

## Home Counties North Regional Group

### Newsletter - Issue No. 6 – June 2018

WELCOME to the sixth edition of the Newsletter of the Home Counties North Regional Group. The bulk of this newsletter was prepared by the past chair to present a brief overview of activities during 2017 and look forward to a full programme of events in 2018 with the hope you will find subjects to interest you and attend the events. I have made little change to that section but have added reports from earlier meetings and reports received since the draft was prepared. Unfortunately, it has taken me longer than expected, for which, my apologies. At the January AGM, there were major changes to the Committee with the resignation of the Chair, Secretary and Treasurer, to whom thanks are due for their sterling service. There were no nominations for the Chair but Rudy Domzalski was elected as Secretary and Mick McCullough as Treasurer. At the first Committee Meeting, John Wong offered to take over the chair, which was accepted by the Committee.

#### HCNRG Officers 2018

**Chair: John Wong** has a BSc in Geology (University of London) and MSc in Analysis of Geoscience



Data, including computer modelling (Kingston University). He also studied Masters degrees in Petroleum Geology and Geophysics at Greenwich University and Sedimentology at University of London. John has worked in the oil and gas industry as Development Geologist and Consultant Geoscientist. He is the Field Officer for the Amateur Geological Society (AGS, based in Finchley, north London) since 2007 and has organised/led more than 80 monthly field trips for that group and he was the Events Organiser for the Bedfordshire Geology Group from 2008 to 2010. John has a passion for vertebrate palaeontology; and geoarchaeology of Hertfordshire and medieval battlefield geology are amongst his many leisure research interests in geology.

**Secretary: Rudy Domzalski** is a geophysicist with experience in archaeology as well as the



petroleum industry. He started his career as an archaeologist excavating and applying geophysical surveys on sites in the UK. Following further studies at UCL and Imperial College he became a Petroleum Geophysicist where he processed seismic maps for oil and gas exploration. He keeps his knowledge of Geology and Geophysics up to date by going on fieldtrips and conferences around the world

**Treasurer: Michael McCullough** got his M Phil from Camborne School of Mines in 1976. He is

a Chartered geologist, scrutineer and Chartership Committee member. He has worked for Wimpey Laboratories as a field geophysicist, Exploration Consultants, Pentex and Marathon Oil as Senior Geophysicist in the oil industry and as consultant senior geophysicist since 1995 for both seismic interpretation and client representative on VSP and site surveys. During downturns in the oil industry, he has been an associate of M & M Geophysical for geotechnical geophysics and part owner of Blue Diamond Drilling, a geotechnical drilling company and spent several years as second driller and site geologist.

**Sarah Smart** remains on the Committee as Web administrator, as does Matthew Rust as Lectures coordinator and **Karoly Pesztranszki** was co-opted in May as Publicity Coordinator,

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## Note from the former Chair.

Firstly, thank you for your support for the Home Counties Regional Geology Group. A big thank you goes to our committee and of course all our speakers and event hosts for giving up their time in promoting geoscience.



From a personal note, it seems to me that geoscience appears to be a dwindling subject and we are doing our best to keep the flames alive. With the introduction of new codes of practice amongst the industry and a greater need for professional qualification and CPD, it is somewhat surprising that attendances to our events have been extremely variable. Whilst we endeavour to provide lectures and field trips relevant across the geoscience disciplines, we would always welcome attendance to our events and we urge professional practitioners to support your local group and encourage younger/newer members and staff to attend our events. We appreciate distance and time is pressured, but we would always welcome new suggestions and places to host events if you feel you are missing out. Earlier we sent out a questionnaire to over 700 members on our mailing list. Whilst we only had a 10% response, we are endeavouring to address the comments made and make the group accessible and appealing to everyone.

