



Colorado Scientific Society

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

Annual Emmons Lecture

Date: Tuesday, January 17, 1995
Location: Bunker Auditorium, Green Center
Colorado School of Mines
Golden, Colorado
Meeting time: 8:00 p.m.

The Crash of Comet Shoemaker-Levy 9 on Jupiter

by
E.M. Shoemaker
and
C.S. Shoemaker

The Crash of Comet Shoemaker-Levy 9 on Jupiter

E.M. Shoemaker, Scientist Emeritus, U.S. Geological Survey;
and staff member, Lowell Observatory

and

C.S. Shoemaker, Lowell Observatory

Approximately 20 observed nuclei of P/Shoemaker-Levy 9 struck Jupiter between July 16-22, 1994. Comparison of the ejecta plumes with numerical models suggests that most of the brighter nuclei were more or less compact objects ranging from 1 to 3 km in mean diameter. If these estimates are correct, we have been privileged to witness an event that may recur no more frequently than about once per millennium. Fine, dark, soot-like particles made each impact plume visible as a complex dark spot above the sunlit face of Jupiter. The larger dark spots spread to radii greater than Earth's in times less than 90 minutes. The crash of '94 is a vivid reminder that the Earth is also subject to the occasional global catastrophe of large-body impact.

French cartoonist Honoré Daumier, 1847.

Message from the President

The highlight of the activities of the Colorado Scientific Society each year is the S.F. Emmons Lecture. The Lecture was established in 1962 by President Rueben J. Ross, Jr., and is held annually—usually in January. A list of past Emmons Lecturers is available in *The History of the Colorado Scientific Society—1882-1993*. The Lecture was named in honor of a founder and the first President (1883) of the Colorado Scientific Society, Samuel Franklin Emmons. Emmons graduated from Harvard and was an economic geologist with a career that included mineral exploration in Colorado and Nevada. Clarence King, the first Director of the U.S. Geological Survey, appointed Emmons to geologist-in-charge of its Rocky Mountain Division in Denver.

Speakers are nationally or internationally recognized earth scientists at the forefront of research in some facet of the science, as evidenced by our speakers this month, Gene and Carolyn Shoemaker. Gene was the Emmons Lecturer in 1980 and is only the second Lecturer to honor us with a return performance. This lecture series contributes significantly to our standing in the scientific community and the intellectual growth of our members and colleagues. I encourage each of you to invite a potential CSS member to the Lecture.

Society Notes

Minutes of Annual Business Meeting

December 13, 1994

Green Mountain Room, Sheraton Hotel, Lakewood, Colorado

Jack Reed called the meeting to order. Paul Williams presented the treasurer's report; the Society's assets are approximately the same as they were last year. Rich Madole reported on membership. He's sent a letter to members who did not renew their membership in 1994; five have responded, generally citing personal reasons for discontinuing their membership. Ken Pierce presented the report of the memorial-funds committee. The committee distributed applications for research grants to about 200 institutions, ranked 43 applicants, and awarded 10 research grants ranging from \$450 to \$700. The memorial funds have increased from \$70,000 to \$104,000; the newly established Pierce fund has \$20,000.

Dave Noe reviewed the year's field trips. The one-day spring trip to Garden City was led by Pete Peterson and focused on the dinosaur stratigraphy of the Morrison Formation. The planned 2½-day fall field trip was canceled when only five people applied and when field-trip leader K Molinaar fell ill. Rube Ross presented the Past Presidents' award to Wendy Harrison (in absentia) for her talk on the disposal of CO₂ in ocean basins.

Jack Reed presented certificates of recognition to Eric Erslev (councilor and science fair), Pete Palmer (councilor), Bob Fleming (outreach) and Mike Machette (in absentia) (memorial funds), Rich Madole (membership), Marge McLachlan (history), Mike O'Neill (newsletter), Dave Noe (field trips), Rube Ross (past presidents' award), Ve Sable (memorial-funds treasurer), Michelle Tuttle (program), and Dave Lidke (arrangements).

Greg Holden presented the recommendations of the nominating committee:

Rich Madole as president-elect

Susan Bartsch-Winkler and Mark Hudson as councilors

The nominations were closed and the slate of candidates were accepted as proposed.

Finally, Jack Reed presented the Society's silver gavel to Sue Landon, who assumed the presidency and introduced Jack for his presentation of the presidential address.

Respectfully submitted,

[signed]

David Schleicher, Secretary

History Committee

Field trip photo album—Ed Johnson (USGS, Branch of Sedimentary Processes; 303-236-7751), a member of the History Committee, is in charge of the Society's field trip photo album. Anyone who wants to give pictures (prints or slides) of members and guests, and of interesting localities taken on trips should send them to Ed at MS 939. Please include information on the identification of all individuals, localities, and dates with each photo.

