

# Colorado Scientific Society

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

## September Presentations

### QUANTIFYING THE SOURCES AND SINKS OF ATMOSPHERIC METHYL BROMIDE

**James H. Butler**

NOAA Climate Monitoring and Diagnostics Laboratory

### WATER-SEDIMENT INTERACTION IN HOLOCENE CARBONATE ISLANDS, NE PANAMA

**John Humphrey**

Colorado School of Mines

♦♦♦♦

Tuesday Sept 9, 1997

Social Time: 7:00 p.m.; Meeting Time: 7:30 p.m.

In The Union Square Theatre in the Sheraton Hotel, 360 Union Blvd., Lakewood, Colorado

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Fall Field Trip October 4

# An Active New Season with the Colorado Scientific Society

I'm amazed at how fast this last year has gone by! With the summer nearly over, I find the Society about to launch itself into a great fall program of events, starting with our first regular meeting on September 9. We're fortunate to have as our guest speakers that evening Dr. James Butler, who will explain why methyl bromide is a more formidable cause of ozone depletion than many people realize, and Dr. John Humphrey, who will fill us in on his research in Panama on carbonate-water interactions. Our fall field trip on Saturday, October 4, led by Carl Norbeck, will examine "environmental issues related to geologic problems created during our long history of mining, industry, agriculture, and urban use of Clear Creek." (From the field trip announcement.) Be sure to reserve your place early for this trip.

On Thursday, October 16, our annual Family Night dinner will once again be held at the Colorado School of Mines and will host Dr. Bruce Jakosky of CU, who will take us to the Red Planet. Dr. Jakosky will not only share some of his own research on the current Surveyor Mission to Mars, but will give us a look at some of the spectacular Pathfinder images that have attracted attention worldwide. He has a remarkable planetarium presentation, so I know it will be an evening to remember. For those who wish to reserve their places early for the dinner, a signup form is below; it will also be in the October Newsletter.

The quality of student presentations at last year's Student Night was so outstanding that we are attempting to make Student Night an annual event. In November, we will host five student presentations and offer considerably larger cash prizes than last year. The student presentations will be preceded by a social hour at which a beverage favored by many students (and others) will be served.

The changing of the guard will take place at our December business meeting, which reminds me that I'd better soon start organizing my Presidential Address! I plan to present some of my ideas regarding the inheritance of some Tertiary basins in the Rocky Mountains (including the northern Rio Grande Rift and basins in southwestern Montana) from older structures.

I'm really pleased that Eric Erslev will be leading the Society into 1998 and know he has some great things in store for us all.

*Karl Kellogg, President*

## FAMILY NIGHT DINNER

Place: Colorado School of Mines Geology Museum

Time: Thursday, October 16, 1997

6:00 p.m. drinks; 6:30 p.m. dinner

8:00 p.m. guest presentation, Metals Hall, Green Center, CSM campus

Menu: Caesar Salad, 2 types of pasta, Lasagna with 2 types of sauces (one meatless), Italian vegetables, garlic bread, Cappuccino cake, iced tea or coffee. Vegetarian menu available on request.

Cost per person: \$17.00 (includes beer, wine, soft drinks, and all gratuities)

-----*Detach here*-----

Please send this portion to Karl Kellogg by October 6\*. Make checks payable to the Colorado Scientific Society.