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Lectures this year have been on a variety of subjects, some very thought provoking and certainly highlighting the need for geoscientists. We have had talks on elements of the oil industry, geology which goes into mobile phones, contamination and scour hollows in the London Basin. This year has seen the introduction of Quiz evenings held at St Albans Museum which have been a hugely enjoyable and more teams are welcome for our forthcoming quiz nights in 2018. A guided tour of the British Geological Survey was a highlight of our year which is something I would recommend to everyone.

We have struggled with members for our committee this year but despite this, we have managed to host a continuum of events. Whilst we had no participants of the Early Career Geologist Award, we hosted the regional Schools Geology Challenge with a School from our Regional Group finishing 3<sup>rd</sup> in the national finals. We have entrants this year for both events and wish them well in the competitions.

Our accounts maintain a reasonable balance to allow us to host and fund the forthcoming events. The group is largely funded by the Geological Society but we are also assisted by various sponsors who provide financial and venue services. Thank you to all those people/organisations. Indeed, if you can provide a venue or would like to sponsor an event please get in touch.

Overleaf are our reports on the events we have hosted and hope you will read with interest. You will find our program of events for 2018 at the back of this report and we hope to see you at the lectures/field meetings. If you have a desire to get involved and can spare a few hours a month, then please get in touch as we are always looking for new committee members. We would also like to hear from you if you can help promote the group and encourage attendance to our meetings through contact you may have. Don't forget, the meetings are open to everyone with an interest and you do not need to be a member of the Geological Society. Nearly all our events are free of charge and we provide food and beverages at selected events.

Best Wishes for 2018 and welcome to our new committee.

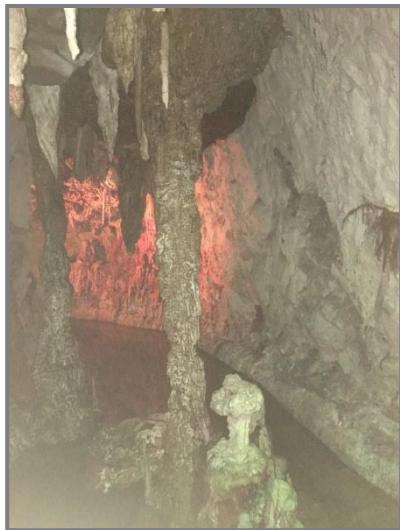
Stuart Wagstaff [Former Chair; Home Counties Regional Geology Group]

## Meetings of the Home Counties North Regional Group

### 2016

#### 1. Soil Consultants Ltd, High Wycombe, Hellfire Caves and St Lawrence Church, West Wycombe John Wong - 15 July 2016

The Soil Consultants office in Holmer Green was the first stop on our field trip, where Stuart Wagstaff (Director of Soil Consultants Ltd) hosted an enlightening seminar about the geology of 'The London Basin'. Stuart began his presentation with a breakdown of the history and origin of the London Basin. The presentation broke down the geological strata from the oldest deposits to the youngest discussing their geotechnical properties and how the soils have shaped the City of London at the present day. Stuart supplemented his enlightening presentation with soil samples that the participants could manually handle and observe.



the cave, where the Chalk changed from Lewes Nodular Chalk to Turonian New Pit Chalk. This was distinguished by being without flints and with a more massive lithology.

The caves had been carved through the chalk hillside by hand during the 18th Century and provided chalk rock for road stone during one of many agricultural recessions. This provided a means for Sir Francis Dashwood (the Chancellor of the Exchequer at the time) to maintain basic employment of his farm workers and improve the access to West Wycombe from High Wycombe cheaply. The network of man-made passages extends a quarter of a mile into the hill-side from which the group stumbled across ten individual caves. Aside from the chalk geology, the colourful history of the Caves was transcribed on the winding passage walls with animated scenes depicting the famous Hell Fire Club events.

After the tour through the caves the group ascended to the top of the hill acknowledging the changes within the chalk grades from the Middle Chalk at the cave entrance through to the Upper Chalk near the Dashwood Mausoleum and the Saint Lawrence Church. As the group reached the summit they were hit by the majestic structure of the Dashwood Mausoleum, although not allowed entry; the flint façade and the pillars could be seen prominently sticking out of the landscape with great views towards the east across High Wycombe and further.

