

# HOGG

## Newsletter of the History of Geology Group of the Geological Society of London

### The Making of the Geological Society of London

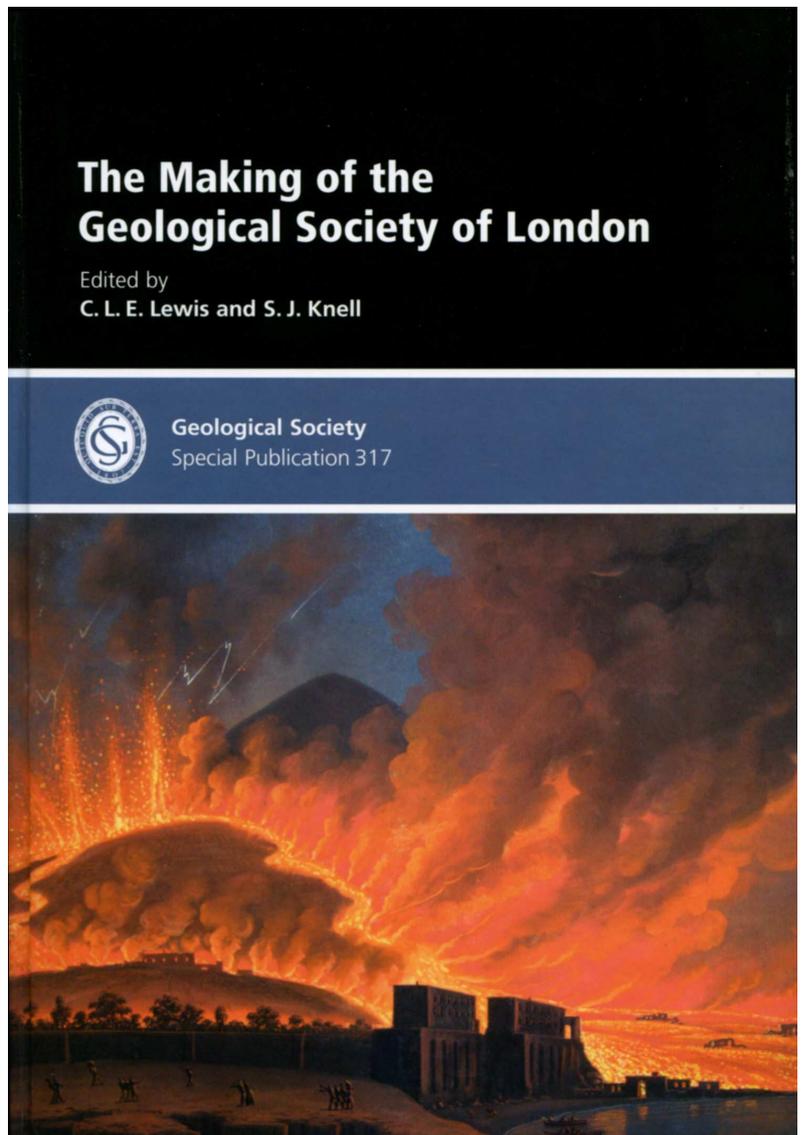
Edited by  
C. L. E. Lewis and S. J. Knell



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### **Front cover**

The cover of the recently published Geological Society Special Publication 317 which commemorates the bicentenary of the Geological Society and HOGG's considerable role in its celebration. The book's contents are listed on page 32 of this newsletter.

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### **Editorial subcommittee**

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**The HOGG newsletter will be issued in February (copy deadline 31<sup>st</sup> January), June (copy deadline 31<sup>st</sup> May) and October (copy deadline 30<sup>th</sup> September).**

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## LETTER FROM THE CHAIR

First a toast! At last it has arrived! *The Making of the Geological Society of London* edited by Cherry Lewis and Simon Knell has finally been published by the Geological Society Publishing House as Special Publication 317. This volume celebrates the founding of the Geological Society, its bicentenary and HOGG's involvement in marking this historic occasion. During the run up to the bicentenary, and in particular HOGG's Founding Father's meeting, the HOGG Committee worked hard to ensure that not only would the bicentenary be a success but that the event was suitably recorded for future historians to appreciate. This fine book is the result of all that hard work, and the vision and ambitions of the editors. I hope you will all join with me in congratulating Cherry and Simon for the time and effort they have spent in making sure that this volume is a fitting tribute to that occasion. On behalf of HOGG, I am confident in saying that the volume will become a key reference for future historians, not only of the Geological Society, but also of the history of geology in a broader sense.

Still in a celebratory mood - this time the Darwin bicentenary. I wish to thank Martin Rudwick and Adrian Palmer for the excellent HOGG field trip to Lochaber which took place from 26th to 29th June. In a year of Darwin-related events, this field trip followed in the footsteps of Charles Darwin and others to examine, through 19th century eyes, the Parallel Roads of Glen Roy. A report of this trip is included in this newsletter (pp. 2-11).

The 'year of Darwin' may be drawing to a close with a meeting at the Geological Society on 'Darwin the Geologist: His Legacy' on 23rd November but we follow it with another celebratory year starting in January 2010 – *The International Year of Biodiversity* (an excuse to continue the Darwin theme?). Although this is a modern view of biodiversity and its associated contemporary issues, I have noticed that already there is a certain degree of myth-making concerning geological and climate change issues. Perhaps there is scope for rectifying some of the potential myths from an historical perspective – the 'old chestnuts' of extinction events and their popular causes feature in some of the proposed exhibition literature that I have seen. One of the problems with celebratory years is that they can act not only as a focusing lens on current issues but also as a distorting mirror by which situations and events are viewed. One of the roles of the Earth Science historian is to try to minimise this distorting effect and provide, for the time in which a topic is exhibited, written about or discussed, a more 'accurate' version of events which go beyond the popular myths.

As a specialist interest group, one of the problems we face is trying to get our respective messages out to a wider public. To that end, the Committee is examining the potential of producing budget-priced popular publications that explore some of the controversies or issues in the history of Earth Sciences. These would be designed for a wide readership and may be thematic in approach, such as '*Geology and the development of railways*'. I would welcome any suggestions for popular level publications so that we are able to explore this potential new avenue of HOGG activity further. These proposed publications would not replace our existing production of scholarly works through the Geological Society Publishing House, but would hopefully stimulate a wider activity and interest in Earth Science history.

Alan Bowden  
September 2009

## HOGG COMMITTEE

**Chairman** Alan Bowden **Vice Chairman** Dick Moody **Secretary** Leucha Veneer  
**Treasurer** Beris Cox **Ordinary members** Tony Brook, David Earle, Nina Morgan, Martin Rudwick, Bob Symes, Hugh Torrens.

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## HOGG AGM 2009

The HOGG AGM will be held at **12.30pm on Wednesday 18<sup>th</sup> November 2009** at Burlington House, Piccadilly. This will be at the start of the lunch break during the HOGG meeting on *Military Uses of Hydrogeology: Past and Present*. It is envisaged that the AGM will be over by 12.45pm.

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## CAN YOU HELP WITH A NEW HOGG WEBSITE?

The committee are exploring the possibility of creating a new HOGG website. As a specialist group affiliated to the Geological Society, we would continue to have our pages on their website but an additional independent site would give us more scope and flexibility. If you have any experience in this area and are able to assist in creating a new site, we would like to hear from you.

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## IN THE FOOTSTEPS OF CHARLES DARWIN: THE PARALLEL ROADS OF GLEN ROY

*Report on the HOGG field trip to Lochaber, Scotland, 26th-29th June 2009 led by Martin Rudwick (University of Cambridge) and Adrian Palmer (Royal Holloway, University of London) to mark the bicentenary of the birth of Charles Darwin.*

**Alan J. Bowden**

This was one of the most enjoyable and memorable field trips I have been on in a long while. To observe a region of controversy through the eyes of its 19th century participants was an education in scholarship accompanied by an appreciation of landforms and their changing interpretation over time.

Upon arrival at Spean Bridge on the Friday evening, the assembled party was treated to a couple of scene-setting talks by Martin and Adrian. Martin discussed the 19th century background to the trip whilst Adrian concentrated on the more modern aspects of interpretation of the region's geomorphology. These scene-setting talks were particularly useful as the group consisted of individuals ranging from geologists, historians and evolutionary biologists to members of the

Darwin Correspondence project. This friendly and eclectic mix of individuals ensured that ideas could be discussed from a number of different viewpoints. Martin produced a marvellous field guide to the area containing all the necessary historical information required to appreciate fully the controversy surrounding the glacial lake versus marine theory. I have used some of the historical quotes (*in italics*) directly from Martin's guide including his [bracketed] additions. Adrian kindly furnished me with some of the modern interpretations which are included in this account where relevant.

Since the 18th century, the Lochaber region has long been famous for the "Parallel Roads of Glen Roy". The linear hillside features, known as roads by local people because they were thought to be forest rides or hunting lures, were documented by the Welsh antiquary and naturalist Thomas Pennant in 1779 in an appendix to his *Tour of Scotland*. Guernsey born Dr John MacCulloch (1773 -1835) visited the region in 1814 and thereafter in two subsequent field seasons in 1815 and 1816 when he described the weather as tempestuous. As a result of his field work and that of his contemporary, the country gentleman and amateur geologist (Sir) Thomas Dick Lauder (1784-1848), views began to change from one based upon local folklore to one based upon surveying, detailed deductive investigation and interpretation.

Lauder surveyed the region in 1816 and 1817 presenting his paper to the Royal Society of Edinburgh during 1817-1818 (later published in the *Transactions* for 1821). Both Lauder and MacCulloch came to the conclusion that the "Parallel Roads" were natural features of lacustrine origin with MacCulloch publishing his paper in the *Transactions of the Geological Society* for 1817. The publication of this paper helped MacCulloch to secure the 4th Presidency of the Geological Society of London.

Lauder and MacCulloch's views that the Roads were lake beaches were challenged by the geologist and naturalist Charles Darwin (1809-1882) after he had returned from his voyage on the Beagle. Darwin expressed the opinion that the Roads were of marine origin as he sought support for his idea, derived from his South American fieldwork where he had observed terraces at Coquimbo, Chile, of a global tectonic theory of vertically oscillating crustal plates. MacCulloch had originally considered a marine origin for the Roads but rejected it on the grounds that the Roads were confined to specific valleys and because no trace of any marine deposit could be found. Darwin was so certain of his viewpoint that, in 1839, he published a paper in the *Philosophical Transactions of the Royal Society* as his first major scientific paper which was well received by the scientific community.

This early approbation of his work placed Darwin into an invidious position when it came to defending his ideas amongst the growing tide of evidence in favour of the lakes theory, particularly as the Swiss naturalist Louis Agassiz (1807-1873) expounded a recent "Ice Age" theory, a form of the snowball Earth hypothesis. This new idea originally met with some resistance amongst UK geologists but later gained credible acceptance and largely explained away some of Darwin's objections to a lacustrine origin for the Roads, namely the absence of recognizable barriers or dams to account for the successive levels of the lakes. Agassiz's ideas were improved upon by the Scottish agricultural scientist and amateur geologist Thomas Jamieson (1829-1913) who managed, by means of detailed fieldwork, to disprove Darwin's ideas. Darwin held out with his marine theory for 20 years before the mounting tide of evidence forced him to capitulate. In a letter to Jamieson dated 6th September 1861, he stated: "*Your arguments seem to me conclusive. I give up the ghost. My paper is one long gigantic blunder ... What a wonderful record of the old icy lakes do these shores present! It really is a grand phenomena. I have been for years anxious to know what was the truth & now I shall rest*

*contented, though ashamed of myself. How rash it is in science to argue because any case is not one thing, it must be some second thing which happens to be known to the writer."*

Despite the intellectual pain Darwin must have felt about his Glen Roy theorising, he showed his integrity and magnanimity as a first class scientist by acknowledging his mistake. In his autobiography, 1876, he stated: *"This paper [on Glen Roy] was a great failure, and I am ashamed of it. Having been deeply impressed with what I had seen of the elevation of the land in South America, I attributed the parallel lines to the action of the sea; but I had to [sic] give up this view when Agassiz propounded his glacier-lake theory. Because no other explanation [sic] was possible under our then state of knowledge, I argued in favour of sea-action; and my error has been a good lesson never to trust in science to the principle of exclusion"*.