Name \_\_\_\_\_

Number of people in party \_\_\_\_\_ Total amount remitted \_\_\_\_\_

Telephone (and/or e-mail) \_\_\_\_\_



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

*or: USGS, Mail Stop 913  
Federal Center  
Lakewood, CO 80225*



# September Speakers' Abstracts

## Quantifying the Sources and Sinks of Atmospheric Methyl Bromide

*James H. Butler*

NOAA Climate Monitoring and Diagnostics Laboratory  
Boulder, Colorado

Methyl bromide ( $\text{CH}_3\text{Br}$ ) is a trace atmospheric gas that has been implicated in the depletion of stratospheric ozone. It is present in the atmosphere at about 10 parts per trillion, which is 10-50 times lower than chlorofluorocarbon (CFC) mixing ratios, yet its contribution to ozone depletion is considerable because it contains bromine. Free, stratospheric bromine, in combination with current levels of stratospheric chlorine, is 40-100 times more effective at removing ozone on a per-atom basis than chlorine alone. Thus,  $\text{CH}_3\text{Br}$  is considered to be on par with some of the CFC's in contributing to stratospheric ozone depletion. Because of this,  $\text{CH}_3\text{Br}$  was recently included by international agreement as a controlled ozone depleting substance, along with CFC's and halons. Methyl bromide differs from these other gases, however, in that its sources are not entirely anthropogenic. Also, its sinks result not only from reactions in the atmosphere, but also from interaction with the oceans and land. Thus, estimating the contribution of industrially produced  $\text{CH}_3\text{Br}$  to the depletion of stratospheric ozone and calculating the atmospheric lifetime of  $\text{CH}_3\text{Br}$  are more difficult than for the other regulated halocarbons. This does not mean that obtaining an adequate description of the behavior of atmospheric  $\text{CH}_3\text{Br}$  is impossible. Considerable research has been done and is being done to understand the budget of atmospheric  $\text{CH}_3\text{Br}$ . This talk will address how the new research has changed our view of the cyclic nature and atmospheric lifetime of  $\text{CH}_3\text{Br}$ , what constraints are imposed upon its budget, and what gaps remain in our understanding of the behavior of this atmospheric gas.

## Water-sediment Interaction in Holocene Carbonate Islands, NE Panama

*John Humphrey*  
Colorado School of Mines

The San Blas Archipelago of islands extends along the northeastern coast of Panama, from Punta San Blas to nearly the border with Colombia. Over 340 Holocene islands occur on this shallow and extensive carbonate platform. Although relatively narrow, shallow-water carbonate environments are spread along 200 km of Caribbean coastline. Onshore waves and currents confine siliciclastic sediment derived from mainland Panama to the near-coastal environment. Clean reef-derived carbonate sands dominate the platform, although no true barrier reef is developed along the margin. The islands occur on topographic highs where pre-existing late Pleistocene reefs developed. Islands are composed predominantly of Holocene skeletal carbonate sand, are generally less than one km across, and are commonly less than two meters in height. High annual rainfall in San Blas has led to the development and maintenance of year-round meteoric phreatic lenses. Holocene sediments, composed of metastable biogenic aragonite and high-Mg calcite, are undergoing diagenesis through interaction with these groundwaters. Hydrochemical and petrological data indicate the occurrence of dissolution of metastable mineralogies and concomitant precipitation of low-Mg calcite. Only a minor proportion of low-Mg calcite is precipitated as cement; the vast majority occurs as neomorphosed skeletal carbonate. The San Blas islands provide an excellent natural laboratory for investigating early, near-surface mineralogical transformations in carbonate sediments.



# Society Business

## 1997 Memorial Funds Grants

The Colorado Scientific Society Memorial Funds Committee, comprised of Richard Madole (Chair), Gregory Holden, Susan Landon, David MacKenzie, and John Rold, met on May 1st to rank evaluations of 40 applications received from students at 25 universities. The committee awarded 10 grants for a total of \$9,050, an increase of \$1,150 over the amount awarded to 10 applicants in 1996. One grant (\$1,000) was awarded from the Pierce Fund, two grants (\$1,750 total) were awarded from the Eckel Fund, three grants (\$2,500 total) were awarded from the Oriel Fund, and four grants (\$3,800 total) were awarded from the Tweto Fund. The applications were reviewed and ranked on the basis of scientific merit, feasibility, and appropriateness with respect to the guidelines of each memorial fund.

The committee solicited applications from graduate students at about 200 U.S. universities and colleges that award Ph.D. and (or) M.S. degrees in earth science and engineering geology. Of the 40 applications received, 21 were from M.S. candidates and 19 were from Ph.D. candidates. The names of the grant recipients, their institutional affiliations, the award amounts, and the titles of their research projects are listed below.

