# *Fulgurite in the Sierra Nevada*

by Christopher A. Libby
Chief Instructor, Outward Bound
Mammoth Lakes, California

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# *FULGURITE IN THE SIERRA NEVADA*

by CHRISTOPHER A. LIBBY
CHIEF INSTRUCTOR, OUTWARD BOUND
MAMMOTH LAKES, CALIFORNIA

The term fulgurite was taken from the Latin word for lightning, fulgur (Bates and Jackson, 1984). Fulgurite is a crust-like structure consisting of fused silica or silicate produced by lightning strikes. It is usually a branching, often tubular or rod like, structure. These structures may be formed in sand dunes, in deserts, or lake shore areas, or on exposed mountain summits. Fulgurite structures may measure 40 cm in length and up to 5 cm to 6 cm in diameter. The heat required to create the fusion has been estimated at 1800°C (Challinor, 1978). There are two general types of fulgurite: sand fulgurite and rock fulgurite.

Peak 12,416 feet is the high point of Glacier Ridge. Fulgurites have been found on many Sierra Nevada peaks. View from Peak 12,340 feet. Photos by C.A. Libby.

## Fulgurite Types

Sand fulgurite has been found in beach and dune areas in Great Britain, along the Atlantic coast of the United States, and on the shores of Lake Michigan (Encyclopaedia Britannica, 1974; Challinor, 1978).

Rock fulgurites are found mainly on mountain peaks, which act as natural lightning rods and receive repeated lightning strikes. However, it is not clear whether repeated lightning strikes are necessary for the formation of rock fulgurites, or whether mountain peaks are merely easily defined places in which to search for and find rock fulgurites. Fulgurite formations have been reported on Mount Thielsen in Oregon by J.S. Diller (1884) of the U.S. Geological Survey, on Nevada deToluca in Mexico by Alexander von Humboldt, and in the Caucasus Mountains by Otto von Abich (Harris, 1976).

Fulgurites are found on Black Kaweah (right background) in the Sierra Nevada. The peak rises to on elevation of 13,765 feet above sea level.

## Cascade Range of Oregon

It appears that the composition of many volcanic rocks is favorable to the formation of fulgurite. This hypothesis was reinforced by my observation of fulgurites atop Mount Thielsen, South Sister, The Husband, and Three Fingered Jack among the volcanic peaks of Oregon's Cascade Range. Fulgurite occurrences in these areas appear as black or greenish, bubbly crusts on the dark volcanic rocks on the upper several feet of those peaks.

## Sierra Nevada

I was surprised to find, in the summers of 1984 and 1985, that fulgurites are relatively common on the granite peaks of California's Sierra Nevada. In Sequoia and Kings Canyon National Parks I found fulgurites atop the following granitic peaks: Thunder Mountain (13,588 feet), Sugarloaf (8,002 feet), Whaleback (11,726 feet), Mount Stewart (12,205 feet), Big Bird Peak (11,602 feet), Peak 12,416 ( feet) on Glacier Ridge, and Peak 11,840 (feet) on Glacier Ridge. I also found fulgurite structures on volcanic rocks of Black Kaweah (13,765 feet). Nearby Red Kaweah had no fulgurites, but an aluminum register can placed there in the 1970s was melted (presumably by

lightning. Mount Stewart had, in addition to fulgurites, a similar aluminum can which was pitted to a lesser degree. All of these peaks are located on the Triple Divide Peak and Mount Whitney 15-minute USGS topographic quadrangles.

The Sierra Nevada fulgurites are similar in appearance to those in Oregon– black, green, or white bubbly crusts on the surface of the rocks. The crusts appear on the topmost rocks as veins running down the summit blocks and in pockets below the topmost rocks. Fulgurites seem to be confined to approximately the top two meters of the peaks.

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