

**RECOVERY OF THE SUTTER'S MILL METEORITE.**

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**Introduction:** On a clear and transparent Sunday morning at 7:51 PDT April 22<sup>nd</sup> 2012, two hours after sunrise, a 4kt detonation was heard and a fireball seen speeding across the California Sierra Nevada mountains. A ~2 to 4 meter sized near-Earth asteroid had entered the Earth's atmosphere and broken into fragments. Doppler weather radar detected the falling meteorites over an area centered on Sutter's Mill, the site where gold was first discovered on January 24, 1848, resulting in the California Gold Rush. On Tuesday April 24, the first Sutter's Mill meteorite, broken in two fragments, was found by meteorite hunter Robert Ward at the entrance of Henningsen-Lotus Park (numbered SM1). Ward noticed that the meteorite looked similar to the CM2 chondrite Muchinson. Later that day, Peter Jenniskens found a crushed 4g meteorite in the parking lot of that same park (SM2). This is one of three samples before heavy rain descended on the area.

The NASA Ames Research Center's meteorite interest group, in an effort coordinated by NASA's Lunar Science Institute, followed up with organized searches for further fragments to increase the amount of material collected cleanly. Following the script of the Almahata Sitta meteorite recovery in 2008 [1], a consortium of researchers was formed to study the new fall, called the Sutter's Mill Meteorite Consortium.

**Results and Discussion:** A call was made for video and photographs of the fireball. Data were received from three locations. Astrometric data for each dataset was retrieved to reconstruct the impact trajectory and orbit in space of the asteroid.

Starting on Saturday April 28, a series of organized rope-searches were conducted with volunteers that resulted, on Sunday April 29, in the recovery of a fully crusted 17g fragment at the de Haas property in a southern location in the strewn field (SM12).

The early rains spurred increased efforts to take larger samples out of the weather. On Thursday May 3, an air ship was deployed over the Roseville/Rocklin area west of Folsom Lake to look for impact scars of kg to tens of kg fragments along the projected impact path. The air ship flew at 300m above ground level. An overcast sky created perfect viewing conditions with no shadows. In a 5-hour search, no obvious scars were observed, but potential sites were later investigated on the ground.

Each new find is assigned an SM number to later relate information about each fragment to where in the strewn field and, potentially, where in the asteroid the fragment originated.

The recovered meteorites support several of NASA's research interests. Freshly fallen CM chondrites are a potential analog to ongoing Near Earth Object sample return missions and a potential source of information on the delivery of volatiles to the early Earth, needed for the origin of life.

**References:** [1] Jenniskens P. et al. 2009. Nature 458, 485.

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