### **Edwin B. Eckel Memorial Fund for Engineering Geology**

*Brendan R. Fisher*, Radford University, Virginia, M.S. thesis (\$1000)—“Geologic map and hazard inventory in the Interstate 77 corridor of the Valley and Ridge Province, Virginia”

*Ruth M. Harper-Arabie*, Colorado School of Mines, Ph.D. candidate (\$750)—“Evaluating geochemical functions in slope and riverine wetlands in Colorado”

### **Steven S. Oriel Memorial Fund**

*Thomas J. Kalakay*, University of Wyoming, Ph.D. thesis (\$1000)—“Structural and thermochronologic study of the Pioneer batholith, southwest Montana: a test of the critical taper wedge model in the Sevier orogen of southwest Montana”

*Paul C. Murphey*, University of Colorado, Ph.D. thesis (\$1000)—“Stratigraphy and depositional history of the upper Bridger Formation (middle Eocene) of southwestern Wyoming, and systematics of the Bridgerian Ischyromyidae (Mammalia, Rodentia)”

*Caleb J. Pollock*, University of North Carolina, M.S. thesis (\$500)—“Structural relationships of high-angle reverse faults and thrust faults in a Laramide uplift: Sierra Nacimiento, New Mexico”

### **Bill Pierce/Heart Mountain Memorial Fund**

*John J. Walsh*, Columbia University, Ph.D. thesis (\$1000)—“The Heart Mountain detachment: a criterion for distinguishing gravity slide blocks from rooted low-angle normal faults”

### **Ogden Tweto Memorial Fund**

*Brian K. Alers*, Colorado School of Mines, M.S. thesis (\$900)—“Multi-stage deformational history of early Proterozoic Cu-Zn, and Zn-Pb-Ag, volcanogenic sulfide mineralization at the Cinderella and Bon Ton mines, Maysville, Chaffee County, Colorado”

*Andrey Bekker*, Virginia Polytechnic Institute and State University, Ph.D. thesis (\$1000)—“A combined sedimentological and geochemical analysis of the Nash Fork Formation, Medicine Bow Mountains, WY: Evidence for a rise of oxygen in the Paleoproterozoic atmosphere”

*Stan P. Dunagan*, University of Tennessee, Ph.D. thesis (\$1000)—“Epicontinental carbonate lake sedimentation and paleoenvironments of the Morrison Formation (Upper Jurassic) Colorado: Understanding variations in paleohydrology and paleoclimatology”

*Wm. Jay Sims*, University of Kentucky, Ph.D. thesis (\$900)—“Fault-boundary geometry and kinematic history, and stratal architecture of the northern part of the Central Colorado trough”

**Richard F. Madole**



# 1997 Student Night

On Tuesday, November 4, 1997, the Colorado Scientific Society will host a special night highlighting geoscience work of students from Front Range colleges and universities. The program will consist of five 15-minute talks and will be held on the campus of the Colorado School of Mines. Cash prizes ranging from \$200 to \$50 will be given to all students chosen to participate. All participants will also receive honorary annual membership in the Society. This student night provides a fine opportunity for students to showcase their research before a knowledgeable yet

friendly audience. Students are welcome to repeat talks from the GSA national meeting of the preceding week.

Interested students should send abstracts to Mark Hudson (U.S. Geological Survey, MS 913, Box 25046, Denver, CO 80225, mhudson@usgs.gov, 303-236-7446) by October 1, 1997. Email submissions are preferred. Please limit abstracts to 400 words and include a complete return address, phone number, and email address. Submitted abstracts will be ranked by a panel of Colorado Scientific Society members and the top five candidates will be notified by October 8, 1997.

## Earth Science Meetings

**Colorado Scientific Society's** regular meetings are held the 2<sup>nd</sup> Tuesday of the month (unless otherwise advertised). Social time begins at 7:00 p.m. and program is at 7:30 p.m. Contact Karl Kellogg at 236-1305 for information.

**Denver International Petroleum Society (DIPS)** meets the 2<sup>nd</sup> Friday of each month at the

Wynkoop Brewing Co., 18<sup>th</sup> 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 calling Kristine Peterson (303) 980-6770. 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: \$13 for lunches; talk only is available for \$2 (make checks payable to "DIPS"). 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 Cappa, 866-2611.

