

Earth heritage

Earth heritage

The geological and landscape conservation magazine

ISSUE
38

Summer 2012



- Enthusiastic young people
- Art and geology
- New partner for *Earth Heritage*
- And more!

EDITORIAL

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Welcome to the third digital-only edition of *Earth Heritage*. You can download it and back issues free, as pdf files, from www.earthheritage.org.uk. This bumper 40-page edition showcases an unusually wide range of news and features about geoconservation – continued testimony to the commitment and hard work of numerous people – volunteers and paid employees – working for a common cause.

The National Planning Policy Framework for England (p. 7) is worthy of special mention. This new highly condensed and simplified guidance for planners is a major and important development. Together with the Nature Improvement Areas scheme (p. 17) and new practical guidance on the age-old and often thorny issue of 'geological collecting' (p. 9), they potentially provide significant opportunities and challenges for geoconservation. We bring you news of the completion of the South East Wales RIGS audit – establishing a pan-Wales RIGS coverage of nearly 800 localities! The recently completed Clwydian Range Geodiversity project has integrated its RIGS into the AONB Management Plan through developing a LGAP (p. 36). At the other end of our huge subject spectrum, we hope to enthuse you with the moody, enigmatic but undeniably geological art of John Piper.

The welcome addition of the Geologists' Association to the *Earth Heritage* board is marked by a brief history of the Curry Fund which has long supported so much geoconservation work.

We now have a presence on Twitter and Facebook, so if you're on either, supporting us will actively enhance *Earth Heritage*'s reputation for providing geoconservation information.



COVER PHOTO
When you're young and studying geology, nothing quite beats sitting in the bucket of a giant front loader. See *Action-packed – Geopartnership produces results*, page 36.
Photo by Jacqui Malpas

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Earth heritage

Earth Heritage is a twice-yearly publication produced for download in pdf format by Natural England, Scottish Natural Heritage and the Countryside Council for Wales. The voluntary geoconservation sector is a major contributor. We would like to thank all those who have assisted with the preparation of the publication. However, the opinions expressed by the contributors are not necessarily those of the above organisations. This and back issues of *Earth Heritage* can be downloaded as pdf files from www.earthheritage.org.uk

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A new partner joins Earth Heritage team

The Geologists' Association has joined Natural England, Scottish Natural Heritage, Countryside Council for Wales, GeoConservation UK and others in the voluntary sector in helping to produce *Earth Heritage* magazine.

Since its formation in 1858, the Geologists' Association has actively promoted the study of geology to all who are interested in the past, present and future of the natural world.

It is a friendly and inclusive organisation and welcomes everyone, regardless of the level of their knowledge. So speaks the 'About us' page of the GA's web site, although this was true long before the internet was invented. The Association is a charitable organization that exists for all geologists and Earth scientists, both professional and amateur, and of all ages and backgrounds. It organizes, in London, a programme of evening lectures and an annual Festival of Geology, with other scientific meetings held elsewhere, as well as regular UK and overseas field trips. The GA also publishes a lively news magazine, a series of geological guide books to UK and overseas locations and a professional scientific journal, the *Proceedings of the Geologists' Association*. The last-mentioned started life in January 1859 and is now in its 123rd volume. It is currently published by Elsevier, with the entire print run from 1859 available to members as searchable pdfs on the Science Direct website (www.sciencedirect.com).

The GA is strongly committed to encouraging 'Geology for All'. It is actively engaged in the public dissemination of science and diverse outreach initiatives. Rockwatch, the nationwide geology club and junior branch of the GA, engages thousands of children and their families each year in hands-on events and field trips, as well as being a regular presence at the Festival of Geology. The GA has several local groups which organize their own meetings and events, and there are numerous affiliated societies, many directly involved in geoconservation (for more information see 'Linked Societies' on the GA website, www.geologistsassociation.org.uk). The GA also supports geological research via its diverse grants programme and, through the Curry Fund (see page 28), has provided some £250,000 over the past 20 years to fund initiatives in geological conservation, education and research around the country.

The Association has a longstanding interest in all aspects of the conservation of geology and geological resources, including the co-ordination of and support for local groups. The current GA President, from May 2012, is Rory Mortimore, who was lead author of No. 23 in the Geological Conservation Review (GCR) series, on the Upper Cretaceous; the previous President, David Bridgland, was also involved in the GCR and was author of No. 7 in the series, Quaternary of the Thames, and also contributed to *Earth Science Conservation*, the predecessor of *Earth Heritage*. The remaining unpublished parts of the Geological Conservation Review will appear in the *Proceedings of the Geologists' Association*, further underlining the involvement of the GA in Earth heritage matters. David Bridgland, meanwhile, continues to serve as Senior Vice-President and becomes the GA's representative on the Editorial Board of *Earth Heritage*. Furthermore Colin Prosser, geologist at Natural England, is currently a Vice-President and Chair of the Publications Committee of the GA.

– David Bridgland, Geologists' Association

The GA's modern-day commitment to Earth heritage is illustrated by the evolution of its badge, from which the geological hammers (rather non-PC in geoconservation circles) disappeared in 1990. To find out more see www.geologistsassociation.org.uk/



Field meeting from yesteryear: GA excursion to Tenby, Easter 1909. The whiskery gentleman circled in the left side of the view, with cane, is W.A. Whitaker, author of the 1889 Geological Survey London memoir and GA President 1900–1902 and 1920–1922.



Biodiversity week focuses on soils

Every May, since starting in 2000 as a local initiative in Fife, communities in Scotland have been celebrating the biodiversity found in their back yard with a week of events and fun activities for people of all ages.

This year Highland Council dedicated its week of events to soil biodiversity, starting with a well-attended soil biodiversity forum in the Scottish Natural Heritage headquarters in Inverness and finishing with a Question Time-like debate on the future of highland soil at Inverness Eden Theatre.

The week was punctuated with a range of field activities and lectures looking at past and present linkage between soil, biodiversity, geodiversity and cultural heritage. This included a BioBlitz in Dingwall, ranger visits to limestone pavement in Strath Special Area of Conservation, the bone caves in Inchnadamph, a worm charming championship in Lairg and illustrated talks on soils and wildlife and agricultural improvement in the Black Isle.



Maiden Pap and Morven are a spectacular sight from Braemore, Caithness. Its soils link biodiversity and geodiversity.

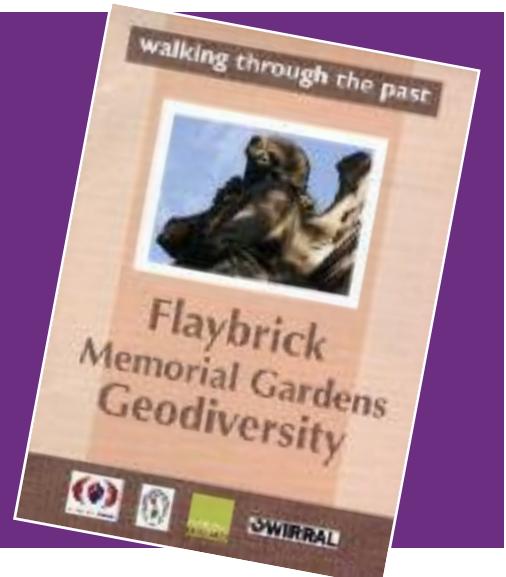
Photo by Iain Sarjeant

For further information on this and other biodiversity week activities visit www.hIGHLANDBIODIVERSITY.COM/ or www.biodiversityscotland.gov.uk/area/biodiversity-week/

– Patricia Bruneau, Scottish Natural Heritage

A little goes a long way

The compact Flaybrick Memorial Gardens Geodiversity leaflet from the Cheshire RIGS Group folds out to A3 to reveal the great variety of stone that masons have brought in as headstones, explaining the distant origins of each of the examples. A large map makes finding the chosen headstones easy. There is the added bonus of a colourful graphic of the rock cycle, complete with explanations of igneous, sedimentary and metamorphic rocks, plus a geological timeline. The leaflet packs a lot into a small space, and should appeal to geologists and non-geologists alike. The leaflet is available by sending a stamped, self-addressed DL envelope to Dr Kate Riddington, Cheshire RIGS group secretary, Grosvenor Museum, Grosvenor Street, Chester CH1 2DD.

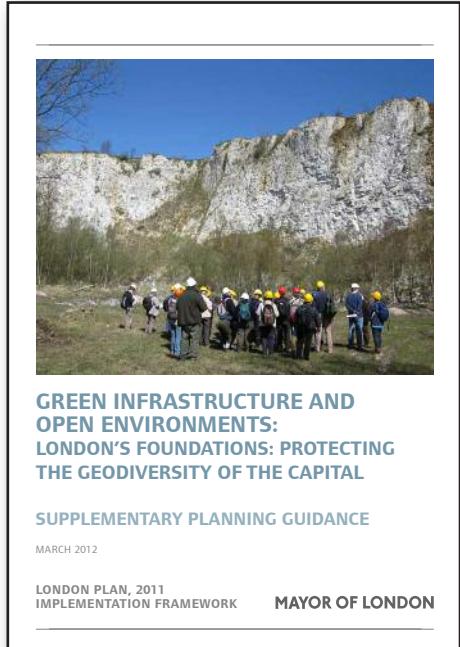


London's Foundations –the 2012 update

The newly updated version of London's Foundations, the document originally published in 2008 to provide a basis for developing a Geodiversity Action Plan (GAP) for Greater London, is now available.

London's Foundations describes a multi-agency/body geodiversity audit which recommended the designation of 14 Regionally and 15 Locally Important Geological Sites (RIGS/LIGS) across the capital out of an initial list of around 470 sites with potential for geodiversity value that was compiled from this information.

The report needed updating due to changes in legislation and the update reflects work done since the original was published – including the publication of the London GAP and the emerging National Planning Policy Framework. Jane Carlsen and Peter Heath of the Greater London Authority prepared the update with the assistance of the London Geodiversity Partnership to which Natural England contributes. The updated version is available to download from
www.londongeopartnership.org.uk/publications.html



Minister launches Scotland's Geodiversity Charter



Stewart Stevenson MSP (left) and Angus Miller (Chair of the Scottish Geodiversity Forum) at the launch of the Charter.

Photo by Brian McIntyre, British Geological Survey © NERC

awareness and more integrated management of something so fundamental to all our lives."

On 6 June 2012, Stewart Stevenson MSP, Minister for Environment and Climate Change, launched Scotland's Geodiversity Charter recognising the importance of Scotland's geodiversity to society.

Mr Stevenson said: "Geological diversity is often taken for granted but it is key to our environment and our quality of life– the importance of its sustainable management should not be underestimated. I welcome Scotland's Geodiversity Charter which not only encourages understanding and appreciation of our geodiversity but also promotes

Scotland's Geodiversity Charter has been drawn up by the Scottish Geodiversity Forum, with support from the Scottish Government, Scottish Natural Heritage, the British Geological Survey and GeoConservationUK. It has already been signed by more than 29 organisations, pledging to ensure that the geodiversity is adequately considered and conserved, and continues to provide essential benefits for Scotland.

The Charter may be found at <http://scottishgeodiversityforum.org/2012/05/22/scotlands-geodiversity-charter/>

GeoSuffolk's Paradise Lost is discovered at open day

Rockhall Wood Site of Special Scientific Interest, a key geological site at Sutton Knoll, Suffolk, is the subject of a highly original piece of interpretation and in May was a novel part of the village's open gardens event, drawing dozens of visitors.

The interpretation has centred on creating a 'living fossil forest', with GeoSuffolk planting trees from all over the world to match fossilised pollens found in the Pliocene Coralline Crag, a marine deposit about four million years old, found on the SSSI.

Some of the genera were identified by Professor Richard West who collected fossil pollen from the nearby Orford borehole in 1968. The results showed a forest which included our modern English genera enriched with *Sequoia*, *Tsuga*, *Cupressus*, *Sciadopitys* and many more which did not find their way back to Britain after the 'Ice Age' - a veritable Pliocene 'Paradise Lost'.

In 2008 GeoSuffolk, with permission from Natural England and the landowner, launched the project to recreate this 'Pliocene Forest' on part of the SSSI. The 126 trees planted to date have been sourced by GeoSuffolk member Barry Hall from far-flung corners of Asia and the Americas to represent the pollen record from the Orford borehole. Visiting geologists have sponsored most of them, and deer-proof fencing has been erected with a grant from the Geologists' Association Curry Fund. The 'Pliocene Forest' has proved an excellent interpretative resource for visiting parties and has its own panel adjacent to the public footpath.

However, the SSSI is on private land with no public access, so GeoSuffolk had been looking for a way to allow public viewing of the forest. The Sutton Gardens Open Day provided an ideal one-off opportunity. We made ourselves known to the organisers and were invited to participate in this community event. Preparations included cleaning up the north face – the

geological exposure closest to the forest; strimming grass; writing 'Pliocene Plant Profile' labels for key specimens and creating our 'Open Gardens' scarecrow, Captain Fitzroy! The village scarecrow theme to celebrate the Queen's Diamond Jubilee was stretched a little to include the polymath Captain of the Beagle, who, with his famous passenger Charles Darwin, was one of the first to bring some of these exotic tree species back to Britain.



