

A century on film

The National Archive of Geological Photographs

by Paul Tod, *Keyworth*

The British Geological Survey houses the National Archive of Geological Photographs (NAGP), comprising in excess of 100 000 fully-described images dedicated to the theme of earth sciences. Of these images, 22 000 are captured on glass plate negatives. The archive is part of the BGS's photographic services department which, since its inception over 100 years ago, has supported the scientific work of the Survey. The NAGP is one of the best collections of geological and associated imagery in the world and is certainly one of the oldest — but where did it all begin and why? In order to understand this, we need to examine the roots of the photographic revolution that swept the world in the nineteenth century.

Early experiments

Elements of the photographic process have been around for centuries. For example, lenses are first mentioned in one of Aristophanes' plays (dating from 434 BC), and the principle of the *camera obscura* has been known for a thousand years.

An example of the *camera obscura* is that bright sunlight, passing through a pinhole into a darkened room, will cast a reflection of the scene outside the room on to the wall opposite the hole. The portable *camera obscura* became popular during the seventeenth and eighteenth centuries, when it was used by architects and artists for tracing the outlines of buildings, landscapes and still life. During the seventeenth century, a simple convex lens was introduced in place of the pinhole and this created a bright clear image on the focusing screen.

In 1725 Johanne Heinrich Schulze, a German professor of anatomy, demon-

strated how light rays affected certain chemicals by exposing salts of silver to the sun. By 1802 scientists Thomas Wedgewood and Sir Humphrey Davy had combined this with the *camera obscura*, but were unable to fix the images to make them permanent.

A Frenchman, Nicéphore Niépce, discovered a process in 1826 for fixing and making permanent the captured image and subsequently made the world's first photograph. Although the exposure of this very rough image took almost eight hours, the fixing process was so successful that these images can still be viewed today. Niépce died in 1833 but his

partner, Louis Jacques Mande Daguerre, continued experiments and in 1839 he introduced the world's first commercial photographic process the 'Daguerrotype'. This was a much faster process, turning exposure times from hours into minutes.

Technique development

By 1841, an Englishman, William Henry Fox-Talbot, had refined this process and made two major advances in the photographic process. The first was the 'latent image' concept — that it was not necessary to wait for the image to develop inside the camera; instead, exposure times could be cut dramatically if the image was later amplified or developed using a chemical process.

He also found that, unlike the Daguerrotype which produced a pale-grey positive image, his light-sensitive photographic paper turned black when exposed to light and showed a negative image. Any number of positive images could then be obtained by exposing photographic paper to light filtered through the original — a process he called the 'Calotype'. And so the negative was born and with it the introduction of mass production.



The first officially registered BGS photograph, picture A1. Puddle Trench for Howden Reservoir, Derbyshire, 1904.



Photographic archives, BGS © NERC
Robert Lunn and field party c.1903.

Fox-Talbot also had a geological connection: he is known to have been acquainted with Sir Henry De la Beche, the first Director of what we now know as the British Geological Survey, and to have photographed him on several occasions.

The science of photography saw several more quasi-alchemistic processes over the following forty years until, in 1888, an American bank clerk, George Eastman, patented a small portable camera containing a roll of cellulose film long enough for 100 exposures.

When the film had been fully exposed, the whole camera was sent back to the factory for the film to be processed and printed. The camera was then reloaded with film and returned to the customer. Eastman called this product the 'Kodak' a name he chose because it could be pronounced the same in any language.

Geology and photography

This photographic revolution must have been comparable in many respects to the information technology revolution of today, and it is no wonder that the Director of the Geological Survey of Great Britain, Archibald Geikie, decided he would embrace the new technology and put it to work capturing images for the survey.

In 1891 under the direction of Survey geologist Jethro Justinian Harris Teall, Mr A Macconochie, Assistant Curator of the Survey collections, along with Mr Robert Lunn, General Assistant in the Edinburgh

office, were sent to the north-west Scottish Highlands to take a series of photographs in order to 'help explain points of geological structure'. This first official photographic survey lasted several weeks and they took with them a half-plate wooden field camera and tripod using glass plate negatives.

