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**EDITORIAL INFORMATION**

The Magazine is very much in the process of development and hence comment is expected and welcome. Even more welcome are articles for publication - particularly articles that will help Members and will illustrate diverse aspects of Geology including field meeting reports, research data, exhibitions, meetings, courses, and reviews. Pictures can be supplied as colour transparencies, colour negatives, digital images, or good quality prints. Digital images will have to be capable of providing a resolution of at least 300 dpi and should be 'tiff' files if possible. Captions should accompany pictures and should include appropriate scales. A full page can accommodate up to 1100 words of text i.e. without pictures.

Copy dates are given below and it is important to recognise that these are effectively the last date at which material can be received for publication. It will greatly help the production team if items are submitted as soon as possible. If necessary proofs of articles can then be sent to authors for correction. There remains about five weeks of production time after all material is in hand.

Consideration must of course be given to the ownership of copyright and acknowledgement given to sources and to the ownership of pictures.

W.J.F.

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**Advertising Rates**

- **Full Page**: £360
- **Half Page**: £190
- **Quarter Page**: £100
- **Other size by arrangement**

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**Copy dates for the Magazine and Circular**

- March Issue: January 14th
- June Issue: April 22nd
- September Issue: July 22nd
- December Issue: October 21st
The Geologists' Association

This Association, founded in 1858, exists to foster the progress and diffusion of the science of geology, and to encourage research and the development of new methods. It holds meetings for the reading of papers and the delivery of lectures, organizes museum demonstrations, publishes Proceedings and Guides, and conducts field meetings. For forms of Proposal for Membership, and further information apply to the Executive Secretary, The Geologists' Association, Burlington House, Adelphi, London W1V 9AG. (E-mail Geol.Assoc@btinternet.com) Present Annual Subscription £30.00, Associates £40.00, Joint Members £45.00, Students £13.00. Telephone 020 7434 9298. Fax: 020 7287 1280. Website: http://www.geologist.demon.co.uk

responsible: Susan Brown
executive Secretary: Sarah Stafford
honorary Vice Presidents:
Professor Allan Rogers FGS
Arabella Young of Scone

over photograph: Mount Cook, New Zealand - RTJ Moody: One of Auckland's most famous volcanoes with three main craters, a complex cone of andesite and lavas, covering an area of some 10 square kilometres.

DITORIAL INFORMATION

The Magazine is very much in the service of development and hence improvement is expected and welcome. We now welcome articles for publication - particularly articles that will help Members and will illustrate diverse aspects of Geology including field meeting reports, research data, exhibitions, meetings, courses, and views. Pictures can be supplied as colour transparencies, colour negatives, digital images, or good quality prints. Digital images will have to be capable of providing a resolution of at least 300 dpi and should be 'tiff' as if possible. Captions should accompany pictures and should include appropriate scales. A full page can accommodate up to 1100 words of text i.e. without pictures. Copy dates are given below and it is important to recognize that these are effectively the last date at which material can be received for publication. It will greatly help the production team if items are submitted as soon as possible. If necessary proofs of articles can then be sent to authors for correction. There remains about five weeks of production time after all material is in hand. Consideration must of course be given to the ownership of copyright and acknowledgement given to sources and to the ownership of pictures.

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deferred after discussion with the applicants to have decided to modify their original application to a geological wall rather than a path. The net RIGS was awarded £700 towards the cost and leaflet production for two geological walls in county.

We have now sent out the first of the GA plaque or name plates for the GA logo, 30cm diameter, to be fixed onto geological walls, into gardens or any other exterior project to which we give support. This project was a geological wall close to the front in St. Andrews which had its official making in August 2001. We expect to be putting a number of these rather eye-catching plaque cases during 2002, so keep an eye out for them on your travels around the country.

Susan Brown,
Curry Fund Secretary

GA FIELD MEETINGS AND THE TRAVEL REGULATIONS

Live in a world of ever-increasing bureaucracy, sometimes questionable as to its relevance, but at all requirement just the same. The Geologists' Association (as a relatively high profile organisation) is now subject to such legislation, really enforced for the mass tourism market, but still concerning certain types of GA field meetings. There are two principal Regulations that apply, aimed at providing consumer protection and ensuring that the organiser of a trip fulfills a number of basic obligations. It must be remembered that these are legal requirements that protect our members and could be tested in court if something goes amiss on a field meeting.

Firstly there are the “Civil Aviation (Airavel Organisers Licensing) Regulations 1995”, these regulations apply to all trips that include flights and are enforced by the Civil Aviation Authority Consumer Protection Group. Compliance is an easy matter of ensuring that all air travel is booked through an ATOL licence holder.

The package travel, package holidays and package tours regulations, as amended in 1992 (generally known as the Package Travel Regulations) are slightly more complex but are signed to ensure that the consumer is provided with adequate information and protection (e.g. departure, formal contract, cancellation, bonding, insurance, etc.). These regulations, enforced by the Civil Aviation Authority, apply to any organiser who engages:

Any package or holiday that covers a period of 24 hours or more, or includes overnight accommodation, and provides two or more of the

directly or through an retailer. The GA has taken advice from Trading Standards and been advised that the “more than occasionally” category applies and therefore the Regulations must be observed. Groups or societies that organise on a less frequent basis (there is no legal definition of “occasional”) may fall outside the Regulations.

A GA working party considered a number of alternative options to ensure compliance with the legislation but, in common with other organisations, decided to adopt the practice of using a tour operator to handle the organisation of relevant field meetings. GA Council subsequently approved this approach in October 2000, with the preferred operator being Tourplanners (part of USAir Tours). Tourplanners also organise field meetings for the Natural History Museum.

A number of possible disadvantages have been considered, but the GA has sought the most effective means of running a comprehensive field meetings programme whilst complying with the mandatory Regulations. The tour operator becomes the “organiser” (legal definition) and therefore responsible for the consumer protection issues, as well as handling the bookings and financial transactions. This releases the GA from a significant administrative and financial burden. Costs to participants are not expected to increase significantly due to the buying power of the tour operator.

The GA working party has agreed (subject to Council approval) that leaders who wish to independently organise trips on behalf of the GA may continue to do so providing they can demonstrate that they are complying with the relevant Regulations. The GA may charge an advertising and/or administration fee and these trips will be identified as “field meetings offered on behalf of the GA”. It has also been agreed that the GA does not support the payment of fees to leaders, but does wish to ensure that all expenses are reimbursed.

This then is the GA approach to complying with the various Regulations. Other organisations may adopt alternative strategies, but it must be remembered that compliance (for the GA, at least) is mandatory. Further advice, in most instances, may be sought from the GA Field Meetings Secretary.

John Crocker
Honorary General Secretary

GA WEB SITE

The new Geologists' Association's web site can now be viewed at www.geologist.demon.co.uk. The site includes sections for Local Groups and Affiliated Societies, for which we still need contact details. If the details of your society are not listed can you please forward them to geoassoc@btinternet.com or by post to the GA office. Also If you know of any useful geological web site links we shall be pleased to add these to the site.

REPORT FROM COUNCIL

At the meeting on Friday December 7th Council business included the following topics.

Annual Reunion in Liverpool

The President reported on the success of the Reunion, which involved many Local Groups, much useful discussion and interchange of ideas. The inclusion of lectures, the usual Local Group displays and a Rockwatch event on the Saturday was very successful as was the field trips on the Sunday morning.

Council discussed the policy of moving the Reunion from London and agreed that every 3 years would be appropriate. The 2002 Reunion will be in London. The South Wales Group has offered Cardiff as a venue plus local field trips for a future Reunion. The President will explore this offer.

Rockwatch

The Rockwatch supplies of activities kits etc have been handed over to the GA and are being sorted out. The President was able to report that funds have been raised from sponsors to support the magazine for this year 2002. Council expressed its thanks for all those involved in getting sponsorship.

Publications

Council passed a formal vote of thanks to Sheila Dellow for her 14 years as Production Manager of the Circular. The new Circular is nearing completion for the first issue and there is a need for a team to run the new magazine.

Strategy Document

A new version of the Strategy Document, which incorporated members comments from the draft document, was presented for Council's consideration.

David Bone
Field Meetings Secretary
WORLD HERITAGE SITE

DORSET AND EAST DEVON COAST - A WORLD HERITAGE SITE

Jonathan Larwood
English Nature

The 13th December, 2001 was a truly momentous day for geology. After eight years in the planning the Dorset and East Devon Coast was officially listed by UNESCO as a natural World Heritage Site. It joins an elite group of 690 global sites of which, like the Dorset and East Devon Coast, 138 are natural sites such as the Grand Canyon or the Great Barrier Reef, or closer to home, the Giant's Causeway. The Dorset and East Devon Coast has become the only natural World Heritage Site in England and is a site defined and founded on its geology.