Sept 8 — Murray Hitzman, "Sediment-hosted Cu-Pb-Zn deposits in Brazil"

Oct 6 — Speaker and title not yet available

**Denver Mining Club** meets Thursdays from 11:30 a.m. to 1:00 p.m. at the Country Harvest Buffet at Villa

Italia, 7200 W. Alameda Avenue, Lakewood. For more information contact Dick Beach at (303) 986-6535.

September 11 – Paul Jones, Executive Director, Minerals Exploration Coalition, "Proposed Changes in the BLM Surface Management (3809) Regulation"

September 18 – Donald D. Haas, Manager, Western Technical Services, Weir International, "Sample Security from the Golden Rule, Ghana, West Africa"

## Colorado School of Mines Van Tuyl Lectures

For information call the Dept. of Geology at 273-3800.

Oct 6 — Speaker and title not yet available



## Colorado State University Geology Lectures

All presentations are at 4:00 p.m. in room NR 316, with the exception of the AAPG Distinguished Lecture, which will be at NOON. For information, contact Eric Erslev at (970) 491-6375.  
Oct — Speaker and title not yet available

## Museums, Internet, News

**Friends of Dinosaur Ridge**...for information call 697-DINO. Visitors' Center is located at 16831 West Alameda Parkway (north side of Alameda, just west of the C-470 overpass). Open 9 a.m. to 4 p.m. weekdays and weekends. Fireside chats are held at the Morrison Town Hall, 110 Stone Street in Morrison starting at 7 p.m.

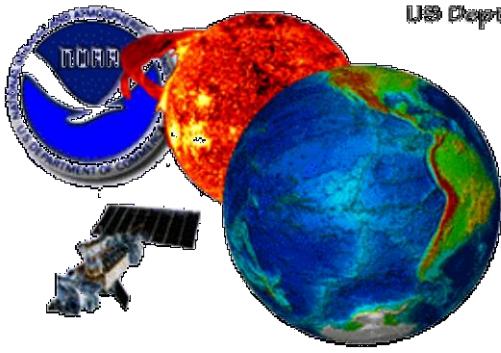
**Morrison Natural History Museum**...is open 1-4 p.m., Wednesday through Sunday. The Museum is located on State Highway 8, ½ mile south of Morrison. Fireside chats are cosponsored periodically by Friends of Dinosaur Ridge (see above).

**Women in Mining**...the local chapter and the Colorado Section of SME/GEM Committee are helping Denver's Young Americans Bank and Education Foundation refurbish their science and nature exhibit in Cherry Creek. The bank hosts "Young AmeriTown," a bank learning experience for top students from the Metro area. Annually, more than 38,000 students pass through the exhibit along with more than 2,000 teachers. For more information, contact Guy Johnson at (303) 969-0365 or GPJ222@aol.com.

**Colorado Mining Exhibit**...is soliciting funds to help finance the 1997 mining and minerals education exhibit at the Taste of Colorado. Last year more than 40,000 people toured the 40ft x 80ft tent at the Taste. For more information, contact Guy Johnson.

## Interesting Web Sites

Each month we mention web sites that relate to that month's presentation(s) or to the geology of the Southwest. This month we look at the NOAA's National Geophysical Data Center website at <http://www.ngdc.noaa.gov/mgg/wdcamgg/>. NOAA has a rotating globe at [http://www.ngdc.noaa.gov/mgg/image-relief\\_slides1.html](http://www.ngdc.noaa.gov/mgg/image-relief_slides1.html) where you can select the direction to view the earth from a list provided. From this URL you can download slides from NOAA's ftp site or purchase hardcopies of the slides on film. In fact, you can find many colorful images of the earth for sale by NOAA at <http://www.ngdc.noaa.gov/mgg/>.



US Dept of Commerce / NOAA / NGDC

National  
Geophysical  
Data Center

announcements/products.html. This URL also describes CDs that you can purchase of NOAA's ocean hydrographic, marine geophysical, ocean drilling, global relief, and lake bathymetry data.

NOAA's slides are great for scientists and teachers who need images for slide presentations or classroom resources. They can be downloaded directly to your PC as jpeg images, where they can be inserted into word documents and electronic presentations.



# New Members

We extend welcomes to Robin VerSchneider, Janet Slate, and Larry Snee.

