
LA SOCIALIZACIÓN DE LA
GEODIVERSIDAD: ESTRATEGIAS
(Ejemplos en Gran Bretaña y Europa)


Geology and geological heritage: new perspectives from the UK
3: Environmental interpretation on geological heritage sites: examples from across Europe

1. Promoting Earth heritage and its conservation:

- News media
- Formal education
- General education
- The internet…
- On-site interpretation

1.1: News media

e.g.

- Radio,
- Television,
- Newspapers,
- Magazines.


MAY 5, 2002 · THE SUNDAY TIMES

European thieves steal fossils to order

Robert Tait

- Ephemeral, but useful for stimulating interest and action or informing about on-going activities…

1.2: Formal education

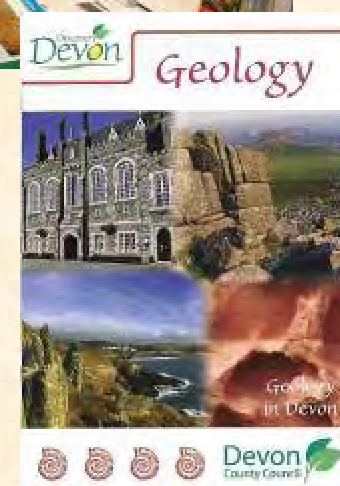
e.g.

- National Curriculum,
- University courses,
- Adult / continuing education, etc.
- Long term investment in the future – but can engender interest and support in the short term..

1.3: General education

e.g.

- Information leaflets,
- Themed publications,
- Seminars / conferences,
- Museum activities and displays,
- 'Festivals' of geology, etc.
- Most appropriate long-term strategy for geodiversity and conservation but should be closely linked with news media coverage and site interpretation...



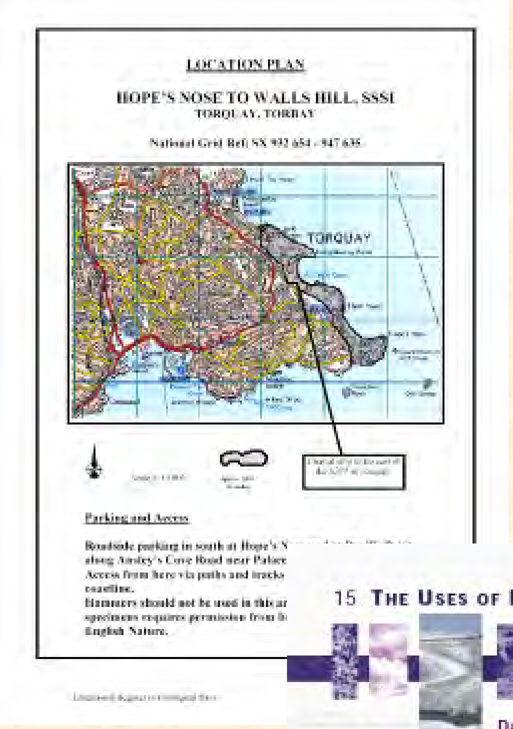
1.4: The internet, including:

- General web-based information and reports

- Information on sites to visit, e.g. the *Educational Register of Geological Sites for Devon*:

- News items, etc.

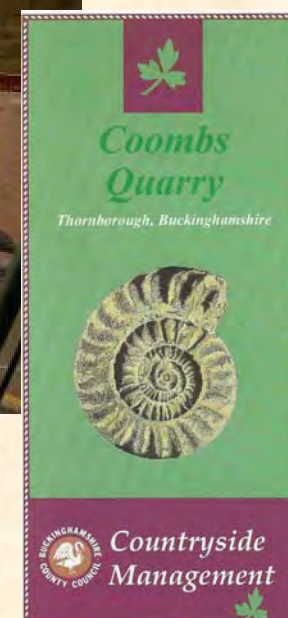
- N.B. All web-based information implies discrimination, is inevitably 'self-targeting' and cannot be a substitute for on-site provision!



1.5: On-site interpretation

e.g.

- Sign boards,
- Self guided trails,
- Heritage centres, etc.



2.The principles of environmental interpretation…

Interpretation is:

> "...*an educational activity which aims to* ***reveal meanings*** *and relationships through the use of original objects by first hand experience and by illustrative media, rather than simply to communicate factual information*." (Tilden 1967)

Environmental Interpretation is, therefore:

> "*....the act of* ***explaining or revealing the character of an area*** *through interrelationships between rocks, soils, plants and man to.....visitors in the field, with preparation and follow-up usually in thematic or story form, to increase visitor awareness of the significance of the site visited and the need to conserve it.*"
>
> (Aldridge 1975)

Interpretation has the:

"*...dual purposes of best **serving the interests of the visitors** who come to see and experience a site and also those of the place itself. Good interpretation will raise the value of a site in the eyes of those who come to visit; greater value will lead to a greater conviction of the need to conserve*."

(Herbert 1989)

Geotourism (provision) is:

"*The provision of **interpretative and service facilities to enable tourists to acquire knowledge** and understanding of the geology and geomorphology of a site (including its contribution to the development of the Earth sciences) beyond the level of mere aesthetic appreciation*."

(Hose 1995)

3. Site information signs and boards

3.1: The function of signs on conservation sites:

- To inform visitors of the conserved status of the site
- To control or manage visitors and therefore aid site conservation
- To establish to role of the organisation or organisations responsible for the management and/or protection of the site
- To interpret features at the site for visitors (optional).

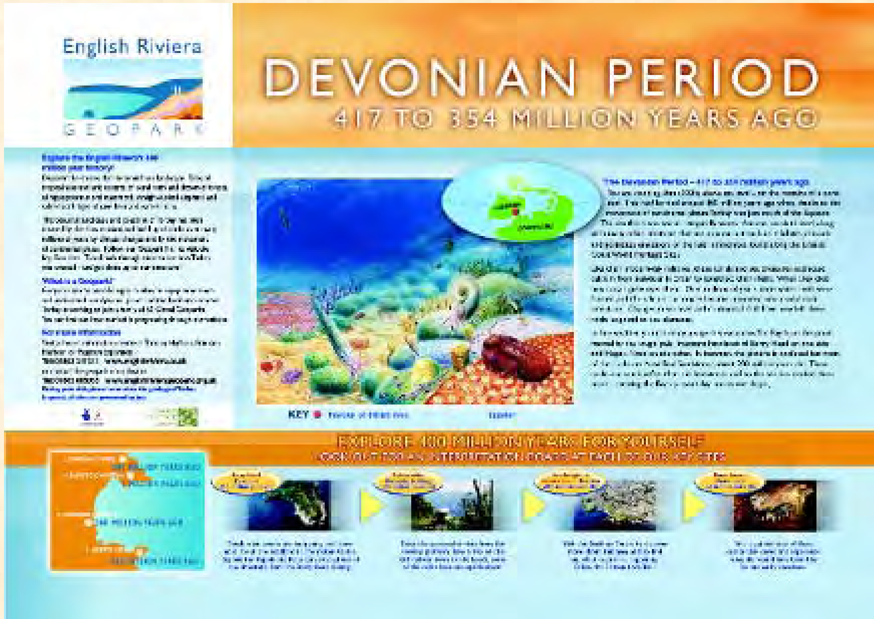
3.2: Interpretative sign boards have additional functions:

- To enhance visitor enjoyment in the belief that an understanding of the countryside increases the pleasure derived from visiting

- To increase the public understanding and appreciation of the countryside leading to a respect for it and an awareness of the need for its conservation

- To facilitate the management of a natural resource by influencing the pattern of visitor movement

- To satisfy a visitor demand for information.

