GA Meetings and Report
Field Meeting Report
Rockwatch, Collecting,
UKRIGS, Proceedings,
REUNIONS 2003 & 2004,
Photographic competition.
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Cover picture:
Trilobite knitted by Susanna Van Rose at the Reunion - patterns are available!

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NOTICE CONCERNING FIELD MEETINGS:
The Association now has a mobile phone for emergency communications concerning field meetings (UK only). If you have to cancel on the day, or are lost or late for the start of a field meeting, please call the GA mobile phone (07990 806961). The mobile phone will only be switched on just before and during field meetings.
(For routine enquiries, please call the Field Meetings Secretary on the usual number.)
REPORT FROM COUNCIL

Since there is not a Council meeting in January this report only covers the December meeting.

Over the past year there has been considerable discussion about the liability of the GA towards copyright of Ordnance Survey maps and grid references in its publications. In spite of continued efforts by the Publications Committee the situation is still not clear. The quest continues.

Another continuing point of discussion is the use of the Internet for GA publications. There was a debate in Council about the relative merits of publishing on the Web - costs, returns, message given to the geological community if not on the Web, etc. At present there is no definitive answer and there will be more discussion on the matter in the future.

The Editor explained that there was an urgent need for more members to assist in the preparation and publication of the magazine. It was agreed that an issue highlighting the activities of Local Groups should be produced. To this end all the Local Groups have been contacted for input (many have already responded).

Still on publications, it had been suggested by the publishers that Geology Today should not be published for a year. However thanks to the efforts of the GA, Geology Today will continue to be published this year with a new Editor and more regular production.

The rules of the Association have been revised to bring them in line with current practice. They are now with the Trustees for their approval. When that is given the revised rules will be put before a Special General Meeting of the Association for approval.

It was pointed out by members of Council that a number of events of geological interest are to take place in 2006: an impressive programme in the Rotunda in Scarborough, a "Geology and Art" exhibition in Normanton, and the 50th anniversary of Wren's Nest which will be marked with events at the Dudley Museum and Art Gallery.

John Crocker
General Secretary

CURRY FUND REPORT

The Curry Fund Committee received eight applications for consideration at its December meeting. Of these, four were supported, three were deferred and one was refused. £783 was granted to Lothian and Borders RIGS and Girlguiding East Lothian for the production of leaflets on the volcanic past at the shore of North Berwick in East Lothian. This is an innovative project in which the Guides, with the support of the local RIGS group, developed a Geology Action "Go For It!" Pack. The "Go For It" Packs are standard guide teamwork packs, but the geology pack is a new project and encourages the Guides to develop a geological understanding of the area in which they live and to produce a leaflet based on their original fieldwork. What a splendid idea and perhaps one that local GA groups might be interested in encouraging in their own areas. Peterborough RIGS was awarded £5350 for production of four geological site interpretation boards at the Swaddywell RIG site. This is a disused quarry and a trail around it will allow visitors to see a variety of geological features and how they have been formed. Information boards will also highlight the impact of the geology on the local heritage and its development from Roman times. The Friends of the General Cemetery, Sheffield were granted £1500 towards the cost of a geological rock garden. This garden will be part of a Memorial Garden within the cemetery and will contain at least one sample of each of the major rock types used for the gravestones. Most of the rocks used in this cemetery are of British origin. There will also be a display showing a polished sample of each of the rock types, to be housed in the proposed new Information Room in the Gatehouse. An information board carrying brief descriptions of the rocks and their provenance (and acknowledgements) will accompany the display. £450 was awarded to the Geologists' Association for the production of one issue of the GA Magazine during 2004.

An application from Lancaster City Museum for a public information panel celebrating Sir Richard Owen's centenary, an application to support fieldwork on the Thames Estuary, and an application from the GA for a portable set of display boards were all deferred pending further information. An application from Brunel University for a grant towards the cost of publication of abstracts and guidebook for a conference was unsuccessful.

Finally, the application from Bristol University towards the cost of replica dinosaur fossils for public education that was deferred from the September meeting was awarded £1898 towards the cost of the project.

For those who don't know, the Guidelines for Applicants and an Application Form for Curry Fund grants are on the GA Website or are available from the GA office. We look forward to hearing from you.

For the GA Reunion to be held in Cardiff in November this year, we have Special Application Forms for Local Groups and Affiliated Societies who wish to apply for small grants (not exceeding £200) to help with costs. All group secretaries received information about these recently. Forms can be downloaded from the GA Website and are also available from the GA office.

The Curry Fund Committee will be meeting in March, June, September and December during 2004 and applications must be received in the GA office by the 20th of the month preceding each meeting.

Special Applications for support for the Cardiff meeting will be taken at the March and June meetings only. Please ensure that your applications are received at the GA office by the appropriate date!

Susan Brown,
Curry Fund Secretary.

ANNUAL DINNER - FRIDAY 7 MAY 2004

This year the Annual Dinner will be held in the Lower Library at the Geological Society from 8.00 to 10.00pm following the AGM and Presidential Address. The cost will be £25.00 per person and dinner will consist of a hot buffet, two glasses of wine and coffee. Additional wine may be ordered at the time of booking.

Please send your booking to Miss Mary Pugh, Helena, School Close, Cryers Hill High Wycombe, HP15 6JX, enclosing a cheque made payable to the Geologists' Association. Please be sure to book before 27 April and indicate if you have any special dietary requirements. The number of places is limited.

The Library Notes

Looking back over requests that have come my way in 2003 I see there have been the usual suspects. Greece, especially Crete, is perennially popular, with Lesbos popping up for the first time. Other travellers were in Cyprus, Spain and its islands, France, Austria, and Italy - Tuscany of course, but also the island of Elba and the heights of the Dolomites. A hop across the Mediterranean provided a bit of a problem with the remoter areas of Morocco, as did an even further afield hop to Argentina. Bird Watchers going to Trinidad and Tobago were also keen to get their heads down to look at the rocks as well. A lucky couple were planning an extended trip taking in Australia, New Zealand, and South Africa.

Now for 2004. The library will be closed for Easter from 5pm on Wednesday 7th April until 9.30am on Wednesday 14th April. Then I will not be available for a month from the end of that week. The subject librarian at University College is also extending his Castles holiday. So there is a need to plan ahead and get requests in well before 7th April. Otherwise they may have to wait until the middle of May.

Also, it is time for spring cleaning - every trip we make results in an expanding collection. So keep the library in mind, for those items from times past, which could make room for future acquisitions.

Elaine Bimpson
Librarian.
March Meeting

CHERRY LEWIS
(Bristol University)
The Dating Game - One Man's Search for the Age of the Earth

5th March 2004
Geological Society, Burlington House, Piccadilly, W1V 0JU, at 6.30 pm, tea at 6.00 pm

This evening's talk takes us through Arthur Holmes' life and his search for the age of the Earth. Like many students, when writing up her PhD Cherry encountered the work of Arthur Holmes, and became captivated by his vision to develop a geological timescale - then a revolutionary idea. Cherry follows the life of Holmes from the terraced house in Gateshead where he grew up, through Gateshead High School and his time studying physics at the Royal College of Science in London. She begins with the work of Kelvin and the discovery of radioactivity that gave the lie to Kelvin's age for the Earth. Cherry follows Holmes' pioneering research on the development of dating methods, documenting the setbacks as well as the successes. Through the application of contemporary cutting-edge analytical work he demonstrated the great antiquity of the Earth, providing a basis for the now familiar timescale. She also gives us an insight into his personal life and troubles, such as the problems that beset him when prospecting for minerals in Mozambique, the tragedy that befell him in Burma and his long-term relationship with Doris Reynolds, who eventually became his wife.

Cherry studied geology at Bristol University as a mature student, after drama college and running her own business. She worked on Tibetan granites for a PhD and did postdoctoral research at University College, London. A career in the oil industry followed. She now works for Bristol University and is responsible for publicising their research.

A spectacular mammoth skull has recently been unearthed in the Cotswolds. Discovered by Dr Neville Hollingworth (left, with the find) a Science Programmes Officer at the Swindon based Natural Environment Research Council, the mammoth skull is complete. Mammoth skulls are very rare, as they are made of light thin bone and rapidly disintegrate before they can be fossilised. The mammoth skull is so rare that only a few complete specimens have ever been found in Britain. The skull belongs to a mature female mammoth which died between 25 and 45 years of age. The skull itself is approximately 50,000 years old and was found protruding from a gravel deposit in the Cotswold Water Park near Cirencester.

