

A GEOLOGICAL CONSERVATION PROJECT IN THE BATH AREA: THE BROWN'S FOLLY GEOLOGICAL TRAIL

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Abstract

A brief account of the geology of the reserve is given and the circumstances that resulted in the decision to undertake the development of the trail outlined. The criteria used to select the trail sites are discussed and the conservation work carried out described. The content and format of the Trail Guide is referred to and a brief description of selected sites given. The crucial role of maintenance following the cleaning of sites is stressed and some conclusions and observations are presented as to the success of the project and its usefulness to visitors to the reserve.

Introduction

The Brown's Folly Nature Reserve is an area of nearly 40 hectares (99 acres) on the hillside overlooking the valley of the River Avon about a kilometre south-east of the village of Bathford. Its location is shown in *Figure 1*.

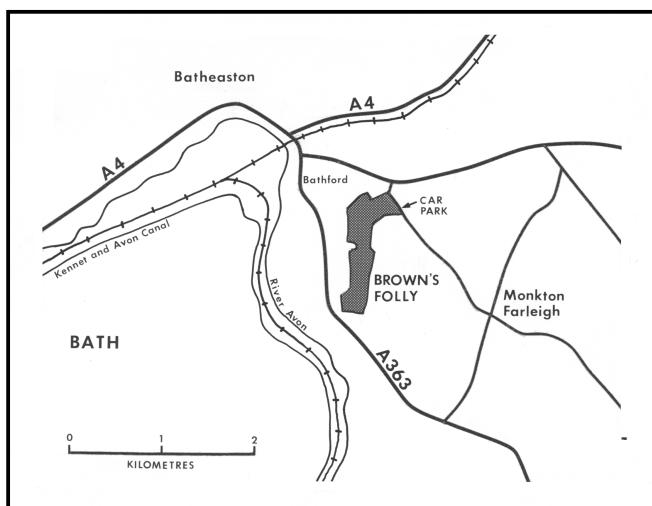


Figure 1: The location of Brown's Folly Nature Reserve, owned and managed by the Avon Wildlife Trust

It is owned by the Avon Wildlife Trust having been purchased with the aid of public subscriptions in 1972 and was nearly trebled in size by the purchase of additional land in 1984. It has been designated as a Site of Special Scientific Interest both for its biological and geological interest. The reserve takes its name from the prominent tower, built by a quarry owner Mr. Wade Browne in 1840, that stands on the hill top at the eastern edge of the reserve and is known locally as the "Pepper Pot".

Extraction of limestone from the hillside by open quarry and mine over a period from the eighteenth to early twentieth century has left many exposures of rock.

Geology of the Reserve

The SSSI citation (1986) for the Reserve describes the geology as follows:-

"A composite section through the Middle Jurassic Great Oolite and the lower part of the Forest Marble is exposed on the escarpment beneath Brown's Folly and to the north towards Bathford. The section is entirely of Upper Bathonian age, ranging from the Hodsoni Zone up into the lower Discus Zone. The section exposed consisting of a mixture of limestone and subordinate clays, illustrates the development of the Great Oolite and Upper Rags of the Bath area. It was for these rock units in the Bath area that William Smith originally coined the name "Great Oolite" and after which the "Bathonian" was named. The succession is of considerable sedimentological interest. Parts of the succession are fossiliferous; in particular a thin clay, resting on an oyster-encrusted hardground at the top of the Upper Rags, which has yielded elements of Bradfordian fauna including *Digonella*, *Apiocrinus* and rhynchonellids. The section is of major importance in the context of the British Bathonian stratigraphy."

Green and Donovan (1969) included Brown's Folly in their investigation of the Great Oolite of the Bath area, and this is the most complete account of the geology of the Reserve available. A summary of the section, (a composite one), through the hillside that they recorded is given below.

Jurassic rock formations of Brown's Folly - composite section through hillside, from Green & Donovan (1969)

Stratum	Thickness, m
Forest Marble	8.3m
<i>Great Oolite</i>	
Upper Rags	6.9m
Bath Oolite	6.9m
Twinhoe Beds	4.3m
Combe Down Oolite	5.6m

In the more recent work on the Bathonian strata of the Bath and Frome area, Penn and Wyatt (1979) have included the Upper Rags in the Forest Marble.