Lunn continued to photograph in the Scottish Highlands for several years and gradually Survey geologists became interested in the benefits the new technology offered in the recording, describing and archiving of their work. By 1904, chiefly due to the work of Lunn, the Survey had begun to assemble an official picture collection.

The official geological picture collection

The first officially catalogued image in the collection, picture A1, is an English picture entitled *Puddle Trench for Howden Reservoir, Derbyshire*. It was taken in 1904 by J J H Teall, by then the Director of the Survey, and is shot on glass quarter plate. Earlier English pictures are recorded, from 1903, taken by a gentleman called John Brooke Scrivenor, a geologist with the Survey between 1902 and 1905. All subsequent early photographs were registered within the A series, later replaced by the MN series. Early Scottish photographs were registered using a B prefix which was subsequently followed by C and D prefixes. However, photography had been used to record geological features long before Lunn and Macconochie set out for the Highlands. In fact records show that as early as 1840, geologist L L B Ibbotson (subsequently a Survey geologist) exhibited images of fossils photographed on Daguerrotype plates.

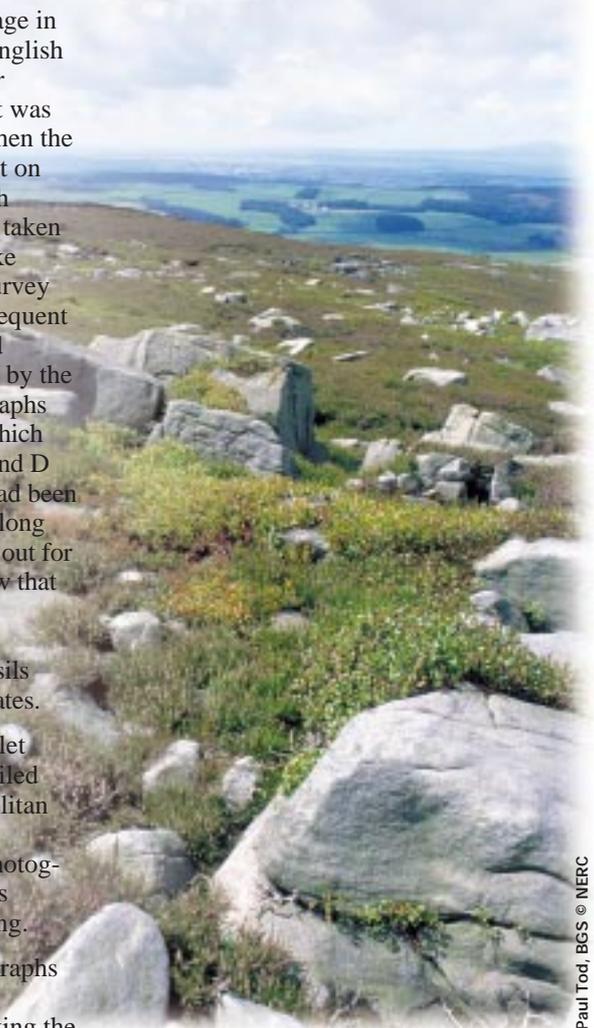
In 1857, seismologist Robert Mallet used photography to create a detailed record of the effects of the Neopolitan earthquake and the United States Geological Survey appointed a photographer to join a party of geologists surveying the territory of Wyoming.

In 1858, J Enys, exhibited photographs at the British Association for the Advancement of Science, illustrating the

structure of granite in quarries near Penrhyn. Another geologist, Joseph Prestwich, is recorded in the same year as having hired a photographer to produce a record of the location of flint implements found near Amiens.

W J Harrison, an amateur geologist and Curator at Leicester museum, published a memoir in 1877 entitled: *A Sketch of the Geology of Leicestershire and Rutland* which incorporated photographic plates of geological features. This was the first time photographic plates of geological subjects had been used in this way. Harrison's interests in photography extended beyond the areas of geology and he was also at the forefront of the movement to establish a photographic record and survey of each county.