## National and Regional Meetings and News

### Geological Society of America Annual Meeting



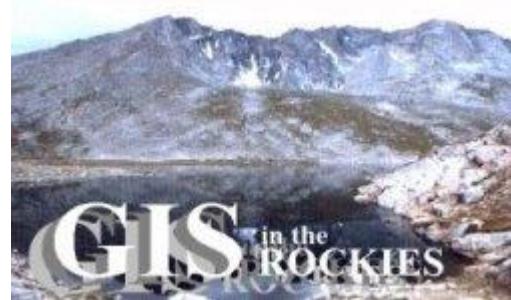
The 109<sup>th</sup> Annual Meeting of the Geological Society of America will be held October 20-23 in Salt Lake City. This year's theme is "Global Connections." GSA calls this the meeting for everyone interested in the Earth System. There will be sessions and seminars on research and applications in the geosciences, education, and the environment. Preregistration ends September 19. For information contact: GSA Meetings Department, P.O. Box 9140, Boulder, 80301, (303) 447-2020 or 1-800-472-1988, FAX (303) 447-0648, email [meetings@geosociety.org](mailto:meetings@geosociety.org). This year's meeting will be held at the Salt Palace Convention Center.

### Rocky Mountain Association of Geologists

The association has announced the publication of "Geologic History of the Colorado Front Range" by Dudley W. Bolyard and Stephen A. Sonnenberg. This book commemorates the 75<sup>th</sup> Anniversary of the RMAG. It includes 14 papers that chronologically trace the tectonic history of the Colorado Front Range from Precambrian through Late Cenozoic time. The cost is \$37.56 if picked up at the RMAG office at 820 16<sup>th</sup> Street, Suite 505, Denver 80202, (303) 573-8621.

### GIS in the Rockies

The 1997 GIS in the Rockies Conference is sponsored by local chapters of AM/FM International, ACSM, ASPRS, and URISA. This meeting will provide you with an opportunity to network, exchange ideas and get up to date on the latest GIS technologies. Environmental, surveying, and oil and gas companies, and local and federal government agencies will demonstrate and explain their GIS products and equipment. All the major GIS software vendors will be there. The meeting will be held at the Holiday Inn at Chambers and I-70. On site registration is \$100 for members and \$105 for nonmembers.



# Colorado Scientific Society Fall Field Trip

4 October 1997

## GEOLOGICAL ASPECTS OF ENVIRONMENTAL MANAGEMENT OF THE CLEAR CREEK WATERSHED

**LEADER:** Carl Norbeck, Coordinator for the Clear Creek Watershed Forum

At 8:00 AM on Saturday, October 4, we will leave from the upper parking area of the Cold Spring Park and Ride on the southeast side of Union by the 6<sup>th</sup> Ave. exit. We will travel by vans up Clear Creek and work our way back downstream during the day to visit critical environmental sites.

The quality of water is essential to our quality of life in the Front Range. This trip is designed for geological scientists to become more knowledgeable about the geological environmental issues related to our local Clear Creek and the efforts to provide the communities downstream with clean water.

The Clear Creek Watershed Forum along with numerous organizations and individuals has the goal of keeping Clear Creek environmentally sound. This consortium is a nationally recognized, stellar example of cooperation between the community, local industry, the state, and the EPA. Carl Norbeck, geologist and coordinator for the forum, has agreed to lead us on a field trip to sites of concern along Clear Creek with an emphasis on environmental issues related to geologic problems created during our long history of mining, industry, agricultural, and urban use of Clear Creek. Our trip will be similar to the one Carl will lead for the International Symposium on Environmental Geochemistry later this fall, but with a broader emphasis than just geochemical aspects.