Background to the Project

As part of the effort made by the Schools Department of the City of Bristol Museum and Art Gallery to provide brief guides to selected geological sites in Avon for teaching purposes, a double sheet outline of the geology of Brown's Folly was produced by the Department in 1978.

The formation of the Geological Conservation Group of the Avon Wildlife Trust in 1980 gave considerable impetus to geological site identifications and conservation in Avon and the Group visited Brown's Folly in 1981 and 1984 to discuss site conservation.

As part of the requirements for the Certificate in Science (Geology) of Bristol University, the author elected in 1981 to log and describe one of the larger rock exposures at Brown's Folly as his practical project. During the course of this work he became familiar with much of the reserve, and continued to work there after the project was completed. The results of this work were published (1986, Smith R.B.J.) in the form of a short Field Guide in which a map showing the location of 24 exposures was given and nine described in some detail.

Many of the exposures were overgrown and difficult to locate and it became clear that if they were to be used as the basis of a Geological Trail considerable clearing work would be needed. It was therefore decided to select a limited number of exposures that could form the basis of a geological trail and endeavour to get these cleaned. These two aspects of the project are considered below.

Selection of Sites for Geological Trail

Quite early in this project it was found that it was more meaningful and appropriate, particularly when working with people not having a geological background, to refer to the locations to be cleaned as sites rather than exposures, the site being both the rock face, the surrounding area and means of access. This practice has been followed in the rest of this paper.

When consideration was being given to the selection of sites for the trail, 24 exposures had been located, (the number has now, 1992, risen to 28) and preliminary logging carried out. These exposures varied from isolated rock faces produced by open quarrying to blocked mine entrances with a rock face above and rock faces resulting from the collapse of the overlying strata into mines.

When logging of sites was carried out particular attention had been given to ensuring that features illustrating the method of stone extraction were noted so that due consideration could be given to this important aspect when selecting sites for the trail.

The needs of geology student teaching was thought to be an important consideration when selecting sites; some sites being selected because they showed a particular geological feature such as cross bedding or oyster encrusted surfaces.

These sites would also be useful to focus and increase the interest of the general visitor.

It was decided that the selected sites should be spread through the whole range of rock units available and as far as possible show the junctions between the various units.

The rocks at Brown's Folly have fossiliferous bands and in some cases a scree containing easily accessible fossils (and samples of rock types) has been produced. Such sites were considered valuable as they enabled samples to be collected easily and thus stimulate the interest of visitors.

The amount and nature of the conservation work required, the accessibility, the need to choose sites that could conveniently form a trail and the prime need for the conservation to be friendly to other interests were all considerations taken into account when the sites to be cleaned were selected.

An attempt was made to assess the stability and therefore safety of the rock faces at sites. The criteria used were such features as overhangs, evidence of recent falls or movement. Safe access to sites was of prime importance and at one of the sites selected much time was spent attempting to improve the access and even now is best described as "safe with care".

Eventually 13 sites were selected and their relationship to the geology of the reserve are shown in figure 2.

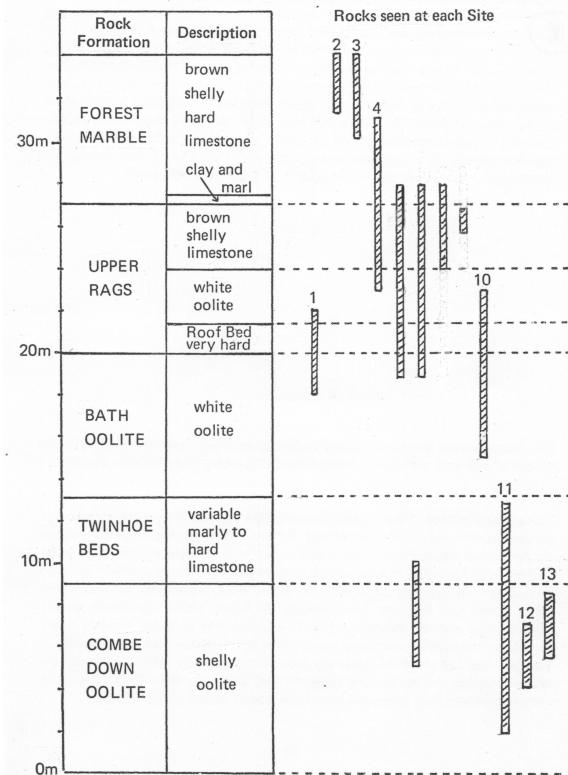


Figure 2: Approximate ranges of rock groups visible at each trail site (2006)