Darwin's words are probably as true today as when he wrote them. They form an excellent lesson in the objectivity of science as well as the intellectual honesty of the individual.

Following this brief scene-setting background to the field trip, the party went first to the viewpoint where the Roads could be seen in all their glory (Fig. 1.). It was useful to compare the modern view with that drawn by MacCulloch and published in his paper of 1817. Although the tree depicted by MacCulloch could not be identified, his sketch was remarkably accurate despite a limited amount of vertical exaggeration. MacCulloch was a trained military artist having once exhibited at the Royal Academy. He always tried to provide a realistic depiction of a scene although, in artistic terms, he was criticised for being too much of a draughtsman.



Fig.1 The Parallel Roads of Glen Roy as seen from the viewpoint.



Fig. 2 Martin Rudwick explaining the significance of Bohuntine Hill.



Fig. 3 The view across Glen Glaster and the unseen Col 2.

From the viewpoint, we made our way up the flank of Bohuntine Hill where Martin then elaborated upon the reasons why this hill was crucial to the debate and in Darwin's Marine theory (Fig. 2). From the viewpoint of Road 3, we were able to examine its profile close up and view the Roads up and across the valley. The party then climbed up to Road 2 and examined the view across to Glen Glaster (Fig. 3) and towards the unseen Col 2 which was to have a crucial bearing on the story later on. The steep climb continued up to Road 1 where we walked along it to the south until it faded away. Close up, the Roads were actually quite difficult to pick out despite being very visible from across the valley. Often the profile of the Road could only be seen by a slight change in vegetation.

Darwin made a particular study of Bohuntine Hill and in 1838 drew up an agenda based upon the fieldwork of both Lauder and MacCulloch prior to visiting the area. His agenda is summarised as follows:

- “1<sup>st</sup>. Nature of shelves. With respect to foundation [i.e. solid bedrock or loose materials]*
- 3. Abrupt termination of shelves. –cause- examine Hill of Bohuntin – where terminates, is rock corroded as would be from tides.*
- 4<sup>th</sup>. Is there lip of escape [i.e. Col R2] to shelf 3<sup>rd</sup> [Road R2 in Glen Roy] in Glen Fintac [i.e. into Glen Gloy].*
- 7<sup>th</sup>. Does Alluvium vary above upper shelf [Road R1]*
- 9<sup>th</sup>. Are there traces of more lines than the three [i.e. are MacCulloch's “supernumerary” or “minor” Roads genuine?]*
- 11<sup>th</sup>. The relative preservation of the shelves [i.e. in proportion to their putative ages].*
- 12<sup>th</sup> The great problem. Why lines are absent in other parts [i.e. of Lochaber, or Highlands generally]. The Hill of Bohuntine and Glen Turrit must answer this.*
- 15. Form of valleys of Glen Roy and Gloy, and of Hill of Bohuntine.”*

Darwin found reasonable objections to MacCulloch's Lauder's and Agassiz's ideas from this locality. He was looking for a suitable barrier that would help to explain away the glacial lake theories.

In his paper of 1839, he noted that *“I paid particular attention to the following observation, namely, that on both sides of the hill of Bohuntine, and on the opposed mountains, where the shelves terminate, there was not the smallest change in the composition, or in the outline of the smooth rounded surfaces. Yet it is in this very spot, where the lines insensibly disappear ... [and] where there is not a remnant of any projecting mass, that we are compelled by the [lake] theory to believe that the two enormous barriers stood, which formed Glen Roy into the imaginary Lake Roy.*

Darwin reinforced his objections to the lake theory in a letter to his friend Charles Lyell on 8th September 1847: *“Now I do not believe in the ice-lake theory, from the following weak, but accumulated reasons... the very gradual dying away of the terraces at the mouth of Glen Roy, does not look like a barrier of any kind...I shd have expected great terminal moraines across the mouth of Glen Roy, Glen Collarig & Glastig, at least at the bottoms of the valleys; such I feel sure do not exist.”*

The Hill of Bohuntine was crucial to the debate and it may be instructive to examine the meteorological conditions encountered by observers to the region. Darwin visited the Lochaber area during a particularly fine spell of weather where he wrote to Lyell on 9th August 1838 *“Here I enjoyed five days of the most beautiful weather, with gorgeous sunsets, & all nature looking as happy, as I felt. It is far the most remarkable area I ever examined. I have thoroughly convinced myself (after some doubting at first) that the shelves are sea-beaches,- although I*

*could not find a trace of a shell, & I think I can explain away [sic] mist, if not all, the difficulties.... I can assure you Glen Roy has astonished me”.*

By comparison, MacCulloch visited during a particularly poor spell of weather and noted that particularly tempestuous seasons in 1815 and 1816 made it impossible for him to survey the relationships between the lines in Glen Gloy and Glen Roy and that weather conditions made it difficult to survey with accuracy. These poor field seasons were probably the aftermath of the 1815 eruption of Tambora, regarded as the greatest eruption of historical times. MacCulloch also noted that his vertical measurements were made using a barometer of “Ramsden’s construction” which he further noted could not be relied upon to make accurate measurements. In a bid to improve accuracy, Lauder surveyed the area with a trained surveyor and more accurate instrumentation under more favourable weather conditions. These early surveys provided Darwin with sufficient detail to pursue his own lines of reasoning. However, all of the observers missed one crucial point of evidence in favour of the lake theory that was recognised by the Scottish country gentleman, lawyer and amateur geologist David Milne (1805-1890). Milne surveyed the area in 1845 and, prior to his visit, was convinced that Darwin’s marine theory was correct and that the lake theory of both Lauder and MacCulloch was untenable. However, whilst in the field, he changed his mind and published a paper which significantly improved upon Lauder’s work. In this paper, he noted that he found an unnoticed Col (Col 2) which provided one of the solutions to an anomaly present in Lauder’s paper. This Col provided the overflow drainage from “Loch Roy” on the level of Road 2 in Glen Roy. Why had the earlier observers missed Col 2? From the viewpoint of some of the party observing the scene under cloudy skies, it would seem that visibility may have had a part to play. Both Lauder and MacCulloch surveyed in relatively poor conditions and may not have been able to see Col 2 due to driving rain and a low cloud base, unlike Darwin’s visit in “beautiful weather”.

The party spent a large part of the morning on Day 1 in the Bohuntine Hill area as this not only provided a good focal point for the region but was also crucial to much of the 19th century debate. After much discussion, the party then made its way along Glen Roy where Martin and Adrian further elaborated upon some of the observed glacial features and their relevance to

Darwin’s marine theory. These included the subaqueous fans at Brunachan and Allt Reinich on the east side of Glen Roy, which are now thought to have formed during the glaciolacustrine systems. The Allt Feith Brunachan was once a more vigorous stream than it is today and the front of the fan has been truncated by the fluvial terraces of the River Roy (Fig. 4). Some modern landforms, such as the mass movement in the form of a landslide as a result of winter rains in the late 1980s, were also easily identified.



Fig. 4 Truncation of the outwash fan at Brunachan by the fluvial terraces of the River Roy.

At the end of the public road at Brae Lodge, we left the minibus and walked across the old Turret bridge (Fig. 5). On our left (the western side of Glen Turret), we were able to view the bedded sands and gravels through which the River Turret had cut down to its current level. These were impressive features as was the Turret Fan, a 20 m high glacial outwash fan, with a classic ice-

contact slope on the up-valley side and with lateral moraines extending along the Turret valley sides. Much current scientific debate has focused on this landform; it is thought that deposition occurred at the front of the glacier before the formation of the 325 m and 350 m Roads visible on the eastern side of Glen Turret (Figs 6a and 6b). Adrian Palmer and Doug Peacock took some time to explain the intricacies of this controversy during the afternoon.



Fig. 5 The old Turret Bridge and Turret delta.



Fig. 6a The party relaxing at lunch before the roads on the eastern side of Glen Turret.



Fig. 6b Group photograph with leaders Martin Rudwick, back row 3rd from left, and Adrian Parker, back row 2<sup>nd</sup> from right.

It should be noted that the Turret Fan was originally considered a delta feature by Jamieson in a letter to Darwin dated 3rd September 1861 where he stated: *“But what seemed to me even more important evidence in this respect [against Darwin’s marine theory] was the wonderfully fine preservation of the deltas at the mouths of some of the streams near the head of Glen Roy. These deltas have the appearance of being lodged in the waters of a placid lake, even in a stagnant pool, so undisturbed is the outline of some of them. This seems inexplicable to me had the lake been an arm of the sea, subject to the flux & reflux of tides. Again the delta at the mouth of the Turret is out of all proportion too large for the size of the stream... This I think can be explained only by supposing the Turret delta to be partly due to the outflow from Glen Gloy.”*

More recently, Adrian has investigated glaciolacustrine laminated sediments from the fan surface. Using microscopic techniques, he has identified an annual pattern of sedimentation, which permits a minimum duration to be given for the lake levels in the Roy.

Before returning to Spean Bridge for the evening, one further stop was made in Caol Lairig, (Glen Collarig, 19th century name) which is on the western flank of Glen Roy and close to the viewpoint.

Darwin wrote in 1839 that *“Observing in Glen Collarig the gradual disappearance of either set of lines [Roads R1 and R2], and that there is not the smallest apparent cause for it in the nature of the ground, the first and obvious supposition is that a sheet of water extended from Glen Spean into Glen[s] Roy and Collarig, and that the mere widening of the mouths of the latter*

[two], as they approached the less protected expanse of the Spean, gradually became unfavourable to the accumulation of detritus, and therefore the formation of the shelves.”

Adrian pointed out a series of shorelines, terminal and lateral moraines in the valley, including an additional shoreline that had not been mapped by the 19th century scholars and which corresponds to the height of the valley floor at the point that Caol Lairig meets Glen Roy. This suggests that Glen Roy was not inundated by water when this shoreline developed in Caol Lairig, further complicating the story in Glen Roy.

On the following day, the party moved into Glen Spean to observe features which Darwin used to bolster his marine theory. He noted in a letter to Lyell on 9th March 1841 that “I think I have thought over the whole case [of the Parallel Roads] without prejudice, & remain firmly convinced they are marine beaches. –My principle reason for doing so, is what I have urged in my Paper, the buttress-like accumulations of stratified shingle on sides of the valley, especially those just below the lowest shelf in Spean Valley.”



Fig. 7 The 325 metre overflow delta at Roughburn.

Milne wrote in his paper of 1847 “A little beyond this flat [Col R2, connecting to Glen Glaster and thence to Glen Roy] and old river course can be distinctly traced down a slope to Loch Laggan. It has a rocky bed, over which a great body of water had evidently flowed at some former period....I afterwards found the place where it had discharged its waters into Loch Laggan, when that loch stood at shelf 4 [Road R3]. It is marked by a huge delta [at Roughburn].”(Fig. 7).

Darwin, upon reading Milne’s paper, wrote to him on 20th September 1847 stating “The oddest result of your paper on me (& I assure you, as far as I know myself, it is not perversity) is that I am very much staggered in favour of the ice-lake theory of Agassiz and Buckland; until I read your important discovery of the outlet in Glen Glastig [Col R2] I never thought this theory at all tenable. Now it appears a very good case can be made in its favour. I am not, however, as yet a believer in the ice- lake theory, but I tremble for the result.”



Fig. 8a Martin explaining the intricacies of the arguments surrounding the Pass of Muckul.

To look for further evidence that Darwin used for his marine theory, the party travelled into Upper Glen Spean to the Pass of Muckul (Figs 8a and 8b). Darwin in his paper of 1839 stated that “I may remark, without wishing to lay any great stress on the argument, that these land straits [such as the Pass of Muckul], whether connected with the shelves, or not, are precisely what might be expected from straits, properly so called, between the arms of the sea laid dry.”