Black Fell, Clougha, looking west-north-west towards the Lancaster/Morecambe conurbation, Morecambe Bay and the Lake District. This photograph was used to illustrate the front cover of the Lancaster memoir.



Mining and photographic records

One of the finest underground mining photographers was John Charles Burrows, who took a series of glass plates documenting the Cornish mines in 1891. Burrows was a friend of William Thomas, lecturer at the Cambourne Mining School, who encouraged him to publish several of his plates in a book: *Mongst Mines and Miners* (1893). They were printed in sepia and it was this publication which gained Burrows the first mining fellowship of the Royal Photographic Society.

Two photographers very prominent in the Survey's early English photographic collections were Thomas Clifford Fitzwilliam Hall and Donald Alexander MacAlister. Both of these men were mining geologists and Hall was charged with the responsibility for photography within the Survey's English division.

Hall and MacAlister worked closely together, chiefly in Cornwall and Devon, taking many of the early glass plate negatives of mining and associated practices. Sadly, which of them took each photograph is not recorded, although it is likely to be one or the other who appears, for the purpose of scale, in many of the images.

Systematic geological photographs

In 1910, a young man by the name of John (Jack) Rhodes joined the survey as a general assistant. Within a year of his appointment he was involved with the photographic work of the survey, pro-



Jack Rhodes, September 1939.

cessing and printing plates. He soon became involved in the taking of photographs, a job which he held until he retired in 1956. During this long career with the Survey, Rhodes added almost nine thousand images to the collection, spending much of his time photographing in south-west England. In the early days he would travel around carrying his equipment on a donkey or horse and cart, for which he received a daily hay allowance. He was later supplied with a motorcycle and sidecar, which must have made his life easier, and by 1945 he had the use of a motor car.

“... we are experiencing a ‘digital’ revolution, where, along with conventional photographic equipment, computers and image manipulation tools are an essential part of the photographers kit...”

The early Survey photographers used large format glass plate cameras in quarter-plate ($3\frac{1}{4} \times 4\frac{3}{4}$) and half-plate ($4\frac{3}{4} \times 6\frac{1}{2}$). The main benefit of using large formats was the quality gained in the resolution of the image, providing extremely sharp and finely-detailed results even by modern standards.

However, one of the main drawbacks, apart from the cumbersome size of the equipment, was the long exposure times needed, even in the brightest conditions. Generally, exposure times varied anywhere from an eighth of a second to tens of seconds, and exposure times of several minutes are recorded.

Many of the early photographs in the collections are recorded in meticulous detail which includes: location in latitude and longitude (in degrees, minutes and seconds), the date and time of day, direction of view, and weather conditions. Technical photographic details were also recorded, including film type, lens, lens aperture and length of exposure.

It was quite common in those days to contact print negatives and therefore photographers would generally make their negatives to the size of print they required. However, enlargers and the enlarging process had been around since the 1850s, enabling the photographer to make large display prints without the need to carry around exceptionally large



formats of camera such as whole-plate ($6\frac{1}{2} \times 8\frac{1}{2}$), a format usually suited to studio portrait work. Carrying such large equipment would have been virtually impossible for Survey photographers.

By the time Jack Rhodes retired, he had contributed some of the collection's finest images, capturing a wide range of geological subject matter throughout Britain.

He was also the last recorded Survey photographer to use a large format wooden field camera in his work. By the 1960s it had become common to use lighter monorail cameras, with cut sheet 5" x 4" film, medium format roll film cameras and 35mm format cameras. Also, the use of colour films, both print and transparency, had become popular and had begun to take over from black and white film, changing the face of the archives forever.

Photography and current BGS activities

Today, we are experiencing a new 'digital' revolution, where, along with conventional photographic equipment, computers and image manipulation tools are an essential part of the photographer's kit.

Of course the role of the BGS photographic department, based both in Keyworth and Edinburgh, is more diverse today than ever before, placing greater demands on the skills of the



Tim Cullen, BGS © NERC

A fine example of a slice of petrified wood from Madagascar.

photographer. The bulk of our work is for the core scientific groups within the BGS, and includes anything from original photography in the studio or on location, to slide production for presentations, high magnification photography, and digital image manipulation — all supported by our in-house laboratory services.