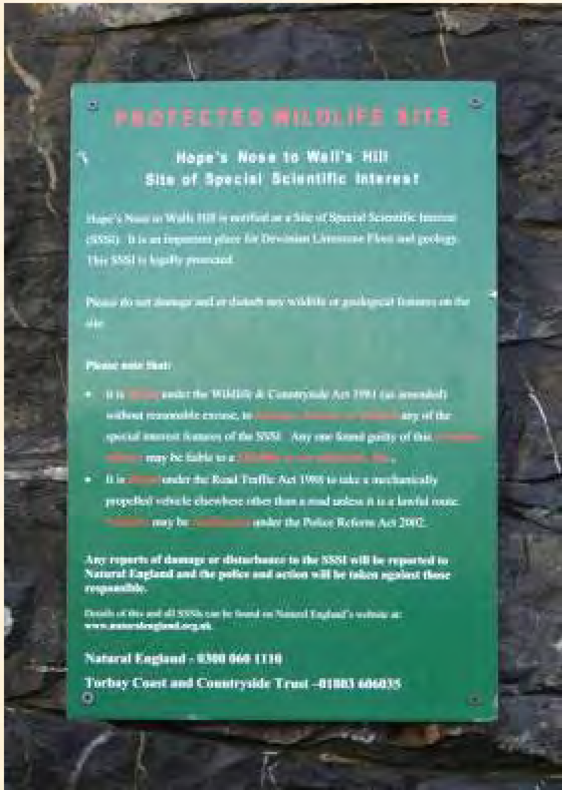


3.3: Basic types of signs for site management and information:

- Site Specific Information Plaque - includes brief description of the site on which it is placed

- Standardised Site Management Sign - includes a statement of the conserved status of the site (non site specific)

- Visitor management instructions - short statement or instruction only.



3.4: Prioritising Interpretative Information Board schemes, considerations include:

- High visitor numbers, e.g. Signs on sites within popular touristic areas/ established viewing points/ visited by significant numbers of visitors (e.g. close to urban areas) will have the highest impact. Schemes must be designed to meet needs of a significant number of these visitors!
- Prime teaching sites, i.e. sign can be a teaching aid.
- Sites damaged or threatened by over use, bad practice, ignorance or trespass may benefit from signing although…
- The site must also have an appropriate level of management to ensure that the facility is maintained in good order!

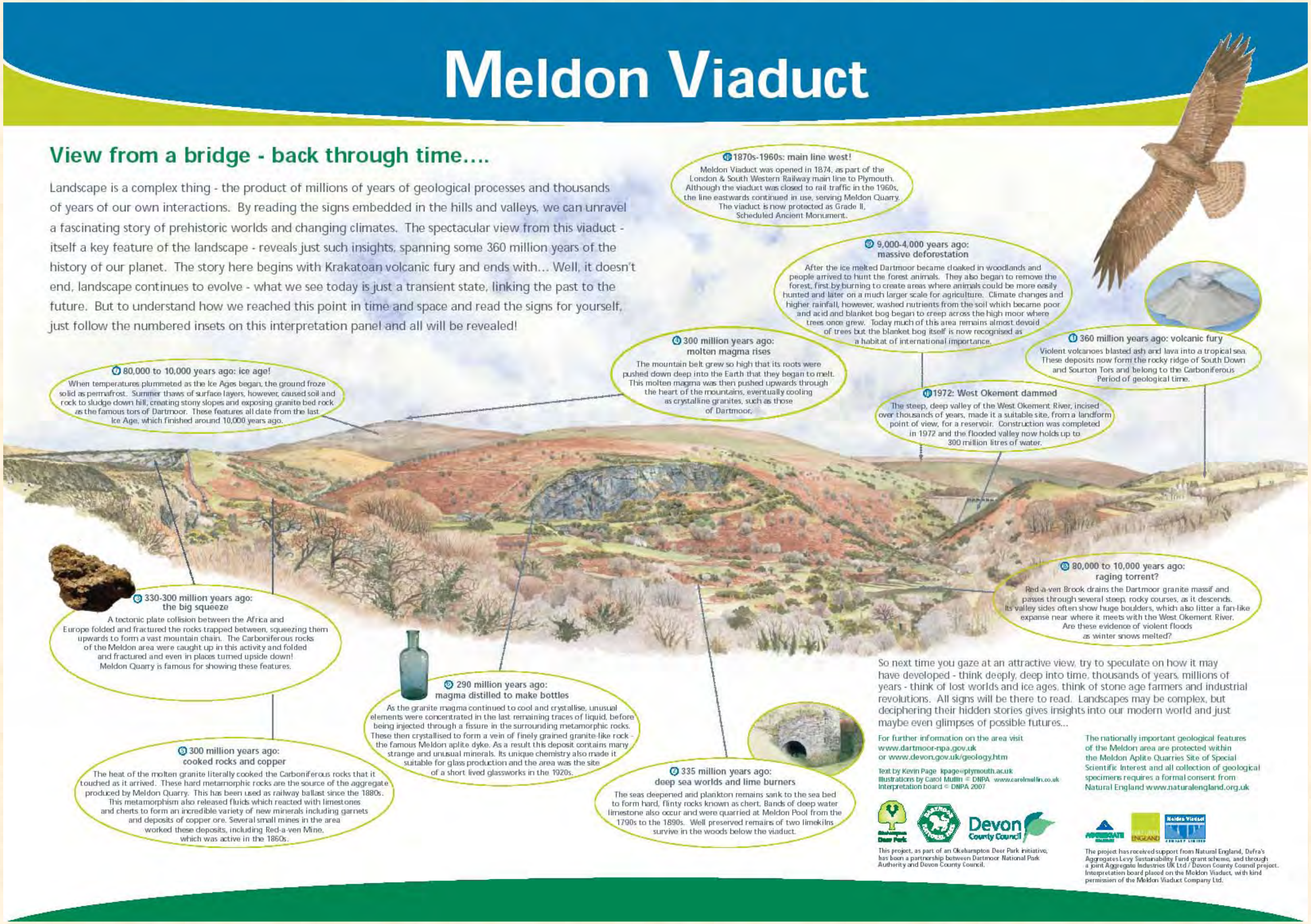
- Full co-operation of site owners and managers is essential - in practice a ‘partnership approach is most reliable and productive.

- Risk of vandalism or erosion must be such that longevity of sign not significantly prejudiced.

- Interpretative signs are most effective if linked into an existing or planned natural and/or man-made heritage interpretation or management programme (e.g. with links to museums, centres, other sites, etc.).

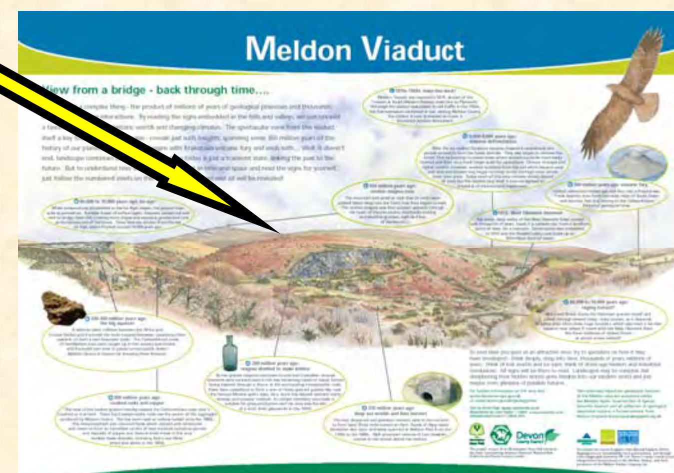
- There must be a strong and interesting story to be told, and preferably dramatic or obvious features, for the scheme to work, i.e. the interpretation provides links with features people can see or experience…

