Meetings - October, December
Curry Fund Comes of Age
Wylea Trust Awards 2007
Field Trips - Bracklesham Bay, Newhaven, Hampstead Heath Churches
GA150 Rockwatch Festival of Geology
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The Geologists’ Association

The 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, organises museum demonstrations, publishes Proceedings and Guides, and conducts field meetings.

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Cover picture: The south-east quoin of the chancel of St Martha, Chilworth, is constructed of moderately large blocks of sandstone from the local Surrey Hythe Beds. These blocks in some instances have been set with the orientation of their bedding vertical; in a style which is thought to be of Anglo-Saxon origin - see ‘A Day Visiting Churches page 15

ADVERTISEMENTS

While precautions are taken to ensure the validity of advertisements the Association is not responsible for the items offered, for any loss arising or for their compliance with regulations.

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 (07724133290). The mobile phone will only be switched on just before and during field meetings.
(For routine enquires, please call the Field Meetings Secretary on the usual number.)
Report from Council.

This report covers the Council meetings of June and July.

The new members of Council were welcomed by the President and the composition of subcommittees organised.

The main business of both meetings was to consider the organisation of events for the 150th anniversary celebrations of the Association - GA150. There was much discussion about what should happen and how it could be organised. The results of Council's deliberations can be found on page 13, where we propose ten strands of activities to celebrate our sesquicentenary. Among the aims of the GA is the idea that we should 'spread the message' of geology and this is reflected in the first of the initiatives for GA150 - getting the message into schools. We plan to engage dozens or hundreds of students to go into schools and give talks about earth science subjects, especially to 14-15-year-olds. Shell has generously funded the appointment of a co-ordinator, Dr Jess Trofimovs, a volcanologist with extensive experience of taking the message into schools, and she will prepare talks and training packages to be used across the country. Another initiative to encourage students to become members is the prizes for the three best MSc theses in a geological subject. Not only will this initiative raise the profile of the GA in Universities but also encourage students to publish in the GA Magazine. Council is always aware of the importance of every President since the Association began! One of the events in GA150 will be to investigate the possibility of digitising these photos for future use and dissemination on the web site. A number of ways of commemorating GA150 field trips was discussed from recreating old field trips (the sites are often no longer available) whether in costume or not! The 50th and 100th year anniversaries of the GA was marked by a prestigious dinner. Council discussed what type of dinner could be arranged, how much members would be prepared to pay, whether to have black tie, how many would come, etc. In the end it was decided to put a notice in this magazine to determine members' interest. With everyone's involvement GA150 should be a most memorable year.

The Festival of Geology / Reunion will be held this year in Liverpool, once again indicating Council's wish to involve non-southeast groups. The Curry Fund has agreed to support Groups financially to get to the Festival and the GA is once again offering a prize for the best photograph. The financial incentive last year generated a large number of excellent photos.

As you can see Council has been very busy in the last two meetings.

John Crocker
General Secretary

Library Notes

Two new geological sheets take us into the Lower Palaeozoic of Western Wales. Sheet 194 Llangranog takes us from the coast eastwards to Sheet 195 Llampeter, parts of which lie within the Central Wales Mining Field. The thick Ordovician to Silurian sedimentary sequences have been affected by the Late Caledonian Acadian Orogeny while the landscape has been shaped by Pleistocene glaciation. Moving up the succession to sheet 267 Newbury, we are in the gentler topography of the Cretaceous and Palaeocene, cut by the valley of the Kennet. Other streams have cut into similar rocks on Sheet 298 Salisbury. On both maps, the outcrops follow the contours reflecting the shallowness of the dip. As ever, on BGS maps, the surface geology is enhanced where appropriate by sections, structure contour maps, or elevation models; shaded to show relief as in the Welsh areas. The brief explanations have the clarity of description, diagrams and photos that are characteristic, and most welcome, of the current BGS house style.

If the above are part of the routine mapping of England and Wales the next publication on Scotland has to be one of the most exciting. Brought out within the series Classical Areas of British Geology is "Glencoe Caldera Volcano, Scotland" and the bedrock map at 1:25,000. The early interpretation of "cauldron subsidence" by E.B. Bailey et al. of 100 years ago has, as a result of a complete resurvey, been modified so it is suggested that we have "the world's best exposed, tectonically controlled, multi-subsidence, piecemeal caldera volcano". Spectacular and dangerous modern eruption reported round the world have brought some knowledge of surface volcanic phenomena to all via TV etc. However, the reappraisal of Glen Coe has provided an important understanding of what might be going on at depth thus helping to inform the whole process. Well laid-out, excellent diagrams and wonderful photographs all make you want to reach for your boots immediately, though do heed the author's hazard warnings as this is dangerous and wild country when off the beaten track. However, that said, do not go to this area of Scotland without taking this publication with you. Truly an eye-opener from the BGS.

See Page 20 for Curry Fund News and Library Notes continued....
In Pursuit of Mantell’s Quarry

Peter Tandy & Tony Brook
History of Geology Group
Geological Society
London

Friday October 5 2007
Geological Society, Burlington House
Piccadilly, W1V 0JU
at 6.00 pm, tea at 5.30 pm

In the 19th Century, Mandell found a group of excellent fossils from a quarry in Sussex which led him to coin the name 'Dinosaur'. Where the quarry was thought to be is now a football pitch. So where exactly was it? This talk is about two members of the HOGG and their quest to locate the quarry from extant evidence and information.

Ferns, fires and plant extinctions: contrasting the end Cretaceous and the Paleocene/Eocene thermal maximum

Professor Margaret Collinson

Friday December 7 2007
Geological Society, Burlington House
Piccadilly, W1V 0JU
at 6.00 pm, tea at 5.30 pm
The Curry Fund Comes of Age : 1986-2007
Serving the Science of Geology for twenty one years

A Generous Gift
In reality it all started forty-nine years ago in 1958, at the time of the GA’s Centenary celebrations. The letter is preserved in the GA archives. Dennis Curry writes to Council offering the GA a gift of 10,000 ordinary shares of Curry Ltd., with a value of about £14,000 - ‘...the income to be dealt with entirely as Council decides from time to time.’ Twenty-seven years on, in 1985, when Curry Ltd. was acquired by Dixons, Dennis advised Council to sell its Curry shares. A sum of about £350,000 was realised. Council decided to use this substantial sum to create a grant-awarding fund, known at first as The Geologists’ Association Fund, but soon to become the Curry Fund of the Geologists’ Association. The first grants were made in 1986 and, in the twenty-one years since then, the Fund has made a total of some 480 grants with an overall value of nearly £450,000.

Dennis Curry (1912-2001), as well as being a very successful businessman, was a distinguished geologist - President of the GA 1964-66 and Visiting Professor in the Department of Geology at UCL. His particular field of interest was the Palaeogene of southern England, the English Channel and northern France. His many publications included important papers in the Proceedings and he was lead editor in the Geological Society’s Special Report A correlation of Tertiary rocks in the British Isles. A complete list of his 135 publications (Whittaker 2002) accompanies his obituary in the Proceedings.

Before 1985 and the creation of the Curry Fund in its present form, the income from Dennis Curry’s gift to the GA helped to pay for the day-to-day costs of running the Association. The Curry Fund still provides substantial financial support to the GA itself, as a funding source for new initiatives and to broaden the scope of the GA’s well-established roles. However, what is striking about the grants awarded from the Curry Fund is the very varied backgrounds from which the applications come and the great diversity of the initiatives they have supported.

Publication, Conservation, Education
The vision for the Fund when it was established is apparent in the original Regulations which still govern its management. These set out, as two primary objects, support for publication and conservation in the field of Geology. At the same time they offer a wider remit and establish a third object in the form of support for ‘other initiatives and developments’, giving equal weight to this third object by stipulating that ‘the income of the Fund shall normally be allocated in three approximately equal parts to each of the three objects’.

In practice ‘other initiatives and developments’ have been concerned mainly with the promotion of Geology to a wide audience as possible through support for existing bodies such as the British Association, for new institutions such as RIGS and RockWatch and for a great range of educational initiatives, conferences, exhibitions and other imaginative geological events.

Table 1 shows in broad terms where the grants have gone during the first twenty one years in the life of the Curry Fund.

