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**A piece of the Moon in Oberhausen**

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*By Manuela Braun*

It takes some imagination - the new exhibit on display at the 'Out of this World - Wonders of the Solar System' exhibition at the Gasometer Oberhausen, does not look very spectacular at first glance. Lent to the German Aerospace Center (Deutsches Zentrum für Luft- und Raumfahrt; DLR) by NASA, it is grey in colour, small - weighing just 92.5 grams - and encased in a Plexiglas casing. But this small piece of rock is no lightweight in its significance and value. It originates from another celestial body and is therefore priceless.

"There is no open market for rock samples from the Apollo missions. It would therefore be impossible to establish any financial value," states Gary Lofgren, Administrator of the NASA Lunar Sample Laboratory in Houston, Texas. This is the storage location for all the samples collected during the Apollo missions. None of these lunar surface samples is available for sale. Collectors are only permitted to sell meteorite fragments found on Earth. "Meteorites from the Moon are traded at around 2000 USD per gram." But at the end of the day, that does not become a benchmark market price for lunar samples. The NASA storage facility in Houston is home to 382 kilograms of rocks, dust and drill cores from the Moon.

**By 'moon buggy' all the way to Hadley Rille**

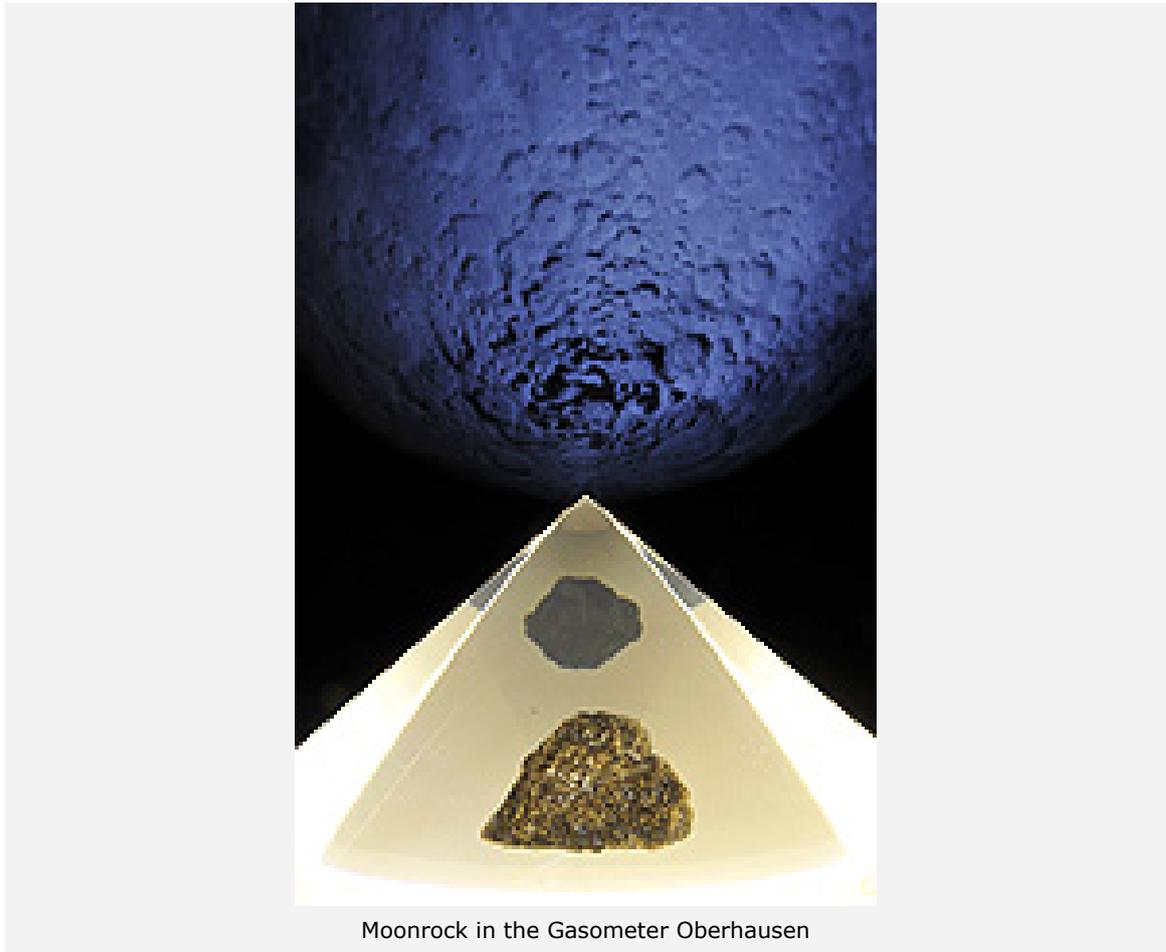


Volcanic rocks from the Moon

The exhibit in Oberhausen is a tiny fragment of a very special piece of Moon memorabilia. In August 1971, astronaut Dave Scott, Commander of Apollo 15, drove the Lunar Rover or 'moon buggy' from the landing site right out to Hadley Rille, a channel that originally formed from molten rock. At that time, no astronaut had ever ventured as far from a landing module. Scott then collected volcanic rock from the rim of the Mare Imbrium impact crater. This lump of rock weighed 9.5 kilograms and was duly logged into the Lunar Sample Laboratory and archived as number 15555. It also became known as 'Great Scott'. This name was a carefully chosen one: firstly, Great Scott is the largest piece of rock that returned to Earth on board Apollo 15. Secondly, it honours the work of Commander Dave Scott during his two-day stay on the Moon. To facilitate access for scientists and museums, NASA prepared various items from this large sample, one of which was this particular exhibit.

