Lightning Essay, Research Paper

Lightning is a natural phenomenon that occurs more often than we think it does. That streaking flash, followed by a loud rumbling noise, that makes your knees buckle is very dangerous because of its unpredictable striking force. Being struck by lightning can be deadly, so the more precautions you take ahead of time, the safer you are. Lightning not only affects us, it also has a great impact on our man-made structures and of course, our natural surroundings.

According to Professor Martin Uman, one of the world?s leading lightning experts:

Lightning is an effect of electrification within a thunderstorm. As the

thunderstorm develops, interactions of charged particles produce an

intense electrical field within the cloud. A large positive charge is

usually concentrated in the frozen upper layers of the cloud and a large

negative charge with a smaller positive are is found in the lower portions. (4)

This produces what you see, a lightning flash, which may be ?two or 300 feet long? (25). The flash itself may be only as wide as a pencil, but because it is extremely hot, hotter than the sun, its glow appears to be very wide to the human eye. When lightning pushes the air from its path, it expands it quickly causing a

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loud explosion, which we call thunder (25). William R. Newcott, part of the National Geographic Editorial Staff, describes lightning as a ?river of electricity rushing through a canyon of air. Moving [SIC] fast as 100,000 miles a second, lightning sears wild and unstoppable through twisted channel as long as ten miles,? (83) he explained.

Lightning, being a natural occurrence, is very unpredictable which makes it even more dangerous. Martin Uman, director of the University of Florida?s Lightning Research Laboratory is quoted in Omni saying, ?A man was talking on a telephone near Gainesville, Florida, when lightning hit the wires. He died instantly, electrocuted. Three or four people die that way every year? (Wolkomir 1). It is hard to believe that someone could just die while using the phone. You never know what will happen next when it comes to lightning.

In fact, even in recent weeks, the state of New Jersey was hit by lightning causing various dangers. On June 6, 1996, a Sewaren oil storage tank in Woodbridge, New Jersey, was hit by lightning causing a ferocious explosion. This fire blazed for an unbelievable 28 hours. According to a staff report in the Asbury Park Press, two employees attempting to turn off the power to the area ?suffered electrical burns, and were apparently the only casualties? (A1). Fortunately, the

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other tanks did not explode, or a few more casualties might have resulted.

Many people in the area felt and heard the force of the explosion. Staff writers add, that ?nearby relaxing in his boat off Cliff Road, Rick Bothwell reported feeling the explosion, even on the water. I heard a bang and a whoosh. It felt like an explosion out of a tube, he said? (A1). Inland, nearby neighbors also felt the impact of the explosion. ?The ground just rumbled from the front of house to the back, said Richard Swallick, who lives on West Avenue within a few hundred yards of the tank field? (A1).

Experts are very unsure as to what caused this almost disastrous explosion. Also in this article, ?Elaine Makatura, a spokeswoman for the state department of Environmental Protection, said it was too early to speculate on what the environmental impact of the blaze will be? (Staff Report A5). In otherwords, they don?t know if any harmful chemicals were released during the blaze. Contaminants in the air could cause a serious problem for neighbors of the gas store area.

After something like this happens, the question that comes to mind, is can lightning strike twice? Well, according to Bernhard Warner, a staff writer for the Asbury Park Press, there was a smaller explosion in Linden, New Jersey, at the Tosco Refining Co. shortly before the one in Woodbridge exploded (A5). A

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manager at the refinery would not say whether lightning caused the fire, because it is still under investigation. It seems the more things, we learn about nature, the more questions arise. Bob Friant, a spokesman for the State Department of Community Affairs, is quoted in the Home News and Tribune, by Sean P. Carr, saying ?we have never been able to conquer Mother Nature, and we never will be? (B1). He has a real optimistic point of view, huh. Although, after Carr points out that their are ?thirty-five fuel storage tank facilities, some of the dozens of tanks each store millions of gallons, dot the Shore of Central and Northern New Jersey waterways,? (B1) the chance of this happening again seems likely.