Table 1
The Curry Fund 1986-2007

<table>
<thead>
<tr>
<th>Grants and Loans</th>
<th>£448,959</th>
</tr>
</thead>
<tbody>
<tr>
<td>Geological Conservation</td>
<td>£166,009 37.0%</td>
</tr>
<tr>
<td>Geological Publication</td>
<td>£153,578 34.2%</td>
</tr>
<tr>
<td>Discretionary</td>
<td>£129,372 28.8%</td>
</tr>
</tbody>
</table>

While the Regulations of the Fund guide its practice, the spirit of the Fund is nicely conveyed in the opening paragraph of the Guidelines for Applicants:

To encourage initiatives within geology which might otherwise not be possible, to encourage innovation and, through far-sighted developments, help a wider public to understand and enjoy geology

Both the spirit and the practice of the Curry Fund also adhere closely to the ‘Objects’ of the GA set out in the Rules of the Association:

....To promote the study of Geology
....to extend knowledge of the science by demonstration and publication
....To promote interest in Geology at all levels of knowledge
....To promote awareness of our geological heritage

Leaflet funded in 1997

Geology in the Churchyard funded 1994
Closely related to the aim of promoting Geology to a wider public is the support given to Geology within the field of education. Grants have been made to supply study guides, maps, equipment and rock samples. The support has been offered at all levels within the education system, from the Open University to several primary schools, including two in which children are now learning about Geology from geological gardens created within their school grounds. The wider presentation of geology through gardens and walls has also been supported on several other occasions (see GA Magazine December 2006), including the planting of a geological garden in the National Botanic Gardens of Wales to illustrate the evolution of plants through geological time.

**Geology in the Field**

Ideally, geology is encountered in the field and many of the grants made from the Curry Fund have supported initiatives that make geology in the field more accessible both to committed geologists and to an interested public. Sometimes this is done through major interpretative centres such as the National Stone Centre at Worksworth in Derbyshire or the Knockan Crag Centre developed by Scottish Natural Heritage. Both these projects received substantial financial support from the Curry Fund. More often the Fund has supported smaller scale ventures to record the whereabouts of surviving exposures, occasionally to acquire an important site, sometimes to clear an existing site and in many cases to provide the interpretation that gives a site its meaning for the casual visitor.

One of the Fund’s earliest grants in 1986 was made to the West London Wildlife Trust towards the cost of acquiring the Writhlington site which has subsequently become a well-loved destination for field meetings and a source of important fossil plant and insect remains. Elsewhere, the Fund has contributed to the cost of acquiring sites in Sussex, the Isle of Wight, Wales and Scotland and has made grants towards the maintenance of sites in many parts of Britain and as far away as the First World War battlefields of Flanders. One of the most innovative projects to receive support was initiated by the Hull Geological Society, to provide a permanent shelter at the Rifle Butts Quarry for the unconformity exposed there between the underlying Lower Lias and the Carstone and Red Chalk above. However, in keeping with the primary object of the GA, the major funding contribution in connection with geological sites has been made to provide on-site interpretation. Curry money has funded some 22 interpretative boards, from Brighton to Dundee, from Suffolk to Dorset, at a total cost approaching £25,000.

**Geology in Museums**

When we can’t see it in the field we go to museums. Here again the Curry Fund has recognised a need and has contributed widely to the acquisition, conservation and display of geological specimens. For the acquisition of specimens the Fund has made available some £17,000 and on specimen conservation, from stegosaurs...
CURRY Fund continued........

to snails, a further £28,000. The largest grant made by the Fund remains the £10,000 put towards the cost of ‘Lizzie’, the earliest known reptile fossil, from the Lower Carboniferous limestone of the Bathgate area, between Glasgow and Edinburgh. Apart from grants directly related to museum specimens, the Fund has supported a number of museum development programmes and curatorial posts, in particular several temporary posts to help museums identify and record their geological collections and then to display or store them using present day methods of conservation. In all a further £30,000 has been devoted to these curatorial initiatives.

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

Geological Publications and Research

Alongside geological conservation, geological publications have attracted a major part of the outlay from the Curry Fund. Many of the publications are ephemeral but nonetheless valuable - guides to individual sites, geological trails, including several urban trails based on local and exotic building stones and leaflets promoting the activities and events of various organisations. Since 1998 the principal contribution of the Curry Fund to the GA itself has been through meeting the cost of publishing the GA Guides. Sixteen Guides have been published in this period at a cost to the Curry Fund of £45,685. The Fund has also assisted the publication of several books, with support usually taking the form of a loan to be recovered from sales. Perhaps the most unusual publication to attract a loan was a book of geological recipes for children. Rather more conventional publications have included a book on The Building Stones of Bath and a mono-

graph on Romney Marsh - Evolution, Occupation and Reclamation. The Curry Fund has also made grants to enable the publication of research results or to allow the inclusion of one or more elaborate illustrations in such publications.

Support for research has otherwise never been a major role for the Curry Fund. However, a small number of small grants have been made, particularly to support the work of amateur members of the GA where there is the promise of a publication in the Proceedings. Support has also been given to overseas visitors working in poorly funded research environments - a role that has recently acquired a more formal status now that responsibility for the remit of the Visitors Fund has been passed to the Curry Fund by Council.

Over the past twenty-one years, as well as giving support to a remarkable range of geological initiatives, the Curry Fund has undoubtedly created a wider awareness of the Geologists’ Association. To appreciate the value of the Curry Fund to the geological community in Britain, look at those, listed below, who have sought and received its support.

Universities, schools and educational groups, local authorities, county Wildlife Trusts, museums, national, regional and local geological societies, natural history and heritage societies, the British Geological Survey, the BBC, NERC, Scottish Natural Heritage, the British Association, the Royal Society for Nature Conservation, The Royal Archaeological Institute, the Earth Science Teachers’ Association and many individual geologists, both professional and amateur.


Chris Green
Doreen Smith holding the Halstead Medal presented to her at the Lyme Regis Festival

Awards 2007

David Wray the recipient of the Richardson Award for the best paper in the PGA for 2006

David Bone the recipient of the Foulerton Award

Trevor Greensmith a new Honorary Life member of the GA

Mike Benton giving his Presidential address at the AGM

Mark Roberts belatedly receiving the Henry Stopes Medal for 2006 before presenting his lecture
Many geological societies came up with innovative ideas to usher in the Millenium. The GA affiliated Westmorland Geological Society’s response was to carry out a full-scale mapping project in a small area of south Cumbria. The results have just been published by the British Geological Survey.*

The area in question, part of BGS Sheet 49 Kirkby Lonsdale (previously 1:63360 ‘old series’ 98 SE), was last mapped by the Geological Survey in the 1860s by Aveline, McKenny Hughes and Tiddeman. William Talbot Aveline, in charge of Lake District mapping, had joined the fledging Survey in 1840 and although his leaving of the Survey in 1882 was somewhat acrimonious, all his working life was with them. Thomas McKenny Hughes, a staunch Sedgwick supporter, went on to succeed Sedgwick as Woodwardian Professor of Geology at Cambridge in 1873. Richard Tiddeman, later prominent in the Yorkshire Geological Society, befriended and encouraged the Morecambe born John E Marr, then a schoolboy in Lancaster, who in 1917 was later to take over the Woodwardian professorship on McKenny Hughes’ death.

But good though these pioneers were, there was now an urgent need to re-map the area. The first idea was for some ‘outcrop mapping’ - walking the ground, marking exposures on a map and showing basic lithologies. But this soon developed into a full-scale mapping exercise: recording lithologies and boundaries, orientation of bedding, cleavage and lineations, structures and other geological and geomorphological features.

**PLANNING** We had to plan carefully and choose the right area. With members not being paid and giving their own time, it was best they were not put off or over-taxed by the rigours of mapping. The area selected was a 5 km square encompassing the villages of Lindale and Witherslack a few km NE of Grange over Sands and corresponding to the 1:10000 Ordnance Survey Sheet SD 48 SW. The right leadership was vital and we were fortunate to have a retired professional geologist, Dr Peter Thomas, to co-ordinate the activity. Before retiring he had carried out mapping for the BGS in the Schiehallion area. Through his contacts with field staff in the BGS, we were able to gain BGS co-operation and assistance early on. It also helped that during the period the Survey started to revise the scale of 1:10000. This was digitised and an accompanying technical report written.

**DOING THE MAPPING** About 20 Society members did the initial mapping with a small core team ‘refining’ the process. Participants gained most of their experience ‘on the job’ but there was some formal training as well. The 1:10000 Ordnance base maps were accurately photographically enlarged to a scale of 1:5000 on which it was easier to record details in the field. This was a good example of it being better to record too much! The agents of two large estates in the area were contacted for their co-operation and farmers were approached personally. Teams also had a small identity card and a single-page Information for Landowners which explained what we were doing. It emphasised that mapping teams would abide by the GA’s Fieldwork Code.

The area was split into 15 sections with small teams of 2 or 3 people doing one or two sections in their own time. Teams covered all the ground recording characteristics of exposed rocks, making measurements of bedding inclination, cleavage etc. and noting fossils and other information to help in relating different rock units. Plastic tracing paper overlays were used to combat the weather and allow information collected in the field to be entered neatly on field slips. One valuable feature was a series of Saturday morning sessions held in the car park of the Gilpin Bridge Hotel. Here teams brought in their work and problems which Peter and another retired geologist, Dr Colin Rowley, could address. In the afternoons they accompanied teams into the field.