(Note: Sites 5 and 6 were renumbered in 2003 as the original site 5 was too dangerous. Site 6 was added)

Site Cleaning

Early in 1986 the author was invited to become a member of the Reserve Management Committee and this proved to be very valuable, enabling not only the needs of geological conservation to be kept alive but also ensuring that geological and other conservation activities were co-ordinated. Discussions with Avon Wildlife Trust's Conservation Officer, Anthony Merrett, took place to consider possible sources of labour for conservation work and during 1986 and 1987 some site cleaning was carried out by Avon Wildlife Trust and British Trust for Conservation Volunteers (BTCV) working parties.

In late 1987 the author proposed that the Avon Wildlife Trust should seek financial support from the Geologists' Association for geological site clearance at Brown's Folly and submitted an initial enquiry to the Association to see if it would support the project. Agreement to support was obtained and a detailed project prepared and submitted by Avon Wildlife Trust for selected sites to be cleaned. A grant of £540 was made to the Trust for this project early in 1988, the site work to be supervised by the author and another member of the Bath Geological Society, the Trust to administer the financial aspects. The grant enabled the number of BTCV parties to be greatly increased and the site clearance work proceeded well through 1988.

From the onset of this conservation project it was clear that it would not be possible to use machinery for site clearing. Most of the sites were not accessible or only accessible with great difficulty to rock-moving equipment and it would have caused unacceptable damage to paths etc. Its use would have been strongly opposed by all concerned with the reserve. This is confirmed by the opposition and outcry that the construction of a road to remove timber caused, some time after the geological site work had been carried out.

Priority in the site clearance was given to making the sites accessible and the exposed rocks easily visible, as this was considered the minimum required to enable the sites to be used as a geological trail. All of the rock faces are heavily weathered and work on the faces was performed limited to removing vegetation that had become established on ledges. The removal of trees around sites resulting in more open, drier conditions has generally resulted in somewhat cleaner rock faces and incidentally in many cases a more interesting selection of plants etc. Small trees up to 150mm in diameter were removed by working parties using hand saws. These were cut up and burnt under controlled conditions at times when there would be the minimum interference with birds' nesting etc. Larger trees were cut down by specialists specifically trained in the use of chainsaws. The stumps of trees were treated with an approved agent to prevent regrowth. The cutting down of trees was by far the most contentious aspect of the site clearance, objections often being expressed by the volunteer workers and frequently resulting in interesting discussions.

A large amount of the clearance work consisted of removing low ground cover such as hawthorn and small

bushes. Most sites not requiring the services of the chainsaw team could be cleared by a working party of five in a day.

All the members of the working parties were given a briefing about the project before work started and this presented an opportunity to explain the aims and purposes of geological conservation, a concept foreign to most of them. The working parties were an interesting mix of young people having a variety of social and educational backgrounds and included two geology graduates.

With the cessation of the government funded work experience scheme at the end of 1988, the supply of labour for conservation work was greatly reduced. Fortunately the planned site clearance work had by then been completed.

The method of marking sites to assist visitors was the subject of some discussion. It was decided that a simple blue marker post would be appropriate, in line with the method already used for marking a nature trail through the reserve. Where possible, the base of a tree or a tree stump was painted with a blue band to act as a marker. Many of the first set of marker posts disappeared and if this was vandalism or people objecting to the new posts is not clear. The use of bigger posts driven well in has so far overcome this problem.

Trail Guide

An essential part of the project was the production of a guide to the sites that had been cleaned. The Avon Wildlife Trust had produced a Trail Guide to Brown's Folly written by Richard Pooley who was then the Reserve Warden. The Guide drew attention to the flora, fauna and features of general interest seen on a Main and Short Trail, both these trails being way marked. In 1986 discussions were taking place about the form of a new guide and it was planned that this guide would make some reference to geological aspects of the reserve. The departure of Richard Pooley from the area halted progress with the planned guide and it has never been produced.

When it became clear that the revision of the original guide was likely to be long delayed and the feeling that the combination of a general guide to the reserve and a geological one would have made the guide bulky, the author decided to produce a guide covering the purely geological aspects of the reserve.