The next stop was the Saint Lawrence Church and its grounds, this Church was a superb structure, constructed with the local flints provided from the Middle and Upper Chalk beneath our feet.

Unfortunately the church is only open for viewing on a Sunday and the group could not view the impressive interior. The church tower is topped by a large, gold painted wooden ball, the design thought to be based on the Custom's House in Venice. There was accommodation for six people within the ball, which gave spectacular views and on a clear day west London could be seen on the horizon. Entry to the ball is not allowed any more on safety grounds. St Lawrence's church was known locally as the 'summer' church, as there was no road to it until 1928 and no electricity until the 1970's and the summer was the time of the year when people could climb up to and access the church.



considered glacial erratics. At this point, a number of the group had to leave the geological party.

The remains of the group then travelled down to Bradenham another 1.5 miles north-westerly along the A4010 towards Princes Risborough from St Lawrence's church, where more Buckinghamshire puddingstone could be seen.



Blocks of the stone have been recently used to mark out the road edge and village green. Again, it is still thought that these blocks were glacial erratics not local to the area but brought in by early man and used as way markers. Again, analysis of the contents of the stone suggests more angular flint content and a more local source.

At Bradenham is St Botolph's church, where lumps of puddingstone have been used as bricks in the church construction. Puddingstones were thought to have

magical properties and were worshipped by pagans and country folk. In 601 AD Pope Gregory I decreed that pagan stones could be sanctified by incorporating them into church structures. Hence their inclusion and an interesting exercise in finding puddingstones included in exterior, older church walls. This has been a theme of many church visits in this region on HCNRG field trips.

I would like to thank John Wong for leading the trip and providing his invaluable knowledge and also Stuart Wagstaff & Soil Consultants for their presentation and insight into the London Basin and its geotechnical properties.

**Report by Matthew Rust & Mick McCullough**

## Thursday 22 September 2016

### 5. Double event and curry night

At the Home Counties North Regional Group meeting at Sir Robert McAlpine in Hemel Hempstead, 27 people enjoyed a curry then heard Owen Green of the University of Oxford on **Colouring the landscape: the extraordinary life of William Smith and the birth of a science**, followed, after a short break, by Tim Atkinson of University College London on **The ripple effect: geological adventures underground in Java**.

### **Colouring the landscape: the extraordinary life of William Smith and the birth of a science**

**Owen Green**

**THE SPEAKER:** Owen Green has worked in the Earth Science Department at the University of Oxford since 1989. Prior to moving to Oxford he was Curator of Geological Collections at Goldsmith's College, University of London. At Oxford he helped establish the Palaeobiology Laboratories and supported the research of staff, including the late Martin Brasier, and was co-author on a number of papers, most notably the contextual studies on the world's oldest (3.5 billion years old) putative fossils from the Archaean of Western Australia. Other diverse research includes a study of the last shallow marine carbonate-platform foraminifera of the Tethyan Ocean recorded in rocks from the NW Himalayas 50.5 million years ago as India crashed into Asia, Neoproterozoic agglutinated foraminifera from NW Europe (Avalonia and Baltica), seasonal growth and development of the flightless New Zealand moa, the formation of gas hydrates during the early Toarcian oceanic anoxic event, and historical studies of the Swedish explorer Sven Hedin and William Smith. Developing palaeobiological sample techniques culminated in the publication of *A manual of Practical Laboratory and Field Techniques in Palaeobiology* (2001). Owen is currently a member of both the Engineering and Physical Sciences and Outreach Committees of the Royal Microscopical Society, has been a co-convenor of the RMS supported Geo-materials meeting (September 2014), has organised Outreach events on volcanoes and mountain building as well as being a member of the Learning Zone team at the bi-annual RMS Microscience Microscopy Conference and an occasional contributor to the Society's newsletter *Infocus*. He is currently Chair of the Oxfordshire Geology Trust, the geo-conservation charity promoting geology to the general public, and has served as a committee member for the Geological Curators Group.