Seven GeoSuffolk members showed nearly 60 people around the site - including geo-visits to the north face in our tour of the 'Pliocene Forest'. We met several parish councillors from Sutton and adjoining parishes; the owner of another nearby SSSI; lots of children, all of whom left with fossil mollusc souvenirs, and some old friends keen to see the trees they had sponsored. Landowner Jenny Quilter 'planted' a tree - *Glyptostrobus pensilis* (a Chinese swamp cypress) - to commemorate the Queen's Diamond Jubilee; four more trees received sponsorship; and we sold some books and gave out leaflets.

The whole event was a big success for the village with 13 gardens open and £893.27 raised for the church fund (Sutton has a very geological church built from the spoils of the 19th Century coprolite industry – Mio-Pliocene boxstones and flints with Red Crag barnacles).

In 2006, the SSSI Crag faces were refreshed as part of a Natural England 'Facelift' operation and since then GeoSuffolk has maintained the site for research work and geological field excursions, keeping the exposures clean and providing interpretative panels.

For a comprehensive account of management at Sutton Knoll and the 'Pliocene Forest' read Barry Hall's article, *Life, the Universe and Sutton Knoll* in GeoSuffolk's new book *A Celebration of Suffolk Geology* – details on www.geosuffolk.co.uk.

– Caroline Markham, GeoSuffolk



Integrating geoconservation into development planning: it's easy with Lego but will the NPPF make it easier in real life too?

Photo by Colin Prosser

Reasons to be cheerful in new National Planning Policy Framework for England

Colin Prosser, Natural England

The Government's new planning policy for England, the National Planning Policy Framework (NPPF), came into force on 27 March 2012. It sets out how the Government's economic, social and environmental policies are to be delivered via the planning system and will guide the preparation of local authority Local Plans and community-led Neighbourhood Plans, as well as providing a steer for decisions on planning applications. It replaces all existing Mineral Policy Statements (MPSs) and Planning Policy Statements (PPSs), including PPS9: Biodiversity and Geological Conservation, with immediate effect, reducing over 1,000 pages of planning policy to just 50.

The published version of NPPF has changed significantly from the consultation draft and incorporates a range of positive policies for the natural environment in general, geoconservation and sustainable development. A welcome change for the environmental movement, in the final version, is the increased weight given to the environment alongside social and economic aspects of planning.

In terms of geoconservation, the NPPF is not perfect, with geomorphological processes not recognised in the policies as explicitly as many would wish. However, given the vast reduction in the size of the guidance, the profile of geodiversity and geoconservation is relatively high. *continued overleaf*

Reasons to be cheerful – 2

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The fact that all planning policy is now in one place, and that geodiversity and geoconservation are recognised within it, can only help to raise the profile of geoconservation amongst planners.

There are several places with statements relevant to geodiversity and geoconservation, which can be used in influencing decisions relating to geoconservation. The most explicit and helpful are:

- ‘The planning system should contribute and enhance the natural and local environment by protecting and enhancing valued landscapes, geological conservation interests and soils; [and] recognising the wider benefits of ecosystem services’ (paragraph 109)
- ‘Local planning authorities should set criteria-based policies against which proposals for any development on or affecting protected wildlife or geodiversity sites or landscape areas will be judged. Distinctions should be made between the hierarchy of international, national and locally designated sites, so that protection is commensurate with their status....’. (paragraph 113)
- ‘Local planning authorities should maintain the character of the undeveloped coast, protecting and enhancing its distinctive landscapes, particularly in areas defined as Heritage Coast, and improve public access to and enjoyment of the coast’ (paragraph 114)
- ‘To minimise impacts on biodiversity and geodiversity, planning policies should aim [among other things] to prevent harm to geological conservation interests’ (paragraph 117)
- ‘proposed development on land within or outside a Site of Special Scientific Interest (SSSI) likely to have an adverse effect on a SSSI interest (either individually or in combination with other developments) should not normally be permitted’ (paragraph 118)
- ‘Substantial harm to or loss of designated heritage assets of the highest significance, notably scheduled ancient monuments, protected wreck sites.....and World Heritage Sites, should be wholly exceptional’ (paragraph 132)
- ‘In preparing Local Plans, planning authorities should put in place policies to ensure worked land is reclaimed at the earliest opportunity.....and that high quality restoration and aftercare of mineral sites takes place, including for agriculture...., geodiversity, biodiversity, native woodland, the historic environment and recreation’ (paragraph 143, bullet point 8)
- ‘When determining planning applications, local planning authorities should consider how to meet any demand for small-scale extraction of building stone at, or close to, relic quarries needed for the repair of heritage assets, taking account of the need to protect designated sites’ (paragraph 144, bullet point 8)

The final Framework has been well received by geoconservationists and the environmental movement more widely. It refers to geological conservation and geodiversity in a number of places and offers some very clear and explicit hooks for geoconservationists to use, especially with regard to conserving locally, nationally and internationally important sites through the planning system. Note, however, that there is still no explicit recognition of Geoparks! Furthermore, there are parts of the Framework where wider policies are relevant to geodiversity, even where geodiversity is not explicitly mentioned. For example, it is possible to look across the whole framework and state the case for considering geoconservation and geodiversity, especially within the wider landscape, when applying the policies relating to green space, local character, landscape conservation, climate change and sustainable development as well as within the overall plan-making process. In fact, it is now easier than ever to look for opportunities for geoconservation across the whole suite of development and mineral planning policies given that these policies are presented in one document.

This new planning policy framework looks very promising for geoconservation but, as ever, we need to see how it works in practice before passing final judgement. ●

Managed collecting

New guidance on how to handle demand for geological specimen collecting

Hannah Townley & Jonathan Larwood, Natural England

Collecting geological specimens is as important today as it was to the pioneering geologists and is probably enjoyed by more people than ever before, providing an inspiring experience of past worlds and today's natural environment. The available collecting resource is, however, finite and it is important to adopt a responsible approach to collecting to ensure this resource remains available for future generations to experience, study and enjoy. This is an important part of geological conservation.

Codes and guidance on responsible fieldwork and collecting practice have been long established.

Examples include the fieldwork codes of the [Geologists' Association](#) and [Geological Curators' Group](#) and the comprehensive [Scottish Fossil Code](#) (see page 13).

Natural England has now produced new guidance on the management of geological specimen collecting. This combines previous English Nature advice on responsible collecting with guidance on site management, and a series of case studies which considers collecting of geological specimens – rocks, fossils and minerals. The focus is very much on helping site managers make clearer and consistent decisions about the degree and nature of site-based management that is required.

Approaches to managing collecting

The guidance contains simple principles linking the scale and nature of collecting to the vulnerability of the resource. Taking the principles of 'responsible collecting' as a common standard, there are three broad approaches to site management:

OPEN COLLECTING should operate where management is not necessary, is undesirable or impractical. Open collecting is most appropriate on a site that is regularly renewed, such as a coast subject to erosion, where the geological resource is extensive and can withstand a wide range of collecting pressures.

OPEN-MANAGED COLLECTING should operate where there are aspects of the site or geological resource that require a degree of protection and where that protection can be provided effectively. This could apply to any site but is more likely to be where there is limited renewal, for example a quarry where the fossil resource is finite. There may be some access restrictions and the need for site-specific guidelines or the guidance of specialists.

Continued overleaf



Photo by
Mick Murphy



Writhlington SSSI, Bath & NE Somerset, children collecting plant and insect fossils at a Rockwatch event in 1994.

Photo by Colin Prosser

Managed collecting – 2

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CONTROLLED COLLECTING should operate where uncontrolled collecting would quickly damage or remove the resource. This may be a mine spoil tip or a limited mineral vein or fossil deposit. To instigate controlled collecting it is important to be able to control access effectively, for example, through secure fencing and the presence of on-site wardening and there may be a need for site-specific guidelines or the guidance of specialists.

How do you decide?

Questions have been developed to help determine which of the three site management approaches should be adopted. Examples of how these questions can be used are illustrated by the case study opposite and overleaf.

continued overleaf

Managing Writhlington SSSI, Bath & NE Somerset

The remains of a disused colliery tip, around 3,000 tons of material, has been set aside as the Writhlington Geological Nature Reserve and Site of Special Scientific Interest (SSSI). The site includes Coal Measures mudstones containing a diverse Carboniferous Westphalian D fossil assemblage. Over 100 species of plant fossils and the largest known collection (over 1,300 specimens) of Carboniferous arthropods in Britain have been collected from here.

Determining the Writhlington collecting approach:

- The spoil tip is a finite resource
- Access is controlled through a secure fence and ownership is simple
- The spoil tip requires mechanical turnover for additional specimens to be found
- Specimens, particularly arthropods, have a high scientific value
- Specialist supervision is required for collection and identification of arthropods.

A controlled collecting approach has been adopted at Writhlington: the site is only opened to organised groups, collecting is supervised with important arthropod specimens being retained for research.

The Roughton Gill Geological Conservation Review site holds a large mine dump which is an important source of geological specimens and preserves a record of the mining history, Skiddaw Group SSSI, Cumbria.

Photo by
Hannah Townley



Managed collecting – 3

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The questions include:

- Is the nature of the collecting resource finite or extensive? – finite favours controlled collecting, extensive favours open collecting
- Is the process of exposure renewal predictable or unpredictable? – unpredictable favours open collecting, predictable favours controlled or open-managed collecting
- Are specimens common, rare or scientifically important? – common favours open collecting, scientifically important favours controlled collecting
- Is there high collecting pressure? – high pressure favours open-managed or controlled collecting
- Is ownership simple or complex? – complex favours open collecting unless the site can be zoned, simple favours open-managed or controlled collecting if needed.

continued overleaf

Sharing the spoils of Caldbeck Fells, Skiddaw Group SSSI, Cumbria

A large area of former mining activity, the Caldbeck Fells contains six mineralogical Geological Conservation Review sites. The diverse mineral veins were once an important economic resource exploiting ores of copper, lead, zinc, iron and tungsten. Over 175 different mineral species have been identified. The mining spoil tips are important for their industrial archaeology and the area is also important for its biodiversity.

Determining the Caldbeck Fells collecting approach:

- The mineral veins and mine spoil tips are a finite resource
- The Fells are Open Access land, but a mineral collecting permit system operates which is policed by rangers
- The Fells have been zoned to allow more collecting in less vulnerable areas, with greater restrictions in the most fragile areas
- New material is exposed slowly by natural erosion
- A mixture of common and rare minerals is present, some with high scientific value requiring specialist skills or equipment for identification and research
- There is high collecting pressure due to the variety and quality of the mineral specimens.

A mixture of open-managed and controlled collecting has been adopted: access to the site is open (although access to mine tunnels is controlled by barriers) but collectors must obtain a permit and observe the code of conduct which is policed by rangers.

Managed collecting – 4

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- Can or should access be restricted? – open-managed or controlled collecting can only operate where it is possible and necessary to control access
- Are particular collecting or identification skills required? – a high level of skill does not favour any particular management approach, but should be considered in all cases
- How much material is needed for future research or museum collections? - specific research projects may lead to a period of open-managed or controlled collecting on a site which is otherwise suitable for open collecting.

This analytical approach encourages site managers to consider the range of often complex factors that can influence both the impact of collecting on a site and the choices made when managing collecting. The answers to these questions may point towards more than one approach to managing collecting. Sites are often complex and may have both extensive and finite elements, both common and rare specimens, and several owners who prefer different management approaches. Zones of open, open-managed and controlled collecting may all be found on the same site. These may be defined on a map, through site-specific collecting codes or by-laws and managed through site wardening or physical barriers preventing access to certain parts of the site.

Summary

Different sites present different challenges in managing collecting. It is important to adapt the management approach to the available collecting resource, the nature of the material being collected and the potential pressure from collecting. Sites vary from an extensive and renewed collecting resource (such as a rapidly eroded coastline) through to a non-renewable finite resource (such as a mine spoil tip) which will require differing management approaches.

Whilst recognising the important role that collectors can play in advancing geological science, it is also important to conserve sites for future geologists to study and reinterpret. The questions outlined above can be applied to any site and should help site managers determine practical solutions to managing collecting.



In the spirit of Robin Hood, Bay fossils are freely collectable

The coastal cliffs and foreshore at Robin Hood's Bay, Yorkshire, include a sequence of Lower Jurassic rocks yielding many species of fossil ammonite and occasional marine reptiles such as ichthyosaurs and crocodiles. The site is open access and an open collecting approach is preferred.

