



Colorado Scientific Society

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

***December Meeting – All are invited!
Tuesday, Dec. 11, 2018, 6:30 p.m.***

***A special multimedia presentation at
Denver Museum of Nature & Science, Gates Planetarium***

Cities, and a World, at Risk

By Dr. Bob Raynolds,

Colo. Sci. Soc. 2018 President and DMNS Research Associate

***CSS official annual meeting – outgoing President’s Address – refreshments;
social time 6:30 p.m., program at 7:00***

[Enter Museum via the staff/security door left of the main entrance; security guards will direct you to walk to the Planetarium via the Space Odyssey exhibit]



Cities, and a World, at Risk

Bob Raynolds, Denver Museum of Nature and Science
Colorado Scientific Society President's Address
December 11, 2018

At the Denver Museum of Nature & Science I have collaborated for the past few years with Space Science Curator Dr. KaChun Yu. We have presented a broad series of talks in the Gates Planetarium using the immersive capacity of the dome to offer global stories in a compelling setting. Topics have included, mountains, rivers, islands, and volcanoes, Vikings, The Silk Route, The Dead Sea Scrolls and Syrah Wine.

In December at my President's talk, I will use the planetarium dome to review the time line of humanity. We will use immersive global satellite imagery to take you on a trip starting at the Rift Valley in East Africa and investigating the saga of our evolution in Africa and subsequent spread across the globe. Our ancestors wandered widely, ending up concentrated along rivers. Major civilizations developed along the Nile, the Tigris, and the Indus rivers. Our progress was marked by a series of key game-changing innovations: language, tools, fire, agriculture, writing, and cities.

After a review of whence we came, we will focus on some challenges facing our civilization today. Mass migration, chronic underemployment, and the challenge to effectively apply the discoveries of our sciences will be considered. Today we are once again concentrating, now along the energy rivers and in urban nodes where we have spawned the first generation of digital natives. We have taken a major step forward with the invention of the internet and such tools as Wikipedia. The digital natives will use these new tools to solve new challenges and build a viable future for us all. They must succeed.

As our population passes 7.5 billion we have more and more people living in risky areas. Tens of millions live within a few meters of sea level. Many others live near moving fault zones and amidst active volcanoes. The earth sciences provide tools and perspectives that can be used to help mitigate risk and protect investments and property. Young people today are entering a job market that is rapidly evolving and will offer opportunities to those who can apply geoscience skills to solving complex problems of human adaptation to changes, both anticipated and not. Our unprecedented abilities to communicate and share knowledge and wisdom across the world should set the stage for a glorious future. May it be so.

Bob Raynolds, CSS President

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December 2018 President's Message

Whence and Whither – a bit more from Bob about his presentation

Using immersive global satellite images on the planetarium dome, geologist Bob Raynolds and space scientist Ka Chun Yu invite you on a trip starting at the Rift Valley in East Africa. Here our ancestors grew up here in lush lands, then left Africa and wandered widely, ending up concentrated by rivers, with major civilizations developing along the Nile, the Tigris, and the Indus. Today we are once again concentrating, now along the energy rivers and urban nodes where digital natives are spawning. Their ambition is to use civilization's new tools to solve global challenges to build a viable future for all. They must succeed.

Chapter 1: Origins

While we may not have been literally born in the African Rift Valley, our ancestor's bones are found here because of the propitious coincidence of favorable environments for living and for fossil preservation---coupled with great outcrops and sixty years spent collecting and studying the remains.

Examined in detail, most of our ancestors appear to walk into the stratigraphic tape recorder having done much of their evolution elsewhere (we know not where). Recent finds in caves in South Africa (Starr Cave) and in the Georgia Republic (D'Manisi) tell us that our evolutionary pattern was very shrubby, rather than tree like.

Paleoanthropologists are browsing in this shrubbery.

Over the last 4,000,000 years we made 4 quantum leaps: we learned to **Speak**, to **Walk** (3.6 MM), invented **Tools** (3.3 MM), and tamed **Fire** (ca. 2 MM?).

Chapter 2: Leaving Africa and Developing Civilization

We left Africa in a steady dribble over the past few million years and settled in Eurasia. Only a few tens of thousands of years ago we wandered into the New World. The arrival of humans foreshadows the demise of charismatic mega-fauna again and again, a pattern so well and repeatedly documented that it has become difficult to deny cause and effect. We grew up to occupy the world, learning, discovering, sharing and teaching. Over the past 10,000 years, we made 3 more quantum leaps: **Agriculture/Domestication**, **Cities**, and **Writing** that carried us through to the eve of the Industrial Revolution; here tool making rose a quantum step with **Steam and Hydrocarbons** leading us to the gilded era: Model T Ford 1908.

