Borrow the Moon: the STFC Lunar Samples and Meteorites Loan Scheme

■ Nick Swift

The Virgin Pendolino from Manchester to Euston makes a good office for last-minute preparations before a presentation to scientists. Last September, I was on my way to make an ASE bid for the contract to update the Moon rocks loan scheme run by the Science and Technology Facilities Council (STFC). The presentation was held in the cathedral-like vaults beneath the Natural History Museum (NHM). When speaking about the Moon, it helps to have an expert on hand, so sitting next to me was Dr. Katie Joy from Manchester University. Katie is an expert on lunar geology, having worked as a Principal Investigator for NASA in Houston where the Apollo Moon rocks are held. She has also made two expeditions to Antarctica with ANSMET to find meteorites (that is Katie in the cover picture (page 13) with a find at the blue ice fields of Gardner Ridge in December 2012). In fact, for a lunar scientist only thirteen years out of school, she has done a remarkable amount, short of actually going to the Moon.

I was beginning to suspect that Katie had been to the Museum before as she negotiated the Tube to South Kensington without a glance at the signs. *'Wait at the Giant Sloth'* is not the usual instruction from a receptionist, but Katie was unfazed as she had worked there in the past. She was on first-name terms with the sloth. We made our presentation and won the bid, thanks, I am certain, to the excellent team we had put together.

Our task was to update and digitise the support materials and refurbish the kit contents in six months. I was to manage the project. Katie and Professor Jamie Gilmour from Manchester University gave us the scientific perspective on planetary evolution and geology, while Stuart Naylor and Brenda Keogh of Millgate House showed us how to present the science in ways that are accessible to younger children. We also teamed up with Tom Lyons, teacher fellow at ESERO, who added the higher level content, and took advice from Professor Paul Roche from Cardiff and Dr. Caroline Smith, Curator of Meteorites at the Museum. Caroline provided vital academic contacts, added expertise on meteorites that are also part of the kit and directed the skilled meteorite restoration by NHM technicians. I made the tea.

Borrowing the Moon at Eccleshall Junior School, Sheffield

Why borrow the Moon?

The Apollo missions brought back 382kg of Moon rock. The financial cost of getting these rocks was historically eye-watering so, understandably, NASA is choosy about who gets to play with them. Many go to scientists for laboratory investigation, but some have been set aside for loan to schools and the public. Luckily, the UK was allowed some, which are kept in the care of STFC for loan to schools, museums and outreach programmes. In addition, the Natural History Museum has lent meteorites to supplement the UK loan scheme. Some of these can be handled and some of the more famous and rare examples, such as the Nakhla martian meteorite fragment, are mounted.

There is a fascination in holding Moon rocks and meteorites in your hand and finding out how they got to be here on Earth. They can be the focus of a series of lessons in schools or a special event for the public. Any school can borrow the kits in the loan scheme. We know from feedback how successful the loans are; the words 'memorable' and 'inspiring' are on almost every feedback form. Over a hundred loans are made each year.

How can I borrow the Moon?

There are security requirements that must be met, but STFC go out of their way to help. Jane Butt runs the scheme from STFC in Swindon and is an expert on smoothing the loan process. The kits arrive and are collected by courier and the loan is free. A security inspection is made before the loan and you will have to provide secure storage for the duration of the loan, which is one week, normally Monday to Friday. The NASA samples are irreplaceable, so these precautions are absolutely essential.

The scheme is popular, so the waiting period is normally several months and you will need to book well in advance. However, it is worth it! The support materials are sent out with confirmation

of your booking. These are also freely available online and on a DVD-ROM in the kit. Information is on the STFC website on the Borrow Moon rocks pages (www.stfc.ac.uk).

What's in the loan kit?

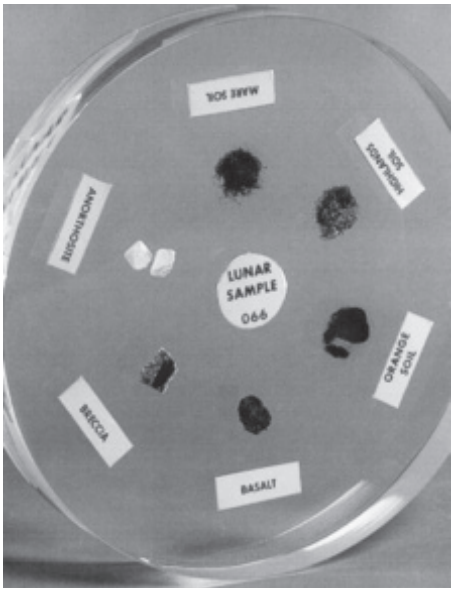
Each kit contains three large meteorite fragments that can be handled (Henbury, Imillac and Parnallee), three mounted meteorites (Nakhla, Murchison and Camel Donga) and the NASA disc of Moon samples (anorthosite, breccia, basalt, orange soil, highland soil and mare soil).

To help see the samples, especially with a large group, we have included a USB microscope and ten geological magnifiers in each kit. Other resources include the Philips Moon Map and Moon Observer's Guide (Octopus Books), the STFC Resource pack, and a copy of the beautifully produced NHM book, *Meteorites*, (available online from the NHM bookshop at www.nhmshop.co.uk).

