

2010

JANUARY MEETING

At its January meeting Professor Selley of Imperial College gave a talk on 'Darwin, Dorking and the Wallace Mystery'. Introducing the speaker the President congratulated him and some 30 members and guests for struggling through the fog, slush and snow to attend the meeting.

The speaker began his talk by pointing out that both Darwin and Wallace would still be regarded as great scientists regardless of their discovery that evolution occurred by natural selection. Both made significant scientific contributions to geology and ecology. By the mid 19th century geologists had established that fossils occur in rocks in regular and predictable sequences that were similar all over the Earth. But the mechanism of evolution revealed by the fossil record was still open for debate. Darwin and Wallace independently stumbled on natural selection as the driving mechanism, though this was already well known and practiced by farmers, dog breeders and pigeon fanciers. Darwin spent most of his life at Down House, Downe, in Kent, but regularly visited Leith Hill Place, the home of his sister Caroline and brother-in-law Josiah Wedgwood. Indeed he used Leith Hill Place as a field station for his research into botany and into the role of earthworms in soil formation. He employed his nieces as field assistants. Three of Darwin's famous worm stones are still visible in an adjacent field.

When Russel Wallace returned from the Malay Peninsula in 1862 he continued his travels, renting a series of houses in the Home Counties. It had been well known that he occupied a house on Rose Hill between July 1876 and March 1878, but the exact house had been shrouded in mystery. Last year, however, eminent local historian and Darwinian guru Michèle Kohler correctly identified it as No 2, now renumbered Number 12.

A story that Darwin and Wallace shared a bottle of port in the White Horse before falling over in Dorking High Street is pure fantasy. There is no evidence that they actually met in Dorking. The talk was followed by a wide-ranging discussion of matters geological and theological. In closing the meeting the Chairman thanked the speaker for entertaining the audience with his characteristic mix of erudition and humour.



12 Rose Hill. The home of Russel Wallace between July 1876 and March 1878,

FEBRUARY MEETING

The MVGS Spring Soirée was attended by some 40 members and visitors. Two members gave presentations. Dr Doug Lester began with a talk on the energy resources of Iceland. In the penultimate century this had been based on indigenous low grade coal. In the early part of the last century this had largely been replaced by hydroelectric power. This took advantage of Iceland's rugged volcanic landscape and high rainfall. More recently Iceland has developed the use of hydrothermal energy. The island contains abundant geysers and geothermal boreholes. Though hydroelectric and geothermal energy are harnessed on an industrial scale, both energy resources are also exploited on a 'cottage industry' scale by low tech systems for individual homesteads, often oblivious to the health and safety regulations of more southerly states. Margaret Hargrave then gave a talk on her research into the geology of Tertiary sediments exposed during the excavation of a pond in Nower Wood Nature Reserve. She had meticulously recorded and sampled the rocks exposed and developed theories to explain the curious features that they displayed. Of particular interest was her discovery of degraded volcanic ash derived from Scottish volcanoes that were active some 60 million years ago.

MARCH MEETING

At its March meeting some 60 members and visitors heard a lecture on “Supercontinent – our once and future world” by Dr Ted Nield, of the Geological Society of London, and author of the best selling book of the same title. Dr Nield took it as a given that the audience was familiar with the ideas of continental drift and plate tectonics. His talk concentrated on the history of how the observations were made that lead to the development of these concepts. He showed how the European deductive scientific method led to the early acceptance of drifting continents, whereas the inductive American method held back US acceptance of the idea. He also told how physicists on both sides of the Atlantic derided continental drift as they could not conceive a mechanism, while empirical geologists, using their own eyes, accepted the evidence for plate movement. This may all sound terribly cerebral, but his talk was given with a light touch and abundant humour. Listeners were impressed by the evidence that sticks placed across the rifting crust in the Afar depression in Ethiopia vanish overnight down the crack between to two separating plates. Modern laser measurement shows that the Atlantic Ocean is widening by the rate at which one’s finger nails grow. A lively discussion followed the talk.