Once initial mapping had been done, a core team embarked on sorting out the problems. They also reconciled information from the 19th century survey, aerial photographs and borehole logs by visiting the BGS in Edinburgh to examine these. Thin sections also proved important particularly in dividing the limestones. Some augering was done to assess superficial deposits. BGS geologists visited the area to meet the core team and advise on common standards. Valuable help was received from Dr Jack Soper and Iain Burgess who had recently mapped adjacent areas. Putting all this information together Peter prepared the fair drawn ‘standard’ map at the scale of 1:10000. This was digitised and an accompanying technical report written.

Mapping started in 2000, and although a year was lost through Foot and Mouth, the initial work was complete by the end of 2002. The core team finished their refining process by March 2004 and the map and draft report submitted to the BGS who published them at the end of 2006. **COST** We first thought that costs to the Society would stem from providing the 1:10000 base maps, enlarging these for outdoor mapping, plastic tracing paper, providing extra compass/clinometers, aerial photographs, drawing pencils etc together with a small contingency fund. The main cost was expected to be in publishing a full-colour map and we thought of applying to the Curry Fund to raise the necessary funds. But in the event these publishing costs were avoided by the map and Report being published by the BGS.

**SUMMARY OF THE GEOLOGY** The mapping area is an attractive area on the southern fringes of the Lake District National Park. It has an interesting relief of rocky ridges and drift-filled valleys.
Field meeting report : Bracklesham Bay, West Sussex
Leader: David Bone 18 March 2007

Compared to the appalling weather conditions during the last GA trip to Bracklesham (March 2004), it was positively luxurious on this occasion. The meeting, attended by 17 members and 23 guests from Discovering Fossils initially gathered to hear David Bone speak on the geology and fossils of the Palaeogene deposits of Bracklesham Bay and Selsey in West Sussex. For this, use was made of the new education room at Fishbourne Roman Palace just to the west of Chichester, which also provided members with the opportunity for lunch and a look around this popular archaeological site where recent Lottery-funded improvements are well worth seeing.

After lunch, the party headed to Bracklesham to meet up in the seafront car park before descending on to the beach following a falling tide. Bracklesham Bay boasts very little in the way of cliffs; in fact most of the coastline is backed by low-lying marshland behind a shingle bank. The geology is therefore exposed on the foreshore, although more often than not concealed beneath an impenetrable cover of beach sand. This is as frustrating today as it was in the days of Frederick Dixon, a 19th century Sussex geologist, who wrote "I have been greatly disappointed [owing to] sand, sometimes two to three feet in thickness, or the tide not leaving the shore sufficiently exposed; so that a stranger might conclude that there were no fossils to be procured at Bracklesham." (Geology of Sussex, 1850). A good low tide is also essential, unfortunately these mostly occurred in the late evening (or at daybreak).

The Eocene age Bracklesham Beds (or, more formally, the Bracklesham Group) comprises sands, silts and silty clays that were deposited in a more or less sub-tropical climate, as indicated by the sharks and rays, corals and palm fruits that are found in these beds. Four separate formations have been recognised, each starting with a marine transgression, moving into shallow shelf sea conditions and gradually returning to shallow marine, estuarine or lagoonal conditions. The Earnley Formation at about 45 million years old is usually the best known, as it is easily accessible from the car park at Bracklesham and the fossils are generally robust enough to withstand erosion by wave action and wash out on to the beach.

Working towards a late afternoon low tide, the group set off along the beach towards the south-east (Selsey direction). Almost immediately, various fossils from the Earnley Formation were found in abundance despite there being no exposures. The underlying beds in this area (the lowermost part of the Earnley Formation) are relatively unfossiliferous, the beach specimens being washed in from the higher beds which outcrop a short distance offshore. These included examples of Venericor planicosta (a bivalve), various Turritella species (gastropods) and the coin-like fossils of Nummulites laevigatus (a large foraminifer). A quick note to say that Cardita, Venericardia and Venericor planicosta are alternate names for the same beast, common usage tending towards Cardita as the easiest to pronounce! A number of shark’s teeth were also found, together with some ray teeth and fragments of turtle carapace.

Further along the beach, the group were fortunate to come across an excellent exposure of the Cardita bed, Bed E3 of the Earnley Formation. Indurated masses of this bed, carved through by a small tidal channel, stood proud of the beach sand. A profusion of Venericor planicosta shells, many still as double-valved examples, yielded up many specimens to the collectors in the group. A range of other molluscs were prodded and poked but, apart from many small oysters, were generally too poorly preserved to be collected. Unfortunately, none of the higher beds in the Earnley Formation were exposed. Of particular interest would have been the Turritella bed (E4) and the Palate bed (E5), both of which yield abundant fossils when exposed. The group therefore retraced its steps along the beach and back to the car park, collecting more beach-drifted shells and sharks’ teeth on the way.

A final note with a bit of advance publicity - the Geological Society is celebrating its bicentennial celebrations with events on various ‘Local Heroes’, including the 19th century geologist, Frederick Dixon. This event starts with a talk on the life of Dixon by local HOGG (History of Geology Group) member, Tony Brook, which will be held in the Worthing Public Library on the evening of Friday 4th April 2008 (Worthing being Dixon’s home town). On Saturday 5th April 2008, David Bone will lead a field trip into Dixon’s geological world, starting on the South Downs above Chichester and continuing on the beach at Bracklesham. Watch out for further details.

David Bone
LONDON’S GEOLOGY AS DETECTED FROM HAMPSTEAD HEATH
Field Meeting led by Diana Clements, 3 September 2006

There has been a long tradition of day excursions to Hampstead Heath by the Geologists’ Association. In the 1870s Caleb Evans would take geologists on tours of the outcrops, winding up at his own home in Hampstead to see his splendid collection of ‘Highgate Fauna’ fossils. Our trip on Sunday 3rd September was a little different: there were no fossils to be seen and our inspection of the geology was largely by indirect means. Thanks to Whitaker and succeeding members of the Survey we now have detailed geological maps as a guide but, wherever possible, we wanted to check the boundaries for the different lithologies ourselves.

We began at Whitestone Pond, its flagpole marking the highest point on the Heath. There were beacons here in the time of the Spanish Armada, and again more recently for the Queen’s Silver Jubilee in 1977. Spectacular views could be had here in Caleb Evans’ time, from the North Downs to the south, to the Chalk ridge of the Chiltern Hills to the north, and the small but prominent Eocene outlier at Harrow-on-the-Hill. Nowadays, however, extensive vegetation obscures the view in all directions, so our overview of the geology began with a look at the maps. It was suggested that the Geologists’ Association might petition the Corporation of London, managers of the Heath, to re-open these vistas to the north and south from the flagpole.

Members discussed how far south the ‘Finchley Glacier’ may have come at the height of the Anglian glaciation, about 400,000 years ago. We all agreed that it probably never reached Finchley Road tube station, as dramatically portrayed by Alan Titchmarsh in his television series Natural Britain, because of the barrier of Hampstead Heath. It was agreed that East Finchley station, a short distance to the north, would have been a much more appropriate location for the filming. The latest BGS memoir (2004 p.59) shows these glacial deposits extending beyond the familiar blue areas of till on the North London 1:50,000 map (256, 1994) down the valley of the Brent as far as the Brent Reservoir.

The group then stopped by the ponds on Sandy Heath. The remarkable topography here recalls the days when 30 cartloads of Bagshot Sands were taken daily down the hill to St. Pancras for construction of the Midland railway. Sir Thomas Maryon Wilson was the man responsible for the...
whole sale removal of the top of the Heath in the 1860s. Old photographs show that just 2 trees somehow survived, and these can still be identified, even though the whole area is once again woodland. 140 years later this is one of the most attractive areas of Hampstead Heath, the dips and hummocks adding extra interest. To find ponds up here on the sandy lithology was something of a surprise. Water is apparently retained by a subsurface iron-pan layer which probably dictated the base of the quarrying activity. An obliging heron demonstrated how shallow the ponds are after a hot summer. Small patches of ‘bike erosion’ allowed us rare glimpses of the sand in situ.

We continued on to the south side of the Heath to trace the contact of the Bagshot Sands with the underlying sandy silts of the Claygate Beds at the top of the London Clay. Here we were very thankful that the GA’s Eric Robinson had campaigned to preserve the trees uprooted by the hurricane of 16th October 1987 so geologists could continue to examine the lithology of the underlying rocks. Despite 20 years of weathering and numerous geological excursions in the interim, these ‘Robinson’s Pits’ are still a valuable source of information. We also looked for evidence of spring lines and spotted numerous small gullies crossing the open ground around Kenwood House, mostly coming from a single horizon which, unsurprisingly, seemed to correlate with the contact line marked on the BGS 1:10,000 maps.