We also work directly for external sales and the publication services section, providing images for a wide range of BGS publications (including this one) and for sale to external customers.

The NAGP is an established commercial concern and we have been developing this area over the past few years to bring it into line with similar commercial photolibraries and to maximise the potential of the collections. Our recent customers include the BBC, Time Magazine, Yale University and Readers Digest.

We continue to add images to the collections and are always looking for new material and categories. Our most recent development has been to create an 'International' collection which includes over 3000 images relating to the recent volcanic activity on Montserrat.

A computer database of photographic descriptions enables images to be located easily through 'key word' searches. The database also allows images to be stored as digital objects, and several thousand photographs have been scanned and databased in this way. This process of digitisation will continue until the whole collection is captured, when it is envisaged that it will become available to view on the world wide web.

Copyright considerations

The BGS's photographs, like many other photographs produced elsewhere, are copyright protected materials. The photographic department works closely with the intellectual property rights (IPR) section, who are responsible for the granting of permits for the reproduction of the BGS's photographs and other materials. The IPR Manager has been closely involved in the development of the BGS's online provision of images and combined copyright permissions delivered through the internet.

E-commerce and photographs

Customers can now view a range of selected photographs, covering a variety of geological themes, and make



Paul Tod, BGS © NERC

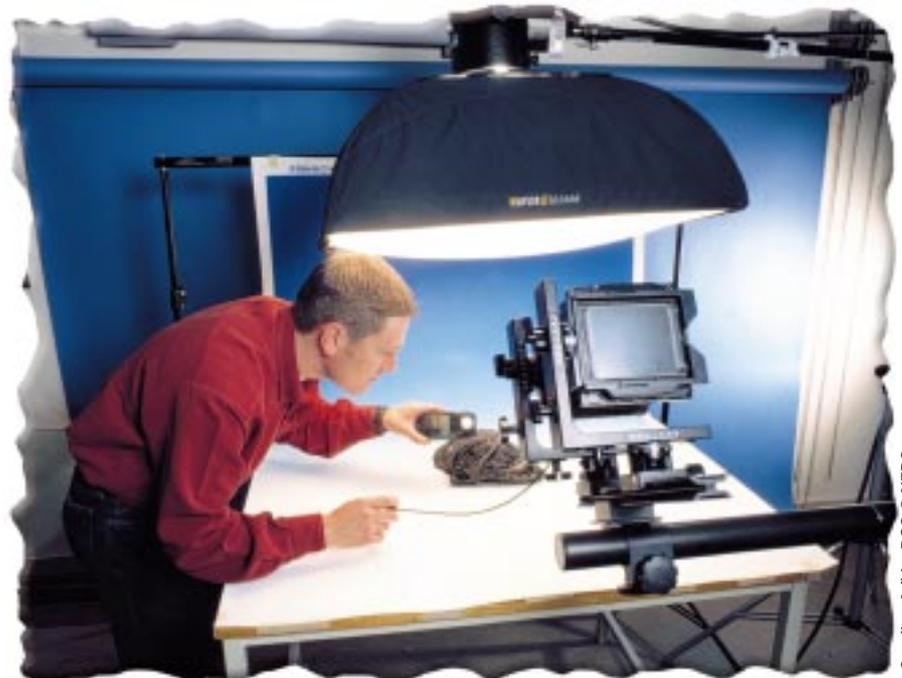
Modern technology is an essential tool in the photographic unit.

their purchase on-line via the new BGS e-commerce website.

The photographic section will soon also be accessible via links from a number of other key web sites, including the British Association of Picture Libraries and Agencies, and the British Institute of Professional Photography.

For further information on the NAGP, or any of the services offered by the photographic departments, please contact either Paul Tod (Keyworth) or Tom Bain (Edinburgh).

The e-commerce site is: www.british-geological-survey.co.uk



Caroline Adkin, BGS © NERC

Inside a modern studio, where traditional photographic skills go hand-in-hand with modern technology.