Somewhere in here we phased into the Anthropocene....The era of accelerated extinctions and oil. Having climbed to ascendancy in the Anthropocene we can now ponder where we are headed.

Chapter 3: The Internet in the Anthropocene; Wikipedia

Last 25 years, 1 quantum leap:

The latest big invention, **the Internet** has trumped all. We are achieving a global consciousness envisioned by de Chardin. The digital natives will lead us into a new world that we can only dimly discern, yet we can see some patterns and some components of the future.

Increased Physical Risks: This is Geology

The world is changing and the rate of change is changing leading to the Great Acceleration. The increased population is at risk due to population growth in active areas, volcanoes, earthquakes, tsunamis, sea level rise, storms. In the past ten years the population of the earth has increased by a billion people; equivalent to the population of the western hemisphere.

Increased Social Risks: This is the Politics of Desire

Fundamental and accelerating changes are afoot fueled by "*Fomo*". Global connectivity has been achieved through the use of social media; some countries have more cell phones than people. Wikipedia is the most powerful tool invented by mankind. In the digital age, we are potentially vastly more effective at utilizing human capital. If Einstein were to be reborn in Sri Lanka he would probably be found.

Our civilization is at risk; geologists may be accused of not warning people.

Using the new tool kit, social media, Wikipedia, and drawing on the fullness of human knowledge through automated search bots, our children will find new ways forward, some completely unimaginable today. Second half of the chessboard; importance of exponential growth.

Chapter 4: Energy is the linchpin:

Water purification

Light: education reading at night

Cooking

Transportation

Energy Transformation:

Grid-scale batteries

“Hacking photosynthesis”

Biofuels from algae (not corn!)

DOE and DOD are intensively studying, legacy of Energy Secretary Chu

End of oil is nigh (we have been saying this a long time but for the wrong reasons); Peak oil is countered by the McKelvey Box....more tech, more money = more oil

De-Materialization; End of cameras, encyclopedias, phonographs, personal operated cars, vinyl records, videos, oil.

De-Monetization: End of taxis, end of banks, end of credit cards?

Science offers solutions, we have adequate capacity, manpower and resources. Yet still we squabble and squander and watch the world wallow in misery.

We are sentient beings recently empowered and networked with global instantaneous communication. Science has built our civilization. Science has propelled our population to beyond 7 billion. Science has elevated hundreds of millions from poverty during our lifetime—yet in the US, science is poorly understood by many.

The above has been accomplished amidst a tragedy of the commons. Beguiled by progress, we have inadvertently, but knowingly triggered and accelerated the sixth extinction. We condone a planetary lifestyle where over a billion people lack clean water and 800 million are malnourished. We flare methane in the Bakken, the Eagle Ford, the Persian Gulf, and Siberia through inefficient exploitation of oil. Our world receives more energy than it emits due to manmade modifications of the atmosphere. Ocean temperature and chemistry together with global climate patterns are changing because of our impact. We are helpless to repair the drought-amplified cultural chaos in Syria, Somalia, Sudan and the Sahel. Tens of millions of our fellows are migrating or are warehoused in refugee camps. Their disillusionment and disenchantment tarnishes us all.

Bob Raynolds, 11 December 2018



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Warren B. Hamilton, 1925 - 2018

Warren Hamilton, longtime scientist at USGS and at Colorado School of Mines and member of the CSS, passed away on October 26, 2018.

“Warren Hamilton passed away at his home in Golden, Colorado on October 26, 2018 at age 93. His primary career was as a research scientist with the US Geological Survey in geologic, and later geophysical branches. He was a geologist known for integrating observed geology and geophysics into planetary-scale syntheses describing the evolution of Earth's crust and mantle. After retirement in 1995, he became a Distinguished Senior Scientist in the Department of Geophysics, Colorado School of Mines where he taught classes through fall of 2017. Warren also taught classes through winter of 2017 with the Osher Lifelong Learning Institute. He is a member of the National Academy of Sciences, and a holder of the Penrose Medal, the highest honor of the Geological Society of America. Warren served in the US Navy from 1943 to 1946, completed a bachelor's degree at UCLA in a Navy training program in 1945, and was a commissioned officer on the aircraft carrier USS Tarawa. After returning to civilian life, he earned an MSc in Geology from USC and a PhD in Geology from UCLA in 1951. Warren was preceded in death by his wife of 67 years, Alicita Koenig. He is survived by three children, Larry (wife Leslie), Kathy (husband Steve Harhai) and Jim (wife Marjorie Flavin), six grandchildren and six great-grandchildren. A memorial service will be held on Friday, December 7 at 11:00 a.m. at Jefferson Unitarian Church, 14350 West 32nd Avenue, Golden, Colorado 80401. In lieu of flowers the family suggests a donation to the non-profit of your choice in Warren's memory.”