Professor Adrian Lister, a world expert on Mammoths from University College London, has confirmed that finds like these are very rare indeed. The intact skulls of mammoths are extremely uncommon and a find such as this should provide new information on Mammoth ecology. The skull is so well preserved that very delicate features such as the cheek bones are intact and the teeth are still in their sockets. It is likely that the skull was buried very quickly after the mammoth died, possibly via a flood, or it was washed into an abandoned river channel where it was preserved in a layer of fine silt. Further systematic excavation at the site may reveal more bones and possibly the tusks. "We will keep on searching" said Dr Hollingworth, "For all we know the rest of the skeleton may be still be in the pit. We just need to find somewhere big enough to house it, because it is too big for the living room at home".

Marion O’Sullivan
NERC Press Officer

(See abstract on the next page for the April Meeting).
NEVILLE HOLLINGWORTH

Earth Sciences Team, NERC, Polaris House,
North Star Avenue, Swindon, SN2 1EU

'Hunting for mammoths in a Co-op Creamery' or The Geology of the Cotswold Water Park.

4th April 2004
Geological Society, Burlington House, Piccadilly, W1V 0JU, at 6.30 pm, tea at 6.00 pm

Extraction of sand and gravel in the Cotswold Water Park in North Wiltshire and South Gloucestershire has provided geologists with a unique opportunity to study in some detail, the geology of an area previously not mapped in detail due to the extensive spread of late Pleistocene river gravels that obscure much of the solid geology in the Upper Thames Valley. The gravel deposits were laid down by a major river system between 350,000 and 45,000 years ago. The underlying beds mainly comprise the Kellaways Beds and Oxford Clay, which were deposited during the Jurassic period between 175 and 155 million years ago. This talk will highlight some of the significant palaeontological discoveries from hitherto rarely exposed horizons in the Kellaways beds and Oxford Clay formations. The recent discovery of abundant mammoth bones and associated hand axes also sheds new light on the Quaternary history of the Upper Thames Valley.

Top right: Kosmoceras (Galilliceras) jason
(Heinecke) Microconch (=Male)
Jurassic, Lower Callovian,
Kosmoceras jason zone; Oxford Clay Formation; Peterborough.
Member Claydon Pike Gravel Pit, Fairford, Gloucestershire

Right: The block with multiple ammonites has Cadoceras sublaeve (Sowerby) and Sigaioceras (Catarstigaioceras) callovense (Sowerby) Jurassic, Lower Callovian, Sigaioceras callovense zone; Kellaways Formation, Freeth Wood Pit, Ashton Keynes, Gloucestershire.
(Paul Davies)
May Meeting

AGM and Presidential Address

William French
Mad about Mudstones

7th May 2004
Geological Society, Burlington House,
Piccadilly, W1V 0JU, at 6.30 pm, tea at
6.00 pm

We learn from the dictionary that mudstone is a
dark clay rock of wet soft or stiff sticky earthy
matter including clay and silt. Mud is widely used
in metaphor – for worthless or polluting, defiling,
muddled, obscure disgraceful – and in phrases
such as clear as mud, muddling, mud in your
eye.

It is seen as the opposite of good –
"Two men look out through the same bars
One sees mud the other the stars" (Langbridge 1896).

However, we also have that "Somehow
good shall come of water and of mud … mud
celestially fair" (Rupert Brooke c1900).

Despite all the gloom, mud and mudstones
are full of interest and problems and are of great
importance for life itself. Mudstones make up
some 70% by volume of the Phanerozoic sedi-
mentary deposits. With a thin Quaternary cover
they tend to be associated with human occupation:
providing low-lying flat topography easy to build
and excavate, easy for construction.

There is much muddle concerning their
mineralogy, texture, chemistry and origins. They
have nuisance value and are not so easily studied
as sandstones and limestones. They also weather
deeply changing mineralogy and structure for sev-
eral metres. Often thought of as being clay, they
are mainly silts, they include such thick and exten-
sive deposits as the London Clay, Oxford Clay,
Liassic Clays, Mercia Mudstone, Gault,
Kimmeridge Clay, the Weald Clay and so on.

In construction they have both the benefit of
making easily worked flat extensive terrain and the
great disadvantage of diverse and dubious
composition. They tend to be dimensionally
unstable both from the point of view of movement
on fairly gentle slopes and from swelling and
shrinkage with water content and composition.
Because of the problems associated with mud-
stones it is often necessary to study them petro-
graphically and with the scanning electron micro-
scope. This review leans heavily on detailed
studies of this type and will illustrate the range of
textures and compositions encountered.

The studies reveal various conundrums.
Clay particle size for sedimentologist and engi-
neer is less than 2 micrometres (some definitions
give 3 micrometres) and so we have a conflict
between the minerals in clay and clay minerals.
Mineral grains less than two micrometres are clay
but not necessarily clay minerals. Minerals with a
size greater than two micrometres identical struc-
turally and chemically with clay minerals are not
clay minerals – for example the clay mineral
kaolinite is commonly present in mudstones but
often exceeds the clay size limit. What do you
call the mineral in these cases? Similarly most
clays are dominated by clastic grains – mainly
quartz - which ranges throughout the clay and silt
size ranges.

The particles of mudstones are of diverse
origins – involving weathering, loessic, volcanic,
and clastic processes. Some of the shapes and
structures of grains are difficult to explain and,
from an early encounter with lunar particles one
would expect that some of the grains result from
meteorite or asteroid impact. Overall composi-
tion is also intriguing with many rocks showing
bulk compositions similar to those of the average
igneous rock. There is also a marked tendency for
the rock to be changed – by cementation, with cal-
cite or aragonite – through biogenic deposition of
sulphides and their oxidation to sulphates and by
precipitation of other phases such as dolomite.

If the present is the key to the past we have
to look for active and widespread processes lead-
ing to mudstone formation. Because of the abun-
dance of mudstone it must also be a dominating
process with perpetual importance for global
processes and climatic variation. In fact we find
abundant evidence for contemporary deposition
of clay and silt particles from many sources on
both land and sea.
June Meeting

A. N. TROTH
Southampton Oceanography Centre, European Way, Southampton. SO14 3ZH

Petroleum systems, Palaeoclimate, and Sea Level Change in the Devonian of Bolivia - A Legendary Guide and Blood-sucking Critters: Field work in Sub-Andean Bolivia

4th June 2004
Geological Society, Burlington House, Piccadilly, W1V 0JU, at 6.30 pm, tea at 6.00 pm

In Bolivia there is a world class reservoir (Huamampampa Sandstone) and a source rock (Los Monos Shales). Producing fields are in the sub-Andean zone where they occur in a structurally complex thrust terrain. Seismic recognition in the subsurface of the reservoir is difficult because of this structural complexity. However, success has been achieved using palynology. A bloom of the acritarch (marine phytoplankton) Evittia sommeri occurs in the lowest Los Monos Shales, immediately above the Huamampampa Sandstone. The bloom only occurs at this stratigraphic level and represents an influx of this distinctive acritarch into the basin. This event has not been studied before at surface outcrop. Surface exposures of the Huamampampa-Los Monos interval have been investigated over two field seasons and the rock samples collected have revealed the precise stratigraphic extent of the bloom. The data will be used for bio-steering purposes during drilling in Bolivia. In Devonian times, Bolivia was in the high latitude, coldwater Malvinokaffric province. The Evittia bloom is monospecific and is coincident with a peak of prasinophyceae algae (leiospheres) that are generally associated with deeper water. The presence of these two palynomorphs suggests there was a sea level rise possibly associated with an influx of warm water from lower latitudes. An influx of warm water would have contributed to the breakdown of the Malvinokaffric realm in the Mid-Devonian times.

Evittia sommeri (Brito, 1967)

Silt grains from the London Clay showing faceted and worn surfaces in grains of less than 50 micrometres.

Framboidal euhedral pyrite in the Kimmeridge Clay. The yellow spot is 1 micrometre in diameter.

Quartz silt grain in the London Clay with complex fine concoidal fractures.
The Reunion for 2003 was a great success with many excellent exhibits and of course held on the occasion of a major lunar eclipse. The Reunion was exactly that - we had many of the friendly faces that had not been seen for a year or two exhibiting. Nineteen local groups and affiliates and an equal number of other organisations and individuals exhibited, including Rockwatch and Marjorie Carreck with the GA Archives. It was a particular pleasure to see many children joining in through Rockwatch and the efforts of the Kent Group. Once again we are very grateful to those who helped to arrange the function especially Professor Alan Lord and the students and others from UC who helped in so many diverse ways.