Anatomy of a signboard…



Meldon, Devon, SW England

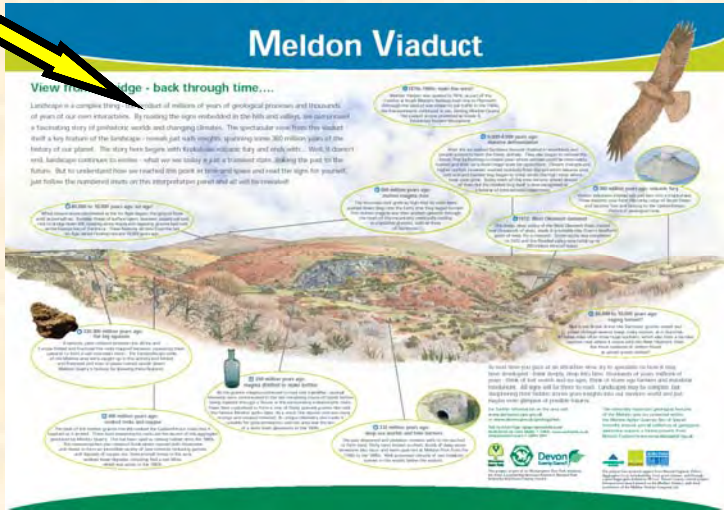
Anatomy of a signboard (1) …the view!:



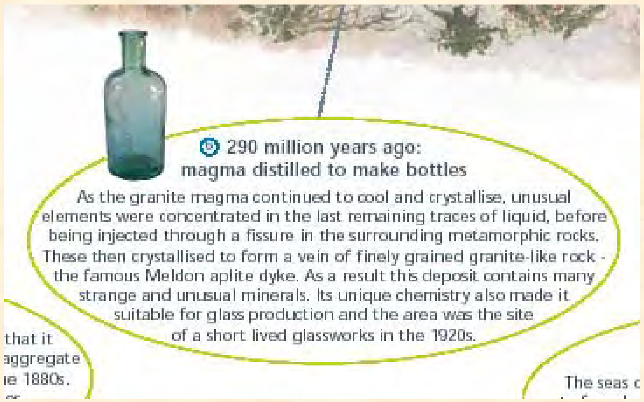
Anatomy of a signboard (2), the introduction:

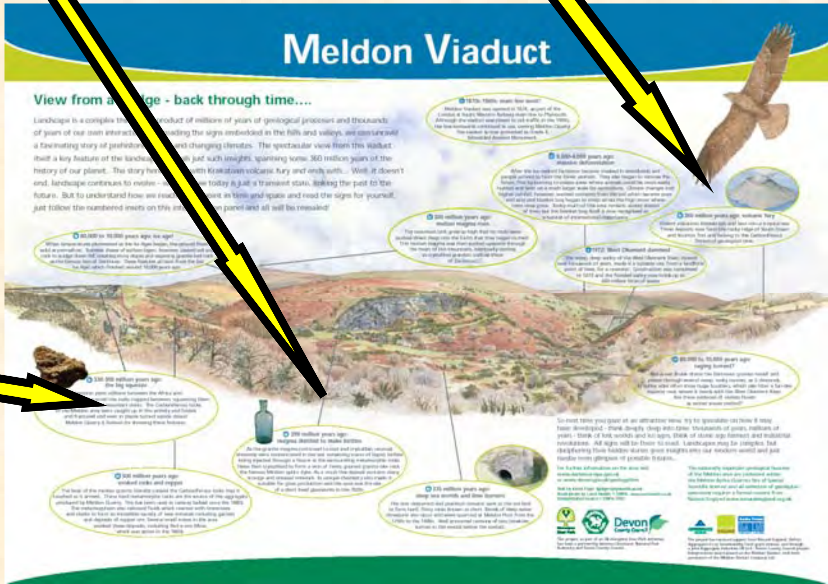
View from a bridge - back through time....

Landscape is a complex thing - the product of millions of years of geological processes and thousands of years of our own interactions. By reading the signs embedded in the hills and valleys, we can unravel a fascinating story of prehistoric worlds and changing climates. The spectacular view from this viaduct - itself a key feature of the landscape - reveals just such insights, spanning some 360 million years of the history of our planet. The story here begins with Krakatoan volcanic fury and ends with... Well, it doesn't end, landscape continues to evolve - what we see today is just a transient state, linking the past to the future. But to understand how we reached this point in time and space and read the signs for yourself, just follow the numbered insets on this interpretation panel and all will be revealed!



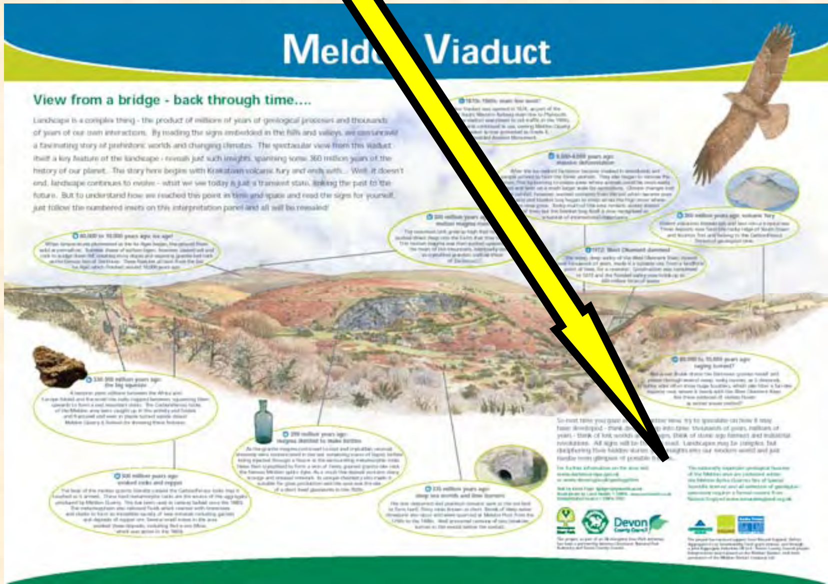
Anatomy of a signboard (3), the story:





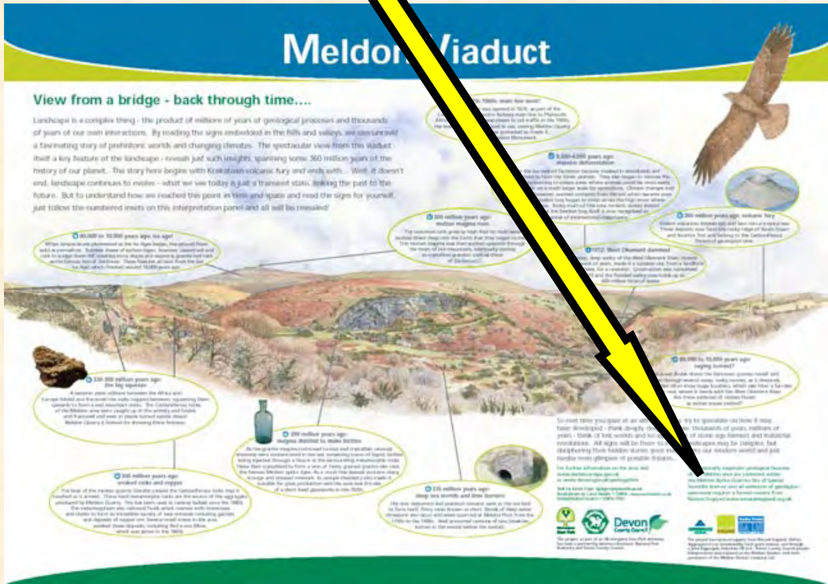
Anatomy of a signboard (4), the conclusion:

So next time you gaze at an attractive view, try to speculate on how it may have developed - think deeply, deep into time, thousands of years, millions of years - think of lost worlds and ice ages, think of stone age farmers and industrial revolutions. All signs will be there to read. Landscapes may be complex, but deciphering their hidden stories gives insights into our modern world and just maybe even glimpses of possible futures...