We next visited an old sand quarry, situated close to Kenwood House and probably used in its construction. Eric has proposed that the slope here should be cleared as a possible RIGS (Regionally Important Geological and Geomorphological Sites) for the Bagshot Sands. Since the 1987 storm the undergrowth has again begun to thicken but one of the Kenwood staff seemed to think it an excellent idea and hopefully the GA too will support the project.

Kenwood House, with its excellent snack bar, is a much appreciated watering hole on a hot day, and the Old Baths, located more or less on the spring line, were an added geological attraction. From here the Fleet River could clearly be seen flowing through Wood Pond below. At the Gazebo on Cohen’s Fields, above the Highgate Ponds, we were at last able to get good views to the south and a better feel for the structure of the London Basin. We were able to pick out the London Eye marking the River Thames and in the distance the Tertiary peaks of Crystal Palace and Shooter’s Hill on the south side of the Thames Valley. These are a mirror image of Hampstead Heath on the north side but with a capping of Quaternary Gravels and no underlying Bagshot Sands.

The watery aspect of our walk took us next to the Goodison Fountain where the group posed for a photograph. The water here tasted positively iron-rich and the bowl of the fountain appeared extremely iron-stained. Is this still the genuine chalybeate water that flows from the iron-rich Bagshot Sands that was responsible for the fashionable Hampstead Spa? Following the series of ponds, originating as part of the City’s water supply, enabled us to see the Fleet up close. As soon as it leaves Hampstead Heath this stream disappears underground to become one of London’s ‘Lost Rivers’.

Our final destination was to see vestiges of another of Maryon Wilson’s ‘destructions’ of the Heath. Despite numerous Private Members’ Bills, Parliament had (thankfully) curtailed his intention of developing this part of the Heath, so instead he just dug it up! This time it was the sandy Claygate Beds close to the Viaduct. The Viaduct was almost the only construction of MW’s Grand Scheme to be built but, as the foundations had been laid on the springline between the Claygate Beds and the more impermeable London Clay, it in fact collapsed repeatedly during construction and took 3 years to complete! Whatever his understanding of geological principles, Maryon Wilson did know that the sandy texture of the Claygate Beds made for good bricks. He installed a ‘tramway’ for bringing in chalk and organic material to add to the clay. The bricks were fired on the spot in large ‘clamps’ and then transported back down the hill. The then-fashionable Hampstead Spa close by must have cursed the smell and smoke from his activity but relics of the industry can still be seen around the village in the ‘overburns’ that were incorporated into garden walls. No doubt the bricks of many local houses are also recycled Heath.

By now it was time to seek out the Hampstead Spa for ourselves. Thanks to Geoff Swann for inviting me to lead this walk for the GA. Also many thanks to Eric Robinson and David McDowall & Deborah Walton for the inspiration for this walk, and also to Caleb Evans, Lobley and the others for the descriptions of walks from a different age.

References


PGA descriptions of excursions to Hampstead Heath:


Diana Clements
GA 150

Background

The Geologists’ Association (GA) celebrates its 150th birthday in 2008, while the Geological Society has been celebrating its 200th birthday in 2007. The presidents of the two societies agreed to cooperate in marking both anniversaries jointly, where appropriate. We have been co-sponsors of the ‘local heroes’ programme that runs through 2007 and 2008, and we are now ready to announce the GA programme of celebrations for 2008.

The correct term for a 150th anniversary is ‘sesquicentenary’, but we will use the shorter version GA150 to label it.

Aims

1. We must use 2008 as a time to celebrate the GA.
2. We must encourage maximum involvement of the membership across the country.
3. We must ensure we spread the message to a wider public.

The message is that ‘Geology (or earth sciences) is an interesting and exciting field, as well as one that is highly relevant to society (energy supplies, raw materials, global change) and rewarding as a career, and we want to encourage involvement of people of all ages, and we want to boost numbers of younger people entering the field.’ Our activities must offer benefits for our members in the south-east of England, but we also make a strong commitment of effort and money to increase activity in the regions.

(1) Your Planet Earth

We are now well advanced in our educational/outreach activity for 2008. We have taken the lead, but the GSL, through its Education Committee, is a partner. The aim is to combine a poster campaign to all schools, with linked web materials, and a programme of talks in schools by students, coordinated by University earth sciences/ geology departments. The plan is to make this a sustainable and continuing programme.

The key aim is to get more children studying science at school, and more of them applying to study geology and related subjects at University/College. Numbers of applicants through UCAS to all British university geology courses have fallen from 1400 or so a few years ago to 830 in 2005-6. And yet the irony is that there have never been more jobs in the earth sciences sector worldwide.

We plan these linked actions:

1. Send a set of posters to every science/geography/chemistry teacher in the country. My instinct is to focus on secondary schools and GCSE time (i.e. ages 13-15).
2. Organise outreach talks in schools, using a supplied Powerpoint talk, but delivered by enthusiastic students (managed and trained through University departments).
3. Create a GA/GSL website (www.earth4567.com) aimed at school children, with clear and easy information on key topics (derived from the posters), and with extensive careers advice, especially featuring ‘people stories’.

The ‘holding’ web site is at: <http://www.gly.bris.ac.uk/www/yourplanet/index.html>

The posters. Posters will be on themes such as: geological time, origin of life, dinosaurs, plate tectonics, how a volcano works, geology and landscape, climate change, geo-hazards, finding oil, finding diamonds. These all relate to key GCSE themes and basic themes in Geography, Chemistry, and other science GCSE syllabuses. The posters will contain a postcard-sized inset box with an easy web-link and a different person’s career story - select interesting people, under 30, who have forged exciting careers in all earth sciences sectors.

The outreach talks. Some universities already organise talks in schools, and staff (sometimes students) deliver them. I suggest three ways of enhancing this activity:
1. We supply well-designed Powerpoint talks on core themes (e.g. Dinosaurs, Volcanoes, Global warming, Extractive industries) pitched at ages 14-15, say, or maybe at two levels (ages 9-9 and 14-15).
2. The talks are given mainly by students, not staff, probably PhD, MSc, and maybe final-year undergraduates. These students need training, which may be available already in some universities, perhaps through the Science Ambassador Scheme, but we could provide a generic training programme on the web, to be delivered locally by a team coordinator.
3. The process is coordinated and is backed with an informative website.

The web site. The web site has to be there to coordinate/link the exercise - everything is styled to look similar, and don’t forget the GA/GSL logos - it is there to answer questions. If a school pupil is interested in an outreach talk, or has questions following from a class-room poster, these questions should be answered by the web-based materials, to lead people further. Once the school pupil has satisfied him/herself about dinosaurs or volcanoes, we want them to be led to look at the careers pages, for example. We will also provide links to other geological sites that may be of interest, particularly Rockwatch, the junior branch of the GA, and encourage the participants to become members.

Costing. We have £25,000 from Shell to cover the salary of the researcher for Year 1. The University of Bristol will donate a computer and cover all office costs. We will also donate the services of a graphic designer and a web author. We are pursuing other options for support of the posters and other aspects, as well as for longer-term funding..

(2) GA150 lectures

We shall hold a number of lectures around the country, listed as a group, and specifically tagged as to celebrate our sesquicentenary. Likely venues include Exeter, Bath, Cardiff, Manchester, and Leicester, and more will be added. We shall announce the full programme shortly. Contact: Diana Smith.

(3) GA150 field trips

In addition to the normal programme, we are organising, and underwriting the costs of, a number of special UK-based field trips for 2008. The special programme is as follows (although please note all events and dates are provisional at the moment):

April 19-20 Swansong at Swanworth - a Requiem in Rocks to the Great Jurassic, quarries and the Jurassic coast led by Eddie Bailey
May 17-18 The geology of the Bytham river and Britain’s earliest humans led by Dr Jim Rose. Travel will be by coach to avoid convoy problems with a convenient pickup point outside central London. Numbers will therefore be limited. It may be possible to arrange accommodation for the Saturday night and we may be able to arrange a dinner if there is sufficient interest.

June 14 The Charlton area - geology with Victorian values led by Dr Jackie Skipper. This will be a chance to wear period dress as we re-enact an early GA field meeting.

July Building stones walk possibly in London or Oxford led by Dr Eric Robinson.

September 27-28 The GA and the Inferior Oolite of Dorset led by Bob Chandler.

TBC ?Bedfordshire? church geology weekend led by Prof John Potter

Further details from the GA office as they become available. Contact: Geoff Swann.

