

## Canyon Diablo Meteorites



**"Except for life itself, meteorites are the most interesting thing on earth"**

Canyon Diablo meteorites are the world's most famous and most attractive meteorites. They are the remains of a giant cosmic bolide, presumably an Apollo asteroid, which struck northern Arizona 50,000 years ago creating a mile-wide and 600-foot-deep explosion impact crater now known as Meteor Crater or, in scientific circles, Barringer Crater. The kinetic energy of the intense shock of impact volatilized or otherwise destroyed nearly all of the meteorite. This "cosmic cannonball", 30 meters across and weighing about 20,000 tons, was traveling with a velocity of 20 km/sec and packed a 15 megaton wallop. Less than 30 tons survived volatilization to be collected and displayed in the world's great museums. Meteor craters can be described, at least poetically, as the result of an irresistible force meeting an immovable object. Less than a dozen are known on earth with associated meteorites. More than 100 ancient impact scars or structures have been described. Geologists term them "astroblemes". Meteor Crater, Arizona, was the first crater on earth to be identified and is the example par excellence.

Canyon Diablo meteorites were first brought to scientific attention by A. E. Foote in 1891, who did not associate them with the nearby crater which he supposed to be volcanic. He also discovered minute diamonds in some of them which we now know were converted from the minerals graphite and cohenite by the shock. It remained for D. Moreau Barringer in 1908 to demonstrate that a cosmic bolide created Meteor Crater. His twenty year attempt to mine the supposedly buried body is a heroic but frustrating epic in the annals of mining.

These nickel-iron meteorites are classified as medium octahedrites based upon their type of crystallinity. In composition they are 92% iron, 7% nickel and 1% "other" - consisting especially of cobalt and interesting amounts of the platinum-group metals. Nickel-irons are rare among observed falls but are common among finds apparently because they are distinctive and resist weathering.

The Canyon Diablo meteorites have had many remarkable scientific uses; for example, in helping to establish cosmic abundances of the elements and as a standard for sulphur isotope ratios. In the mid-1950's, a Canyon Diablo meteorite also was used to first establish the age of the solar system as 4.5 billion years and by inference the age of the Earth, a dating which has been sustained.

Owning one of the rare Canyon Diablo meteorites, a messenger from outer space perturbed from the asteroidal belt, is a privilege demanding responsible curatorship.

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