BOX HILL RIGS GROUP WALK

On 25th March four members of the Surrey RIGS Group (Regionally Important Geological Sites) were delighted to be joined at Ryker’s Car Park by 15 stalwart MVGS members who had braved the misty morning and grim forecast to join us for a Geo-Walk over Box Hill. This noble group sampled the fascinating swallow holes beside the Mole and the glutinous mud ascending the hill but were rewarded by the evidence of millions of years of changing environments as the mist lifted across the Weald. The different resulting geological beds provide Surrey with building stone, mineral wealth and agricultural opportunities. After a rainstorm, enriched with Napoleonic and World War history, we followed the Military Road to make our descent, thus ensuring that no-one slid on the wet chalk face into the Mole Gap. We parted at 3pm. Everyone agreed that it had been an enjoyable, interesting and friendly day.



The view from Box Hill

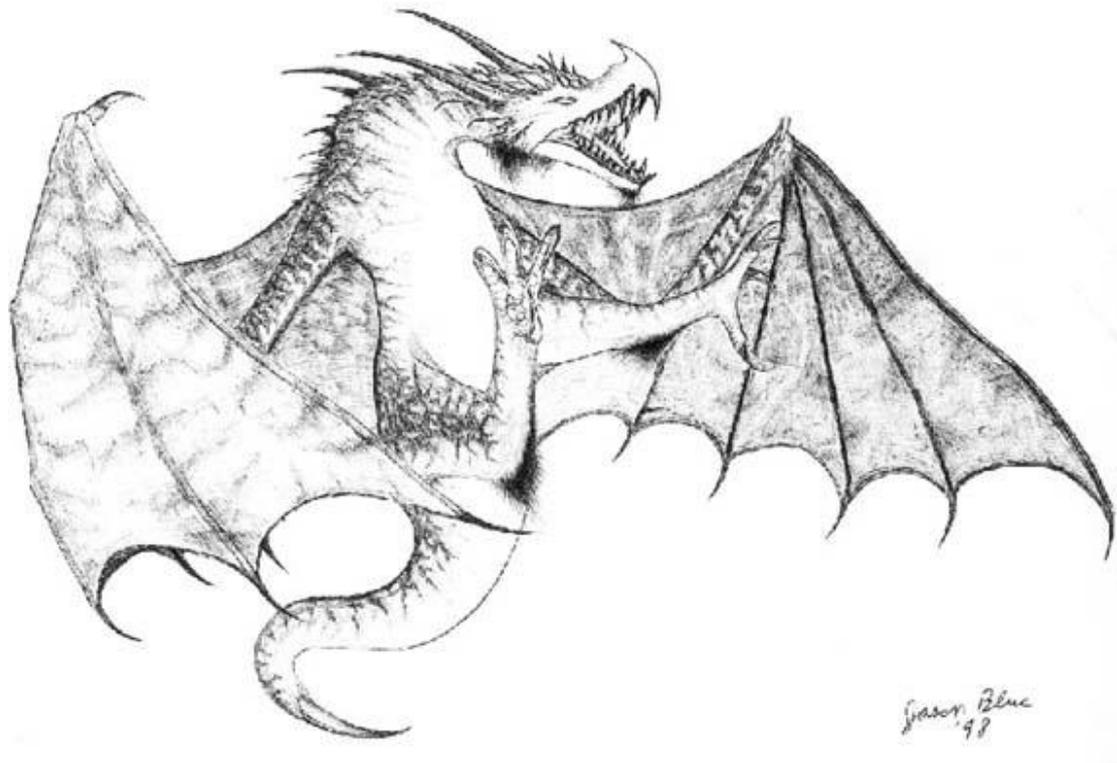
Let it never be said that geologists do not take their pleasures seriously

APRIL MEETING

At its April meeting some 55 members and visitors heard Professor Ian Jarvis of Kingston University give a lecture on ‘Chalk – The record of life & death in a hot house ocean’. Chalk is a familiar rock to dwellers in the Mole Valley as it is the limestone that forms the North Downs. Chalk has been of considerable economic importance by providing lime for the adjacent poor Wealden soils, and as a source of flint for building. For many years geologists thought of Chalk as a rather boring monotonously uniform rock. Chalk was noted, however, for its spectacular fossils such as those housed in Dorking Museum’s world class collection. Professor Jarvis showed how chalk is composed of nothing but fossil fragments, largely too small to be seen by the naked eye. Studies of these fossils and their geochemistry showed that they were deposited from a deep sea at a time when the planet was uniformly warm, such that there were no polar ice caps. High sea levels resulted in the flooding of most of the planet’s land surface. Carbon dioxide, a major green house gas, was as abundant in the Late Cretaceous atmosphere as it is today. In the Lower Chalk the white limestone is thinly inter-bedded with grey marls. Detailed measurements have been made of the thickness of the chalk: marl couplets. Statistical analyses of these data reveal regular episodic thickness fluctuations. These correspond to the Milankovitch cycles caused by cyclic variations in the Earth’s axis and orbit, cycles that are known to affect climate change today. The Chalk thus provides an ancient laboratory to study past climate change. Much may be learnt from it to understand modern climate change.

