**LIGHTNING PROCESS**

Few natural spectacles are as impressive as a well choreographed lightning storm. I am particularly fond of the thunderous light shows that can be experienced at the higher elevations, particularly the Adirondack region.

While I enjoy the storms, going outside during the real wicked ones to get a breath of the negatively charged air just before the deluge sets in, my wife is deathly afraid of them.

There are many popular myths and wives' tales surrounding the lightning phenomenon, chief among these is the debate about how and
what lightning will strike.

MYTH : Lightning strikes from the clouds to the ground.
FACT : The actual current travels from the ground to the clouds.

This is the most common erroneous assumption, no doubt confirmed by visual observation. It however, is totally BACKWARDS. The lightning you see is the result of ionized air. To make the analogy simple, it's like turning on a lamp; first you throw the switch, then current (which is invisible) flows up to the bulb, and the bulb illuminates, and LIGHT comes FROM the bulb TO you.

The current carried by a single bolt can be upwards of MILLIONS of AMPERES, and HUNDREDS of MILLIONS of VOLTS. The current actually flows from the ground to the clouds. There is a quick sequence of events that happen just before the "bolt" is evident:

1 - The POTENTIAL; that is the difference in charges, builds up between the cloud(s) and the ground.

2 - "LEAKAGE PATHWAYS"; are established from the ground to the clouds via the "path of least resistance". A relatively small amount of current flows which charges the air around the path conduit, and makes the air conductive.

3 - The DISCHARGE; A fraction of a second after the "Leakage Paths" are established, the conducting air IONIZES, that is, electrons in the air molecules are "ripped" from their orbits as upwards of millions of Amperes of current flow.

4 - DISCHARGE PATH COMPLETED; Microseconds after the path is established, and current is flowing (from GROUND to CLOUD), the air around the discharge path lights up, releasing PHOTONS, which is the light you see. The phenomenon STARTS at the CLOUD, and ends at all of the points on the ground that have established a "discharge point". The light phenomenon is analogous to blowing up a long balloon, and having the inflated part approach you from the end you're holding; The air comes from your mouth into the balloon, but the inflation appears to start at the other end.

5 - DISCHARGE AVALANCHE; As the multiple paths to ground are established, the subsequent current flow is like throwing a switch to turn on a light. Each of the current paths from the ground, supply a portion of the total current that make up the discharge at the cloud. This is why the VISIBLE part of the lightning bolt "fans out" into multiple forks at it approaches the ground. The "bolt" appears to come FROM the cloud, since there is usually one or two discharge points on the cloud, and many on the ground. The surface area of the cloud is relatively small compared to the available surface of the Earth below.

8 - ELECTRO-MAGNETIC PULSE; The flow of all of this current produces an extremely powerful electromagnetic "pulse", which you observe as "static" on your AM radio. EMF (Electro Motive Force) pulses can INDUCE high voltages in electronic equipment which is in close enough proximity. Your computer, VCR, stereo, or other electronic equipment can be DESTROYED just be being in the VICINITY of a strike, without being actually struck. It helps to UNPLUG things during a storm, as "SURGE" protectors are no match for a direct hit - they will FRY along with everything else that's plugged in.

7 - THUNDER; Thunder results from super-heated air around the discharge pathways suddenly expanding. The moisture-laden air literally "explodes". The more moisture (humidity) in the air around the discharge path, the more additional "steam" is generated when the current flows, and the louder the explosion.

RULES TO OBSERVE:

#1 : Don't attend golf tournaments (see Murphy's Law section :
36th. Law of Meteorology – “Golf tournaments attract lightning”).

#2: Don't sleep in a tent that has metal tent poles.

#3: Avoid seeking shelter under a lone tree. If you're in the middle of the woods under the forest canopy, the risk is minimal, because ANY tree can be "struck". Having lots of trees around "spreads" the risk out amongst the area.

#4: Avoid flying kites during storms, or when storms are approaching. A charge can travel down the wet string.

#5: If you MUST use the phone, use a cordless phone, or a CEL phone. Although the TRANSCEIVER (or the CEL transponder) can be FRIED by a strike, you would be safe because the handset is not physically connected to anything. However, if you stand near a 300-foot aluminum flagpole using your CEL phone, don't blame the phone if you get toasted.


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