From Orcombe Point to the east of Exmouth in Devon to Studland Bay in Dorset the Site stretches for 95 miles and encompasses a nearly continuous Mesozoic sequence. It is literally a journey through time from west to east. This stretch of coast has its place firmly lodged in the history of geology. It has inspired some of the most famous geologists with some of our most spectacular geology and geomorphology. It boasts a nearly unbroken Triassic outcrop including one of the richest Mid-Triassic reptile sites in Britain. The Lower Jurassic is the best exposed in Europe, Lyme Regis being the best Lower Lias marine reptile locality in the world. Classic sections abound, the Kimmeridge-Pooleland succession is the most continuous of its age in the world and the Isle of Portland is the type locality for the historic Portlandian Stage. With the exception of the uppermost Chalk the Cretaceous succession is complete and includes highlights such as the Portland and Purbeck fossil forests - nowhere else is there an example of this age so well preserved. Some of the most recent features are among the most spectacular. The mud slides of Black Ven, Charmouth, are the largest in Europe, the landslipped cliffs between Aymouth and Lyme Regis are among the earliest studied and Chesil Beach is probably the most studied beach in the world.

So what does being a World Heritage Site mean? World Heritage status places a commitment on the UK to ensure the identification, protection, conservation and presentation and transmission of the site to future generations. World Heritage Site status underlines a coast already protected by thirteen Sites of Special Scientific Interest (SSSI), a National Nature Reserve (Axmouth-Lyme Regis Undercliffs) and two Areas of Outstanding Natural Beauty. The management mechanisms exist, World Heritage status will strengthen these by co-operation and partnership between Government Agencies, Local Authorities, geologists, landowners, the tourism industry and fossil collectors, to ensure that the management is successful and sustainable.

As so ably anticipated by Arkell, here is the challenge of the Dorset and East Devon Coast World Heritage Site: "What will be the future of this...coastline, so richly endowed as a training ground and museum of geology? Few tracts of equal size could raise so many claims, scientific, aesthetic and literary, for preservation as a national park. If the English of the present generation allow this heritage of the community to be irreparably spoilt for private gain they will be held by posterity to have been unworthy to possess it. To all geologists who have enjoyed and profited by this coast, an appeal is made to do their utmost to preserve it." (W.J. Arkell, 1947)

For more information on the Dorset and East Devon World Heritage site why not look at www.jurrassic-coast.com or consult the Geologists' Association Guide 'Geology of the Dorset Coast' (No 22)
Silification of plants by hot springs at Rhynie, Aberdeenshire during the Lower Devonian preserved abundant plant axes in situ and at the cellular level, conserving arguably the most important and informative evidence of early terrestrial ecosystems. Investigation of rate, timing and extent of tissue degradation and silica deposition in modern hot spring vents reveals that excellent preservation of parenchymatous and sclerenchymatous tissues occurs in hot, wet conditions intolerable by microbial decomposers. Plants within pools are thoroughly inundated by silica within eleven months of immersion. Sinter aprons, characterised by lower water temperatures and immersion frequency, allow increased microbial degradation; plant preservation quality is correspondingly low. Wet sinter aprons with water temperatures below 45°C are sites of in situ preservation of sparse halophytic plants. Cooler peripheral wetlands are sites of abundant plant growth. Silica supersaturated geothermal fluids entering the wetlands cause the cellular silicification of plants in life position and in plant litter.

Permeation of plants by silica in solution occurs via rhizomes, stomata and the epidermis/cuticle. Within plants, silica nucleates and polymerises onto cell walls (creating films) and within intracellular/intercellular spaces, creating colloidal particle suspensions. Colloidal particle growth, aggregation and sedimentation form distinctive intracellular silica fabrics. Particle coalescence and cementation occlude intracellular (and in compact tissues intercellular) porosity. Early silica deposition stabilises cell walls but does not isolate tissues from decay. Subfossil/fossil material indicates slow hydrolytic removal of organic frames and later infilling by silica.
GA MEETINGS May - June

Recent studies treat the Antarctic ice sheet as comprising several climatically different regions with a distinctive role for the Antarctic Peninsula where about 25% of Antarctic precipitation occurs in some 7% of the continental area. Concentrating on this region shows that the high accumulation rate, warmer temperatures and relatively thin ice lead to a fast dynamic regime where the increased snowfall from atmospheric warming is compensated by greater ablation and a rapid ice flow response (of the order of a few decades).

In the future the role of glaciologists will be to improve our knowledge, models and predicting capacity of ice sheet response to climate.

Shirase Glacier, a high velocity outlet of East Antarctic ice sheet (800m a$^{-1}$) showing break-up of tabular extremity into large tabular icebergs

MAY MEETING 2002
ANNUAL GENERAL MEETING and
PRESIDENTIAL ADDRESS
The GA in the Twenty First Century – Are We There Yet?

Susan Brown
3rd May 2002
Scientific Societies Lecture Theatre, New Burlington Place, London W1 at 6.00pm Tea at 5.30pm.

As the Association fast approaches its sesquicentenary (150th Anniversary) it seemed a good time to indulge in a little crystal ball gazing. The GA has changed in many ways since its humble beginnings back in 1858, but one thing that has remained constant is the tremendous enthusiasm of Members for their subject. In these days of specialisation, it is refreshing to see so many general geologists amongst our lively Membership and I wonder if the GA might be setting the scene for a change (back?) to an integrated approach to looking at some of the problems facing science today.

JUNE MEETING 2002
Prof. Richard J. Howarth
University College London

The secret life of Frederick Hatch

7th June 2002. Scientific Societies Lecture Theatre, New Burlington Place, London W1 at 6.00pm. Tea at 5.30pm.

The petrologist, Frederick Henry Hatch (1864-1932) is best known today, at least to older geologists in the British Isles, as a co-author with Alfred Wells and his son Maurice of "Hatch, Wells and Wells", a 1949 textbook on the petrology of igneous Rocks, which ran to many subsequent editions. Unknown to many, however, is the fact that a major part of Hatch's career was actually spent as a highly-respected consulting economic and mining geologist.

Hatch joined the Geological Survey in 1886, where he was regarded as "undoubtedly the best trained of the younger petrologists in Britain," following training in mineralogy, geology and petrography at the University of Bonn. He subsequently translated Rosenbusch's Petrographical Tables (1890) and published his own Introduction to the Study of Petrology (1891), Mineralogy (1892) and Textbook of Petrology (1914), which all greatly assisted the growth of petrology as a subject in Britain.

In 1892, he emigrated to Johannesburg, South Africa, where he is still revered as a pioneer of the geology of the Transvaal, Natal and Zululand. He published The Gold Mines of the Rand (with J.A. Chalmers, 1895) and a 1:253440 (4 mile to in.) Geological Map of the Southern Transvaal (1897), and significantly advanced the course of exploration of the Witwatersrand goldfield when, in 1897-8, he demonstrated that gold-bearing reefs, similar to those being worked in the Central Rand, were also present at depth in the East Rand. But, with political troubles between the Boers and the British mining community in the Transvaal heading towards breaking point, and a young daughter on the way, Hatch and his wife left South Africa for England in the autumn of 1897, and he began work as a consultant on gold deposits. Following the end of the Boer War, in 1902, the family returned to Johannesburg in 1902 and Hatch became chief consulting engineer of the firm of Lewis and Marks. He served as President of the Geological Society of South Africa (1905-6) and published The Geology of South Africa (with G.S. Corrington, 1906) but, by 1910, the family had become established in Cambridge, England, where Hatch lectured on economic geology. These lectures were later published as An Introduction to the Study of Ore Deposits (1929).

Moving to London in 1913, Hatch resumed work as a consultant, and was President of the Institution of Mining and Metallurgy when the first World War broke out. He subsequently played a major role in ensuring adequate domestic supplies of iron ore, essential to the war effort. Drawing on previously unpublished material, the talk will describe Hatch's upbringing and personality, his geological career, the impact of the First World War on his family and work, and its aftermath.
FIELD MEETINGS - Paris

Visit to the National Museum of Natural History, Paris
(1st December, 2001)

Ed. Jarzembskowski

Over thirty members assembled at 10.00hrs in the Rue Buffon outside the museum’s Entomology Department. It was a mild but overcast, damp day. The party was split into two groups: one, morning; one, afternoon, to avoid congestion behind the scenes. Thus everyone also had a chance to visit the traditional Paleontological and Modern Evolution Gallery. Before going in, members admired a large mural inspired by the dendritic patterns of the mineral pyrolusite.

André Nel of the Paleontological Laboratory showed us the new Paris Basin amber, a fossil tropical angiosperm resin from the Creil Region (Oise valley) to the North of Paris. The amber is of early Eocene age (Ypresian, MP7) and the museum team had sieved out over 100 kg of it after four years of collecting in a disused sandpit. The amber occurs in lignitic sand deposited in Sparrnacian river channels. Inclusions are usually found in amber stalactites, the best pieces being made of several flows. The stalactites are first polished on one side to see if they are fossiliferous; if so, three more faces are prepared. The amber is then trimmed to best show the inclusion, which is finally mounted in Canada Balsam. 11,000 insects have been found so far and represent several hundred mainly small species. Less than 20 species have been described, so much work remains to be done. Fine structure including cell nuclei is preserved so there is hope that intact pollen grains may yield DNA. The pit was filled in last year but there are over 30 amber pits in France of various ages. In the Paris Basin, amber tends to occur in built-up areas like under the Eiffel Tower.