(4) The new and improved GA web site

The new GA web site was launched in April 2007, and it offers many new services, not least the opportunity for members and the public to buy GA guides and other items on-line, and to renew their membership on-line as well. We are now open for additions to the web site, and will continue to improve it through 2007 and 2008. Contact: Sarah Stafford or John Crocker.

(5) The GA photograph archive

One of the glories of the GA is its wonderful archive of photographs. These not only illustrate some of the best known, less well known, and in many cases greatly changed, geological localities, but also the many GA members who have visited these places over the last 150 years. The photographs have been brought out on a regular basis at reunions and other events and have been used to illustrate articles in the GA magazine.

Using these photographs, and associated ephemera, we plan to run a series of historical articles in the GA Magazine through 2008. Contact: John Crocker. We are also looking carefully at how the archive collection can be made more widely available, including via the GA web site, as well as encouraging new donations to the archive so that it can reflect the next 150 years of the GA! Contact: Jonathan Larwood and Marjorie Carreck

(6) New support for regional GA meetings

Each year from 2008, the GA will plan to hold its November meeting (the ‘Festival of Geology’ or ‘Reunion’) in London. In addition, we would like to encourage one or more major regional GA events each year, possibly in spring, and we are offering a substantial sum of new money to support these activities. The regional event could be a major festival of geology, with involvement of several local societies, it could be a mini-conference, a special field trip, an exhibition, or an event happening in schools and libraries. The key will be to achieve maximum impact on the public, and especially on children.

We propose to offer grants up to £3000 each year from the JAPEC fund to regional groups or consortia who wish to run an event. Preference will be given to proposals that have a strong management group based either on one regional earth sciences/ geological society, or a consortium of local groups, who have a strong theme for their meeting and are likely to attract strong attendance. The JAPEC funds may be used to contribute to the costs of hire of the venue and display materials, advertising, production of literature, payments for a celebrity lecture, or the like. Contact: Diana Smith.

(7) GA150 Festival gala dinner

We propose to hold a splendid dinner in central London on the evening of Friday October 31st. This is the weekend of the Reunion/ Festival of Geology, to be held at UCL in London, and it will allow GA members to attend the ‘local and affiliates meeting’ if they so wish earlier in the day, enjoy the gala dinner in the evening, and then attend the Festival events on the Saturday and Sunday. Dr Iain Stewart of the University of Plymouth, the star presenter of numerous geological programmes on television, including ‘Journeys from the Centre of the Earth’ and ‘Journeys into the Ring of Fire’, has agreed to be our speaker at this event. The dinner will be followed by an auction of good-quality antiquarian and second-hand books on geological themes, as well as other items of interest. We are exploring costs and venues, and will provide further details shortly. Contact: Sarah Stafford.

(8) The GA Curry prizes for MSc theses

The GA proposes to establish three prizes, each worth £1000, to be awarded each year to the three best MSc theses on geological topics. We shall invite the coordinators of each relevant MSc programme (and we have identified about 40 such programmes so far, being taught in all our major universities, from Aberdeen to Bristol) to submit the best thesis of the year, and the best three will be given the prize. We will use this as a way to recruit enthusiastic young members who are training to enter the professions and academia. The prizes are funded by the Curry Fund. Contact: Richard Howarth.

(9) Quaternary Research Association meeting

The GA are co-sponsors of a major international meeting, ‘The Quaternary of the British Isles and adjoining seas’ to be held at The Royal Geographical Society from Tuesday 8th to Thursday 10th January 2008. The meeting will cover all aspects of Quaternary Science and will comprise a series of lectures by invited speakers covering the topic, and poster sessions at which particular items of new work will be discussed. The topics to be considered include: North Atlantic margin forcings; applicable dating methods and their significance; glacial history; sea-level change and the nearshore record; terrestrial system responses to climate change; British Isles during warm climates; fine resolution responses to climate change; human presence on the British land area; scenarios for the future.

Contact: Jim Rose.

(10) Rockwatch event(s)

Rockwatch, the junior club of the GA, is already working in partnership with the External Relations Committee (ERC) of the Geological Society of London on a children’s book celebrating 200 years of geological history. Publication is planned for 2008. We are also working with the ERC to run a 1 day conference/workshop for youngsters on Planet Earth in the 21st century. A number of planned outcomes from this event will include an ongoing dialogue/discussion on the Rockwatch web site with the aim of engaging youngsters in thinking about the future of Planet Earth. We will have a major public event (field based) for youngsters and their parents (RW members and the public) in partnership with the Dorset GA and the Jurassic Coast heritage Education Team. Updates and details will be posted on both the Rockwatch and GA web sites over the coming months. Contact: Susan Brown.
Twenty-eight members and friends assembled at Worplesdon Station, near Guildford, to learn what, about 30 years ago, had first initiated John Potter’s enthusiasm for ecclesiastical geology! Armed with an illustrated brochure and route details, the party set off in a convoy of cars to examine six Surrey churches: three to the north of the North Downs in the London Basin, at Worplesdon, Send and Pyrford; and three in the Wealden area at Albury, Chilworth and Compton.

Within the London Basin the Palaeogene and Neogene rocks provided few suitable building stones for the early church builders. The early stonemasons relied heavily on the few rock sources that provided local stone of some physical resilience and most of these were illustrated in the walls of Worplesdon church (SU 973536). Flints, derived principally from the Upper Chalk, here only a few kilometres from the church, offered such a material. The various church walls exhibited an evolution in the use of the flints; the older rubble walls containing flints in the form of iron-stained, river deposited and often field-picked cobbles, ranging to those flints in the 1866 south chapel which were quarried and knapped. Developing masonry skills could apparently also be illustrated in the use of the sarsens, or ‘heathstones’, of the tower and clerestory walls. These skills in breaking and subsequently working this silcrete were fairly well-developed (Fig. 1), sufficient for John to propose that the tower had been built in the 15th century - and he claimed that he had not read the plaque provided by one of the masons inside the tower providing a date of inside the tower providing a date of

The east wall of the chancel was constructed of four local rock types; from the ground upwards these were, sarsens, ferruginously-cemented gravel, Chalk, and flints. An order of use of these materials could be determined (Fig. 2). Fragments of at least three times used Roman tiles were illustrated in the aisle walls and the party members were informed how these could be distinguished from more modern clay bricks. Described as a stone which reflected a period of church affluence, or at least one indicating a person or patron of considerable wealth, a tomb slab of once-polished *Viviparus* limestone (‘Sussex Marble’) fronted the west door.

St Mary the Virgin, Send (TQ 018543), picturesquely situated beside the River Wey, emphasised the importance of fresh water to the position of early churches and the population which they served. The rock types, with subtle differences, were similar to those used at Worplesdon, but some more recent imports into the church from the Wealden area included Horsham Stone roofing slabs, Surrey Hythe Beds sandstone, and Upper Greensand.

Pyrford church (TQ 040583) is situated on terrace gravel from which no doubt the ferruginously-cemented sand and gravel of its walls were obtained (Fig. 3). This stone, John, from his studies, believes was one only worked by Anglo-Saxons. He pointed out the Norman north door and Upper Chalk chancel arch, stated that a church was recorded in a charter of 956, and posed the party a problem. Did the church represent Anglo-Saxon walls into which Norman structures were placed, a Norman church re-using Anglo-Saxon materials, or a Norman church unusually quarrying a Saxon building stone? The majority fortunately agreed with John’s option two, for the blocks of gravel were ill-shaped and fragmentary and probably re-used. Members also looked unsuccessfully for an elusive ecclesiastical ammonite in the gravel; for in travelling to lunch they were to pass Ripley church (TQ 052566) where John had discovered in similar gravels the first such interesting, much-travelled and religious Oxford Clay fossil!

A brief stop at Newlands Corner permitted an introduction to Wealden geology and an indication of the whereabouts of the afternoon’s whereabouts of the afternoon’s churches. Albury old church (SU 063478) introduced a new range of rock types; sandstones, some with thin cherts, from the Hythe Beds, ironstones from the Folkestone Sand Formation and a little Bargate Stone,
together with rocks such as Upper Chalk, Upper Greensand and fragments of Roman tile. Attention was drawn to the bedding orientations in the sandstones from the Hythe Beds seen in the north-east quoin of both the nave (Fig. 4) and the tower. These were in certain instances vertical, a feature which John had shown to indicate Anglo-Saxon workmanship. The tower, although exhibiting Norman architectural features, had been built on top of the original Anglo-Saxon chancel. Inside the church, members were shown a Roman font base of Pulborough Stone and distinguished Viviparus limestones from both the Weald and Purbeck.

The Folkestone Sand escarpment was climbed to reach St Martha, Chilworth (TQ 028483) and the fine views which were offered (Fig. 5). In accordance with its situation much of the church is built of pieces of ironstone from the Folkestone Sands. Extensively rebuilt in pseudo-Norman style in 1848, there are only remnants of the earlier building. The south-east chancel quoin, however, provides a clue as to an Anglo-Saxon origin, for in it at least three of the lower stones (of local Hythe Beds) are emplaced with their bedding oriented vertically - see cover photograph.