Photo by Richard Cottle

Further information

Natural England Technical Information Note, TIN111, Managing geological specimen collecting. Available at <http://nepubprod.appspot.com/category/9001#content>, along with case studies TIN112 to TIN119 inclusive from July 2012. ● See overleaf for an update on the Scottish Fossil Code

Reckless collectors in view

– but Scottish Fossil Code is working

Colin MacFadyen,
Scottish Natural Heritage

Four years after publication of the Scottish Fossil Code in April 2008, the first review has found that although there are encouraging signs that collectors are adhering to the Code's best practice guidance, work is still required to promote uptake of the Code among sections of the collecting community that continue to collect in a reckless manner.

Scottish Natural Heritage prepared the Scottish Fossil Code under the powers of the Nature Conservation (Scotland) Act 2004. The Act also obliged SNH to review the Code occasionally and revise it if required. The Code was the Scottish Government response to perennial irresponsible fossil collecting that was affecting vulnerable fossil localities.

The review has revealed that the Code is well regarded nationally and internationally. Indications are that the Code has resulted in fossil collectors generally behaving more responsibly when collecting from sites. However, there is unwillingness among collectors to seek permission from landowners to access land, so by definition irresponsible collecting is still widespread.

Unfortunately, large-scale damaging collecting continues at a few 'honeypot' sites such as the South Threave SSSI (Ladyburn fossil locality) in Ayrshire that yield particularly rare, visually appealing and commercially valuable fossils. These actions may be truly described as reckless.

The review has revealed that the Code content is good, but it could have been more effectively promoted, particularly amongst those that collect in a blatantly irresponsible or reckless manner.

continued overleaf



Above: Dinosaur footprint at a beach locality in Trotternish, north Skye. Evidence shows that slabs of rock in which the prints occur have been hammered in an attempt to form portable samples for easy carriage from the locality. Voluntary monitoring of this site will help safeguard new fossil discoveries and arrange rescue before they are damaged or stolen.

Below: Discarded fossils on a beach on Trotternish, the host rock appears to have been quarried with only the largest and best-preserved ammonites being collected.

Photos by

Colin MacFadyen / Scottish Natural Heritage



Reckless collectors in view – 2

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Consequently, non-adherence will be addressed through renewed, better and more targeted promotion. SNH is proposing:

1. continued promotion of the Code among all collectors, to raise awareness of the legal situation;
2. promotion of the Code to 'land managers' that have particularly vulnerable fossils and fossil-bearing sites, to help them distinguish between responsible collectors who cause minimal site impact, and collectors whose irresponsible and reckless activities cause serious damage; and
3. a highly targeted promotion of the Code amongst those most likely to collect recklessly. Promotion of the Code to that collector grouping should emphasise the risk of prosecution for non-adherence to the Code.

SNH is also considering instigating voluntary site monitoring groups, so interested members of the community can keep an eye on particularly vulnerable sites for instances of reckless collecting. Such groups would have close links to landowners, countryside rangers, SNH and Police wildlife liaison officers. This new development is a response to the worst instances of recklessly irresponsible collecting that have taken place in Scotland in recent years, on the Isle of Skye, the home of Scotland's dinosaur remains. It was discovered in late 2010 and the summer of 2011 that dinosaur footprints were being removed from an SSSI in Trotternish and that a particularly rich fossiliferous ammonite horizon was being quarried. Still the subject of police investigation, it is hoped that concerted effort by local people with support from the police and others will help create the conditions whereby responsible collecting will replace reckless activity.

Follow the Code

If collecting fossils in Scotland, please do so responsibly and follow the advice on best practice in the collection and storage of fossil specimens outlined in the Scottish Fossil Code. The Code may be viewed and downloaded from www.snh.gov.uk.

The essentials of the Code:

SEEK PERMISSION – You are acting within the law if you obtain permission to extract, collect and retain fossils.

ACCESS RESPONSIBLY – Consult the Scottish Outdoor Access Code prior to accessing land. Be aware that there are restrictions on access and collecting at some locations protected by statute.

COLLECT RESPONSIBLY – Exercise restraint in the amount collected and the equipment used. Be careful not to damage fossils and the fossil resource. Record details of both the location and the rocks from which fossils are collected.

SEEK ADVICE – If you find an exceptional or unusual fossil do not try to extract it; but seek advice from an expert. Also seek help to identify fossils or dispose of an old collection.

LABEL AND LOOK AFTER – Collected specimens should be cared for and labelled.

DONATE – If you are considering donating a fossil or collection, choose an accredited museum, or one local to the collection area. ●

High road to successful geoconservation

Colin MacFadyen,
Scottish Natural Heritage

A road interchange proposed for the M80 at Mollinsburn, north-east of Glasgow, meant unavoidable encroachment on part of a geological Site of Special Scientific Interest, threatening its integrity. However, discussions early in the planning process ensured that encroachment was minimised, that effects were mitigated and that the overall condition of the site was improved.

Mollinsburn Road Cutting SSSI encompasses the best and most representative exposures of the Lenzie-Torphichen Dyke, a major east-west intrusion, averaging 40 metres wide, that can be traced for over 40 km across Scotland's Midland Valley. Providing a key example of a late Carboniferous quartz-dolerite dyke, of the type that is believed to have fed the Midland Valley Sill-
continued overleaf



Mollin Craigs after the work had been completed. Photo by Colin MacFadyen

Low road to a lost opportunity

Sid Howells & Raymond Roberts,
Countryside Council for Wales

A temporary exposure of Upper Cambrian 'Lingula Flags', created during recent improvements of the A40 trunk road at Kell's Corner, near Treffgarne, west Wales, has been buried again before it could be fully studied and documented.

It is particularly disappointing since, in early comments on the scheme and during consultations over the Environmental Statement, the Countryside Council for Wales (CCW) highlighted the potential for geological recording and conservation. However, in contrast to biological and archaeological conservation, there is no formal provision for such work, although the aspirations are covered by TAN 5 which says: '*The geology of Wales, including its landforms, minerals and fossils is diverse, visually impressive and of great scientific importance*'. Tan 5, para 1.5.1



A trilobite found in the A40 exposure.
Photo by Sid Howells

'*The enjoyment of wildlife and geology provides opportunities for lifelong learning recreation and tourism*'. Tan 5, para 1.5.2
continued overleaf

High road – 2

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complex, the intrusion holds a variety of features including columnar jointing, chilled margins against Carboniferous sedimentary rocks, and superb onion-skin weathering. Although nibbled at by quarrying activity, it forms a raised ribbon of rock across the landscape representing a textbook illustration of differential erosion, revealing that the dolerite intrusion fared better than the host sandstones and shales in recent glaciations.

The site found itself close to a planned major road interchange that was integral to the development of the M80. The original configuration would have wiped out most of the SSSI. However, early discussions between SNH and the consultants employed by Transport Scotland, ensured the interchange layout was revised to achieve the road needs while having minimal impact on the SSSI. While it still involved removing a portion of the exposed rock, it was agreed that mitigating efforts would be made to reveal a fresh exposure of the dyke intrusion elsewhere within the SSSI boundary. Work in and around the site began in 2009 and was completed by the end of 2011. In early 2012, final landscaping within the SSSI exposed previously hidden areas of the intrusion and also removed material that had been tipped against some of the faces well before the site had been designated – a double gain for the loss of a section of outcrop to the road project.

The mitigation works at Mollinsburn Road Cutting SSSI illustrates that, with early consultation, major infrastructure development work on designated land need not lead to loss of the designated interest and can have positive aspects. ●



The completed scheme allows for road and geoconservation needs. Photo by Colin MacFadyen

Low road – 2

from previous page

CCW geologist Sid Howells and volunteer Ced Conolly started assessing the scientific value of the new exposure (Kell's Corner is adjacent to an existing geological SSSI) over several Sunday afternoons (the only time when access was allowed). Potential source beds were marked with spray paint and wooden stakes in preparation for a planned visit by Dr Bob Owens from the National Museum Wales.

Unfortunately, the visit had to be cancelled when the entire bank was found covered in topsoil, despite prior consultation and demarkation of key areas with marker posts. The outcome is yet another lush green slope with tree planting to follow!



Kell's Corner is just one example of countless road schemes where the opportunity to improve understanding of geodiversity and conserve the geological resource has been lost. The opportunities start with road design where the conservation of exposures in the final profiles can be negotiated, sometimes avoiding the norm of burial and rock meshing. Where providing accessible exposures after completion of the works is not possible, reasonable access during construction can be agreed. While there are examples of good practice, too often opportunities are missed, as in this case. The geological community needs to continue to push for parity with archaeological and biological surveys which are required prior to large civil engineering schemes such as this. ●

Nature Improvement Areas and geodiversity

**Jonathan Larwood, Natural England &
Alan Cutler,
Birmingham and Black Country Biodiversity and Geodiversity Partnership**



Rowley Hills in the centre of the Black Country – a quarried dolerite intrusion and watershed of England viewed from Wollescote, Stourbridge. Photo by Alan Cutler

The natural environment white paper *The Natural Choice: securing the value of nature in 2011* set out the Government's plans to improve and protect the natural environment. Part of what was proposed was the establishment across England of Nature Improvement Areas (NIAs).

NIAs are very much focused on opportunities to deliver ecological networks through restoring habitats and underpinning ecosystem processes – enlarging and enhancing existing sites, improving connectivity between sites and creating new sites will all be important. What is also clear is the value of wide participation in delivering the aspirations of each NIA and the role they will play in inspiring people by an enhanced experience of the outdoor world.

In February 2012, 12 successful NIA proposals were announced. Over the next three years (April 2012 – March 2015) they will receive a share of a £7.5 million Defra fund to help develop and deliver the planned actions of each NIA. So far the partnerships have mobilised a further £43 million in cash and in-kind contribution.

What role does geodiversity play? This will vary between the NIAs. NIAs have a strong focus on ecological networks and ecosystem services (as well as mitigating for the effects of climate change), and understanding an NIA's geodiversity is vital to maintaining and enhancing the area's natural processes. Integrated management of geodiversity and biodiversity interests can be mutually beneficial and potentially improve connectivity between sites. Geodiversity also has a vital role in linking us to past environments and increasing understanding of the landscapes and environment around us today and their influence on our lives, culture and history. This is all part of the NIA aim of inspiring the human experience of the outdoor world.

What does this mean in practice? To illustrate the potential of geodiversity 'on the ground', overleaf Alan Cutler sets out the opportunities (and challenges) that the Birmingham and Black Country Living Landscape NIA presents for geodiversity.

To find out more about NIAs go to:
www.naturalengland.org.uk and www.defra.gov.uk.
For more information about the Birmingham and Black Country Living Landscape NIA go to:
www.bbcbwildlife.org.uk/NIA

Birmingham & the Black Country Living Landscape NIA

The Birmingham and Black Country Living Landscape NIA has set out “to achieve long-term environmental gains for the wildlife and people of Birmingham and the Black Country by delivering targeted, on the ground, biodiversity projects at a landscape scale”. It is led by the Birmingham and Black Country Wildlife Trust supported by more than 50 partners, including the Black Country Geological Society and the Birmingham and Black Country Geodiversity Partnership.

The NIA encompasses the largest urban area in the UK in which 2.2 million people live and work. The area spans urban environment, semi-natural habitat, ‘urban common’ and open countryside. Working across this landscape for the natural environment has always been important. The NIA now provides a real opportunity to galvanise this approach – enhancing ecological processes, increasing the contribution of the natural environment to the area’s economy and involving people in this journey.

Landscapes of the NIA

For its size, Birmingham and the Black Country NIA has some of the most diverse geology in the world. The present-day landscape is mainly the result of erosion by ice and water during the Quaternary Period, which left most of the area with a blanket of sands, gravels and sandy clays. Underlying geology divides broadly into two parts, each with a distinct topography, ecology and related industrial, historical and cultural associations.

The western area is the southern part of the South Staffordshire Coalfield (also known as the Black Country Coalfield) which extends from Rubery in the south through Halesowen and the Black Country to Wolverhampton and Walsall. The rocks comprise the Lower and Middle Coal Measures and the Etruria Marl, of Carboniferous age with the prominent dolerite of the Rowley Hills and the Silurian limestone outcrops at Wren’s Nest and Castle Hill, Dudley and at Walsall. The eastern area is dominated by younger rocks which record a very long desert phase ranging from late Carboniferous through Permian-age rocks to the Triassic Sherwood Sandstone Group and Mercia Mudstone Group.

The complexity and scientific value of the NIA’s geology is reflected by the many geological SSSIs and Local Geological Sites. In Dudley we have one of the UK’s first geological NNRs, Wren’s Nest, whose limestone caverns have yielded many key fossils, including the eponymous Dudley Bug. Equally, reflecting the geodiversity is a diverse mosaic of habitats. These include upland ash and oak woodland, calcareous and acidic grassland, heathland and a diversity of wetland habitats connected by streams, rivers and canals.

