

STEM Society Meeting, June 12, 2012

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1 About the STEM Society and the STEM Society Website

STEM is an abbreviation for Science, Technology, Engineering and Mathematics. There are nearly 100 people on the mailing list, although a much

smaller group attends any one meeting. We meet on the second Tuesday of each month at the Trailside Center at 99th and Holmes in Kansas City, Missouri. The meetings are open to all. The start time is 6PM. We make presentations, have discussions, and sometimes have scientific demonstrations. The topics range from General Relativity to scientific experiments for kids.

The set of meeting notes may be viewed by going down the list of notes appearing on the front page of the site. These notes contains links to documents, which may be viewed or downloaded by clicking the link. Other documents can be reached by clicking the heading "Documents and Downloads" that appears on the left side of the front page. Then click on "documents." The meeting notes may also be viewed in an archive file in the list of documents. Usually this archive document is not quite up to date. Most of the documents are PDF files. They may be viewed or downloaded to the computer by clicking, provided Adobe Reader is present, or another program capable of reading PDF files. There are often more documents available at the site than are listed under "Documents" because they may not have been added to the documents.htm file yet. Links to such files can often be found in the monthly meeting notes.

The web site is:

<http://www.stem2.org/>

To go direct to the documents list:

<http://www.stem2.org/je/documents.htm>

To go directly to the archive file:

<http://www.stem2.org/je/archive.pdf>

2 The June Meeting Announcement

The June meeting of the STEM Society will take place on the second Tuesday of the month, June 12, 2012, at the Trailside Center at 99th and Holmes in Kansas City, Missouri. The starting time is 6PM.

Possible topics are:

(1) A talk about "Solar radiation and heat transfer on hill sides," by Cécil Lagandré

- (2) Henry Stoever and Ann Suellentrop, will talk about alternate uses of nuclear weapons plants, the convoluted involvement of Kansas City, Missouri in the new facility at Missouri Highway 150 in Grandview Missouri, and related topics.
- (3) Book Reports by Bob Kessler.
- (4) Using MikTeX and various computer aids to science.
- (5) A continuing discussion of microcontroller projects.
- (6) A Little Astronomy Related to the Recent Transit of Venus.
- (7) Information About the Coming Maker Faire June 23 - 24 at Union Station.
- (8) The usual member projects and Surprise Topics.

3 Solar Radiation and Heat Transfer on Hill Sides: Cécil Lagandré

Let λ be the latitude, v the hill grade, α the hill aspect, σ the declination, and ω the hour angle, where

$$\sigma = (23.45\pi/180) \sin(2\pi(284 + n)/365)$$

$$\omega = \pi(12 - T_{solar})/12.$$

Then the projection factor giving the solar radiation energy is

$$P(\lambda, v, \alpha, \sigma, \omega) = \cos(\sigma) \cos(\alpha) \cos(v) \cos(\omega) - \sin(\sigma) \cos(\lambda) \sin(v) \cos(v) \\ + \cos(\sigma) \sin(\lambda) \cos(v) \cos(\omega) + \cos(\sigma) \sin(v) \sin(\alpha) \sin(\omega)$$

Note. The projection factor given here according to Cécil contains some typos, as does the equation given in one of the slides. She has given me corrections, and I will fix this. Also we should have a reference for this projection function.

Cécil took some of the pictures from her Lear Jet while buzzing her estate in southwest Missouri (Yes, this is a joke, I think they were created with Google Earth). //

Cécil's beautiful slides:

<http://www.stem2.org/je/SunHills.pdf>

4 The Evil of Nuclear Weapons, and Alternate Uses of Nuclear Weapons Plants: Henry Stoever and Ann Suellentrop

Henry is a lawyer in the Kansas City area. He and his wife Jane have been involved in protesting the manufacture of nuclear weapons for many years. Ann Suellentrop is a nurse at the Shawnee Mission Medical Center and is a member of Physicians for Social Responsibility.

The 1985 Nobel Peace Prize was awarded to the International Physicians for the Prevention of Nuclear War (IPPNW). This organization includes medical doctors from the competing power blocs working harmoniously together, bound only by the Hippocratic oath and by the shared goal of eliminating the global nuclear threat. Ann said that the famous Helen Caldicot attended a local meeting of their organization a while back.

Henry Stoever, a lawyer from Overland Park and the chair of the Board of PeaceWorks, Kansas City, will share ideas about the illegalities of nuclear weapons of mass destruction and the convoluted involvement of Kansas City, Mo., in the new facility at Mo. Hwy. 150.

Ann Suellentrop, a master's-prepared maternal-child nurse from Kansas City, Kan., directs activities related to the Kansas City Plant for the local chapter of Physicians for Social Responsibility and serves on the PeaceWorks Board. She will discuss the threat of nuclear darkness and the international effort to reach a nuclear-free world.

Addresses:

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Henry Stoever 913-375-0044, henrystoever@sbcglobal.net

Ann Suellentrop 913-271-7925, annsuellen@gmail.com

Note. Henry gave me a hard copy of a two page summary of his talk titled "Nuclear Engineers Talk, June 12, 2012." I will place that here if I can get him to send me a computer version. My recollection of the talk may not be terribly accurate, because my journalistic skills are somewhat lacking.

