

# History of photography in the British Geological Survey

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[Jump to navigation](#) [Jump to search](#)



Puddle Trench for Howden Reservoir, Derbyshire, 1904. The first officially registered BGS photograph. Picture A1. Puddle Trench for Howden Reservoir, Derbyshire, 1904. J J H Teall. BGS Image P018978.

(An expanded version of the original article formerly on the previous BGS website under the title: A century on film)

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## Contents

- [1 Introduction](#)
- [2 Early experiments](#)
- [3 Technique development](#)
- [4 Geology and photography](#)
- [5 The official geological picture collection](#)
- [6 BGS Photograph series](#)
  - [6.1 Catalogues of photographs](#)
- [7 Mining and photographic records](#)
- [8 Systematic geological photographs](#)
  - [8.1 Travelling by donkey or horse and cart...](#)
  - [8.2 The devil is in the detail](#)
  - [8.3 From black and white to colour](#)
- [9 BGS, BAAS and GA photograph collections](#)

## Introduction

The British Geological Survey houses the National Archive of Geological Photographs (NAGP), comprising in excess of 100 000 fully-described earth science images. 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.

Some of the NAGP is available to view and download at GeoScenic.

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, the early experiments and technique development.

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

A Frenchman, Nicephore Niepce, 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. Niepce 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.

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-alembic processes over the following 40 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'; he chose the name because it could be pronounced the same in any language.

## Geology and photography



Robert Lunn and Survey field party c.1903, near Braemar. From left to right the group comprises John Flett?, Robert Lunn (with camera), E. H. Cunningham-Craig (in kilt) and John Horne. BGS image ID: P225747 - (Old photograph number Y00005.)

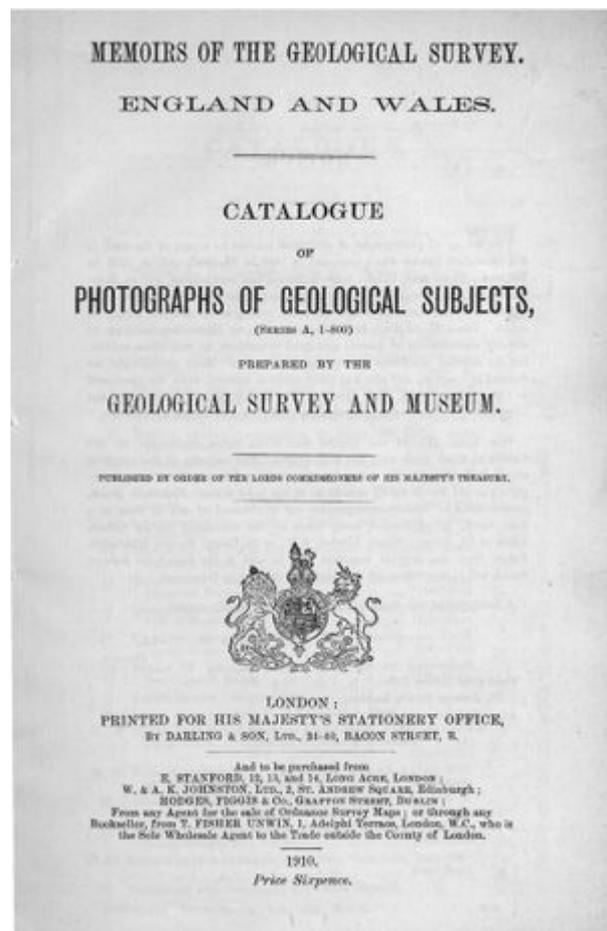
This photographic revolution must have been comparable in many respects to the information technology revolution of today, and it is no wonder that the Director of the Geological Survey of Great Britain, Archibald Geikie, decided he would embrace the new technology and put it to work capturing images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



Title page: Catalogue of the photographs of geological subjects, (Series A, 1-800)

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 for full plate glass negatives and C, half plate, these were followed by photographs with 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.

## **BGS Photograph series**

P Series — The current unified photograph series. With the creation of a photographs and image database, the earlier photographs were assigned a number in a unified P sequence. All current photographs and photographic digital images are in this series.

### **Original Land Survey collection of field photographs**

Series A — England and Wales. Black and white and later colour photographs.

Series B — Scotland. Full plate. Black and white photographs.

Series C — Half plate. Black and white photographs.

Series D — Black and white photographs and later colour.

Series L — Leeds Office field photographs.

### **Other series**

MN — England and Wales Miscellaneous. A wide range of photographs from some field photographs, photos relating to the museum and reproduction in BGS publications etc. They are neither databased or scanned. Manual registers exist in the Archives in Keyworth.

