Transcript

NATALIE STARKEY:

Rocks fall from space all the time. Most of them are tiny, smaller than the width of a human hair. So impossible to see with the naked eye. And they fall harmlessly to earth, sometimes making shooting stars as they come through the atmosphere. But less frequently larger pieces of space rock can find themselves on an earth-crossing orbit. If they enter earth's atmosphere, they can produce a spectacular fireball and importantly deposit pieces of rocks known as meteorites on the surface of our planet.
Meteorites are rocks from other worlds. That could be planets such as Mars, the moon, comets or asteroids. It is the job of scientists to find out where these rocks came from and what they can tell us about the origins and history of the solar system. Scientists commonly search for meteorites in parts of the world with low vegetation. That could be hot deserts such as the Sahara or frozen deserts like Antarctica, where meteorites which are often very dark in color are relatively easy to spot against a background of sand or ice. It is much less common to find meteorites in the United Kingdom, for example, but it's not impossible.
On February the 28th, 2021 a bright fireball lit up the sky over the UK. A specially designed network of cameras also detected this event, photographing it from different locations. Allowing scientists to calculate the trajectory of the incoming space rock. They use these calculations to predict where in England members of the public might be able to search for pieces of the fallen rock. Sure enough their predictions proved accurate and less than 12 hours later a member of the public found the first piece of this special spacerock. The first UK meteorite in 30 years.
I'm here at the Open University which has a long history in analyzing meteorite samples. As scientists commonly work with pieces of rock from the moon, Mars, comets and asteroids. Doctor Richard Greenwood from the Open University was the first scientist to identify fragments of the meteorite in the small Cotswold town of Winchcombe which is informally given the meteorite its name.

RICHARD GREENWOOD:

So when I heard about the reports from Winchcombe, I was really excited and I drove over and I went up the driveway of the person who discovered this rock on his driveway. And he went and got a plastic bag full of pieces of the sample and handed it to me. So I looked inside and I couldn't believe what was inside because it was like seeing an old friend again. 30 years earlier I've worked at the Natural History Museum on a very similar meteorite which fell in South Africa in the 19th century. But what I really couldn't believe was that here in front of me was this very same rare meteorite type, never before discovered in the United Kingdom, and so I was very, very excited.

NATALIE STARKEY:

Other organizations were soon involved in the recovery of further pieces of the Winchcombe meteorite. Because as the fireball came through the atmosphere, it broke up and deposited pieces of rock over a large region.

RICHARD GREENWOOD:

At the Open University we were particularly pleased that we were able to very rapidly analyze a sample of Winchcombe using oxygen isotope analysis, which is able to confirm that it is a very rare meteorite type which we call carbonaceous chondrite.

NATALIE STARKEY:

Professor Monica Grady has spent her career analyzing meteorite samples and she's equally excited about the recovery of the Winchcombe meteorite.

MONICA GRADY:

Winchcombe came from the outermost fringes of the asteroid belt. Now the asteroid's orbit the sun in a large array somewhere between Mars and Jupiter. The asteroids that are in the outermost fringes of the asteroid belt contain more volatile species, like water and organic compounds because they're further away from the sun. And so they haven't been heated by the sun in the same way as others have been. One of the interesting things is to understand how Winchcombe managed to get all the way from the outer edges of the asteroid belt down to earth.
Most times the asteroids are really stable in their orbit, but occasionally one crashes into another which crushes into another and then it fires something out of the asteroid belt and they fall inwards towards the biggest object, which is the sun. So they get pulled in towards the sun. They might orbit two or three times the sun before being captured by the sun maybe by Mercury, sometimes by the earth.

NATALIE STARKEY:

The type of asteroid that we think produced the Winchcombe meteorite has the potential to tell scientists about the origins of the planets and life on earth. As such two space missions have recently been to visit similar asteroids in space, sampling them to bring rocks back to earth. These are Hayabusa2 and OSIRIS-REx.

MONICA GRADY:

So there's two main reasons why we still need to have space missions to asteroids, even though we can get them for free when they come to earth. First of all-- yeah, we got Winchcombe for free, but we didn't predict it was going to happen. We can't predict when meteorites are going to fall. We can't predict what sorts of meteorites are going to fall or where it's going to fall. And even once it has fallen whether we're going to be able to find it and pick it up again.
The other reason for going to an asteroid and bringing bits back from them is we know which asteroid it's come from. We know whereabouts on the asteroid. So that gives us context for understanding the whole of the asteroid. Meteorites like Winchcombe date back from the very birth of the solar system. They're made from the same stuff that the earth was made from. They also contain within them organic compounds and water-- the building blocks of life. And even rarer, inside them are tiny, tiny grains that come from stars that died before our star was born. So when you look at a rock like Winchcombe, it's a history lesson and the bits of Winchcombe can tell you about those different periods of history. It's a great story and scientists just love unravelling it.