Milne, in his paper of 1847, noted that Darwin did not actually visit the Pass of Muckul stating: “Mr Darwin did not visit the Pass of Muckul”. If he had studied the appearances presented by it, and by those almost as strikingly exhibited at

*Glen Glaster, he would have found it impossible to deny that the waters which formed shelves 3 and 4 [Roads R2 and R3/S] flowed down river courses, and therefore could not be arms of the sea... There is no such thing in nature as a river flowing out of an arm of the sea, to a lower level ... For these reasons I consider Mr Darwin's explanation of the coincidence of the shelves with the water-sheds before described, is quite inadmissible."*



Fig. 8b. The Pass of Muckul.

Darwin countered this in a letter to Chambers on 11th September 1847 by stating that the description sounded more like a tidal channel to him rather than a river bed. Jamieson provided further evidence of water flow when he wrote to Darwin on 3rd September 1861. Here he described clear evidence of an energetic stream of water flowing towards the basin of the Spey, indications of previous glacial action as well as: *"...quantities of well rounded pebbles like cocoa nuts or cannon balls lie on water-worn surfaces, and heaps of shingle in the recesses and sheltered spots to the east of the rock masses...I satisfied myself that this could not have been caused by tidal action but it was due to a current flowing downward and Eastward."* (Fig. 9).



Fig. 9 The well rounded pebbles "like cocoa nuts" as described by Jamieson in his letter to Darwin dated 3rd September 1861.

In the Pass of Muckul area, Adrian explained further evidence for glaciolacustrine varve sedimentation, similar to that observed in Glen Roy and, when combined with the Glen Roy data, this allowed a total duration for the lake systems of 515 years. In addition, a series of Digital Terrain Models, a form of airborne infra-red mapping, was presented to the group. These models provide an unparalleled insight into the landforms of the area and one wonders how Darwin may have viewed such evidence if it were available in the 19th century.

After the Pass of Muckul, the party travelled to Glen Treig to view the glacial features around Fersit and Tom-na-Fersit. The site of Fersit, which lies at the confluence of the Trieg and Spean valleys, is where a classic suite of kame and kettle topography is developed and large deltaic landforms occur as sediment was transported from the Treig into the 260 m lake occupying the Spean. This site provided Lauder, Darwin and later observers with ample evidence with which to argue their cases regarding a lacustrine, marine or glacial origin for the features.

Lauder noted in his 1821 paper that *"By far the most satisfactory and perfect example, of any shelf completely surrounding the top of a hill, is to be observed on the isolated one of Tom-na-Fersit, immediately opposite to the opening into Loch Treig. Shelf 4<sup>th</sup> [Road S] is most distinctly and broadly traced around it, at the same level as it appears on the rocks where it enters to Loch Trieg."*

The party stood near the viewpoint from where Lauder drew his view from Tom-na-Fersit up into Glen Treig, with Road S. (Fig. 10). It was generally agreed that the published wood cut showed a significant degree of vertical exaggeration (although nothing like the 20 times oblique view exaggeration employed by NASA in their interpretation of Venusian features). Sadly, much of the visible form of Tom-na-Fersit was lost in the clutches of a Forestry Commission plantation. Similarly, Shelf 4th (Road S) was also obscured from view by overzealous planting.



Fig. 10 The viewpoint close to the position where Lauder drew his view from Tom-na-Fersit up into Glen Treig.

Darwin in his 1839 paper stated *“Standing on the precipitous and waterworn rocks [near the exit from Loch Treig], it required little imagination to go back to former ages, and to behold the water eddying and splashing against the steep rocks on one side of the channel, whilst on the other it was flowing quietly over a shelving spit of sand and gravel.”* In particular, Darwin wanted to search the area for smooth waterworn rocks and Balani (barnacles).

Agassiz on the other hand in 1842 remarked that: *“I shall never forget the impression I experienced at the sight of the terraced mounds of blocks at the mouth of the valley of Loch Treig, where it joins Glen Spean; it seemed to me as if I were looking at the numerous moraines of the neighbourhood of Tines, in the valley of Chamoni.”*

Later Jamieson wrote to Darwin on 3rd September 1861 *“.....in fact the whole ground around the mouth of Loch Treig is a perfect study of glacial action...The glacial markings on the N. side of Glen Spean opposite the entrance to Loch Treig are among the finest specimens of ice work I have seen, this with the heaps of moraine matter & the perfect wilderness of boulders made me stare with astonishment how anyone, after Agassiz had drawn attention to all of this, could go on the ground & yet deny that there had been any glacier here! I do not suppose there is any place in Britain where the traces of a great ice stream are more complete.”*

The party agreed that this was a fine site to observe the glacial features but felt that perhaps Jamieson’s account of glacial markings were somewhat exaggerated. Certainly ice scratches were present but very indistinct (Figs 11a and 11b).

Another stop close to the hilltop Chapel at Achluachrach afforded further views across Middle Glen Spean and examination of the 260 m shoreline. The final stop of the day was in the Great Glen at the famous Commando memorial and afforded the opportunity to take a last look across Glen Spean and stare in wonder at the scale of the ice mass that would be required to block the Spean valley and develop the lake systems.



Fig. 11a Ice scratched rock (faint horizontal line).



Fig. 11b Whale-back boulder.

A brief wrap-up session was provided in the Spean Bridge village hall where Adrian provided more detail on the duration of the lake systems and highlighted that each of the lake systems in Glen Roy probably existed for between 100 and 200 years each, and most were likely to have been formed between 12,200 to 11,700 years before present. Martin and Adrian were thanked for an extremely enjoyable and stimulating trip before dinner was taken in the Roy Bridge Hotel.

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*A report on the field trip to the west Midlands and North Wales led by Peter Worsley and sponsored by the Geologists' Association, Geological Society of London and the Quaternary Research Association, which was also held in June this year to celebrate the Darwin bicentenary, appears on pages 17 -23 of this newsletter.*

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## **FUTURE HOGG EVENTS**

- \* **MILITARY USES OF HYDROGEOLOGY: PAST AND PRESENT**  
(Joint meeting with the Geological Society's Hydrogeological Group and the Institution of Royal Engineers)  
**WEDNESDAY 18th NOVEMBER 2009**  
**Burlington House, Piccadilly, London**  
(including HOGG AGM)  
Programme (revised) and registration form in this newsletter (pp. 12-13, 35).
  
- \* **GEOLOGY AND THE HISTORY OF PROVINCIAL SCIENTIFIC SOCIETIES**  
**FRIDAY 9<sup>th</sup> – SATURDAY 10<sup>th</sup> APRIL 2010 (this is the weekend after Easter)**  
**The Williamson Building and the Manchester Museum, University of Manchester,**  
**Oxford Road, Manchester**  
Full programme and registration form will appear in the next (February) newsletter.

**\* HISTORY OF APPLIED GEOLOGY**

**16th – 17th NOVEMBER 2010**

**Burlington House, Piccadilly, London  
(including HOGG AGM)**

Call for papers in this newsletter (p. 14).

**\* LITERATURE AND GEOLOGY**

**2011**

**\* GEOLOGY AND MEDICINE**

**2011**

**\* METALLIFEROUS MINING IN THE SOUTH-WEST AND ITS LEGACY**

**2012**

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**MILITARY USES OF HYDROGEOLOGY: PAST AND PRESENT  
WEDNESDAY 18th NOVEMBER 2009  
BURLINGTON HOUSE, PICCADILLY, LONDON**

**Programme (slightly revised from that given in previous newsletter)**

**09.05-09.25** REGISTRATION

**09.25-09.30** John Mather  
*Introduction*

**09.30-10.00** Ted Rose (Honorary Research Fellow in Earth Sciences, Royal Holloway, University of London, UK)  
*Groundwater as a military resource: hydrogeology and the British army in World Wars I and II*

**10.00-10.30** Peter Doyle (Visiting Professor in Earth Sciences, University College, University of London, UK)  
*Groundwater as a military engineering obstacle: the influence of hydrogeology on mining operations on the Western Front, 1914-1918*

**10.30-11.00** COFFEE

**11.00-11.30** Dierk Willig (GeoDirektor, Bundeswehr Geoinformation Office, Euskirchen, Germany)  
*The importance of hydrogeology to the German army in World Wars I and II*

**11.30-12.00** John Mather (Emeritus Professor of Earth Sciences, Royal Holloway, University of London, UK)  
*The Geological Survey at war: groundwater work from 1939 to 1945 and its significance for the development of hydrogeology in Britain*

- 12.00-12.30** David Greenwood (The Kirkaldy Society, Barnet, UK)  
*Soil and water: research by the British army's 'Mud Committee' (the Committee on Mud-Crossing Performance of Tracked Armoured Fighting Vehicles) on 'going' in World War II*
- 12.30-13.30** LUNCH BREAK [including **HOGG AGM 12.30-12.45**]
- 13.30-14.00** Chris Gellasch (Lt-Colonel US Army & Army Researcher, University of Wisconsin, USA)  
*Hydrogeology and US military operations during the last 100 years*
- 14.00-14.30** Robbie Dow & Bernard Whishaw (170 Engineer [Infrastructure Support] Group, Royal Engineers, UK)  
*British hydrogeological support for recent military operations in Afghanistan*
- 14.30-15.00** Dierk Willig (GeoDirektor, Bundeswehr Geoinformation Office, Euskirchen, Germany)  
*Hydrogeology and the Bundeswehr: German armed forces' support to UN and NATO groundwater operations, from Somalia to Afghanistan*
- 15.00-15.30** Fred Ogden (Department of Civil and Architectural Engineering, University of Wyoming, USA)  
*US Army research in hydrologic modelling: recent investment, current capabilities, and future directions*
- 15.30-16.00** TEA
- 16.00-16.30** Stacy Howington & John Peters (US Army Engineering Research/Development Center, Vicksburg, USA)  
*Influence of very-near-surface hydrogeology on thermal infra-red signatures for detecting landmines and other targets*
- 16.30-17.00** Lewis McCaffrey (Brey Services Limited, UK)  
*Hydrogeology of Ministry of Defence sites in the UK: Project Aquatrine*
- 17.00-17.30** Majdi Mansour (British Geological Survey, Keyworth, Nottingham, UK)  
*Tension over water: towards the equitable allocation of the renewable groundwater resource in the Western Aquifer Basin beneath Israel and the West Bank*
- 17.30-18.00** WINE AND NIBBLES

**\* REGISTRATION FORM AT THE BACK OF THIS NEWSLETTER \***

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# HISTORY OF GEOLOGY GROUP



## **THE HISTORY OF APPLIED GEOLOGY** **International Conference and Fieldtrips**

**16th-17th November 2010**

**Geological Society, Burlington House, Piccadilly, London, W1J 0BG**

*Nearest underground stations are Piccadilly Circus (Bakerloo and Piccadilly lines) and  
Green Park (Jubilee and Victoria Lines).  
Burlington House is also home to the Royal Academy.*

## **CALL FOR PAPERS**

**and poster displays on any aspect of the history of applied geology such as  
mining, quarrying, engineering geology, civil engineering, hydrogeology,  
geophysics, mineralogy etc. etc.**

### **Conference Organisers**

**Richard T. J. Moody** e mail: [rtj.moody@virgin.net](mailto:rtj.moody@virgin.net)

**David Earle** e mail: [daearle@btinternet.com](mailto:daearle@btinternet.com)

**Conference Dinner on 16th November 19.30hrs  
at Getti, Jermyn Street**

**For further information please contact Richard Moody  
on 07973273623 or e.mail [rtj.moody@virgin.net](mailto:rtj.moody@virgin.net)**

**EDWARD CHARLESWORTH (1813-1893)**  
*Crag pioneer, museum curator (York 1844-1858; Saffron Walden 1880-1893)*  
*and natural history dealer*

Hugh Torrens is gathering data on this man. Charlesworth wrote a large number of letters and pamphlets, and Hugh would appreciate news of any of these, especially the pamphlets which were often very ephemeral publications reprinted from newspapers. In particular, he seeks any sets of *The Magazine of Natural History*, a widely distributed and popular magazine from May 1828 to August 1840, which have the original covers bound in. In August 1840, under its new editor Charlesworth, this publication suddenly stopped being produced. The Natural History Museum's three sets do not contain the covers, nor do those of the Linnean Society or Hugh's own copies. The Zoological Society has only a volume of "*Natural History Illustrations: or supplementary plates to the New series of the Magazine of Natural History*", issued by Charlesworth, with its original covers.

