



Colorado Scientific Society

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

ARITHMETIC, POPULATION, AND ENERGY

Professor Albert A. Bartlett
Department of Physics
University of Colorado at Boulder

Tuesday, February 9, 1999
Union Square Theatre in the Sheraton Hotel
360 Union Boulevard
Lakewood, Colorado

Social Half-hour: 7:00 p.m. (bar available downstairs)
Meeting Time: 7:30 p.m.

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Summary of February 9 Presentation

ARITHMETIC, POPULATION, AND ENERGY

Professor Albert A. Bartlett
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“The greatest shortcoming of the human race is our inability to understand the exponential function.”

With these words, Prof. Bartlett starts his one-hour talk. First he gives a very elementary introduction to the arithmetic of steady growth, showing what steady growth of population means in Boulder, in Colorado, and in the world. Then the talk examines the situation where one has steady growth in a finite environment and the results of this are applied to fossil fuels, particularly to petroleum and coal. Data from the U.S. Department of Energy are used to show that the realistic lifetimes of U.S. coal, U.S. petroleum and world petroleum are much shorter than the optimistic figures that are so often quoted. Next the talk then examines reassuring statements from experts, the press, scientists, political leaders, and others, that are wildly at odds with the facts. The talk then examines the widespread worship of economic growth and population growth throughout the western world. These facts give the listener a better understanding of the real meaning of “sustainability,” which Prof. Bartlett gives as the First Law of Sustainability:

“You cannot sustain population growth and /or growth in the rates of consumption of resources.”

This allows the listener to appreciate fully the implications of the growth path of western society and in particular, of the United States. The talk closes with a plea for the widespread education of people on the arithmetic and consequences of growth.

September 19, 1998 is the 29th anniversary of the first time Professor Bartlett delivered the talk. In these 29 years he has given the talk 1282 times in 48 states, Canada, and overseas, to audiences ranging from high school students to graduate students, to community groups, to scientific colloquia, to scientific and non-scientific local and national conventions, and to Congressional staff people in Washington. Well over a thousand video tapes of the lecture have been sold by the University of Colorado.



P x 4 *(President Pierce's Purple Prose)*

The leadership of your Society has been busy making plans for 1999. We initiated a membership drive which is headed by Dean Kleinkopf. Dean and Mary-Margaret Coats prepared and mailed 1000 post cards advertising Wally Broker's Emmons Lecture. The results were gratifying. Lisa Bader updated our brochure which was handed out at the lecture. In February, we will mail a letter of invitation, fully-updated brochure, and membership form to about 1500 with the hope of bringing in new members.

We generated a lot of publicity for the recent Emmons lecture, and had very good attendance. Our speaker, Wally Broecker discussed (1) abrupt, millennial scale climatic oscillations related to oceanic "conveyor belt" deep water circulation, (2) the decadal "flickers" between these changes in state, and (3) the risk of anthropogenic carbon dioxide forcing major change in climate state through such mechanisms as the shutting down the conveyor-belt circulation.

Program Chair Eric Nelson has organized our monthly program through May, with emphasis on the Cenozoic geologic evolution of Colorado (see separate article). Sherm Marsh has our field trip planning well underway, with a June trip to the Arkansas River Valley a prime project.

We are working to establish links with the broader geologic community. New Councilor Emmett Evanoff has ties to both the University of Colorado and the Denver Natural History Museum. New Councilor Bob Jarrett has ties to the Water Resources Division of the USGS and the hydrological community, where some of the more recent earth-science graduates have found employment.

We can notify you by email of meetings, field trips, and other activities. See the next page of this newsletter for this service.

Although this year will end the millennium, we haven't formed committees for Y2K or millennium prophecy problems. From our deep-geologic time perspective, we'll just sit back and see what happens. Besides, that will be Mark Hudson's problem when he takes over the reins in 2000.