MAY MEETING

At its May meeting some 60 members and visitors heard a lecture on “The Folklore of fossils” by Dr Paul Taylor of the Natural History Museum, London. He began his talk by telling how fossils have been found in many prehistoric burials. This implied that even if early man did not know how fossils formed he believed them to have mystical and religious properties. In early Christian times many fossils were believed to have resulted from saints turning animals to stone. For example St Hilda of Whitby was famous for metamorphosing snakes into ammonites. Legends of dragons may have been based on dinosaur bones found in China. The legend of the wyvern may have been based on skulls of dinosaurs exhumed by erosion in the Gobi desert and tales of giants may have originated to explain huge bones of extinct elephants found around Euroland. Dr Taylor concluded his talk by describing how Siberian mammoths thawed out from Siberian permafrost were once believed to have been giant moles dazzled to death by the bright Arctic sunlight. This tale was much appreciated by members of the Mole Valley Geological Society and lead to a lively discussion.



Could the legendary Wyvern have been based on the sight of exhumed skeletons of dinosaurs exhumed in the Gobi Desert?

JUNE MEETING

At its June meeting some 50 members and visitors heard a talk on ‘Snowball Earth’ by Professor Philip Allen of Imperial College. He showed photographs of ancient glacial sedimentary rocks from around the world. They have been dated as deposited in two, possibly 3, major periods just before the explosion of life on Earth at the start of the Cambrian Period 540 million years ago, extending as far back as 850 million years ago. Geophysical measurements of these deposits show that many of them were deposited in equatorial latitudes. Thus it has been argued that these widespread deposits indicate that at times the whole planet, both continents and oceans, has been covered in snow and ice. The Earth was essentially a giant snowball moving through space. At that time only microbial life had evolved on the planet. Professor Allen said that though he began as a ‘true believer’ in the ‘Snowball Earth’ theory he now had many doubts about it. There were too many inconsistencies when the data were examined in detail. These related to the accuracy of measuring palaeo-latitude and the frequency of glacial advances and retreats. His talk led to a vigorous discussion centring largely on the accuracy of the data that suggested that the glacial deposits were deposited near the equator. Could they not just have formed in high latitudes, like the glacial deposits of the Arctic and Antarctic today? Most geologists now believe that the ‘Snowball Earth’ theory is out in the cold.