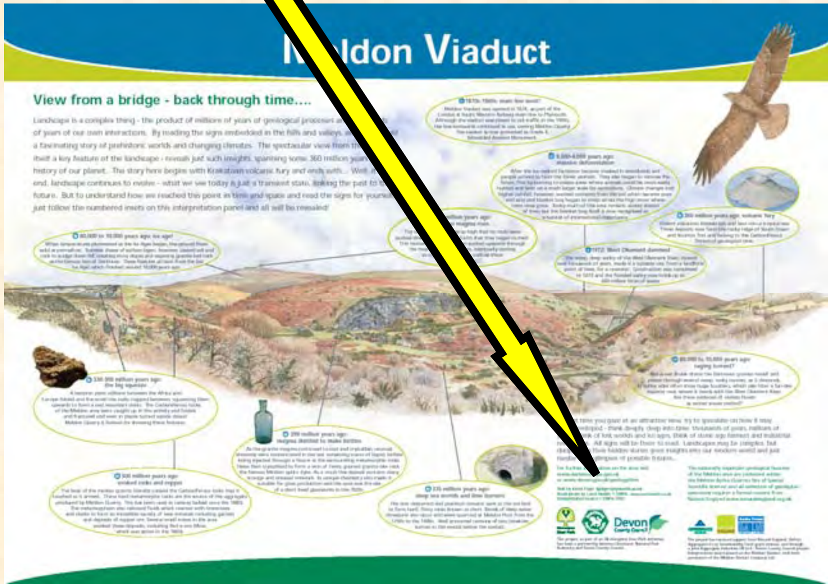
Anatomy of a signboard (5), the conservation message:

The nationally important geological features of the Meldon area are protected within the Meldon Aplite Quarries Site of Special Scientific Interest and all collection of geological specimens requires a formal consent from Natural England www.naturalengland.org.uk



Anatomy of a signboard (6), how to find out more:

For further information on the area visit
www.dartmoor-npa.gov.uk
or www.devon.gov.uk/geology.htm



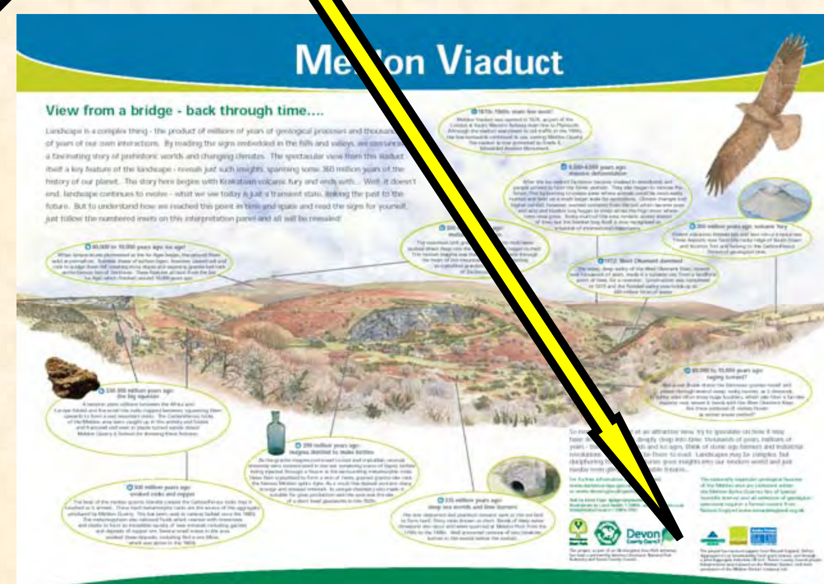
Anatomy of a signboard (7), who is responsible for the board?

Text and illustrations

The conservation manager and/ or landowner

Funding sources

Partners and funders logos



Interpretative sign boards: Examples of good (and not so good!) practice (1):

Hunstanston, Norfolk, E England

Interpretative sign boards (2):

Dozeski Soteska, Slovenia

Interpretative sign boards (3):

Sobrabre European Geopark, Pyrenees, Spain (1)

Bielsa valley, Sobrabre European Geopark, Pyrenees, Spain (2)

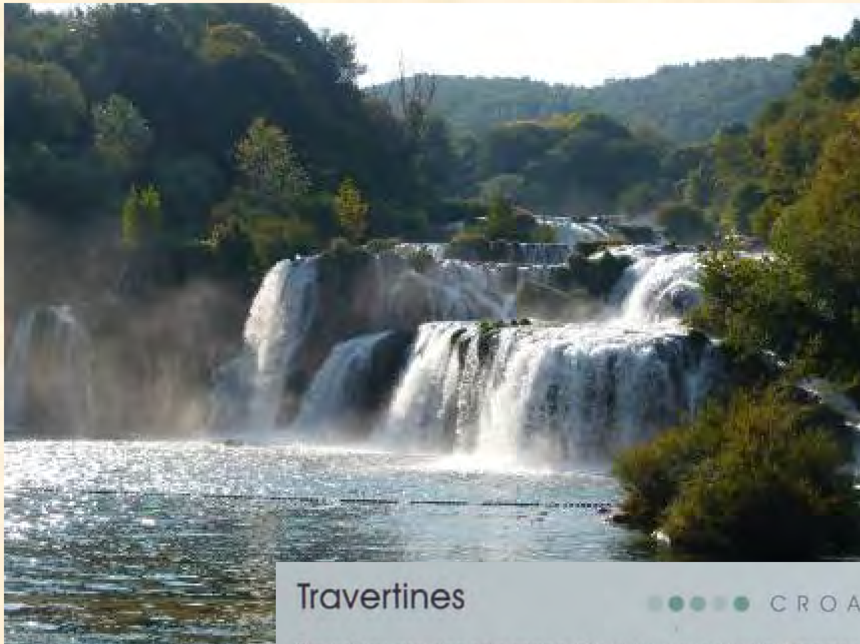
Interpretative sign boards (4):

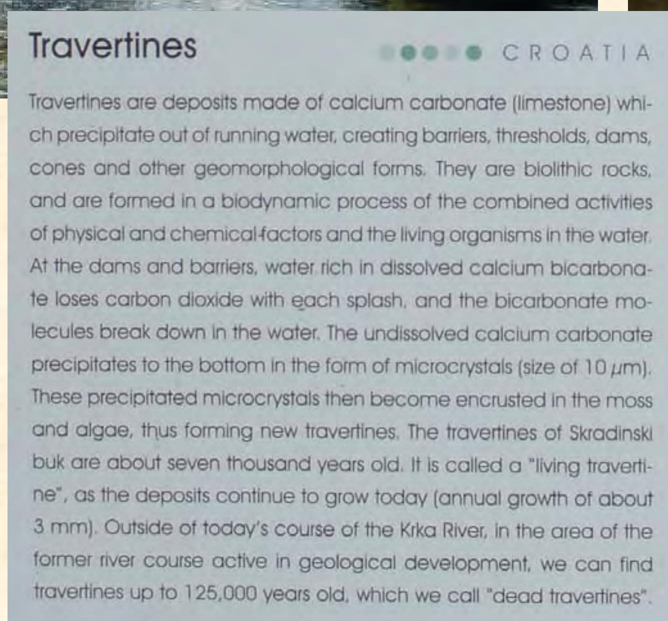
English Riviera European Geopark, Devon, SW England

Interpretative sign boards (5):

