

SHATTER CONES IN METEORITES.

J.F. McHone¹, C. Shoemaker², M. Killgore³, and K. Killgore³.
¹Arizona State Univ., Planetary Geol., Tempe AZ 85287-1404, jmchone@hotmail.com, ²USGS Astrogeology Science Center, Flagstaff AZ 86001, ³Univ. Arizona, Southwest Meteorite Ctr., Univ. of Arizona, 1415 N 6th Ave. Tucson AZ 85705

Introduction: Shatter-coned terrestrial rocks occur at more than 70, of about 180, documented impact structures on Earth [1] and reliably identified shatter cones are now considered diagnostic markers for meteoritic impact. Shatter cones recently have been identified in two separate NWA meteorites; the first reported shatter cones found in extraterrestrial material [2].



Fig.1 A 1.74 kg ordinary chondrite, one of two separate NWA meteorites with shatter cones [2].

The Meteorites: Both meteorites were recovered from a 40 kg bulk lot, now designated NWA-869, and shipped from Erfoud, Morocco in the year 2000. Over two tons of “NWA-896” are now distributed worldwide and it seems certain this material represents multiple fall events. Both meteorites in this report are ordinary chondrites. The first is a 1.74 kg subangular magnetic mass (H4-5, W1-2) with fusion crust and regmaglypts on one side and desert patina overall. The far side displays distinct horse-tail shatter cone packets on the surface (**Fig 1.**) and into the interior. The second meteorite is a 0.851 kg subtabular, slightly magnetic mass. A polished “window” cut shows shock veins, dispersed metal flecks, and vesicles indicating lost metal (L5, S5-6, W3-4). The convex side is ogival with radiating shatter cone ridges which penetrate the interior.

Conclusions: Until now shatter cones have been found only in terrestrial impact target rocks. Their presence indicate these meteorites were fragmented from larger parent bodies during violent impact collisions prior to arriving on Earth.

References: [1] Ferriere L. and Osinski G.R., 2010. Shatter cones and associated shock-induced microdeformations in minerals – new investigations and implications for their formation (76 shatter cone sites +38 questionable, presented in poster display), Abst. # 1392, *41st Lunar & Planetary Sci. Conf.* [2] McHone J.F. et al., 2012. Two shatter-coned NWA meteorites. Abstract # 2359, *43rd Lunar & Planetary Sci. Conf.* [3] Connolly H.C. et al. 2006, Meteorite Bulletin 90, Meteoritics & Planet. Sci. **41**, **9**, 1383-1418.