Hope to see you February 9th, Ken Pierce

Research Grants Available

The Colorado Scientific Society invites graduate students to apply for research grants to be awarded in April 1999. Applicants must be enrolled in a Masters or Ph.D. program at an accredited college or university. Approximately eight grants, ranging from \$500 to \$1200 each, will be awarded for field-oriented research on the geology, geochemistry, and geophysics of the Rocky Mountain region. In addition, grants as large as \$1000 are awarded for engineering geology research (with no restriction on the geographic area of interest), and one grant as large as \$1000 is offered for studies of the Heart Mountain fault in northwestern Wyoming. Interested students can obtain application forms and grant information directly from the Society web site at: <http://shell.rmi.net/~css/> or by mail from the Chair of the Memorial Funds Committee, Colorado Scientific Society, P.O. Box 150495, Lakewood, CO 80215-0495. Deadline for applications is March 20, 1999.



1999 CSS Speaker Schedule

Thanks to Program Chair Eric Nelson, we can look forward to the following speakers in 1999. About one-half of the scheduled talks (with an *) address aspects of the theme "The Cenozoic Development of the Colorado Rocky Mountains", reflecting discussion at the past two CSS council meetings.

<i>Date</i>	<i>Speaker</i>	<i>Title (approximate in some cases)</i>	<i>Affiliation</i>
Feb 9	Al Bartlett	Arithmetic, Population, and Energy	CU Boulder
Mar 9	Pete Lipman	Blasts from the past: when there were huge volcanoes in Colorado*	USGS
Mar 9	Paolo Marco De Martini	Italy, "terraemotus" country: a bird's-eye view of the 1997 Assisi earthquakes	Istituto Nazionale di Geofisica Rome, Italy
Apr 13	Emmett Evanoff	Upheaval in the Southern Rockies: Climate vs tectonics for stream incision in the Late Cenozoic*	CU Boulder, Museum
Apr 13	Bob Kirkham	Dissolution of evaporites causes widespread active collapse in west-central Colorado*	Colorado Geological Survey
May 11	Julie Cole	El Niño: Geological evidence for past events	NOAA
May 11	Dave Crow	Growth of gold nuggets during active mountain building	Univ. of Otago, New Zealand
Sept 14	Randy Streufert	Why is Mt. Sopris so big? - A Middle Tertiary pluton caught with its pants down*	Consultant
Oct 12	Family Night		
Nov 9	Student Night		
Dec 14	Presidential Address		

Membership e-mail reminders

Colorado Scientific Society members who would like to receive an e-mail "reminder" before monthly meetings should send their email address in an e-mail message to bucknam@usgs.gov. Please put "CSS reminder" in the subject line of your message.



K-T Boundary Symposium, March 20-21

The Western Interior Paleontological Society will be convening a symposium on

The K-T Boundary: Extinction and Emergence

at the Green Center, Colorado School of Mines on Saturday, March 20 from 8 a.m. to 5 p.m. The program will feature poster sessions, fossil exhibits, and over a dozen speakers, including the following keynote speakers:

Dr. Anthony Fiorilla	Taphonomy at the K-T Boundary
Dr. Louis Jacobs	Mass Extinctions: Similarities and Differences
Dr. Kirk Johnson	The End of an Era: Evidence of Ecosystem Devastation at the K-T Boundary in Southwestern North Dakota"
Dr. James Kirkland	Patterns of Extinctions during the Cretaceous: Contrasts to the Terminal K-T Boundary Extinction
Dr. Douglas Nichols	End of an Era: Evidence for a Continent-Wide Catastrophe at the K-T Boundary

A field trip on Sunday March 21 will go to Dinosaur Ridge and South Table Mountain to view the K-T Boundary. For registration and other information call 303-948-1184, or visit the website www.wipsppc.com

New Members

The Colorado Scientific Society would like to welcome the following new members!!!