Henry started his talk by asking "What important event occurred in 1986." None guessed the answer that Henry was looking for, which was the 1986 meeting of Reagan and Gorbachev in Reykjavk where they almost agreed on a complete ban of nuclear weapons. Then he described the terrible consequence of nuclear war, and why we should be devoted to the elimination of such weapons so as to preserve the earth.

The Reykjavk Summit was a summit meeting between U.S. President Ronald Reagan and General Secretary of the Communist Party of the Soviet Union Mikhail Gorbachev, held in a famous house in Reykjavk, the capital city of Iceland, on October 1112, 1986. The talks collapsed at the last minute, but the progress that had been achieved eventually resulted in the 1987 Intermediate-Range Nuclear Forces Treaty between the United States and the Soviet Union.

Much of the talk was about converting nuclear weapons plants to positive uses, which in my opinion has no real practicality. Secondly, it was about the convoluted involvement of Kansas City, Missouri in the construction of the new facility at Missouri Highway 150 in Grandview Missouri. This latter topic is scandalous and probably corrupt, and even bribery would not be surprising. The net result seems to be that the citizens of Kansas City Missouri have bought a new Nuclear Defense plant through the issue of municipal bonds. And in all likelihood will be liable for it, and will be stuck with it when it is ultimately abandoned in a few years. These bonds are supposed to be payed off through rent. Nobody really understands this deal at all, except perhaps the crooks that cooked it up. The whole thing is disgusting. There is really nothing wrong with the old plant. It is claimed that it is massively polluted, but that is probably quite exaggerated. The old plant is no more polluted than any large manufacturing plant in the US.

Another argument given for the construction of this new plant is that heating and cooling of the old plant was very inefficient. But since the new plant costs the best part of a billion dollars, it would probably take a hundred years to make this new construction pay off in reduced heating and cooling.

Another topic was the subject of contamination of the plant by such as

Beryllium and PCBs. The seriousness of this pollution is probably quite exaggerated, but one never knows absolutely. Ann I believe has made a study of Beryllium poisoning, but did not really talk about this much.

Now Henry, Jane, and Ann are really primarily devoted to the abolishment of nuclear weapons and of nuclear war, and not really to the economic issues, of saving money and preserving jobs. In the next two sections are links to related documents that we prepared for the May meeting.

One should also note that the National Laboratories and the Production Plants have always done useful work and research not related to nuclear weapons at all. So actually they were always partially converted to other purposes.

5 Beryllium

<http://www.stem2.org/je/beryllium.pdf>

6 A Discussion on the Atomic Scientists

<http://www.stem2.org/je/atomicscientists.pdf>

7 Book Reviews: Bob Kessler and Greg Swartz

Bob Kessler reviewed the book:

The Universe in a Single Atom: The Convergence of Science and Spirituality by The Dalai Lama, (Sep 12, 2006).

I wonder if it says "Dalai Lama" on his drivers licence?

No one seemed to have an answer to the question "What is spirituality?" A hundred years ago it was a big craze, and everyone flocked to séances to hear table knocking from the dead, and to watch Ouija boards move about.

I think Bob liked and recommends the book highly, and even does this when he is not high. He has a curious interest in Buddhism, and all things Chinese. Bob may have said "It has a good beat, and you can dance to it,"

but perhaps I am putting words into his mouth. As you might surmise I am not tuned into this wavelength, perhaps I have a faulty capacitor.

For comment and enlightenment about books like this, one might read the introductory chapters of the new book by particle physicist Lisa Randall, **Knocking on Heaven's Door**. Also see Carl Sagan's **The Demon Haunted World**, and Martin Gardner's classic **Fads and Fallacies In The Name of Science**.

Bob also gave a review of the book:

Consciousness: Confessions of a Romantic Reductionist by Christof Koch.

Koch is from Kansas City, but nobody is perfect. Christof Koch is an American neuroscientist working on the neural basis of consciousness. He is the Lois and Victor Troendle Professor of Cognitive and Behavioral Biology at California Institute of Technology, where he has been since 1986.

He is the son of German parents; his father was and his older brother Michael is a diplomat. He was raised as a Roman Catholic and attended a Jesuit high school in Morocco. He received a PhD in nonlinear information processing from the Max Planck Institute in Tbingen, Germany in 1982. He then worked for four years at the Artificial Intelligence Laboratory at MIT. In 1986, he joined the newly started Computation and Neural Systems PhD program at Caltech.

He has been active since the early 1990s in the promotion of consciousness as a scientifically tractable problem, and has been particularly influential in arguing that consciousness can now be approached using the modern tools of neurobiology. His primary collaborator in the endeavour of locating the neural correlates of consciousness was the late Francis Crick.

Together with James Bower, he founded in 1988 the Methods in Computational Neuroscience summer course at the Marine Biological Laboratory in Woods Hole, which remains ongoing. In 1993, he founded, together with Rodney Douglas and Terrence Sejnowski, the Neuromorphic Engineering Summer School in Telluride, Colorado, which remains ongoing. Koch was the executive officer of the Computation and Neural Systems program at Caltech from 2000 to 2005.

