Fort Matanzas

National Park Service
U.S. Department of the Interior

Fort Matanzas National Monument

Lightning

Lightning, the thunderbolt from mythology, has long been feared as an atmospheric flash of supernatural origins-- the great weapon of the gods. The Greeks both marveled and feared lightning since it was hurled by Zeus, the king of the gods. For the Vikings, lightning was produced by Thor as his hammer struck an anvil while he rode his chariot across the clouds. In the East, early statues of Buddha show him carrying a thunderbolt with arrows at each end. Indian tribes in North America believed that lightning was due to the flashing feathers of a mystical bird whose flapping wings produced the sound of thunder.

Today, scientific rather than mystical techniques are used to explain lightning. Yet, we remain in awe of lightning which still shines with its mystery, and rightly so. Each year, lightning is responsible for the deaths of a hundred or so people, injuries to several hundred more, and millions of dollars in property damage, in the United States alone.

Florida, nearly surrounded by water, is the lightning capital of the United States. Moist air and heated land combine to produce ideal conditions for thunderstorms which are a frequent afternoon occurrence in the summertime and occasionally in the winter. A brief, 15 minute thunderstorm will typically produce more than 200 lightning strikes to the ground with many more bolts occurring inside or between the clouds.

A lightning flash is composed of a series of separate strokes with an average of about four. The length and duration of each lightning stroke vary, but typically average about 30 micro-seconds. (The average peak power per stroke is about 1012 watts.) Each bolt, although appearing much larger, is usually less than one inch thick, or about the size of your index finger.

Thunder is the sound generated along the length of the lightning channel as the atmosphere is heated by the electrical discharge to the order of 30,000 degrees C (3 times the temperature of the surface of the sun). This compresses the surrounding air producing a shock wave which then decays to an acoustic wave as it moves away from the lightning channel.

Although the flash and resulting thunder occur at essentially the same time, light travels at 186,000 miles in a second, almost a million times the speed of sound. Sound travels at the relatively snail pace of one-fifth of a mile in the same time. Thus the flash is seen before the thunder is heard. By counting the seconds between the flash and the thunder and dividing by 5, an estimate of the distance to the strike (in miles) can be made.

A storm does not have to be close in order to be a hazard to people. If you are close enough to hear thunder, you are close enough to be hit by lightning, even if there are no clouds where you are.

(Over)

Lightning strikes the ground about 40 million times a year in the United States alone. It performs a valuable role in wilderness ecosystems by lighting fires which are a natural part of most ecosystems. Fire cleans out underbrush, opens the forest to sunlight, and replenishes the soil with ash which allows other plants to grow—plants which provide food for wildlife. Without lightning, fire would be almost non-existent in nature for the only other source of natural fire is volcanic activity.

More Electrifying Facts:

- Each bolt is capable of carrying over 300,000 volts of electricity, can travel as fast as 40,000 miles a second,
  and reach a temperature of 55,000 degrees F.
- 20% of the people struck and killed by lightning in the US are killed while on the golf course. <u>The beach is also an area of high risk!</u>
- At any given time there are more than 200 lightning storms taking place on earth.

Lightning Safety at Fort Matanzas:

- Storms approach rapidly, so seek shelter before a storm approaches. Do not wait for the storm to reach you. If a storm approaches while you are swimming or fishing, exit the water, and leave the beach immediately.
- Shelters include enclosed vehicles and enclosed (not open-sided) buildings. During park hours, our Visitor Center is an excellent shelter from storms.
- Boats and docks, even if covered, are not considered safe shelter from storms.
- If a storm approaches while you are at the fort, the captain will ask that you move calmly, but quickly, back to the boat. The isolated fort with a tall flag pole and iron cannon is not a good place to be in a storm! If thunder is heard, the boat trip will be cancelled for that hour.