Contact Hugh Torrens, William Smith Building, Earth Sciences and Geography, University of Keele, Staffs., ST5 5BG e mail: gga10@keele.ac.uk

**CAN YOU HELP?**

**THE INTERNATIONAL GEOLOGICAL CONGRESS LONDON 1888**

For some years, David Oldroyd (Sydney, Australia), has been soliciting articles about past IGCs for the journal *Episodes*. In particular, he is asking HOGG members if there is anyone who would be interested in writing up the IGC held in London in 1888 which is currently a 'serious omission' from his list (see below). David can send examples of previous offerings if it would help. The list so far is:

| <b>No.</b> | <b>Date</b> | <b>Host country</b> | <b>City</b>   | <b>Author</b>               | <b>No.</b>                                                                                                                                                                          | <b>Date</b> | <b>Host country</b> | <b>City</b>    | <b>Author</b>            |
|------------|-------------|---------------------|---------------|-----------------------------|-------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|-------------|---------------------|----------------|--------------------------|
| 1          | 1878        | France              | Paris         | Ellenberger (1978)          | 20                                                                                                                                                                                  | 1956        | Mexico              | Mexico City    | Puche & Martinez (2009)  |
| 2          | 1883        | Italy               | Bologna       | Vai (2004)                  | 21                                                                                                                                                                                  | 1960        | Scandinavia         | Copenhagen     | Sørensen (2007)          |
| 3          | 1885        | Germany             | Berlin        | ----                        | 22                                                                                                                                                                                  | 1964        | India               | New Delhi      | ----                     |
| 4          | 1888        | UK                  | London        | ----                        | 23                                                                                                                                                                                  | 1968        | Czechoslovakia      | Prague         | Schneer (1995)           |
| 5          | 1891        | USA                 | Washington    | Nelson (2006)               | 24                                                                                                                                                                                  | 1972        | Canada              | Montreal       | ----                     |
| 6          | 1894        | Switzerland         | Zurich        | Franks & Trümpy (2005)      | 25                                                                                                                                                                                  | 1976        | Australia           | Sydney         | Cooper et al. (in prep.) |
| 7          | 1897        | Russia              | St Petersburg | Milanovsky (2004)           | 26                                                                                                                                                                                  | 1980        | France              | Paris          | Gohau (2006)             |
| 8          | 1900        | France              | Paris         | Puche et al. (2008)         | 27                                                                                                                                                                                  | 1984        | USSR                | Moscow         | Milanovsky (2004)        |
| 9          | 1903        | Austria             | Vienna        | ----                        | 28                                                                                                                                                                                  | 1989        | USA                 | Washington     | ----                     |
| 10         | 1906        | Mexico              | Mexico City   | ----                        | 29                                                                                                                                                                                  | 1992        | Japan               | Kyoto          | ----                     |
| 11         | 1910        | Sweden              | Stockholm     | Sundqvist & Nordlund (2004) | 30                                                                                                                                                                                  | 1996        | China               | Beijing        | ----                     |
| 12         | 1913        | Canada              | Toronto       | Middleton (2007)            | 31                                                                                                                                                                                  | 2000        | Brazil              | Rio de Janeiro | ----                     |
| 13         | 1922        | Belgium             | Brussels      | ----                        | 32                                                                                                                                                                                  | 2004        | Italy               | Florence       | ----                     |
| 14         | 1926        | Spain               | Madrid        | Ayala-Carcedo et al. (2005) | 33                                                                                                                                                                                  | 2008        | Norway              | Oslo           | ----                     |
| 15         | 1929        | South Africa        | Pretoria      | ----                        | <b>Enquiries to Professor David Oldroyd</b><br>e mail <a href="mailto:doldroyd@optusnet.com.au">doldroyd@optusnet.com.au</a><br>28 Cassandra Avenue, St Ives<br>NSW 2075, Australia |             |                     |                |                          |
| 16         | 1933        | USA                 | Washington    | Nelson (2008)               |                                                                                                                                                                                     |             |                     |                |                          |
| 17         | 1937        | USSR                | Moscow        | Milanovsky (2004)           |                                                                                                                                                                                     |             |                     |                |                          |
| 18         | 1948        | UK                  | London        | Trümpy (2004)               |                                                                                                                                                                                     |             |                     |                |                          |
| 19         | 1952        | Algeria             | Algiers       | Durand-Delga (2005)         |                                                                                                                                                                                     |             |                     |                |                          |

# The Growth of Science

*A day school to be held at Rewley House, 1 Wellington Square, Oxford*

**Saturday 30 January 2010 9.45am – 5.00pm**

HOGG members may be interested in this day school which will emphasise the development of the Earth sciences. Enrolment for the day starts at £44. Further details are available from:

Oxford University Continuing Education  
Day and Weekend Office  
OUDCE Rewley House  
1 Wellington Square  
OXFORD OX1 2JA

e mail [ppdayweek@conted.ox.ac.uk](mailto:ppdayweek@conted.ox.ac.uk)  
tel 01865 270380/270368

## PROGRAMME

9.45am **Physical science from ancient times to the early modern era**  
**Dr Robert Lambourne**

10.30am Coffee/tea

11.00am **The origin and growth of the earth sciences**  
**Dr Carol Lister**

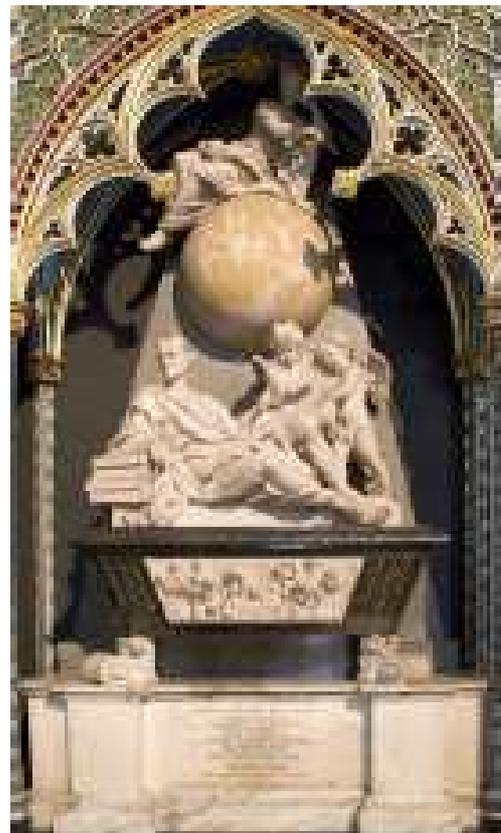
12.15pm Lunch

2.00pm **Physical science and the modern era**  
**Dr Robert Lambourne**

3.15pm Tea/coffee

3.45pm **The earth sciences in the modern era**  
**Dr Carol Lister**

**Director of Studies: Dr Robert Lambourne**  
*The Open University*



Science does not simply change, it grows and develops. The story of that growth is a fascinating tale of a vast human endeavour. Throughout the history of science colourful characters have battled with nature, with themselves and sometimes with those around them. Disputes have been common, breakthroughs vital and often the result of luck rather than good planning. In the first of a planned annual series of events, Bob Lambourne and Carol Lister will present a broad historical survey of the origin and growth of physical science with a particular emphasis on the development of geology and the earth sciences. The major concepts of these related fields will be introduced and examined in their historical context. Key scientific figures include Theophrastus, Pliny, Galileo, Newton, Maxwell, Hutton, Lyell, Darwin and Einstein. These and others will be discussed, their relationships considered and their contribution to science explained. The coverage will be wide but the ideas deep and abiding. The history of science has been compared to the Icelandic sagas. In the sagas, it has been said, there is usually one hero who has many adventures. In the history of science there are many heroes but only one great adventure. This is an inspiring but superficial view. *The Growth of Science* will attempt to provide a more realistic picture of the rise of physical science with real insights into its achievements, its working methods, the challenges it faces, and the promise that it holds. This event assumes no prior knowledge of the field and is open to all.

## IN THE FOOTSTEPS OF CHARLES DARWIN – WEST MIDLANDS AND NORTH WALES

*Report on the field excursion to the west Midlands and North Wales 19th-24th June 2009 jointly sponsored by the Geologists' Association, Geological Society of London and the Quaternary Research Association as part of the celebration of Charles Darwin's bicentenary.*

**Peter Worsley (University of Reading)**

This field excursion, which attracted twenty participants, started in Reading and the first three nights were spent at Keele University. En route north, a stop was made in Islip near Oxford for lunch, and to pay homage to William Buckland (1784 -1856). Buckland, Reader in Mineralogy and Geology at the University of Oxford, was buried in Islip churchyard beneath a slab of Peterhead granite. Buckland, of course, was the promoter of the glacial theory in Britain and prime motivator of Charles Darwin's 1842 glacial geological fieldwork in North Wales.

It was initially intended to stay in Shrewsbury but the booked hotel became a victim of the recession necessitating a late change of location. This proved to be fortuitous since the School of Earth Sciences and Geography at Keele kindly made available the William Smith Building. On the first evening, resident Emeritus Professor Hugh Torrens presented, in his inimitable style, a fascinating paper on Charles Darwin in Shrewsbury. Hugh gave us a wide ranging overview of early 19th century science in Shropshire, stressing the dynamic industrial character of the area and presenting the young Charles Darwin in a different light to the rural stereotype which has been portrayed in the past. He also told us of his recent research into 'old Mr Cotton' who stimulated Charles's geological interest whilst still at Shrewsbury School.

On Saturday, we focused on a field study of the medieval county market town of Shrewsbury, the home of Charles, for the first 27 years of his life. The walking tour was jointly led by Hugh Torrens and Peter Worsley. As the 2009 official tourist guide accurately proclaims - 'Walking the streets and passages [shots] ... it isn't difficult to imagine yourself transported back to the early 19<sup>th</sup> century'. We first visited '*The Origin*' across the Welsh bridge over the River Severn in the NW suburb of Frankwell. There at 'The Mount', a house built in 1798 by Dr Robert Waring, Charles was born in 1809.

Alas, the Shropshire Rating Office (an Inland Revenue Agency) rents the house and being the weekend it was firmly shut. Nevertheless, the front garden was open. Since the building is devoted to office use, and the interior is largely off limits, this was not disastrous (see later). From the lawn, a good view was obtained of the first floor room (left of the portico) in which Charles was born. It is also important to recall that the Darwin family vacated the house in 1866 following the death of Charles's sister Susan, and the entire contents were sold. A full appreciation of the impressive



Fig. 1 The Mount, Frankwell, Shrewsbury; birthplace of Charles Darwin

setting of 'The Mount' is not easy without access to the rear garden and steep bluff above the river. Even today, its northerly outlook across the Severn valley remains entirely rural. By taking the footpath (part of the Severn Way) which follows the bluff crest to the east of the site, we were able to gain an impression of this.

We then crossed the river to enter the medieval urban core of Shrewsbury which largely occupies a large River Severn meander loop. The next stop was the curious (politely speaking), modern sculpture of the 'Darwin Gate' at the intersection of Mardol and Shoplatch. Then a short walk led to the Unitarian Chapel on the High Street. Apart from when services are being held, the chapel is normally locked. Fortunately, two Quaker ladies promoting a petition in the entrance (which all duly signed!) kindly allowed us into the serene interior. Hugh pointed out a number of memorials some of which were associated with the founding fathers of British geology. Until he was eight, Charles regularly attended services in the chapel with his mother Susannah.



Fig. 2 Interior of the Unitarian Chapel taken from the gallery at the back of the building.

The next locality was the Bell-stone (a rounded glacial erratic) which today is displayed in the courtyard in front of the Morris Hall. 'Old Mr Cotton' told the young Charles about its likely provenance in Cumberland or Scotland but could not say how it was transported. Despite a plaque claiming 'this granite ...', it is a volcanoclastic rock. Tradition has it that a piece of the Bell-stone was collected by Adam Sedgwick and the new Darwin exhibition at the Sedgwick Museum in Cambridge displays a rock fragment identified as such. However, this does not appear to be the same lithology as the alleged parent boulder.



