

LIGHTNING DATA CENTER MINUTES
June 14, 2013
ST. ANTHONY HOSPITAL WEST, LAKEWOOD, CO
On the Web at: www.stanthonyhosp.org/ldc

Monthly Quote: "Life is the fire that burns and the sun that gives light. Life is the wind and the rain and the thunder in the sky. Life is matter and is earth, what is and what is not, and what beyond is in Eternity." -- Lucius Annaeus Seneca, as quoted by Denver's KMGH-TV Broadcast Meteorologist Mike Nelson, during Tim Samaras' funeral service, held on Wednesday, June 5, 2013.

1. The meeting began at 11:50 PM and adjourned at 1:20 PM. Members Present: Clark, Stewart, Elder, Claus, Schoessow, Collier, Gift, Yarnell, Cherington, Wachtel, Nibbe and Wells. Clark moderated the meeting.
2. Steve Clark presented an article about the use of electrical stimulation of the brain to enhance mathematical performance. A group of 25 volunteers were stimulated in the brain, with a current, which was ramped up to a maximum value of 1 mA and a control group was given a single brief shock. The group receiving the ramped current, after practicing the math, was between 2 to 5 times faster at solving problems than the control group. There are two problems with the article. First, the author got voltage and current mixed up. Second, the so-called "math operations" listed as examples are not traditional math operations like addition and subtraction. Howard Wachtel says electrical stimulation of the brain is unethical and stated a current of 1 mA can be lethal to the heart. Greg Stewart think if this is done in targeted areas in concert with brain mapping, that this may be acceptable. Paul Schoessow recalled strong permanent magnets were used for therapeutic uses, per American Scientist.
3. Clark also presented an article about the "GyroStim", featured in the Denver Post. The device is a chair, which spins the patient around, up, down, and around, for an individually prescribed time. The spinning motions are thought to heal the patient by stimulating the vestibular region of the brain. Hockey star Sidney Crosby with the Pittsburgh Penguins suffered a concussion in January 2011 and saw little improvement for several months later. After undergoing treatment in the GyroStim, Crosby was doing much better. The Air Force Academy has purchased one of these devices for use in its Arizona facility for evaluation of motion sickness and disorientation. The manufacturer, UltraThera, is based in Arvada, Colorado. Phil Yarnell, among others, questions the validity of these claims, saying the placebo effect may be the reason why people report being well after the treatment. Phil also thinks we need a much better understanding of the mechanism of concussion injuries.
4. Lightning Safety Awareness Week is June 19 to 25, 2013. Here is the link to the Denver/Boulder National Weather Service's lightning safety week page: http://www.crh.noaa.gov/bou/?n=lightning_week

5. Michael Utley, founder of Struckbylightning.org, sent an e-mail via the Yahoo Lightning Safety Group, advising of the unwise usage of the so-call “lightning safety crouch”. The concept was introduced back in the 1990s, with the idea that the pose could be used to minimize your chance of being hit by lightning, if you were caught outdoors and lightning was nearby. Utley is not happy that NLSI, FEMA, and other entities are continuing to promote the lightning safety crouch. Examination of the NLSI web page shows the crouch is recommended if outdoors, but only *after* the reader is advised to plan in advance for safety and evacuation measures, and then to seek shelter in a building or a vehicle, when possible. The FEMA website recommends the crouch if you are anywhere where you feel your hair stand on end, which indicates lightning is about to strike. [As an aside, FEMA still promotes the 30/30 rule.]
NLSI crouch link: http://www.lightningsafety.com/nlsi_pls/1st.html
FEMA crouch link: <http://m.fema.gov/before-thunderstorms-lightning>

Utley also thought the idea of crouching with your feet together and covering your ears was not realistic. In response, e-mails from Alex English and Abdul Mousa state otherwise about keeping the feet together. By keeping the feet together, you are minimizing the step voltage between the legs. English recalled hearing about a photograph of cows that were near a tree when lightning hit. The cows whose heads or rear-ends were pointed at the tree were mostly dead. The cows whose sides were pointed at the tree were mostly alive. Thus, the step potential was greater for the first group of cows than the second group of cows.

As for covering one’s ears, I personally recommend it whenever possible. This was driven home in dramatic fashion in a YouTube video of the recent West, Texas fertilizer plant explosion. The shock wave from the blast has clearly affected the child’s hearing. See the link in the Lightning Links section.

6. Greg Stewart has completed his portion of the LDC bibliography, much of which has to do with lightning meteorology and ball lightning. Greg wanted to say a gracious “Thank you” to Dr. Michael Cherington and to Leland Anderson for amassing the 350+ pieces of literature that were added to the LDC library. Steve Clark says the bibliography is still a work in progress and hopes to be able to set up some kind of online access to the bibliography – perhaps via the LDC website.