Dany Azar then spoke about another project at the museum on the Early Cretaceous Lebanon amber, which is of similar age to Wealden amber. Successes include extraction of the actual insects from the amber. Andrés then showed fossil insects preserved in various types of rock from the French Carboniferous to the Cretaceous of Africa. He dispelled some myths, e.g. not all Carboniferous insects were gigantic, some 3 mm ones having recently turned up in the French Westphalian. The celebrated giant dragonfly Meganeura from true fly (Plecia) in Paris Basin amber (Diptera: Bibionidae).

Commentary in the museum had a disproportionately large wingspan (about 0.7 m) compared to a slender body no wider than in some modern beetles. Meganeura is exceptionally rare and could not have flown in Carboniferous forests; in contrast, Permian relatives from the South of France include species of normal (small) size.

Before leaving, members were presented with a piece of Paris Basin amber. It is only slightly older than Highgate Copalite from the London Clay, another angiosperm fossil resin. Could there be undiscovered inclusions in British Tertiary amber?

References


NEW ZEALAND

New Zealand field meeting
November 7 – 29 2001
R. T. J. Moody

Photography by Z.A. & R.T.J. Moody

Thirty-two members of the Association journeyed to New Zealand in late 2001: guinea pigs! On probably the first fieldtrip ever to be organised purely via e-mail messaging and a plethora of websites.

The trip organised by Professor Richard Moody spent two days, on the way out, in Los Angeles, visiting several beautiful localities along the southern section of the San Andreas Fault System. Between LA and the Salton Sea, south-west of Palm Springs, it is possible at Palm Drive (Avenue 20), where a massive linear stand of tamarisk trees occurs on both sides of the road to plot the trace of the San Andreas Fault. The trace occurs in front of the trees. Sadly it is covered with alluvium, but according to Gene Singer (pers.com.), the trees are on the North American plate with the Pacific Plate below your feet. Right lateral movement means the trees would move right in a theoretical major earthquake. The communities in and around Palm Springs are supported by water drawn from the Coachella Aquifer, with its air conditioning and power development reliant to some extent, on the myth of metal windmills that dominate both hills and valley floor.

Before flying to Auckland on day 2, the group spent 3-4 hours at the George Page Museum at La Brea. Situated on Wilshire Boulevard the museum is a must for all geologists. It tells the story of the early wealth garnered from the tar pits, the discovery of oil in the substrate and of millions of bones belonging to dire wolves, saber toothed tigers, mammoths, mastodons and the beautifully preserved skeletons of vultures, condors and eagles. These and many more species revered in great detail life in the La Brea area 10-40,000 years ago.

On the 9th of November the party travelled on to Auckland arriving on the 11th, effectively ageing one day en route. Early in the planning of the New Zealand leg, it was obvious that there would be too much to see over a seventeen day period. Professor Rick Sibson of the University of Otago kindly
wrote out an ideal itinerary for the trip to the North Island with the help of Dr. Hugh Grenfell, Murray Baker, John White, Brent Alloway, Mike Johnston, Malcolm Laird, Peter Balance, Ewan Fordyce and Brett Black. An outstanding compromise was put in place. Local knowledge is essential for planning the planning of a good trip, especially in a country where narrow roads and 50 slope roads are difficult to match.

In the words of every proverbial football manager, the trip was one of two halves - in both the geographic and geologic sense. The first day on the North Island focussed on the volcanic fields north and south of Auckland, the Coromandel Peninsula, the Taupo-Rotorua area and Hawkes Bay.

These areas occur to the east of the Junction Magnetic Anomaly that curves around the western coastline of the North Island from Cape Kaitaia in the north to Wanganui, to the east-south-east of Mount Taranaki.

The JMA crosses the Cook Strait and merges with the Alpine Fault at Nelson. Earthquakes are commonplace on both the North Island and the Northern area of South Island. Days before the group left the UK an earthquake of 4.8 on the Richter scale shook an area just north of Wellington. Bad timing for geotourism! The boundary between the Australian and Pacific plates would be of significant interest throughout the trip but the formidable presence of the Southern Alps to the north of the Canterbury Plain provide the defining image on our travels.

Both islands provide access to wonderful geology and classic outcrops. The images displayed on this report are essentially snap shots from Los Angeles and the North Island and other areas including Katikati, Oamaru, Moeraki, Otematata, Benmore, and Mount Cook. As in California to cross over two plates at the aptly named Boundary Stream west of Blenheim was certainly food for thought.

New Zealand is a must for all geotourists, accommodation is well-priced, travel is easy and the overall ambience is perfect. Add to this the scenery and the excellent local assistance of some great geologists and you have a truly memorable trip. However, we should not forget the need for a friendly driver. Ron was perfect with a joke for all occasions. Finally I should mention Stewart Hunter who works at home late into the night the under the web-name ONENZ. Found late one night during a somewhat frantic search, Stewart proved to be masterful in terms of the planning and co-ordination of both travel and hotel arrangements.

Our thanks.

Above: Stand of Washingtonia filifera the oldest surviving indigenous palm in North America. Locality: close to the town of Thousand Palms in the Coachella Valley, California.

Above: Reconstruction of Mustodon in a Tar Pit at Rancho La Brea in front of the George C. Page Museum.

Above: Artists Palette at Wai-O-Tapu. The pools and fumeroles of these features display many colors due to the presence of diverse elements.

View (above) of Auckland from the summit of Mount Eden. The mountain is one of 128 volcanic centres in the Auckland and South Volcanic Fields. Basaltic lavas covered an area of 5.6 square kilometres and flowed downhill through such exotic routes as the Kyber Pass.

Below: Columnar Basalts in a disused quarry in the playing fields of Auckland Grammar School. The basalt was extensively used in the building of the nearby prison.

Below: Tiny c.15 mm scleractinian coral in a greenstone deposit, Campbell's Bay near Kaitaia, North Island.

Mud Pools of Wai-O-Tapu (NZ) are noisy and very active - an experience is needed to record them.
Above: Braided river system photographed after take-off from Christchurch-Wezmukarin River.

Below: Prof. Gerry Silkin provides the scale for abundant fossil tree debris at Ihumatao (NI). The forest was destroyed in a lateral blast and is covered by grey brown ashes and tuffs.

Above: Elephant Rocks: weathered limestones near Duntroon, Route 83 Oamaru - Otematata, North Otago.

Below: Glacial moraines and glacial debris below ice fields and glaciers at Mount Cook, Southern Alps.

Above: Mead's wall - a north-south dyke above the iwaikiu ski village on Mount Tongariro, central North Island.

Below: Famous Moeraki Stones with Dr Norman Dean for scale. The stones were thought to have dropped from the food basket of a famous Maori explorer but geologists believe them to be gigantic septarian nodules. The boulders occur in Palaeocene marine claystones.

Below: Sinking ground in Waikato (NI) thermal area. The site covers 1.8 square kilometres with hydrothermal activity dating back 15,000 years.
**EARTH ALERT 2**

**FESTIVAL OF GEOLOGY**  
23 to 26 August 2002  
Scarborough Spa Complex

In some ways the Earth Alert Festival of Geology, held in Brighton in 2000, was instrumental in the birth of this new journal which has evolved over a two year period. The fact that we are coming into Earth Alert 2 appears therefore to be more than coincidental with success hopefully breeding success in both new ventures.

By the time the journal drops on to your doormat more than 100 delegates will have registered for the Conference and we will be well on our way to recruiting numerous Local and Affiliate Groups, Government Agencies and Industrial exhibitors for our exhibitions and the exceedingly popular Discovery Room.

By early March we hope to receive additional sponsorship to add to the £22,000 total we have received from Amadeas Hess, The Coal Authority, Foster Yeoman, The Institute of Petroleum, IPEC, NIMR Petroleum and Southern Testing. Small donations have already been received from many other sources, with the names of individuals and group donors being listed in the Festival Programme due out in May. Our overall budget is now approaching £40,000, a true reflection of the magnitude of the task in hand.

**At Scarborough the Festival will be made up of:**

- Exhibitions from industry, government agencies and academia
- Rock, Mineral and Fossil Fair
- Geological displays from Local and Affiliate Groups
- A Discovery Room
- The Earth Alert Conference and Public Lectures

There will be an extensive programme of walks and field trips and presentations to the winners of the Earth Science Photographer of the Year, Student Poster, Schools and Kitemaking competitions. The Summer Bank Holiday weekend of August 23rd-26th 2002 in Scarborough is a must!

Delegates will receive details on accommodation during January and February, with a list of different hotels or boarding houses to choose from. Members wishing to simply visit Scarborough for a day or a one night sojourn are advised to approach the town tourist office for essential information.

The Festival Programme is taking shape and times can be allocated now to the different components.