English Riviera European
Geopark, Devon, SW England

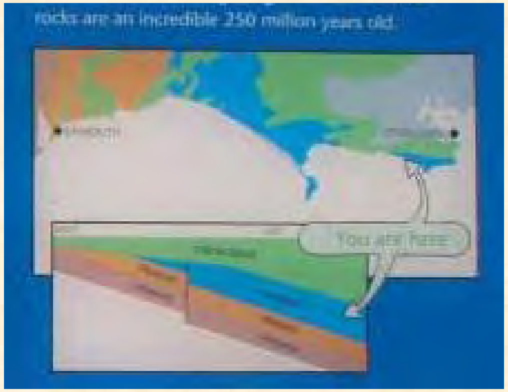
Interpretative sign boards (6):





Krka National Park, Croatia

Interpretative sign boards (7):



Kimmeridge Bay, Jurassic Coast World Heritage Site, Dorset, SW England

Interpretative sign boards (8):

Parc Natural de Cap de Creus, Costa Brava, SE Spain

4. Geological trails

4.1: *Definition*: Self-guided written trails are:

“...*booklets [or leaflets] involving the identification and explanation of a collection of linked sites which can be examined by the reader without the physical presence of an interpreter*” i.e., they are “*self paced structured distance-learning packages*”

(Keene 1995)

4.2: Geological trails - Important considerations (1):

- *Is your trail really necessary*? (Or is some other technique more appropriate?)

- *Target audience*? (Who is likely to use the trail and will their expectations influence its development?)

- *Focus*? (What is the theme of the trail and what do you wish your target audience to gain from using it?)

- *Participation*? (e.g. What degree of interaction do you expect to achieve from your chosen target audience?)

4.2: Geological trails - Important considerations (2):

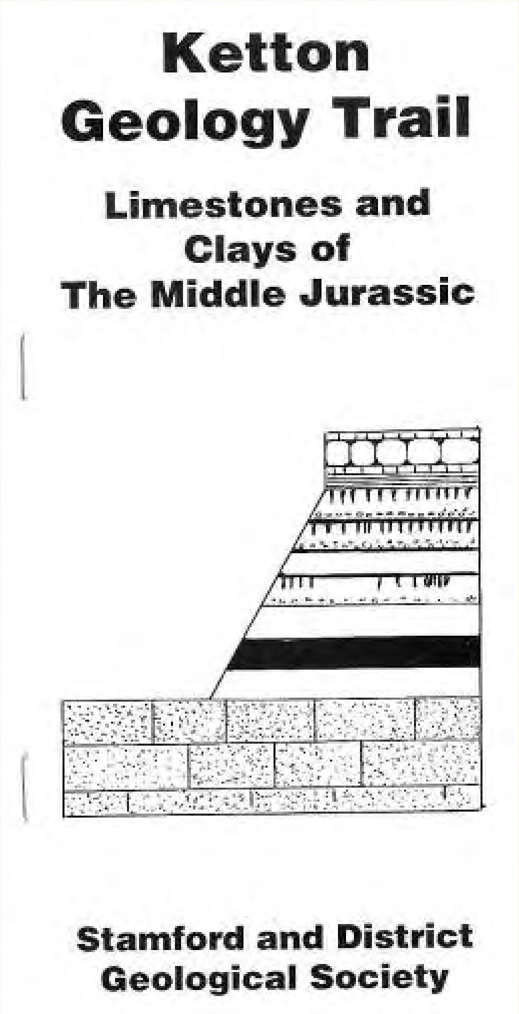
- *Adjustment to audience*? (e.g. Can some of the needs and expectations of other potential audiences be combined with those of your target audience without significantly prejudicing the effectiveness of the trail?)

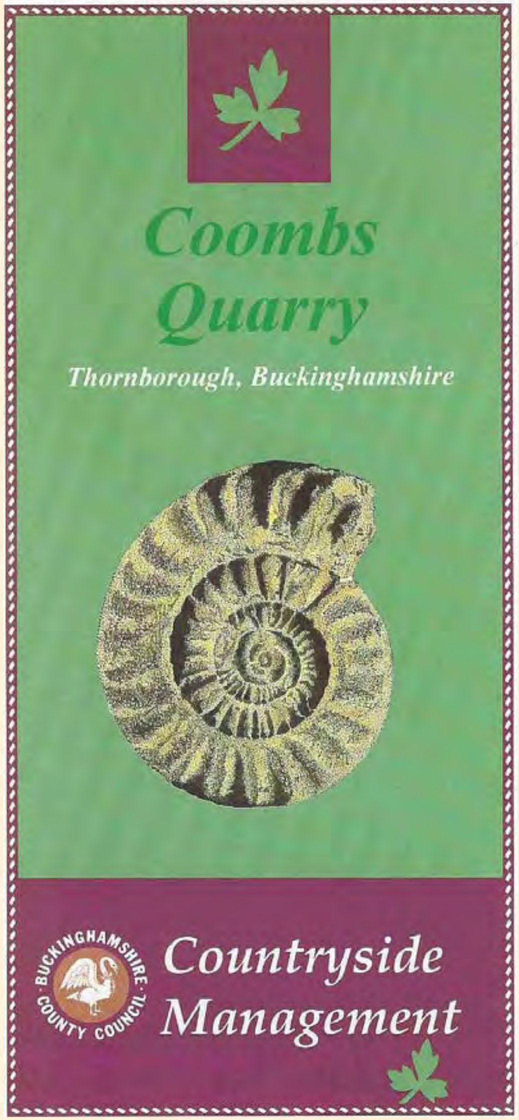
- *Authorship*? (communicator v. specialist)

- *Logistics and finance*? (e.g. sponsorship, safety, access, rights of way, maintenance)

Examples of self-guided trails (1):