**ABSTRACT:** *This presentation will put into context the life and work of William Smith, the author of the first geological map of England, Wales and part of Scotland. It will examine aspects of life in Britain at the time of his birth in the mid-18<sup>th</sup> century and his influence and legacy to subsequent generations of geologists. Smith was born in 1769 in the small West Oxfordshire village of Churchill, the son of a local blacksmith. His birth coincided with the start of the industrial revolution and an important time during the agricultural revolution. This was all against an intermittent back-drop of war against the 'old enemy', France, and the rise of the British Empire with a social and economic system still evident today. Following a basic education at the village school and time spent on his uncle's farm in the nearby village of Over Norton, Smith became an assistant to a land surveyor from Stow-on-the-Wold in 1787. Sent on assignment to Somerset, there is evidence that he was introduced to the work of a local pioneer 'geologist'. Remaining in the area, his geological knowledge and understanding of the relationship and surface expression of strata and its distribution and attitude below the surface was further increased. He also recognised the value of fossil remains present within the rocks and that when seen the sedimentary layers always occurred in a particular order. A tour of the country for the Somerset Coal Canal Company allowed Smith to examine engineering structures, methods of land drainage, and by being lowered down mine shafts the examination of the*

attitude of sub-surface strata. Following his dismissal from the Somerset Coal Canal in April 1799, Smith spent the rest of his working life seeking employment as a mineral surveyor, land drainer or sea-defence engineer and collecting information to support his thoughts on the value of fossils and for his great map. The map, coloured to depict the extent of different rock types, first published in 1815, was a work of genius and provided a legacy that supports many sub-disciplines of the science of geology.

## Introduction

The speaker aimed to put William Smith's life in its context noting the 200 years between 2 significant dates, 1 August 1815, when Smith's map was initially published, and 18 December 2015 when Britain's last deep coal mine, Kellingley Colliery, closed. A comparison of Smith's map with the BGS current map shows they are very similar and Smith's colour schemes largely remain and his life and work have been the subject of a number of books, including Simon Winchester's *The map that changed the world* (2001), John L. Morton's *Strata: the wonderful life story of William Smith, the father of English geology* (2001) and John Phillips' *Biography of William Smith* (1844). The portrait in the Geological Society shows Smith at the age of 68 upon appointment to the Commission to select stone for Westminster Abbey.

## William Smith and life in the 18<sup>th</sup> and 19<sup>th</sup> centuries

Smith was born at the start of the industrial and commercial revolution with the first working automobile, a steam tractor being developed in 1769, Captain Cook sailing to New Zealand, Watt patenting his improved steam engine and Arkwright developing his spinning frame. It was also a time of agricultural change with the Act of Enclosure the development of land drains and reclamation, the introduction of crop rotation, new fertilisers and mechanisation. Coupled with all this were the wars with France, the development of canals, enclosure acts and the development of road infrastructure. Life in 18<sup>th</sup> century England changed significantly with the population growing from 6.5M to 9M by the 19<sup>th</sup> century and the growth of towns and urban areas. There were also significant advances in medicine, science and the arts.



Smith was born on 3 March 1769 in ~Churchill, Oxfordshire, the eldest son of the village blacksmith. His father died in 1777 and in 1779 his mother married Robert Gardner. The site of the house where he was born now has a plaque in York Stone. He would go fossil collecting at his uncle's farm, collecting pundibs (brachiopods) and pound stones (echinoderms), so-called because they were used to weigh out butter.

He left school at the age of 11 in 1780, having had a rudimentary education and in 1787 was engaged by Edward Webb (1751-1828) of Stow on the Wold as an assistant to survey estates. In 1788, Warren Hastings (1732-1818), the first Governor General of India, repurchased 650 acres of his paternal family home at Daylesford for £11,000 and had the gardens landscaped by John Davenport and the grounds by Edward Webb, with Smith doing the survey. Inspired by John Strachey (1671-1743) who had an estate at Sutton Court, 8 miles from Bath, he set out notions of the regularity of strata in coal mines and recognised that strata were dipping towards the east.