Books

The History of the Colorado Scientific Society—1882-1993 is available for \$4.00 by mail (postage and handling included within the United States) or for \$2.50 at Society meetings. If ordered by mail, please include your return address and allow 4 weeks for delivery.

Memorial for C. M. ("K") Molenaar

*(Contributions from E.A. Merewether, Anny B. Coury, T.D. Fouch,
T.S. Dyman, W.A. Cobban, and J.E. Fassett, U.S. Geological Survey)*

Cornelius M. Molenaar, "K" to his family and many friends, was born and reared in the Watts district of Los Angeles. While adolescents, "K" and his brother Dee explored the hills and deserts of southern California and developed their life-long love for wild areas. "K" graduated from George Washington High School and attended Los Angeles City College in the academic year of 1940-1941.

In the early part of World War II, he volunteered and served with the 10th Mountain Infantry Division at Camp Hale near Climax, Colorado. After the war "K" studied geology at the University of Washington where he received a B.S. degree in 1950. While attending the university, he met and courted Barbara Ann ("Barnie") Barnett; they were married in 1948 in Reno, Nevada. He was actively involved in skiing, hiking, and climbing in the mountains of California, Washington, and Alaska. His climbing included participation in the first American ascent of Mount St. Elias in Alaska. "K" was very proud of that feat and maintained relationships with other members of the expedition.

During the years 1953-1978, "K" was a leading exploration geologist and eventually a staff geologist for Shell Oil Company. He conducted field-investigations in many frontier areas, preparing stratigraphic frameworks from his studies of outcrops and subsurface records. "K" retired from the Shell Oil Company in 1978 but was hired shortly thereafter by the U.S. Geological Survey (USGS) to refine the stratigraphy of Cretaceous rocks in the hydrocarbon-bearing basins on the North Slope of Alaska. He served until 1987 as Project Chief and USGS Coordinator in that region. For the World Bank in 1986-1987, "K"'s skills and experience as a petroleum geologist were applied to the stratigraphy and the assessment of hydrocarbon-resources in the Pannonian basin of Hungary. Subsequently, in 1987-1989, he was a major contributor to stratigraphic studies and hydrocarbon assessments of Cretaceous rocks in several basins in New Mexico and Utah. In the following years, "K" was a leading participant in a variety of stratigraphic and energy-resource investigations. Most of "K"'s professional activities during his tenure with the USGS are represented by nearly 60 published reports and charts.

"K" was an enthusiastic, thoughtful, and skillful geologist and obviously derived much satisfaction from his professional life. The quality and abundance of his professional contributions were acknowledged by many awards from several geological societies, including an Honorary Life Membership from the Four Corners Geological Society in 1971, Past President's Awards for best paper delivered by a member of the Colorado Scientific Society in 1981 and 1988, a Superior Performance Award from the USGS and a Commendation from the Secretary of the Interior in 1988 for outstanding work on the Arctic National Wildlife Refuge, an Outstanding Scientist Award from the Rocky Mountain Association of Geologists in 1990, and a Meritorious Service Award from the USGS in 1994. He was widely appreciated by members of all these organizations, and will be remembered for his dedication to traditional societal values, for his professional accomplishments, as well as his contributions to the Colorado Scientific Society.

Association for Women Geoscientists to offer Chrysalis Scholarship

The Association for Women Geoscientists will award two (2) Chrysalis Scholarships on March 31, 1995. The scholarship is for women who have returned to graduate school after an interruption in their education of one year or longer. Applications should be made by February 28, 1995, and should include a letter stating background (and nature of interruption of studies), career goals, objectives, involvement in the geosciences and community, and how the monetary award will be used.

For more information and application forms, contact:

Chrysalis Scholarship
Association for Women Geoscientists
G & H Production Company
518 17th Street, Suite 930
Denver, CO 80202
Phone: 303-534-0708
Fax: 303-623-6724

Earth Science Meetings

Colorado Scientific Society. The next regular meeting will be held on February 14, 1995, in the Green Mountain Room (second floor, southwest corner), Sheraton Hotel, 360 Union Boulevard, Lakewood, Colorado. Social time is 7:00 p.m., meeting starts at 7:30 p.m.

"In the tracks of the Hayden survey" by Michael Foster, author and historian.

"The architecture of a South American volcano" by Ren Thompson, U.S. Geological Survey.

