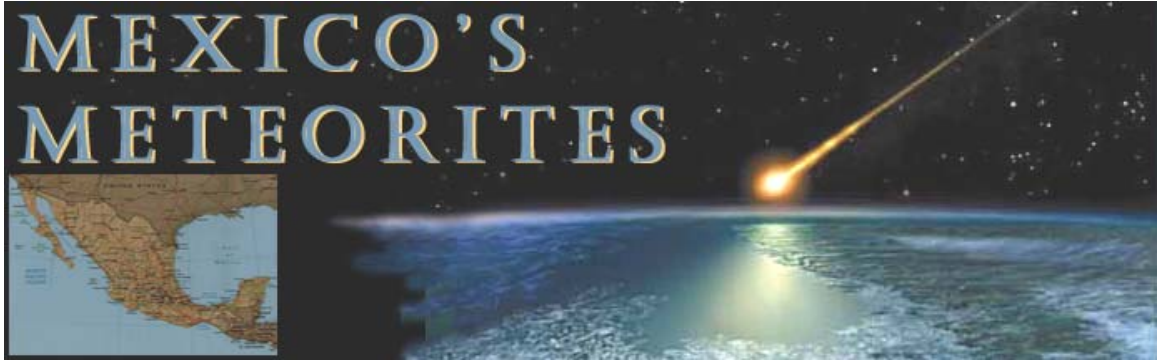
MEXICO'S METEORITES



A meteorite is a solid body from outer space that has fallen to the Earth's surface. A *"fall"* is a meteorite that was observed to fall and then collected. A *"find"* is a meteorite that was not observed to fall but that was recognized by diagnostic features. Most of the *"shooting stars"* that are observed in the night sky are actually pieces of dust rather than large objects.

Most meteorites are believed to originate from the asteroid belt between Mars and Jupiter. They are the remains of a planet that never formed and are considered to represent the building blocks of the terrestrial planets, including Earth. A handful of meteorites appear to come from the Moon and Mars. Meteorites escape their parent bodies through collisions with other objects in the solar system or they are pulled from their orbits by the Sun's large gravitational field.

DIFFERENT TYPES OF METEORITES

Stony meteorites: These meteorites, the most common type, contain 75-90% silicate minerals (like olivine), 10-25% nickel-iron metal alloy, and iron sulfide. Stony meteorites are the most common type of meteorite to fall, making up about 94% of observed falls. Of the two subgroups, chondrites are the most abundant, making up approximately 86% of all observed meteorite falls.

Chondrites - Chondrites, the most abundant type of stony meteorite, are very primitive in terms of chemistry. They also contain many of the first objects to have formed in the solar system, such as calcium-aluminum-rich inclusions and chondrules (from whence they get their name). Most chondrites also contain tiny flecks of nickel-iron metal.

Achondrites - These meteorites underwent melting or other types of processing on their asteroid or planetary parent body (lunar and martian meteorites included). Because achondrites closely resemble Earth rocks to the untrained eye, they are rarely found. For this reason, most of the achondrites in our collections were seen to fall and then collected.

Stony-iron meteorites: These meteorites contain ~ 50% silicates and 50% nickel-iron metal.

Pallasites formed where an asteroid's silicate mantle and metal core mixed.

Mesosiderites, the other type of stony-iron, likely formed from the collision of a metal-rich asteroid with a silicate-rich asteroid.

Iron meteorites: Composed of almost entirely nickel-iron metal, these meteorites come from the cores of large differentiated asteroids. Therefore, they are considered analogous to the Earth's core. Iron meteorites make up only about 5% of observed falls. However, they are overrepresented in our collections, in part because they are more easily recognized than the other types of meteorites.

The minerals which make up the bulk of meteorite composition include seven common Earth minerals and three found only in meteorites:

Earth Minerals

Olivine - magnesium iron silicate
Pyroxene (hypersthene, bronzite) - iron magnesium silicate
Plagioclase feldspar - calcium sodium aluminium silicate
Magnetite - iron oxide
Hematite - iron oxide
Troilite - iron sulphide
Serpentine - magnesium iron silicate with water

Minerals found only in Meteorites

Taenite - nickel-iron (high nickel)
Kamacite - nickel-iron (low nickel)
Schreibersite - iron nickel phosphide

Found in 1863, meteor BACUBIRITO in Culiacan, Sinaloa (the 2nd largest meteor to hit the Americas)

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Mexico's Major Meteorite Falls & Finds

ACAPULCO
Location: Acapulco, Mexico
Fall: August 11, 1976
Total known weight: 1.9 kg
Group: Stony Meteorite (Achondrite)
Class:Acapulcoite

AHUMADA
Location: Chihuahua, Mexico
Fall: 1909
Total known weight: 50 kg
Group: Stony-Iron Meteorite
Class: Pallasite

ALDAMA
Location: Chihuahua, Mexico
Fall: 1985
Total known weight: 11 kg
Group: Iron Meteorite
Class: IIIAB, Om