Published in Denver Post on Nov. 2, 2018 See

<https://www.legacy.com/obituaries/denverpost/obituary.aspx?n=warren-b-hamilton&pid=190635114>

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Candidates for 2019 CSS Officers and Councilors

The following candidates have been selected by consultation between our Nominating Committee and the rest of the CSS Council. We will vote on the candidates at our December 11 Annual Meeting. Of course, additional “write in” candidates may always be proposed at the meeting.

- President-Elect..... Jim Paces, USGS (will then become President in 2020)
- Secretary..... Lisa Fisher (incumbent; re-nominated for another term)
- Treasurer..... Don Sweetkind (incumbent; re-nominated for another term)

Councilors

- 2019-2021: Linda Barton Cronoble (incumbent; re-nominated for another term)
- 2019-2021: Yvette Kuiper (Colorado School of Mines, Dept. of Geology & Geological Engineering)

The following remain in office for the remainder of their designated terms:

- President..... Tom Casadevall, (now President-Elect)

Councilors

- 2017-2019: Jim Reed
- 2017-2019: Chris Morrison
- 2018-2020: Pete Modreski
- 2018-2020: Matt Rhoades

We are pleased to thank Melissa Foster for her service as Councilor, 2016-2018, now retiring from the CSS Council but continuing to help as chair for several CSS projects.

A peek at our next upcoming meetings in 2019:

January 17, Don Becker (USGS) and Jeff Sloan (USGS) **Kilauea’s 2018 eruption - new methods and perspectives for monitoring volcanic eruptions**

February 21, Ken Balleweg (Consulting Geologist), **“The Beulah marble: Ornamental stones of Colorado”**, and, Don McGurk (Rocky Mountain Map Society), **"Geographies Unrealized, The Story of Four Cartographic Myths of North America."**

March 21, Vince Matthews (Leadville Geology), **“A Cook's Tour of Colorado's Glacial Landscape”**

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Colorado Scientific Society dues are \$25 for regular members, **\$20 if dues renewals are paid before Jan. 31 of each year**, \$10 for corresponding members (outside the Colorado Front Range area) and only \$5 for students. A Lifetime Membership is now available, for \$395.00. Mail a check to the CSS or pay with a credit card using PayPal on the CSS website. Please contact CSS Treasurer Don Sweetkind at 303-236-1828 or dsweetkind@usgs.gov if you are uncertain of your dues or membership status. Extra payments to contribute to our Memorial Funds or Endowment Fund are always most welcome; you’ll see a list of them on the membership form attached to this newsletter, or see our website at <http://www.coloscisoc.org/membership/dues.html>.

Colorado Scientific Society, P.O. Box 150495, Lakewood CO 80215-0495 <http://www.coloscisoc.org>

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Calendar of Coming Events

Most all of the societies’ and institutions’ lecture series are finished for the holiday season! But you can always look up all these websites for upcoming lecture/meeting series in the new year:

Colorado Beer Talks (2nd Tuesday, 6-8 p.m.), Windy Saddle Café, 1110 Washington Avenue, Golden, “Golden’s grassroots version of TED talks, Expand your mind with a beer in your hand”, <http://goldenbeertalks.org/>

Colorado Café Scientifique in Denver, monthly lectures on science topics held either at Blake Street Station or Brooklyn’s, Denver; open to the public, no charge other than refreshments you may choose to purchase; see <http://cafescicolorado.org/>.

Colorado Scientific Society (3rd Thursday, 7 p.m.), see <http://coloscisoc.org/>. Meets at Shepherd of the Hills Church, 11500 W. 20th Ave., Lakewood CO, except when noted.