Fig.3 The Bell-stone in the courtyard of the Morris Hall, Shrewsbury. This glacial erratic has been repositioned since Darwin's day and is a volcanoclastic rock not a 'granite' as described on the plaque.

Close to the Morris Hall is Rowley's House, a lovely 16th century timber-framed building housing the Tourist Information Office. There the party collected copies of the new 'Darwin's Shrewsbury' brochure and other literature/maps etc. A further short walk brought us to 13 Claremont Hill, the former home of the Rev. G. Augustus Case, the minister at the Unitarian Chapel from 1798 to 1831. He ran an infant school at the house and Charles was one of his pupils for the 1817-18 school year. Today the house is in private hands but from the outside appears to be little changed from Darwin's day. Immediately behind the house lies the unusual circular Georgian-styled St Chads church built in 1792. Charles Robert Darwin was baptised in St Chads although apparently the current font is more recent than 1809.

After an extended lunch break giving time for individual exploration, the party reconvened to examine further sites. The town library occupies the former Shrewsbury School built with Grinshill Sandstone (the school moved to a new site about the turn of the last century). This was the building where Charles attended school as a boarder from 1818–25. From the Music Library on the top floor, we enjoyed fine views over the town. Numerous carved names were scanned but a C. Darwin could not be identified. Close by is the former Royal Salop Infirmary (1830) designed by Edward Haycock and this, along with its predecessor on the site, was one of the first public hospitals in England. Both have associations with Robert Darwin. We then entered the grounds of St Mary’s church to view the rather neglected grave of Thomas du Gard MD one of



Fig. 4 The restored interior of the Shrewsbury Music Library on the second floor of the former Shrewsbury School building where Charles Darwin was a boarder.

the founding honorary members of the Geological Society. Walking along Dogpole, we passed Newport House dating from 1696 which for a period served as the Guildhall and a museum. At the junction with Wyle Cop, we faced the Lion Hotel, a composite of three buildings all antedating the 19th century. This coaching inn on the London to Holyhead road acted as an ‘inter city bus station’ before the age of the railways. Charles arrived here upon his return from the Beagle at Falmouth and undoubtedly called there on many of his journeys.

The foot exploration of the town concluded at Victoria Quay just downstream from the Welsh Bridge. There we boarded the MV

*Sabrina* (named after the Celtic goddess of the Severn) for a short river cruise around a segment of the Severn meander which gave a changing panoramic view of the town centre and the best preserved section of the town wall built by King Henry III. At the English Bridge, the *Sabrina* reversed and returned upstream to the quay.

Earlier in the day whilst visiting St Chads, a rehearsal was in progress. The quality of the performers and a programme including Fauré and Handel attracted the group’s interest leading to a unanimous decision to delay our return to Keele so we might attend the evening concert. We were rewarded by a superb performance by the Shrewsbury Phoenix Choir and Orchestra.

On Sunday, the focus was on the environs of the small village of Maer, the family home of Emma Darwin, which lies some 7 km SSW of Keele in Staffordshire. First, however, we visited Loggerheads, a settlement which incorporates Ashley Heath, a distinctive hill of Permo-Trias sandstone 4 km SW of Maer. It was a stage coach stop, where horses were changed, on the Shrewsbury to Newcastle under Lyme road. The former coaching inn – Ring of Bells - is now a private residence but next to the A53 road verge is a large *in situ* dolerite glacial erratic. In 1842, Charles Darwin reported an investigation which he made of an erratic occupying the highest point of the heath at c. 235m. He interpreted this as an ice-rafted clast associated with an ice age ‘great submergence’. Severn – Trent Water has a reservoir on the summit area and the original erratic site is almost certainly destroyed. However, a scatter of erratic boulders lying on the bedrock sandstone remain in the vicinity.

Upon arriving in Maer village, the party undertook a circular three hour walk, based on public rights of way, to experience first hand the kind of landscapes frequently walked by Charles when

visiting his Uncle ‘Jos’ Wedgwood at Maer Hall. Soon after climbing out of the village along a lane to the south, we had a superb view of the hall and the lake. Around the lake (Maer Pool) is the original ‘sandwalk’ so called because of the underlying glacial outwash sands. The hall is, alas, in private ownership and closed to the public. Substantial physical changes have been made to the immediate surroundings of the hall since the Wedgwoods lived there and they did not enjoy the current secluded overlook of Maer Pool as formerly the main road ran between the hall and the lake. The next stop was at William Dabb’s Cottage where the present owner kindly permitted us to explore the grounds. This historic spot is where the original observations were made which led to an appreciation of the magnitude of earthworm activity and ‘The formation of [vegetable] mould’, a paper first published by Charles in 1837. Just after the cottage, a long distance footpath - The Newcastle Way - was followed up the dip slope of the Kidderminster Conglomerate to the summit ridge of the Maer Hills at Camp Wood, with an excellent view of the Woore Moraine ridge forming the northern skyline. The hills are now largely forested whereas in Charles’s time they were open heathland. On descending, in a hollow on the eastern side of the summit, we viewed Camp Hill House, which was especially built for Sarah Wedgwood (1776-1856). She was the unmarried aunt of Emma and a strong anti-slavery campaigner. Charles and Emma often walked over from Maer to visit her. We retraced those footsteps to within 1 km of the hall when we diverged slightly to the NE to Slater’s Farm for lunch.



Fig. 5 Maer Hall, the former Wedgwood family home, viewed from the south. St Peters Church is just visible to the top right of the Hall.

Subsequently, a short walk brought us to St Peters Church in Maer directly opposite the boundary wall of the hall. In a corner overlooking the hall laid the grave of Josiah Wedgwood II (1769 -1843) and after his death, the estate was sold and the Wedgwood family had no further involvement with Maer Hall. It was in St Peters that Charles and Emma married on January 29th 1839, and a framed copy of their entry in the marriage register is displayed on the interior north wall. Our arrival was known to the Churchwardens Sheila Mannion and Wendy Kinson and they very graciously laid on tea and homemade cakes. We were also delighted to meet David Thompson, the Staffordshire doyen of Darwiniana, who had made a special journey to welcome us.

The final element of the field programme was a visit to the Hanchurch Hills, east of Maer, to examine a road side section [SJ 841 400] through a member of a Palaeocene dyke swarm. This was at the locality where Charles had identified a dyke c. 1842. Unfortunately, the exposure is now both overgrown and on the inside of a dangerous bend of a road. Nevertheless, a reasonably fresh sample was extracted and examined by the party. Luckily some 100 m to the north along a traffic-free woodland track, a newly discovered section some 1.5 m high exposed a 1 m wide vertical basic dyke with chilled margins intruding a red sandstone [SJ 841401].

After dinner at the Sneyd Arms in Keele village, a fascinating evening discourse was given in the Department of Science Education by the Director Professor Chris King. He had created a new

teaching package featuring Darwin science and the party was invited to participate in some of the exercises.

On the Monday morning, the group travelled to North Wales via the A5 main road from Llangollen to Capel Curig in the footsteps of Charles's final field trip in June 1842. At the Plas y Brenin Mountain Centre (formerly the Royal Hotel where Charles stayed in 1842), we were joined by the Rev. Michael Roberts who is the unrivalled expert on Charles's geological travels in North Wales in both 1831 and 1842. He generously gave us the fruits of his research during the subsequent days aided by manuscript material. After lunch, we followed the A5 to a parking area just short of Idwal Cottage.

We then walked cross-country directly towards Llyn Idwal where we were met by Professor Mike Hambrey. We first inspected the 'Darwin Boulder Group' with Peter Worsley emphasising their historic significance in terms of supraglacial transport processes. He also recounted that the late Dr Eddie Watson of Aberystwyth had obtained a copy of Charles's 1842 paper three decades



Fig. 6 The 'Darwin Boulder Group' viewed from the south with Llyn Idwal on the left.

earlier and how after Watson's untimely death, this came into his possession. Later, this copy became the catalyst for him to seek the field identity of the boulders and subsequently to organise this field excursion. Mike then led the party around the lake and *en route* discussed the formation of the hummocky moraine landforms. He outlined the controversies arising from the various hypotheses of formation and gave credit to Kenneth Addison for first suggesting that the key to their genesis was a Younger Dryas glacier descending from Cwm Cneifion which forms part of the SE side of the Idwal cirque. It was envisaged that this glacier had crossed the cirque floor and pushed against the lower slopes of Y Garn (implying a minor Cwm Idwal glacier at this time). Thus a series of push moraine ridges trending approximately NE-SW were interpreted as signifying a SE-NW ice flow rather than a dominant flow SSW-NNE along the cirque axis as had been assumed previously. Mike explained that good modern analogues dating from the late 19th century occur in Svalbard. A corollary to this was the probability that the deposition of the Darwin Boulder Group occurred during the main deglaciation c. 17 ka BP and that they lay outside the Younger Dryas Readvance limit. After returning to the car park, the party drove round northern Snowdonia to Llanberis and checked into the Royal Victoria Hotel for two nights. In 1842, Charles had stayed in the same hotel. After dinner, we went to Bangor University where Michael Roberts lectured on 'Charles Darwin in North Wales'. This was made into a public event and attracted a large audience. Returning in the late evening, we enjoyed a cloudless spectacular view of northern Snowdonia highlighted by very low angle sunlight.

Magnificent sunshine heralded Tuesday and we first made a pilgrimage to Llansadwrn in east Anglesey to see the grave of Sir Andrew Crombie Ramsay (1814-1891), a former Director of the Geological Survey and early glacialist. There, Professor James Scourse talked on Ramsey's career and his wife's links with the Darwins, enriched with anecdotes from his surviving relatives. The grave is marked by a large rounded glacial erratic of Carboniferous Limestone and recent weathering has etched out a diverse fossil fauna. We then drove back to the mainland and down to Dinas Dinlle where coastal erosion has revealed complex glacial tectonics. Although

Charles does not appear to have visited this site, it was one examined by Buckland and in his 1841 paper he adopted one of Lyell's concepts and interpreted the thrust slices as ice-berg grounding structures produced during a phase of marine submergence. Even recently, there have been divergent interpretations of the landform and structures, although the present consensus regards the surviving hill as an isolated push moraine landform related to ice moving from the north. This was an excellent locality to analyse close-up the sedimentology of glacial sediments, both tills and outwash.

During lunch in the surviving part of an Iron Age hill fort on the top of the Dinas Dinlle hill, we had a splendid view eastwards of Moel Tryfan (1400 m OD) in the western Snowdonia foothills. This locality has gained great historical importance since it was first described by Joshua Trimmer in 1831. Trimmer reported the finding of a marine fauna in a sand succession lying unconformably upon slates (later assigned to the Cambrian by Adam Sedgwick). The fauna was of modern aspect and its presence encouraged the view that there had been a great submergence during a glacial period, a view subscribed to by Ramsay until his death. From the 1870's, a controversy raged over whether the fauna was *in situ* or glacially transported from out of the Irish Sea basin. It was not until into the early 20th century that the glacier transposition hypothesis gained the ascendancy. The age appears to be related to the Last Glacial Maximum. From close to Moel Tryfan village, we undertook a circular walk clockwise around the former Alexander slate quarry, initially following the track bed of an abandoned narrow gauge railway. The deposits which excited the interest of the Victorian glacial geologists have long been quarried but fortunately on the northern side of the quarry, above a deep drop into the slate workings, a glacial sequence of up to 7 m of glacial sediments survives. Both till and outwash lithologies could be identified with the latter containing comminuted shell debris. After walking around the quarry rim, we climbed to the summit, a tor landform developed in a conglomerate surrounded by a litter of soliflucted boulder-sized clasts. A plaque on the summit records Charles's visit to the locality on 26th June 1842. There can be little doubt that the occurrence of marine fossils at Moel Tryfan was influential in the persistence of Charles's support for the marine submergence concept even though within the Snowdonia massif he accepted the evidence for the presence of mountain glaciers. Curiously, he envisaged the submergence occurring after a local mountain glaciation. From the summit, the visibility was absolutely superb with the Wicklow, Isle of Man and Lake District mountains clearly visible.



Fig. 7 View down Nant Francon from the top of the major rock step just below Cwm Idwal.. The scale figures in the foreground are Michael Roberts and Peter Worsley. This is an attempt to replicate a sketch made by Thomas Sopwith in 1841.



