.net
2003-2005: John Lufkin, 216-1076, Lufk3@aol.com

COMMITTEE CHAIRPERSONS

Best Paper Award: Mark Hudson, USGS, 236-7446, mhudson@usgs.gov
Database Manager: Cynthia Rice, USGS, 236-1989, crice@usgs.gov
Field Trips: Emmett Evanoff, UCB, 492-8069, evanoff@colorado.edu
Graphics: Karen Morgan, CGS, 866-3529, karen.morgan@state.co.us
History: Marjorie E. MacLachlan, USGS-retired, 986-7192, jcmemaclachlan@aol.com
Membership: Jim Yount, USGS, 236-5397, jyount@usgs.gov
Memorial Funds: Eric Nelson, CSM, 273-3811, enelson@mines.edu
Newsletter Editor: Mary-Margaret Coates, TECH Edit, 422-8349, mmcoates@att.net
Assoc. Editor: Scott Minor, USGS, 236-0303, sminor@usgs.gov
Assoc. Editor: Van Williams, USGS, 236-1289, ywilliam@usgs.gov
Assoc. Editor: Vince Matthews, CGS, 866-3028, vince.matthews@state.co.us
Outreach: Sue Hirschfeld, 720-565-9302, eqdoc@ix.netcom.com
Publicity: Mearl Webb, 810-1296, mf_webb@msn.com
Science Fair: Chuck Weisenberg, 238-8806, cweisnberg@aol.com
Webmaster: Bill Wingle, 720-544-8830, wwingle@uncert.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!!*