



# The Black Country Geological Society

NEWSLETTER NO. 109

FEBRUARY 1995

The Society does not provide personal accident cover for members or visitors on field trips. You are strongly advised to take out your own personal accident insurance to the level you feel appropriate. Schools and other bodies should arrange their own insurance as a matter of course.

Leaders provide their services on a purely voluntary basis and may not be professionally qualified in this capacity.

The Society does not provide hard hats for use of members or visitors at field meetings. It is your responsibility to provide your own hard hat and other safety equipment (such as safety boots and goggles/glasses) and to use it when you feel it is necessary or when a site owner makes it a condition of entry.

Hammering is seldom necessary. It is the responsibility of the hammerer to ensure that other people are at a safe distance before doing so.

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## FUTURE PROGRAMME.

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Lecture meetings are held in the Banquet Room (Dudley Suite) at the Ward Arms Hotel, Birmingham Road, Dudley. Phone: (01384) 458070. 7.30pm for 8 o'clock start.

MONDAY 20th FEBRUARY. 7.45pm ANNUAL GENERAL MEETING (see notice in the December newsletter). All posts of officials and committee members are up for annual election. Any nominations for election should be given to the Secretary, or can be declared at the AGM.

Followed at 8pm (approx) by a lecture "Icelandic cocktail - fire and brimstone, with ice" by Alf Cole (Society Member).

ALF COLE writes: "Much of Iceland (which is NOT an arctic country) comprises arid plateaux which are 1000 +/- 200 metres above sea-level. These extensive areas of lava flows - much still covered by ice caps - are broken only by occasional valleys carved by rivers and glaciers, or are uplifted as volcanic cones.

*Chairman*  
A. Cutler B.Sc., M.CAM.,  
Dip.M., M.CIM.

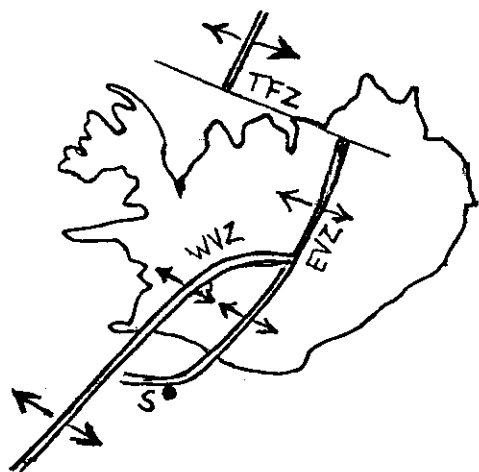
*Vice Chairman*  
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*Hon. Treasurer*  
Mrs J. Shilston

*Hon. Secretary*  
P.D. Shilston M.A., C.Eng.,  
F.I.E.E., M.I. Mech.E.

The world's oldest democracy is one of the newest land areas. It straddles the Mid Atlantic Ridge; no rocks are older than 16 million years, some are less than 10 years old and still warm.

Large areas of Iceland have been built up within the last 1 million years, and 10% of the surface is covered by lavas less than 10,000 years old. About 200 volcanoes have been active since glacial times; indeed there have been over 30 separate eruptions this century, some of the most recent providing exciting evidence of the ongoing rift process. One rather special feature is the rift lines of craters occupying fissure rows produced by widening movements across the Mid Atlantic Ridge; these cause the North-South splitting across the country due to dilation".



EVZ : east volcanic zone  
WVZ : west volcanic zone  
TFZ : Tjörnes fracture zone  
S : Surtsey

ALF COLE, who is a Society member, trained as an inorganic chemist and worked at, among other places, Wolverhampton Poly and Sandwell College. His interest in geology is as a hobby; he has an OU degree in geology and is Secretary of the Open University, West Midlands branch.

SATURDAY 25th FEBRUARY 10am-5pm)

SATURDAY 11th MARCH 10am-5pm)

Second and third dayschools of the series of 3-linked dayschools "The Midlands through geological time" run by University of Birmingham.

Details and booking: School of Continuing Studies,  
University of Birmingham  
Edgbaston, Birmingham B15 2TT.  
phone: (0121) 414-5606/7/8

MONDAY 20th MARCH. (Note the change of date).