The pictures show something of the activities at the meeting in addition to those on page 13 in the Rockwatch page, and on the front cover. Here the pictures are as follows. 1. Members of the Kent Group provided much for the children to do including in 2 serving for fossil teeth in the sand bed. 3. The splendid exhibit put on by the Farnham Local Group. 4. David Bone, Sarah Stafford and Roger Dixon enjoying a break. 5. The GA Enterprises stall with Barbara Butler and Lynne Allen.
of other activities. These include hands-on workshops, Rock Watch, two top public lectures in the Museum’s lecture theatre on dinosaurs (Phil Manning) and catastrophes (Mark Davies), as well as a series of field trips to a variety of localities in Cardiff and southeast Wales on the Sunday. The field trips will vary in length and distance to give participants the widest possible choice to suit their needs and interests. Localities likely to be included are the Triassic/Jurassic succession of the Penarth-Lavernock coast, the Barry Triassic dinosaur footprints, the marginal Lias of the western side of the Vale of Glamorgan and a visit to an opencast mine in the coalfield, the latter probably linked with an underground visit at the National Coal Mining Museum at Big Pit, Blaenafon. We are also looking at the possibility of organising a post-reunion week-long visit to see more of the geological delights of South Wales, so watch this space!

Cardiff offers a range of accommodation types to suit all pockets, is easy to get to by road and rail (the Central Station is only a 15 minute walk away) and also has a rapidly expanding International Airport only 30 minutes drive away, so there is no excuse not to come. If you miss it you will regret it so put it in your diaries now. An outline programme and details of local accommodation should be available early in the New Year. In the meantime if you have any queries please do not hesitate to contact Sarah Stafford or Steve Howe. See you there!

Already a number of Local Groups and Affiliates have said that they are coming to Cardiff. Those who have not applied should write to or telephone Sarah Stafford for a form indicating their requirements. Alternatively contact Steve Howe at the National Museum in Cardiff.

The photograph left shows the National Museum and Galleries of Wales in Cardiff and was kindly provided by the Museum.

Below are shown the cliffs at Southerdown which might be among the many spectacular sites visited on the field excursions.
Field Meeting: Dublin

Left: GA members admiring the reconstructed skeleton of the Giant Irish Deer, Megaloceros giganteus in the Natural History Museum, Dublin. Photo D. Bone, reproduced with permission of the Museum.

On the evening of Friday 5th December some 20 GA members, led by David & Anne Bone, descended on Dublin. We came for a weekend of geology, and our local leader, Patrick Wyse Jackson of Trinity College, did not disappoint us. He and his colleagues - Nigel Monaghan of the Natural History Museum, and Matthew Parkes of the Geological Survey of Ireland - were entertaining leaders, and in the process we got history, culture, and fun as well. Patrick had provided handouts in advance of the visit, so we arrived knowing something about the institutions and the characters who made Irish Geology, such as Samuel ("Hanging") Haughton (1821-1897) - Professor of Geology, also a doctor, Quaker, and (as required of academics of the time) ordained clergyman, who became famous for the Haughton Drop, making hangings more humane. Sir Richard Griffith (1784-1878), whose fossil collection now belongs to the Natural History Museum, made the first (6" to 1 mile) geological map of Ireland, while John Joly, whose collection is now at Trinity College, was an inventor and geophysicist who worked on radioactivity and the age of the Earth. William Fitton (1780 - 1861), President of the Geological Society (1827-29) and winner in 1852 of the Wollaston Medal, also had the distinction of being arrested in the 1798 rebellion for carrying a (geological) hammer!

On Saturday morning we assembled at the Natural History Museum (part of the National Museum of Ireland) for a tour with Nigel Monaghan, its Curator. The collection was started in 1792, when a devoted Irish Parliament voted funds for a mineral collection, but apart from a few specimens on display here, the minerals are now housed at Beggars Bridge. The present museum building, of Leinster granite and Portland stone, opened in 1857 as the Museum of the Royal Dublin Society, and many of the exhibits are specimens which RDS members brought back from service overseas. This "relatively intact Victorian museum" (to quote Nigel) has changed little since then. With 10,000 items on display, of course we were only able to take in some of the highlights.

The ground floor exhibition features Irish fauna - invertebrates, insects, birds, fish & mammals - and the entrance is dominated by the skeleton of a Giant Irish Deer (we were to see more of these). The deer died out at the end of the Ice Age, along with the vegetation it fed on. Strangely, only male remains have been found - Nigel's theory is that the weight of their enormous antlers made movement difficult, and the deer were trapped in bogs where they died and their remains were preserved.

The first floor is an enormously tall room with two upper gallery levels. The whole gallery is dominated by the suspended skeleton of a fin whale, half the length of the building - a good 15 metres long, at a guess. The display is divided into marsupials, rhinos, bears & monkeys, and shows stuffed animals & skeletons from such diverse places as the Channel Islands, Zambezi, Borneo and Cuba - a real animal United Nations. It was particularly interesting to see families of animals from different parts of world - a lemur from Sumatra next to one from the Cameroons, for example. We made the acquaintance of beasts we have never heard of before: ratite, bulbul, kinkajou, kakapo, serval, gerenuk and pika - a Scrabble player's delight, really! One of the most popular exhibits here is the "tarmac elephant" - enthusiastically preserved in layers and layers of lacquer. The single African elephant tusks - one of the largest known, and weighing 176 lb - is equally memorable.

Above that the first gallery features birds and fish - including, curiously, the Barrington Collection - birds (or pieces of them) killed when they light hothouses. Exhibits here range from ugly to exquisite - the scales of the tarpon fish being as remarkable for their size (10 cm across) as for their silver-pearl beauty. Other interesting exhibits included the saw of the smalltooth sawfish, 1m long, a porcupine fish, coelacanth, elephant bird and dinosaur fossils. For something really repulsive, however, it is necessary to go to the top gallery, home to insects, shellfish, crabs, worms, jellyfish, corals, mites, spiders, scorpions, slugs, snails and other creepy-crawlies. The Japanese giant spider crab, with legs 1.5-metre long, was particularly impressive.

From there we went on to the Natural Museum - officially to have lunch at its cafeteria (fresh wholesome food; the courgette & almond soup is particularly recommended) - but it turned out to be a worthwhile stop in its own right. The display of gold jewellery - lumiæ, armlets, hair rings & bracelets - dating from 2000 BC onwards also has an explanation of the geological background: gold may be found in nuggets, close to the source rock, or else as placer gold, when flakes are carried in water from the source rock and concentrated in sediments. Prehistoric man, who had no way of mining gold, panned it from river deposits using a sheep's fleece (hence the legend of Jason, apparently). We saw examples of alluvial gold, nuggets & ingots from the Bronze Age, and placer gold from Co Tyrone. We also paused for a look at the building's beautiful decorated marble pillars, and banisters of marble and polished limestone.

After lunch we had a brief look at the restoration work being carried out on the outside of the building. The Mount Charles sandstone was damaged by smog and is being replaced with reconstituted material in the same colour. Amongst the now familiar Leinster granite there was a doorway in Carrara marble - streaked with blotches of mud retained in the metamorphosing. We then walked through Dublin admiring its building stones (and some particularly striking fossiliferous Carboniferous limestone). There was a little diversion to see the multi-coloured statue of Oscar Wilde, lounging on a lump of granite. Sculpted from gabbro, Yukan jadeite, Norwegian thulite and Larvikite, with a ceramic head, the statue is known locally as the Fag on the Crag, we're told!

We continued our walk across the Grand Canal at Griffith Bridge (named for one of the directors of the canal company, & father of Richard the geologist) to Beggars Bridge, where Matthew Parkes showed us behind the scenes at the Geological Survey of Ireland. The work of the GSI includes bringing geology to the public, and we saw their travelling display What on Earth? and the results of a recent photo competition. Matthew introduced us to the GSI's publications and database (containing maps, unpublished reports, and surveys) and showed us the fibreproof store & safes in the basement. We also learned about the mid Devonian Valentina Tetrapod Trackway in Co Kerry - the earliest known example in the fossil record of vertebrates moving onto land (385 million years ago), breathing air & walking on four limbs. The GSI has an informative website (www.gsi.ie).
The Natural History Museum Reserve Store - used for research by zoologists, entomologists & geologists - is in an adjacent building, where a huge chunk of Connemara marble (a striking green, the colour of pond-slime, as someone said) greets visitors in the hall. This is where the NHM's collection of minerals is stored, and we had a look at the Irish ones, ordered by county, a small number of foreign specimens, and examples of building stones. It is also the home of the Griffith collection of fossils: brachiopods, echinoderms, fossil fish, belemnites, cephalopods, ammonids, trilobites, bivalves, molluscs, plants and more. Among the remains of Quaternary mammals we also encountered our friend the Giant Irish Deer. (Seeing a roomful of antlers is quite surreal.) A pair of antlers, typically weighing 35 kg, was produced in a single 7-8 month season, Nigel told us. There are another 40 odd rooms of boxed specimens, mainly awaiting conservation.