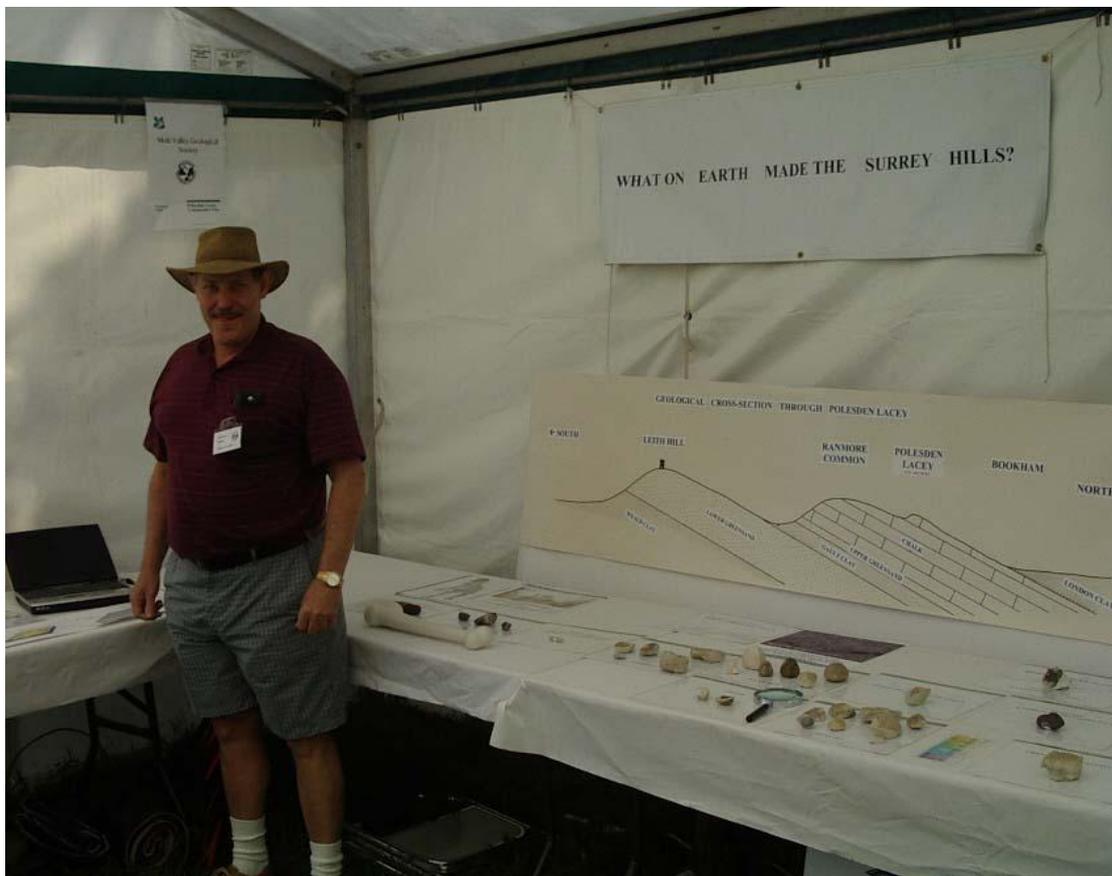


Could the Earth have once looked like this?

POLESDEN LACEY COMMUNITY DAY

What on Earth made the Surrey Hills?

On 13 June some 2,600 people attended Polesden Lacey's Community Day where the Mole Valley Geological Society put on an exhibition explaining the formation of the Surrey Hills. A large collection of local fossils were on parade, and children were fascinated by the display of Dorking's very own dinosaur, known to geologists as *Baryonyx walkeri*. Grown ups were introduced to the deep time during which the rocks of the Surrey Hills had been deposited, deformed and eroded to form the beautiful landscape that we enjoy today. The display also featured the natural resources of the Surrey Hills, including lime, sand, phosphate, clay, building stone, water, iron, fuller's earth, oil and gas. This mineral wealth has been exploited by the inhabitants of the Surrey Hills for over 2000 years.



Chas Cowie and exhibit awaits the crowds

JULY FIELD TRIP & PICNIC AT ST BARNABAS CHURCH, RANMORE COMMON

St Barnabas rocks!

On 25th July under the guidance of MVGS President Richard Selley over 30 members and guests studied the geology of St Barnabas Church on Ranmore Common. The church was designed by Sir George Gilbert Scott and built by George Cubitt, the First Baron Ashcombe in 1859. The church is now listed Grade 2*. The object of the visit was not to study architecture, however, but the amazing variety of rocks with which the church is built. The exterior is framed with Bath stone, a middle Jurassic limestone from the Cotswolds, and faced with flint cobbles. The flints are certainly not local and members mused that they could have come from as far away as the Chesil Beach in Dorset. The roof is covered with slate from Devon. Entering the church over a slab of Cornish granite one sees a font of Cornish serpentinite. Though the inside of the church is largely built of Bath and Portland limestones, there is extensive use of a wide range of ornamental stones including granite, sandstone, alabaster, and several types of marble. These rocks were brought to the site from all over England, and as far away as France and Italy.



The President pontificates.

After the tour members enjoyed the sunshine and one of St Barnabas' famous teas. These are available on Sunday afternoons throughout the summer.



MVGS members enjoy tea served by Sir Hugh & Lady Cubitt

Thereafter throughout the summer many MVGS members enjoyed field trips organised by the Farnham and West Sussex geological societies,

SEPTEMBER MEETING

September was a busy month for the MVGS. On the 9th some 50 members and guests heard Professor John Cosgrove of Imperial College give a talk on 'Mountains on the Move'. He began with illustrations of small scale experimental models that show how strata are folded and faulted. He then moved on to real examples seen in outcrops. He concluded by showing how the huge Zagros mountain chain of Iran was formed by the collision of the Arabian and Asian plates. Members were particularly impressed by seeing how salt flows up from deep beneath the mountains to erupt at the surface and flow down wadis like lava flows or glaciers.

