NATURALIST'S CORNER

ROCKS FROM SPACE

The Springfield Science Museum's Astronomy Hall is home to a magnificent 290-pound black iron and nickel meteorite that was found near the Barringer Crater in northern Arizona. To most visitors, this rock — a melted meteorite — is the stereotypical rock from space.

The great majority of space rocks come from the Asteroid Belt, some 200 million miles away from Earth, between Mars and Jupiter. The parent bodies of space rocks are some 600,000 asteroids that, together, are no larger than 1/3 the size of our Moon. The rocks are relatively stable, but huge Jupiter occasionally sends some our way.

There are two main types of meteorites: melted or unchanged. Melted meteorites formed in asteroids that were differentiated by radioactive melting, volcanism, and collisions. Among the melted meteorites, iron and nickel ones (including the 290-pound one in Astronomy Hall) come from cores of asteroids; beautiful silicate and iron ones from the mantles of asteroids; and soil-like ones, called achondrites (Greek: *without seeds*), from the upper mantles and crusts.

The other kind of asteroids — meteorites relatively unchanged from the early solar system, some four and a half billion years ago — represent 85% of all space rocks. They are called chondrites, due to their seed-like inclusions, and they look a lot like many rocks here on Earth. These small particles are older than our planet and were formed in the early solar nebula. A few are even older than the Sun and were created in supernova explosions of older stars! One very rare type of chondrite contains carbon and looks like charcoal, but surprisingly, it has many of the amino acids, and even water –– features that are associated with life on our planet.

An impact four and a half billion years ago radically transformed our planet. An object half the size of Earth itself struck with a glancing blow, temporarily forming a ring around Earth. The ring gravitationally formed the Moon, which is moving away from us at a rate of roughly one and a quarter inches a year. The impact knocked Earth off an upright stance to its current axis of 23.5 degrees, giving us our four seasons. The impactor's iron core merged with our own, allowing Earth to have a very large magnetic field that makes an atmosphere, liquid water, and even the aurora possible. Much more recently, just sixty-six million years ago, the dinosaurs and three-quarters of all species went extinct due to the catastrophic impact of a giant space rock, clearing the way for the rise of mammals.

Our fate is truly connected to rocks from space.

~Jack Megas