On Sunday morning we met Patrick again at Trinity College for a tour of the Geological Museum. This is in a wonderful Victorian building (Deane & Woodward, 1854-7) with pillars of Irish marble & Cornish serpentine, an imposing staircase with spectacular stone banisters and balustrades, and a domed ceiling faced with coloured tiles. Showcases in the entrance feature fossils, Shark Bay stromatolites from Australia, and a colourful display of minerals. (And yes, there is also a skeleton of the ubiquitous Giant Irish Deer.)

The Museum collection, started in the 1750s, is in the Geology Department on the first floor. One showcase is dedicated to minerals. It shows how zeolites (with examples from Northern Ireland and Scotland) were formed in the early Tertiary by igneous activity either side of a rift in the Atlantic. There is an exhibit of industrial products: gold, copper, chalcopyrite, galena, sphalerite, mercury, glass, sand, tale, halite and industrial diamonds, along with Irish facing stones (granites & limestones). A particularly interesting section on minerals covers their diagnostic features and properties, both physical and optical. There is also a modest display of gems, and of Widmanstätten structures in meteorites.

The second showcase features Irish sedi-

mentary and metamorphic rocks. We learned about the Lower Carboniferous marine transgression in Ireland, which occurred 360-325 million years ago when a shallow sea invaded the Devonian landmass. We saw 8 types of rocks (limestones, sandstones, mudstones and conglomerates) taken from a single 299m borehole core. There is an explanation of the Earth's structure & composition, with possible materials from the core, mantle, lower and upper continental crusts. And there are displays about Hutton's Unconformity, igneous rocks, and the formation of the oceanic crust. There are also sections on conservation methods, the lower carboniferous reefs of Ireland, and main rock types.

Left: Group photograph with leader Dr Patrick Wyse Jackson (at rear in orange fleece) in front of the statue of Oscar Wilde: Photo D. Bone.

Below: Entrance Hall to the Geology Department Museum, Trinity College, Dublin. Columns on first floor landing of Cork Red and Connemara marbles. The latter are also used for the staircase rail. Photo: D Bone.
Field Meeting - Dublin

Another fascinating display shows examples of the different processes of fossil formation: preservation, permineralisation, strengthening, carbonisation, moulds and casts, recrystallisation, and compression/distortion of the original fossils.

This display continues in the next showcase, which shows (in addition to some formidable mammoths' teeth) fossil groups, fossils, plants, and microfossils - the latter are used in the correlation of rock successions from area to area. There is also a section on Fitton, including his medal, which turned up recently in Canada and was donated to the College by one of its graduates. Finally, there is a display of meteorites, along with Griffith's 1855 geological map of Ireland. With so much to see we were lucky that the department had placed its coffee-making facilities at our disposal. We gladly made use of them and took a break before continuing.

For this was not all! Patrick is also the author of a book on Dublin Building Stones (partly sponsored by the GA), and he then led us on a tour of the stones of Trinity College, pointing out not just the building materials (starting with Leinster granite & Portland stone, with some French limestone from Caen) but also the details of the buildings. But for this we might have missed the little carvings, high on the top of windows, above the line of vision, of squirrels, mice, cats, and other animals. Other stones used in the college were volcanic slates from Westmorland and purple Bangor slates (for roofing), white sandstone from St Bees, Cumbria (for carvings under the caves), calc limestone (slightly brown, partly fossiliferous, and unique to the Dublin area, for the library) and Arklow dolerite (for cobblestones). And we learned how the local granite eroded into a clay popular with potters. The increasing cold did not diminish our interest, but after saying goodbye we were glad to scurry off our respective ways to find lunch and warmth before catching an evening plane home.

Seeing all this in less than two days is truly a measure of the trip's success. (As newcomers to geology we feared we might be out of our depth, but that was not the case at all; we would certainly recommend such visits to other new members.) It remains only to thank David and Anne Bone (the field trip organisers), Roger Dixon (for arranging the trip with the leaders), and Patrick Wyse Jackson, Nigel Monaghan and Matthew Parkes in Dublin, for giving us such a good weekend.

John and Julia Spencer

The Building Stones of Dublin, A Walking Guide (10 Euros or £7, including p&p) is available from the author, Dr Patrick Wyse Jackson, Department of Geology, Trinity College, Dublin 2, Ireland. (Patrick points out that sending well-wrapped sterling is cheaper than a bank draft.)

The Geological Museum in Trinity College is open to the public. The Natural History Museum in Merrion St is open on Tuesday to Saturday 10-5, Sunday 2-5.

Place of origin - attraction

Tower Bridge, the Forth Railway Bridge and the new Scottish Parliament have all used granite from the Kemnay Quarry, near Aberdeen. The site has been worked for over 150 years and is about 12 miles NW of Aberdeen. Three sculptors have been working with the quarry owner Aggregate Industries to create "The Place of Origin" attraction which will officially be opened in autumn 2004, to celebrate Kemnay's history and the importance of granite to Scotland. The project began back in 1996 when the quarry, then owned by John Fyfe, was looking for a way to celebrate 150 years in business. On its takeover Aggregate Industries took on the idea, matching the lottery funding with help in kind in the form of the stone itself, machinery and labour.

Over 100,000t of waste material from the site has been carefully formed into a 25m high cairn-shaped summit named the 'Ziggurat' by John Maine who was instigator of the Yorkshire Sculpture Park. It is 20 metres from Kemnay's southern rim, from where visitors can look down, right into the bowels of the quarry. On the way up through a newly planted woodland, there are dotted a series of special feature areas with granite in its various forms - from glacial boulders to gravels and quarried blocks. (Summarised from the New Civil Engineering Magazine - June 2003).

Claire, my daughter, and family, who live in Inverurie a few miles away, enjoyed the climb to the top this summer and sent these photos.

S E Stephens

View of the granite quarry from the summit

On the way up

25 metre high cairn-shaped summit
Rockwatchers, with their friends and families, enjoyed an exciting day at the Geologists' Association Reunion held at University College, London in early November. Activities tailored specially for Rockwatch members included fossil plaster casting, Jurassic and Carboniferous model making scenes, fossil rubbings and puzzle solving. Visitors were also shown just how much of their everyday shopping depended on the skills and knowledge of geologists – quite an eye-opener for many! A new experience for our visitors was knitting trilobites and graptolites, magnificently demonstrated and developed by Susanna van Rose (patterns for sale from her, by request through the Rockwatch office). The Kent Geologists Group also put on a splendid programme for young people of all ages searching for microfossils and then preparing them on slides for microscopic identification.

Rockwatchers also enjoyed the displays put on by GA groups from around the country. Those I spoke to were thrilled to see so much geology under one roof and really enjoyed talking to people about their displays. I think more than a few Rockwatchers also spent their pocket money buying fossils and minerals to augment their own collections and all thoroughly enjoyed the event.

Saturday 17th January, saw the Rockwatch team joining a Fossil Roadshow at The Royal Museum and Art Gallery in Canterbury. It was a day of non-stop activity for Rockwatch with hundreds of visitors keeping us busy all day long. Children and their parents were amazed to learn just how much of their weekly shopping depended on the skills and knowledge of geologists and then were thrilled doing wax rubbings of fossils millions of years old — many finding the concept of a fossil trilobite 460 million years old somewhat hard to grasp! Dozens of Carboniferous and Jurassic models were made and fossil plaster casting ran non-stop throughout the day. The streets of Canterbury were thronged with happy youngsters and their parents, clutching their trophies of fossil replicas, models of ancient geological scenes and wax rubbings to decorate their bedroom walls. It was an excellent event and I’m very grateful to Jane Lister and Andrea Kaszewski for joining me to help on the day.

Susan Brown,
Rockwatch Chairman.
Geology Today celebrates its twentieth year of publication in 2004. Published by Blackwells, the magazine was conceived by the Geologists' Association and continues to represent the Association and its special membership. The magazine is the perfect forum for debate, discussion and news from the wider geological community. The magazine reviews the issues that are of interest to the wider public through its Briefing section, and concentrates on topics of current concern to the scientific community in the specialist journals through its Geodigest. News and Views carries reports of all topics of concern to the wider geological community. And Geology Today gives you the human stories behind the discoveries – the Beagle 2 is a good example, to be featured in v.20. Features and Topics – dealing with issues very much in the news – are written by experts in the field for the general reader. Features for this year will include: The Impact of Climate Change on Ground Conditions; The Use of Digital Geology in Fieldwork; and The Comparison of Modern and Ancient Desert Environments. Many more are in production. Fossils and Minerals are explained for the non-specialist by recognised authorities – Molybdenite and Ancient Toothed Whales will appear soon. A new addition to these explanatory series is Building Stones Explained – with Limestones already covered, Marble in production, and more is to come. As always, book reviews are an important part of the magazine.