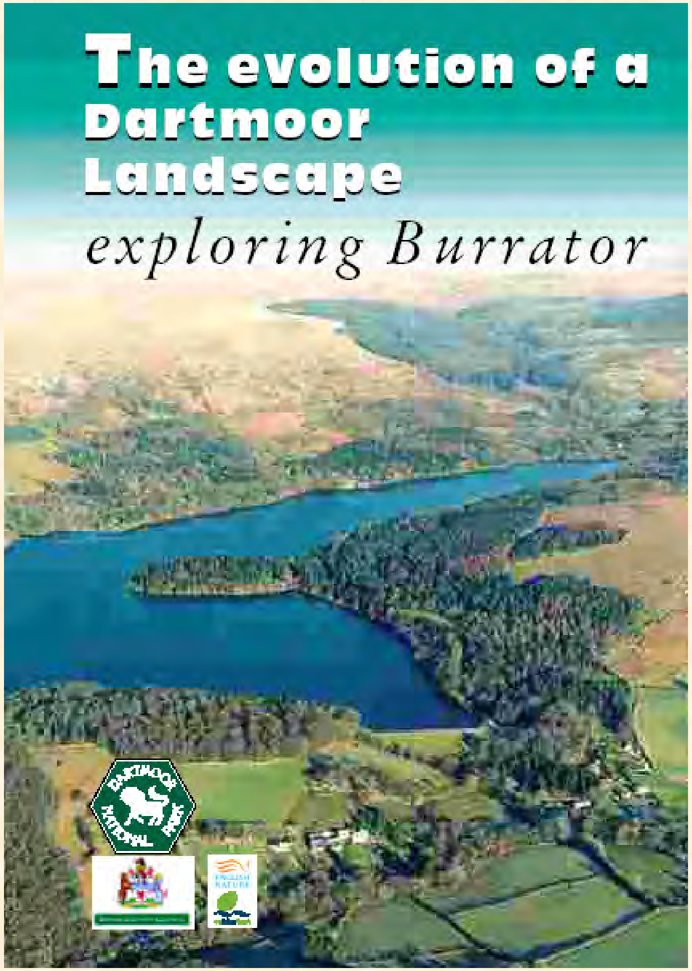
Leicestershire, central England



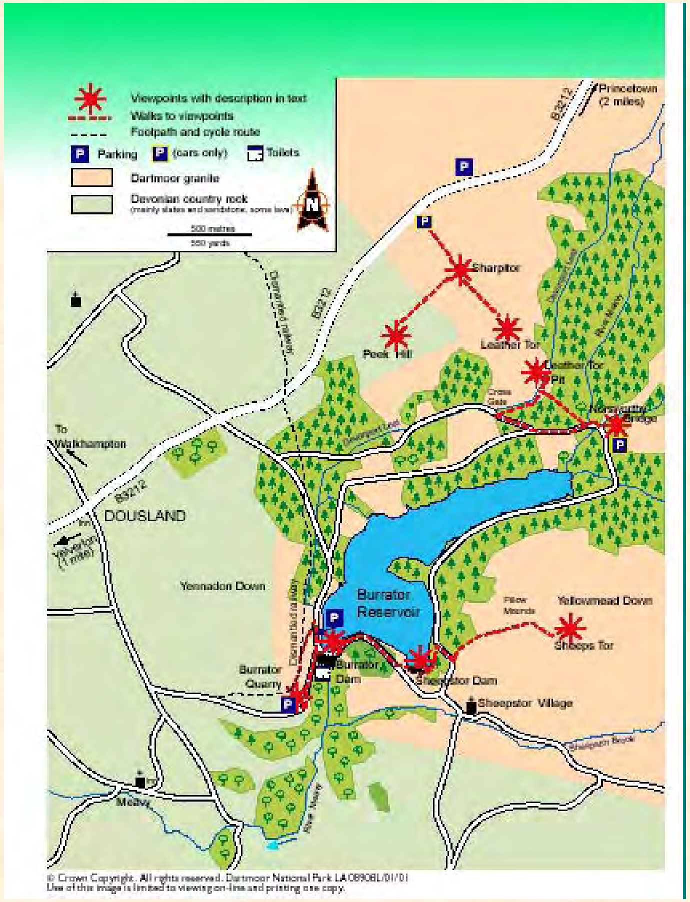


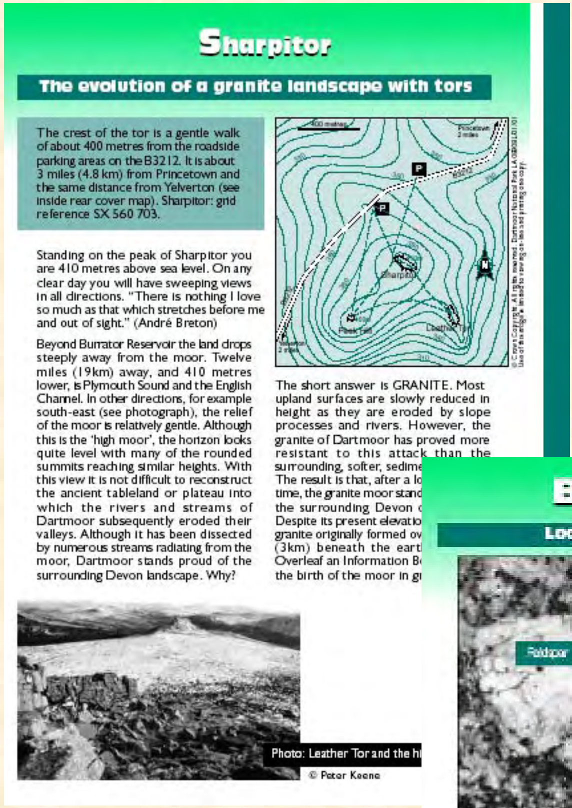
Buckinghamshire, central England

Examples of self-guided trails (2):



Burrator, Devon,
SW England (1)





Sharpitor

The evolution of a granite landscape with tors

The crest of the tor is a gentle walk of about 400 metres from the roadside parking areas on the B3212. It is about 3 miles (4.8 km) from Princetown and the same distance from Yelverton (see inside rear cover map). Sharpitor: grid reference SX 560 703.

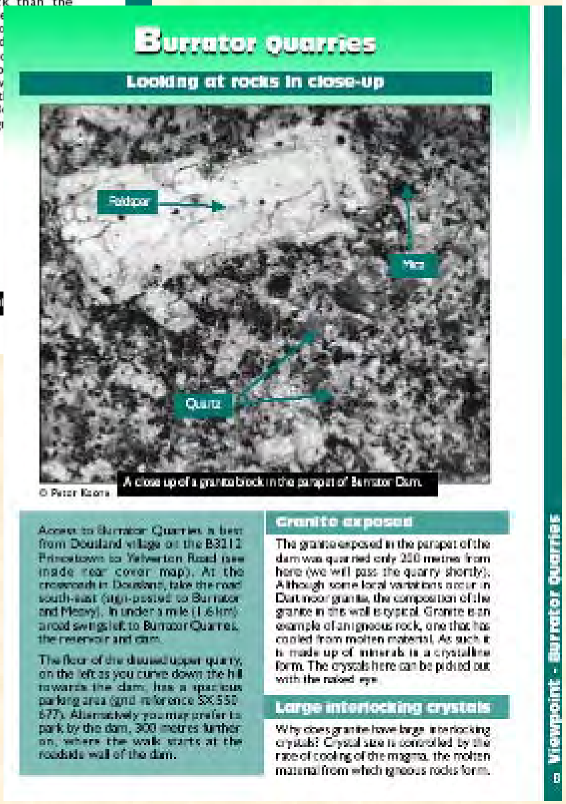
Standing on the peak of Sharpitor you are 410 metres above sea level. On any clear day you will have sweeping views in all directions. "There is nothing I love so much as that which stretches before me and out of sight." (André Breton)

Beyond Burrator Reservoir the land drops steeply away from the moor. Twelve miles (19km) away, and 410 metres lower, is Plymouth Sound and the English Channel. In other directions, for example south-east (see photograph), the relief of the moor is relatively gentle. Although this is the 'high moor', the horizon looks quite level with many of the rounded summits reaching similar heights. With this view it is not difficult to reconstruct the ancient tableland or plateau into which the rivers and streams of Dartmoor subsequently eroded their valleys. Although it has been dissected by numerous streams radiating from the moor, Dartmoor stands proud of the surrounding Devon landscape. Why?

The short answer is GRANITE. Most upland surfaces are slowly reduced in height as they are eroded by slope processes and rivers. However, the granite of Dartmoor has proved more resistant to this attack than the surrounding, softer, sedime… The result is that, after a lo… time, the granite moor stand… the surrounding Devon … Despite its present elevatio… granite originally formed ov… (3km) beneath the eart… Overleaf an Information B… the birth of the moor in gr…

Photo: Leather Tor and the hi…

© Peter Keene



Burrator quarries

Looking at rocks in close-up

A close up of a granite block in the parapet of Burrator Dam.

© Peter Keene

Access to Burrator Quarries is best from Dousland village on the B3212 Princetown to Yelverton Road (see inside rear cover map). At the crossroads in Dousland, take the road south-east (sign-posted to Burrator and Meavy). In under a mile (1.6km) a road swings left to Burrator Quarries, the reservoir and dam.

The floor of the disused upper quarry, on the left as you curve down the hill towards the dam, has a spacious parking area (grid reference SX 550 677). Alternatively you may prefer to park by the dam, 300 metres further on, where the walk starts at the roadside wall of the dam.

