

Quote of the Month:

“(Benjamin Franklin) suggested....a way to prove the identity of lightning and electricity. Erect a sentry box on a mountaintop or inside a church steeple, he said. The box should have a pointed iron rod in the roof, which would be connected to a Leyden jar inside. Because there was neither a church steeple nor a high mountain in the vicinity of Philadelphia, Franklin had not tried the experiment himself, and only later had the idea of a kite occurred to him....Letters from Europe informed him that a half dozen French and English scientists had performed the “Philadelphia experiment”.... using sentry boxes. Later, from Russia came news that....a scientist in St. Petersburg had tried a variation of Franklin’s sentry box idea, and put a rod on top of his house. He had failed to ground it properly and had been killed by a direct hit from a lightning bolt.

“But the risk only made Franklin’s triumph greater....The King of France sent his personal congratulations....Immanuel Kant, the greatest philosopher of his time, called him the modern Prometheus, who had brought down the fire from Heaven.”

Thomas Fleming in ‘The Man Who Dared the Lightning’ 1971

1. Meeting began at 11:30 am and adjourned at 1:15 pm.
2. Members present: Bergschneider, Carney, Cherington, Collier, Cusack, Foley, Gustafson, Hodge, Kithil, Langford, Yarnell.
3. Melissa Carney passed out a draft of our new Directory for members to review prior to its being mailed next month. She requests that all members who have had a change in their address, phone numbers, fax numbers or Email names to contact her **by next week** to be sure that the Directory is current!!!! She can be reached at 629-4258.

Melissa and Rich Kithil raised the issue of lightning education courses or seminars to be offered to managers and coaches of recreation centers and schools. Rich felt with the support of the Hospital we could design an effective program. Members of LDC agreed to volunteer their time to such an effort.. Rich stated that many hazardous situations exist and that we could, by education, help reduce them. As one example, he pointed out that he visited an outdoor recreational facility that had shelters with ungrounded metal roofs that he described as “death traps.” Rich said with help from the Public Information Facility of SAC a successful program could be implemented. George Hodge suggested that we also contact the director of EMS Continuing Education Department. Peggy Gustafson said she will help to develop these ideas.

4. I distributed materials on five subjects.
  - A. An article in ‘Bulletin of American Meteorological Society’ (May 1996) by Andrew Watson and Ronald Holle. They summarized cloud to ground lightning flash density in the Atlanta, Georgia region during the July and August months. The Summer Olympics will be held in Atlanta between July 19 and August 4. They analyzed flash density and thunderstorm day estimates. Lightning frequency reaches a maximum in the late afternoon and early evening in the Atlanta area. Lowest frequency is from midnight to noon. They also mention that lightning can still be occurring up to 2 hours after the beginning of lightning activity.
  - B. An article in ‘Morbidity and Mortality Weekly Report’ (May 31, 1996) on

electricity-related deaths on lakes in Oklahoma. In this report, the Oklahoma State Department of Health inspected commercial docks and found deficiencies such as failure to have grounded electrical systems or to have weather-proofed electrical boxes. Electricity-related drownings are difficult to identify because physical evidence of burning may not be apparent. Water dissipates heat and prevents the skin from attaining temperatures required for burning.

This article brings to memory a discussion that we held at the LDC on the dangers of lightning strikes to bodies of water to underwater divers. At that time, we were unaware of any scientific literature on the subject of the travels and dissipation of "ground current" when lightning strikes a lake, river, etc.