The future is bright for Geology Today; new developments include the inclusion of colour, and a faster publication schedule. I commend you to look, enjoy, and take part in this twenty-year publishing phenomenon.

Peter Doyle
Editor

Dino-Birds

Dino-treat for Belfast Geologists!

A timely coup by the Ulster Museum in Belfast has given members of Belfast Geologists' Society an unexpected event to help them celebrate their Golden Anniversary this year.

Of course it is not just BGS members who have been given the chance to enjoy one of the most exciting geological exhibitions to be staged in Britain; 'fans' from all over Ireland are travelling to Belfast to see Fuzzy Raptor and his feathered kin – the remarkable Chinese fossils that, it is generally agreed now, are the proof that modern birds evolved from small theropod dinosaurs.

The interest is shown by the fact that some 2,000 visitors came to see the exhibition on the first Sunday afternoon after it opened at the end of January!

Dino-Birds, a remarkable exhibition, created by the Natural History Museum in London in collaboration with the Geological Museum of China in Beijing, and built around 13 exquisite fossils from Liaoning Province, has been seen only in London and in Edinburgh, and after it closes in Belfast on 3 May will move on to tour Europe.

The Dino-Birds, while incapable of flight developed a coat of primitive feathers, initially probably for insulation and in time for courtship display. The exhibition traces the scientific trail linking dinosaurs to ancient birds and the modern fliers of today.

The Ulster Museum has become the spiritual home and centre of activities for Northern Ireland's geologists since Queen's University 'killed off' its geology department two years ago, and when Dr Peter Crowther, its Keeper of Geology and acting Head of Sciences was unexpectedly offered the chance to stage the exhibition for three months, the opportunity was grabbed without hesitation – to the extent of stripping out two of the Museum's main art galleries to accommodate it.

The exhibition could not have come at a better time for Northern Ireland's geology community with a major drive under way to raise the profile of the science, especially among young people, to whom it will be, hopefully, inspirational.

David Kirk

The wings and long tail pennants of this male Confuciosaurus, the oldest known beaked bird, are beautifully preserved.

Sinoasauraptor was a small, fast-running predator. Its feather-like coat probably provided insulation to help keep its body temperature constant. © John Sibbick.

Above: The dark structures running along the back of this juvenile Sinoasauraptor are a mass of simple hollow downy filaments. © Natural History Museum, London, and Geological Museum of China, Beijing.

Below left: Confuciusornis was sexually dimorphic. Males were slightly bigger than females and had a pair of long tail pennants to advertise for a potential mate. © John Sibbick.

Below right: This most stunning Dinosaur of them all, discovered in 2000, was covered from head to tail in fine branched feathers. Still not formally named or described, for the time being it has been affectionately christened 'Dave the Fuzzy Raptor'! © John Sibbick.

Above: The spectacular preservation of 'Fuzzy Raptor', a young dromaeosaur, shows the typical long grasping hands and swivelling wrist bones, as well as extensive feather preservation. © American Museum of Natural History, New York.
UKRIGS - What is it?

Cynthia Burek,
Chair, UKRIGS

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UKRIGS is the umbrella national organisation for RIGS groups. The acronym stands for UK Regionally Important Geologica/geomorphological Sites although I personally prefer UK Regionally Important Geodiversity Sites (Still UKRIGS) as this fits in with the modern terms used in conservation circles. Biodiversity and Geodiversity along with BAPS and LGAAPs use the diversity term, which seems to be more widely accepted nowadays. Geodiversity is also easier to say, and broader in content than either geology or geomorphology as it incorporates that lost area between geology, biology and ecology - the soil! UKRIGS is a national organisation and represents the local face of geocountservation at the national and indeed at the international level. It should not be confused with local and regional initiatives. When RIGS is represented on national committees or at government level it is through UKRIGS. However the local has always been important in conservation terms and it is at that level that we must operate.

History of RIGS

RIGS are inherently local. They must be by their very nature. There has always been a strong allegiance with the local environment by naturalists, but many people fail to understand the geological or geomorphological nature of their habitat and environment. It is interesting to note therefore the strong link, which has existed between the wildlife trusts and the local geological/geomorphological and indeed pedological conservation movement at the local if not the national level. While this may not be universally true throughout the country, many voluntary groups and societies do look at the natural environment in its entirety. It therefore seems natural that the origin for the term RIGS should be born from English Nature with whom we now have a Memorandum of Agreement. The origin of the term RIGS is clearly mentioned by Harley in 1989.

Welsh RIGS sets precedent

The local nature of some RIGS activities changed with the realisation first by Wales and then by the UK in general that groups needed to come together nationally to discuss problems (a good example of this is insurance cover), aims, share good practice and to publicise what they were achieving. In Wales, the first national meeting was held in Brecon in 1994 (Campbell & Wood, 1995) with about 39 participants. However, before this event, the idea of a national umbrella body for Welsh RIGS had been mooted in Cardiff in late 1993 by Professor Mike Brooks (Burek, 1998). From the Brecon meeting a steering committee made up of the chairmen of the regional groups in 1994, explored the national identity of the main regional activities of the groups and took forward the ideas from the first conference. It was this group which proposed the establishment of the Association of Welsh Rigs Groups (AWRG).

In Wales, therefore, the Association of Welsh Rigs Groups (AWRG) has operated since 1996 with annual fora being held by the local groups in different locations and addressing different topics. It is run by a national committee and is strongly supported by Countryside Agency for Wales. This is one of the three national agencies that followed the break up of NCC in 1991. It was initially perceived that by being a national organisation additional influence would be gained in funding bids and the organisation could give a national voice when asked. This proved true in 2003 when the two northern RIGS groups applied for funding individually to the Welsh Aggregate Levy Sustainability Fund and were turned down. However with replication together with a single strategy they were successful in gaining funding for a North Wales Geodiversity audit which would inform the rest of Wales (Campbell, 2004).

England

England looked on and learnt from the Welsh example. However, within England, it was perceived that there were too many groups to follow the example set by Wales (initially made up of six groups), and instead regional groupings were initiated. Several met but failed such as the northwest area. However, the area around the southern Welsh borders has thrived and grown. It was initially set up in 1996 and was originally known as the Western Association. It is a measure of their success that they have just developed the second acknowledged Geopark within England again through partnerships (2003).

Based broadly on Hereford, Worcester and Gloucester, this group hosted the first national meeting of all RIGS groups in 1998 through Worcester University College (Oliver, 1998) and the second meeting in 1999. It was at the first conference that Mark Campbell from the then Gloucestershire RIGS read a paper setting out a new funded structure for UK RIGS, (Campbell, 1998).

UKRIGS

Following this meeting, a steering committee was set up, selected from willing volunteers by Phil Doughty, Chair of the Geoconservation Commission of the Geological Society of London. Nineteen members met in Birmingham in December 1998 to form the first national RIGS steering group. They represented government, RIGS groups, statutory agencies, academia and museums. The meeting was chaired by Mick Stanley at that time of RSNC (Royal Society for Nature Conservation). They had eight terms of reference and agreed to represent all four countries, widely publish their findings in RIGS briefing and to be flexible, by adopting a bottom up approach and by focusing on common purposes. At the first meeting in December 1998, it was agreed to set out objectives, which emerged at a later meeting as follows.
UKRIGS conference Oct 2003 Oatridge near Edinburgh. Salisbury Crags a volcanic sill, seen from Carlton Hill. The points of Dynamic Earth are clearly visible in the foreground.

Provide a UK perspective through a national body
Work towards a British isles perspective
Focus on common issues and meet the needs of RIGS group
Develop structures and promote nationally
Identify and secure resources
Promote standards and systems
Implement policies and strategies
Work with others
Review Objectives
(Burek & Potter, 2002a).

UKRIGS saw the light of day in 1999 following the first year of the steering group and was inaugurated at the national RIGS conference at University College Worcester (Oliver, 1999).

A chequered history followed, which is best left behind with many clashes of personalities and I do not intend to elaborate here other than to say that as the dynamics of the group change, we have progressively put the negatives behind us, grabbed the positives and moved on. Geoconservation as the focus of UKRIGS is bigger than any small individual differences.