The NIA objectives

The Birmingham and Black Country Living Landscape NIA has five key objectives:

- To increase the amount of wildlife habitat in the NIA - BIGGER
- To enhance the value of existing habitats across the NIA – BETTER
- To increase the number of sites with wildlife value across the NIA – MORE
- To target action on corridors and stepping stones for biodiversity – JOINED
- To involve local communities in the above work – PEOPLE.

and delivery themes

To meet these objectives, the NIA has a simple structure and a number of delivery themes:

- Woodland – management & enhancement of recently established woodland
- Grassland – restoration and linking of long-established grassland
- Heathland – restoration and linking of long-established heathland
- Corridors – improving quality, linkage & bridging gaps
- Geology and Geomorphology – linking geodiversity and biodiversity
- Community Engagement – involving people.

continued overleaf

Birmingham & the Black Country Living Landscape NIA – 2

From previous page

The NIA will test innovative approaches to targeting and collaboration which will encourage similar initiatives in other urban areas, and which set the scene for ongoing development of our NIA.

Geology and Geomorphology – linking geodiversity and biodiversity

The NIA is primarily focused on biodiversity. However, uniquely the NIA has explicitly recognised the importance of geodiversity in shaping its natural environment and adding to the delivery of the ‘bigger, better, more, joined and people’ objectives. There are many sites across the NIA where enhancing biodiversity and connectedness improves geodiversity and where revealing geodiversity brings more biodiversity. For example, removing scrub benefits access to exposures and restores habitat for scarce ruderal plants and invertebrates. The industrial past of the area means there is much overlap in sites now valued for both their geodiversity and biodiversity. Similarly surveying and actively managing sites with active geological processes, such as erosion and deposition along our watercourses connects with the processes that maintain the quality and diversity of the area’s plants and animals.

The NIA has been awarded £600,000 over a three-year plan with an initial allocation of £18,000 specifically for geodiversity. The opportunity is there but the challenge is clear – we need to work within the NIA to maximise the benefit for geodiversity and, importantly, demonstrate the difference geodiversity makes to achieving and sustaining the goals of the NIA. Workshops have now been held across each of the themes looking for ideas and opportunities to connect across themes.

For geodiversity the basic need to survey and manage sites remains but the desire to establish a cross-cutting approach is central. It was also clear that geodiversity has a pivotal role in telling the story of the NIA and reconnecting people with the environment around them by flagging up the detail of what they find under their feet to the views that connect across the NIA landscape.

There’s no doubt that a long history of engagement with our biodiversity counterparts has helped in securing the inclusion of geodiversity in the Birmingham and Black Country NIA plans. Hopefully local geoconservation groups are engaging with the other 11 NIAs in or near their areas of operation. Although competition for funds is great there will still be opportunities for combining geodiversity interests, adding value within planned biodiversity projects, and demonstrating through geodiversity the breadth and depth of our natural environment. ●



At Pinfold Lane Quarry, part of the Barr Beacon Local Nature Reserve, vegetation clearance has exposed Kidderminster Formation conglomerate overlying breccias and made the section more accessible to nesting miner bees.

Photo by Alan Cutler

MESH

– the growing geoconservation challenge

Colin MacFadyen, Scottish Natural Heritage

Earth Heritage 32 highlighted how rock mesh had been used on Edinburgh's Castle Rock to prevent rock fall onto the railway track and trains below – a necessary precaution against loss of life and infrastructure. But has the increasingly ubiquitous use of wire mesh instead of more considered and geoconservation-friendly options got to the stage that open road and rail-side exposures will become a thing of the past?

Traditionally, there has been a range of solutions to stabilise rock faces. These include the re-profiling of rock faces, removing of rock to the point it forms a shallower-angled rock-slope; scaling to remove small loose rock; rock bolting that secures larger blocks to the main outcrop; grouting of cracks and fissures; and limited use of brick and concrete abutments. However, the use of high-strength steel wire mesh, bolted to rock faces, is becoming increasingly prevalent to help stabilise rock-slopes and try and prevent loose rock falling onto roads, rail lines, other infrastructure and buildings that lie below. Shortening the duration and cost of rock stabilisation work, with a design life that can be measured in decades, mesh has the function of providing 'passive drapery' that guides the fall of any rock to the base of the outcrop, sometimes into a trench. This allows any fallen rock to be removed without the use of costly scaling.

Although the rock face is technically to an extent stabilised, once covered in mesh it is exceedingly difficult to examine and record an exposure; sampling becomes very difficult and in time the rock face can become lost from view behind a veil of vegetation.

continued overleaf



A road cutting on the A87 at Loch Alsh south of the Skye bridge has provided valuable rock exposure. However, mesh has been fixed over the rock face, limiting access and visibility. Slippage of the inclined sheets of rock onto the road is possible in theory, but will the mesh actually prevent slippage and movement of hundreds of tonnes of rock? Or is the mesh to trap and prevent small loose rocks rolling over the rock surface and bouncing onto the road? Is there a better way of safeguarding the road and the safety of those that use it? Photo by Colin MacFadyen

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This is serious enough if it affects exposures of local and regional importance, but when it occurs within an SSSI it can be a disaster for geoconservation (see item by Colin Prosser in issue 27). In recent years, SNH has dealt with five cases where the application of mesh has led to the loss of exposures in SSSI across Scotland on a scale that had a detrimental impact on the interest of the sites. The damaging effect of mesh may be mitigated to a limited extent by stipulating that the face to be meshed is thoroughly recorded and the information archived by the British Geological Survey. Nevertheless a record, however detailed, is a poor and generally unacceptably alternative to an accessible and visible outcrop.

Is the use of mesh which shortens the duration and cost of rock face stabilisation, now becoming a too easy quick-fix ‘solution’? While it negates the need for regular maintenance of faces, in many cases the mesh appears to create a protected ‘habitat’ for plants, providing artificial support that can enable sizeable bushes and trees to grow where they would otherwise probably not have been able to establish themselves. It may be imagined that this could in some circumstances give rise to a more unstable and therefore dangerous slope in the longer term.

Hopefully by bringing this serious geoconservation issue to the attention of engineers and developers, the damaging effect of blanket mesh may become more widely realised. Hopefully it will result in its use being more considered and applied only where other methods will not work effectively.

Beach cliff netting still allows access

Mesh can be used sensitively, as at Pen Benar, a popular beach accessible from Abersoch on the Llŷn peninsula with access either along a public walkway and jetty, or private steps from clifftop properties. The cliff exposures are notified as a SSSI and provide the most north-westerly outcrop of Tremadoc rocks in Wales.

Following small-scale rock falls onto a walkway and steps, engineers suggested options to safeguard public use of the affected part of the beach. The landowner and local authority appreciated the scientific importance of the site and the need to maintain some access, but safety was paramount. Following site meetings it was agreed that the rock netting could stop some six feet short of the base of the cliff, allowing continued access to some of the exposures. The steeply dipping nature of bedding meant that access to higher parts of the cliff were not as critical and the compromise reached was acceptable to all concerned.



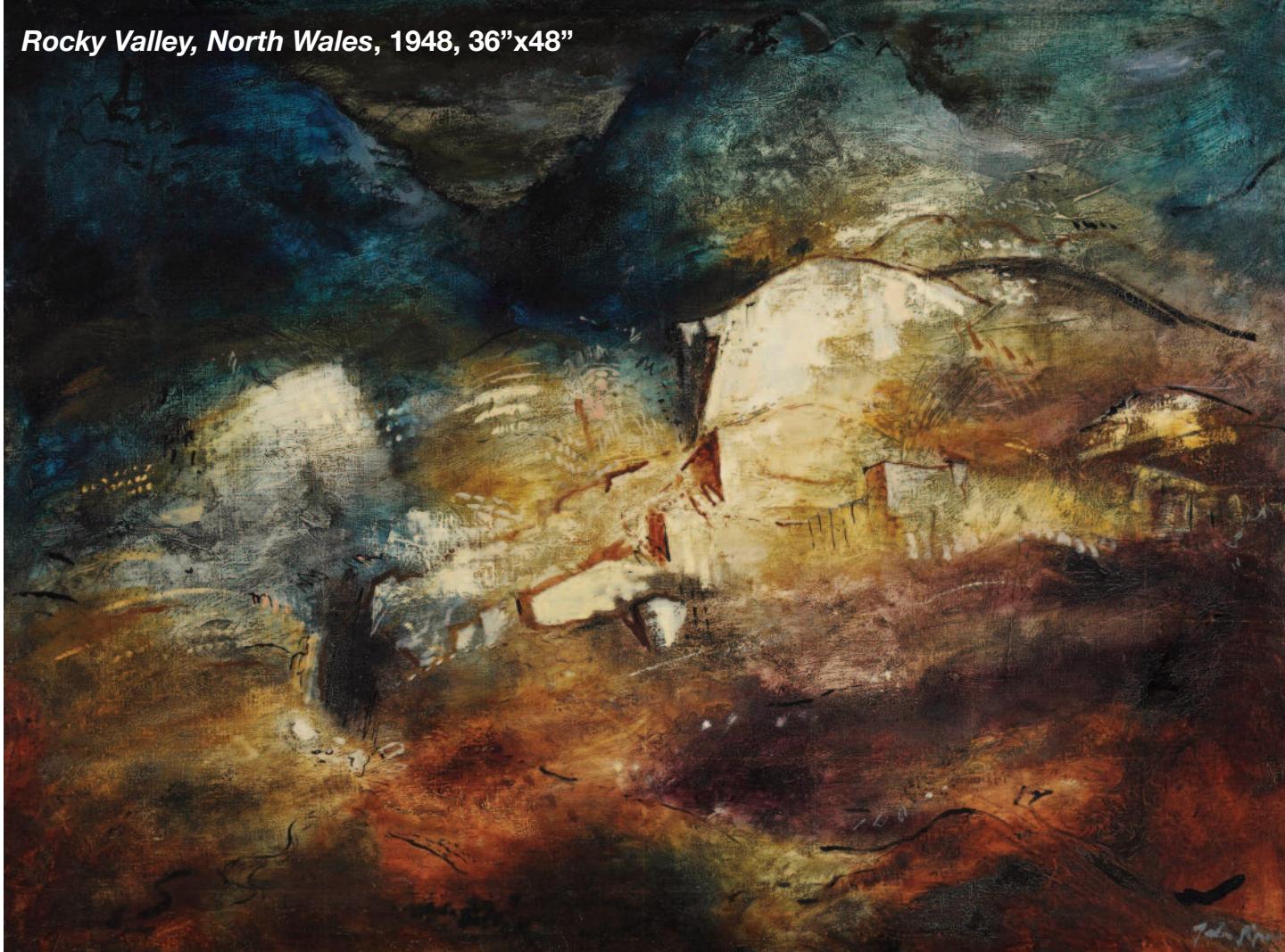
The succession at Pen Benar is tightly folded and interrupted by numerous minor faults. The nature of the rock varies along the section and includes dark-grey laminated mudstones, siltstone, sandstone and feldspathic sandstones.

– Raymond Roberts, Countryside Council for Wales

Piper's North Wales paintings

All images courtesy of
the Estate of John Piper.
Text © Amgueddfa
Cymru - National
Museum Wales.

Rocky Valley, North Wales, 1948, 36" x 48"



Melissa Munro and Richard Bevins, Amgueddfa Cymru – National Museum Wales

Between February and May 2012 Amgueddfa Cymru – National Museum Wales hosted an exhibition entitled 'John Piper: The Mountains of Wales'. It drew together 29 works from an outstanding private collection of John Piper's paintings and drawings of Wales, exhibited alongside works from the Derek Williams Trust collection and the collection of Amgueddfa Cymru.

Our research for the exhibition and catalogue involved field investigations to locate the sites and to discover more about the geology depicted in Piper's paintings of Snowdonia, and to photograph the exact locations from which Piper painted and drew them. Robin Maggs also took part in the fieldwork and captured images of a number of the scenes painted by Piper; these images appeared in the gallery and in the catalogue alongside the relevant painting. *continued overleaf*

Piper's North Wales paintings – 2

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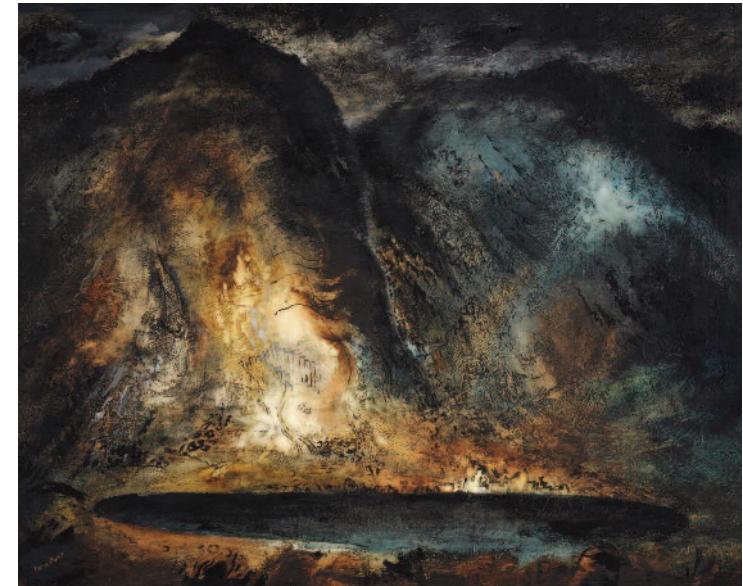
John Piper

John Piper was born on 13 December 1903 in Epsom, Surrey. As a teenager he cycled around the countryside making sketches of churches, Celtic sites and lych gates. Following a short spell in the family law firm, Piper pursued his love of art with a year at the Royal College of Art before becoming an independent artist in 1930.

