

The Lightning Data Center logo includes 3 symbols representing the professions of Medicine, Engineering and Meteorology. The medical symbol is the caduceus. Hence, the following is the

Quote of the Month:

“The caduceus has been widely accepted as the symbol of medicine, but in reality the connection is tenuous, the result of the confusion between two separate images with striking visual similarities but different origins. The caduceus is derived from the Greek word for a herald’s staff, more specifically the magic wand of Hermes (or Mercury), the messenger of the gods and the patron of trade, and is represented by a straight staff with two wings at the end and two intertwined snakes. In Greek sculpture, medicine was represented by Asclepius or Aesculapius, son of Apollo, the god of medicine, holding a knotted staff around which is coiled a single snake...An appropriate name for the correct symbol of medicine is perhaps the Aesculapion.”

R Finn, DA Orlans, G Davenport in *Lancet* 1999;353:1978

1. The meeting began at 11:30 am and adjourned at 2:00 pm.
2. Members present were: Cherington, Conrad, Cook, Foley, Huntsman, Kamin, Larson, Lines, Smith, H Wachtel, T Wachtel, Yarnell.
3. New members: Lily Conrad, MD, Emergency Department Physician at Denver’s St. Joseph Hospital; George W. Cook, Sr. Staff Representative of Occupational & Environmental Safety at United Airlines; Bruce Huntsman, Aviation Maintenance Technician at United Airlines.
4. I brought the following articles from the literature (abstracted in part here):

a.) Aboulafia AJ, Brooks F, Piratzky J, et al. Osteosarcoma arising from heterotopic ossification after an electrical burn. *J Bone Jt Surg* 1999;81A: 565-70.

“Extraskeletal bone formation (heterotopic ossification) may originate in tendons, fasciae, periosteum, subcutaneous fat or organs such as the kidney or breast... Heterotopic ossification usually develops after a single traumatic injury or series of minor injuries and is considered to be a benign, self-limiting condition...A 44 year old man..was referred..for..treatment of a bleeding wound on..the right forearm...He had sustained an electrical injury of the involved extremity 10 years earlier, when he was working on an electrical stove...The case of our patient involved malignant transformation of heterotopic bone, which had developed after an electrical burn more than a decade earlier, into extraskeletal osteosarcoma.”

b.) The little device that could save 100,000 lives a year. *Univ of Calif, Berkeley Wellness Letter*, September 1999.

“Cardiac arrest..is an ‘electrical accident’ that sends the heart muscle into abnormal rhythms...If it happens outside a hospital..chances of survival are very poor, even if someone is on hand to administer CPR...Essentially what must happen is that a faltering heart must be electrically shocked back to life...Recently a new generation of automatic external defibrillators (AEDs) have arrived on the scene. Easy to use, portable, safe, and effective, these devices can interpret heart rhythms and announce to the user whether and when to apply the shock. Little training is required to use them; they cost about \$3000...It’s not out of the question that one day AEDs..will be part of the standard first-aid kit.”

c. Ensslin JC. Lightning kills herd of 56 elk. *Denver Rocky Mountain News*. Friday September 3, 1999, page 5A.

“A herd of 56 elk have been discovered dead on remote tundra in the Mount wilderness, the victims of an apparent lightning strike...While such deaths are common above timberline, the number killed is the largest in the memory of state officials...A Jefferson County man scouting hunting sites made the grisly discovery Aug. 17 on a ridge at 12,200 feet...The bodies were decomposed and other wildlife--ravens, golden eagles and coyotes--appeared to have been feasting on them.”

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Members present speculated that ground current associated with lightning was probably responsible for the deaths of the elk. Mike Foley will check with officials at GAI to see if they can shed light on lightning strikes in the region. Gene Lines will contact the Colorado Division of Wildlife and invite them to attend a future meeting to discuss this further.

Lightning deaths of Colorado mountain animals is not uncommon. In contrast, fish are seldom killed by lightning strikes to lakes, unless they are in the near vicinity of the strike, according to Gene and Mike. There are several reasons including: dissipation of current and voltage; small voltage difference encountered by the fish. Other factors include the mineral content of the water.

5. Dr. Conrad wrote an excellent article entitled: Clinical update on lightning injuries. *Wilderness and Environmental Med* 1998;217-22. We shall have copies made to distribute at the October meeting.
6. Ron Larson reported that a friend of his, who frequently swims at an indoor pool, was asked to leave the pool during a lightning storm and go to the shower room. The members present agreed that the advice to leave the pool was wise, but the

advice to take a shower was not good advice. Gene Lines had already advised the officials at a nearby school, that people should not swim in either outdoor or indoor pools during lightning storms.

We discussed the risks to underwater construction worker or divers during lightning. Mike Foley stated that underwater construction workers (e.g. working on a dam) would be at increased risk if they were connected to cables or lines to equipment on the surface. A diver free of such equipment was probably safer than one connected to cables.

Ron also reported that the citizens group of Look Out Mountain won a legal battle with the company wanting to add more powerful television equipment on the mountain near a residential neighborhood. Ron stated that radio frequency radiation from this equipment (about 100 megahertz frequency) could be damaging.

7. George and Bruce stated that flying airplanes not infrequently take lightning strikes. Small burn holes (about 1/16 inch) are seen in the fuselage. Modern commercial aircraft have static discharge wicks that help divert and dissipate the current from lightning.
8. The group discussed the reported phenomenon of temporary blinding of pilots from a lightning flash. Tom Wachtel told us that when he was in Flight School with the U.S. Air Force, personnel were studied with bright light flashes to see how long it took for each person's vision to return. He said the bright lights effect retinal cells differently in each person. Howard Wachtel and Ron Larson discussed the damaging effects of radio frequency energies and electrical current on the eye. Cataracts are a common sequelae of lightning and electrical trauma.
9. These minutes reflect the comments of the members present and do not represent official positions of the LDC.
10. Next meeting: Friday, October 8, 1999 at 11:30 am in the Main Auditorium of St. Anthony Central Hospital.

Respectfully submitted,

Michael Cherington, MD
Chair, LDC Scientific Committee