UKRIGS Successes

After 5 years UKRIGS has had some remarkable achievements considering it has a voluntary body. It has also had its disappointments.

I have a cup that is half full not half empty, so I propose to mention only the former before outlining the way ahead.

The national committee has had four different secretaries and met in many different venues. However the national office is at the National Stone Centre in Derbyshire. The very first executive committee meeting was held in Chester and that is where the last one was held (November 2003) but other venues include the National Stone Centre, Derby University and Wolverhampton University.

4 Successful conferences have been held in Penrith; Peterborough area, Addison (2001, 2002) and then Llandudno, Wales; and Oatridge near Edinburgh, Scotland. Each has addressed a different theme and we have been treated to some marvellous geology in good company. Perhaps the most unusual was the convening conference venue in Llandudno with the food and weather both great! (Jones, Tilson & Campbell, 2003)

A constitution, a development strategy and wide recognition by both the national statutory bodies and national societies have enabled the national organisation to represent its view and those of the local groups on important issues. Consultation on various legislation and other important documents has been submitted often within a short timeframe and against an impossibly hostile or ignorant clientele. An example of this is the submission to the DEFRA Local sites (Reynolds, 2001, 2002, 2003).

Memorandum of Agreement or


Representation on national committees such as the Earth Science Education Forum, Geoconservation Commission and All Party Earth Science Committee of the House of Commons gives UKRIGS and all the local RIGS groups visibility.

A quarterly newsletter and a website which is about to be revamped following a national survey (Burek, 2003a) form an important communication network between and to the RIGS groups. These are funded by English Nature although covering the whole of the UK.

The development and acceptance of both a GeoConservation Database (Jones & Lawton, 2003, Jones C., tilson, E. & Cambell, S., 2003) and a project officer by the majority of the RIGS groups is a positive result.

Further information on many of these points is available from the UKRIGS website at www.ukrigs.org.uk.

However there are two developments which will have an incredible effect on RIGS and UKRIGS. These are the Aggregate Levy Sustainability Fund and the development of LGAPs. Both have the potential to ignite under RIGS and fire them into the sky to be seen by all.

Aggregate Levy Sustainability Fund

The first is a source of income which is targeted at Geodiversity not only biodiversity. This is good as often Geodiversity is the ‘country cousin’ of biodiversity and the poor relative. Many groups to date have used this to their advantage and this has been highlighted elsewhere by both Natalie Bennett and Colin Prosser of English Nature (Bennett, 2003, 2003a, Prosser 2002) and generally in the UKRIGS Newsletters numbers 12, 13 and 14. Let us hope that it continues now that we know the funding is to continue for another 3 years in England. The development of LGAPs Local Geodiversity Action Plans needs further discussion.

Members of UKRIGS conference looking towards Salisbury Crags.
Local Geodiversity Action Plans

Original research on these was undertaken by Cynthia Burek and Jac Potter at University College Chester in 2001 (Burek & Potter 2002a, 2003a). This was conducted with a remit from English Nature to look at Biodiversity Action Plans and see what lessons could be learnt and transferred to Geodiversity. The outcome led to two pilot studies being undertaken by Cheshire and Warwickshire. The methods were similar but the outcomes were different.

The Cheshire Region Local Geodiversity Action Plan was launched in September 2003 and quickly adopted by other organisations. To date it is a partnership of over 25 organisations from all walks of life from Industry to Academia from Local Authorities to the WI but led by Cheshire RIGS, University College Chester and the County Council. With an overall aim developed by all the partners to safeguard and maintain the Geodiversity of the Cheshire Region it has breathed life into geocconservation in the area. There is real enthusiasm and cooperation in pushing the aim and eight objectives forward (Burek & Potter, 2000, 2003, 2004).

Other LGAPs are embedded in Biodiversity HAPs (Habitat Action Plans) or are initially being developed as geological audits, which I would argue must be at the forefront but not the whole. Geodiversity Action Plans are more than just an audit; they need to be broader and encompass all aspects of nature conservation including the economic and social aspects. This is clearly too large a task for a small RIGS group but by joining with other interested organisations each doing a little, it is possible.

The way ahead

The only way is to move forward and by keeping your eyes on the road ahead. Being distracted or looking backwards can distract you.

If something is moving slowly but you want it to move more quickly you get out and help to push. In geocconservation we are such a small group of people really when you consider the whole population of the UK and their lack of concern, that we must all work very hard to get our points over.

The key to UKRIGS success is to help each other. Partnership, as has already been shown in both the Welsh and Geopark cases, does succeed. We need monitors, mentors, a good reliable set of data and both patience and humour! We have a tough task ahead in UKRIGS, not least to educate the next generation of geologists and earth scientists as to what geocconservation is all about. They should be actively on our side. Politicians, economists, biologists may need further incentives. Everyone can make a difference if they only try and remember that sustainable geocconservation is a process - it does not stop - so jump on board.

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GA LECTURE

Missing Molluscs – just how incomplete is the fossil record?

Paul Wright

BG Group, Reading and School of Earth Sciences, Cardiff University

Every palaeoecology student is taught that the molluscs were a relatively unimportant component of the marine fauna until the Mesozoic. This seems perfectly reasonable because even a cursory glance at a typical Palaeozoic assemblage reveals a dominance of brachiopods, bryozoa, trilobites and echinoderms, and few molluscs. Compared with the Mesozoic fauna, the Palaeozoic one is especially depleted in bivalves. There are some exceptions but in the main fossil bivalves are a minor component of most Palaeozoic assemblages, and until recently the textbooks seemed to have the facts clearly laid out.

Another important truth also taught in introductory palaeontology courses is that the fossil record is woefully incomplete, and that except for those remarkable examples where partial soft part preservation exists, such as the Burgess Shale, only organisms that produce hard parts such as shells, are likely to be preserved. There has been an acceptance that when studying a fossil shell fauna, the fossils one sees are a reasonable representation of the original, preservational biota. What point would there be in reconstructing fossil communities if that was not the case, and there are hundreds and hundreds of research papers devoted to just such reconstructions.

Studies at Cardiff University by Paul Wright, Lesley Chens and Peter Hodges (Chens & Wright, 2000; Wright et al., 2003) have produced examples that not only contradict this view but also show that even in well documented Palaeozoic bivalve-dominated assemblages, the majority of fossilisable species have disappeared, probably because of very early dissolution in the top few centimetres of the sediment. The implications are many, and are especially important for studies of ancient communities and their ecology.

The evidence comes from two faunas with silicified fossils. This silification preserved some fossils still articulated, and close to their original life positions. The first example comes from the middle Silurian (Wenlock) of the Swedish island of Gotland. Extensive quantitative analysis has been carried out on a section with normal preservation of fossils at Vattenfallet. The faunas here are dominated by brachiopods, along with corals and trilobites. Bivalves are rare and are mainly epifaunal forms. This is a typical Palaeozoic level bottom fauna. The host successions exhibit well developed nodular limestones that have been shown to represent former aragonite-rich sediments that were replaced by calcite during burial. The exact source of this aragonite is unclear but it has been suggested that it was originally deposited as mud grade material. At the nearby inland Molbbs section, of slightly younger but still Wenlock age, and in similar facies, the fauna was silicified. The brachiopods, coral and trilobites are still present but so are large numbers of molluscs, including gastropods, bivalves and even chitons. The diverse and well preserved bivalve fauna is dominated by shallow burrowing forms (95% of the bivalve fauna), the living relatives of which are composed of aragonite. Silification has increased the proportion of molluscs in the assemblage a hundredfold. The Molbbs fossil lode (lagerstätte) is overlain by a bentonite (volcanic ash) that appears to have released silica leading to the replacement of the whole skeletal fauna. As the fossils were very locally derived, the assemblage provides a window into the nature of the original fauna whereas at Vattenfallet the molluscs seem to have "reconstituted" into diagenetic nodules and limestones.

Does this mean the textbooks are all wrong? If this discovery is representative, an urgent reappraisal of the nature of Palaeozoic communities is needed. The bivalve groups making a dramatic appearance at Molbbs had been around for tens of millions of years yet are not common as fossils. In the latter part of the Palaeozoic bivalves are just as infrequent in most shallow faunas as they are at Vattenfallet. Only further studies will reveal if the abundance of molluscs at Molbbs is merely an ecological effect, or represents a taphonomic window into the real nature of Palaeozoic communities.