Furthermore, Martin Uman continues saying, ?At any moment, planet wide, about 2,000 thunderstorms are in progress. Each storm generates a flash every 20 seconds? (4). That is unbelievable. Now I can understand how there are so many deaths and injuries from people being struck by lightning. The more thunderstorms, the more chances lightning will strike. If you give lightning enough chances, it is bound to hit something. In the time it takes you to read this sentence, lightning has flashed more than 500 times (4), Uman notes. Facts like that are really amazing to me. How could lightning have just flashed 500 times? This is because most of the lightning flashes we see are cloud-to-ground strokes, but they ?compromise only

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about 20 percent of lightning? (4). Much more frequent are flashes within clouds.

Although lightning kills many Americans every year, luckily some victims of lightning hits have lived to tell about the experience. More than a year after lightning nearly killed him during football practice, Tony Trice still does not want to talk about it (Newcott 90). According to eyewitnesses in Burtonsville, Maryland: ?They saw a bolt tear a hole in the high schooler?s helmet, burn his jersey, and blow his shoes off. Toy?s breathing stopped, but he was resuscitated on the spot? (90). It is unbelievable that this teenager survived after being hit by one of nature?s unpredictable and deadliest forces. How is it possible someone could survive after being struck by lightning? Researchers at the University of Queenland in Australia have traced the path followed by lightning when it enters a living creature (Dayton 1) and according these researchers:

simulated lightning strikes on anaesthetized sheep showed that lightning

first enters the body orifices and then flow along the blood vessels and

cerebrospinal fluid (CSF) pathways. Since the CSF pathway narrows

near the brainstem, this part is hit hardest, resulting in cardiac and respiratory arrest. Since the heart can restart itself because of autonomous

control, fatality usually results from respiratory failure. (1)

This shows the importance of mouth-to-mouth resuscitation for lightning victims.

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I almost witnessed someone being struck by lightning, but luckily they were not. It was during a soccer tournament that I was playing in, about nine years ago. All of a sudden, the sun was hidden behind the clouds and the sky turned a dark purplish color, and then it downpoured. The sky rumbled with fierce thunder and you could see a couple of lightning flashes. The tournament was at a high school, so everyone ran to the school for safety. My father was with me, and as we headed towards the school, we saw a bright flash of lightning strike a tree about a mile from us and split it in half, starting a little fire. There were two kids from my team that were around 50 feet away from the tree and they stood there frozen in fear. My dad told me to keep going. Then, he went back and had to literally carry them to safety because they were so scared. Fortunately, no one was any closer to that tree or they would have been seriously injured or killed that day.

Golfers are prime targets for lightning, because they tend to either stand in open grassy areas or huddle under trees while playing their game. Also, they use umbrellas which attract lightning to them because of the metal point on top. In addition, they hold metal golf clubs which increase their chances of being struck by lightning. ?A scored pattern on the fifth green at Phalem Park Golf course in St. Paul Minnesota, defied ground zero when four golfers were injured, one fatally, by

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a June 1991 strike? (Newcott 89). I guess that kind of proves that golf can be a dangerous sport, especially during a thunderstorm.

In the film, Lightning, directed by Linda Gorman, a golf legend, Lee Trevino describes his experience of being hit by lightning, while playing in a tournament in 1975. Trevino says:

The sensation that I got was, I knew that something was wrong. It

did not just go pow, and it was over. I felt it, and I started shaking.

The next thing I knew, I started to hear a ringing sound in my ear,

like a ball-peen hammer. Then all of a sudden, the next thing I know

is look at my feet and now they are in the air. Now I?m off the ground…

its got me all stretched out. At the time, I guess it stops your heartbeat

and I?m gasping for air. The next thing I knew, is I woke up, and I

was all doubled up. My left arm was under my body… (Lightning)

In listening and watching Trevino speak, I could see his confusion and uncertainty of what was happening to him.. I am sure to this day, when he is golfing on the green during a thunderstorm, he becomes reminiscent of his previous experience with lightning.