**Friday 23rd August**
9.00 - 17.00: Set up day for all Exhibitions, Rock, Mineral & Fossil Fair & the Discovery Room
12.30 - 16.30: Delegate walks: Castle Hill, South Bay and Scalloway
19.00 - Late: Icebreaker at the Scarborough Sea Life Centre

**Saturday 24th August**
9.30 - 18.00: Exhibitions, Rock, Mineral & Fossil Fair & Discovery Room
9.30 - 12.30: Conference - Yorkshire Rocks and Landscapes
12.45 - 14.15: Delegate Walks, South Bay
14.30 - 15.20: Public Lecture: Mineral Heritage - Professor Jane Plant
15.30 - 17.30: Conference - Yorkshire Rocks and Landscapes

As tides permit - Children's Beach Activities

**Sunday 25th August**
9.30 - 18.00: Exhibitions, Rock, Mineral & Fossil Fair & Discovery Room
9.00 - 12.00: Conference - Petroleum Geology of the North Sea
13.00 - 14.00: Public Lecture - Dinosaurs: Dr Phil Manning
15.00 - 17.00: Conference - Petroleum Geology of the North Sea
14.00: Dinosaur Coast Walk
17.15: Competitions Awards Ceremony
19.00: Conference Dinner and Seaside Extravaganza

**Monday 26th August**
9.30 - 17.00: Exhibitions, Rock, Mineral & Fossil Fair & Discovery Room
9.00 - 12.00: Conference - Extractive Industries - Past and Present
1.00 - 2.00: Public Lecture: Minerals of Northern England: Dr Euan Clarkson
2.00 - 16.00: Conference - Extractive Industries - Past and Present
16.00 - 19.00: Field Walks

The conference programme on the 26th is likely to change to a more environmentally based topic with the Geological Society hosting both sessions.

Richard Moody

**Reception - House of Commons**
On March the 6th we have organised a Reception at the House of Commons. If you are interested in attending please contact Dick Moody (dickmoody@compuserve.com) or the Office as soon as possible. The reception is likely to cost around £37 and will be 18.30 for 19.00 hrs.
On the 26th October a panel gathered at the RSNC headquarters in Newark to judge the entries into the ROCKWATCH artists competition. Submissions were received in two age groups - under 12 and 12 to 16. Standards were high and reflected a great deal of time and effort – judging was very difficult with much disagreement at first.

Some of the entries are illustrated on the left. The winner in the under 12 group was the copper coloured sculpture of the dinosaur (1) by Leigh Tate. The prize for the over twelve entries was awarded to Kirsty Pepper. Her extensive set of water colour illustrations and notes is illustrated by the fragment in (2). Many of the exhibits cannot be illustrated readily in photographs but fragments of a few other paintings are shown in (3) by Kathy Marshall, (4) by Emily Johnson, and (5) by Ellen Gallimore all in the 12 to 15 group.
ROCKWATCH NEWS

As many of you will have read in recent issues of the Circular, Rockwatch has undergone some organisational changes recently. The Royal Society for Nature Conservation (RSNC) withdrew from the partnership it had with the GA for managing Rockwatch at the end of October 2001. We had been jointly responsible for the club since its inception ten years ago.

However, the good news is that the GA Council has agreed to take sole responsibility for the club and to do this a small management committee has been formed. We spent last summer very successfully raising funds, so we were able to honour existing commitments up to the end of 2001 and have sufficient funding for a full programme this year. Rockwatch clearly has a lot of support "out there" and we are confident that future funding will be forthcoming so that we will be able to put longer-term plans into place.

There are still some details to be sorted out with RSNC over the membership list, but we hope that these will soon be dealt with and that memberships can continue without interruption. Members have been very patient during the change-over period and we hope that the few administrative hiccups we have had have not been too irritating. These have delayed the publication of the Winter 2001 issue of the magazine, but we are sure that the three issues for 2002 will be on schedule. We have a very loyal and enthusiastic membership that has come to expect a high standard of delivery of the "Rockwatch product" and we can now assure them that they will not be disappointed this year.

We are changing membership renewal date to once a year, on 1st April, rather than the rolling basis which had been the practice until the GA took over the club and we believe will ease the administration considerably. We are very fortunate to have Geraldine Marshall as the administrative assistant for Rockwatch and she can be contacted on E-mail at:

Geo.L.Assoc@btinternet.com

Finally, it is hoped that those GA Local Groups and/or Affiliated Societies that have run Rockwatch events in the past will continue to do so and we are also looking to encourage more groups to run events in the future. From the many comments, good wishes and offers of support we have received during the past few hectic months, it is clear that Rockwatch has a great following. Do keep your offers of help and support coming in and we look forward to meeting you at Rockwatch events throughout the year.

Susan Brown

BRAMERTON

A VISIT TO THE SEASIDE AT BRAMERTON

On a lovely sunny afternoon, Saturday 22nd September, 2001, over 65 Bramerton parishioners and numerous children gathered together to witness the unveiling of a new Interpretation Panel for the SSSI known as the Bramerton Common Pit. Jonathan Larwood from English Nature explained the geological importance of the site; Bob Markham spoke about some of the famous people who had visited at the site (including Huxley in 1868 with the British Association). The party then adjourned to the pit itself, where Jonathan Larwood, Bob Markham and Roger Dixon gave on-site explanations of the geology.

The hand-coloured sketch of Bramerton Pit made by Richard Taylor of Norwich and reproduced here was originally published in the Transactions of the Geological Society for 1824 and included in Chris Wood's article published in the 50th Anniversary Jubilee Volume of The Geological Society of Norfolk.

The double panel comprises an explanation of the geology and a delightful map of the immediate vicinity. English Nature has spent some £2000 towards the improvement of fencing and visitor access to the pit as part of its Pacebook initiative. English Nature also issued a press release, and the Parish Council invited all Bramerton households to attend the meeting by means of a leaflet drop.

The pit was first described by Taylor in 1823; this wonderful hand-coloured section was reproduced in the Geological Society of Norfolk's Jubilee Volume and was subsequently regarded as the 'type' section for the Norwich Crag. It was already degraded and wooded in 1954, when it was first notified as a SSSI. The Geological Society of Norfolk (as the Parapodium Club) surveyed the Norwich Crag from 1950–1952, and members celebrated the 100th Club meeting by setting up camp in the Common Pit in 1956 and clearing a section. Further excavations were done for research purposes, resulting in key papers by Brian Funnell, Richard West, Peter Norton and others. The last major excavation was done by the Society in a field meeting on 3rd September 1978.

The pit was originally used for the excavation of chalk for field lime, but is known for the c.12m of sands with silts, loams, clays and two shell beds. The forams and molluscs indicate a sequence of shallow water marine environments about 1.6my old. They indicate a change from a warm, temperate stage - the 'Bramertonian' - to a colder phase (Pliocene). It is possible that the 'Bramertonian' correlates with the Westleton Beds and Crag at Caistor St. Edmund, Sizewell and Chilsea, deposited during a post-Bavarian marine transgression.

It was a splendid occasion and it was most encouraging to see the enthusiasm of the people of Bramerton, and the genuine interest they had in this site. It is only to be hoped that such events can be repeated elsewhere and with such success.

Roger Dixon
THE ANNUAL REUNION 2001 - LIVERPOOL

In the early years of the Association each of its meetings took the form of a conversazione with exhibitions of samples in a gathering of people who had attended the various field meetings and who met to share their varied experiences. In the latter part of the 19th century the meetings became more formal and the conversazione element became the Annual Reunion. The first of these was held at University College and this continued to be the venue until W.E. Smith and Tony Barber hosted the gathering at Chelsea College in the late 1960s. Then in about 1980 the Reunion moved back to University College and has been held there each year since. Until that is 2001 when the Reunion moved from London for the first time and was held in the recently refurbished Foresight Centre opposite the Department of Geology of the University of Liverpool. Our hosts on this occasion were the Liverpool Geological Society and we are particularly indebted to them and to Dr Hilary Davies who did much of the detailed hour-to-hour management. The meeting was well publicised in the local press with the headline ROCK FESTIVAL LURED AWAY FROM LONDON.

Entertaining and well attended lectures were given in the department by Professor Martin Preston who discussed various topics of geochemistry related to health as Minerals of Life and Death. Professor Peter Doyle talked about the importance of communication with the general public under the title Geology on Your Doorstep, and Professor Dick Moody told of the coming festival of Geology at Scarborough - Earth Alert 2.

The Foresight Centre made an ideal venue for the Reunion and held a large number of exhibits. There was also a convenient spot for rest and refreshment that gave an opportunity for informal discussion and represented something of a return to the conversazione of old. This facility was always well attended. As usual the displays showed much initiative and hard work. The work of Local and Affiliated Societies formed the majority of the exhibits and included a wide range of rocks, minerals and fossils, together with much artwork. It is impossible to do justice to all in a few words, a little is illustrated here, but the several hundred people who attended surely must have appreciated the venue, the organisation and the show as a whole. In addition Rockwatch was represented in the Discovery Room, just along the road and organised by Jonathan Allison, where the children particularly enjoyed working with specimens and driving remote controlled triboloids. Again this was popular with the local media and the Evening Echo had the headline - DO TRIBOLITES RUN ON FOSSIL FUELS, DADDY?