In 1794, he was appointed Superintending surveyor and resident engineer on the Somerset Coal Canal and accompanied by Samborne Palmer and Richard Perkins of the Canal Committee with whom he made a 900-mile tour of England inspecting canals and mines. He set out his thoughts on the use of fossils in stratigraphy at the Swan Inn, Dunkerton, having recognised the importance of fossils, which had previously been regarded only as curios. In 1798, he bought Tucking Mill House, though the plaque commemorating this is actually on the wrong building and, in 1799 he was employed as an adviser on drainage and irrigation.

He dictated lists of strata to his friends the Reverend Joseph Townsend and the Reverend Benjamin Richardson and produces his first geological map in 1799, a tourist map of Bath, on which he coloured

the oolite yellow, the Lias blue and the Triassic red. In 1800, he was employed by Thomas Coke of Holkham Hall and in 1801 by the Duke of Bedford. Also in 1801, he issued a prospectus of his proposed work on strata and 2 coloured maps of England and Wales showing the principal strata.

From 1802-07 he lived in Norwich. In 1802 he rented an office in Bath and formed a land survey partnership with Jeremiah Cruse. From 1804 to 1819, he leased a property in Buckingham Street, London, the site of which is now marked by a plaque. In 1812-14, for his base map, he enlisted the help of John Cary (1754-1835), a land map engraver and publisher.

In 1815 he completed his map, exhibiting it in London and being given a 50-guinea award from the Society for the Encouragement of Arts, Manufacture and Commerce. It showed 23 strata in 21 colours. By January 1816 he had 200 copies of the map and accompanying memoir. The map was published on 15 sheets with the 51-page memoir as a travelling set and in rolled form. The table of organised fossils was published in 3 parts, 1 and 2 in 1816 and 3 in 1817 and, in 1818 Smith's fossil collection was bought by the British Museum. In 1819, he published 5 cross-sections and 21 county maps were produced between 1819 and 1824. George Bellas Greenough, first President of the Geological Society, from 1807 to 1813, published his own rival geological map, initially not acknowledging any contribution from Smith, in 1819.

Smith spent 10 weeks in the King's Bench Prison, Southwark for debt in 1819 and was forced to leave London and moved to Yorkshire. He published his second map in 1820, split into sections, mounted on card and folded. Assisted by his nephew, John Phillips, he made a lecture tour of several Yorkshire towns. He designed the Rotunda in Scarborough to house his third fossil collection. John Phillips (1800-74) accompanied Smith on his tour of northern England in 1820-24, published his *Geology of Yorkshire's coast* in 1829 and his *Memoirs of William Smith* in 1844.

Smith was finally recognised by the Geological Society in the award of the Wollaston Medal in 1832. He was awarded an Honorary LL.D. from Trinity College Dublin and was appointed to the Committee to find building stones for The Houses of Parliament. In 1839, he caught a chill near Northampton and died aged 70 on 28 August. He is buried in St Peter's Church, Northampton, the only grave in the graveyard.

His legacy is recognised in the Churchill and Sarsden Heritage Centre with a monument erected in the village in 1891. His brother and sister are buried in the churchyard at Churchill. There are busts of Smith in the museums at Oxford, Churchill and Northampton. His portrait hangs in the Geological Society, along with his map alongside the modern BGS map, his silhouette adorns the logo of the Society's Engineering Group and he is recognised in the William Smith Medal and William Smith Award and the William Smith meetings. There is a crater on Mars named after him. Useful links on the internet include [www.williamsmithonline](http://www.williamsmithonline.com) and [www.strat-smith.com](http://www.strat-smith.com).