Jason T. Carolan
Rex G. Jarrett
Amy Johnson
Hugh M. Marshall
David R. Pyles
John Reiss, Jr.
Jill E. Savage
Jo Stanley
Christopher K. Zahm

Museums and 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.



Earth Science Meetings and Talks

Colorado Scientific Society's regular meetings are held the 2nd Tuesday of the month (unless otherwise advertised). Social time begins at 7:00 p.m. and presentations start at 7:30 p.m. For information, contact Ken Pierce at (303) 236-1244 or kpierce@usgs.gov

Denver International Petroleum Society (DIPS) 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 calling or leaving message with Dan Spancers (303) 446-5701. 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 Cappa, (303) 866-2611, or the website <http://www.qadas.com/dregs>

Colorado School of Mines Lectures For Heiland Lectures at 4:00 p.m. on Fridays, contact Michelle Szobody (303) 273-3451. For information on Van Tuyl Lectures, call the Dept. of Geology at (303) 273-3800.

Colorado State University Geology Lectures Mondays, 4:10 p.m. in room 109 or 316 of the Natural Resources Building. Call the Dept. of Earth Resources at (970) 491-5661 for further details.

University of Colorado at Boulder, Geological Sciences Colloquium
Wednesdays, 4:00-5:30 p.m., Rm. 180. For schedule, contact Kathy Madsen 303-492-8141

USGS Geologic Division Colloquium

Thursdays, 1:30 p.m., Foord Room , Building 20, Federal Center. For information, contact Pat Poole at ppoole@usgs.gov

February 4-- Bob Crovelli "Philosophy of Probability: Does God play dice with the universe? (Part 2)"

February 11--Rich Reynolds "Eolian dust on the Colorado Plateau: ecological importance and evidence for recent disturbance of southwestern deserts"

February 18--Marty Goldhaber "Extreme arsenic enrichment in Alabama coals: Possible links to southern Appalachian gold deposits and regional metamorphic fluid flow"

February 25--Christine Turner "Morrison Extinct Ecosystem - results of the integrated, multidisciplinary cooperative study with the Park Service"

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



COLORADO SCIENTIFIC SOCIETY

1999 DUES AND MEMORIAL FUND CONTRIBUTIONS

(Last Name)	(First Name)	(Initial)	(Telephone)
(Mailing Address)		(E-mail Address)	

DUES: Dues are for the calendar year and help support the monthly meetings, newsletter, field trips, family night, and the Emmons Lecture.

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

MEMORIAL FUNDS: Supports earth-science research grants to graduate students.
If not specified as to the fund, contribution will be distributed equally:

(A) Ogden Tweto Memorial Fund	
(B) Steven Oriel Memorial Fund	
(C) Edwin Eckel Memorial Fund	
(D) Bill Pierce-Heart Mountain Fund	
(E) George Synder Memorial Fund	

This contribution in memory of _____

ENDOWMENT FUND: Funds are used to support the Society's operations and special activities:.....

TOTAL CONTRIBUTION (DUES AND FUNDS):

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

All Colorado Scientific Society activities depend on volunteer help. Please circle those activities that you can help with. We will pass your name on to the appropriate Committee Chairperson.

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|----------------|--------------|------------------|---------------|
| Audio Visual | Fund Raising | Newsletter | Science Fair |
| Geologic Signs | History | Program of talks | Student Night |
| Field Trips | Membership | Publicity | Web Site |

If you have an e-mail address, please be sure to enter it on the renewal form, as that will facilitate our ability to more efficiently and rapidly reach membership, as needed in the future.

<p>Send this form & your check to:</p>	<p>Colorado Scientific Society P.O. Box 150495 Lakewood, CO 80215-0495</p>
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Colorado Scientific Society Officers, Councilors, and Chairpersons

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1998-2000: Eric Nelson, CSM, 273-3811
1998-2000: Ted Ball, Consultant
1999-2001: Emmett Evanoff, CU, 492-8069
1991-2001: Bob Jarrett, USGS,, 236-6447

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