On the Saturday evening a Reunion Dinner was held in the Blue Bar and Grill in Albert Dock. This had clearly been chosen by those with inside knowledge and made for a most enjoyable occasion. Perhaps some of the pictures of past and present Officers show something of the atmosphere of the occasion.

On Sunday four field meetings were held. These worked out well despite the failure of the coach to turn up. Cars were used instead. Hilary Davies showed one group the Red Beds of the Wirral where we were able to see the spectacular sedimentary structures of these deposits. Particularly intriguing were the erosional forms in some of the exposures at Thurston Hill and in particular the features on Thor’s Stone. These have been described in the Proceedings. Glasser, N. F. and Hambley, M. J. 1998 PGA 109 pp139-148 interpreted them as erosional forms created beneath ice from flowing melt-water. Derek Flint (PGA 1999) regards them as representing human activity - with grooves and steps being developed by numerous children playing on the rock. The rocks are covered with names inscribed by visitors over many decades. Dr Flint showed an old photograph, which apparently implied for one interpretation, that the cannon was pre-glacial. There was a vote and it seems to have been agreed that both mechanisms were involved in the shaping of the rocks. A second group was shown round Liverpool - examining the rocks of the City - and lead by Professor W.S. Pitcher former head of Department. A third group visited the Quaternary of the local Estuary led by Professor David Huddart (from John Moores University) and a fourth, led by Hazel Clark (John Moores University) visited the sea defences of the Wirral.

It is clearly possible to hold a successful Reunion outside London with an increased range of activities. Those who attended will surely agree that all in all it was a very successful experiment with perhaps a few lessons learned. Above all thanks are due to Hilary Davis and all those who organised the function, to those who led the field excursions, and those who helped in other ways including the students who showed us the Department of Geology at Liverpool University with its facilities for teaching over a hundred students a year while maintaining a first class facility for research.

The Reunion benefitted from support in the form of donations from BHP Billiton, Condoco, Ranger Oil and Amerada Hess and this help is gratefully acknowledged.

CONTRIBUTORS
1. The Geologists’ Association
2. Essex Group
3. GA Enterprises Ltd
4. Earth Science Teachers’ Association
5. North Staffordshire Group
6. Warwickshire Geological Conservation Group
7. North Wales Geology Association
8. North Eastern Geological Society
9. John Hepworth
10. Sam Baldwin
11. Isis Minerals
12. Dr Quartz
13. G Sobolevsky
14. The Lancashire Group
15. Cumberinud Geological Society
16. Natural History Centre
17. Westmorland Geological Society
18. Leeds Geological Association
19. NEWRIGS
20. South Wales Group
21. Open University Geological Society
22. Liverpool John Moores University
23. Michael J Simms
24. Huddersfield Geology Group
25. Harrow & Hillingdon Geological Society
26. East Midlands Geological Society
27. Maps Geological Survey
28. Quaternary Research Association
29. The Russell Society
30. Liverpool Geological Society
31. Manchester Geological Association
32. Reading Geological Society
33. Geological Curators Group
34. Birkbeck College
35. English Nature
36. British Geological Survey
37. Northern Geological Supplies

Professor W.S. Pitcher and John Hepworth taking time out in the refreshment facility.
The story of Geology told in paintings by A. D. Pugh, here shown only in fragments, for the North Staffordshire Group.

Above, the controversial erosional forms on Thor's stone. Below and right, spectacular photographs by Gordon Smithies (Pule Hill) and A.H.A. Krasinski (Fossil tree in Appleton Quarry) displayed by the Huddersfield Geology Group.

Left: Presidents and organisers at the dinner. Below a mineral compendium exhibited by the Harrow and Hillingdon Group.
Geology and Landscape of Taunton Deane
by Hugh Prudden


Hugh Prudden’s book, subtitled ‘a geological exploration of south west Somerset’ is nearly square in format, but far from square in content. It reflects the author’s personality, even a glimpse of idiosyncrasy, linked to deep knowledge of the region. Surprises await the reader at every turn. For example, the geological exploration promised by the subtitle does not appear until its introduction on page 38, about a quarter of the way into the book. What came first was a block of nine chapters, mostly quite short, treating a miscellany of subjects ranging from rock to radon by way of earthquake. For historians and seriously inquisitive tourists, two very interesting initial passages concern local building-stone and the economic necessity of lime-making in a sandy terrain.

Personally, I would have put most of the miscellaneous matter of the first nine chapters into the main exploration-guide, which starts with Taunton itself. Then follow twenty chapters arranged alphabetically, from Ash Priors to Wellington, and the book ends with an epilogue and seven appendices. Maps and geological sections are clearly printed, easy to understand, and presented with just the right amount of colour.

The Geology of Building Stones
by John Allen Howe


Reprinting books of some antiquity can do our science an important service. The basis of our understanding and the recognition of things not yet resolved are but two matters served by this process. This book provided a useful simple introduction to petrology and, in the history of the study of building stone, credit for this account goes to the one-time librarian of the Museum of Practical Geology (later the Geological Survey and Museum) and subsequently, Director of the organisation to his retirement in 1931. His account of the wide range of stones used in Victorian and Edwardian buildings is a valuable compendium of named stones and their quarry sources. More valuable, however, must be his pages dealing with decay in stones and the agencies of attack, a first overall review of this subject of keenest interest to architects and the owners of buildings. His gazetteer of world stone was soon to be overtaken by the catalogues, which covered the vast collection donated to the Sedgwick Museum Cambridge by John Watson after the First World War. Here we must make the important point: this facsimile of Howe 1910 has not been changed in any important way in the new printing which remains a historical document - not to be mistaken for a guide to modern usage.

This is brought home by the regular citing of buildings where specific stones such as Bath Monk’s Park Bath Stone were used. Sadly, as many as 50% of these stones will have disappeared. Many of the named stones will figure on the three pages devoted to “Unavailable Stone” in the current Natural Stone Directory (pp 100-102). Once this is understood, we can welcome this reprint for its information, especially about quarries which have now virtually passed from memory locally. This in itself is not without importance to us when ‘heritage’ and conservation of its expression in listed buildings, may be the justification for the reopening of the original source of stone.

Dipping into just part of the text, the Millstone Grit and Coal Measure sandstones, it is disappointing to see the scant treatment of the Derbyshire grits and sandstones, which remain our present sources of quality stone. As much is true of the Coal Measure sandstones that were worked in Victorian times in County Durham and Northumberland and continue to sustain the fabric of the Georgian New Town of Edinburgh. Howe also remains silent over the Magnesian Limestone as used in the great Minster churches of the Vale of York, probably one of our finest dimension stones in Britain in spite of the bad Press given it in most discussion of the history of the Houses of Parliament. The Cadeby revival would make the point. Howe was human and could err in judgement. For all of this, here we have an elegant facsimile, nicely produced and a pleasure to handle and for this we have to be grateful. Would that Oxford University Press would contemplate a similar treatment for any of the Arkell books which remain gold dust in the secondhand book business.

Eric Robinson
November 2001
Increasingly he was interested in soils, particularly those on his own farms. His interest in soil chemistry led him to wider geological issues, so that in 1764 he made a ‘geological tour’ of the north of Scotland with George Clerk-Maxwell. Also during this period he collaborated with his old college friend, James Davie, in developing a successful commercial process for producing sal ammoniac.

Nevertheless, he gave up farming in 1767 and moved back to Edinburgh. There, within sight of Arthur’s Seat, he devoted himself to the life of a full-time intellectual, diligently pursuing interests in the natural sciences and enjoying ‘the society of his literary friends’. And such friends! Edinburgh was then in the throes of the Scottish Enlightenment and was one of the foremost places in Europe for rational discussion and dispute. There was a zest for knowledge and discovery, and such luminaries as David Hume, Adam Ferguson, Joseph Black, James Watt and Adam Smith stalked the coffee-houses and clubs. And most of them were on close terms with Hutton.

As befits an 18th century philosopher, Hutton had wide interests, but most of his writings remain unpublished. In 1785 he presented his Theory of the Earth to the newly-formed Royal Society of Edinburgh. Later that year an abstract was published, and the full version appeared in the Society’s Transactions in 1788 as Theory of the Earth: or an Investigation of the Laws Observable in the Composition. Dissolution and Restoration of the Land upon the Globe.

Outside the Edinburgh group it attracted little attention until the Irish chemist and mineralogist, Richard Kirwan (1733-1812), fiercely attacked it. This, and the urging of his friends, stimulated Hutton into expanding and publishing his ideas more fully in his monumental work of 1795, Theory of the Earth with Proofs and Illustrations. The title highlights Hutton’s search for examples - illustrations - to demonstrate his theories. With various friends he made a number of journeys in Scotland, particularly during the years 1785-1788.