MNS — Miscellaneous Scotland. Similar to the MN, containing a variable mix of photographs including some field photographs that didn't make it to the official Land Survey collection. Databased but not scanned.

MNL —Miscellaneous Leeds. Similar to MS and MNS in content, a mix of types but taken by the Leeds Office photographers. Not databased or scanned. Registers available in the BGS Archive.

LFP — Leeds Field Photographs. Field photographs that did not make the official L collection. Databased and scanned.

## **Catalogues of photographs**

Within a short time, in 1910 the Survey produced printed catalogues of the photographs, one each for England and Wales and one for Scotland. These systematic catalogues were not followed up with later full catalogues but with selective catalogues under the title: "Classified geological photographs

selected from the collection of the Geological Survey and Museum". The first in 1928 and subsequent editions in 1952 and 1963.

1910. [Catalogue of the photographs of geological subjects, \(Series A, 1-800\) prepared by the Geological Survey and Museum](#)

1910. [Catalogue of the photographs of geological subjects, \(Series B, 1-676, Whole plate. Series C, 1-1237, Half plate\) prepared by the Geological Survey and Museum](#)

1928. [Classified geological photographs from the collection of the Geological Survey of Great Britain](#) [1st ed.]

1952. Classified geological photographs selected from the collection of the Geological Survey and Museum [2nd ed.]

1963. [Classified geological photographs selected from the collection of the Geological Survey and Museum](#) 3rd ed. The classification used in this publication has been used in [GeoScenic](#).

Albums of photographic prints were prepared for visitors to consult in the Survey libraries and offices. They were in Photographic number order. At about the time of the introduction of colour photography the albums in numerical order were stopped and a series of One-inch to the mile map area albums were created. Albums are held in the Library and Archive at Keyworth. The last major change was the database and scanning of the collection and delivery on the web as the National Archive of Geological Photographs later renamed [GeoScenic](#).

## **Mining and photographic records**

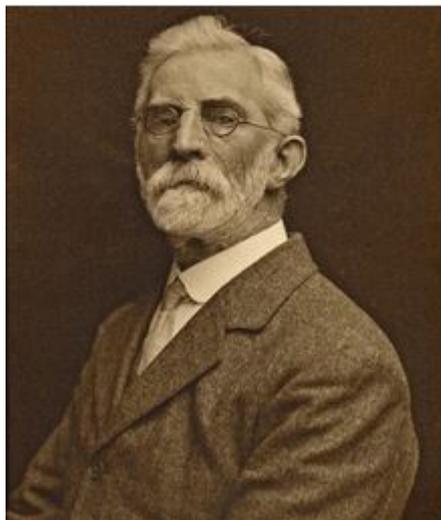
One of the finest underground mining photographers was John Charles Burrows, who took a series of glass plates documenting the Cornish mines in 1891.

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**



John (Jack) Rhodes

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, processing and printing plates. He soon became involved in the taking of photographs, a job which he held until he retired in 1956.

"... 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 ..."

Jack Rhodes

During this long career with the Survey, Rhodes added almost 9000 images to the collection, spending much of his time photographing in South West England.

### **Travelling by donkey or horse and cart...**

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.

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.

### **The devil is in the detail**

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 (6½" x 8½"), a format usually suited to studio portrait work. Carrying such large equipment would have been virtually impossible for Survey photographers.

## **From black and white to colour**

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.

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.

## **BGS, BAAS and GA photograph collections**

Within a short time frame in the 1890's the British Association for the Advancement of Science (BAAS), the Geologists' Association (GA) and the Geological Survey of Great Britain and Ireland (GSGBI) all started, for different reasons, major collections of geological photographs. All were firmly focussed on geological field photographs of Great Britain and Ireland, all the collections were longlived or are still active today. They have now been brought together by the British Geological Survey. The first two collections have been available for some time on the BGS image resource [GeoScenic](#) and work is ongoing in digitizing the GA Carreck Archive with some key photos on Geoscenic and access to many albums on Earthwise.

[BAAS Collection on GeoScenic](#)

[GA Collection on GeoScenic](#)

[GA collection on Earthwise](#)

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## **Navigation menu**

### **Personal tools**

- Not logged in
- [Talk](#)
- [Contributions](#)
- [Log in](#)
- [Request account](#)

## Namespaces

- [Page](#)
- [Discussion](#)

## Variants

## Views

- [Read](#)
- [Edit](#)
- [View history](#)
- [PDF Export](#)

## More

## Search

## Navigation

- [Main page](#)
- [Recent changes](#)
- [Random page](#)
- [Help about MediaWiki](#)

## Tools

- [What links here](#)
- [Related changes](#)
- [Special pages](#)
- [Permanent link](#)
- [Page information](#)
- [Cite this page](#)
- [Browse properties](#)

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- [Disclaimers](#)

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