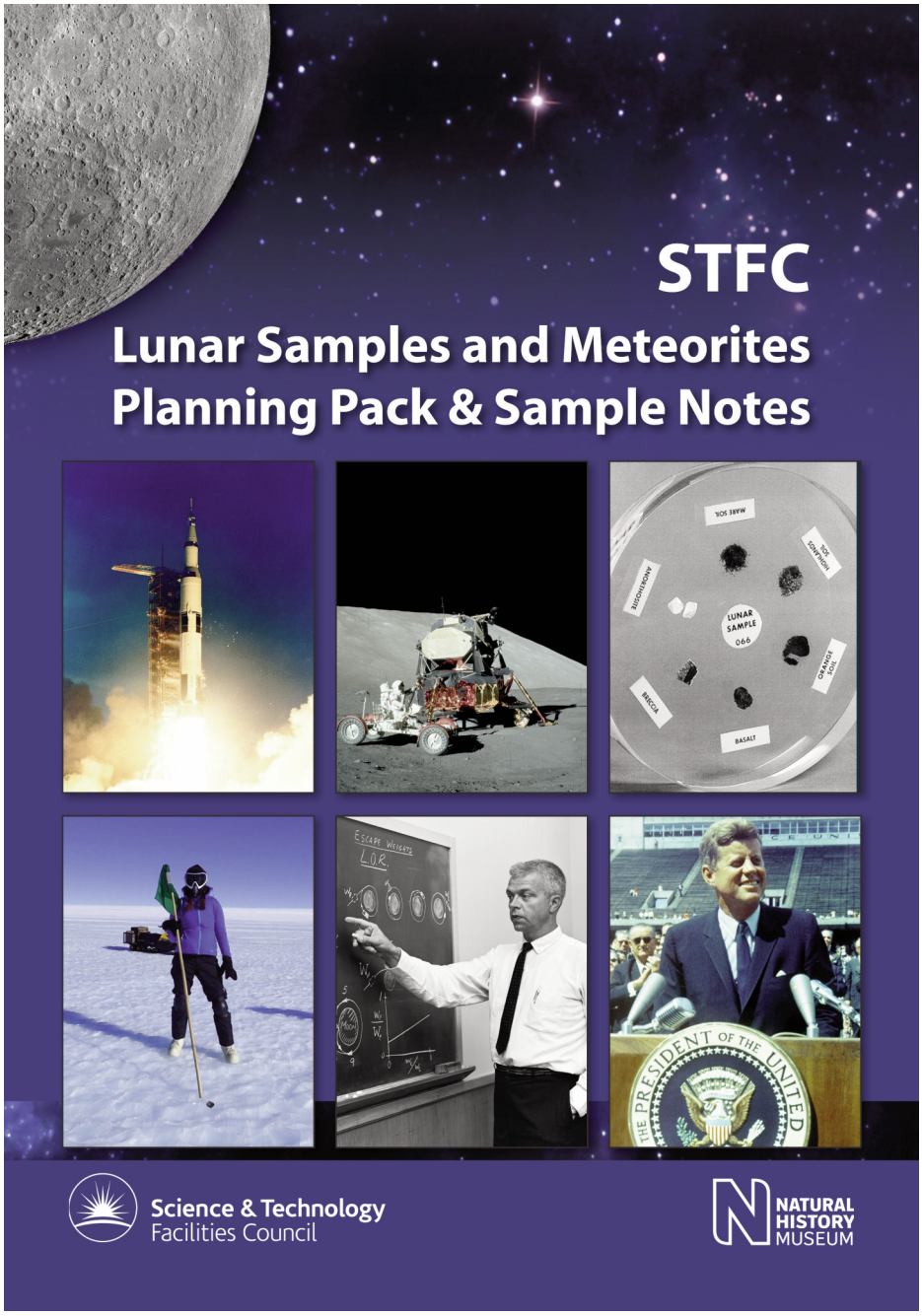
What can I do before the kits arrive?

The printed book and PDF guide will give you plenty of ideas. If you want to compare Moon rocks to Earth rocks, you should obtain some Earth rock samples, preferably some with layers and visible grains: sandstone, shale, limestone, chalk and peat. These are all very 'unmoonlike' and can inspire comparisons between Earth, Moon and even Mars. Basalt, on the other hand, shows just how 'moonlike' some of the Earth is.

The activities written by Millgate House and ESERO require advanced planning and printing of cards and activity sheets. All these pages are available, copyright-free, as PDF files.



NASA Moon rocks disc



Use the suggested links to discover the main websites, such as NASA GRIN and History, Lunar and Planetary Institute, NHM, Smithsonian, and many more. You can find these on the schoolscience website (www.schoolscience.co.uk). In recent years, the amount and quality of information online about the Moon and meteorites has grown enormously. We have included several digital pages of weblinks to important sites, which will help to save you time collecting background information and images. These sites can be used by groups researching what they see in the kits.

One site in particular can prepare groups for the loan and give them a chance to do some real science. Moon Zoo (moonzoo.org) is a citizen science site that lets you contribute to measuring and even discovering craters by scanning LROC images. Humans are better at this than computers. It also has excellent background information on the origin and geology of the Moon.

A task that the sloth and I were qualified to do was to write some pages on the Apollo missions. Fifty years on, the sheer scale and audacity of the project is awe-inspiring. If you stop to think about what it took to get those rocks here, you will understand the true meaning of President Kennedy's phrase, *'…we must be bold.'*

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