

## Be a Rock Detective around Hawkstone Park

Christine Rayner<sup>1</sup>

RAYNER, C. (2007). Be a Rock Detective around Hawkstone Park. *Proceedings of the Shropshire Geological Society*, **12**, 79-83. Be a Rock Detective - follow this trail! Look for clues to unravel the story of Hawkstone's wonderful rock formations. Keep your eyes open. What can you discover?

A geotrail for children (Key Stage 3/4), helped by an adult.

<sup>1</sup>Cressage, UK. E-mail: [chris.rayner@virgin.net](mailto:chris.rayner@virgin.net)

### INTRODUCTION

Be a Rock Detective - follow this trail! Look for clues to unravel the story of Hawkstone's wonderful rock formations.

A magnifying glass or hand lens will be useful for looking at the minerals within the rocks, and take a torch if you want to explore the Grotto.

Teachers may find the associated paper of assistance (Rayner, 2007), and can also refer to Peter Toghil's *Geology of Shropshire* (2006) to benefit from his detailed knowledge of the local geology.

Keep your eyes open. What can you discover?  
Follow this trail!

### THE GEOTRAIL

#### 1. The Urn

*On the way into the Park, having passed through the kiosk and paid your entry fee, stop at the top of the steps. Let's just test how sharp your eyes are!*

What colour were the rocks you just passed? Were they hard or soft? How do you know? What were these rocks made of? Mole hills give a clue.

Who didn't notice any rocks? Open those eyes!

*Stop at the rail before the Urn and look across at the cliff opposite.*

What colours are these rocks?

Suggest what might cause these colours.

Why is there no vegetation where the rocks are brightest in colour?

Notice how the rock face looks blocky in places.

The face is broken up by cracks running through it. These are *joints*.

*Now look behind the Urn.*

Any ideas about the holes along the layers of rock?

These layers are known as '*beds*' by geologists.

Another thing! What causes that red staining we can see here?

#### 2. The White Tower

On the way to the White Tower, what are those vertical and curved markings in the rocks you pass?

What are those hollows in the steps?

What does all this tell you about the nature of the rocks?

#### 3. The Monument

*Yes, there's a good view from the top!*

Gaze upwards.

Is the monument made of the same rock all the way up?

Examine the corner stones.

What can you deduce by looking at them? (shape? markings? relative age?). How are the markings different from the ones you saw near the White Tower? Why are they different?

#### 4. Swiss Bridge

*It's exciting on this bridge. Do you dare to look down? While you are here admire the good view of Grotto Hill.*

*You need to go down below, though, to follow the rock trail and pick up more clues, down beneath the bridge.*

*It's damp, cool and shady here and the rock faces are covered with moss and algae.*

We are in a narrow, deeply cut, steep sided valley.

What is the name for a valley like this?

Now let's try to explain why it is in this place.

Erosion is more effective where rocks are weak. Along this path is a line of weakness called a 'fault'. There are lots of faults in Hawkstone Park and we need to recognise them as we walk the trail. You are standing in a fault-guided gorge which has been deepened and widened by the Hill family when they constructed the walks in Hawkstone Park.

#### 5. Weston Bridge and Gingerbread Hall

*As you cross Weston Bridge to reach Gingerbread Hall, look down on the left.*

Look for grooves and polished, flat surfaces on the rocks.

There is a link with faults. Discuss how these might have been formed.

They have a special name – 'Slickensides'.

#### 6. The Cleft

*Another dark, damp place! More steep sides and narrow path! Compare this with the gorge under Swiss Bridge.*

Find evidence:

- (a) that it is a natural feature.
- (b) that it has been altered artificially.

What natural feature do you think it is?

#### 7. The Grotto

*Perhaps the most exciting place on the Trail!*

*Have you remembered your torch? Even with a torch, you can't see too much in the dark. The rock*

*has been excavated around some old mine tunnels which have been made into a fascinating network of chambers, pillars, and passageways.*

What do you think they were mining here?

Clue: look for green staining, especially at the exit.

*Emerge into the sunshine (we hope!) and walk along to Raven's Shelf.*

*Admire the spectacular vertical cliff.*

It's time now for more observations.

What colours can you see in the cliff? Write down what these colours tell you.

What causes the impressive overhang?

*Look across the valley to the Red Castle.*

*The castle is built out of the red sandstone but you might just be able to make out the white sandstone capping the hill.*

*Now look under your feet.*

Try to describe the appearance of the slabs.

What are the wavy lines in the rock?

What are the white knobbly crystals.

Discuss with your teacher what these things might be.

*No visit is complete without standing on the top of Grotto Hill. So climb up to the arch. Still some observations to make!*

Examine the blocks used for building the arch. They are not all the same.

What differences are there? Clues: colour, texture, size of grains, easily worn away or not?