CU Geological Science Colloquium (Wednesdays, 4 p.m.) see <http://www.colorado.edu/geologicalsciences/colloquium>

CSU Dept. of Geoscience Seminars (Fridays, 4 p.m.), see <https://warnercnr.colostate.edu/geosciences/geosciences-seminar-series/>

Van Tuyl Lecture Series, Colorado School of Mines, (Thursdays, 4 p.m.): <https://geology.mines.edu/events-calendar/lectures/>

Denver Mining Club (Mondays, 11:30), see <http://www.denverminingclub.org/>.

Denver Museum of Nature and Science, Earth Science Colloquium series, 3:00-4:00 p.m., VIP Room unless noted, day of the week varies. Museum admission is not required; see <http://www.dmns.org/science/research/earth-sciences/>

Denver Region Exploration Geologists Society (DREGS; 1st Monday, 7 p.m.), <http://www.dregs.org/index.html>

Florissant Scientific Society (FSS); meets monthly in various Front Range locations for a lecture or field trip; meeting locations vary, normally on Sundays at noon; all interested persons are welcome to attend the meetings and trips; see <http://www.fss-co.org/> for details and schedules.

Nerd Night Denver is a theater-style evening featuring usually 3 short (20-minute) TED-style talks on science or related topics; held more-or-less monthly at the Oriental Theater, 4335 W. 44th Ave., Denver; drinks are available; for ages 18+. Admission is \$6 online in advance, \$10 at the door. See <https://www.nerdnitedenver.com/>.

Rocky Mountain Map Society (RMMS; Denver Public Library, Gates Room, 3rd Tuesday, 5:30 p.m.), <http://rmmaps.org/>

Western Interior Paleontological Society (WIPS); beginning January, 2019, WIPS will meet on the 1st Monday of the month, 7 p.m., at Lowry Conference Center, 1061 Akron Way, Denver; <http://westernpaleo.org/>.

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2018 CSS Officers

- President..... Bob Raynolds, bob.raynolds@dmns.org
- President Elect..... Tom Casadevall, tcasadev@gmail.com
- Past President..... Marith Reheis, 303-277-1843, marith16@gmail.com
- Secretary..... Lisa Fisher, 303-215-0480, lisa.fisher@alumni.mines.edu
- Treasurer..... Don Sweetkind, 303-236-1828, dsweetkind@usgs.gov

Councilors

- 2016-2018: Linda Barton Cronoble, lbarton1611@gmail.com, 720-338-1237
- 2016-2018: Melissa Foster, melissa.ann.foster@gmail.com, 707-498-2484
- 2017-2019: Jim Reed, jim@rockware.com
- 2017-2019: Chris Morrison, chris-morrison@comcast.net
- 2018-2020: Pete Modreski, pmodreski@aol.com, 720-205-2553
- 2018-2020: Matt Rhoades, rhoadesgeo1@gmail.com

Committee Chairpersons

- Database Manager: Paul Morgan, 303-384-2648, morgan@mines.edu
- Field Trip Chair: Cal Ruleman, 303-236-7804, cruleman@usgs.gov
- GSA Meeting Co-chairs, Lisa Fisher & Libby Prueher
- History Chair: Beth Simmons, cloverknoll@comcast.net
- Hospitality Chair: Mary-Margaret Coates, geotechedit@gmail.com **Position open for 2019!**
- Membership Chair: Bob Raynolds, bob.raynolds@dmns.org
- Newsletter & Publicity: Pete Modreski, 303-202-4766, pmodreski@aol.com or pmodreski@usgs.gov
- Outreach: Joe Mestichelli, joseph.mestichelli@gmail.com **Position open for 2019!**
- Past Presidents' Best Paper Award, Marith Reheis, 303-277-1843, marith16@gmail.com
- State Science Fair: Chuck Weisenberg, 303-238-8806, cweisnbrg@msn.com
- Student Programs Chair: Melissa Foster, melissa.ann.foster@gmail.com, 707-498-2484
- Student Research Grants Chair: Marith Reheis, 303-277-1843, marith16@gmail.com
- Webmaster: Chris Morrison, chris-morrison@comcast.net

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The CSS website is www.coloscisoc.org. Anyone can also view our facebook page, whether you have a facebook account or not, at <https://www.facebook.com/groups/511533159044226/>.

See our membership form, attached. Now is a fine time to send us your dues for 2019! Remember—there's a \$5 discount if you pay dues by January 31. Please also consider making an extra contribution to our Endowment or Memorial funds!