John Piper and North Wales

At the start of World War Two, Piper had been enlisted in a project called 'Recording Britain' under the direction of the Ministry of Labour to record pre-war Britain before it could be obliterated by bombing. As a war artist Piper continued to receive commissions to record sites during the war and in 1943 the War Artists Advisory Committee commissioned Piper to record the interior of Manod Mawr quarry. It housed artworks from the National Gallery and the Royal Collection to protect them from the Blitz. The commission was abandoned when it became clear that the cave was too dark to record. Piper took the opportunity to travel around the area, using Murray's North Wales as a guide.

Following the examples of J.M.W. Turner and Richard Wilson he travelled to isolated spots, and climbed to the foot of Aran Fawddwy, the highest mountain in Wales outside central Snowdonia, to see Creiglyn Dyfi lake, the source of the River Dovey. This was the subject of a major oil in the exhibition, *The Rise of the Dovey*, 1943-44.

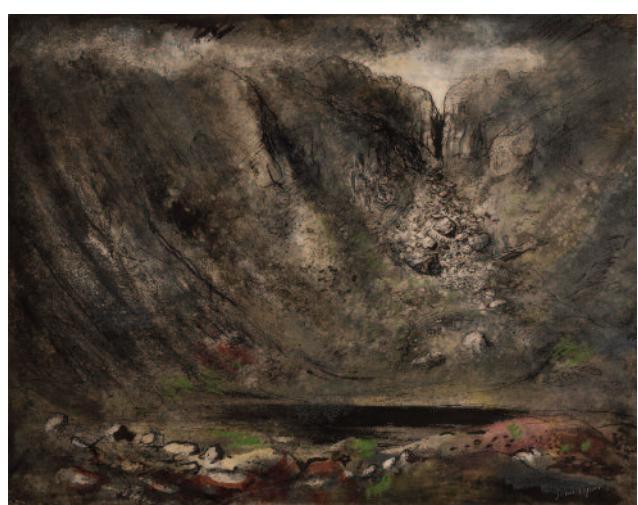


The Rise of the Dovey, 1943-44, 27.5" x 34.5"

Cwm Idwal and Devil's Kitchen



*Cwm
Idwal,
1949.
8.5" x 11"
(left)
and
Devil's
Kitchen,
1946-47,
21.5"
x 27"*



In the exhibition there were watercolours of both Cwm Idwal and Devil's Kitchen. Cwm Idwal is located to the west of Tryfan and is a National Nature Reserve. It is also the location of Devil's Kitchen. The Idwal Slabs are visible to the left of the scene, dipping steeply into the cwm. These rock exposures are composed of thick ash-flow tuffs belonging to the Lower Rhyolitic Tuff Formation of the Ordovician-age Snowdon Volcanic Group. Cwm Idwal is a typical glacial cirque or cwm with a moraine-dammed lake flanked by a steep arc of cliffs.

continued overleaf

Piper's North Wales paintings – 3

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The lake dominates the foreground. To the right of the lake are moraine deposits which appear as little hummocks of earth. Next to these are rock screes, dappled with a rusty red colour that appears throughout the composition including the clouds in the sky.

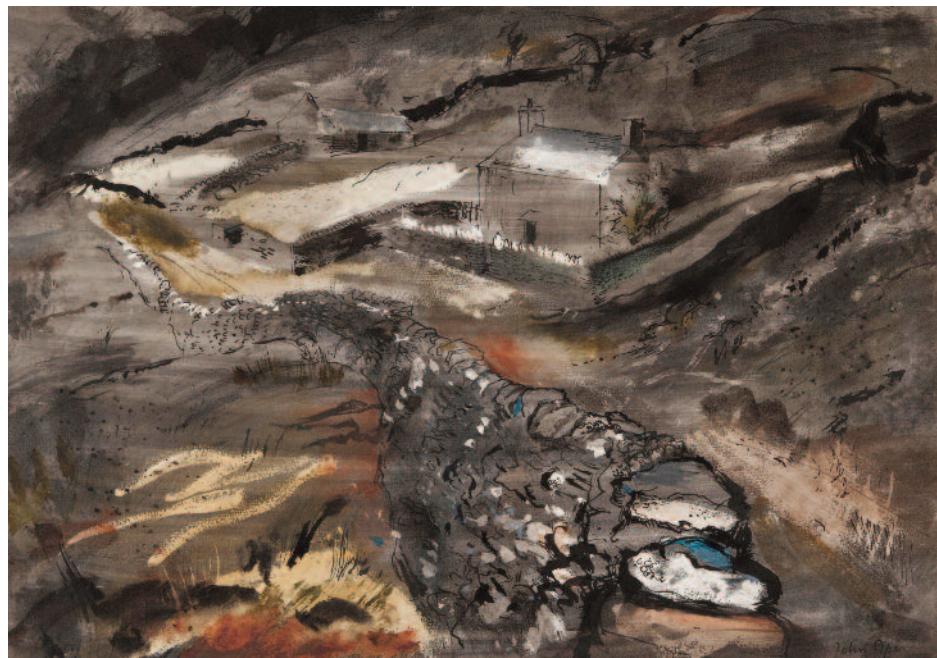
A prominent feature in the cliffs is Devil's Kitchen gully (in Welsh Twll Du, meaning black hole), visible in the upper right side of the painting. It was carved out of the cliff face of Cwm Idwal by a stream from Llyn y Cwn ('lake of the dogs'). This view is captured from a grassy outcrop on the south-east end of the lake. This provides good protection from the wind and would have been a practical spot to paint from. Devil's Kitchen is the most striking feature of the readily observable Idwal Syncline. It is possible to see some of the layers to the right of Devil's Kitchen, which are jointed rhyolitic ash-flow tuffs. These are overlain by well-bedded basaltic tuffs and pillow lavas belonging to the Bedded Pyroclastic Formation, also forming a part of the Snowdon Volcanic Group. There are prominent vertical fractures depicted in pen by Piper. Beneath Devil's Kitchen is a distinctive scree. Piper has made a feature of the scree by carefully showing the shape, features and shadows of the most distinctive boulders. In the middleground is Llyn Idwal and in the lower foreground we see a profusion of small rocks and hummocky moraine.

Piper's technique

Piper mainly used brushes to paint an overall watercolour wash to show the shadows and lights, then used ink and gouache to describe greater detail and also the patterns of the rocks. He would also sometimes use his fingers to apply the medium. In all of the works, Piper is very careful to depict the geological details which attracted his attention, particularly jointing and fracture patterns. The use of colour is another important element in the Snowdonia works.

John Piper living in North Wales

By 1945, after two years of working sporadically in North Wales staying with friends or in hotels, Piper found Pentre Farm to rent for £35 a year. It is situated in the Nant Ffrancon Valley on the quieter western side. There is a painting of the farm by Piper titled *Nant Ffrancon Farm*, 1950, mixed media on paper. The view is from the road leading up to the cottage and the barn is pictured in the background. In the foreground there are three very distinctive stones in the wall; two white and one blue in between. On the wall today there are two very bright white quartz blocks with a bluish-grey sandstone in between. The predominant palette of grey is indicative of a cold winter's day. Piper mainly spent the autumn and winters in Snowdonia. ***continued overleaf***



Nant Ffrancon Farm, 1950, 21"x14", Derek Williams Trust Collection, on loan to National Museum Wales

Piper's North Wales paintings – 4

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Nant Ffrancon Pass

Pentre farmhouse lies close to the head of the Nant Ffrancon Valley. This was the subject of two works in the exhibition – *Head of the Nant Ffrancon Pass, Tryfan, Snowdonia, c.1947*, ink, chalk and watercolour on paper, and *Rocky Valley, North Wales, 1948*, oil and gesso on canvas. The work on paper was painted in the year before the oil painting. The composition and viewpoint are identical. To achieve this particular view, Piper would have been on the grounds of Blaen-y-Nant Farm, a short distance from Pentre Farm. The title of this work is misleading in that it seems to proclaim that the Nant Ffrancon Pass is part of Tryfan, when in fact Tryfan is merely depicted in the background. The prominent crags in the foreground are ash-flow tuffs of the Pitts Head Tuff and sandstones of the underlying Cwm Eigiau Formation.



Head of the Nant Ffrancon Pass, Tryfan, Snowdonia, 1947, 21" x 26" and Rocky Valley, North Wales, 1948



The overall grey wash that Piper has used is more accurate in terms of the natural colour of the rocks, particularly as the artist usually painted in the area during the winter months when it would appear more barren. Piper has drawn much more detail in this work by applying pen and ink lines over a watercolour wash base. The jointing of the Pitts Head Tuff and associated sandstones is more pronounced than in the oil painting. The great care he has taken to depict each joint and boulder shows his appreciation for geology. Piper learnt of the glacial deposits of the Nant Ffrancon Valley from A.C. Ramsay's *Old Glaciers of Switzerland and North Wales*, dated 1860, which he carried around with him in the field.

Rocky Valley, North Wales, however, has an abstract quality as the forms of the rocks pass out of immediate recognition. The use of colour is of prime importance and there is the clear influence of Turner in the handling of the paint.

Bodesi and Tryfan

The difficulties of living in Pentre farmhouse forced the Pipers to seek alternative accommodation. Bodesi, the second house they rented in Snowdonia, was opposite Tryfan. This was the landlord's hafod or 'summer dwelling' and could only be used by the Pipers outside the summer months. This would account for why so many of the Snowdonia paintings are winter scenes. Bodesi led to a flurry of paintings of Tryfan, one of the more prominent peaks in Snowdonia.

continued overleaf

Piper's North Wales paintings – 5

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Not only did Piper capture the full mountain, but he would paint prominent and unusual rock outcrops and formations found around the base of the mountain, particularly on its eastern flank. The upper crags on Tryfan are composed of ash-flow tuffs of the Capel Curig Volcanic Formation intruded by rhyolite. The lower crags are sandstones that lie above tuffs and sedimentary rocks (predominantly sandstones) of the Gwern Gof Tuff, belonging to the Llewelyn Volcanic Group, which is older than the Snowdon Volcanic Group, on the western limb of the Tryfan Anticline.



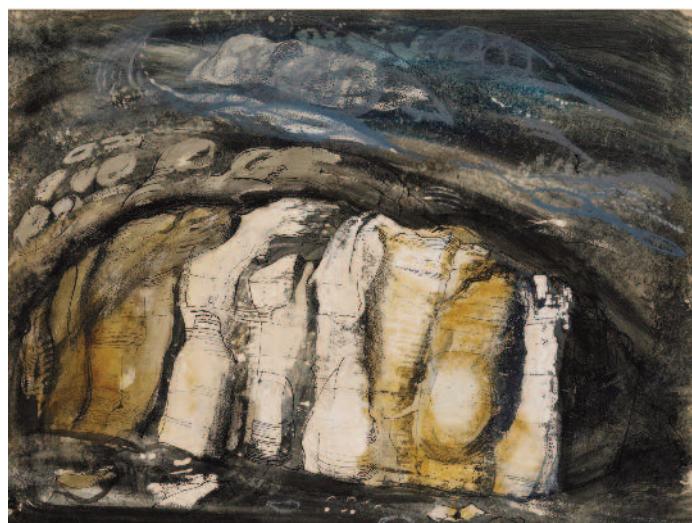
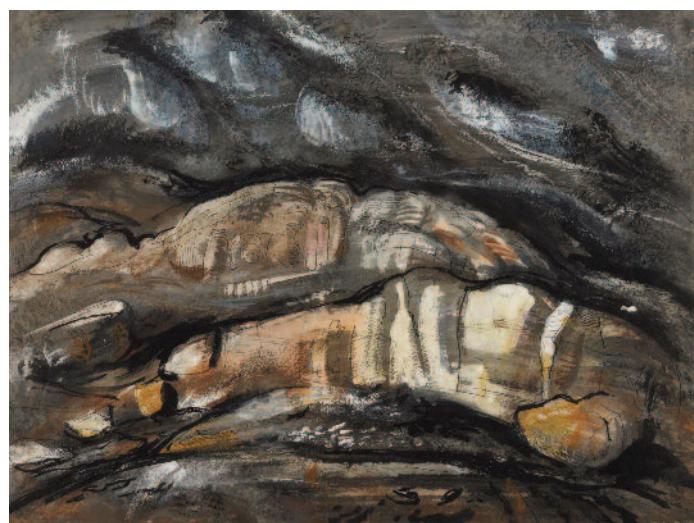
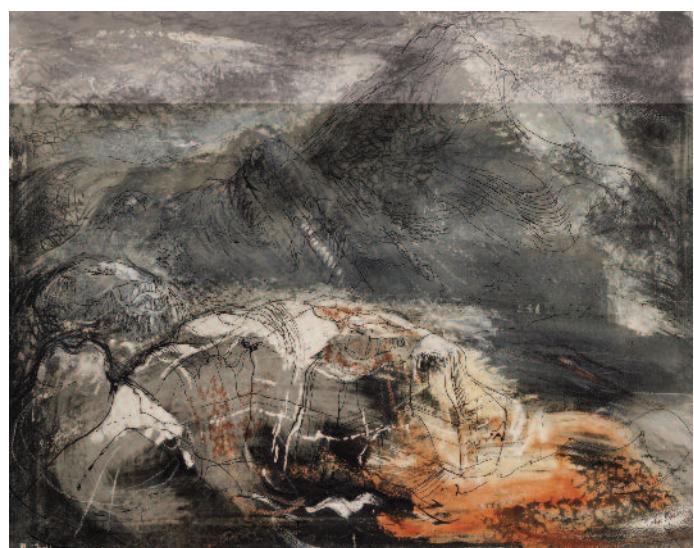
Jagged Rocks under Tryfan, 1949-50, 22" x 27"

Jagged Rocks under Tryfan, 1949-50 (pictured above right), ink, watercolour and gouache depicts the distinctive Tryfan Bach (Little Tryfan), a rocky outcrop of tuff beneath the mountain on its eastern side. The white markings to the right of the painting represent sandstone layers. The red markings in the lower foreground may be lichen or dead bracken. Piper's notes

describe 'chrome yellow and chrome orange lichen'. Both of these colours appear in this work, adding a vibrant splash to a predominantly grey scene. The noticeable white spirals in the lower left foreground are perhaps the patterns left on the rocks by lichen.