It was decided that the guide should meet the following criteria:-

- It should enable visitors to locate the sites easily,
- It should provide interest and information for both the general visitor and also the visitor with a developed geological interest,
- The text should include simple questions and exercises to encourage the visitor to have some involvement with the rocks,

- It should be a low cost production to enable the relatively small number it was anticipated would be required to be sold at an attractive price.

The guide was produced by a member of the Bath Geological Society and consists of five folded A4 sheets giving twenty pages of text, diagrams etc. and a semi-stiff cover. The title of the guide is "The Rocks of Brown's Folly" and it is sold at 50p, slightly above the production cost. An example of the type of illustration used in the guide is given below, (figure 3).

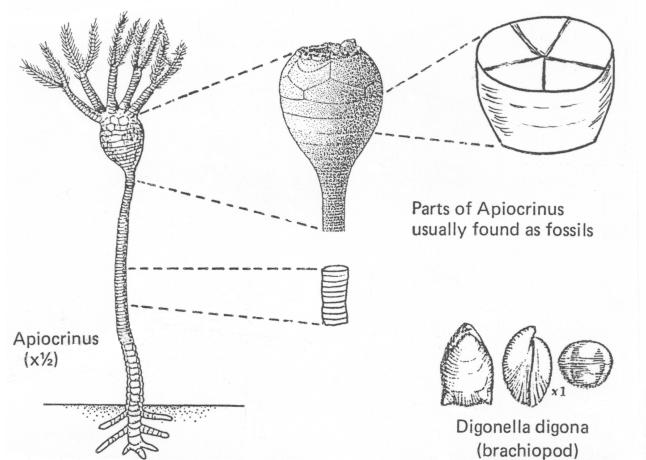


Figure 3: Elements of Bradfordian fauna visible at several sites along the trail

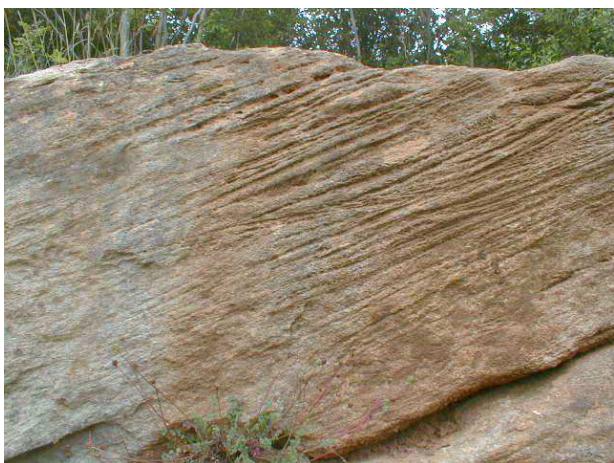
Description of Selected Sites

To illustrate the features that can be seen on the trail the following brief description of selected sites is given.

Site No. 10 - shows the entrance to a mine that penetrates the hill for only about 30m. It was stopped presumably because it encountered rock unsuitable for building.

Site No. 7 - shows the development of a patch reef and although the face is very weathered interesting features can still be seen.

Site No. 9 - is an isolated block on the faces of which complex cross bedding is displayed, *see photograph below*.



Site No. 11 - At this site large blocks of Combe Down Oolite that have slipped on the underlying Fuller's Earth clay make a striking feature.

Site No. 4 - Close by this site is a large exposure of a channel in Forest Marble. This is probably one of the best exposures of this feature in the area and its potential was only realised when considerable cleaning was carried out after the trail had been decided.

Maintenance of the Trail Sites

The maintenance of geological sites is essential if the considerable effort and expense spent in the original cleaning is not to be wasted. Whilst this observation is self evident and obvious there are many sites in Avon that are becoming lost or at least of little use because of failure to maintain. The usual source of people to do this work has been members of the two local Geological Societies.

The Brown's Folly Trail, through the author and his colleagues who have been connected with the trail, has a strong association with the Bath Geological Society, and parties of members (increasing in numbers of late) have been responsible for maintaining sites on the trail. It has been found possible by bi-annual working party visits supplemented by more frequent visits by one or two members to not only maintain the trail but also increase the sites available and improve access. The adoption of sites by a group of people (or one person) willing to maintain them is a very effective but probably quite limited way of maintaining sites. At present there seems to be no alternative.