'Great Scott' is very similar to basaltic rock found here on Earth. However, things start to get really interesting when scientists get to grips with the age of this sample. Volcanic rock on Earth seldom comes close to being three billion years old. In contrast, 'Great Scott' and the small sample bearing number 15333.462 originated on the Moon 3.3 billion years ago. The oldest samples are more than four billion years old. "With lunar rock, we are effectively looking through a window at the very distant past of Earth, when our planet was still young", says Ulrich Köhler from the DLR Institute of Planetary Research (Institut für Planetenforschung; IPF). Back in the early days of Earth and the Moon, their surfaces were covered in oceans of molten magma over which a rocky crust eventually formed. Before this, the Moon was formed from the debris of Earth's collision with a body the size of Mars.

#### **Researching lunar rock**



Moonrock in the Gasometer Oberhausen

"Lunar rock was, and still is, irrefutable evidence proving that we were up there", says planetary scientist Ulrich Köhler. "The chemical composition and the ratio of element isotopes is so typical of the Moon – it is as impossible to fake as a fingerprint." During Apollo 11, Neil Armstrong put Moon dust in his pocket even before Buzz Aldrin stepped out of the landing module. "For the very first time, we were in the possession of extra-terrestrial material whose origins were known to us with absolute precision, thus contrasting sharply to meteorites found on Earth."

First, scientists tested the chemical composition and the age of these samples. Even today, lunar rocks are being researched and analysed by scientists around the globe. "We are still addressing the same questions that we had 40 years ago - it's just that now we have newer and better methods at our disposal. And that's why we keep coming up with more new results," says Köhler.

#### **Scientific treasure of enormous significance**

About 100 scientists carry out research each year on location in the Lunar Sample Laboratory while several hundred more obtain samples on which they can work in their own laboratories. Every single sample is stored in a container filled with nitrogen, which provides an oxygen-free environment. Workers on location in Houston handle these extra-terrestrial rocks and drill cores only with triple-thickness gloves and specially cleaned tools. "These samples are a scientific treasure of enormous significance", added Köhler.



Rock samples in the Lunar Sample Laboratory

Indeed, the lunar samples are guarded just like real treasure at their 'home' in Houston. "We have taken extensive security precautions," says Curator Gary Lofgren. No further details are forthcoming. The Lunar Sample Laboratory has even been specially prepared to withstand natural catastrophes. In case a tornado or a hurricane strikes the site, the lunar samples are stored at a height that is safe even in the event of flooding. How then, can museums protect these exhibits? "We stipulate the security criteria with which they must comply."

The lunar rock will be on show at the Gasometer Oberhausen in the 'Out of this World - Wonders of the Solar System' exhibition until 13 April 2010. This exhibition is also, incidentally, home to the 'largest Moon on Earth'.

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