Other works by Piper looking at Tryfan are *Near and Far Rocks, Tryfan*, 1950, 21.5" x 27.5" (pictured left), *Tryfan Mountain*, 1950, *Rocks on Tryfan* 1948-50, 22" x 28" (below left), and *Rock Formations*, c.1950, 21.5" x 27.5" (below right).

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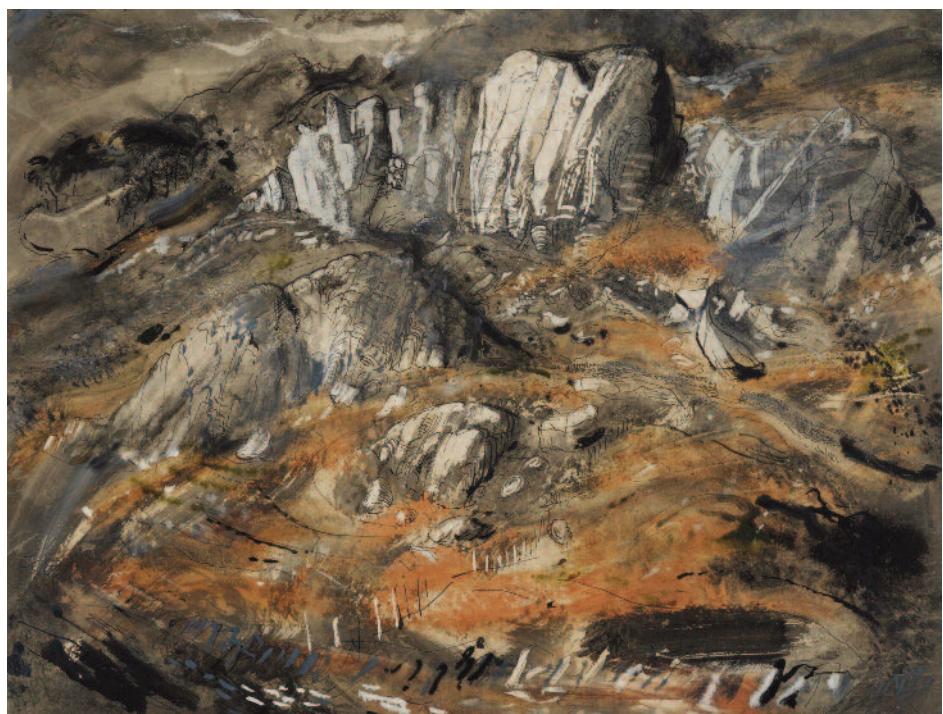


Piper's North Wales paintings – 6

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Capel Curig

South-west of the village of Capel Curig, north of the A4086, the distinctive set of rocks on the northern slopes above Llynnau Mymbyr is known as the 'Ricks and Racks'. These are ash-flow deposits, part of the Capel Curig Volcanic Formation. This and many other ash-flow deposits around Capel Curig provided the subject matter for some of Piper's paintings. The 'Ricks and Racks' are depicted in the painting *Rocks at Capel Curig*, c.1950, ink, watercolour and gouache.



Rocks at Capel Curig, c.1950, 22"x29"

In the painting there are three layers, each growing in size the higher they are until the top layer dominates the lower ones. Piper has used white gouache to depict the ash-flow tuffs and drawn on top in ink the detail of the rocks. In the top layer he has also used the white gouache to indicate horizontal lines – layering features in the ash-flow tuffs. These outcrops are internationally important for demonstrating welding of hot ash-flow deposits in a submarine environment.



Capel Curig, c.1950-55, 22"x27.5", Derek Williams Trust Collection, on loan to National Museum Wales

Capel Curig, c.1950-55, is a view looking north-east in Capel Curig village from the A4086. To the right it shows, in exaggerated form, the basic tuffs of the Curig Hill vent, to the left of which is Clogwyn Mawr, underlain by ash-flow tuffs of the Crafnant Volcanic Group, a lateral equivalent of the Snowdon Volcanic Group.

Piper stopped working so intensively in Snowdonia around 1951 and in the early 1960s bought a cottage near Fishguard. Many of his paintings and drawings from this period onwards focus on Pembrokeshire and South Wales. ●



Curry Fund

– hot on geoconservation funding



Brown End Quarry Geological Nature Reserve in Staffordshire – Site conservation, an interpretative board and an explanatory leaflet were supported by grants from the Curry Fund in 1987 and 1991.



Display of the Coles Geological Collection at Bournemouth University was funded in part by a grant from the Curry Fund in 2004.

All photos © Geologists' Association

**Christopher Green, Susan Brown, Jonathan Larwood and David Bridgland,
Geologists' Association**

The Geologists' Association Curry Fund has established itself as a valuable source of support for many aspects of Earth heritage work.

The spirit in which the fund works is evident in the opening paragraph of its Guidelines for Applicants: "To encourage initiatives within Geology which might not otherwise be possible, to encourage innovation and, through far-sighted developments, help a wider public to understand and enjoy Geology".

In the 25 years to 2011, the Curry Fund made 549 grants totalling £557,000, broken down approximately:

Geological Conservation	164 grants	£208,513
Geological Publication	169 grants	£180,115
Other Objectives	216 grants	£168 329

Future issues of *Earth heritage* will include updates about recent Curry Fund grants and what the projects have achieved. Details and application forms are available at

www.geologistsassociation.org.uk/Curry.html

Sites & Specimens

Acquiring and caring for sites and specimens and presenting them to the wider public have attracted a major share of Curry Fund awards – in total nearly £137,000. Highlights include contributions towards the development of the Writhlington Geological Nature Reserve; a grant of £10,000 to the National Museums of Scotland for the acquisition of 'Lizzie', the earliest fossil reptile in the world; conservation of the Peterborough Plesiosaur and other large reptiles; acquisition by Powys RIGS of the Pales Quarry near Penybont; and interpretative boards at some 25 sites from Dundee to Dorset.

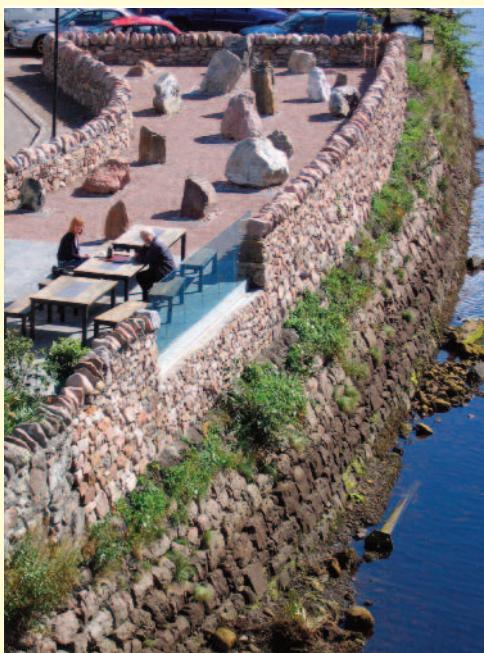
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Curry Fund – 2

from previous page

Archives and the history of Geology

Earth heritage is not just about rocks and fossils. The Curry Fund has provided financial support towards the conservation of documentary archives, including the great Murchison cross-section at Ludlow Museum and the extensive and fascinating Geikie archive at the Haslemere Museum. Among its more unusual awards and of great interest for the history of the geological sciences, the Fund has supported the purchase by Birmingham City Council of the cabinet housing Matthew Boulton's geological collection and helped the Friends of West Norwood Cemetery to restore the tomb of Gideon Mantell.



The development of the Geological Garden at the Timespan Heritage and Arts Centre in Sutherland was supported by a grant from the Curry Fund in 2006.

From 1986 to 1993 the Curry Fund supported the work of a travelling curator, appointed to help museums in south-east England identify and record their geological collections.

Supporting RIGS

The Curry Fund has channelled nearly £38,000 into the development of the RIGS (Regionally Important Geodiversity Sites) scheme at both national and local levels. It made grants towards newsletters promoting the RIGS scheme during its early years and has helped a dozen county groups to make a start, most often by funding the recording of potential RIGS. It has also funded a variety of local promotional and interpretative leaflets, contributed towards the cost of site acquisition and supported the annual RIGS conference. Twenty-four RIGS groups have received grants.

In addition the Curry Fund has supported the wider geological community. Its grants have been sought by universities, schools and educational groups, local authorities, county Wildlife Trusts, museums, national, regional and local geological societies, natural history and heritage societies, the British Geological Survey, the BBC, NERC, Scottish Natural Heritage, the British Association, the Royal Society For Nature Conservation, the Royal Archaeological Institute, the Earth Science Teachers' Association and many individual geologists, both professional and amateur. ●



This geological column at High Lodge Forest Centre in Suffolk illustrates the geological sequence beneath the site. An interpretative board was funded by the Curry Fund in 2005.

How the Curry Fund was started

The Curry Fund began in 1958 as the GA celebrated its Centenary. Dennis Curry a long-time GA member wrote to the GA Council offering a gift of 10,000 ordinary shares of Curry Ltd., with a value of approximately £14,000. Dennis requested that "...the income (from the gift) be dealt with entirely as Council decides from time to time". Then in 1986, when Curry Ltd. was acquired by Dixons, Dennis advised Council to sell its Curry shares. The sale raised some £350,000 and Council decided to use this to create a grant-awarding fund, known firstly as The Geologists' Association Fund and subsequently as the Curry Fund of the Geologists' Association, by which name it is still known.



Geology thrives in Essex

Gerald Lucy,
Essex Rock and Mineral Society
&
Peter Allen,
Essex Field Club & GeoEssex

The rocks of Essex are geologically young and were once regarded by 'hard rock' geologists as of little importance. Nothing could be further from the truth. Following the pioneering work of William Whitaker of the Geological Survey in the late 19th Century, study of the soft rocks of the region has grown in importance. In particular, some Ice Age sites in Essex are now of international standing, providing a unique record of the climate, fauna and flora of many glacial and interglacial stages. Essex currently has 26 Sites of Special Scientific Interest (SSSI) of geological or geomorphological importance, the most well known being the cliffs at Walton-on-the-Naze.

In Essex, part of the London Basin, the surface rocks range from the Chalk, through what used to be called the Lower London Tertiaries to London Clay, Claygate Beds and Bagshot Sand. Later deposits include Red Crag followed by the 'drift' or 'superficial' deposits of the Quaternary Ice Age, which are dominated by the boulder clay or till left behind by the Anglian ice sheet, and the terraces of the Thames. The terraces of the Lower Thames are the most complete record of the post-Anglian interglacials in north-west Europe.

The rocks of Essex have been studied seriously for nearly 200 years, mostly by amateurs. This tradition continues into the 21st Century with members of the Essex Rock and Mineral Society, GeoEssex and the Essex Field Club working together informally. The three organisations have complementary aims.