Routine maintenance consists of little more than removing brambles and new shoots from trees that have been cut down, the latter despite the use of an approved stump-killing agent, is not always easy to control. The routine maintenance of a site rarely takes more than half an hour with four people working and this can be reduced if a strimmer is available and site conditions enable it to be used.

No serious effort has yet been made to clean the weathered surfaces of the rocks exposed at sites; in most cases patches of fresh rock are available for examination. Methods considered for cleaning faces are the use of an algicide, cutting areas of face with a power saw and chiselling.

The storms of 1989 caused very little damage to the sites though a considerable number of trees on the reserve were blown down. In some cases large trees that there had been reluctance to cut down were blown down by the storms and after cutting up and removal resulted in an increase in the rock displayed or made the access easier. Truly, "It's an ill wind"

Conclusions and Observations

1. The Brown's Folly conservation project has made available on the reserve 13 sites that display its geology and to some extent the stone extraction that was carried out there. A guide to these sites has been produced to enable visitors to appreciate the geology and hopefully encourage their interest in the geology of the area. The sites are being maintained.

2. It is difficult to gauge the interest in or the use made of the trail by visitors to the reserve. As copies of the Trail Guide are not available at the reserve and there are no description boards at the sites the general visitor is probably not aware of the trail. This is little different from many other geological trails. Two local women's organisations that arrange as part of their programme walks in the Bath area have been taken around the Trail and have shown considerable interest.

3. As far as the author knows only one school at which the Geology teacher is a member of the Bath Geological Society uses the trail for teaching purposes.

4. The Brown's Folly Reserve is an example of an area where geological interest and the much more widespread interests of ornithology, botany etc. can be easily combined, and indicate a way to heighten the awareness of "nature consciousness" and alert the "geologically unaware" to the considerable way in which geology influences their surroundings. Should geological trails be for only the people whose chief interest is geology or is there a need for wider interest trails?

Acknowledgements

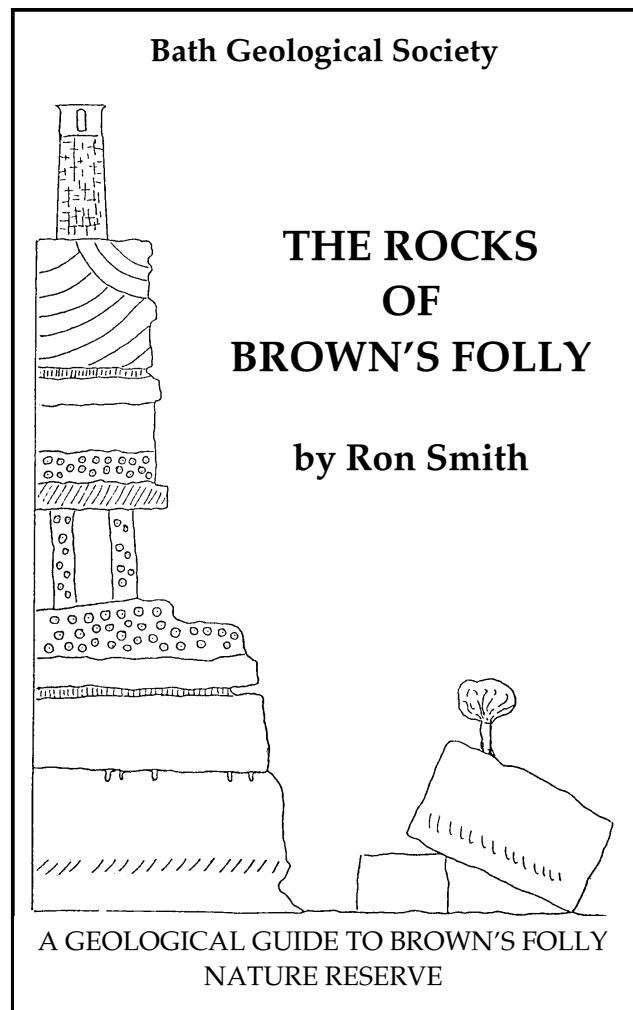
This paper records the work of many people and the author is indebted to all those who have helped him in this project. Particular thanks are due to George Hibberd who has given so much help at the sites and Elizabeth Devon for her work on the Trail Guide and arranging for the word processing of this manuscript. I am grateful to Dr. Peter Crowther for his invitation to prepare this paper and his advice and assistance.

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