In 1785 he visited Glen Tilt in company with John Clerk of Eldin and there, to his great delight, was able to distinguish granite veins intervening into the overlying schists. Hutton deduced from this that the granite could not be of sedimentary origin derived from a primeval ocean, as required by current orthodoxy. In the following year he toured Arran with his erstwhile companion’s son, also called John Clerk. At Loch Ranza he was the first to see, or to have confirmed, that the steeply dipping schists represented the products of erosion, transport, deposition, burial, heating and folding and that to find them now at the surface overlaid by sediments (themselves of great age) required unimaginably long periods of time. This was the first of his three celebrated unconformities which proved critical in confirming that the Earth does not just inexorably decline from a primordial state, but showed direct evidence of repair and renewal, with cycles of erosion and uplift. The second unconformity, visited in 1787 at Allar’s Mill just south of Jedburgh is famously illustrated in his Theory with a drawing by John Clerk. Hutton describes the schistus standing upright in the bed of the river, the bed of Puddingstone comprising the wreck of the schistus, beds of red and many sandstone deposited above as horizontal beds. In 1788 along with Sir James Hall and the mathematician and scientific reviewer, John Playfair, he made his most famous trip to the unconformity at Siccar Point. There they viewed the site from the sea, with Playfair famously writing of them as looking into ‘the abyss of time’. Hutton died in 1797, and was buried in Greyfriars Churchyard. In 1847, on the 150th anniversary of his death, a plaque was placed denoting him as the ‘Founder of modern geology’.

What does Hutton say?

Hutton’s theory is a complete Earth system theory. He saw the Earth as a
Hutton's Legacy

Hutton's ideas eventually came to have a profound influence on the history of geology. Indeed, Dynamic Earth gives him pride of place and uses his emphasis on field observation and whole Earth systems to exemplify its approach. But in his day Hutton's theories had little impact, lost in the side view, outside the realm of science.

He recognised that many rocks thought to be the sedimentary products of decay were, in fact, igneous, e.g. at Glen Tilt and Arthur's Seat. He introduces the concept of repair and uplift. "We are thus led to see a circulation in the matter of the globe, and a beautiful economy in the works of nature. The earth, like the body of an animal, is wasted at the same time that it is repaired; this world is thus destroyed in one part, but it is renewed in another". All this leads Hutton to the conclusion of the immensity of time.

The Earth is set in ever repeating cycles. Topography is products transported to the oceans and deposited on the earth. Layers are laid down, their weight generates enough heat and pressure to mobilise the lower layers. The heat of the melting layers and intruded magma causes water to expand "with amazing force", creating uplift and generation of new land on the sites of old oceans. The energy sources driving these processes are the Sun, gravity and the Earth's internal heat.

Hutton is often represented today as the first person to recognise and emphasise that observable processes occurring now act in the same way as they did in the past. Past forces are not catastrophic or extraordinary events - in discovering the nature and constitution of this earth...there is no occasion for having recourse...to any destructive accident in nature, or to the agency of preternatural cause, in explaining what actually occurs" (1788).

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The Hutton Memorial Garden at St. John's Hill, Edinburgh

Norman Butcher

The year 2002 sees the completion by Edinburgh for the University of Edinburgh, the architect for the project being Crichton Lang Willis & Galloway of Edinburgh. Constructed on what was effectively a small piece of waste ground since the late 1960s, the site coincides exactly with the house and garden of James Hutton (1726-1797), recognised throughout the world as the Founder of Modern Geology. As the second son of William Hutton, merchant and City Treasurer, and Sarah Balfour, James Hutton abandoned farming in Berwickshire at the two small farms he inherited from his father at the end of 1767. He then returned to Edinburgh, building a house in the early 1770s at St. John's Hill, then a fancy new development within sight of the Salisbury Crags where Hutton was to make
his first profound geological observations. He lived with his three sisters and wrote the four books and other papers, including his Theory of the Earth, for which he is renowned. Hutton is still probably the least known of the four great figures of the Scottish Enlightenment in the second half of the eighteenth century, the others being Adam Smith, David Hume and Joseph Black.

James Hutton died at his house at St. John's Hill on 26th March 1797 and is buried in the Greyfriars Kirkyard in Edinburgh where his grave remained unmarked until 1947, the 150th Anniversary of his death when the then Lord Provost, Sir John Falconer, unveiled a plaque commemorating Hutton as the Founder of Modern Geology. For the Bicentenary of his death, an International Conference was organised by The Royal Society of Edinburgh, which Hutton co-founded in 1783, in the Royal College of Physicians of Edinburgh, in August 1997. During the meeting, Wednesday afternoon 6th August, a bronze plaque cast by Charles Laing & Sons Limited Foundry was unveiled at the north side of the site of Hutton's house in the names of The Royal Society of Edinburgh and the Edinburgh Geological Society, founded in 1834. Participating in the unveiling ceremony, attended by delegates and invited guests, were Mr David Land, President Edinburgh Geological Society, Mr Fraser Morrison, CBE, Executive Chairman Morrison Construction Group plc, Councillor Brian Weddell, Chairman Housing Committee City of Edinburgh Council, Professor Sir Stewart Sutherland, Principal and Vice-Chancellor University of Edinburgh and Professor Malcolm Jeeves, CBE, President The Royal Society of Edinburgh.

The bronze plaque was mounted on a single block of Clashach stone from the southern edge of the Moray Firth, a Triassic dune-bedded sandstone from a coastal quarry north of Elgin now being much used in major buildings, for example the new Museum of Scotland. On the cut face of the stone beneath the plaque David Lindsays Stone Carvers inscribed the famous final sentence of Hutton's 1788 paper: "... we find no vestige of a beginning, no prospect of an end."

At the unveiling ceremony in 1997, the stone bearing the bronze plaque was surrounded by other large boulders designed to illustrate two of the main themes of Hutton's remarkable geological work. Hutton's own collection of rocks having long since disappeared these were specially brought to St. John's Hill by the Morrison Construction Group plc. Two boulders showing granite veins came from the famous locality above the Duke of Atholl's hunting lodge in Glen Tilt in the Scottish Highlands by courtesy of Charlie Pirie, the Duke's gamekeeper and illustrate Hutton's work on the origin of granite from September 1785. The other three boulders of conglomerate carried by ice and water came from Birnham on the edge of Dunblane by courtesy of Andrew Fleming & Sons and illustrate Hutton's understanding of the cyclicity of geological processes.

Since 1997, all these materials have been in store with the British Geological Survey in Edinburgh and they are now all incorporated in the splendid new Hutton Memorial Garden. Excellent features in the design include a substantial flight of well-lit steps with railings leading up the steep bank from Vieweraig Gardens, with disabled access from the southern back of the garden by a ramped path leading from the University Car Park off the Plesance.
MUSEUMS

READING MUSEUM SERVICE

Green Space Gallery
Reading Rocks

The newly opened Green Space Gallery offers learning experiences that are fun and suitable for all the family. This gallery traces the development of Reading's environment, landscape and wildlife, using hundreds of local geology and natural history specimens. The geology display includes drill cores, ichthyosaur and plesiosaur bones, fossil sea urchins, a geological relief map of the area and much more. There is a selection of rocks that can be handled by visitors, making this space particularly suitable for family groups. Follow the story of our local environment from 400 million years ago to the present day. The gallery provides the venue for school educational sessions on geology and the local environment, please contact the museum for further details of session content and dates.

Geology research room

A newly refurbished research room is available for members of the public to carry out research and other creative projects on the Museum's collections. Here, it is possible to use the Museum's database and to examine objects from the geology collection which are not on display. The geology collection comprises about 20,000 specimens of rocks minerals and fossils of all eras, from around the world. There are particular strengths in Berkshire fossils, and Pleistocene mammals between the Borrowdale Volcanics and the Silurian Slates of the Windermere Supergroup. A large window in the award-winning Museum effectively links the geological displays with the landscape.

The Ruskin Museum is located in the centre of the village of Coniston, on Yewdale Road. Its site commands an awesome view of the Yewdale Craggs, which mark the unconformity between the Borrowdale Volcanics and the Silurian Slates of the Windermere Supergroup. A large window in the award-winning Museum effectively links the geological displays with the landscape.

The Ruskin Museum is named after the artist, John Ruskin, 1819 - 1900, that prophetic seer of the Victorian age - arbiter of artistic and architectural taste, artist, critic, radical political economist and social reformer, conservationist, and pioneering "Green", and eminent amateur geologist, who lived at nearby Brantwood in his latter years.

The Ruskin Museum has published - with the aid of grants from The European Regional Development Fund and the North

View of the Coppermine Valley showing some of the geological sites and evidence of extractive industries described in the guides. Photograph by Jeff Wilkinson.