While working on the bibliography, Greg found some information on ball lightning and lightning safety, some of which is presented here.

A Russian researcher, Stahanova, sent questionnaires to eyewitnesses of ball lightning. After 1000 responses, the data revealed features, which were comparable to American data and “...allowed us to speak about ball lightning as a real physical phenomenon.” After 1500 responses, there was very little change in the data.

From 1986 to 1999, the Japanese Information Center of Ball Lightning (JICBL) collected some 2000 observational reports. More than 50% occurred in summer, with 89% observed in fine or cloudy weather, 7.6% during rainy weather, and 2.5% during thunderstorms. Data were further broken down by month color, and motion. The predominant description of motion was horizontal. Reports were similar to data from countries, although Japan tended to have more fine weather observations than other countries.

During the height of the Cold War, the U.S. wondered if the Soviet Union was developing an anti-missile weapon using lightning balls. In August 1959, Donald Ritchie, with the Bendix Corporation, was assisting policymakers by reporting on the potential uses of plasma ball" weaponry. The Soviet Institute of Energetics, had designed, or was in the process of designing a directed particle beam weapon, which could: "...generate balls of lightning in the sky, high above cities, by focusing an intense electromagnetic field with the use of two parabolic antennas. Thus, a small artificial star or sun of intense high-energy plasma would be formed. It would be fed from the ground by electromagnetic energy, but its light output would originate in a nuclear fusion process occurring within the ball of lightning." The U.S. responded with its own particle beam experiments.

And finally, this quirky piece of lightning safety from the January 1919 edition of The Electrical Experimenter: "Most of us know how to protect ourselves from this pyrotechnical display occurring in nature, and one of the best ways is to recline in a hammock suspended in the center of the room with respect to the four walls, color and ceiling, the hammock being hung preferably on silk ropes. It should not be placed under a chandelier. Care should be exercised in keeping away from open windows, doors, chimneys fireplaces and stoves, or in fact, any metallic or conductive body which might tend to gather a charge or act as a highly conductive path for a lightning discharge which might strike the building."

7. About the lightning incident with the Chevy HHC: Alan Elder brought a caliper to the meeting. The thickness of the metal Steve Clark brought to the last meeting was measured at 31 one-thousandths of an inch thick. To the metallurgically inclined members, what, if anything, does that tell us? Your thoughts, please.
8. Howard Wachtel wanted us to know Professor Bill Hannah died at 91 years old. He ran the lightning simulator lab in Boulder. An array of 20kV capacitors in parallel was used to generate high voltages. The device, used for high-energy physics research, came from General Electric in New York from a group which included physicist Charles Steinmetz.

IN MEMORIAM

The lightning research community has lost a valued member. On May 31, 2013, Tim Samaras, along with his son Paul and meteorologist Carl Young, were killed by a tornado while storm chasing near El Reno, Oklahoma. In November 2007, the LDC had the good fortune of seeing some of Tim's incredible high-speed lightning cinematography. As of 2013, Tim had a camera capable of capturing 1.4 million frames per second (See link below). A Weather Channel video commemorating Tim was shown (See link below). LDC member Ken Langford knew Tim well and has asked me to put the following comments into the minutes:

“As many of you know, Tim Samaras, his son Paul Samaras, and their friend Carl Young were killed while storm chasing in the May 31st El Reno Oklahoma tornado. The storm was an exceptional meteorological event: an EF5 tornado that was 2.6 miles wide in its' most violent phase. These three men were killed after having deployed probes to directly measure the conditions in the funnel on the ground. This is something Tim had previously and successfully done in the past. On this occasion the storm turned out to be too intense and unpredictable for a safe escape. Their vehicle was thrown, causing the deaths of all three men. My understanding is that when the probes were recovered they were still recording data.

I knew Tim through my association as a speaker and attendee of the Storm Chaser Convention in Colorado. I did not know Tim's son, or Carl Young.

Tim came to speak to the Lightning Data Center at St Anthony Hospital in November of 2007. He gave a great presentation on his high-speed lightning videos. It was his footage that first showed me motion images of the stepped leader process of lightning formation - a holy grail of lightning research. I have contacted the manufacturer of the camera he used, the Phantom 7 by Vision Research, headquartered in Wayne, NJ. They were not clear as to whether Tim was the first to capture such images, but he was among the early users of their equipment for the purpose of studying lightning.