Friends of Dinosaur Ridge. For info about Dinosaur Ridge activities and location of lectures, call 303-697-Dino.

Rocky Mountain Association of Geologists. Regular meetings consist of a lunch at 11:55 a.m. and a lecture at 12:25 p.m. in the Banquet Room of the Wynkoop Brewery, 18th and Wynkoop Sts., Denver. The cost of the luncheon buffet is \$11.00. Luncheon reservations are taken on a recording line (303-623-5396) until 10:30 a.m. Thursday, before the meeting. No reservations are necessary for the talk; however, there will be a \$2.00 charge at the door.

Society of Economic Paleontologists and Mineralogists—Rocky Mountain Section. All lectures at the Denver Press Club, Downtown Denver, 1330 Glenarm Place, unless otherwise noted. Cash bar at 11:30, lunch at 12:00, speaker at 12:30. For reservations, call and leave message at 303-697-6698 by Friday prior to lecture. For further information, call Dave Eby at 303-738-9697. Lunch reservation **not** required to attend lecture.

Jan. 24 - *Dr. Matthew M. Laughland, Senior Geologist, Basin Analysis Group, Mobil Exploration and Producing Technical Center, Dallas, Texas. "A practical approach to reconstructing burial and temperature histories—an example from the Mobil O'Connell Well, southern Piceance Basin, Colorado."*

University of Colorado—Department of Geological Sciences, Boulder. Lectures are held on Wednesdays at 4:00 p.m. in Geology Building, Room 121 (unless otherwise noted). For more information about lectures call Joseph Smyth (303-492-6109) or the Geology Department (303-492-8142).

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, 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).

Jan. 12 - *Richard W. Hutchinson, Professor Emeritus, CSM. "Proterozoic metallogeny—a record of profound global changes."*

Jan. 26 - *Dr. Michael Coffin, University of Texas-Austin. "Large igneous provinces on the terrestrial planets—a perspective from oceanic plateaus and volcanic passive margins."*

Feb. 2 - *Dr. Richard Hanson, Department of Geophysics, CSM. "Direct magnetic detection of hydrocarbons."*

Association for Women Geoscientists. New and prospective members are encouraged to find out more about AWG from 5:30 p.m. to 7:30 p.m. at the Colorado School of Mines Geology Museum. Contact Leslie Landefeld at 303-278-1292 for further details.

[See page 2 in this newsletter for information on Chrysalis Scholarship applications.]

Denver International Petroleum Society ("DIPS"). Meetings held on 2nd Friday of the month, Wynkoop Brewery, 18th and Wynkoop, Denver. Reception at 11:30, luncheon at 12:00, program at 12:30. Reservations required by calling RMAG recording line (303-623-5396). Reservations accepted between 2:00 p.m. on Friday and 11:00 a.m. on Wednesday before meeting. Cost: \$13.00

Denver Mining Club. All regular meetings are on Thursday, from 11:30 a.m. to 1:00 p.m. at Denver Federal Center, Building 41 Cafeteria (south entrance), Lakewood. For more information call Jane Ohl, Program Chairperson (303-237-4043).

Jan. 5 - Irv Parrish, Geologist, DMBW Inc. "Small-scale Gold Mining in China."

Jan. 12 - Ed Lewandowski, Owner, Broken Handle Mining Co. "High-altitude Silver Mine, Clear Creek County, Colorado."

Jan. 19 - Thomas S. Hendricks, President, Hendricks Mining Co. "Cross Gold Mine at Caribou, Colorado—recent changes."

Jan. 26 - [To be announced]

Feb. 2 - Greg Hahn, Vice President, St. Mary Minerals Inc. "Development Plans for Lisbon Valley Copper Project, Utah—future Heap Leach SX-EW Copper Mine."

Feb. 9 - Mike Leidich, Mines Manager. **A 2-hour Tour of the Robinson Brick Company Plant.** Meet at 1845 Dartmouth (main office) at 11:30 a.m. Bring your lunch to Robco's lunchroom. Groups of 10-12 people will be formed (no more than 3 groups). Bring hard hats and protective glasses.

American Institute of Hydrology—International Mine Water Association. The next annual meeting—"Water Resources at Risk"—will be held on May 14-18, 1995, at the Red Lion Hotel near Stapleton Airport in Denver, Colo. Authors intending to offer a paper/poster are requested to submit an abstract no later than November 30, 1994. Manuscripts for both papers and posters are due by March 15, 1995. For more information, contact Joe Downey or Ed Gutentag at 303-425-0419; fax 303-425-1053; Internet e-mail address is 76330.3650@CompuServe.COM.