West Museums Service - three guides to sites of local geological and Ruskinian interest. These each consist of a folded A3 sheet providing practical advice and maps for the walks. They are of stout material, are convenient to handle in the field, and include the following topics:

Rocks and Landscape of the Coniston Fells: A geological walk from the Museum to the Coppermines Valley and Coniston Fells, written by David Millward;

All that Glistens: An introduction to the minerals of Coniston, where to see them and how to recognise them, compiled by Brian Young;

Walking in the footsteps of Ruskin: A moderate - grade walk of five miles over the Yewdale Fells, taking about 4 hours; and a low-level walk of three miles in and around Coniston village, taking two and a half hours.

The Museum also arranges special interest walks for groups (including school parties) at a modest cost.

Victoria Snowe
Curator

THE RUSKIN MUSEUM - CONISTON

The Ruskin Museum is located in the centre of the village of Coniston, on Yewdale Road. Its site commands an awesome view of the Yewdale Craggs, which mark the unconformity

Access

Reading Museum Service aims to be a centre of excellence in providing opportunities for life-long learning through real objects. The Museum of Reading is accessible to wheelchair users. The galleries and display areas have been improved by the addition of a glass lift, which can be reached from the ground floor. There is a separate entrance for the young and the elderly. Each gallery has its own icon to help you find your way around the Museum. Admission to the galleries is free. Access to the research room is by appointment with the Curator of Natural History.

Opening hours

The Museum is open Tuesday to Saturday 10am - 4pm, Thursday late night 10am - 7pm, Sunday 11am - 4pm, closed on Mondays except Bank Holiday Mondays 11am - 4pm.

Reading Museum Service, The Town Hall, Blagrave Street, Reading, Berkshire, RG1 1QH. Tel.: 0118 939 9800. E-mail enquiries: curator@readingmuseum.org. Web: www.readingmuseum.org.uk

GA magazine of the Geologists' Association Issue 1, vol.1, 2002
THE PEAK DISTRICT MINING MUSEUM

The Peak District Mining Museum, the Pavilion, Matlock Bath, Derbyshire. DE4 3NR explains 3500 years of lead mining with displays and commentaries, and includes climbing shafts, working pumps, and displays of mineral painting. The Museum is open all year round typically from 10.00 to 17.00.

A number of mineral collections are held at the Museum. First and foremost is the - some 1685 in all - was donated to the Peak District Mining Museum, Matlock Bath, Derbyshire, in Autumn 1993 by Professor R.A. Howie, Emeritus Professor of Mineralogy, Royal Holloway University of London, and co-author (with W.A. Deer, F.R.S and J. Zussmann) of some of the world's standard works on mineralogy.

The Collection was gathered together by Professor Howie largely between 1953, when he was appointed Lecturer in Geology at Manchester University, and 1993. He did, however, collect some specimens prior to commencing his teaching career in 1953, for example MATMM 5000/430 (Glyptotheca Dilatata) was collected as early as 1947, a year after he was invalided out of the RAF. For a note on Professor Howie's early interest in minerals, see the History File, 5000/1143.

Professor Howie collected specimens in the field on various trips, independently and with the IMA; also making purchases at mineral shows and from dealers such as Gregory, Bottley and Lloyd of London. He also acquired specimens as gifts from friends, acquaintances and colleagues, and even by purchase from former students of his. Some specimens were exchanged with people abroad whom he met through conferences and advertisements. The Howie Collection also includes specimens acquired when other mineral collections were broken up, for example, Bedford School, disbursed 1936; Burdett Coutes and A.W. Scobade.

Professor Howie built up his collection largely for his own interest, research and teaching purposes. It was kept in the study, show cases and boxes in his office rooms until his retirement.

Upon the arrival of the collection at the Peak District Mining Museum a preliminary sort and classification of the specimens was carried out on a voluntary basis by the writer, working with Professor Howie.

Working from this preliminary information the writer catalogued the collection during Summer 1994. The specimen were allocated, and labelled with discrete catalogue numbers (Museum Documentation Association registered code "MATMM" 5000/ series). Each was allocated a card carrying basic information about it, which was placed with it in metal storage drawers or oversize (OS) crates for larger specimens. More detailed information about the specimens can be found in the Museum's Accession Register, volumes 1 and 2, and is duplicated in this catalogue.

Professor Howie's biography, additional information, material and anecdotes relating to the collection can be found in the History File which supplements the Museum's catalogue. This has a separate "Contents and Notes" list by the writer, appended here. The file includes letters, photocopies of published articles relating to specimens and Professor Howie's research, and many original labels.

Robin A Hall

PLYMOUTH CITY MUSEUM & ART GALLERY

Drake Circus, Plymouth, Devon, PL4 8AJ

PLYMOUTH City Museum's geology collections range through the whole of mineralogy, petrology and palaeontology but its strength lies in its collection of minerals, composed of some ten thousand specimens representing nearly five hundred species. Four major collections make up the majority of specimens:

Sir John St. Aubyn (1758 - 1839)
Col. Sir William Serjeant (1857 - 1930)
Rene Gallant (1906 - 1985)
Richard Burrow (1947 - 1982)

The Sir John St. Aubyn Collection

A world-wide collection made at the end of the 18th and beginning of the 19th centuries, and arranged by the Count de Bourmont in 1815 (a refugee from the French Revolution and an expert mineralogist). The collection includes material purchased from Richard Green, Lord Bute and Dr. William Babington in 1799. This collection was presented to the Mechanics Institute of Devonport in 1876 and subsequently transferred to the Devonport Museum in 1881. It came to the main Plymouth City Museum in 1924. Saffron Walden Museum also holds St. Aubyn mineral specimens, though little work to date has been done to compare these two collections.

The Col. Sir William Serjeant Collection

This fine collection of approximately two thousand mineral specimens representing nearly two hundred species was acquired by the City Museum in 1924.

The basis of this late 19th century and early 20th century collection is Cornish, but there are also specimens collected from the world's classic mineral localities. Although there is no catalogue with the collection, every specimen is fully labelled - local minerals having a blue label, foreign specimens a red label. The additional Serjeant Collection of casseriterius contains specimens that represent nearly one hundred and sixty Cornish and Devon mines. Very little information exists in our archive about the life of Serjeant and more is sought.

The Rene Gallant Collection

René Louis Charles Gallant began collecting minerals in Devon in 1966, and over the years built up a large collection by purchase, exchange and field excursions to sites in Wales, Scotland, Belgium and France. The collection of about twelve hundred specimens was intended primarily to supplement his research into the effects of meteorite impacts.

GA magazine of the Geologists' Association Issue 1, vol. 1, 2002
n the Earth. Gallant's research was published in London in 1964: "Bombarded Earth: an Essay on the Geological and Biological Effects of Huge Meteoric Impacts". Gallant kept meticulous records of his acquisitions and the result is extremely detailed labelling of specimens.

The Richard Barstow Collection

Richard Barstow, a mineral dealer living in East Cornwall, collected the majority of this collection from the mines and quarries in Devon and Cornwall. With over one thousand specimens of display quality, there are about 100 species represented, including some important rarities. Many of the classic mining localities represented in the collection are now infrequent and closed, thus making the material even more valuable as a reference and research collection. The collection also includes a comprehensive collection of cassiterite (tin ore) specimens from Cornish and Devon mines, which, together with the Serjeant Collection of cassiterite specimens, forms an important research collection of South West in minerals.

Tel: 01752 304774 Fax: 01752 304775 Email: Plymouth.Museum@plymouth.gov.uk
Open: Tuesdays to Fridays 10am - 5.30pm Saturdays & bank holiday Mondays 10am - 5pm

The Rich and the Sebel Collection can be viewed by appointment.

Contact: Helen Fothergill, Keeper of Natural History Tel: 01752 304765 Email: helen.fothergill@plymouth.gov.uk

The Mineral Collection at the Royal Cornwall Museum

The Royal Cornwall Museum houses one of the country's foremost mineral collections. Amounting to some 12,000 specimens, the collection is rich in historic Cornish material, but also contains excellent material from the north of England and other classic localities worldwide.

At the core of the collection is the renowned Rashleigh Collection — one of the finest 18th century mineral collections to remain largely intact in the region where most of its finest specimens were amassed.

Philip Rashleigh (1729-1811) assembled his collection during the heyday of Cornish mining activity, and it therefore provides a tangible record of Cornish mineralogy and mining that remains unsurpassed in quality and rarity. The collection is of great scientific and historic importance. The historic documentation (in the form of correspondence, catalogues, publications and illustrations) which accompanies the collection, helps illuminate the unique mineral heritage of Cornwall and the pioneering decades of the science of mineralogy. Original hand written letters and labels complete the collection, giving a personal insight into the life and times of the collector himself.

The Rashleigh Collection is complemented by other, more recent, material including the extensive mineral collection of James Wickett (1841-1921) which includes a comprehensive collection of Cornish and foreign cassiterites. Further material from numerous other local collectors is also present, including a superb suite of calcites from Weal Wrey presented by William Sergent in 1930 and specimens donated by Richard Barstow (1947-1982).