**Report by Dave Brook**

## **The ripple effect: geological adventures underground in Java**

**Tim Atkinson**

**THE SPEAKER:** Tim Atkinson graduated in Geology in 1968, PhD in 1973, both from Bristol University. He is a Chartered Geologist and has spent a lengthy career in university-based research and teaching, with interests in hydrogeology, geochemistry, Quaternary geology and palaeo-climates, and geomorphology, with over 100 publications on these and other topics. He has had a lifelong interest in caves and speleology and his current research is on how to interpret past climate from the geochemistry of stalagmites and other cave deposits, mainly in Britain and Gibraltar. He is now a Principal Research Associate at University College London, where he was formerly Professor of Environmental Geoscience.



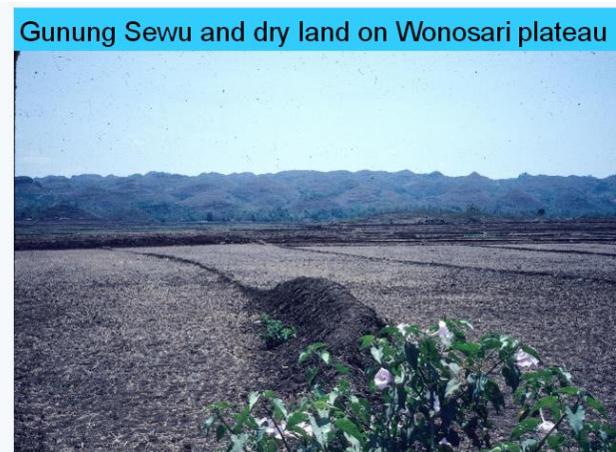
**ABSTRACT:** *In 1982 five caver-geologists undertook a survey of caves and water resources in an impoverished karstic limestone area of south Java known as Gunung Sewu – the Thousand Hills. The results were impressive, but little development took place until after a major change of*

government in Indonesia in 1998-2000. This opened the way to a regional partnership between the Sultanate of Yogyakarta and the German province of Baden-Wurttemberg. New water abstractions were developed including an innovative hydro-mechanical design pumping water from a cave river through a 140m head to a distribution network serving 80,000 people. The talk will concentrate on the 1982 Gunung Sewu Cave Survey and will conclude with the return by two of the participants to Gunung Sewu in 2014.

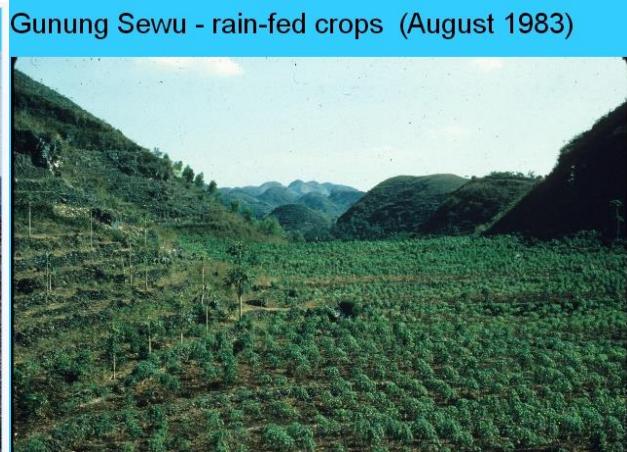
## Introduction

The title of this talk arises from the observation by the speaker that sometimes things you do have an effect without you being aware of it.

In 1982, he was part of a team of 5 put together by Tony Waltham who had been approached by Macdonalds for a water resource survey in Java. The aim was to investigate cave systems between the Merapi volcano and the coast, just south of the city of Yogyakarta, which was briefly the capital of Indonesia at the time of independence. The coastal area of Gunung Sewu (1,000 hills) is a classic karst region with conical hills separated by blind valleys and closed depressions (cone karst or egg-box topography) with all the water underground. There are thin soils on the hills but fertile soils in the valleys of volcanic ash but the area suffers severe water shortages. Inland of this, to the north of the cone karst, the Wonosari Plateau has some rivers and streams on the chalky lagoonal limestone. Some areas had only dry season shortages, while others had shortages all year, with journeys on foot carrying spring, pond or cave water home of longer than 7.5km (5-mile round trip).



