

Exhibition in the  
Ural Geological Museum

## FULGURITE IS PETRIFIED LIGHTENING

Dmitry A. Kliemenov<sup>1</sup>, Alexander L. Usov<sup>2</sup>

<sup>1</sup> Ural Geological Museum, Yekaterinburg, Sverdlovsk Oblast  
dmitry\_kleimenov@mail.ru,

<sup>2</sup> Gusinoozersk, Republic of Buryatia, Russia  
usov66@bk.ru

All samples are from the  
Ural Geological Museum,  
Ural State Mining University,  
Yekaterinburg, Russia.

All fulgurites were collected  
in the Selenga river area,  
Republic of Buryatia, Russia.

Photos: Michael B. Leybov  
if other is not mentioned

The exhibition “*Fulgurite is petrified lightening*” where forty remarkable natural samples formed by lightning discharged into sand are exhibited has been opened at the Ural Geological Museum of the Ural State Mining University in Yekaterinburg, Russia. All samples are from the Ural Geological Museum, Ural State Mining University, Yekaterinburg, Russia.

The term fulgurite (from the Latin *fulgur*, meaning “lightning”) was introduced into use in science by the French scientist François Arago in 1821. However, German pastor David Hermann described “thunder tubes” for the first time in 1706.

Fulgurites are irregular shaped tubes filled by bubbly glass composed of fused silica (lechatelierite) penetrated sand or rock and formed as a result of lightening discharge and rock melting.

On our planet, approximately hundreds lightening discharges happen each second. The lightening heats the channel along which it moves up to 30000 degrees Celsius. This temperature is five times higher than that at the surface of the Sun and is obviously much higher than the melting temperature of sand (1600–2000°C).

Grains of quartz, feldspar, and other minerals immediately fuse into glass when lightning discharges into sand. The porous structure of glass is caused by air and moisture, which glow to the highest temperature in a split second and the bub-

1. Fulgurite (80 cm long) in one of the  
showcases at the exhibition.



6. Fulgurite. 22 x 2 cm.

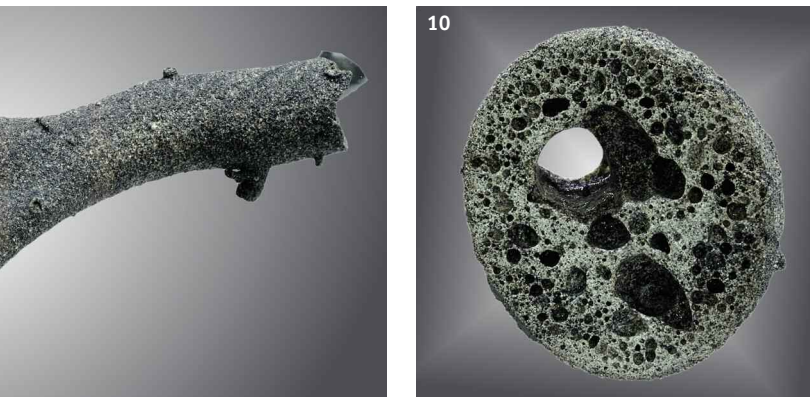


7. Fulgurite. 29 x 13 cm.



8. Fulgurite 23 cm long.

9. Fulgurite 16 cm long.



10. Cross section of fulgurite. 4.3 x 4.9 cm.

have a general feature: porous (bubbly) mass with a hollow central channel ranging from 0.5 to 2 cm in diameter while the pore size decreases from the central part to the outside.

Alexander Usov has organized a small business of fulgurite souvenirs (“*petrified lightening*”), which are small fragments of fulgurites on stands.

At the display are also exhibited natural samples and items which were believed to have resulted from lightning (“*thunder arrows*”) in ancient times: columns of belemnites, obelisk-like rock crystals, and ancient arrow heads.