Approximately 1,500 of the finest specimens are on display in the Rashleigh Gallery of the Museum. Prize examples which can be seen in this very specimen-rich gallery include, stunning boumnotites and tetrahedrites from Herodsfoot, and probably the finest example of lironconite in the world, nestling amongst a superb selection of other Cornish copper arsenates. Many of the specimens figured in Rashleigh's 'Specimens of British Minerals' (1797 and 1802) are also on display.

Other exhibits in the gallery illustrate further facets of the region's geology and palaeontology. The geological influences exerted on Cornwall's industrial development are also well demonstrated. Displays illustrate Cornish mining and associated industries and also the production of china clay.

The mineral collection is in the preliminary stages of a major conservation and documentation project. Funding from the South West Museums Council has enabled the collection to be reorganised, re-stored and documented prior to conservation of both specimens and historic documentation.

Visitors wishing to view specific specimens or wanting to tour behind the scenes should contact the curator to arrange an escorted visit.

The Royal Cornwall Museum can be found on River Street in Truro. Further details of opening times etc. can be obtained by contacting the museum via telephone: 01872 272205, E-mail: enquiries-royal-cornwall-museum@plymouth.gov.uk, or by visiting the museum's web site: www.royalcornwallmuseum.org.uk.

Sara Chambers (Curator of Natural Sciences)
Note: Lironconite is a rare hydrated arsenate of aluminium and copper with some replacement of arsenic by phosphorus. It is found as minute crystals of secondary origin in copper deposits associated with malachite and recorded in Devon and especially at St Day and Gwennap in Cornwall. Boumconite is a brilliant metallic grey sulphide of lead, copper and antimony. (Editor)
From the library

Library Notes

I am writing, a little nervously, to introduce myself as your new Librarian, but how indeed can anyone try to follow Eric without some trepidation. Over so many years the Association has benefited from his long geological experience, his exhaustive knowledge of the geological literature and of course his equally long connection with University College, its Library and its ways. Not forgetting too his connections with you and all your needs. We owe him an immense debt of gratitude for all his services to the Association over the years.

My own background has always been in geological libraries. A short stint with the Geological Survey Library was followed by many years in the Earth Sciences libraries of the BP Group, then the Geological Society Library from which I retired at the end of 2001. It is following this retirement that I shall be able to devote time to the needs of the GA Library.

Eric and the Subject Librarian at University College have given me a guided tour of the Library still recovering from building works and reorganisation over the summer/autumn of last year. Getting to grips with this and finding my way round is now a priority. Indeed many of you may be more familiar with the library than I am at present. Perhaps I can remind you that for personal visits to the library you need to become a registered user - those not to visit should contact me with their queries. Application forms are available and a stamped addressed envelope would be appreciated.

I shall, of course be at most of the G.A. meetings in London and am looking forward to the next Earth Alert where I hope to get to know more of you from other parts of the country. In the meantime do write and let me know your needs and I will do my best with them. Don’t forget that you may know the detailed location of the area you wish to study but I will not. Some indication would be helpful e.g. How many miles/kilometres from the nearest town and in which direction; latitude and longitude would be useful if known.

Your travels may reveal new maps and publications which would be helpful to others in the Association - I would welcome this sort of information as it is intended that this should become a regular column.

Enquiries, in the first instance should be addressed to me via the Association’s office in Burlington House. Do bear with me as I learn on the job.

Looking forward to hearing from you.

Elaine Bimpson

In the paragraphs that follow papers in the journals are reviewed (by Bill French and Bernard Leake on this occasion). Possibly this section will grow.

Scottish Journal of Geology

Volume 37, Part 1, pages 1 to 44

Intertidal peat deposits and early Holocene relative sea-level changes, Traigh Eilean, Isle of Coll, Scottish Hebrides.

A. G. Dawson, S. Dawson, T. M. Mighall, G. Waldman, A. Brown, F. Macgattogart

On sand rich in peat and associated diatoms and related flora and fauna show that a marine transgression occurred for which Carbon 14 data give a date of 8000-840 years BP. The diatoms and other species constitute a brackish water to marine assemblage indicating deposition in an intertidal area. Evidence of transgression is indicated by the peat layer at about 0.6m OD. The peat remains at 0.55 to 0.57m OD include violet, marsh charlock, seaside and hypericum (St John’s Wort). A hazel-birch woodland or scrub is suggested by pollen values. Taken together with evidence from other localities the present data suggest that the balance of uplift due to isostasy and the eustatic sea-level change due to melting led initially to a relative fall in sea-level from about 16 m to 2m OD over some 2000 years. This was followed by a relative rise to about 4m OD over the next 2000 years. A gradual relative fall to the present level took place over the next 8000 years.

Scottish Journal of Geology

Volume 37, Part 1, pages 1 to 44

A dorylephorinian dinosaur from the Early Jurassic (Middle Triassic) of the Isle of Skye, Scotland.

N. D. L. Clark

Two fragments of the proximal ends of the shafts of a right ulna and radius are described. The bones are comparable with those of the Eurypterus, stegosaurus and anklylosaur. This is the first description of this group from Scotland where evidence for the presence of dinosaurs is only recently come to light. Occurrences have been recorded.

Journal of the Geological Society

Volume 158, part 4, July 2001

Onset of Late Palaeozoic glacio-eustatic and evolving climates of low latitude areas: a synthesis of current understanding.

A. B. Wright and S. D. Vansonne

Glacio-eustatic cyclothem begin around 330 million years ago in the early Carboniferous and provide a global marker horizon. A progressive increase in the amplitude of sea level oscillations can be detected in the thickness and composition of the cyclothem during the late Viséan. From the Ashian onwards Goniolema ice sheets were able to grow sufficiently for sea level changes of tens of metres to take place. Other triggers for the alternations could be exogenous, with areas of uplift forming the location of alpine glaciation, and variation in atmospheric carbon dioxide content. The sea level oscillations had a periodicity of about 100,000 years with an increase in amplitude occurring in the late Viséan. The alternations had significant effects on the structure of the carbonate platforms.

Journal of the Geological Society

Volume 158, part 4, July 2001 pp. 709-724

Biodiversity and terrestrial ecology of a mid-Cretaceous high latitude floodplain, Alexander Island, Antarctica.

J. J. Falcon-Lang, D. J. Canfield, and G. J. Nafis

Polar regions were once covered with forests, the earliest of which appeared in the late Permian and grew in paleoaltitudes of up to 80 degrees south. They were most abundant in the mid-Cretaceous. Only small upland glaciers existed at this time. This paper reviews the floral diversity and assemblages of leaf shreds and growth rings in fossil wood and structures in charcoal are analysed in detail. The forests grew as scattered woodlands on bradied alluvial plains and as dense rain forest in coastal meander belts. Mammals, birds, amphibians and arthropods in the forests accompanied diatoms with large eyes and large brains, perhaps adapted to the cool environment. The climate resembled that of the rainforests of present day New Zealand.

Journal of Petrology, vol. 41, April 2000, pp. 563-582

Granulite-facies overprinting of ultramafic/metasomatite rocks, northeastern South Carolina.

D. Nakamura & T. Hirose

Ultramafic (25-25 kbar pressure) (1)P metamorphic rocks, are crustal rocks, often containing diamonds and coesite, which have been pushed or dragged into the mullite to depths of 100 km or more and are now found at the surface of the Earth. The problem of how they come back to the surface sufficiently quickly to preserve the high pressure minerals in them, especially as many of the rocks are very dense and would not rise easily seems to have been solved for the UHP rocks from the Ste-Louis region of eastern China. Here UHP eclogite (garnet sphene pyroxene rocks) block surrounded by ophiolite, are exposed and the authors show that these eclogite blocks have been isothermally uplifted at 700 to 8000 C and that this could only happen if the blocks were uplifted in regions >7 km in size which is much larger than the size of the blocks. This means the orthogneiss must have also been uplifted, even though it now lacks UHP minerals, so that the whole assemblage of eclogite blocks and enclosing gneiss was uplifted together. The combination provides the exact type density needed to explain the split of the heavy eclogites because they only constitute a small part of the whole complex.


Human Impacts on Atmospheric Chemistry, P. J. Crutzen and J. Lelieveld.

Burning fossil fuel releases some 5x1015g/year into the atmosphere. A very similar amount is released by biomass burning, including slash and burn, forest clearing, burning savanna grasses, burning wood for cooking and heating, and burning waste. This localized biomass burning also releases other pollutants including ozone. It is considered that the release of ozone and water will have a warming effect adding to the effect of carbon dioxide and methane. Aircraft through the release of nitrogen oxides also contribute to increases in ozone. Surface ozone has increased by 2 to 3 times in the last 20 years, methane production is some three times that deriving from natural sources and nitrogen oxides are about double the amount produced from natural sources.
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Date for meetings: September 9-15, 2002
Venue: Sedgwick Museum & Department of Earth Sciences,
Downing Street, University of Cambridge, CB2 3EQ, UK.
Accommodation: Emmanuel College, Cambridge
Information and initial contact: Alison Allen,
Department of Earth Sciences, University of Cambridge, email: alison@esc.cam.ac.uk

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