Petrified Lightning

by Peter E. Viemeister

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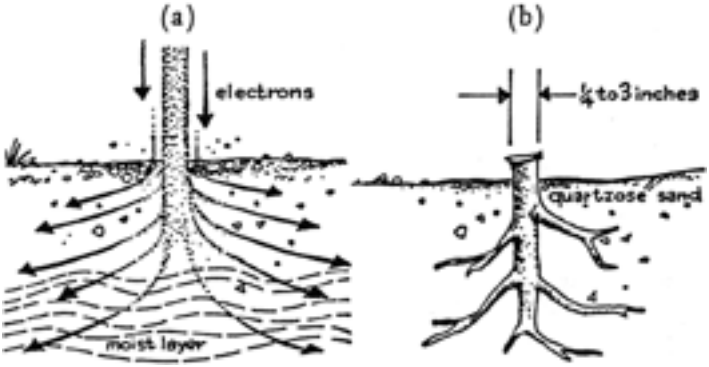
If lightning strikes sand of the proper composition, the high temperature of the stroke may fuse the sand and convert it to silica glass. "Petrified lightning" is a permanent record of the path of lightning in earth, and is called a *fulgurite*, after *fulgur*, the Latin word for lightning. Fulgurites are hollow, glass-lined tubes with sand adhering to the outside. Although easily produced in the laboratory in an electric furnace, silica glass is very rare in nature. The glass lining of a fulgurite is naturally produced silica glass[1], formed from the fusion of quartzose sand at a temperature of about 1800° centigrade.

Most people have never seen a fulgurite and if they have they might not have recognized it for what it was. A fulgurite is a curious glassy tube that usually takes the shape of the roots of a tree (see illustration). In effect it gives us a picture of the forklike

[1]The geological name for this natural silica glass is lechatelierite, in honor of the French chemist Henry Le Chatelier.



a) When lightning strikes the earth, electrons flow outward in all directions. (b) Petrified lightning or fulgurite is sometimes made when lightning strikes and fuses certain types of sand. When formed on beaches or shores, a fulgurite is usually covered with shifting sand and goes undiscovered. Eroding sand may expose a fulgurite. (diagram by Read Viemeister)

routes taken by lightning after striking sand. One of the largest ever found was discovered in South Amboy, New Jersey. When scientists dug the sand away from around the fulgurite, it broke so that the largest single piece was only six inches long; however, when put together, this Jersey fulgurite was almost nine feet long. It was virtually a straight tapering tube with only a few branches coming off the main stem. It was three inches in diameter near the surface of the ground and tapered down to about three sixteenths-of-an-inch diameter at the lowest recovered piece. The thickness of the tube wall was on the order of a thirty-second of an inch.

Fulgurites have been found in all parts of the United States as far south as Florida and Mississippi and as far north as Waterville, Maine. Next time you are at a beach after a thunderstorm, look around, perhaps you will be lucky enough to find a fulgurite. You can recognize it as an approximately circular section of tube that would go down into the ground. A fulgurite is quite brittle. Dig around it carefully so that it can be removed with a minimum of breakage. Fulgurites vary in color, depending upon the type of sand from which they were formed. They are usually tan or black, but an almost translucent, white fulgurite was found in Pensacola, Florida. The inside tends to

PLATE XLII, "Petrified Lightning," of fulgurite, is made of sand fused by lightning.

be lustrous and somewhat irregular and the outside is rough sand which adheres to the fused areas. The glassy portion usually includes tiny bubbles which are formed by moisture trapped when the fulgurite cools suddenly after the lightning has passed.

Fulgurites are produced not only in sand but also on rocks. Pieces of rock may be consolidated and fused together or the surface of a rock may be converted to a lustrous glassy material when struck by lightning. William Hallock, a Professor at New York University, reported an incident in August 1900 of a rock fulgurite formed near Lake Champlain, New York. Lightning struck a mountain, splitting an old pine tree. Observers went to the scene and found, near the pine, a large rock which had been split into fifty to a hundred pieces. "A white incrustation was apparent on the rock as if white paint had either been splattered about or had been spread over as a rough branching, straggling line. This incrustation went as far down as a foot into some of the large cracks of the large rocks." Besides the Lake Champlain rock fulgurite, others have been

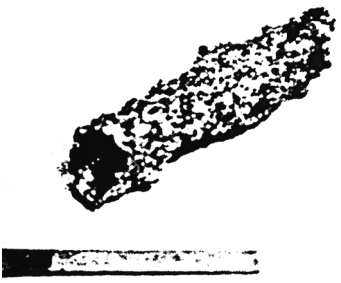


PLATE XLIII, Inside of a fulgurite is glossy.

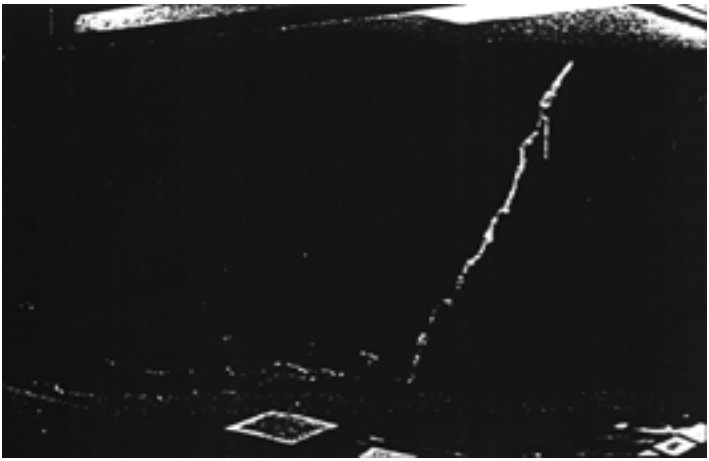


PLATE XLIV, Fulgurite found in Florida went four feet into ground.

found near mountain summits in the Caucasus, in Toluca, Mexico, and on Mount Thielson, Oregon.

Good specimens of fulgurite are almost as rare as gold. They are rare because most people wouldn't recognize one if they saw one. Beach fulgurites are quickly rendered invisible by shifting sands, but they sometimes are seen to protrude from sand as sand is eroded away. A fine fulgurite specimen was obtained from a prospector in California, in the early 1940's. While ferreting around Indio, in Riverside County, California, a grizzled prospector came across a fulgurite. He didn't know what the peculiar thing was, but he suspected some geologist would be interested in it. He sold it to a rock dealer in Hollywood who in turn forwarded it to geologists at Stanford University. The prospector, however, refused to tell exactly where he had found it.

Perhaps the finest fulgurite on display is at the Academy of Natural Sciences in Philadelphia. This fulgurite was discovered on Santa Rosa Island, near Fort Walton, Florida, in October 1940 by Miss Josephine de N. Henry. She dug it up and carefully tagged each of 500 pieces, which were later reassembled with dental cement. Its maximum diameter is two inches, and the lowest part was four and a half feet underground, where it reached the water table and branched out.

THE EVENT

PETRIFIED LIGHTNING FROM CENTRAL FLORIDA

A PROJECT BY ALLAN MCCOLLUM

CONTEMPORARY ART MUSEUM
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