Lecture "Mining and mineral exploration in Russia" by Clyde Leys (RTZ Mining & Exploration Ltd).

The RTZ Group is one of the world's major mining and mineral combines, with interests worldwide in iron ore, copper, lead, zinc and precious metals. This activity requires a continuous programme of exploration for new sites, and for development of existing ones.

This lecture will describe exploration and evaluation techniques used by the company, and will be illustrated by examples of prospecting in Russia.

CLYDE LEYS is a geologist with RTZ's Mining and Exploration Company, and has worked for them in many parts of the world.

SATURDAY (NOTE - Saturday) APRIL 22nd.

Field meeting to the area around Brampton Bryan, Worcestershire.

Leader: Dr. Helen Boynton

Meet 10am at the village green at Brampton Bryan (grid ref: 371724). This is just off the A4113 Ludlow-Knighton road, about 10 miles west of Ludlow.

The meeting will look at the Pre-cambrian, Cambrian and Silurian formations in the attractive area of the Welsh Borderland around Brampton Bryan and Pedwardine. The general strata of the area are Silurian Wenlock series but Pedwardine has an inlier of Pre-Cambrian grits and conglomerates of the Western Longmyndian series and also a Cambrian inlier of Shineton shales.

*This is a joint field meeting kindly organised by Shropshire Geological Society. They have arranged for a local pub 'THE ROYAL GEORGE INN' at Lingen to provide a PUB LUNCH - probably soup and a ploughman's - for those who book it in advance and it is hoped that members will take advantage of this facility.*

*The charge is £3 per person payable to Sue Beale, Shropshire Geological Society, 63 Shrewsbury Road, Church Stretton. Shropshire SY6 6EX (phone: 01694-723679).*

*--- A BOOKING FORM IS WITH THIS NEWSLETTER ---*

*--- HARD HATS ARE REQUIRED FOR THIS FIELD MEETING ---*

WEDNESDAY 26th APRIL.

Afternoon visit to salt mine at Winsford, Cheshire. This is Britain's only dry salt mine.

Party is limited to 12 - ADVANCE BOOKING IS ESSENTIAL.  
See separate sheet with booking form in this newsletter.

THURSDAY (NOTE - THURSDAY) 27th APRIL. Joint lecture meeting with the West Midlands branch of The Geological Society at the Ward Arms Hotel. The timing of this meeting will be HALF AN HOUR EARLIER than usual - 7pm for 7.30pm start.

Lecture: "Mineral exploration and the environment - studies in the Pacific and the Andes" by Professor H. Colley (Oxford Brookes University).

Nowadays mineral companies have to be aware of the environmental effects of their activities and frequently they have had a 'bad press' in this regard. This lecture will consider in particular the

impact of mineral exploration and the subsequent extraction of minerals on the environment and Professor Colley will take as examples two areas where he has first-hand knowledge - the Pacific Ocean and the Andes of South America.

PROFESSOR COLLEY is head of Geology and Cartography at Oxford Brookes University. In this capacity he has been carrying out research and exploration in the Andes, and previously when he worked for the Fiji Geological Survey he was involved in mineral exploration in the Pacific. He also has a special interest in the training of geologists, enquiring whether current university teaching is suitable for the needs of industry afterwards.

SUNDAY 14th MAY. Field meeting to Horton-in-Ribblesdale, Yorkshire, organised by The Geological Society of London (Yorkshire Group). BCGS members are invited to attend, but must book a place by contacting the Secretary (Ian Prior) at Sheffield on 01142-551480.

MONDAY 15th MAY. Lecture "The origin and use of semi-precious stones" by Barry Taylor (Society member).

BARRY TAYLOR writes: "The talk will cover the wide variety of minerals that are often called 'Semi-precious stones'. Specimens and slides will illustrate the extensive spectrum of semi-precious stones and minerals in use for jewellery manufacture. Topics covered will include details of the various environments of formation for these minerals, giving an insight into WHY and WHERE they can be found and HOW they are formed.