#### 8. Hermitage and Retreat

*As you walk along the path there are some magnificent planes on the left, above your head. It should be easy to identify these as there are several parallel to the path and to each other.*

These planes may be fault planes or they may be joints. Even the experts are not too sure. Are you? See if you can convince your teacher.

Clue: look for displacement of rock on either side.

The colours are really striking. Suggest which two minerals have formed along these fault or joint planes:

1. ....
2. ....

*Look out for rounded boulders close to the path. These are blocks with their corners rounded by weathering.*

*The Retreat makes a pleasant resting place. If you have room, sit down and pick up some loose sand.*

What does the sand remind you of?

What are the harder white crystalline features? (You have seen these before, at Raven's Shelf).

*Have you started piecing together the clues yet, to reach conclusions about the history of these rocks?*

### 9. Fox's Knob

What has produced the pinnacle that is called Fox's Knob?

It is made of pale Grinshill sandstone, like the top of Grotto Hill.

Examine the white mineral  
What is its name?

Describe in words how it is found in the rock:

- (a) in layers?
- (b) continuous layers?
- (c) stronger or weaker than the surrounding rock?
- (d) thickness?

*Walk through to the other side of the Knob and then look back. This is a really impressive rock face.*

Draw in the space below a sketch of Fox's Knob as seen from here, and label the sketch with arrows so as to indicate the following features:

- (a) curving beds
- (b) thin black beds
- (c) white sand beds.



Beds that are inclined at an angle and curve like this display 'cross bedding'. This gives us an important clue about the environment in which the sands were deposited. Discuss this with your teacher! By the way, what mineral might colour the black stripes?

### 10. Reynard's Walk and The Terrace

As you walk from Fox's Knob, what do you notice about the colour of the sandstone rock faces?

*We are now on the final stretch of the Trail with more clues to solve. The path winds in and out, and takes us along the foot of the terrace. At each turn you get a new view of the cliffs.*

*Stop where you can see the full height of the rock face. See how the red merges into yellow and white.*

In what way(s) are the rocks at the top of the cliff different from those at the bottom?

You will come across more sweeping, curved beds.

What is the name for this type of bedding plane?

What differences are there between these and the striped beds you saw at Fox's Knob?

Discuss this with your teacher and try to work out what the landscape and climate were like 230 million years ago in the geological period called the Triassic.

Look for the miniature 'crystallised waterfalls' of the mineral 'barytes' on the surface of the white sandstone.

*You are now nearly back to the Urn and within a few minutes of the Visitor Centre where you can relax and enjoy refreshments. While you are doing this, see if you can fill in the missing words in the paragraph below, to test your ability as a rock detective.*

### THE STORY OF HAWKSTONE ROCKS

Long ago, about \_\_\_\_\_ years ago, the climate around here was very \_\_\_\_\_ and \_\_\_\_\_. This was because the area was in

the middle of a huge continent called Pangaea and was located much nearer the Equator than nowadays.

There was lots of \_\_\_\_\_ which was blown by the \_\_\_\_\_ to form \_\_\_\_\_. Today we can find evidence of this when we see \_\_\_\_\_ in the rock faces. There were also dried up river channels where more sand accumulated.

Everything would have been very barren and there were few signs of life except for some small \_\_\_\_\_, whose footprints have been found nearby.

The sands eventually were compacted and held together by a 'cement' of \_\_\_\_\_, which made the sandstone \_\_\_\_\_ when weathered.

Much later, earth movements resulted in lines of weakness called \_\_\_\_\_, along which rocks were \_\_\_\_\_. These weaknesses allowed more effective \_\_\_\_\_ and so features like \_\_\_\_\_ and \_\_\_\_\_ were formed. Later still, hot fluids containing minerals came along the fault planes and we see green \_\_\_\_\_ and white \_\_\_\_\_ in the sandstones of the park.

These same hot fluids also bleached some of the red sandstone and hardened it. This is why the Grinshill Sandstone is usually \_\_\_\_\_ in colour.

### ACKNOWLEDGEMENTS

The author would like to thank the owners of Hawkstone Park for their encouragement in producing this guide. It is intended for use by younger visitors (Key Stage 3/4), accompanied by an adult.

### REFERENCES

- Rayner, C. (2007). A Geological Trail around Hawkstone. *Proceedings of the Shropshire Geological Society*, **12**, 70-78.
- Toghill, P. (2006). *Geology of Shropshire*. 2<sup>nd</sup> edition, Crowood Press, Marlborough, 256 pp.

Copyright Shropshire Geological Society © 2007.

*Disclaimer - The information contained in this Trail Guide has been prepared following a summary of the geological literature of the area and visits to all the locations described. Its sole aim is to give younger visitors to the area, accompanied by a responsible adult, an insight*

*into its geology and the links between it and the development of the Park. It should not be used for any other purpose.*

*ISSN 1750-855x*