

Lightning Data Center
Minutes
April 13, 2001
St. Anthony Central Hospital

Quote of the Month:

"During the whole of a dull, dark, and soundless day in the autumn of the year, when the clouds hung oppressively low in the heavens, I had been passing alone, on horseback through a singularly dreary tract of country, and at length found myself, as the shades of evening drew on, within view of the melancholy House of Usher."

Edgar Allan Poe 1839

1. Meeting began at 11:30 am and adjourned at 1: 15 pm.
2. Members present: Blanke, Burrows, Cherington, Collier, Dick, Fletcher, Gray, Keen, Kummerfeldt M, Kummerfeldt P, Larson, Lines, McDonough, Molen, Nikkel, Paton, Richards, Sellon Swanson, Terrill, Wachtel, Yarnell.

3. I brought the following articles (abstracted in part here):

(In the past, we have discussed the vulnerable period of the cardiac cycle, the period of repolarization, and the possible danger of induced electrical current interfering at that time. The article below gives a lucid discussion of the repolarization period and other aspects of cardiac function.)

- a.) Rosen MR. The heart remembers; clinical implications. *Lancet* 2001;357:468-71.

"Cardiac memory is seen electrocardiographically in the T wave, which is the product of genetic and structural determinants, ionic currents, and environmental influences. We now understand that there is continuous protein turnover in cardiac myocytes, such that myocytes resynthesize the totality of their protein components regularly and rapidly.

Not only is this resynthesis genetically programmed, it is sensitive to environmental influences, and is reasonably mirrored on the electrocardiogram (ECG). Herein lies the basis for the plasticity of the heart, and it is here that the concept of memory as manifested in the T wave comes into play... Of the three waveforms that can be recorded, the P wave reflects atrial activation, the QRS complex relates to ventricular activation, and the T wave to ventricular repolarisation... T waves ultimately derive from a balance between inward and outward ion currents occurring in individual ventricular myocytes. Inward current is carried by sodium ions... Calcium ions contribute inward current during the plateau as well. Outward repolarising currents are carried by potassium."

- b.) Gurnett DA, Zarka P, Manning R, et al. Non-detection at Venus of high-frequency radio signals characteristic of terrestrial lightning. *Nature* 2001;409:313-15.

"If lightning exists in the venusian atmosphere, it is either extremely rare, or very different from terrestrial lightning. The Cassini spacecraft made two fly-bys of Venus. During these fly-bys the Radio and Plasma Wave Science Instrument conducted a search for impulsive high-frequency radio signals from lightning. Impulsive signals of this type are commonly heard on AM radios during terrestrial thunderstorms, and are called spherics. Because spherics are always produced by terrestrial lightning, the detection of spherics by a spacecraft flying over another planet provides strong evidence of lightning."

4. Peter Kummerfeldt gave a scintillating presentation on Rocky Mountain Safety. Peter's bio included the following information: Peter grew up in Kenya, East Africa and came to America in 1965. He joined the United States Air Force and is a graduate of the Air Force Survival Instructor Training School. He retired from the Air Force in 1995 after 30 years of service.

I cannot do justice, in words here, to Peter's outstanding lecture. I will copy a few of the notes I made during his talk. He provided a list of "Accident Factors." They included: Lack of preparedness, fatalistic attitude, bad luck, weather, getting lost or separated in the mountains. Among the topics he covered were: lightning, acute mountain sickness, and wild animal attacks. He pointed out that there were larger numbers of serious injuries in this country from insect bites and domestic dog bites than from bears and cougars combined. He spoke about poisonous plants including Water Hemlock (the most toxic plant in the USA), Amanita mushrooms and Baneberries. One should avoid ingesting plants with umbrella shapes.

5. These minutes reflect the comments of members present at the meeting and do not represent official positions of LDC.

6. Speaker at the May meeting: John Weaver, Satellite Research Meteorologist for NOAA in Fort Collins.

Topic: "The Fort Collins Flood: A Benchmark Event in Utilizing Lightning Data in the Short Term Forecast."

PLEASE NOTE: the room change for the next meeting will be held in the Birch Room on the Ground Floor of St. Anthony Central Hospital at 11:30 A.M. on Friday, May 11, 2001.

Respectfully submitted,

Michael Cherington, MD
Chair, Scientific Committee, LDC