ALLENDE
Location: Pueblito de Allende, Chihuahua State, Mexico
Fall: February 8, 1969
Total known weight: over 2000 kg
Group: Iron Meteorite/Carbonaceous Chondrite
Class: CV3

ARISPE
Location: Sonora, Mexico
Fall: 1869
Total known weight: 408 lb
Group: Iron Meteorite
Class: IC, Og

BACUBIRITO
Location: Sinalao, Mexico
Fall: 1863
Total known weight: 22,000 kg
Group: Iron Meteorite
Class: IR-ANOM, Off

BUENA VENTURA
Location: Chihuahua, Mexico
Fall: 1969
Total known weight: 113.6 kg
Group: Iron Meteorite
Class: IIIB

CARBO
Location: Sonora, Mexico
Fall: 1923
Total known weight: 1000 lb
Group: Iron Meteorite
Class: IID, Om

CARICHIC
Location: Chihuahua, Mexico
Fall: 1983
Total known weight: 17 kg
Group: Stony Meteorite (Chondrite)
Class: H5

CASAS GRANDES
Location: Chihuahua, Mexico
Fall: 1867
Total known weight: 3407 lb
Group: Iron Meteorite
Class: IIIA

CENICEROS
Location: Chihuahua, Mexico
Fall: 1988, August 20
Total known weight: 1025g
Group: Stony Meteorite (Chondrite)
Class: H3.6

CHARCAS
Location: San Luis Potosi, Mexico
Fall: 1804
Total known weight: over 780 kg
Group: Iron Meteorite
Class: IIIA

CHICXULUB
Location: Yucatán peninsula (off the coast)
Fall: 65 million years ago
Total known weight: ???
Group: ???
Class: ???

CHIHUAHUACITY
Location: Chihuahua, Mexico
Fall: 1929
Total known weight: 54 kg
Group: Iron Meteorite
Class: IC-ANOM

CHUPADEROS
Location: Jimenez, Chihuahua, Mexico
Fall: 1852
Total known weight: 14114 kg and 6767 kg
Group: Iron Meteorite
Class: IIIB, Om

COAHUILA
Location: Mexico
Fall: 1837
Total known weight: 4000 lb
Group: Iron Meteorite
Class: IIA, Hex

EL CARMEN
Location: Chihuahua, Mexico
Fall:1987
Total known weight: 629g
Group: Stony Meteorite (Chondrite)
Class: H6

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GUADALUPE Y CALVO
Location: Chihuahua, Mexico
Fall: 1971, recognized 1990
Total known weight: 58.6 kg
Group: Iron Meteorite
Class: IIAB, Hex

HUIZOPA
Location: Chihuahua, Mexico
Fall: 1907
Total known weight: 108.5 kg
Group: Iron Meteorite
Class: IVA, Of

MOCTEZUMA
Location: Sonora, Mexico
Fall: 1899
Total known weight: 1.7 kg
Group: Iron Meteorite
Class: IA, Om

NUEVO MERCURIO
Location: Zacatecas, Mexico
Fall: December 15, 1978
Total known weight: ???
Group: ???
Class: H5

SALAICES (B)
Location: Chihuahua, Mexico
Fall: 1981
Total known weight: 20.6 kg
Group: Stony Meteorite (Chondrite)
Class: H4

SANTA APOLONIA
Location: Nativitas, Tlaxcala, Mexico
Fall: 1872
Total known weight: 1050 kg
Group: Iron Meteorite
Class: IIIA, Om

SANTA CLARA
Location: Durango, Mexico
Fall: 1976
Total known weight: 63 kg
Group: Iron Meteorite
Class: IVB, Ataxite

SANTA ROSALIA
Location: Baja California, Mexico
Fall: before 1950
Total known weight: 1.631 kg
Group: Stony-Iron Meteorite
Class: Pallasite

TLACOTEPEC
Location: Puebla, Mexico
Fall: 1904
Total known weight: 71 kg
Group: Iron Meteorite
Class: IVB, Ataxite

TOLUCA
Location: Xiquipilco, Mexico
Fall: known before 1776
Total known weight: over 1200 kg
Group: Iron Meteorite
Class: IA, Og

TOMATLAN
Location: Jalisco, Mexico
Fall: 1879, September 17
Total known weight: 1 kg
Group: Stony Meteorite (Chondrite)
Class: H6

TRES CASTILLOS
Location: Chihuahua, Mexico
Fall: 1992, March
Total known weight: 150 kg
Group: Iron Meteorite
Class: IIIAB

TUXTUAC
Location: Zacatecas, Mexico
Fall: 1975, October 16
Total known weight: 4.25 kg
Group: Stony Meteorite (Chondrite)
Class: LL5

VALLE DE ALLENDE
Location: Chihuahua, Mexico
Fall: 1983
Total known weight:
Group: Stony Meteorite (Chondrite)
Class: ???

ZACATECAS (1792)
Location: Zacatecas, Mexico
Fall: 1792, known before
Total known weight: about 1000 kg
Group: Iron Meteorite
Class: IR-ANOM

The ALLENDE meteorite from Pueblito de Allende in the state of Chihuahua, Mexico. Fall was recorded: February 8, 1969.

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