The minerals covered will include 'the Quartz Group' with its many varieties - quartz, amethyst, citrine, chalcedony, carnelian and agate - and other mineral groups including Garnet, Tourmaline and Feldspar. Also included will be some of the softer minerals that are often to be found in jewellery manufacture.

The talk should be both enjoyable and informative, with something new for everyone".

BARRY TAYLOR, who is a Society member, has a particular interest in minerals and has assembled a substantial collection of prime specimens. He will bring along a selection from his collection to illustrate the lecture.

#### EVENING FIELD MEETINGS TO THE LICKEY HILLS.

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The Lickey Hills are an interesting and varied local geological area and we are holding two Monday evening field meetings (7pm-9pm) to cover the best parts. Each evening will be a self-contained visit but if you can come to both - so much the better.

MONDAY 12th JUNE (7pm-9pm). Evening field meeting to the Lickey Hills (part 1).

MONDAY 26th JUNE (7pm-9pm). Evening field meeting to the Lickey Hills (part 2).

MONDAY 19th JUNE. Lecture "Alaska and the Yukon - glaciers and gold" by Paul Shilston (Society member).

SUNDAY 24th SEPTEMBER. Field meeting to Lathkill Dale and Stoney Middleton, Derbyshire. Leader: Dr. Cynthia Burek (Open University).

MONDAY 2nd OCTOBER. Lecture "The geology of the Solar System" by Dr. Bob Owens (National Museum of Wales).

MONDAY ? OCTOBER (date to be announced). Lecture "Geology of the Canary Islands" by Dr. John Stanley (Keele University).

MONDAY 27th NOVEMBER. Lecture "Thrust tectonics and piggyback basins in the western Spanish Pyrenees". By Dr. Jonathan Turner (Birmingham University).

MONDAY 15th JANUARY 1996. Lecture "The Great Dyke of Zimbabwe" by Dr. J. I. Langford (Birmingham University).

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### EDITORIAL

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How does the non-geological world report the Japanese earthquake ? I've had a cursory look at recently produced magazines. Articles had to be hurriedly written to meet press deadlines. Many completely ignored the event.

The earthquake, registering 7.2 on the Richter scale is reported to be of shallow focus, a mere 19km, and the epicentre was 20km offshore in Osaka Bay.

'*New Civil Engineer*' reported that exceptionally high vertical exaggeration played a significant part in the collapse of hundreds of medium rise buildings and at least one elevated highway. Vertical forces may have been over 100% of gravity. (Worldwide building codes take no specific account of vertical forces which are usually less damaging than the horizontal movements).

No post 1980 buildings incorporating full earthquakes strengthening have been reported as suffering any structural damage, a credit to modern building codes and standards. The new airport on an island in Kobe harbour suffered little damage.

Japanese codes require buildings to be stronger and with less ductility than those of the USA. In low power earthquakes Japanese buildings suffer less damage, but in extreme cases more damage results. Kyoto had particularly strong timber jointing in its ancient, ornate temples and these suffered little damage.

'*New Scientist*' writes on the uncertainty of seismological prediction. Despite tremendous investment in research, scientists were looking in the wrong place.

'*Post Magazine*', the insurance weekly, comments that insurance shares were sent tumbling but that foreign insurers can count some blessing as the Japanese government pays excess of loss insurance.

The most chilling reports came from the American '*Business Week*' which writes that in cold economic terms, the devastation looks manageable !

Reconstruction spending could boost Japan's economy by 1.5% over 2 years. The Nikkei stock average dropped just 0.6% in the two days following the *jolt* (my italics).

At one brewery the earthquake took out 1.5 million litres of bottled beer and halted production while a large computer firm will 'lose several days of production at its Kobe area plant'.

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## REPORTS

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Monday 14th November. Geology - without a rock hammer ?

Kathie Bowden from the National Remote Sensing Centre Ltd. (NRSC) overwhelmed and impressed us with a deluge of information about the achievements and potentialities of artificial satellites. Working through the medium of an excellent array of coloured slides she explained how data from remote sensing is being used. There are three main 'core' areas; Geo-information, Geo-systems, and Operations and Archiving. Founded in 1989 the NRSC hopes to stimulate new applications and markets for remotely sensed information - in other words new ways of using the absolute plethora of information now pouring earthwards.