In early 2011, Christof Koch became the Chief Scientific Officer of the Allen Institute for Brain Science, leading their high through-put, large scale

ten year, cortical coding project.

Recall that Greg Hodes does philosophical research on consciousness, and gave a talk on this at one of our illustrious meetings a couple of years back.

Greg Swartz reviewed a book countering the Dalai Lama book:

God and the Folly of Faith: The Incompatibility of Science and Religion. by Victor J. Stenger, 2012. Greg co-hosts a radio program on this topic on community radio station KKFI on Sunday mornings.

Other related books by physicist Victor J. Stenger:

- 1988. *Not by Design: The Origin of the Universe.*
ISBN 0-87975-451-6
- 1990. *Physics and Psychics: The Search for a World Beyond the Senses.*
ISBN 0-87975-575-X.
- 1995. *The Unconscious Quantum: Metaphysics in Modern Physics and Cosmology.*
ISBN 1-57392-022-3.
- 2000. *Timeless Reality: Symmetry, Simplicity, and Multiple Universes.*
ISBN 1-57392-859-3.
- 2003. *Has Science Found God? The Latest Results in the Search for Purpose in the Universe.*
ISBN 1-59102-018-2.
- 2006. *The Comprehensible Cosmos: Where Do The Laws Of Physics Come From?.*
ISBN 1-59102-424-2.
- 2007. *God: The Failed Hypothesis: How Science Shows that God Does Not Exist.*
ISBN 1-59102-481-1. New York Times bestseller.
- 2009. *Quantum Gods: Creation, Chaos and the Search for Cosmic Consciousness.*
ISBN 1-59102-713-6.
- 2009. *The New Atheism: Taking a Stand for Science and Reason.*
ISBN 1-59102-751-9.
- 2011. *The Fallacy of Fine-Tuning.*
ISBN 978-1-61614-443-2.
- 2012. *God and the Folly of Faith: The Incompatibility of Science and Religion.*

Peer-reviewed articles by

- 1964 (with W. E. Slater et al.), "K-N Interactions in the I=0 State at Low Energies,"
Phys. Rev. 134, B1111. Publication of Stenger's Ph.D. thesis results.
- 1984, "The Production of Very High Energy Photons and Neutrinos
from Cosmic Proton Sources," *Astrophys. J.* 284, 810.
- 1985, "Photinos from Cosmic Sources," *Nature* 317, 411.
- 1986, "The Extraterrestrial Flux Sensitivity of Underground
and Undersea Muon Detectors," *Il Nuovo Cimento* 9C, 479.
- 1990, "The Universe: the ultimate free lunch,"
European Journal of Physics 11: 236-43.
- 1999, "The Physics of 'Alternative Medicine': Bioenergetic Fields,"
The Scientific Review of Alternative Medicine, Vol. 3(1).
- 2000, "Natural Explanations for the Anthropic Coincidences,"
Philo 3: 50-67.

8 Canadian Tar Sands: Rich Kaufman

Rich discussed the tar sands in Canada and what it takes to turn that into useable petroleum product, and related mining technology....e.g. froth flotation.

A background for this discussion is the Wikipedia article on **Athabasca Tar Sands**. From Wikipedia:

”The Athabasca oil sands or Athabasca tar sands are large deposits of bitumen or extremely heavy crude oil, located in northeastern Alberta, Canada - roughly centered on the boomtown of Fort McMurray. These oil sands, hosted in the McMurray Formation, consist of a mixture of crude bitumen (a semi-solid form of crude oil), silica sand, clay minerals, and water. The Athabasca deposit is the largest known reservoir of crude bitumen in the world and the largest of three major oil sands deposits in Alberta, along with the nearby Peace River and Cold Lake deposits.

Together, these oil sand deposits lie under 141,000 square kilometers (54,000 sq mi) of sparsely populated boreal forest and muskeg (peat bogs) and contain about 1.7 trillion barrels ($270 \times 10^9 m^3$) of bitumen in-place, comparable in magnitude to the world’s total proven reserves of conventional petroleum. Although the former CEO of Shell Canada, Clive Mather, estimated Canada’s reserves to be 2 trillion barrels ($320 km^3$) or more, the International Energy Agency (IEA) lists Canada’s reserves as being 178 billion barrels ($2.83 \times 10^{10} m^3$).

With modern unconventional oil production technology, at least 10 percent of these deposits, or about 170 billion barrels ($27 \times 10^9 m^3$) were considered to be economically recoverable at 2006 prices, making Canada’s total proven reserves the second largest in the world, after Saudi Arabia’s. The Athabasca deposit is the only large oil sands reservoir in the world which is suitable for large-scale surface mining, although most of it can only be produced using more recently developed in-situ technology.”

9 Optical Instruments, Steve Cummins

Steve brought some optical instruments to the meeting. In particular he brought his polarized light device, which consists of polarizers that produce fringes showing elastic stresses in transparent substances such as glass and plastic. We will have to give a talk on this subject at some point.

Dave VanDyne is especially interested because he once wrote a paper on this subject.