The Essex Rock and Mineral Society, founded in 1967, is an affiliate of the Geologists' Association. The Society is based in Hornchurch and prides itself on its 'popular' approach to geology, without jargon. By coincidence, its current meeting place is only 400 metres from one of Britain's most important geological sites, the Hornchurch Railway Cutting SSSI. This marks the maximum southerly extent of the ice sheet in eastern England and provides proof that the modern Thames was diverted by the ice sheet; the foundations of the meeting hall are cut into the till (boulder clay). The Society organises the Essex Mineral and Gem Show in February each year and has a programme for 2012 of nine lectures plus three other indoor meetings and 11 field meetings, particularly to Essex sites. It also provided the funds to publish Gerald Lucy's *Essex Rock: A look beneath the Essex landscape*, the first and only popular book on Essex geology, written and illustrated by two ERMS members and published in 1999. The Society is the principal way that the other two organisations below talk to the geological fraternity in Essex. *continued overleaf*

Geology thrives in Essex – 2

from previous page

The county's geological conservation group is **GeoEssex**, a successor to the Essex RIGS Group which was formed in the late 1990s. The change of name reflects the change of emphasis of its activities, from a group that existed merely to notify non-statutory sites to one that also promotes interest in all aspects of geology and landscape conservation in Essex. The name for non-statutory geological sites in Essex has also changed in recent years from RIGS to Local Geological Sites or LoGS. This move clearly defines such sites as the geological equivalent of Local Wildlife Sites, bringing geodiversity towards an equal footing with biodiversity although there is still a very long way to go. Over 500 geological sites have been identified in Essex, of which well over 100 reach the standard for LoGS notification. This high number reflects the county's geological diversity. Most sites are included in a gazetteer that can be interrogated to show sites by stratigraphic position, location or status (e.g. SSSI, LoGS). GeoEssex is well advanced on an Essex Local Geodiversity Action Plan (LGAP) and is also building a portfolio of geotrails, starting with Chafford Gorges Geotrail 1: The Chalk Walk and with the Thorndon Park Pebble Walk.

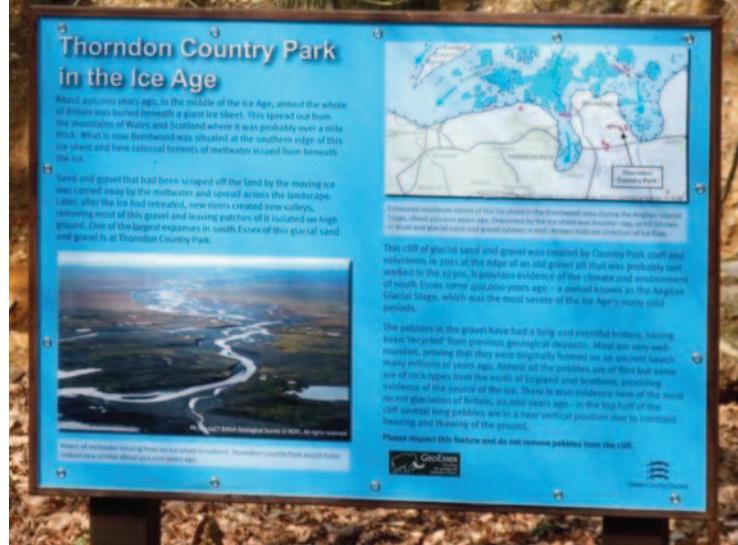
By co-operating with planning authorities, GeoEssex has helped to ensure the conservation of geological sections in terraces of the former route of the Thames in the Colchester area at Fingringhoe and Wivenhoe following the restoration of recently active gravel workings. It also secured the long-term preservation of chalk cliffs at an active chalk quarry at Newport in north-west Essex. Such co-operation has also led to the production of the *Tendring Geodiversity Characterisation Report*, a pioneering report promoting the contribution of geodiversity to landscape identity in this district of north-east Essex. Two posters illustrate the report.



Edge of a former chalk quarry in Thurrock, now part of Chafford Gorges Nature Park.

Photo by Gerald Lucy

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The new interpretation board at Thorndon Country Park, Brentwood. Photo by Ian Mercer

Another success has been the re-creation of a section in an old gravel pit in the forest at Thorndon Country Park, near Brentwood, that was last worked in the 1930s. Essex County Council, which owns and manages the park, has created an 11 metre-long, 2 metre-high gravel cliff in conjunction with volunteers from GeoEssex and the Essex Rock and Mineral Society. The gravel is outwash laid down by meltwater from the Anglian Ice Sheet some 450,000 years ago, the edge of which was then only a short distance away. An interpretation board has been erected and a Pebble Walk leaflet takes visitors on a self-guided round trip to learn about the park's geology. *continued overleaf*

Geology thrives in Essex – 3



The premier geological site in Essex is at Walton-on-the Naze where the Naze Cliffs provide superb exposures of London Clay and Red Crag. Working with the Essex Wildlife Trust, GeoEssex has contributed to geological interpretation at the Naze and this will be continued with the proposed new visitor centre at the site. Photo by Gerald Lucy

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Thurrock is one of the best districts in Essex for geological variety and spectacle, with a large number of disused quarries providing exposures of Chalk, the Lower London Tertiaries and Thames terrace gravels. Some of the Thames terrace sites, such as Purfleet, are of great importance, providing information not only of the evolution of the Thames but also the arrival and evolution of humans in the Thames estuary over the last 400,000 years. GeoEssex has worked with the Essex Wildlife Trust to provide a geological trail in Chafford Gorges Nature Park, which is a nature reserve encompassing a large area of former quarries near Grays.

The Essex Field Club, founded in 1880, has made an enormous contribution to the study and recording of geological sites. It has extensive collections of geological material, such as those of H. Brown and W.H. Dalton (both wide ranging), A. Bell (Red Crag of Essex and Suffolk), A. Wrigley (faunal succession of the London Clay of the London Basin), as well as London Clay fossils and Quaternary erratics from the construction of the M11 and M25 (still being processed). There are also specimens from temporary or now-lost exposures in the Chalk, London Clay and the pre- and post-Anglian Thames terraces. For display and educational purposes there are rocks and fossils from the Cambrian onwards. After closure of the Passmore Edwards Museum at Stratford, the material was put into store but has now been transferred to the Club's new Centre for Biodiversity and Geodiversity at Wat Tyler Country Park in Basildon. The specimens will be audited and curated and made ready for inspection and display. The Centre opened its doors to the public in March and already has changing displays of geological interest, video loops and will eventually have computer access to its collections. It will seek to become the major repository for geological and Palaeolithic artefacts relating to Essex and a resource for education and research.

The Club publishes the Essex Naturalist annually which regularly contains geological articles, many of historical importance. All the Club's publications back to 1880 have been scanned and are available as a searchable resource at www.essexfieldclub.org.uk/portal/p/Unlocking+the+Natural+History+Heritage+of+Essex, including the Naturalist, except the most recent issues (which are available for purchase). The Club also holds regular geological field meetings, shared with or hosted by the **Essex Rock and Mineral Society**. ●

More Information

www.erm.org ■ www.geoessex.org.uk (website under construction) ■ www.essexfieldclub.org.uk

Wales first



Wales completes its National RIGS Audit

Rhian Kendall
British Geological Survey

Corn Du in the Brecon Beacons, viewed from the east with the Brownstones Formation sequence in its north-facing scarp and cap of Plateau Beds Formation. Photo by Rhian Kendall

Wales has become the first country in the UK to complete an audit of RIGS (Regionally Important Geodiversity Sites). This is the culmination of the enormous effort and dedication of many people, dating back to when the first Welsh RIGS group was started in 1990.

The last piece of the jigsaw was the South Wales region. In 2008 the British Geological Survey Cardiff Office was awarded a grant by the Aggregates Levy Sustainability Fund for Wales, administered by the Welsh Government, to co-ordinate the audit of the South East Wales area. The project aimed to recommend a set of RIGS and SINC (Sites of Importance for Nature Conservation) to represent the geology and landscape of the area, which extends from Kidwelly in the west to the border with England in the east and from the Severn Estuary in the south to Builth Wells and Hay-on-Wye in the north. Some of the most densely populated areas of Wales, with a rich history of coal and iron extraction and steel production, add to the geological interest. The Brecon Beacons National Park and its associated Fforest Fawr Geopark, Gower Area of Outstanding Natural Beauty and the Severn Estuary, all nationally and internationally important areas, are also in South Wales, as are many sites of significance (including GCR sites and SSSI) for the understanding of geology in an international context.

continued overleaf

Wales first – 2

from previous page

The project began with a systematic review of literature as well as consultation with local people and geologists to build a database of sites of potential interest. Much of this work was undertaken by volunteers who ploughed through BGS maps, memoirs, books and papers. This phase produced a staggering number of potential sites – over five and a half thousand! The data were managed in a bespoke MS Access database. With so many sites to consider, the dataset was next scrutinised using ARC GIS. Grid references for sites in the database were converted to location dots on a map. This allowed many to be discounted on the basis of duplication, or their position within existing SSSI – or under new developments! Using ARC, BGS geological maps were overlaid to match sites which highlight geological formations of interest. The biggest task remaining was to visit as many of the sites as possible, assessing geology, condition and safety, prioritising work based on local knowledge of geology and landscape. This would not have been possible without the work of over 60 volunteers.

The volunteers were from a range of organisations and backgrounds with a huge variety of experience of geology and geomorphology. Some were professional geologists, others had backgrounds in geology from school or university. There were students from local universities and many from the Open University, others still had no formal training but wanted to join in to learn. Standard forms were devised to ensure a consistent approach to field work and data collection and a series of training workshops was arranged. These training days have been one of the many highlights for me. It has been a wonderful opportunity to meet other people who are clearly passionate about geology and geoconservation – not to mention, they were great fun!

These workshops consisted of morning talks about geoconservation, the project and standards for field recording. The afternoon field trips practised recording the kind of information required. Many volunteers ventured out in small groups to assess sites, others came along to days organised by BGS in which 4x4s accessed some of those harder to reach places. The feedback from volunteers has been great. Most (including me) appreciated the opportunity to learn more of the geology of our region and the unexpected places that we have all discovered as part of the work – places we would never have thought of visiting. *continued overleaf*

South Wales geology

The bedrock geology of the South Wales RIGS region is dominated by Palaeozoic rocks. The oldest are rocks of Ordovician age exposed in the west. Silurian rocks are to be found in the west of the area and also in the inliers of Usk and Cardiff. Late Silurian and Devonian rocks, collectively known as the Old Red Sandstone, form an extensive area of outcrop throughout much of the northern and eastern part of the region and form some of the iconic mountains of the Brecon Beacons and Black Mountains. The overlying limestones contain some of the longest cave systems in the UK. The South Wales area is famed for its Carboniferous Coal Measures which were extensively mined and had an enormous influence on landscape, history and culture. The youngest rocks in the area are Jurassic and Triassic strata, exposed in the Vale of Glamorgan. Superficial Quaternary deposits were largely deposited during and immediately following the most recent glaciations and form a patchy veneer of variable thickness covering much of the region.



**Learning how to evaluate a potential RIGS on one of the workshop days.
Photo by Rhian Kendall**

Wales first – 3



Dowlais Limestone and Caledonian structures at Carreg Cennen Castle.
Photo by Moonsoft

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Some of the organisations from which the volunteers came include South Wales Geologists' Association, The Russell Society, Open University Geological Society, Brecon Beacons Park Society, Blaenavon World Heritage Site - Forgotten Landscape Project, Monmouthshire Volunteers, Cambrian Cave Registry and Cardiff University and the University of Glamorgan. Working alongside them has been a network of geologists with specific interest in the geology of the region. This includes staff and academics from BGS, Swansea University, Cardiff University, the National Museum Wales, Countryside Council for Wales, the Environment Agency and the Fforest Fawr Geopark. Involving specialists has ensured that the latest research is represented in the choice of sites.

The South Wales Audit has identified over 250 RIGS and SINC, each with written reports. These include photographs, maps and aerial photography. To accompany these reports is a volume which describes the methods used in the project, geoconservation, the planning system in Wales, and a set of network reports illustrating how the individual reports form parts of networks of sites. The chosen sites reflect the geology, geomorphology and social history. Other highlights include a network of sites through the Type Llandovery area, illustrating recent work done on Llandovery-aged rocks by BGS and a network of sites, describing the Carboniferous sequence right around the rim of the South Wales Coalfield. The audit has highlighted new, previously unknown mineral sites, forgotten building stone quarries and rediscovered many of the wells where people once flocked to take the waters.

With the initial audit of sites complete, there is an enthusiasm for doing more geoconservation work in South Wales. If you want to get involved with the fledgling South East Wales RIGS group, please get in touch. There is still much to do! ●



Dinas Silica Mines. Photo by Andy Kendall

Action-packed

Geopartnership produces results

Jacqui Malpas,
Clwydian Range & Dee Valley Area of Outstanding Natural Beauty

The Clwydian Range AONB Geopartnership began in 2006 following the North East Wales Regionally Important Geodiversity Sites (NEWRIGS) audit. These sites would complement the network of geological SSSI and Geological Conservation Review (GCR) sites. The audit identified 120 sites of which 54 are within the Clwydian Range & Dee Valley Area of Outstanding Natural Beauty (AONB).

