



When Meteors Explode: Full Account of a Wild Chicago Night

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You might think meteor expert Steven Simon knew exactly what was happening one evening when the skies over his home were lit up by an exploding, 2,000-pound space rock bigger than a refrigerator. But it was only the next day, when nearby residents brought him chunks of the extraterrestrial visitor that had landed in the street and punched through their roofs, that Simon began to understand the true nature of the frightening event.

Now after a year of study, the University of Chicago researcher has helped produce a full account of the giant rock that tore through the atmosphere at 54 times the speed of sound.

Simon was in his Park Forest home about 30 miles south of Chicago with the drapes drawn near midnight on March 26, 2003.

"I saw the flash, and although it lasted longer than a lightning flash, that's what I thought it was," he told *SPACE.com* last week. "I knew it had rained that night, and thought maybe it was multiple flashes, perhaps diffused by the clouds."

Lawrence Grossman, a geophysicist who oversees Simon's research, got a different impression of the incoming object from his home in nearby Flossmoor.

"I heard a detonation," Grossman said the morning after the event. "It was sharp enough to wake me up."

The fireball in the sky was witnessed across a wide area, from Illinois, Indiana, Michigan and Missouri. Simon and Grossman teamed up with other researchers to gather rocks and eyewitness accounts and then calculate the space rock's original size, composition and origin, and to trace its fragmented path from space to Earth. Their findings are detailed in the April issue of the journal *Meteoritics and Planetary Science*.

Daily barrage

Several tons of space stuff rain down on the planet every day. Much of it is dust. Objects no larger than sand grains generate typical "shooting stars" when they vaporize.

Playing marble-sized objects can create dramatic fireballs that prompt phone calls to local law enforcement. Asteroids bigger than about 100 feet (30 meters) can mostly survive the plunge, possibly hitting the surface or exploding devastatingly close to the ground. The latter events are very rare.

Scientists call all these things meteors once they enter the atmosphere. When in space, the same objects might be referred to as asteroids if they are large, or meteoroids if they are small. If they hit the ground, they're called meteorites.

Whether the things vaporize, break apart or reach the surface intact depends in part on whether they are made mostly of fragile stone or of more durable iron.

The Chicago rock was stony and about 6 feet in diameter, the researchers conclude.

About 10 objects of this size enter the atmosphere every year, according Doug ReVelle of the Los Alamos National Laboratory, which uses satellites and other means to monitor the resulting explosions and separate them from possible [rogue-nation nuclear detonations](#). Most of these in-air explosions are not noticed by eyewitnesses because so much of the world, including the two-thirds that is water, is unpopulated.

Chicago fireball

Here's what happened over Chicago:

"It hit the atmosphere at about 40,000 mph," Simon said. "At this great speed, air pressure builds up in front of the object and is much greater than the pressure behind it. This will pull apart many meteors, especially if they already had some cracks. This object probably went through four fragmentation events as it passed through the atmosphere."

Tremendous heat created by the pressure lit much of the object in a fiery display.

Park Forest resident Noe Garza was asleep when a fragment burst through his ceiling, sliced some window blinds, then bounced across the room and broke a mirror. "I thought somebody was breaking in," Garza told a news agency the next day. "It was a big bang. I can't really describe it."

Another resident whose home was hit said the room lit up and it sounded like a plane had crashed.

Simon's team examined hundreds of fragments -- 65 pounds worth that were picked up and delivered to the scientists -- to estimate the original rock's size and weight.

The measurements are difficult to pin down, he explained, because a lot of fragments probably hit wooded areas and were not found. And some of the original meteor was probably broken into particles too small to notice. The scientists also analyzed the fragments for a certain radioactive form of cobalt, which can reveal the rock's minimum size. "If the object is too small [while in space for eons] the cosmic rays will just pass through and not make 60 cobalt," Simon said.

He said the original rock weighed at least 1,980 pounds as it entered the atmosphere. Long ago, the analysis shows, it was probably heated for a long period of time inside a larger parent asteroid. That asteroid then broke apart, again a long time ago, perhaps in a collision with another asteroid.

The researchers found in the fragments a mineral called shocked feldspar, which suggests the ancient collision between two asteroids.

There are no records of a meteorite ever killing anyone. But there have been [injuries](#). A dog was killed by a space rock in Egypt in 1911.

The Park Forest meteorite event is not totally unlike others that have been reported in recent years. A similar meteorite shower [rattled a village](#) in India last September, apparently injuring three people. Other reports of [fireballs](#) in the sky are fairly common, and the occasional small rock [slices through a home](#).

But Simon and his colleagues write in their report of an important distinction with the Chicago event: "This is the most densely populated region to be hit by a meteorite shower in modern times."

This article is part of SPACE.com's weekly Mystery Monday series.