Fig. 8 The party just below the summit of Snowdon.

The return to Llanberis was anticlockwise around Snowdon. Close to Rhyd-ddu, the roche moutonné figured by Thomas Sopwith was viewed, and afterwards afternoon tea was taken in the Royal Goat Hotel in Beddgelert. Whilst staying at the Royal Goat, on the 16th October 1841, Buckland entered in the visitor's book an exaltation to geologists to examine the glacial erosional evidence in the vicinity. In the evening, we returned to Bangor for a second public evening lecture, on this occasion Mike Hambrey lectured on the Glaciation of Wales in its global context to a large appreciative audience.

The final morning (Wednesday) dawned with the cloudless skies precisely as 'Metcheck' had predicted when the 'early bird' tickets arrived five days previously. Thus in perfect weather, we ascended Snowdon viewing the abundant evidence of glaciation and in particular the limits of several Younger Dryas glaciers. From the summit, the views were breathtaking and Michael Roberts led our eyes along the route taken by Charles towards Barmouth in 1831. To the east, magnificent skyline tor groups marking the summits of the Glyders could be envisaged as standing as nunataks thereby defining the upper surface of the ice sheet at the Last Glacial Maximum. After the descent, those bound for Reading traversed the Llanberis Pass in optimal conditions and then followed the A5 road to Shrewsbury. Being a working day, The Mount was open and we were permitted to enter the room in which Charles entered this world, a fitting conclusion to the field meeting.

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## FORTHCOMING DARWIN DATES

**THURSDAY 12<sup>TH</sup> NOVEMBER 2009**  
**GEOLOGICAL SOCIETY OF LONDON**  
**FOUNDER'S DAY LECTURE AND DINNER**  
**BURLINGTON HOUSE and LE MERIDIEN, PICCADILLY, LONDON**



**Lecture:** *Celebrating Charles Darwin and the World of Geology*  
**Speaker:** Professor Jim Secord (Director of the Darwin Correspondence Project, Cambridge)

**Dress: Black tie. Tickets are limited. The dinner is now sold out but there is a waiting list. If you would like to be added to this, contact Alys Hilbourne (see below).**

As well as the 150<sup>th</sup> anniversary of the publication of *On the Origin of Species* and the 200<sup>th</sup> birthday of its author, 2009 is also the 150<sup>th</sup> anniversary of Charles Darwin's Wollaston Medal – the highest honour conferred by the Geological Society, and the first awarded to William Smith in 1831. Darwin won the medal for pioneering work on the structural uplift of the Andes and his theory of the origin of coral reefs. In his most celebrated work, Darwin used a geological approach to solve the 'mystery of mysteries', the origin of new species.

This pre-dinner talk will explore a too-often overlooked aspect of Charles Darwin's science.

**Dinner:** After the lecture, the party will move along to Le Meridien Hotel for the reception and dinner.

The ticket price is £65 and is fully inclusive, covering the lecture at the Geological Society, and the reception and dinner at Le Meridien, with half a bottle of wine per person with the meal.

The current expected times are

17.30 Guests arrive at the Geological Society, Burlington House where tea and coffee will be served.

18.00 Lecture begins

19.15 Reception drinks served at Le Meridien

20.00 Call to dinner

**Contact details:**

Alys Hilbourne, Events Manager, The Geological Society, Burlington House, Piccadilly, London W1J 0BG Tel. 020 7432 0981 E mail [alys.hilbourne@geolsoc.org.uk](mailto:alys.hilbourne@geolsoc.org.uk)

Web: <http://www.geolsoc.org.uk/gsl/events/listings/page5725.html>

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**WEDNESDAY 23<sup>RD</sup> NOVEMBER 2009**  
**GEOLOGICAL SOCIETY OF LONDON**  
**DARWIN THE GEOLOGIST: HIS LEGACY**  
**BURLINGTON HOUSE, PICCADILLY, LONDON**



While Charles Darwin (1809-1882) became world renowned as a biologist with publication of *On the Origin of Species* in 1859, there are few who are aware that he was also an accomplished geologist. As naturalist for the *Beagle* voyage under Capt. Robert FitzRoy from 1831-36, Darwin developed a fascination for geology. Despite his lack of any formal training but as a result of his meticulous observations, Darwin published several major works on subjects as diverse as the structure and distribution of coral reefs (1842), geological observation on volcanic islands (1844), and on various aspects of South American geology (1846). Although he was self-taught, his contributions and influence were considerable: for example, he was the first to propose that subsidence and uplift might be a major geological phenomenon. In February 1859, when he was 50 years old, the Society presented him with its highest honour, the Wollaston Medal, for his outstanding contributions to geology.

This one day meeting will take place in the bicentenary of Darwin's birth, to celebrate the legacy of Charles Darwin the Geologist. A series of internationally renowned speakers will offer an analysis of Darwin's contribution to various fields of geology, and show how these subjects have since developed and continue to be relevant at the present day.

Sally Gibson (Cambridge): Igneous petrology (CONFIRMED)

Martin Brasier (Oxford): Darwin and the dawn of life (CONFIRMED)

Jean-Phillippe Avouac (Caltech): (CONFIRMED)

David Graham (Loughborough): Glaciation (CONFIRMED)

Paul Wilson (Southampton): Ocean islands and guyots (CONFIRMED)

Rachel Wood (Edinburgh): Coral reefs and atolls (CONFIRMED)

Steve Jones (UCL): The people of the reefs: Darwinism at work then, now and in times to come (CONFIRMED)

Discussion Chair: Richard Fortey (NHM)

Display: Manuscripts and geological material from the NHM and BGS

For further details, contact Alys Hilbourne, The Geological Society, Burlington House, Piccadilly, London W1J 0BG Tel. 020 7432 0981 e mail [alys.hilbourne@geolsoc.org.uk](mailto:alys.hilbourne@geolsoc.org.uk)

**Booking form at the back of this newsletter.**

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## ENDLESS FORMS: CHARLES DARWIN, NATURAL SCIENCE AND THE VISUAL ARTS

Fitzwilliam Museum, Cambridge, 16th June – 4th October 2009

Review by Melanie Keene, Homerton College, Cambridge  
(e mail: [mjk32@cam.ac.uk](mailto:mjk32@cam.ac.uk))

The forms in which we have been able to encounter Charles Darwin in this anniversary year appear to have been endless: from books to beer bottles, poetry and plays, tea-towels to TV, and international festivals. One of the most prestigious of these commemorative events was the co-curation of the ‘Endless Forms’ exhibition by the Yale Center for British Art, and the Fitzwilliam Museum, Cambridge.



Darwin’s life and works were used as threads throughout the extensive exhibition, which occupied five of the Fitzwilliam’s rooms including three large galleries: visitors moved between sections exploring such themes as the struggle for existence, man and animals, and beauty and aesthetics. They came across pigeon skulls and Wedgwood pottery, depictions of the *Beagle* voyage and of animal camouflage, Argus pheasant feathers, ethnological *carte de visite* photographs, electrically-stimulated expressions, impressionist classics, and a hummingbird fan: Charles Cordier’s sculpted *African Venus* (1851) was particularly striking.

The themed section dedicated to ‘the age of the Earth’ will be of most interest to historians of geology, including an excellent array of stratigraphical paintings: the marvellous exploration of time depicted in William Dyce’s *Pegwell Bay* (1858-60) sat alongside many other examples of faults and epochs. Robert Farren’s grandly repainted *Duria Antiquior* (ca. 1850), a large-scale reworking of Henry De La Beche’s influential cartoon of ‘an earlier Dorset’, faced William Fox Talbot’s small early photograph of *The Geologists* (ca. 1843), a very different representation of the search for the Earth’s history. Fossil samples surrounded William Buckland’s *Bridgewater Treatise* (1836); a chart of ‘Greens’ from Darwin’s copy of *Werner’s Nomenclature of Colours* (1821) was placed next to the mineralogical samples ‘of well-known objects’ from which its names were derived.



William Dyce *Pegwell Bay*



Robert Farren *Duria Antiquior*



William Fox Talbot *The Geologists*

To have viewed the visual and tactile abundance of this exhibition solely as a biographical exercise, to have traced absolutely every brushstroke or thumbprint, barb or tint, to Darwin's life, would have missed its message and importance. Monet's paintings of Rouen cathedral, with which 'Endless Forms' closed, reminded us of the far reach and interconnectedness of the sciences in the nineteenth century. The exhibition – and its lavish catalogue of images and essays – was a fitting tribute for the anniversary year, a point of reflection and of provocation for future work; it was, as in the quotation from *On the Origin of Species* which its title evoked, indeed 'most wonderful and most beautiful'.

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## LOST BOOKS

***Our regular feature highlighting books or papers known to have been printed but of which no copy apparently remains. Please provide feedback or items for inclusion to Hugh Torrens (e mail: gga10@keele.ac.uk).***

### **No. 3**

In Catalogue No. 84 of Stanley Crowe (the same London bookseller who handled William Smith's lost Norfolk book; see HOGG Newsletter 36, p.17), he listed the following item:

"129. A Guide to the Land-Slip near Lyme Regis, with a Geological and Philosophical Account of its Nature and Causes, by an "Eminent Geologist". Published Lyme [Regis, Dorset], 15 pp. Original printed wrappers. Very scarce."

How right he was! Who was 'the geologist' and can anyone now find us a copy?

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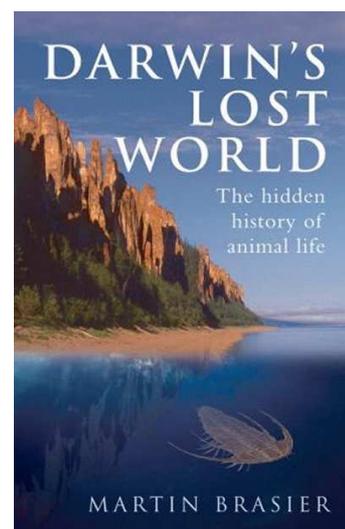
## BOOK REVIEWS

### ***Darwin's Lost World: The Hidden History of Animal Life***

Martin Brasier. 2009. Oxford University Press, 304pp.  
ISBN 978-0-19-954897-2 (hardback) £16.99

Review by Nina Morgan

If you've heard quite a lot about Charles Darwin this year, there is a reason. It is 150 years since Darwin's *Origin of Species* hit the shelves, and Darwin-themed exhibitions and events abound. Darwin's book shocked Victorian society to the core with its suggestion that life forms evolved over millions of years. By implying that the age of Earth is very much older than many believed, it challenged the literal truth of the Biblical creation story.



Darwin himself recognised that his book raised many unanswered questions. One of the great conundrums centred on the 'Cambrian explosion', when a vast range of life forms seemed to

'suddenly' appear in the fossil record in rocks at the base of the Cambrian System (542 – 488 million years old). Darwin referred to the Precambrian – which is now known to have spanned more than 80% of Earth history – as a Lost World. And so, in many ways, it remains. What caused the Cambrian explosion – and indeed, whether it really existed at all – is a topic that has dominated the career of Martin Brasier, a palaeontologist/palaeobiologist who now leads a thriving research group at the Department of Earth Sciences in Oxford.

In spite of the repeated references to Darwin and other early geologists, this book deals less with historical research than with Brasier's own career. And a fascinating one it is. Following a brief spell studying modern Caribbean marine ecosystems, Brasier became hooked on the topic of Precambrian life in the early 1970s, when he was presented with a slab of Precambrian rock from the Ediacara Hills in Australia, famous for containing fossils of early multicellular life.

As it happens, some of the best preserved Precambrian rocks occur in the most distant regions of the world. As a result, Brasier's search for Precambrian fossils has taken him to remote areas in places like Russia, China and Outer Mongolia. His descriptions of the logistical, political and cultural challenges he had to overcome to pursue his research make for very amusing reading. For example, developing a taste for arak, a fermented mare's milk 'tasting faintly of yoghurt and lightly scented with *eau-de-cheval-derrière*', he reveals, is *de rigueur* in the steppes of Outer Mongolia.

If you're expecting a book about Darwin, this book may disappoint. But if you're searching for a thoughtful read that combines musings on the origin of life, the Universe and everything with cracking good yarns about a geologist's adventures in the field, this is a book for you.