Tim had since purchased a military surplus high speed movie camera which had been used in the 1940s to image nuclear detonations, and he had repurposed it for the goal of capturing the first super-high speed video of the lightning return stroke, which even the Phantom 7 at 15,000 frames per second could not resolve. This was a goal that, to the best of my knowledge, Tim had not yet achieved. Neither had he given up.

What I loved about Tim was not just his enthusiasm for storm research but his engineering competence and his tenacity to pursue some of the difficult data and questions in the field of storm research. He did not just wonder about things, he set out to design ways to answer some of the mysteries. Then he actually delivered some spectacular successes in data collection. He was a diligent scientist as well as an enthusiast. It is with great sadness that we mark the passing of these three dedicated men. Many of our members attended the memorial service for Tim and Paul.

Finally, this is a reminder to all who study severe weather phenomena. We must never forget that no matter how familiar we may become with these forces of nature, they are extremely dangerous, and it just takes one slip to suffer serious consequences.”

Ken Langford

9. Next meeting: Friday, July 12, 2013 at 11:45 AM at St. Anthony Hospital West. Conference Room TBA. Larry Bull, Director of Cherry Creek School District’s Athletics and Activities Department, is scheduled to discuss the new lightning sensors installed at Cherry Creek’s Stutler Bowl in Greenwood Village and Legacy Stadium in Aurora.

Respectfully Submitted,

Steven E. Clark, Consulting Meteorologist

In Case You Missed It...Lightning Links

This is a monthly listing of news, articles, websites, and videos about lightning and allied areas as reported in the media. A headline or description is listed, followed by the link. Please note that some of the links are perishable, which means you’ll need to go to the source for the information. Enjoy!

“Lightning May Have Sparked Denver House Fire”

<http://www.thedenverchannel.com/news/local-news/lightning-may-have-sparked-denver-house-fire>

“Colorado Storm Chaser Tim Samaras Killed in Oklahoma Tornado Along With Son, Longtime Partner”

<http://www.thedenverchannel.com/news/local-news/colorado-storm-chaser-tim-samaras-killed-in-oklahoma-tornado-along-with-son-longtime-partner>

“Lightning Bolt Damages Aurora Homes”

<http://www.thedenverchannel.com/news/local-news/lightning-damages-aurora-homes>

NOTE: This event happened less than 0.2 miles away from Clark’s house.

“Man Recounts Lightning Strike: ‘Okay, Going to Die Now’”

http://weather.aol.com/2013/05/30/man-recounts-lightning-strike-okay-going-to-die-now/?icid=maing-grid7%7Cmaing5%7Cdl10%7Csec1_Ink3%26pLid%3D320377

“Math Skills Improved By Electric Shocks To Brain, Study Suggests”

http://www.huffingtonpost.com/2013/05/17/math-skills-electric-shock-brain_n_3291817.html

“A Theoretical Approach to Estimate the Annual Lightning Hazards on Human Beings”

<http://www.eng.upm.edu.my/celp/Resources/A%20theoretical%20approach%20o%20estimate%20the%20annual%20lightning%20hazards%20on%20human%20beings-Atmospheric%20Research%202011.pdf>

“GyroStim Spinning Chair May Help Concussion Recovery; No FDA Approval Yet”

Read more: [GyroStim spinning chair may help concussion recovery; no FDA approval yet - The Denver Post](http://www.denverpost.com/avalanche/ci_23370920/gyrostim-spinning-chair-may-help-concussion-recovery-no-fda-approval-yet#ixzz2W9MMf6jy) http://www.denverpost.com/avalanche/ci_23370920/gyrostim-spinning-chair-may-help-concussion-recovery-no-fda-approval-yet#ixzz2W9MMf6jy

“Lightning Hits Aurora Home, Destroying Woman's Living Room”

<http://www.thedenverchannel.com/news/local-news/lightning-hits-aurora-home-destroying-womans-living-room>

“Weather Researcher Hopes to Capture Elusive Images of Lightning Striking the Ground”

<http://www.kansas.com/2013/03/10/2710653/weather-researcher-hopes-to-capture.html>

"Report on the 5th International Symposium on Ball Lightning (ISBL97)"

<http://home.planet.nl/~icblsec/1997.html>

"CAUGHT ON CAMERA: Fertilizer Plant Explosion near Waco, Texas"

<http://www.youtube.com/watch?v=ROrkKx3aljA>

"Weather Community Remembers Three" – A Weather Channel video, June 2013 <http://www.weather.com/video/weather-community-remembers-three-37107>

"William J. Hanna, Electrical Engineering, Education" – A Short Biography

<http://www.colorado.edu/engineering/deaa2/cgi-bin/display.pl?id=116>