C. A letter from Professor Earle Williams of MIT. He wrote to comment on our discussion in April on Raul Lopez and Ron Holle's article on "The Fluctuation of Lightning Casualties in the US." The authors asserted that periods of low casualties match with periods of low summer surface temperatures for Colorado. George Hodge speculated that with higher temperatures there is more convection. Professor Williams stated that based on recent research in his laboratory on the relationship between surface air temperature and lightning lead him to agree with George's interpretation. Professor Williams enclosed three articles which I brought to the meeting. These articles are:

Global Circuit Response to Seasonal Variations in Global Surface Air Temperature. ER Williams Monthly Weather Review August 1994

The Schumann Resonance: A Global Tropical Thermometer

Science. ER Williams May 22, 1992

{ "Convection is...deeper and more frequent in the tropics than at higher latitudes. This behavior is essentially the result of the pole-to-equator temperature increase....Lightning activity increases dramatically with the depth and vigor of convection and is dominant in the tropics.....The global electrical circuit, which integrates the electrical effects of disturbed weather the world over, is expected to provide a natural global thermometer. The global circuit consists of electrified convective clouds in the troposphere, bounded by the conductive earth and the conductive upper atmosphere and ionosphere. This global spherical capacitor is a resonant cavity for extremely low frequency electromagnetic waves excited by global lightning, a phenomenon predicted by Schumann." }

Spectral characteristics of Schumann resonances observed in Central Europe

G Satori and B Zieger Amer Geophys Union Feb 1994

{ "The electromagnetic frequencies of the Earth ionosphere cavity are known as Schumann resonances." }

D. A letter from Dr. Elisabeth Gourbiere of France. Dr. Goubiere raised several issues in her letter including:

a. Low-voltage injuries, the subject of many articles in the European literature. She provided the following source for information on the physical parameters of low voltage injuries: International Electrotechnical Commission of Geneva, technical committee 64, 1994.

b. The French have a national census bureau that lists all causes of death. The bureau is called Institut National de la Sante (INSERM). She inquired as to whether such an institute exists in the U.S.

c. The Lightning & Mountains 97 meeting will be held in Chamonix France (June 1 to 5, 1997) at Le Majestic Congress building. Deadline for abstracts is September 15, 1996.

- E. Materials sent to me from Nicolas Floret of APERI (Association for the Promotion of Exchanges between Research and Industry):
- a. International Workshop on Lightning and Human Beings (IWLH)  
Call for international data on the subject of lightning accidents.
  - b. International Safety and Rescue Guide Against Lightning Hazards (Andrews, Berger, Floret et al.)
  - c. Registration form to the IWLH.
  - d. Human Lightning Accidents Questionnaire.

Rich Kithil stated that he had written to Nicolas Floret regarding the "Safety" Guide. He disagreed with the body position recommended where the person has four contact points. Rich suggests that if a person finds him/herself in the open with no shelter or other avenue of escape he/she should remove all metal objects and assume the "airline crouch" position on the balls of the feet so that there are only two contact points with the ground.

5. Rich Collier informed us that he will be working this summer with NASA at Cape Kennedy on the Space Shuttle Launch Pad. Rich and his colleagues will be measuring with sensors the effects of lightning on the launch pad.
6. Jerry Cusack raised a question about a patient that we had discussed in the past. That patient, who was killed by a lightning strike on Pikes Peak, had no major skin burns. Jerry wondered if that could be explained by the shorter distance from the cloud to ground when one is at an altitude of about 14,000 feet. Ken Langford suggested that the voltage difference and the amperage delivered between the cloud and ground might be less at those elevations. Michael Foley said another factor to consider is the the probable greater ground resistance in high mountain areas. Rich Kithil suggested that data on the electrical parameters may be available and that we ask Professor Philip Krider about these questions.
7. Rich Kithil will be interviewed tonight on NBC Nightline at about 9 to 10 pm MDT. He was interviewed about the lightning-related explosion involving a Shell Oil Company Tank in New Jersey. Rich distributed a news update from NLSI which are included with this mailing.
8. George Hodge commented that he had received an Email message from someone who said that there places of prolonged or perpetual lightning flashes in Venezeula. I suggested that the literature supplied by Professor Williams (see above) might provide an explanation for intense lightning density and duration in certain parts of the globe.
9. Michael Foley discussed the concept of a lightning investigation team that would include EMS, Emergency Department personnel, insurance investigators, meteorologists and others. This team could be utilized for lightning and electrical burn cases. We discussed the feasibility of SAC becoming a Lightning and Electrical Burn Center. I indicated that we had discussed such a committment in the past, but, since electrical burn cases are often severe, we would need to become or be affiliated with a major burn center.
10. Ken Langford stated that he continues to work on developing the lightning safety bag. He has been in contact with Dr.Martin Uman and Richard Olsen on testing methods.