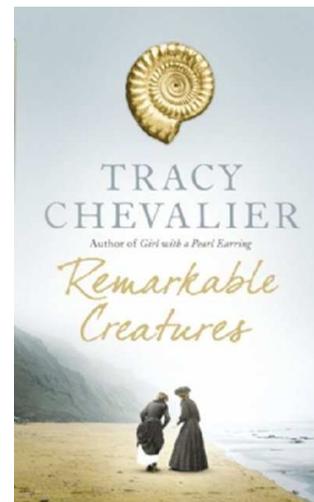
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### ***Remarkable creatures***

Tracy Chevalier. 2009. HarperCollins, 352pp.  
ISBN 978-0-00-717837-7 (hardback) £15.99

Review by Cynthia Burek

This novel by the author of *Girl with a Pearl Earring*, deals with the early life of two famous female fossil hunters and collectors: Mary Anning and Elizabeth Philpot. It is an interesting report of the early years of the 18th century in Lyme Regis, Dorset and alternates between the account of happenings from Mary Anning's poor, local, working girl point of view and those of Elizabeth Philpot coming from a middle class genteel London family who had fallen on hard times. At the time of the opening chapter, Mary Anning is about 5 years old and she is thinking about how unusual she is to have survived a lightning strike. This is a recurrent theme throughout the book and is echoed on p. 257 "No one wants someone like me for a wife". Indeed, Mary is depicted as strange, with experiences such as being nearly buried alive in a landslide. She is considered an outsider in her own town which was probably true of a very conservative small town society; people were afraid of her and her uncanny ability to find 'monsters'.



In Chapter 2, Elizabeth Philpot, at about the age of 25, comes to live in Lyme with her two spinster sisters; once their parents had died, their brother married and they were required to move from the family home in London. At that time, this was a common outcome for unmarried women who had to set up home together and lead a quiet life on a meagre income. Thus the stage is set for these two remarkable women to meet. The description of their first meeting leads Elizabeth to describe Mary as a “tall, lean child” with “a rather plain flat face made interesting by bold, brown eyes like pebbles.” Their shared interest in fossil collecting and hunting brings these two unlikely companions together. Much of the work is fiction but based around known facts, which are explained and acknowledged in the postscript at the end of the book

The story of fossil hunters and fossil collectors, the differences between them, the difficulty of reconciling the age of the Earth to Church of England goers and dissenters alike in a small provincial seaside town, the problem of extinctions as posed by Cuvier, the social difficulties of women travelling, working and collecting, and the restrictions of society are all dealt with from the two female perspectives governed by the class structure they belonged to. These two perspectives are presented as alternate chapters first by Mary and then by Elizabeth; this is a clever way of describing the chronological facts and fiction which are interwoven around the finding of the ichthyosaur, plesiosaur and pterosaur skeletons by Mary Anning.

Elizabeth Philpot was an avid collector of fossil fish and these are also dealt with but in less detail. The geological context of the time is set by the author who mentions James Hutton’s theory, Ussher’s timescale, the religious conflict that many people had with fossils being creatures that God made and then effectively discarded. It is clear from the “Further reading” that the author has done her homework. She acknowledges the work of Torrens and Taquet, and thanks the various archivists as well as Paddy Howe, the fossil hunter.

For me, the strong themes of female friendship, support, lack of acknowledgement of scientific ability and knowledge, the trials and restrictions put upon women at the time are an all too common theme. However, I enjoyed the fictitious way that Elizabeth Philpot gets into the “Men Only” Geological Society to hear Conybeare’s report on the plesiosaur, the way she describes the label on her fossil fish items donated to the Natural History Museum “On the label the collector was called simply Philpot, neatly sidestepping the question of my sex”, the comment about Colonel Birch that “But it was his dismissal of women’s power of observation – thus denying Mary and me any credit for all that we had found over the years” and the comments she makes about Mary “Her name will never be recorded in scientific journals or books, but will be forgotten. So be it. A women’s life is always a compromise.” that are interesting. However, Mary herself did actually write that “When I write a paper there shall not be but one preface”. Sadly, she never wrote that paper because we know that she died at the early age of 47. Elizabeth died much later at the age of 78 in 1857. The novel ends long before this though.

The last comment I would like to make is that Tracy Chevalier brings on some well-known players on to the imaginary stage such as William Buckland, Cuvier, Charles Lyell and Henry de la Beche although the last named is merely mentioned and does not play a prominent role in the novel. However, she does develop the characters of little known Captain Curry and Colonel Birch as well as developing the characters of Molly Anning, Margaret Philpot, Louise Philpot and Joseph Anning.

In places, she mirrors the 19th century writers’ habit of explaining scientific concepts through a dialogue between mother and child, teacher and pupil, and in this case on p. 293 between an aunt and her small nephew about extinction and the age of the Earth. This is a particular genre which

is pleasing to see developed in the book. In places too, she has Mary talking in her chapters in a rather forced West Country accent such as “Them men don’t always respond quick to letters” or “Weren’t it a thrill to dig up”. This though is not consistently carried out throughout all chapters and can be a bit distracting in places.

Overall though, I think that the book is a jolly good read and providing it is taken as a work of fiction, a play if you will on a stage, it will raise the reader’s awareness of both the role of women in an 18th century scientific context and the important but time consuming hard work of fossil hunting and collection. The relationship between Mary and Buckland, and Mary and Birch is pure fiction, based on a few facts.

I read this book on the island of Lanzarote where there are few true sedimentary rocks let alone fossils. I would recommend the book and would put it in the same category as *The Dinosaur Hunters* by Deborah Cadbury or *Emma* (Darwin) by Edna Healey. It is just a shame she didn’t mention Burek and Higgs’ 2007 paper ‘The role of women in the history of geology’ as Mary Anning certainly had a pivotal role to play there.

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## OTHER TITLES

*Two items reported by Peter Tandy (NHM):*

**Fossils and Reputations. A scientific Correspondence Pisa, Paris, London 1853-1857**

Pietro Corsi

Pisa University Press, 2008. ISBN 978-88-8492-564-0

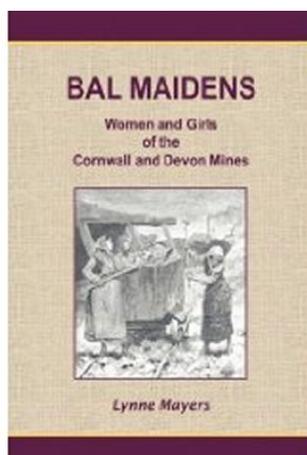
Mostly in Italian (there is a long introduction and history in English), this book concerns a remarkable series of correspondence between Iginio Cocchi (1827-1913) and his teacher and friend Giuseppe Meneghini (1811-1889), when the former travelled to Paris and London.

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**Bal Maidens. Women and Girls of the Cornwall and Devon mines**

Lynne Mayers

Blaize Bailey Books, 2008. ISBN 978-0-9556896-1-1



[From the back cover] “Lynne Mayers estimates that between the years 1720 and 1920 at least 60,000 women and girls worked in the mines, quarries and clay works of Cornwall and Devon. They carried out hard skilled and specialised work which was a crucial part of the dressing operations.

The author has carefully researched their working lives and home life, their characteristics, and the occupational hazards which they encountered. How essential were they to the industry? What were their working conditions? How much did they earn? What did they do with the very little

spare time and money they had? As the mines closed where did they go and what happened to them? This is the record of a remarkable group of women plus some individual accounts of the few whose studies have survived.

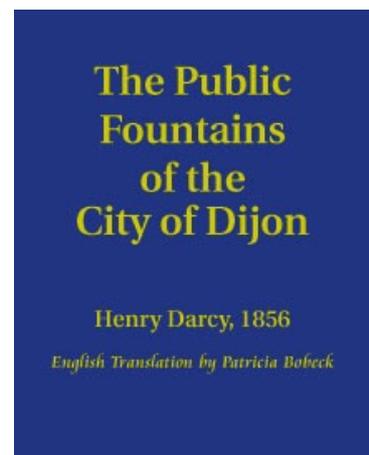
The Cornwall and Devon metal mines and smelters of the 18<sup>th</sup> and 19<sup>th</sup> centuries formed a unique and separate part of the mining heritage of these islands. No other metal mining district was so extensive, nor used women and girls in such abundance. It was here that much of our nation's mineral wealth was created, based in no small part on the labours of these girls and women.

The 1<sup>st</sup> edition of this book was published by the Hypatia Trust in 2004 and was awarded the Holyer An Gof Trophy in 2005. In this second edition, the material has been revised and expanded. The geographical scope is now extended to Dartmoor and the Teign and Exe Valleys. There is also a more detailed coverage of the tin streaming in the late 19<sup>th</sup> century. “

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***A reminder from Pat Bobeck (Austin, Texas):***

My English translation of Henry Darcy's ***Public Fountains of the City of Dijon*** was published in 2004, almost 150 years after the original publication in French. The 1856 book describes Darcy's planning and construction of Dijon's first water supply system in 1840, and more importantly for hydrogeologists, includes Darcy's account of the water flow through sand experiments he conducted in 1855 that led to Darcy's Law.

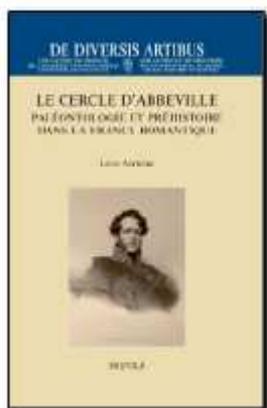


There are numerous links to the UK in the book. Darcy bases his discussion of the geology of the Rosoir Spring, the spring whose water he conveyed to Dijon via aqueduct, on William Smith's terminology (cornbrash, fuller's earth, etc.). Darcy also discusses the mid 19<sup>th</sup> century status of water filtration in various UK cities that used surface water for their water supply systems, which is the reason Darcy conducted the 1855 filtration experiments. Darcy also visited London in the early 1850s to study the construction of macadam roads.

The book provides unique insight into the status of groundwater knowledge and the construction of water supply systems in the 19<sup>th</sup> century, and into Darcy's expertise and personality.

The book can be ordered via Pat Bobeck's website: [www.pbobek.com](http://www.pbobek.com), and costs \$99.

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## DE DIVERSIS ARTIBUS

Léon Aufrère

### *Le Cercle d'Abbeville. Paléontologie et préhistoire dans la France romantique*

Marie-Françoise Aufrère (éd.). Préface de Philippe Taquet.

396 p., 43 b/w ill., 155 x 240 mm, 2007, DDA 77 (NS 40), HB,  
ISBN 978-2-503-52576-1, € 63,60 (TTC)

En mai 1940, le Musée Boucher de Perthes à Abbeville fut anéanti par les bombardements. Mais dans les années d'avant-guerre, Léon Aufrère (1889-1977) y avait pris copie de quantité d'archives et de correspondances. Ces documents, aujourd'hui perdus, sont la source du présent ouvrage, lui-même posthume et publié par sa fille. Léon Aufrère y retrace les premières découvertes paléontologiques et préhistoriques dans la vallée de la Somme et ressuscite un monde d'amateurs éclairés, où s'enracine l'œuvre de Boucher de Perthes. Ce livre est ainsi une contribution décisive à l'étude des origines de la préhistoire, mais aussi des débats sur les ossements fossiles et l'ancienneté de l'homme, et plus généralement à l'histoire de la vie intellectuelle et sociale en France à l'époque romantique.

BREPOLS PUBLISHERS Begijnhof 67, B-2300 Turnhout (Belgique);  
T: +32 14 44 80 30 - F: +32 14 42 89 19 orders@brepols.net - [www.brepols.net](http://www.brepols.net)

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## OPEN UNIVERSITY GEOLOGICAL SOCIETY JOURNAL SYMPOSIUM EDITION 2008

*In 2008, the OUGS held a symposium on the History of Geology at Royal Holloway, University of London. The symposium papers have been published in a special issue of the OUGS Journal (Vol. 29 No. 2) and are listed here.*

Allan Chapman – William Buckland and the foundations of English geology.

