# Meteorite find may be 'missing half' of interstellar collision

July 1 2014, by Bob Yirka


The Thorsberg quarry and the Mysterious Object. (A) Thorsberg quarry on June 15, 2013. The Österplana church is seen in the back. (B) The Mysterious Object from the Glaskarten 3 bed. The meteorite is 8 × 6.5 × 2 cm in size. It was found in the youngest quarried bed of the Thorsberg quarry, at the top of the section. Credit: *Earth and Planetary Science Letters*, Volume 400, 15 August 2014, Pages 145–152.

(Phys.org) —A team of researchers with members from the U.S., Sweden and Switzerland studying a meteorite found in a Swedish quarry is reporting that the rock is unlike anything else ever found. In their paper published in *Earth and Planetary Science Letters*, they suggest the meteorite might just be evidence of a collision between two asteroids millions of years ago.

For several years scientists have debated the reason behind a lull, then sudden resurgence of biodiversity on planet Earth a little over 500 million years ago—some suggest the resurgence was due to a sudden major increase in the number of meteorite impacts. The increase, theorists suggest, came about due to an impact between two asteroids, likely somewhere between Jupiter and Mars. Debris from the remains of one of those objects is believed to be the source of L chondrites, which have been found in many places around the globe. But, until now, no evidence of the other asteroid has been found on Earth, putting a damper on the theory—some have suggested the second asteroid simply vaporized on impact. The meteorite found in Sweden has reignited interest, however, because it's possible it is a piece of that second asteroid (because it appears to have been part of the same meteor shower as the L chondrites), which if true, will add a lot of credence to the entire theory that seeks to explain the sudden resurgence of life during the early part of the Ordovician period.

The meteorite was found by quarry workers three years ago—other meteorites have been found in the same quarry before, but all of them were L chondrites. It was different from the other's, the researchers noted, after studying its crystals, but was in the same rock layer and dating in the lab, suggesting it arrived during the same time period as part of a wider meteor shower. While still in the same class of primitive achondrites as L chondrites, it's not exactly the same because of small differences in its elemental composition. The team is hopeful that the finding suggests that others will be found, hopefully some that can offer more evidence of their origin.

The unique meteorite has not been given an official name yet—for now it's simply being referred to as the "mysterious object."

**More information:** A fossil winonaite-like meteorite in Ordovician limestone: A piece of the impactor that broke up the L-chondrite parent

body? *Earth and Planetary Science Letters*, Volume 400, 15 August 2014, Pages 145–152. www.sciencedirect.com/science/ … ii/S0012821X14003367

**Abstract**

About a quarter of all meteorites falling on Earth today originate from the breakup of the L-chondrite parent body ~470 Ma ago, the largest documented breakup in the asteroid belt in the past ~3 Ga. A window into the flux of meteorites to Earth shortly after this event comes from the recovery of about 100 fossil L chondrites (1–21 cm in diameter) in a quarry of mid-Ordovician limestone in southern Sweden. Here we report on the first non-L-chondritic meteorite from the quarry, an 8 cm large winonaite-related meteorite of a type not known among present-day meteorite falls and finds. The noble gas data for relict spinels recovered from the meteorite show that it may be a remnant of the body that hit and broke up the L-chondrite parent body, creating one of the major asteroid families in the asteroid belt. After two decades of systematic recovery of fossil meteorites and relict extraterrestrial spinel grains from marine limestone, it appears that the meteorite flux to Earth in the mid-Ordovician was very different from that of today.