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Tall man-made structures have been known to attract lightning. According to The New Book of Popular Science, engineers in 1935 set up a device inside the Empire State Building in New York City, to find out how the building handles being struck by lightning in the experience. In the film Lightning, one source noted that this famous building is ?struck more than twenty times each year? (Lightning). The special rod at the top of the building was connected to this device by steel. This would allow a small amount of the current to safely deflect from the rod to their machines. Also photographs were taken from a small building to provide proof of this experiment. They concluded from their studies that it is possible for lightning to strike twice in the same place (142-143). ?The empire state tower has been struck by lightning as many as 42 times in one year. It was hit 12 times in a single storm, and on one memorable occasion, 9 times in 20 minutes,? (142-143) which proves their studies to be accurate. Yet, after all those strikes, there was no damage to the

building.

Nature itself is also affected by lightning. Lightning is a cause of forest fires, which of course, may be devastatingly destructive. According to The New Book of Popular Science:

It also causes a great deal of damage as a result of heating and

expansion. When it passes through wood, for example, the

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enormous current heats the wood and causes it to expand many

many times. As a result, the wood is converted into vapor, and

this adds to the general effect of expansion. (143)

It is interesting that Mother Nature can create lightning, but she can also destroy a part of herself in the process.

All of us must respect lightning. It is very dangerous and it kills! We do not have to be afraid of it, though. We can protect ourselves from lightning by observing some basic lightning safety rules. According to my research, I have learned that one should keep away from conductors such as metal and water, as well as tall trees. When inside a home avoid using the telephone except for emergency. You will not see me talking with my friend during a lightning storm, not after hearing about the man getting electrocuted while talking on the phone. If outside, with no time to reach a safe building or an automobile, follow these rules given by Martin Uman:

Do not stand underneath a natural lightning rod such as a tall isolated

tree in an open area. Stay away from wire fences, clotheslines, metal

pipes, rails, and other metallic paths which could carry lightning to

you from some distance away. If you are hopelessly isolated in a level

field or prairie and you feel your hair stand on end, indicating lightning

is about to strike, drop to your knees and bend forward, putting your hands

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on your knees. Do not lie on the ground!!! (95)

Lightning does not choose its victims or target. It just happens. For the many fatalities, those people were just in the wrong place at the wrong time. It is alright

to be curious about lightning, but do not be stupid. Take the proper precautions or

you may just be another statistic. Remember you cannot predict when or where lightning will strike, but you can be aware of the possibility. It might be well, also to recall this passage from ?Playing with Lightning?, written by a lightning stalker, Karl B. McEachron, quoted in The New Book of Popular Science: ?If you heard the thunder, the lightning did not strike you. If you saw the lightning, it missed you; and if it did strike you, you would have known it? (144). So, in otherwords, you can not predict when or where lightning will strike, but you will definitely know it, when it strikes you.

Carr, Sean P. ?Lightning can strike twice at vulnerable gas storage areas.?

The Home News & Tribune 12 June 1996, sec. B: 1.

Dayton, Leigh. ?Secrets of a bolt from the blue: How a lightning bolt enters the

body.? New Scientist 18 Dec. 1993: 16.

Lightning. Dir. Linda Gorman. Prod. Nova. Boston Science Unit, 1995.

?Lightning.? The New Book of Popular Science. Vol. 12. 1994.

Newcott, William R. ?Lightning: Nature?s High-Voltage Spectacle.?

National Geographic July 1993: 81-103.

Staff Report. ?Fire rages after lightning strikes Sewaren oil storage tanks.?

Asbury Park Press 16 June 1996, sec. A: 1,5.

Uman, Martin A. All About Lightning. New York: Dover Publications Inc, 1986.

Warner, Bernhard. ?A second fire strikes oil refinery in Linden.?

Asbury Park Press 12 June 1996, sec A: 5

Wolkomir, Richard. ?Electric Sky.? Omni March 1994: 50-60.