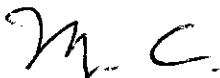
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11. Kevin Bergschneider has been consulting with mountain golf course organizations. Many of these places are in need of new safer weather shelters. Jerry Cusack said that he has observed people huddling in shelters while holding on to their metal golf clubs. Kevin recommends that people in shelters stay away from metal clubs and away from down conductors. Down conductors are often improperly placed.

Kevin, who recently completed the Boston Marathon, will be travelling to Atlanta during the Summer Olympics. He will witness first hand the 'lightning situation' equipped with the information in the article by Watson and Holle.

Rich Kithil, George Hodge, and Ken Langford discussed the relative merits of proximity to power line facilities and poles during lightning storms. George wondered if some of these open facilities might provide some protection. Ken commented that they are really a "pseudo" Faraday cage because the ground is not covered. Ken said that, if he cannot get to his car when he is stormchasing to photograph lightning, he will stand underneath power lines but equidistant from two poles. He is underneath overhead conductors, but wants to avoid "flashover." Rich Collier remarked that the "cylinder of the human body" is a greater target for induced voltage next to a small cable. Rich Kithil reminded us, again, that there are no absolutes when it comes to lightning.

12. Phil Yarnell described two electrical trauma patients. One had the "post electrical shock syndrome" which resembles the post-traumatic syndrome that is seen following automobile accidents.
13. Next meeting: Friday, July 12, 1996 at 11:30 am in the Main Auditorium at St. Anthony Central Hospital.

Respectfully submitted,



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## - NEWS FROM NLSI -

1. The Shell Oil Tank explosion and fire in New Jersey on Tuesday, June 11 was lightning-induced. NBC News flew a TV crew to Denver on Thursday, June 13 to interview Richard Kithil, NLSI President. Kithil's interview will be on NBC DATELINE, Friday June 14, at 10PM Denver time. (9:00pm)
2. NLSI will conduct a Certified Lightning Safety Professional school in Louisville CO. The two day intensive instruction is designed to create an in-house lightning safety expert for business, commercial, and government organizations. Dates are July 16 and 17. Course tuition is \$795. Rich Kithil and Rich Hasbrouck are co-instructors. For additional details, contact NLSI at 303-666-8817.
3. NLSI completed a lightning safety assessment and installed an upgraded lightning detector at the Lockheed-Martin/US Air Force facility at Spaceport USA, Camp Blanding FL.
4. NLSI participated with George Hodge, Phoenix Investigations, and Gene Dowell, Innovative Control Systems...all as Lightning Data Center representatives at the St. Anthony/Provenant Hospital Annual Safety Fair on June 6.
5. NLSI has prepared two books for sale:
  - a. "**Lightning 101**" is a 30+ page basic introduction to lightning issues. Cost, prepaid in the USA, is \$5.00.
  - b. "**Lightning Safety**" is a 175+ page in-depth examination of lightning issues. Cost, prepaid in the USA, is \$75.00.
6. NLSI is preparing an in-depth lightning safety assessment for nine sites of the cellular telephone company TELECEL, in Asuncion, Paraguay. Cellular phone growth in Latin America is increasing at five times the USA rate.
7. NLSI Director of Engineering Richard Hasbrouck wrote the cover story for the May 1996 issue of Science & Technology. The article is: "**Mitigating Lightning Hazards.**" The magazine is published by Lawrence Livermore National Laboratories.
8. Mike Foley, NLSI Director and President of Technical Consultants Group, Ltd., and Rich Kithil, NLSI President have been retained as expert witnesses in a lightning-related lawsuit in Montgomery AL.