We should be safe when looking at Mesozoic faunas because the bivalves are a major component, so it seems unlikely that the "missing molluscs" effect is an issue; or so we thought. What could be more typical of a Mesozoic bivalve-dominated fauna than the intensively studied Blue Lias (Lower Jurassic) of Britain? Outcrops of this famous unit have been picked over by generations of fossil collectors since Mary Anning over 150 years ago. Surely there are no shocks waiting in these well documented outcrops? During the building of the Ford Motor Plant near Bridgend excavations revealed silicified fossils in Blue Lias facies, in assemblages of a diverse nature. The nearby spectacular outcrops along the South Wales Heritage Coast contain numerous fossils of bivalves such as the calcitic form Gryphaea. In fact the fauna is dominated by only three main genera of large bivalves, the other two having had some calcite in their shells. Burrowers are restricted to the former aragonite, deep burrowing Pholadomya. Ammonites occur but are poorly preserved. The silicified Bridgend assemblage is rich in former aragonitic gastropods, has well preserved ammonites and has the same calcitic bivalves as occur in the non-silicified sections, but also present is a diverse former aragonite, shallow burrowing bivalve fauna. Another similarity to the Swedish example is that these Blue Lias contain abundant diagenetic nodular limestones and beds. The source of their carbonate is unknown but the finger points at the aragonitic molluscs.

However, many limestones are rich in the remains of former aragonitic molluscs and just a short distance from the Blue Lias outcrops at Southenndown are the time equivalent palaeo-rocky shoreline limestones of the Sutton Stone. These molluscan carbonate sands show clear evidence of aragonitic fossils being preserved into burial depths before having their aragonite replaced by more stable calcite. If the process or processes causing the "missing molluscs" effect is real it only seems to have operated in certain environments. Is there a process or processes that could explain this environmental selectivity, and indeed also explain why the deep burrowing former aragonitic bivalves seem to have avoided early dissolution? The importance of early shallow dissolution, even in modern tropical settings where seawater is supersaturated with respect to calcite and aragonite, was demonstrated some years ago by Lynne Walter and co-workers. Under saturation in some of these settings is generated in the upper part of the sediment layer by microbial reactions, either by the oxidative decay of organic matter, or by the oxidation of the products of microbial sulphate reduction from lower in the sediment column; aragonite is much, much more susceptible to dissolution than calcite. The drive for these processes is a supply of organic matter, which most readily accumulates in low oxygen settings with muds. The depositional settings for both the Blue Lias and the Goyt Limestone successions discussed above were offshore, muddy sea floors. The high energy shoreline represented by the Sutton Stone would not have promoted the accumulation of much organic detritus, hence the local variations in the preservation of molluscs in the Southerndown area is explainable. Why did the deep burrowers in the Blue Lias escape this dissolution effect? As the work of Lynne Walter and others has shown, the zone of enhanced dissolution is only in the uppermost part of the sediment column, as little as a few centimetres or less. Thus the deeper burrowing forms were already living effectively below the dissolution layer.

If this Lower Jurassic example is representative, the "missing molluscs" effect has even skewed the fossil record in the Mesozoic, when molluscs were the dominant component of the sea floor biota, but completely distorted the biostratigraphy of the Palaeozoic, albeit in both cases in selected offshore settings.

To attract the respect of your peers a geologist needs to provide some useful insight into major processes or events, shedding light on the past. However, finding examples that indicate that we have been underestimating the incompleteness of many, many fossil faunas is important but rather negative. Being the messengers of bad news once (from the Silurian) is bad enough, but to do it a second time (from the Jurassic) is arguably unforgivable, but sometimes it hurts to know the truth.


In the following paragraphs, the Editor reviews the forthcoming articles in the Proceedings of the Geologists' Association vol. 115 part 1 (2004).

This must be the first time that a President of The Geological Society of London has agreed to the publication of the full text of his Presidential Address in the Proceedings! In The Curse of Oil?, Sir Mark Moody-Stuart discusses the effect of the discovery of hydrocarbons on a developing country, the resulting economic and environmental impact, and the social changes which often ensue. He points out that while technology can help to minimise the environmental impact, the remaining challenges cannot be remedied by the resource company alone – consultation, planning and partnership are all necessary. The steps which companies should take to ensure that real benefits result from hydrocarbon development are examined, and the role of international bodies in setting standards, against which local solutions can be benchmarked, are discussed, using examples from the Phillipines, China, Nigeria, Oman and Chad. The article is followed by Invited Comments by Duncan Green and Katherine Astill, policy analysts at CAPFOD, the official aid agency of the Catholic Church in England and Wales; Lord Holme of Cheltenham, Special Advisor to the Chairman of Rio Tinto plc.; Dr. Jeremy Leggett, former director of the Climate Campaign and Solar Initiative at Greenpeace International; and Giles Merritt, Editor of Humanitarian Affairs Review and Islander, based on plant and insect fossils. They show that during the Devonian Lateglacial, sands and silts, probably carried by slope wash and a snow-melt stream, were being deposited into water and onto wetland in an arctic-alpine environment in which the mean temperature of the coldest and warmest months lay between −20° to −3°C, and 9° to 13°C, respectively.

In Description and implication of valley moraines in upper Eskdale, Lake District, Peter Wilson describes the results of mapping moraine ridges and mounds in the valleys penetrating the high fells of this area. He concludes that the patterns displayed by the moraine ridges indicate that ice removal involved active retreat until after the read- vances, rather than decay in situ, during either a late stage of the Dingly Stage or in the Loch Lomond Stage, suggesting a more complex late Pleistocene glacial history may exist than some recent studies suggest.

In Charles Doolittle Walcott in England and Wales (1888): a crucial visit in the resolution of Taconic-Cambrian-Ordovician questions Michael G. Bassett and E.L. Yochelson describe a historic visit by this noted American palaeontologist and stratigrapher. Encompassing attendance at the 4th International Geological Congress in London, meetings with British stratigraphers, and fieldwork in Wales, it was important to the introduction of the concept of an Ordovician Period to the USA and the faunally-based tripartite subdivision of the Cambrian to Britain. The life and work of William Barlow (1845-1934); speculative builder, man of leisure and inspired crystallographer, sometimes regarded as 'one of the last great amateurs of science' is described by Peter Tandy. Barlow made important contributions to geometrical crystallography, independently determining the presence of 230 space groups (almost simultaneously discovered by Arthur Schoenflies and Evgraf Fedorov); perhaps of more importance was Barlow's contribution to the theory of crystal structure, in which he argued that the atoms in a crystal occupy distinct portions of space, and thus crystal structures can be represented by packings of spheres. You will have to read the article to find out why Barlow bought gloves by the gross.

Earth, Water, Ice and Fire by David Oldroyd (Geological Society Memoir 25, 2002) is the subject of an Essay Review by Peter E. Brown and, in Correspondence, Reg Wyatt revises his previous conclusions regarding the interpretation of the Great Olite Group succession in the Stowell Park borehole, Gloucestershire, and discusses the implications of this.

Richard J. Howarth
The G.A. Photographic Archives

The photographic archives consist of a number of sets of albums. One set of nine volumes of photographs were taken by T.W. Reader on a heavy plate camera. He attended every field meeting between 1907 and 1919. These are a wonderful record of geological sections of long lost exposures invaluable for those doing research.

There are also 6 volumes of geological exposures dating from 1894 to 1937 arranged stratigraphically, again showing lost geological sections.

Miss Johnston’s two volumes were her private record of field meetings she had attended between 1890 and 1937. These are invaluable in that most photographs are of groups of GA Members fully identified. I have been able to supply photographs of some GA members taken from a group, where there were no known photographs of them before. There are also a number of foreign fieldtrips and some past members’ individual albums.

I have started two new volumes. The first one is full and starts with eminent GA members of the end of the 19th and first half of the 20th Century. Then a few GA field meetings of the 1920’s, 1930’s and 1940’s. There is a more complete record of the 1950’s and 1960’s. When Mr. H.N. Wright attended many field meetings in the 1970’s, 1980’s and the first half of the 1990’s, he sent us photographs of most of the field meetings. Since then the records are very incomplete with only the odd field meeting represented. The second new volume has plenty of space for your photographs.

At G.A. Reunions members enjoy reliving the past field meetings and seeing familiar faces. So please look out your photographs of past and recent field meetings to keep our photographic record which already goes back over one hundred years.

For each photograph we need to know which field meeting, where it was taken, date, and if possible the identity of as many members as possible. Please send them to me, at New Hall, New Hall Lane, Small Dole, Henfield, West Sussex BN5 9YJ.

They will be gratefully received.