A couple of examples will, I hope, indicate the scope of the NRSC.

Firstly, the visual effects of different depths of mines and heights of dumps in a projected surface mining operation and the subsequent land restoration, can be shown in a Digital Elevation Model in 3-dimensions from any desired viewpoint.

Secondly, mineral exploration companies use remote sensing to locate geological environments or specific structures likely to be mineralised or oil-bearing; identify and map surface material before field surveys start; identify natural off-shore seepages and measure coastal water depths; and map the lithology and structure at scales from 1:250,000 to 1:25,000 very cheaply.

The requisite information is derived from the American Landsat Thematic Mapper satellites in both polar and geostationary orbits. The latest in the series is equipped with a Thematic Mapper (TM) instrument, recording reflected radiation in seven wavebands; it also has the Multispectral Scanner System (MSS) using green, red, red to near infra-red, and infra-red wavelengths. The TM maps plant species by measuring chlorophyll absorption; biomass content of water bodies; vegetation and soil water content; snow and cloud differentiation; thermal mapping and rock types.

In 1991 the European Space Agency launched its first Remote Sensing Satellite (ERS-1) which uses microwave techniques mainly to measure and record oceanic features such as sea state, sea surface winds, oceanic circulation, sea/ice levels, and accurate sea surface temperatures - to within 0.5 degrees K. Its imaging radar can

collect information irrespective of cloud cover or whether it is day or night and one of its achievements has been the best topographic map of Antarctica.

In addition, the French SPOT (satellite pour l'observation de la terre) satellites (three so far) have taken over three million high-resolution pictures of the earth's surface. The NRSC is the licensed distributor for SPOT data.

Are you suitably impressed by these achievements? We have come a long way since I stood on the sweet machair of Tìree in the Hebrides, in early summer 1957 trying to spot the world's first artificial satellite SPUTNIK. I failed, of course, in the short, pale, black velvet of night in those latitudes, to see more than a billion stars and had to content myself with its "bleep bleep" on the radio. However I was rewarded with a magnificent auroral display. Incidentally, did you know that there is a pink marble quarry on Tìree of Lewisian Gneiss age?

The little SPUTNIK bleeps have grown to an avalanche of information over the last 40 years, the bulk of which still lies unexamined. Even if we could absorb all this data will we eventually realise we have opened Pandora's Box? Will we be like Icarus - will our waxen wings wilt as we wander, wantonly and wastefully, wafting, wailingly with the weight of withering, woolly worry, waywardly wavewards? Non-alliteratively speaking, does this take the fun out of geology?

Gordon Hensman.

Monday 28th November. Dr. David Keen (Coventry University)  
Pleistocene deposits of the Chinese Loess Plateau

The Pleistocene deposits of the Loess Plateau represent the world's largest and most stratigraphically complete sedimentary record of the past 25ma. Because the sediment shows such an unbroken stratigraphy throughout its thickness, it is of great value in unravelling the sequence and duration of climatic fluctuations which have occurred from the Pliocene to the present day.

The climate of the past 2.5ma consists of alternating ice ages (cold, arid glacial episodes) and warmer, wetter temperate interglacials, each of which last approximately 10,000 years. The transformation from one to the other may result from average global temperature fluctuations of as little as 6 degrees C. This Pleistocene climatic periodicity was first identified by the Polish scientist Milankovitch, who ascribed the periodicity both to variations in the Earth's orbit, resulting in changes in distance between the Earth and the Sun, and also to changes in the Earth's axial tilt over time.