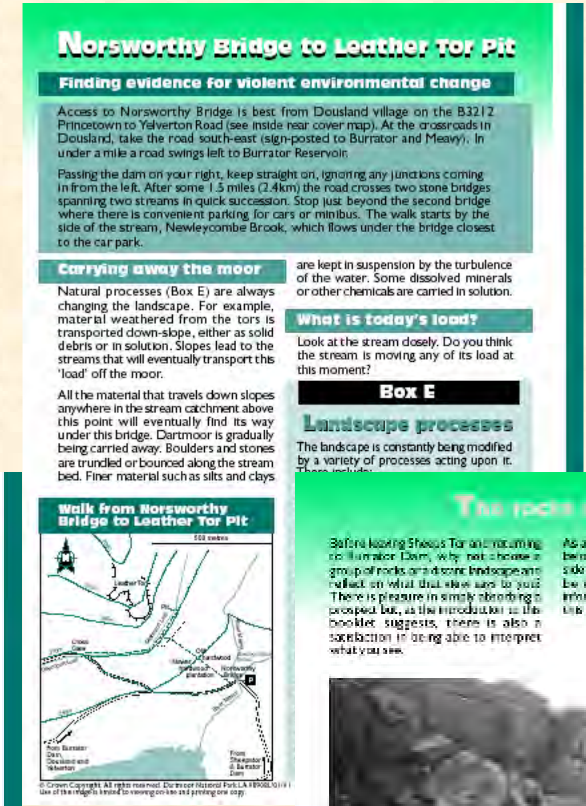
Granite exposed

The granite exposed in the parapet of the dam was quarried only 200 metres from here (we will pass the quarry shortly). Although some local variations occur in Dartmoor granite, the composition of the granite in the wall is typical. Granite is an example of an igneous rock, one that has cooled from molten material. As such it is made up of minerals in a crystalline form. The crystals here can be picked out with the naked eye.

Large interlocking crystals

Why does granite have large interlocking crystals? Crystal size is controlled by the rate of cooling of the magma, the molten material from which igneous rocks form.

Viewpoint - Burrator Quarries 8



Norsworthy Bridge to Leather Tor Pit

Finding evidence for violent environmental change

Access to Norsworthy Bridge is best from Dousland village on the B3212 Princetown to Yelverton Road (see inside rear cover map). At the crossroads in Dousland, take the road south-east (sign-posted to Burrator and Meavy). In under a mile a road swings left to Burrator Reservoir.

Passing the dam on your right, keep straight on, ignoring any junctions coming in from the left. After some 1.5 miles (2.4km) the road crosses two stone bridges spanning two streams in quick succession. Stop just beyond the second bridge where there is convenient parking for cars or minibus. The walk starts by the side of the stream, Newleycombe Brook, which flows under the bridge closest to the car park.

Carrying away the moor

Natural processes (Box E) are always changing the landscape. For example, material weathered from the tors is transported down-slope, either as solid debris or in solution. Slopes lead to the streams that will eventually transport this 'load' off the moor.

All the material that travels down slopes anywhere in the stream catchment above this point will eventually find its way under this bridge. Dartmoor is gradually being carried away. Boulders and stones are trundled or bounced along the stream bed. Finer material such as silts and clays are kept in suspension by the turbulence of the water. Some dissolved minerals or other chemicals are carried in solution.

What is today's load?

Look at the stream closely. Do you think the stream is moving any of its load at this moment?

Box E

Landscape processes

The landscape is constantly being modified by a variety of processes acting upon it. These include:

Walk from Norsworthy Bridge to Leather Tor Pit

© Crown Copyright. All rights reserved. Dartmoor National Park LA 09008L/01/01 Use of the image is limited to viewing on-line and printing one copy.

The rocks …

Before leaving Sheeps Tor and returning to Burrator Dam, why not choose a group of rocks or a distant landscape and reflect on what that view says to you? There is pleasure in simply absorbing a prospect but, as the introduction to this booklet suggests, there is also a satisfaction in being able to interpret what you see.

As an example, look at the photograph below, which was taken on the western side of Sheeps Tor. A wealth of detail can be read into this scene, simply using information contained somewhere within this booklet.

© Peter Keene

In the background, granite, cut by sheet joints, matches the curve of the hillside. The sheets are themselves cut by short near-vertical joints at right angles to the sheets. These vertical joints are probably the result of the release of pressure on the granite (pressure release) as the overlying rocks were eroded away. The joints have been exploited and widened by weathering. Clearly, the resulting isolated granite blocks have become candidates for impending collapse.

Blocks collapsing in the past must have produced the jumble of clitter on the left of the photograph. The mat of vegetation partly engulfing the lichen-coated clitter suggests that today the slope is relatively stable.

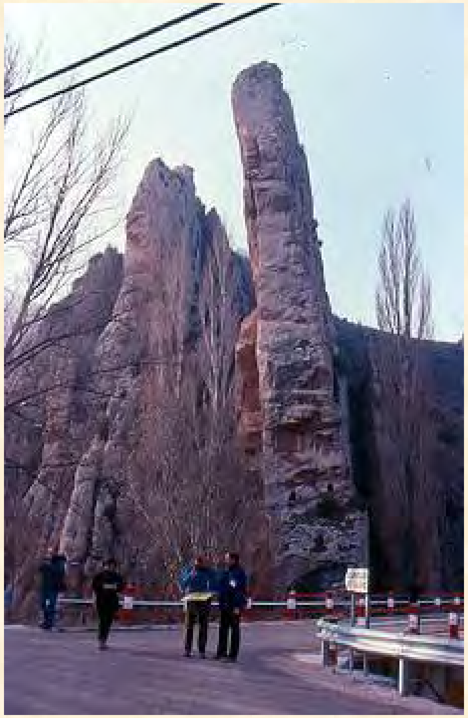
It is almost as if the photograph has caught that 'moment', 10,000 years ago, when the cold stage 'engine of destruction' was suddenly turned off. In the temperate climate that followed, cold stage processes such as frost-shattering and rapid slope movements, solifluction, were largely replaced by chemical weathering and solution. Visible rock moving processes were put 'on-hold' – dormant – but just awaiting a climatic change which could start the cold stage machinery up again.

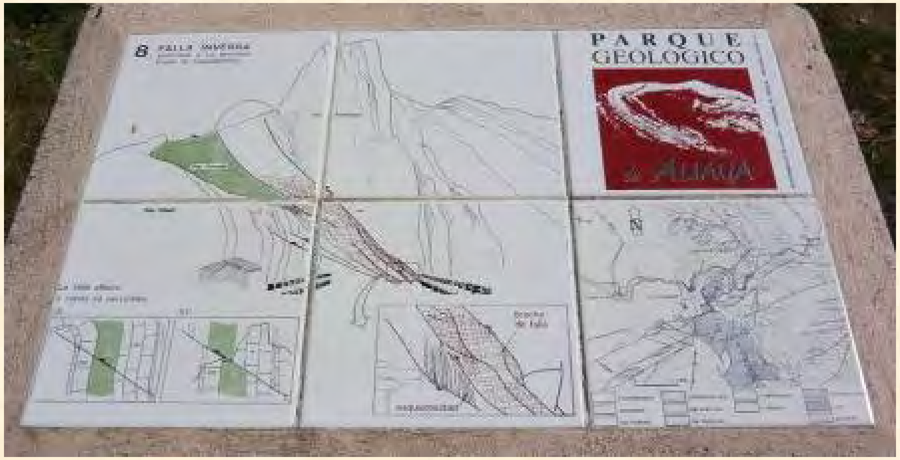
The easiest way to return to Burrator Dam is to retrace your steps.

Viewpoint - Burrator Dam to Sheeps Tor 11

Burrator, Devon, SW England (2)

Examples of self-guided trails (3):





Aliaga Geological Park, Maestrazgo Geopark, Aragon, Spain (1)

Aliaga Geological Park, Maestrazgo Geopark, Aragon, Spain (2)

Examples of self-guided trails (4):

Geopark trail, Rab Island, Croatia

5: Heritage centres

5.1: Prerequisites for successful centres are likely to include (1):

- A location where there is a significant existing interest in aspects of the natural history or heritage of the area or site
- A location which is already frequented by significant numbers of visitors
- Multi-tiered and attractive displays, providing ‘something for everyone’, with each separate display clearly and separately themed
- Interactive displays, ranging from simple specimen handling tables to computer technology.