Compton church (SU 954470) possesses clear evidence of Norman workmanship and its sandstones at two levels provide the only example in the country where these are accessible and in use. Internally, Upper Chalk provides much of the stone. With a church recorded in the Domessay records, the lower portion of the unbuttressed tower constructed of a rubble of Hythe and Bargate sandstones, ironstone from the Folkestone Beds and flints, is often suggested as being of Anglo-Saxon origin. The tower's rubble type quoins are generally given as additional evidence for this age. Locally, however, the two churches previously visited had used large blocks of Hythe Beds to create Anglo-Saxon quoins. John suggested that stronger evidence for an earlier Saxon church (of which perhaps little remains) was probably provided by the fragments of re-used ferruginously-cemented gravel preserved in the walls. Those who had caught the ecclesiastical geology bug finished the day with a visit to the local Watts chapel, built in 1896, and providing an interesting mix, partially in terracotta, of Romanesque, Celtic and Art Nouveau!

The following articles by the author may assist those who wish to understand more of the challenges of ecclesiastical geology:


John Potter

Continued from page 9...together with extensive low ground which in historical times has been reclaimed from Morecambe Bay. Bedrock geology is sedimentary, with gently tilted lower Carboniferous limestones unconformably overlying folded Silurian turbidites and sandstones of the Bannisdale and Kirkby Moor Formations. The latter has been recognised for the first time south of Whitarower, so that it has been possible to estimate the thickness of the underlying Bannisdale Formation within the area to be at least 2600 m. Lithostratigraphical boundaries of the Dinantian limestone formations are traced in detail on Yewbarrow from the lowest Chadian (Martin Limestone) to newly identified exposures of Asbian age (Urswick Limestone). Exposures of the unconformity below Whitarower's southern crags are also documented for the first time.

Superficial deposits were investigated using geomorphological techniques together with close inspection of river banks, field ditches and auger holes. The last advance of ice in the area, which took place during the Late Devensian, Dimlington Stadial (26000-13500 BP), resulted in the deposition of drumilinoid and blanket diamicton (boulder clay). The rapid increase in ablation at the onset of the Windermere Interstadal, led to the deposition of a glacio-fluvial tufa at the southern end of the limestone crags of Whitarower and numerous ablation moraines together with proglacial and lacustrine sediments. Holocene sea level rises were responsible for the flooding of the Winster Valley and the deposition of silty clays in tidal flats, now reclaimed from the Bay.

LESSONS The Society achieved its objective in producing the map and, through the good offices of the BGS, has succeeded in having it published. Scope for GA members and other societies to do the same sort of thing may perhaps be limited: our Society was fortunate in being in the right place at the right time. But I think it does show what the enthusiastic can do when there is a mind to it. Also bearing in mind some of the things Di Smith was saying in the March issue of GA Magazine, Groups and Societies must guard against becoming moribund. I think this can be countered by 'hands on' geology: doing something practical hopefully with 'benefit' to the local community. Even the most modest project should help recruitment quite apart from any other benefits it brings. Using that phrase of the GA of a few years ago, 'it is the true spirit of geology'.

Vic Parsons
Chairman
Westmorland Geological Society

*1:10000 map SD 48 SW Lindale and Witherslack Internal Report IR/06/079 Geology of the area between Lindale and Witherslack.
Field meeting report: Newhaven to Peacehaven, Sussex. Leader: Geoff Toye 14 April 2007

Geoff Toye had chosen an excellent day for a cliff top and foreshore ramble from Newhaven to Peacehaven on the Sussex coast. A bright sunny April morning promised a good day, weather-wise at least, although a brisk northerly wind had most of the 20 members wrapping up warmly. A few more forward-looking members dressed more lightly, correctly anticipating rapidly escalating temperatures beneath south facing chalk cliffs.

The group gathered in the foreshore car park at Newhaven, beneath the cliffs of Castle Hill, believed to be named after an Iron Age hill-fort that once existed here. The cliff top is now mostly obscured by 19th and 20th century military defences but fortunately these do not conceal the Cretaceous / Palaeogene unconformity for which this site is well known. 19th century descriptions suggest far better exposures than exist today but sea defence works have resulted in a build-up of shingle that has stopped further cliff erosion. The section is easily accessible (some scrambling required) but the higher beds do require some interpretation due to slumping and military construction works.

David Bone assisted by explaining the Palaeogene sequence (Woolwich Formation capped by London Clay Formation) as the group climbed an erosion gully that allows access to the cliff top. We rapidly passed over the basal conglomerate of glauconite coated flints, clearly seen to rest on an eroded chalk surface, with overlying marine sands seen in the vertical section. Ascending on to the upper slopes of the hill, the group spent some time searching small and disparate exposures of lignitic clays for fossil shells and selenite crystals. These clays, laid down in estuarine or fluvial mudflats, occasionally yield specimens of brackish water shells and fish remains, but nothing of particular note was found on this occasion. Most of the group managed to find selenite (gypsum) crystals of small size but reasonable quality. Some cliff edge collecting appeared to be more hazardous than it was in reality (or so I was told).

By this time, the tide had receded sufficiently to make the walk along the wave-cut platform for the 2.5km to the steps at Peacehaven (not to be attempted on a rising tide as the cliffs drop sheer down to the sea). Geoff led us across the richly fossiliferous Upper Santonian and Lower Campanian chalk that forms the cliff and beach platform. Echinoids, sponges and large ammonites (the latter up to 1.5m in diameter, but...
Exploring the Mediterranean coast between Agde and Montpellier

While the whole of the French coastline between the mouth of the Rhône and the Spanish border is of interest for its series of lagoons and intervening headlands which result in a wide variety of geological landscapes, a few years ago I happened to stay at Agde, which is a few kilometres inland. Based in this historic town with a cathedral on the banks of the river Hérault, I was able to explore this fascinating coast with local buses and the trains that run from the Spanish border via Montpellier to Avignon and beyond. Like the cathedral, many of the older buildings in Agde are built of the local basalt (Fig. 1) that forms Mont St Loup, which rises to 113 m some 3 km southeast of the town towards the resort of Cap d’Agde. With its harbour this modern development is built on the other side of the flanks of this extinct volcano, which is one of a number of scattered volcanic centres that erupted, between 1·4 and 0·64 million years ago (Ma), on an axis running northwards from the coast.

While there is a large quarry at Petit Pioch roughly half way between the old and new towns, scattered outcrops of clinkery lava (Fig. 2) can be seen on the track though the woods leading up to the top of Mont St Loup. Here it is possible to look down upon the surrounding countryside and along the coast towards Sète, where a narrow strip of coastal sediments some 13 km long divides the Bassin de Thau from the Mediterranean (Fig. 3). From the harbour it is possible to take a boat trip to Fort Brescou, an old pre-Revolutionary prison about a kilometre offshore, and get a good view of Cap d’Agde. This low headland is composed of shallowly dipping volcanoclastic deposits with at its tip darker stacks consisting of much harder viscous lavas. These cliffs can be examined from the beaches either side of this headland and consist of ash and small lumps of pumice, lava and country rocks. This includes occasional brick red fragments which can be seen within these surge deposits: as the magma which erupted them passed through the underlying Cenozoic sediments, clay was plucked from the sides of these conduits and baked before it was ejected from a nearby vent.

Travelling along the coast to the industrial but still charming port of Sète (which, along with the canals though the coastal lagoons, was developed in the 17th century as an alternative to navigating the problematic channels at the mouth of the Petite Rhône to the east), it is well worth climbing to the top of Mont St Clair, a large isolated hill above the town composed of Upper Jurassic limestone. From here you can look back towards Mont St Loup and Agde and see the narrow ribbon of post-glacial beach sediments about a kilometre wide which divides the sea from the lagoon behind it. To the northwest of Mont St Clair it is possible to look inland across the upper end of the Bassin de Thau with its oyster beds over the relatively flat Pliocene and Miocene plain towards low hills composed of Mesozoic sediments (Fig. 4). Further up the coast, tucked just behind the very narrow strip of beach sediments, is the isolated island of Maguelone, roughly 10 km south of Montpellier. This inconspicuous island - a low hummock in the coastal lagoon only 10 m high and rough-
Deeply eroded sutures that were totally impossible to extract from the chalk were soon to be found. These eruptions can be identified away from this vent, though nothing can be seen in the soil, it turns out that this was the site of a volcano that erupted with a series of violent phreatic outbursts as water was converted to steam when it came in contact with hot magmatic material. This degraded volcanic material is found interbedded with a shallow series of marine and lagoonal Pliocene sediments that formed between 4.2 and 3.8 Ma and are the only known occurrence of this age in the Languedoc region. Also, if at more distant locations fallout from these eruptions can be identified away from this vent, these products would become a significant local time marker in the rather thick and monotonous sequence of Pliocene sediments. However, this assumes that these enigmatic deposits are really unique and that other similar vents are not buried beneath these lagoons or just offshore, parallel to the regional Nîmes fault which runs straight under both Maguelone and Agde. To this end a small gravity and magnetic survey could be conducted to see if the Maguelone vent yielded any discernible deeper anomalies: the causeway from the mainland, the paths and tracks along the beach and the canal towpath would be ideal for a quick reconnaissance survey. If this were the case, then these local surveys could be extended to see if similar anomalies were picked up which might be indicative of other buried volcanic vents.