The importance of the Chinese Loess deposits in the study of ice age periodicity results from its fossilised gastropod content. The occurrence and abundance of these animals is strictly dependent on temperature and humidity, thus their occurrence in a loess horizon implies that the sediment was deposited in a warmer, humid, interglacial, and their absence implies colder, arid glacial conditions existed at that time. Theoretically therefore it is

possible to trace the climatic cycles from the Pliocene to the present day throughout the thickness of the continuously deposited loess of the Chinese Plateau, from the position within the stratigraphy of both barren and gastropod rich horizons. This information becomes even more valuable when combined with the results produced from the study of other major continental loess deposits which exist in North America (Mississippi region) and Europe (Danube region), and also with oxygen isotope data from studies of loess deposits in stable ocean basins. (High  $O^{18}$  levels in oceanic loess correspond to interglacials, whereas during ice ages  $O^{18}$  is preferentially evaporated from the oceans to be concentrated into ice sheets and not into ocean bed loess).

Loess deposits worldwide comprise extremely well sorted, wind blown sediments of quartz, plagioclase feldspar, some mica and tiny quantities of heavy minerals, with 50-70% of the sediment falling within the silt size category (10-50 $\mu$ m) and no grains exceeding 100 $\mu$ m (0.1mm). It is only deposited in arid areas and has two main sources, these being deserts, and dried-out river bed and flood plain silts exposed during arid glacial episodes.

The Chinese loess is an example of the latter, with its main supply river being the Yellow River (Huang Ho) and its many tributaries which flow across the Loess Plateau, and have their original sediment source from the uplifting Himalayas and Tibetan Plateau to the south. (The Loess Plateau is in mid north-east China, south-west of Beijing, and averages 2000m o.d.). The loess thickness varies from 300m in the west to 14m against mountain ranges in the east, but due to the climate of the area (varying from arid in the north-west to monsoonal in the south) it is strongly eroded into sharp, steep sided peaks subject to vast landslips. Towards the south the loess hills are completely terraced for rice cultivation.

In 1992, Dr. Keen together with researchers from Liverpool University (bringing palaeomagnetic data) and Prof. Derbyshire (soil scientist) from London's Royal Holloway College, went to the southern area of the Plateau close to Lanzou and Xian to study the loess, which in this region has the Yellow River as its source. Problems encountered on the trip included a lack of 4-wheel drive vehicles, and dirt tracks of loess which made travelling to and from good exposures very long winded. Landslips, whilst providing good sectional exposure, were common in this seismically active area. (One week your section is in situ, the next it is 10,000 years downslope !)

The Main collection site, which remained in place throughout the duration, was a 41m deep well, cutting down through approximately 150,000 years of sediment. During its construction (by paid and willing locals) the loess was brought up in buckets and bagged in 10kg units. In total, 41 X 10kg bags were later sieved through a 0.5mm mesh, with a hose pipe in an alley at the back of the geological buildings ! The resulting gastropods (typically between 3-6mm in size) including *Pupilla Aeoli* and the planispiral *Cathea Pulveraticula*, were only identifiable after comparison with a Chinese gastropod collection in the National Museum of Wales, Cardiff, brought back to the UK by missionaries in the 1890's.

Gastropods from the north-west of the Loess Plateau showed low species diversity (5 species only) with high abundances, occurring



in 5 distinct horizons, showing strong periodicity throughout the top 40m of sediment. (The topmost horizon is taken as being the most recent modern-day 'interglacial' deposit). 10-15 mollusc species occurred in loess taken from the middle of the plateau, including gastropods and slugs (identifiable by their plate-like calcite internal skeleton) indicating a more humid climate, and again showing 5 marked periodicities through the sediment's depth. Results from the monsoonal south were disappointing, as acidic soils destroyed most of the calcium carbonate molluscs, providing very little data.

The mollusc data from all areas when correlated showed 5 strong peaks with high numbers of gastropods, indicating 5 definite warmer, humid interglacials including the surficial modern-day peak. Conversely, gastropod absences within the sediments indicate a proportionally equal amount of time with cold, arid ice age glaciations over the past 150,000 years. The longest interglacial comprises 3 close set peaks, of approximately 130,000 years in age (at about 35m depth) and at present the modern day peak is small in comparison.

When the Chinese loess data was compared with oceanic loess oxygen isotope data, a strong correlation was seen between high gastropod numbers and  $O^{18}$  peaks, both indicating interglacial conditions, and gastropod absences with low concentrations of  $O^{18}$  of the ice ages.