5.1: Prerequisites for successful centres are likely to include (2):

- Displays based on spectacular specimens or other interesting objects
- A range of locally produced / targeted information leaflets or other publications which enable visitors to continue to benefit from the facilities elsewhere on the site or at home
- A warden or attendant on hand to bring the displays to life or lead guided walks
- An adequate and ideally self-sustainable source of funding and support (e.g. through partnerships and community participation)

5.2: Types of geological heritage centre include:

- Simple shelter or building with flexible displays linked to geological activities
- ‘Stone gardens’ and parks
- Reconstructions and sculptures
- Staffed buildings with displays, educational facilities, etc
- Museums and related facilities (e.g. with integrated interpretative programmes and activities, incorporating site-specific displays and/or conservation themes)

Simple shelter or building with flexible displays linked to geological activities (1):

Yorkshire Brick Quarry,
Yorkshire, NE England

Simple shelter or building with flexible displays linked to geological activities (2):

La Rioja, Spain

Simple shelter or building with flexible displays linked to geological activities (3):

Berry Head,
Devon, SW England

Simple shelter or building with flexible displays linked to geological activities (4):

Ljubliana castle, Slovenia

Simple shelter or building with flexible displays linked to geological activities (5):

Galve, Maestrazgo Geopark, Aragon, Spain

Simple shelter or building with flexible displays linked to geological activities (6):

Hallsands, Devon, SW England

‘Stone gardens’ and parks (1):

Tata Geological
Park, Hungary

‘Stone gardens’ and parks (2):

Los Galachos de la
Alfranca, Aragon, Spain

‘Stone gardens’ and parks (3):

National Botanic Gardens of Wales
Carmarthenshire, Wales

Reconstructions and sculptures (1):

Crystal Palace, London,
England

Reconstructions and sculptures (2):

Galve, Maestrazgo Geopark, Aragon, Spain

Reconstructions and sculptures (3):

La Rioja, Spain

Staffed buildings with displays, educational facilities, etc (1):

Ainsa, Sobrabre European Geopark, Pyrenees, Spain (1)

Ainsa, Sobrabre European Geopark, Pyrenees, Spain (2)

Sobrabre European Geopark,
Pyrenees, Spain (3)

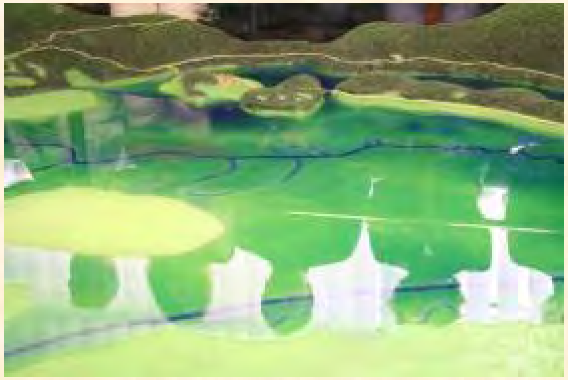
Staffed buildings with displays, educational facilities, etc (2):

Morwellham Quay, Cornish Mining Landscapes World Heritage Site, Devon, SW Engalnd

Staffed buildings with displays, educational facilities, etc (3):

Aliaga Geological Park, Maestrazgo Geopark, Aragon, Spain

Staffed buildings with displays, educational facilities, etc (4):

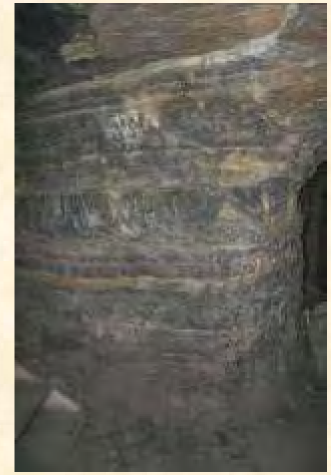


Cerknica Polje, Slovenia

Staffed buildings with displays, educational facilities, etc (5):

Antonijev Rov Mine, Idrija, Slovenia (1)






Antonijev Rov Mine, Idrija, Slovenia (2)

Staffed buildings with displays, educational facilities, etc (6):





Podezemlje Pece Mine, Idrija, Slovenia (1)

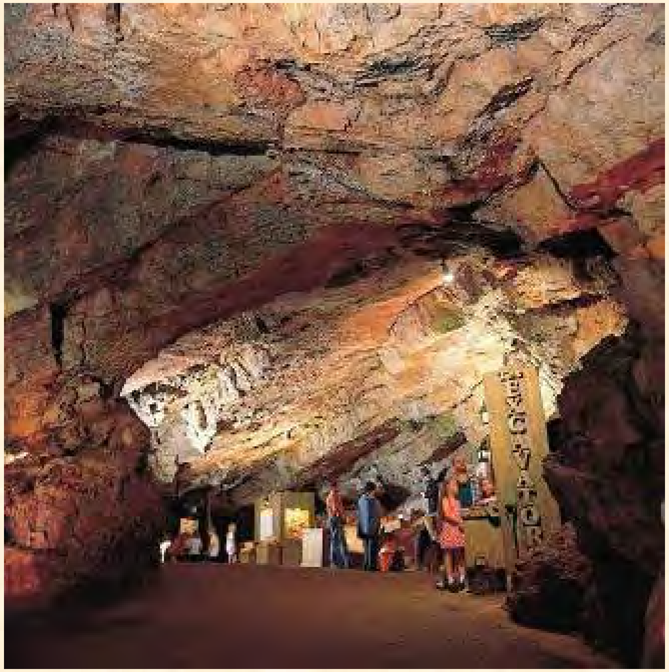





Podezemlje Pece Mine, Idrija, Slovenia (2)

Staffed buildings with displays, educational facilities, etc (7):

Kents Cavern, Torbay, Devon,
SW England



Museums and related facilities (with site-specific displays) (1):

Semur en Auxois Museum,
Burgundy, France

6: Evaluating the effectiveness of interpre-tative schemes

6.1: Methodology includes interviews with assessment of:

- Visitors response to panel/scheme(e.g. ignored / viewed)
- Size of groups logged
- Number of visits a year by interviewee
- Age profile of visitors
- Daily newspaper readership
- Visitors educational attainment
- Visitors level of geological education
- Common fossil recognition
- Recognition of or naming of geological systems
- Rock types believed to be at site by visitors.

Roadside interpretation at a Neogene bird footprint site in the Réserve Géologique de Haute Provence: how much geological information will these visitors retain on leaving the locality?

6.2: Implications:

- Given sufficient exposure, people *will* recall geological terms
- At present geological information cannot compete with other natural history and general heritage material
- Geological information therefore needs to be presented in isolation or integrated within a themed landscape approach to be most effectively communicated
- Additional detailed analyses of visitor responses to existing provisions are needed to aid the design and fully develop new geological attractions…

7. Interpretative Strategies and ‘geodiversity audits’

- Provide a rationale and framework for developing cost-effective and suitably targeted schemes.
- Enable integrated approaches by exploring the potential of the geological resource available and by identifying established facilities or materials and potential partnerships.

What should the geoscientists role be in environmental interpretation?

- Encouraging more geologically focussed interpretation?

- Providing free advice to any organisation establishing geologically focussed interpretation?

- Or even being paid commercial rates for providing such advice?!

Peña Oroel, Pyrenees, Spain - possibly the worst sited interpretation board in Europe….

…and one of the best!