These sites inspired the thought that the RIGS could be integrated into the management strategy of the AONB through the development of a Local Geodiversity Action Plan (LGAP). Working with officers and wardens of Denbighshire Countryside Service, an LGAP offered a unique opportunity to have an holistic view of the landscape; to manage the landscape for its geodiversity and biodiversity. As opposed to being just a list, the RIGS would be actively used to show residents and visitors the wonderful geodiversity of North East Wales. The LGAP was launched in 2007, following wide consultation, with the aim of conserving, enhancing and promoting the geodiversity of the Clwydian Range.

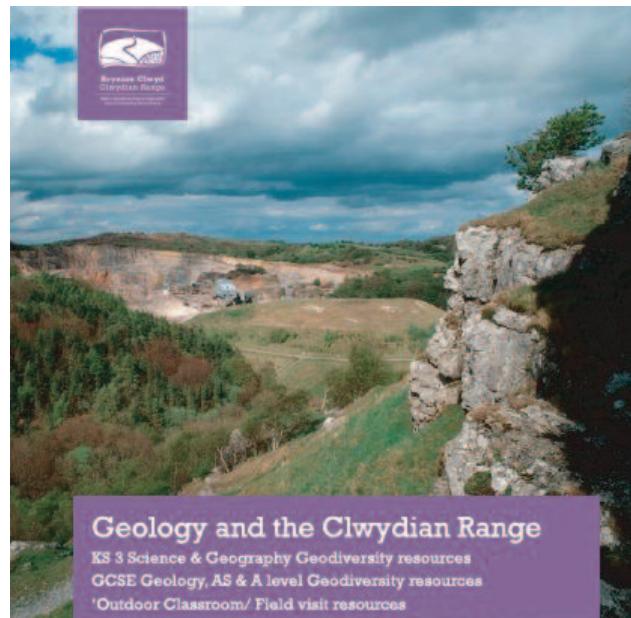
So what has geodiversity done for the Clwydian Range? The highlights:

Education resources

Over the past six years the Geopartnership has produced a complete range of school-based education materials. At the Clwydian Range Information Centre in Loggerheads, sticker trails for 3-6yr olds use maps on which participants can place stickers as they spot natural and human-made features in the park. The Loggerheads Geodiversity Education pack is aimed at Key Stage 2 and 3 pupils and a DVD contains a limestone to cement case study for Key Stage 3, plus GCSE geology curriculum and A-level geology 'virtual' field trips to the Clwydian Range. The *Pebbles along the Beach* leaflet developed for the North Wales coast is fun for all. A programme of field trips for students has been very rewarding. The most popular have been to quarries, working and disused... finding fossils is always fun but nothing quite beats sitting in a front loader (see cover photograph)!

Events

Genius Geology is a school holiday series of events. Among other things, participants have made 'fossils', erupted volcanoes, induced 'earthquakes', played with dinosaur 'stuff' and decorated 'geo' T-shirts. These events are always messy and oversubscribed – a great testament to their power of popularising geology among youngsters. *continued overleaf*



Geology and the Clwydian Range

KS 3 Science & Geography Geodiversity resources
GCSE Geology, AS & A level Geodiversity resources
'Outdoor Classroom' Field visit resources

The Geodiversity and the Clwydian Range DVD carried a KS3 Limestone to cement case study, GCSE geology and geology virtual field trips.

Action-packed – 2

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Geodiversity guided walks have also been extremely popular. Subjects and routes have ranged from the slate workings in the North Berwyn Mountains via the Llangollen Steam Railway in the south; limestone and lead along the limestone escarpment of the Eglwyseg, Bryn Alyn and Prestatyn hillside; the geodiversity of the Pontcysyllte Aqueduct and Canal World Heritage Site; and the shingle ridge and dune system of the North Wales coast. There have been day and weekend field trips for geological groups and numerous talks on the geodiversity of the Clwydian Range, and especially the Brymbo Fossil Forest, to groups in North Wales, North West England and the Welsh Borders.



A windswept guided walk along the Eglwyseg and World's End followed 'In the footsteps of Darwin'.
Photo by Jacqui Malpas

Earthcaching

We have pioneered Earthcaching trails – GPS-web-based treasure hunt – for primary school children and their families to explore two local forests. The children get to play with a GPS device while following the clues, maps and questions in a comic. When all the tasks are completed, their reward is a dip in the treasure chest full of fossils and crystals. The kits are hired from the Clwydian Range Information Centre and are used by school groups and families. A series of Earthcaches has been set up along the Denbighshire section of Offa's Dyke National Trail, which has so far been 'logged' by over 300 people.

Planning

Areas of Outstanding Natural Beauty have a duty to conserve and enhance the landscape. Part of this role is to assess planning applications and their impact on the protected landscape. Planning applications now have to take account of any geodiversity sites and individuals, companies and local government have sought advice and guidance. The Aggregates Levy Sustainability Fund for Wales, the Clwydian Range AONB Sustainable Development Fund, CCW and Cadwyn Clwyd generously funded the geopartnership.

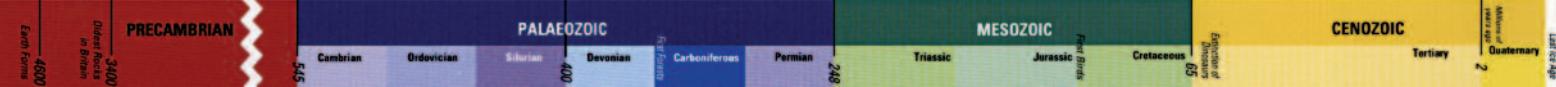
Working in the Clwydian Range and Dee Valley AONB as the Geodiversity Officer has been a privilege and, if I have opened a few eyes to the wonder of the geodiversity and the Clwydian Range & Dee Valley AONB, I will retire happy. It has been a joy to walk the Range with my dog. ●

A wide-ranging partnership

The Geopartnership has included people, groups and organizations that care for the Clwydian Range: geological organizations, archaeologists and historians, teachers and educators, quarrying companies and especially Countryside Council for Wales and Denbighshire Countryside Services, without whom the project would not have been so successful. Project partners have included Association of Welsh RIGS Groups (AWRG); Arden Early Learning; North Wales Wildlife Trust; Millennium Eco Centre, Borras, Wrexham; Clwyd Powys Archaeological Trust; Castle Cement (now Hanson Aggregates); Tarmac; Lafarge and many valued individuals. All this would not have been possible without the support of the Clwydian Range & Dee Valley Joint Advisory Committee with members from Denbighshire, Flintshire and now Wrexham Councils.



Safeguarding NW England's geodiversity



Measuring success in North West England

The North West Geodiversity Partnership (NWGP) was founded in December 2007 by Cheshire RIGS, Cumbria RIGS, GeoLancashire, Greater Manchester RIGS (GMRIGS), British Geological Survey and Natural England as a 'forum of public, private and voluntary organisations working together at the regional level to conserve and enhance the geodiversity of the North West for landscape, geological features and people with particular reference to geotourism and education'.

From the outset, the Partnership identified a key overall aim, to 'conserve, protect and enhance the unique geodiversity heritage of the North West region for the future' and has worked through a set of six clear operating objectives to reach some notable goals.

To date the voluntary group has met 20 times and initial funding from Natural England, provided for three years from December 2008, has been invaluable in helping members achieve success on four broad fronts:

Research and documentation: The Partnership has achieved near-complete coverage of the region with Local Geodiversity Action Plans (LGAPs). The exception is North Merseyside.

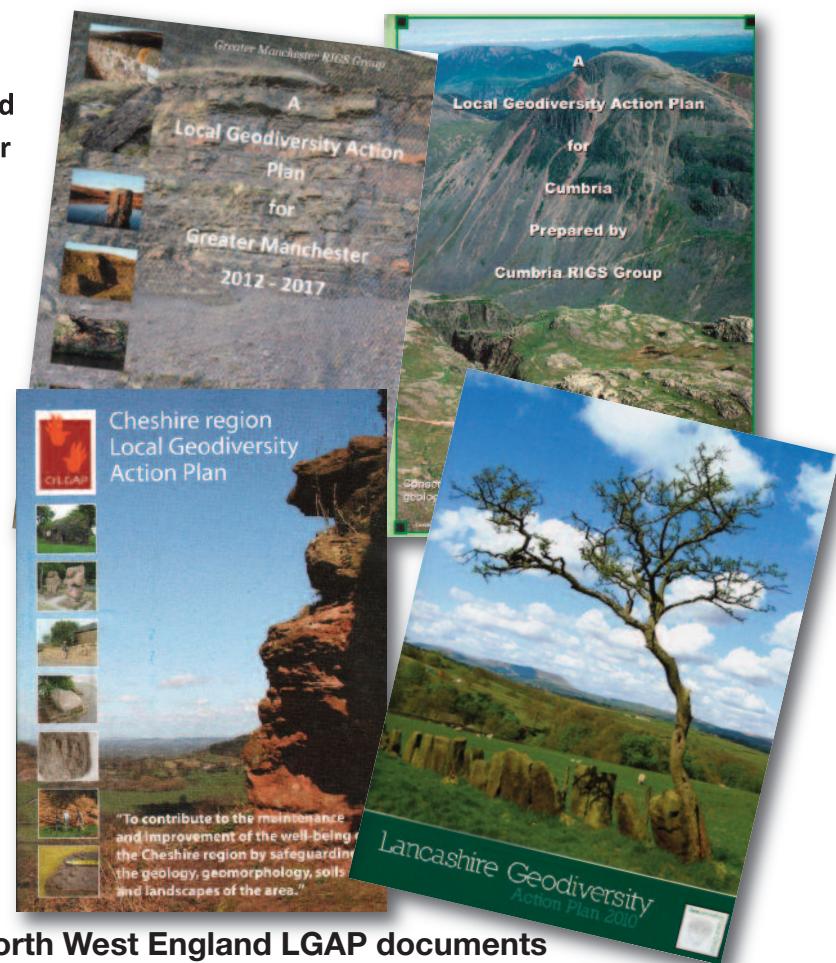
Communications: It has produced a website and printed material. Output included a regional leaflet explaining and promoting Geodiversity in the North West; the website www.nwgeo.org.uk; and laminated bookmarks (pictured above) carrying a geological column, scale bar, photographic scale and logos (using the best practice developed by NEWRIGS).

continued overleaf

**Cynthia Burek, Kevin Crawford,
University of Liverpool Hope University**

Cheshire RIGS,

**NW Geodiversity Partnership,
GeoConservationUK**



North West England LGAP documents

Measuring success – 2

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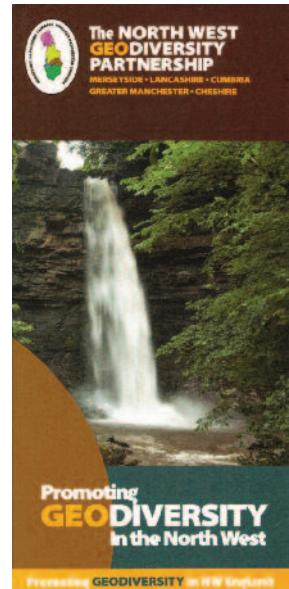
Consultations: Without a regional network, a co-ordinated consultation would not have been possible for the Irish Sea Conservation Zone (ISCZ) stakeholder group or the forum for the North West Landscape Character Framework (NWLCF) phase 2 development. Our representations significantly raised the profile of geodiversity – something which could otherwise have been largely overlooked.



Site designation and management can be helped by group working. Above, Edgar's Field RIGS, Cheshire and, below, Sandrock Mine in West Lancashire.



The North West Partnership in session (below).
All photos by NWGP



Inter-group networking:

Quarterly meetings of the regional Partnership have kept the members updated with developments in other local areas and nationally, as well as allowing constructive debates on sensitive issues. Invaluable discussions took place on sometimes difficult issues such as charging for products, collecting moneys, interacting with biodiversity communities and forging links with reticent Local Authorities, education and raising public awareness. All four RIGS groups learned from each other's experiences. A tangible benefit for Cumbria RIGS was learning from GeoLancashire's experience of illegal removal of material from a protected site. Without support from the NWGP, the North Merseyside Local Sites Partnership would not be in a position to develop an up-to-date geodiversity audit. GMRIGS developed its LGAP with support from Cheshire RIGS, GeoLancashire and BGS. As voluntary organisations, networking which enables an exchange of views and knowledge is vitally important where funding is limited. It minimises the risk of people unwittingly expending precious time and resources 're-inventing the wheel'.

Bringing everyone in the North West together has

led to fruitful discussions and tangible outcomes that have benefited from the experience of others in the region. This is an example of successful networking in the voluntary sector. It would not have been possible without the support of Natural England both for financial reasons and meeting accommodation. ●

Earth Heritage magazine promotes geological and landscape conservation.
Download a pdf copy from www.earthheritage.org.uk



The artist John Piper spent many years capturing the majesty and sombre power of the mountains of North Wales. This work, *Jagged rocks under Tryfan*, painted c. 1948 in ink, watercolour and gouache, is a fine example. The works have been the subject of a major recent exhibition. To explore his paintings, and the geology, further, see page 22.

Image courtesy of the Estate of John Piper.