Dr. Keen believes that due to the physical, technological and political hindrances which exists in China, further study of Pleistocene climates will probably be based upon renewed interest in the Mississippi loess in the USA providing the opportunity for borehole data from far greater depths than has been possible in China.

Sam Richards

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### NEWS IN BRIEF

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1. '*Earth Heritage*' is a new magazine, launched in January 1994, published twice yearly by Great Britain's country conservation agencies: English Nature, Scottish Natural Heritage and the Countryside Council for Wales. *Earth Heritage* contains articles on geological, landscape and wildlife conservation. Individual subscription costs £5.50 (send cheques made payable to English Nature to Dept. EN5, English Nature, Northminster House, Peterborough, PE1 1UA).

2. The Royal Geological Society of Cornwall is one of the oldest geological institutions in the world. Its premises, a Grade 1 listed building, were closed in 1987 due to deterioration. A programme of building renovation and environmental improvement has permitted the return of the collections and library from temporary storage. Further funding is required.

Contributions should be addressed to the :

R. G. S. C. Museum Restoration Appeal,  
Cornwall Geological Museum,  
Alverton, Penzance, Cornwall TR18 2QR

3. Eric Robinson (Geologists Association) writes: 'We have just discovered the existence of a splendid one sheet 1:500,000 scale Geology Map of Iceland (1993). Costing £9.50, this is a wonderfully clear summary of the Geology. It is obtainable in this country from the Iceland Information Centre, P.O.Box 434 Harrow, Middlesex HP1 3HP (081 422 2825). Mention the G. A.'

4. At the February lecture we hope to have on sale a few copies of the new G. A. guide to Iceland at the reduced price of £6.80.

5. Lapidary Publications of 84 High St. Broadstairs, Kent CT10 1JJ 0843 862256 have sent the Society their booklist and order form. Gems magazine has ceased publication.

6. Trinity College, Dublin announces the publication of an illustrated history of the Department of Geology entitled 'In Marble Halls' and a walking guide to 'The Building Stones of Dublin'. Both are obtainable from the Geology Department at IR£7.

7. The editor of the BCGS Newsletter has just had published by the Dorothy L. Sayers Society a paper on the Geology of the Devil's Flat Iron. In Miss Sayers' novel 'Have His Carcase' a body is found on the rock. The paper attempts to locate the rock within the S.W. of England from the descriptions in the novel. I am happy to send a copy of this eccentric work to anyone who requests it.

8. WELCOME TO NEW MEMBERS.

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Eddie Bailey - Worcester.  
Marion Coombes - Sutton Coldfield.  
D. J. Holden - Codsall.  
Terry Johnson - Selly Oak.  
Katherine Morgan - Cannock  
Martin Normanton & Family - Walsall.  
Vivienne Pickett - Tamworth.  
Miss Sam Richards - Oldbury.  
Andrew Rochelle - Telford.

9. FIELD STUDIES COUNCIL - RESIDENTIAL COURSES 1995.

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(a) Preston Montfort Field Centre.

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Details and booking: Preston Montfort Field Centre  
Montfort Bridge  
Shrewsbury SY4 1DX  
phone: 01743-850380

- (1) Rocks, minerals and mines. 9-11 June. £90
- (2) Geology and scenery of the Welsh borderland.  
28 July-4 August. £220

(b) Dale Fort Field Centre.

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Details and booking: Dale Fort Field Centre  
Haverfordwest  
Dyfed SA62 3RD  
phone: 01646-636205

Geology and scenery of the Pembrokeshire coast.  
2-9 August. £240

(c) Blencathra Centre.

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Details and booking: Blencathra Centre  
Threlkeld  
Keswick  
Cumbria CA12 4SG  
phone: 017687-79601

(1) Geology of Cumbria. 11-18 August. £238  
(2) Introducing geology. 17-19 November. £95

(d) Juniper Hall Field Centre.

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Details and booking: Juniper Hall Field Centre  
Dorking  
Surrey RH5 6DA  
phone: 01306-883849

Geology and landscapes in south-east England.  
11-18 August. £270

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