### Further Reading

Ambert, P. 2003. Le volcanisme Pliocène inférieur de Maguelone (région de Montpellier, Hérault) - Early Pliocene volcanism in Maguelone (Montpellier area, Hérault, France). *Comptes rendus Geoscience, Paris*, Volume 335 pages 1,051-1,058


David Nowell

STOP PRESS....

**Geology Events at the BA Festival of Science (13-14th September, 2007) University of York**

This year’s BA Festival of Science will feature a number of geological sessions focused around the Bicentenary of the Geological Society of London. Two talks sessions on Thursday 13th September will demonstrate the substantial contribution that geologists have made to the historical development of society, and will look forward to their continuing role in the search of water, fossil fuels and mineral reserves, and the mitigation of natural hazards. The festival will also feature a half-day field excursion on Friday 14th September to the Swillington Brick Pit in Garforth that will examine the economically-important Upper Carboniferous coal measures of Yorkshire.

Full information about the Festival as a whole, including booking information and ticket sales can be obtained from the BA’s website at: [http://www.the-ba.net/the-ba/Events/FestivalofScience/index.html](http://www.the-ba.net/the-ba/Events/FestivalofScience/index.html)

Alternatively, you can contact Richard Waller, the organiser of the geological events at:

r.i. waller@esci.keele.ac.uk

David Bone

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**Fig. 4.** View to the northwest of Mont St Clair, above the town of Sète near Notre Dame de la Salette (~1:498 E 48-224 gr.), over the near rows of oyster beds at the upper end of the Bassin de Thau with, in the foreground on the right, le Barrou, the northernmost suburban peninsular in Sète.
Curry Fund News

We had seven new applications for the Curry Fund’s June meeting and one deferred from the March meeting. Six of the new applications were funded. Hestercombe Gardens Trust was refused as this was a retrospective application.

Warwickshire Geological Conservation Group was awarded £300 towards the cost of a geological exhibition/display box for use on the island of Colonsay by visitors and residents. A grant of £300 was awarded to Woolhope Naturalist’ Field Club towards to cost of publicity and information for its Rock & Fossil Roadshow in August 2007.

The City & County of Swansea was awarded £1000 for the reprinting of its highly successful booklet on the City Centre Heritage Trail (which was also supported by the Curry Fund). The booklet will be distributed to local schools and be available for the city’s summer visitors. Dr. J. Larwood, on behalf of the Geologists’ Association, was awarded £1400 for the cost of a conservation survey and review of the GA Photographic Archive. This will form part of the GA’s 150th celebrations for 2008 and is the first step in making the archive readily accessible to a wider public as well as the GA membership. A grant of £1480 for a geological trail leaflet of the Jumbles was awarded to Lancashire RIGS. An updated and completely revised bilingual geological trail leaflet of the Vale of Llangollen is to be produced by NEWRIGS for which they have been awarded a grant of £894.

Cumberland Geological Society was awarded an interest-free loan of £2000, repayable within 2 years, towards the cost of publishing a new edition of its book “Lakeland Rocks and Landscape”. This application was deferred from March.

It’s always good to have positive feedback from the recipients of Curry Fund grants and we’ve recently had a number, including the long article in the June issue of this magazine about the visit of Professor Perle from Mongolia. Other recent projects that have been completed include the World Heritage Coast application for new fossil display cabinets for local fossils at Sherborne Castle and the Wren’s Nest Geological Trail leaflet designed and created by the children of Bramford School Wildlife Group in Dudley.

The City & County of Swansea was awarded £1000 for the reprinting of its highly successful booklet on the City Centre Heritage Trail (which was also supported by the Curry Fund). The booklet will be distributed to local schools and be available for the city’s summer visitors. Dr. J. Larwood, on behalf of the Geologists’ Association, was awarded £1400 for the cost of a conservation survey and review of the GA Photographic Archive. This will form part of the GA’s 150th celebrations for 2008 and is the first step in making the archive readily accessible to a wider public as well as the GA membership. A grant of £1480 for a geological trail leaflet of the Jumbles was awarded to Lancashire RIGS. An updated and completely revised bilingual geological trail leaflet of the Vale of Llangollen is to be produced by NEWRIGS for which they have been awarded a grant of £894.

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The delightful Wren’s Nest Geological Trail leaflet is a fun guide to the geology, wildlife and local heritage of Britain’s first national Nature Reserve which celebrated its 50th birthday in 2006. At their after school club, run by teacher Mark Sergison and Anna Gorski, the Wren’s Nest senior warden, the children produced, designed and created the guide using their own drawings, poems, photographs and words. It takes users on a geological trail around the Wren’s Nest in Dudley and is perfect for children and adults alike, really bringing the geology to life. A visit during the summer using this leaflet will make a good day out.

At the launch ceremony at Bramford School, the children received framed certificates from the Mayor of Dudley, Councillor David Stanley, recognising their achievement. I think they can be justly proud of their leaflet and I felt privileged to join the children, their parents and others at this event.

Leaflets free and available from libraries in the Dudley area.

Susan Brown
Curry Fund Secretary.

Library Notes continued.......
Rockwatch News

Spring and early summer activities for Rockwatch members and at public events kept the team extremely busy.

In late March, Adrian Rundle ran a very successful workshop where Rockwatch members learnt how to pick out microfossils from sand, prepare slides of them and identify the fossils. All this was done looking down microscopes - a new and often frustrating experience for many of the group.

In early May, Rockwatch was at the Lyme Regis Fossil Festival where we ran a hugely successful series of activities for children and their families. I think this was our busiest geology festival yet and we didn’t have time to stop during the 3 day event! At the festival there were also fantastic fossils to buy, walks and talks about the Jurassic Coast for people to enjoy, activities with a team from the Natural History Museum and local artists and children creating festival masterpieces.

In late May, our field trip to Studley Grange in Wiltshire was, I think, the biggest group that we have had on a Rockwatch trip. For many, it was their first Rockwatch field trip, so they were not quite sure what to expect but everyone found something that thrilled them. That made the trip all the more special and there are some amazing fossils at this Jurassic Kimmeridge Clay site. The finds included Lepidotes fish scales, fish teeth, lots of small fish vertebrae, marine reptile rib pieces, a superb plesiosaur tooth, a crocodile tooth, lots of echinoid spines, beautifully pyritised ammonites and lots of the big oyster Deltoideum delta. This truly was a superb collection for a Rockwatch trip.

Our most recent field trip was to King’s Dyke Nature Reserve near Peterborough on a remarkably hot, sunny, June day in this very wet summer. This is also a Jurassic site, but with the Oxford Clay outcropping, so a slightly different suite of fossils was found to those from Studley Grange. The clay here is highly organic and is still used by the London Brick Company for making bricks. We saw thousands of bricks, stacked neatly, awaiting distribution. We were surprised on the walk down to the site by a grass snake nonchalantly warming itself in the morning sunshine, but still too tired, or cold, to worry us! Our fossil finds were splendid, including belemnites, ammonites - especially Kosmoceras (the Rockwatch logo), gastropods, Gryphaea and fossil wood. We spent the afternoon at the Peterborough Museum where we went "behind the scenes" to see fossils being prepared in the lab. for display in the museum. After this we explored the store to see hundreds of specimens collected from the local area. It was good to see the Curry Fund logo on display here, acknowledging its support to the museum for enhancing its storage facilities and enabling other project to be undertaken.

Our thanks, as ever, to all those who so willingly gave their time to help and support these Rockwatch activities for our members, their families and members of the public.

Susan Brown.
Rockwatch Chairman
2007 marks the start of a long period of celebration in Liverpool. The year 2007 marks the 800th anniversary of the city’s founding charter. 2008 sees the start of Liverpool’s Capital of Culture year of celebrations. And finally in 2009 Liverpool Geological Society will celebrate its 150th anniversary. It is therefore appropriate that the Geologists’ Association should launch this celebratory period with a visit to Liverpool for its annual Festival of Geology on the weekend 2-4 November 2007.