Marjorie Carreck

An extract from Muriel Arber’s wartime diary

(From Dr. Eric Robinson’s personal collection)

A few notes on the effects of the Blitz on London’s buildings from my diary. I thought it worthwhile to include a little to show how ordinary scientific life continued in the middle of chaos. I was living in Cambridge and visiting London for the day.

“Wed. 23rd April 1941. ... 8.20 train to Liverpool St. ... To the B.M. Down to Miss Mair-Wood’s room. She seems wonderfully cheerful and lively in spite of everything, and of the experience of fire-watching on the roof at her home last Wed. night. She gave me a most vivid description of the ring of fires; flames and red tracer bullets; plane shot down and circling round before falling; bombs everywhere, and Germans all overhead; the house rocking. She showed me specimens of theecideae¹... worked at them with her microscope... they are still sending out loans. She has got back to her work this week on the Lincs. Lst. [Limestone]... She has an allotment on the front lawn of the Museum. After lunch she took me round the Geol. Dept. It is really dreadful. The roof over the Cromwell Rd. front is all gone (now tarpaulined), but the water pumped in during the fire (five months ago or more) is still seeping through: down and behind everything; marks of water everywhere; the floors soggy and undulating. The Geol. Lib. emptied and the roofs covered over and windows at the back boarded up. Some specimens remaining; others removed... In the Sat. raid last week a huge bomb fell between the Survey, B.M. and V. & A., in Exhibition Rd. penetrating passage under Rd. All windows gone in Survey, and all in Exhib. Rd. frontage of V. & A., and whole surface of V. & A. chopped and scarred - Portland Stone not dislocated but chipped. All over London you see the surface of everything scarred (brick and stone alike). Stanford’s in Long Acre was burnt out on Sat. night and entire G.A. stocks were lost, and all maps; devastating. Back and continued with the thecideae. Miss Mair-Wood not coming to Geol. Soc. so alone to Burlington House. Piccadilly in an awful mess. No buildings actually gone, but surfaces broken, almost all windows gone, and general smash. Side roads with craters and more smashies. One big crater near Albermarle St. and water main pouring down the road. (They got a gas main). The queerest effect: clocks stopped, mostly at different times. Burlington House windows gone, and roof over the Upper Library. Now very inadequately screened from the weather, and books are to be dispersed at once among Fellows as far as possible. Rooms very draughty and noisy; sound of traffic in front and of shovelling broken glass in courtyard. Doors refusing to shut. Everyone in greatcoats, and President and two Secretaries in macintoshes!... Neville George read a paper on the Towy and Upper Usk drainage pattern. Involved very complex plots of logarithmic curves of river profiles. O.T. Jones decried the whole method... declaring that the error was far too great. R.O. Jones more or less supported George, agreeing in places with O.T.J. Trueman supported George; also Hollingworth; and Hawkins with reservations... Tea; lights failed and we were left in half-dark... To Piccadilly Station. Piccadilly blocked to traffic where the land-mine fell outside St. James’s. Colossal crater and road surface upheaved all round. Half entrances to station blocked. 5.49 train home from Liv. St. Stood in the corridor first part of the way with good view of East End damage: whole streets vanished in Hackney Downs region and very frequent wrecks; most windows gone and many houses obviously uninhabited. Some cut down with all the furniture, and even food on the table, exposed. The solid new [extract ends].

1 Punctuation as in the original
2 Small adherent brachiopods fixed to the shells of other larger invertebrates of the benthos. [E.R.]
3. Dr. Helen Mair-Wood published her work on Jurassic brachiopods from the Lincolnshire Limestone in Proceedings of the Geologists’ Association Vol. 53 pt 2 (1952) pp. 113-143 (with the following remarks in her introduction: “The brachiopoda described in is paper were obtained during field meetings of the Geologists’ Association held at Kettering (1938, 1946), Stamford (1938), Grantham (1939) and Lincoln (1940). It was originally intended to publish description of three brachiopod species... but work was unfortunately interrupted by the war...”.

p. 113.

GA Magazine of the Geologists’ Association Vol. 3, Issue 1, 2004
To see the Fellows Fight

"Eyewitness accounts of meetings of the Geological Society of London and its Club, 1822-1868"

John C Thackray,
ISBN 0-906450-14-4 (pp 1-244) £15
from BSHS Monographs,
5 Woodcoke Green, Fleet, GU51 4EY
Editors: Janet Browne, Jim Secord, Hugh Torrens.

This monograph derives from the archives of the Geological Society and the Natural History Museum. John Thackray was archivist to both organisations for some years.

The text of the book was translated for printing by optical character recognition and there are occasional signs of this process in the spelling. In the book John demonstrates the way in which geology developed in the first half of the 19th century - a period of considerable controversy concerning many issues from the nature of coal through the structure of mountains and volcanoes to the contrasts of marine and freshwater faunas. The controversy was often rudely spoken in discussions at meetings, in letters, and in diary entries. All fascinating reading even touching as it does on the dining out and travel arrangements. The meetings are reviewed year by year. The contributors are illustrious, including William Buckland, William Conyngham, Roderick Murchison, Charles Lyell, Gideon Mantell, Richard Taylor, Adam Sedgwick, George Scrope, Charles Darwin, Thomas Sopwith, Louis Agassiz, Edward Forbes, Andrew Ramsey, Charles Babbage, and John Ruskin.

As a small illustration, John Ruskin wrote in his diary “Conyes was made a fool of himself; the most extraordinary delivery. I think that ever disgraced our human faculty of speech.” It would be interesting to know what he said!

On another occasion Mantell wrote: “Paper by Cuyton on the lower greensand - his last. A very dear affair altogether.” While of the same meeting Ramsey wrote “Cuyton on greensand: a tremendous row and a regular blow up after between Cuyton and Forbes.” Again, following the paper on Agates of Osnaburg by W. J. Hamilton (1848) Ramsey wrote “Slow evening at the society. I fell asleep! Bad!!

Not much has changed there perhaps!

CELEBRATING THE LIFE AND TIMES OF HUGH MILLER

Edited by Lester Horley
ISBN 0 906265 33 9
This book has 50 contributions in 352 pages. It is a publication of the Cromarty Arts Trust and the Elphinstone Institute, supported by Scottish Natural Heritage and Ross and Cromarty Enterprise. It can be obtained from the Cromarty Arts Trust, 4 Belford Place Edinburgh EH4 3DH for £13.50 plus £2.50 postage and packing in the UK.

The papers in this volume use Hugh Miller’s life and writings to explore contemporary issues of geology, church, and Society. It also explores the way of life in Scotland at the time and the consequences of clearance and emigration.

Newspaper obituaries following Hugh Miller’s suicide in 1858 recorded his life as stonemason, geologist, journalist, author, and theologian. He was also a folklorist, banker, and newspaper editor. These matters are covered in various chapters and there is a thematic symposium of 124 pages covering his geological interests. This includes a comparative review of William Smith by Hugh Torrens, and papers on his interests in fossils, landscape, and microscopy.

REUNION PHOTOGRAPHIC COMPETITION

Entries were not abundant but those submitted for this competition were of very high quality and interest. The lava surface from Hawaii presented by David Turner was awarded third prize, with the second going to Anita Wolfe for her picture of an esker thrown into sharp relief by a beaver pond on a glacial plain north of the Denali Highway, Alaska. First prize was awarded to Linda McCredell for her picture of an ironstone nodule in ankeritic laminated siltstone, Amroth, Pembrokeshire. These pictures are on the back cover of this issue of the magazine.
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**UNIVERSITY OF BRISTOL STUDY TOURS IN 2004**

**GEOLOGY OF EAST PURBECK:**
JCW COPE 5 – 7 March 2004

**FIELD GEOLOGY IN SOUTH SHROPSHIRE part 2:**
N CHIDLAW 22 – 23 March 2004

**POMPEII AND HERCULANEUM**
T BARKLEM/PG HARDY 14 – 21 May 2003

**GEOLOGY AND SCENERY IN ARRAN**
P G HARDY 27 June – 2 July 2004

**GEOLOGY AND SCENERY IN ICELAND**
P G HARDY 1 - 15 August 2004

**GEOLOGY OF THE LIZARD PENINSULA**
N CHIDLAW 21 – 23 May 2004

**TRILOBITES AND GRATPOLITES IN MID-WALES**
T BARKLEM 12-13 June 2004

**GEOLOGY OF THE ISLE OF WIGHT**
JCW COPE 30 April - 3 May 2004

Details of costs and further information can be obtained from:
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8 - 10 Berkeley Square,
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Tel: (0117) 9287153.
Email: peter.g.hardy@bris.ac.uk
Winners of the Reunion photographic competition: First prize below, second prize above. See page 22 for details.