As we visit sites, Carl will explain to us what the geologic/environmental problems are, what mitigation methods are being used to solve these problems, what results are being reached, and what problems remain. Included in the trip will be a series of EPA Superfund sites, such as the wetlands in the Silverplume area that are being used in an experimental metal removal method, and the Argo Tunnel of Idaho Springs where we will see a Superfund treatment plant. The efforts of volunteer cleanup at the McClelland Mine at Dumont, private cleanup at the Black Eagle Mill at Idaho Springs, and the casino cleanup using ceramic filter technology at the Gregory Incline at Black Hawk will be important stops. At Lions Park and Vanover Park in Golden, the City of Golden, Colorado School of Mines, Coors, and the Clear Creek Water Users Alliance are engaged in cleanup, stream improvements, and diversion structures. Finally, if time permits, some of the visual benefits of these efforts will be seen at the Jefferson County land acquisition site in Clear Creek Canyon and at the open space at the confluence of the South Platte.

Each of us will bring our own bag lunches, but liquid refreshments for lunch and later in the day will be provided. We will return to the park and ride by 6 PM.

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### REGISTRATION FORM

Name \_\_\_\_\_

Address \_\_\_\_\_

Phone \_\_\_\_\_

email \_\_\_\_\_

Trip cost per person: \$15 Beverage preferences (sodas, iced tea, beer) \_\_\_\_\_

To register, please send your check for the total amount, payable to the Colorado Scientific Society, to the CSS Field Trip Chair: Bob Scott, USGS, MS 913, Federal Center, Denver, CO, 80225 before Friday 26 September. Refunds must be requested BEFORE Friday 26 September by calling Bob Scott at 303-236-1230.



# Invitation to Join the Colorado Scientific Society

The Society is dedicated to the advancement of science through open forums and activities. We sponsor lectures, field trips, student scholarship grants, and discussions of scientific matters of public concern.

I hereby apply for  membership in the Colorado Scientific Society.  
**(Regular, Corresponding, Student)**

---

(Last Name)

(First Name)

(Middle)

---

(Address)

(Telephone)

(e-mail)

---

(City)

(State)

(Zip)

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(Company/Agency/University)

---

(Mailing address if different than above)

---

School

Degree

Year

Major

## Main Scientific Interests

**DUES**—Your dues are for the calendar year and help support the newsletter, monthly meetings, two field trips each year, family night, and the Emmons Lecture.

Regular Member (\$15)

Corresponding (outside Denver metro area) Member (\$10)

Student Member (\$5)

Please make your dues payable to Colorado Scientific Society. Thank you!!

**T**he success of certain Colorado Scientific activities depend on your volunteer help. Please circle those activities for which you can provide assistance. We will pass your name on to the appropriate Committee Chairperson.

*Arrangements*

*Best Paper Award*

*Field Trips*

*Fund Raising*

*History*

*Membership*

*Newsletter*

*Outreach*

*Program*

*Publicity*

*Science Fairs*

*Web Site*

I certify that all statements in this application are correct and, I agree to promote the objectives of the Society and to abide by its Constitution, Bylaws, and Rules.

---

Applicant's signature

---

Date

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



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

Visit CSS at <http://rainbow.rmi.net/~css/>

## Colorado Scientific Society Officers, Councilors, and Chairpersons

### OFFICERS

President: Karl S. Kellogg, USGS, 236-1305  
President-Elect: Eric Erslev, CSU, (970) 491-6375  
Treasurer: Michael N. Machette, USGS, 273-8612  
Secretary: Stephen F. Personius, USGS, 273-8611  
Past President: Richard F. Madole, USGS, 236-4612

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1995-97: Lisa R. Bader, USGS, 236-5547  
1996-98: James A. Cappa, CGS, 866-2611  
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1997-99: Michelle L. Tuttle, USGS, 273-8626  
1997-99: William D. Nesse, UNC, (970) 351-2830

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Best Paper Award: Bruce R. Bryant, USGS, 238-1234  
Field Trips: Robert B. Scott, USGS, 236-1230  
History: Marjorie E. MacLachlan, USGS-retired, 986-7192  
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Memorial Funds: Richard F. Madole, USGS, 236-4612  
Memorial Funds Treasurer: Michael N. Machette, USGS, 273-8612  
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Outreach (signs): Peter J. Modreski, USGS, 236-5639  
Program: Eric P. Nelson, CSM, 273-3811  
Publicity: David Moore, USGS, 236-1271  
Science Fair: Bonnie L. Crysdale, DOE, 443-7261

**\*\* NOTE: Please help us with publicity by posting copies of the Newsletter on bulletin boards.**