SEPTEMBER HERITAGE WEEKEND EVENT

The MVGS always puts on an event for the Heritage Weekend. It was challenging to come up with a geological angle to fit this year's theme 'By George'. Nonetheless MVGS President Richard Selley gave a talk 'Dorking Caves: Before, during & after the Georgians'. This attracted an audience of 58. In his concluding vote of thanks the Chairman said that it was amazing that Dorking's famous South Street Caves remained closed, but he expressed delight that MVGS Council had graciously allowed them to re-open for the Heritage Weekend. MVGS members served as Cave Guides on both Saturday and Sunday.

WAVERLEY JURASSIC COAST CRUISE

Two years ago some 30 MVGS members went of the Cretaceous Coast Cruise around the Isle of Wight on the paddle steamer *Waverley*.



The Cretaceous chalk cliffs of Ballard Down in the foreground and the Tertiary sands & clays of Bournemouth in the distance. The *Waverley* provides the scale.

The week after the Heritage Weekend a small but intrepid and enthusiastic group of MVGS members studied the World Heritage Site of the Jurassic Coast from the deck of the paddle steamer *Waverley* as she cruised from Portsmouth Harbour to Lulworth Cove and back. Sadly the weather was not too fine and the ship had to keep well out from the coast to avoid being hit by stray shells from the army firing range. Nonetheless the cruise was an excellent way to view the coast from a different perspective that a conventional onshore field trip.



**Dark grey Kimmeridge Clay overlain by Portland Sands & Portland Limestone.
St Albans Head.**

OCTOBER ANNUAL GENERAL MEETING AND DINNER

The Annual General Meeting of the Mole Valley Geological Society was attended by some 50 of its 73 members. The Committee reported that in the last year the society had held monthly lectures on topics as varied as ‘Snowball Earth’ and ‘The Folklore of Fossils’. It had arranged an exhibition on ‘What on Earth made the Surrey Hills?’ at Polesden Lacey, and had organised excursions to study the geology of St Barnabas Church on Ranmore Common, and an epic cruise to study the Jurassic Coast of Dorset on the paddle steamer Waverley. A full report of the previous year had been circulated to members with the agenda papers.

Founding members, and long time supporters of the MVGS Jim Dalmon, Natasha Claridge and James Crawford were elected Honorary Members. The accounts were approved and a modest subscription increase agreed.

After some items of Any Other Business a couple of dozen members adjourned to VIVA for the Annual Dinner. This provided a jolly conclusion to the MVGS year.

NOVEMBER MEETING

At its November meeting some 50 members, together with visitors, including several astronomers, were entertained, and educated when Professor Hillary Downes of Birbeck College lectured on 'How to make & break an asteroid'. Professor Downes described how asteroids are left over material from the creation of the Solar System some 4.5 billion years ago. They can tell us much about how planetary bodies formed. Most asteroids orbit around the sun in a belt between Mars & Jupiter. Some asteroids, however, have eccentric orbits that intersect that of the Earth. When asteroids strike Earth they are termed meteorites.

Prof Downes has worked at the Johnson Space Centre in Houston, Texas. She has access to some 36 000 meteorites and also samples from the lunar missions. Professor Downes was particularly interested meteorites termed ureilites, which are believed to have been part of the superficial mantle of another planet. Ureilites are stony (rather than metallic) meteorites that contain the minerals olivine, pyroxene, various metals and carbon, both in the form of graphite, but sometimes diamond. Many ureilites exhibit shock features resulting from impact with other rocky bodies. Radiometric dates show that they are the same age as the creation of the Solar System.

Professor Downes concluded that ureilites were formed from the destruction of a single parent planet, and resulted from the partial melting of its mantle. On top of this they were also disrupted by subsequent 'hit-and-run' impacts.

DECEMBER MEETING

This was to have been the traditional Christmas Soirée with member's micro-lecturettes and mince pies. Sadly it had to be abandoned due to heavy snow.