U.S. Geological Survey 10th McKelvey Forum—This forum will be held on February 13-16, 1995, at the Omni Shoreham Hotel, Washington, D.C. The focus of the meeting is "Energy and the Environment." Featured highlights include the presentation of ongoing research dealing with energy and environmental issues for non-scientific managers, planners, and government leaders, as well as scientists and technicians. For more information, write to U.S. Geological Survey, McKelvey Forum, Box 25046, Mail Stop 934, Denver, Colorado 80225-0046; or call 303-236-5769; or e-mail to mckelvey@bpgsvr.cr.usgs.gov.

Items for Newsletter

We would like to include any items of general interest regarding members, new programs, etc., in future newsletters. Please submit materials (hardcopies and/or computer disk) to Mike O'Neill, USGS, P.O. Box 25046, Mail Stop 913, Denver Federal Center, Denver, CO 80225-0046, or call (303) 236-1288. Please send items to the editor before the 20th of the month to ensure inclusion in the next newsletter.

CALLING ALL MEMBERS who have not paid 1995 membership dues (your dues are current if "95" appears in the first line of the mailing label on this newsletter). Please pay as soon as possible, as we will soon be

undertaking a number of fall and winter activities. If you *have* paid and receive an overdue notice, please inform treasurer Paul Williams (303-526-2037) and (gently) chastise him for the oversight, so he can fix his records. If you have *not* paid, you might wish to pay 1996 dues as well--the end of the year is not far away. Please so indicate on you check. Please use the form below. Make your check payable to the Colorado Scientific Society, P.O. Box 150495, Lakewood, CO 80215-0495. Thanks very much.

COLORADO SCIENTIFIC SOCIETY
1995 DUES AND MEMORIAL FUND CONTRIBUTIONS

<i>(Last Name)</i>	<i>(First Name)</i>	<i>(Initial)</i>
<i>(Address)</i>		<i>(Telephone)</i>
<i>(City)</i>	<i>(State)</i>	<i>(Zip)</i>

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

Regular Members (\$15)	
Corresponding Members (\$10)	
Student Members (\$5)	

MEMORIAL FUNDS *You can specify that your tax-deductible gift go to any of the following funds for research grants to graduate students.*

(A) <i>Ogden Tweto Memorial Fund</i>	
(B) <i>Steven S. Oriel Memorial Fund</i>	
(C) <i>Edwin B. Eckel Memorial Fund</i>	
(D) <i>Bill Pierce–Heart Mountain Fund</i>	

Gift in memory of _____
(goes equally into funds unless specified as A, B, C, or D)

ENDOWMENT FUND *Helps support the Society’s operating expenses.* _____

TOTAL DUES AND FUND CONTRIBUTIONS _____

Please make your dues and/or contribution check payable to Colorado Scientific Society and specify the Fund(s) to which you are contributing. All contributions are tax deductible.

The success of certain Colorado Scientific Society 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.

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|--------------------|------------------|----------------|--------------------|
| (1) Arrangements | (4) Fund Raising | (5) Newsletter | (10) Publicity |
| (2) Geologic Signs | (5) History | (8) Outreach | (11) Science Fairs |
| (3) Field Trips | (6) Membership | (9) Program | |

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

Colorado Scientific Society

OFFICERS

President: Susan M. Landon, Consultant, 436-1930
President-Elect: Richard F. Madole, USGS, 273-8607
Treasurer: Paul L. Williams, USGS, 236-1256
Secretary: David Schleicher, USGS, 236-1247
Past President: Jack Reed, USGS, 236-1276

COUNCILORS

1993-95: Marith C. Reheis, USGS, 236-1270
1993-95: Karl S. Kellogg, USGS, 236-1305
1994-96: Kathleen M. Haller, USGS, 273-8616
1994-96: Frank J. Adler (retired)
1995-97: Mark R. Hudson, USGS, 236-7446
1995-97: Susan Bartsch-Winkler, USGS, 236-8289

COMMITTEE CHAIRPERSONS

Arrangements:
Best Paper Award:
Field Trips: Robert Raynolds, Consultant
Fund Raising:
History: Marjorie E. Mac Lachlan, USGS-retired, 986-7192
Membership: Mary-Margaret Coates, 422-8349
Memorial Funds: Michael M. Machette, USGS, 273-8612
Memorial Funds Treasurer: Vera H. Sable, USGS-retired, 526-9250
Newsletter Editor: J. Michael O'Neill, USGS, 236-1288
Outreach (signs):
Program: Richard B. Wanty, USGS, 236-1819
Publicity:
Science Fair: Eric A. Erslev, CSU, 491-6375