Our host for the GA festival will be World Museum Liverpool, formerly Liverpool Museum. The museum is only 5 minutes walk from Lime Street Station. This walk will take you across St George’s Plateau and past St George’s Hall which is itself well worth a visit to see the spectacular Italian marble floor.

FRIDAY NOVEMBER 2

Local Groups Meeting: The annual meeting of Local Groups and Affiliated Societies will take place from 2.00 pm to 5.00 pm at Lecture Theatre in the Museum. A buffet lunch will be provided from 1.00 pm.

SATURDAY NOVEMBER 3

Members’ Stands and Displays will be integrated into the museum open spaces so that members of the public can visit all the stands and learn about the activities of local geological groups across the country.

In the Weston Discovery Centre Rockwatch will be running their range of child-friendly activities.

The Natural History Centre of the museum will be scheduling an on-line Interactive Link to another museum across the world which members will be able to join in.

The Planetarium will be running a programme which all visitors will be able to enjoy.

LECTURES

In the afternoon there will be lectures in the Lecture Theatre:

Professor Jim Rose (Royal Holloway) - The geology behind the earliest Humans in Britain

Recent work has demonstrated that Humans lived in Britain more than 700,000 years ago, some 200,000 years earlier than previously believed. This is prior to the earliest known lowland glaciation of Britain and at a time when Britain was linked with the continent. This lecture sets out to explain the evidence upon which this interpretation is based, the reasoning behind the age and the nature of the environment associated with human occupancy.

Professor Bob Spicer (Open University) - Climate Change Beyond the IPCC.

Our lack of understanding as to the causes of the data/model disparity on climate change has become of great concern in recent years because it is at high latitudes and in continental interiors where the most rapid observed warming appears to be taking place. If the models are in some way inadequate for these regions it has profound implications for mitigation and adaptation strategies. Here the quality of the geological data will be reviewed and the disparities quantified as a first step to understanding the cause of the mismatch.

SUNDAY NOVEMBER 4

For those able to stay for Sunday there will be opportunities for some outdoor activity.

Dr Neil Meadows will be leading a full day trip to the Triassic of the Wirral and adjacent areas (see below for a detailed schedule for this trip but note that car transport is needed).

For a shorter trip, Members of Liverpool Geological Society will escort you on a morning tour of urban geology of the city. There will also be morning tours available of the Williamson Tunnels. The Williamson Tunnels are a labyrinth of tunnels and underground caverns under the Edge Hill district of Liverpool. They were built in the first few decades of the 1800s under the control of a retired tobacco merchant called Joseph Williamson. The purpose of their construction is not known with any certainty. Theories range from pure philanthropy, offering work to the unemployed of the district, to religious extremism, the tunnels being an underground haven from a predicted Armageddon. Friends of Williamson’s Tunnels is a voluntary organisation which is trying to find and excavate the whole of the system of tunnels and they will escort you on your visit which will give a new dimension to urban geology.
VENE

The World Museum LIVERPOOL was founded in 1851 as the result of a generous bequest to the City of Liverpool from the 13th Earl of Derby; it embraces both the Humanities and Science Collections. The museum was not the first to be established in Liverpool and parts of several older collections such as William Bullock’s Liverpool Museum (c1820), the Liverpool Royal Institution (founded in 1817) and the Liverpool Botanic Garden (founded in 1802) have subsequently been incorporated. The appointment of Henry Ogg Forbes as Director of the Museum at the beginning of the 20th century led to the construction of a major extension to the Museum, now known as the Mountford Building, whose upper floors originally housed the large displays of mounted birds and mammals. During World War II a large proportion of the collections were evacuated to safety. However, a fire as a result of an incendiary device dropped in May 1941, destroyed much of the mounted bird and mammal material along with most of the geology and invertebrate zoology collections - then reckoned to be one of the best in Britain. The museum was rebuilt during the 1950s and 1960s with a major rebuild linking the Mountford and earlier structures via an airy atrium space occurring from 1999-2002. During this project the collections have been rehoused offering a much improved facility for storage and research. In 1974 the City Council handed over the museum to the newly established Merseyside County Council and in 1986 the collections were recognised as being of national importance when the National Museums & Galleries on Merseyside was established. This was the first creation of a National Museum in England outside of London and is a testmony to the quality and scope of the collections. In recent years the Institution was renamed National Museums Liverpool (NML) to reflect the international diversity of its collections - then reckoned to be one of the best in Britain. The museum was founded in 1858 and, despite their destruction in 1941, have been rebuilt to become a collection of national significance with over 50,000 palaeontology specimens. Important collections lost during the war were Edward Charlesworth’s British Fossils, Louis Agassiz, Silurian brachiopods from Anticosti Island, Canada, J.S. Bowerbank’s British fossils, Frank Archer’s Paris Basin fossils. T.Mellard Read’s vertebrate remains from the Quaternary peat and Forest beds and Henry Beasley’s Triassic footprints. Important surviving collections form the war era include Henry Higgins Ravenhead Collection of Coal Measure Plants - cited and type material; Thomas Austin’s crinoid collection, cited and type material. The mineral collection is one of the most significant in northern England with over 20,000 specimens. A significant and tragic wartime loss was the mineral collection of William Phillips which included the specimens upon which the system of Miller indices was devised. The Petrology collections are of both regional and national significance with some 8,000 specimens with accompanying thin sections for 4,000 of them.

As you enter the museum through the new atrium (Fig.1) you will immediately see the magnificent Cretaceous pterosaur flying over your head. Quetzalcoatlus northropi survived until the K/T boundary. It was found in Big Bend National Park, Texas. A graduate student by the name of Douglas Lawson, working under the supervision of Dr Wann Langstrom, found a flight bone eroding out of a gulley cut into the Javelina Formation fluviatile and lacustrine sediments. Subsequent excavation recovered three fragmentary wing bones indicating that the wing had detached from the rest of the skeleton. In the intervening 30 years the fragmentary remains of other smaller individuals have been recovered so that a complete reconstruction could now be attempted. This is currently the only complete skeletal cast, mounted in flying position, in the UK and probably Europe. The giant size of the Cretaceous azhdarchids (giant pterosaurs) can tell us something about global climate patterns as well as growth rates in these animals.

The rest of the museum’s geological collections will provide a fascinating start for your visit to Liverpool.

Full-Day Field Trip
The Triassic of NW England
Leader - Dr Neil Meadows, Redrock International Ltd

Visit one of the few places in the world where you can stand on reservoir rocks and view offshore platforms producing oil and gas from the same succession. Exposures on the Wirral and around Chester will be used to examine the heterogeneous nature of a mixed fluvial and aeolian reservoir that serves not only as a local analogue but can also be used to illustrate the universal complexity of such sequences and how the application of continental sequence stratigraphy aids an understanding of stratigraphic architecture.

In the morning outcrops in the NW of the Cheshire Basin that range throughout the stratigraphy of the Sherwood Sandstone will be used primarily to demonstrate variations both areally and stratigraphically in the character of the fluvial system that supplied the vast majority of the sediment to the area in Early Triassic times. These include Chester and Burton Point where fluvial sequences in the lower Sherwood Sandstone and aeolian/sandflat deposits in the underlying Kinnerton sandstone can be examined, the latter providing an opportunity to see the presumed Permain:Triassic boundary, and Helsby Hill where the prominent crags comprise fluvial sandstones of the Delamere Member overlying aeolian sequences in the Thurcaston Member of the Helsby Sandstone in the upper Sherwood.

In the afternoon outcrops on the Wirral Peninsula will be used mainly to examine sequences high in the Sherwood Sandstone succession that are the equivalent, in terms of both stratigraphy and sedimentary facies, to the producing horizons in the offshore East Irish Sea Basin fields. Subtle variations in the depositional products of a major low sinuosity fluvial system will be examined in detail at Hilibre Point within sight of the producing Hamilton and Lennox Fields. The non-channelised facies in this area are dominated by sand-flat deposits that range from wet and damp, palaeo-water table controlled environments to aeolian sandsheet and small scale aeolian dune sequences that are well exposed in the Thurcaston Road Cutting. Vertical and lateral facies changes in these sequences demonstrate both a climatic control on sand-flat processes and the variability of depositional products across an active sand-dominated floodplain.

Lunch will be taken at a local hostelry.
Festival of Geology

Saturday 3rd November
10.00 - 4.30
at
World Museum
Liverpool

Local Groups Meeting Friday 2 November
Members’ Stands and Displays,
Rockwatch’s activities for children: jurassic dioramas, etc., etc.
Talks on the Earliest Humans, Climate Change,
Photographic Competition (with £100 cash prize),
Assistance for Local Groups to attend,
Half and Full day field trips on the Sunday 4 November
Read all about it on page 22

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