Cherry Lewis – James Parkinson: medicine, the founding of the Geological Society and a little light treason  
[abstract only].

Edward P. F. Rose - World wars: a catalyst for British geological innovation.

Cynthia Burek – The role women have played in developing the science of geology 1797 to 1918-19 in Britain.

Bill Chaloner – Marie Stopes – palaeobotanist.

Alan J. Bowden – Fear, reverence, entrapment and enlightenment: selected aspects of the story of meteoritics up to 1864.

Jane Randle – Ian Gass – our founding father.

John Mather – Geologists versus engineers – 19<sup>th</sup> century conflicts over the supply of water to London.

Chris Duffin -- 'God's great plough' – Louis Agassiz and the Ice Age.

Anne O'Connor – Nineteenth-century battles over bones and ice: Geikie versus Dawkins.

Richard J. Howarth – Making the invisible visible: early data display in the geological sciences.

B. A. Thomas – An introduction to the history of geological conservation in the United Kingdom.

Tom Sharpe – Slavery, sugar, and the Survey.

Patrick Wyse Jackson – Geochronological hits and misses: various attempts to determine the age of the Earth.

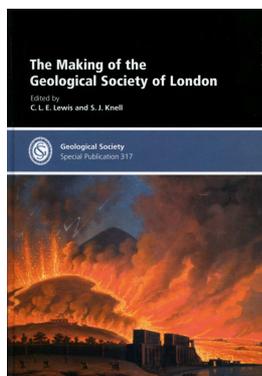
Sandy Smith – Summary remarks.

## AND FINALLY .....

### ***The Making of the Geological Society of London***

Edited by C. L. E. Lewis and S. J. Knell. 2009. Geological Society Special Publication 317  
Geological Society Publishing House, 471pp.

ISBN 978-1-86239-277-9 (hardback) £120.00 (GSL fellows £60.00; other qualifying societies £72.00)



“Founded in 1807, the Geological Society of London became the world’s first learned society devoted to the Earth sciences. In celebration of the Society’s 200-year history, this book commemorates the lives of the Society’s 13 founders and sets geology in its national and European context at the turn of the nineteenth century. In Britain, geology was emerging as a subject in its own right from three closely related disciplines – chemistry, mineralogy and medicine – disciplines that reflect the principal professions and interests of the founders. The tremendous energy and cooperation of these 13 men, about whom little was previously known, quickly mobilized like-minded men around the country and fuelled the nation’s passion for geology; an enthusiasm that soon spread to America and Australia. Two previously unpublished works from this period, essential to understanding the founding of the Society, are reproduced here for the first time. The book closes with a review of the Society’s 2007 Bicentenary celebrations.”

## Contents

### **The Founders**

C. L. E. Lewis – Doctoring geology: the medical origins of the Geological Society.

D. Knight – Chemists get down to Earth

G. L. Herries-Davies - Jacques-Louis, Comte de Bournon.

M. Kölbl-Ebert – George Bellas Greenough’s ‘Theory of the Earth’ and its impact on the early Geological Society.

H. S. Torrens – Dissenting science: the Quakers among the Founding Fathers.

### **The Status of Geology**

M. J. S. Rudwick – The early Geological Society in its international context.

P. Taquet – Geology beyond the Channel: the beginnings of geohistory in early nineteenth-century France.

M. Guntau – The rise of geology as a science in Germany around 1800.

G. B. Vai – Light and shadow: the status of Italian geology around 1807.

V. E. Khain & I. G. Malakhova – Scientific institutions and the beginnings of geology in Russia.

J. R. Newell – A story of things yet-to-be: the status of geology in the United States in 1807.

### **The Nature of Geology**

E. P. F. Rose – Military men: Napoleonic warfare and early members of the Geological Society.

L. Veneer – Practical geology and the early Geological Society.

A. J. Bowden – Geology at the crossroads: aspects of the geological career of Dr John MacCulloch.

J. R. Smallwood – John Playfair on Schiehallion, 1801-1811.

N. Heringman – Picturesque ruin and geological antiquity: Thomas Webster and Sir Henry Englefield on the Isle of Wight.

P. J. Boylan – The Geological Society and its official recognition, 1824-1828.

R. O’Connor – Facts and fancies: the Geological Society of London and the wider public, 1807-1837.

D. F. Branagan – The Geological Society on the other side of the world.

C. V. Burek – The first female Fellows and the status of women in the Geological Society of London.

### **The Bicentenary**

T. Nield – A year to remember.

M. J. S. Rudwick – Walk with the Founding Fathers.

R. T. J. Moody – Dining with the Founding Fathers: a personal view.

### **Appendices**

Appendix I: Geological Inquiries (1808).

Appendix II: Preface to Comte de Bournon’s Complete Treatise of Carbonated Lime and Aragonite (1808).

**REPORT ON THE 23rd INTERNATIONAL CONGRESS OF  
HISTORY OF SCIENCE AND TECHNOLOGY  
28th JULY – 2nd AUGUST 2009  
TECHNICAL UNIVERSITY, BUDAPEST, HUNGARY**

**Hugh Torrens**

This was a typical international congress – vast (c. 1300 participants from 60 countries), friendly but of incredibly variable quality as to its many presentations. As always, the history of geology was rather thinly represented when set against the hegemony of medicine, and the ‘non-stamp-collecting’ sciences of physics and chemistry. However, there were several symposia of much interest. The most significant were

S96 on **Seeing and measuring: Instruments in the history of the Earth Sciences** with papers on winds (Hauer, Salzburg), instrumentation (Malaquias & Pinto, Aveiro), the language of mineralogy (Kasztner, Jena), travelling with instruments (Vaccari, Varese), spectrography (Figueiroa, Campinas), microscopes in Japan (Yajima, Tokyo), maps (Oldroyd, Sydney), hammers (Klemun, Vienna), measuring the inaccessible [geophysics] (Good, Philadelphia), models (Mota, Lisbon & Brandstetter, Vienna) and photography/cameras (Carneiro, Lisbon).

S70 on **Cultural contexts of Geology 17th to 20th century** with papers on Marsigli’s work in Hungary (Papp, Budapest), British and French expeditions to Australia 1788-1803 (Mayer, Canberra), the first president of the Jena Mineralogical Society [founded 1796 – before the Geological Society of London – and which had 595 members by 1801! ] (Viczián, Budapest), mining versus archaeology in the origin of stratigraphy (Fritscher, Munich), Lyell in Gran Canaria (Sendino & Taylor, London), genealogical reasoning in Alpine tectonics (Westermann, Zurich), Eduard Suess (Hamm, Toronto), Ries crater origins (Kölbl-Ebert, Eichstätt), geology as a service in nation building (Küppers, Potsdam & Nogami, Kyoto) and Soviet expertise in China (Hu, Beijing).

Other topics were **The Earth Sciences 1800 on** (T09-03) with some extraordinarily disparate papers on subjects such as the evolution of ideas about the age of the Earth (Maghidov, Dagestan), Philippine seismology (Batllo, Lisbon), from polar wandering to plate tectonics (Sutherland, New York), geothermal heat flow (Zemysov, Russia) and Symoniwicz’s mineralogical travels to Transylvania 1803 (Grilelis, Vilnius).

Many book publishers had impressive stands for sales. The English-based ones happily seemed to want to sell off their stock to avoid taking it all back home which allowed me to add to my collection of Ashgate’s Variorum series. The Congress was very well organised logistically and was made memorable by the renewal of old friendships and the creation of new ones.

Two special treats for a very small group of us were specially organised trips to the historic city of Eger, in northern Hungary, where Bishop Count Karoly Eszterhazy (1725-1799) had planned to open a university with four faculties – law, philosophy, theology and medicine – along with a wonderful library and observatory, both of which survive largely intact. But then it never became a proper university which certainly helped preserve both these last named. The observatory was still full of British-made 18th century instruments which we took great delight in seeing, especially a camera obscura which, in the full sunshine of Eger, proved much less obscure than those I have seen in this country. The second trip was to an abandoned bauxite

mine in the Bakony Mountains where the Lower Cretaceous has yielded the first dinosaurs from Hungary to a young student. The discovery of such beasts as *Hungarosaurus* in Hungarian rocks meant, I was told, that Hungary had now joined the serious nations on whose territory such fossils had been found.

I will be happy to send a copy of any of the abstracts listed above\*, if they are printed, to any who might be interested, or provide e mail addresses. I can also supply a few copies of a fascinating book, edited by Peter Rózsa in 2000, *Robert Townson's Travels in Hungary*, published by Kossuth Egyetemi Kiadó, Debrecen, 220pp.

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\* The book of abstracts (764pp.) is available at  
[http://www.conferences.hu/ichs09/ICHST09\\_book\\_of\\_abstracts\\_author\\_index.pdf](http://www.conferences.hu/ichs09/ICHST09_book_of_abstracts_author_index.pdf)

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**Editors' note:** Hugh has been made an Honorary Member of the Hungarian Geological Society for his “activity in historical research of Earth sciences, focused mainly on the work of Robert Townson in Hungary, as well as his efforts in the several decades of English – Hungarian scientific relationships” (see *Geoscientist*, Vol.19 No. 10, October 2009).

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## **BOOKCASES FOR FREE**

If anyone is interested in some glass-fronted (sliding), sectional (“Simplex”) bookcases in dark wood, please contact Beris Cox (e mail [beris.cox@btinternet.com](mailto:beris.cox@btinternet.com)).

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**REGISTRATION FORM**

**MILITARY USES OF HYDROGEOLOGY: PAST AND PRESENT**

**Wednesday 18 November 2009**

**Geological Society, Burlington House, Piccadilly, London W1**

History of Geology Group (HOGG), jointly with the Hydrogeological Group of the Geological Society and the Institution of Royal Engineers

Convenors: Ted Rose (ted.rose@virgin.net)  
John Mather (mather@jjgeology.eclipse.co.uk)

For programme, see pages 12-13 of this newsletter or visit  
[http://www.geolsoc.org.uk/gsl/groups/specialist/hogg/military\\_hydrogeology](http://www.geolsoc.org.uk/gsl/groups/specialist/hogg/military_hydrogeology)

Please complete this form, and mail it as soon as possible, together with a cheque payable to HOGG (drawn on a UK bank) for the appropriate registration fee (which includes cost of morning/afternoon refreshments but not lunch).

Overseas registrants may pay by credit/debit card using PayPal (NB You do not need to have a PayPal account yourself). Complete and return the form below, and a separate PayPal invoice will then be e mailed to you.

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To: Dr Edward P. F. Rose, 3 Stubbs Wood, Chesham Bois, Amersham, Bucks HP6 6EY, UK

I/we wish to register for the "Military Uses" meeting on 18 November 2009

Name(s).....

Address.....

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Postcode/Zip code/Country.....

E-mail .....

Telephone .....

Registration fee (by cheque payable to HOGG, herewith)

Members of HOGG, Hydro Group or Institution of Royal Engineers.....£20  
Others, not full-time students.....£30  
Students in full-time education..... £5

**Darwin the Geologist: His legacy**  
**23 November 2009**  
**Burlington House, London**



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**Registration Fees**

|                                        |          |  |  |
|----------------------------------------|----------|--|--|
| Fellow / Speaker / Corporate Affiliate | £45.00   |  |  |
| Non-Fellow                             | £60.00   |  |  |
| Retired/ student                       | £25.00   |  |  |
| <b>Total payable</b>                   | <b>£</b> |  |  |

**Payment Details**

I enclose a cheque for £ \_\_\_\_\_ made payable to the Geological Society  
 Please debit my Visa/Master/Amex/Switch card by the sum of £ \_\_\_\_\_  
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**General Information**

Full prepayment must accompany your registration form to guarantee a place. Student ID will be required. An email confirmation will be sent on receipt of your completed registration form. A VAT receipt may be issued on request.  
 Notification of cancellation must be given at least 10 working prior to the event for a refund to be given. **\*\* Please return this form to: Alys Hilbourne, Events Manager, Conference Office, The Geological Society, Burlington House, Piccadilly, London, W1J 0BG. Tel: +44 (0) 20 7434 9944 Fax: +44 (0) 20 7494 0579. Email: alys.hilbourne@geolsoc.org.uk**