Gunung Sewu and dry land on Wonosari plateau

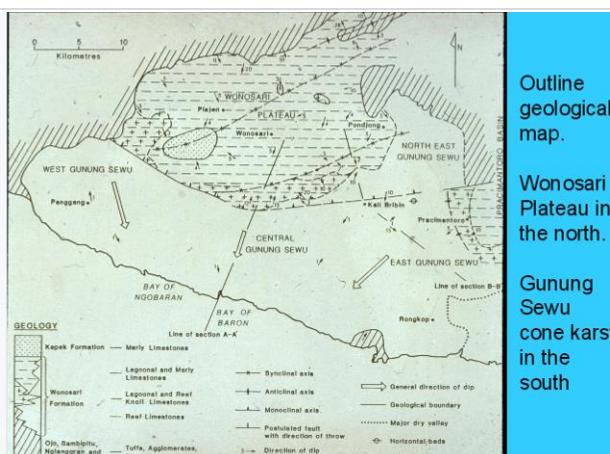
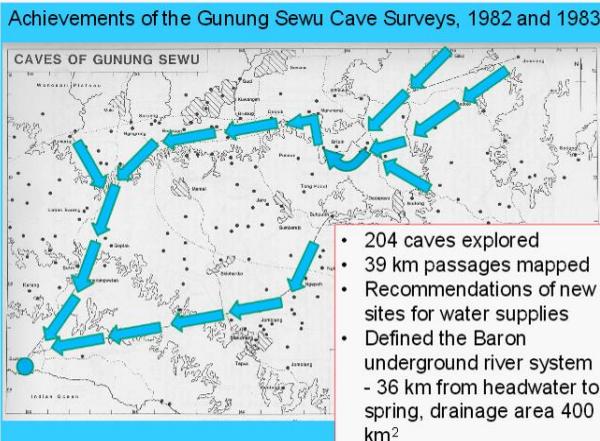


Gunung Sewu - rain-fed crops (August 1983)

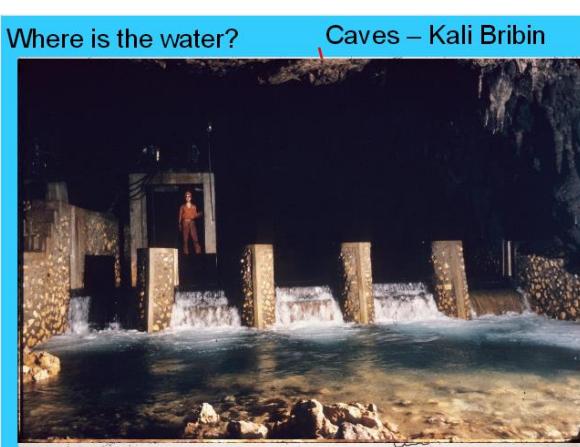
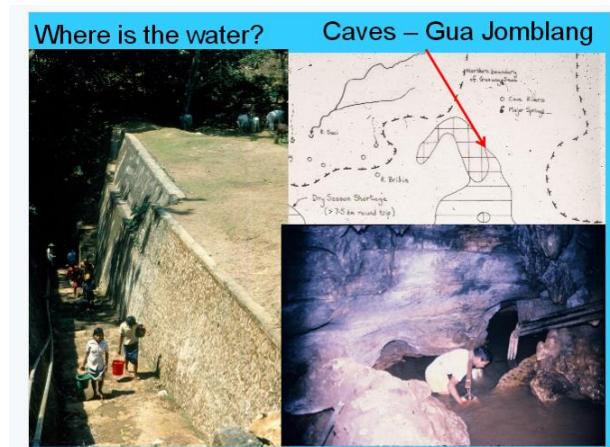
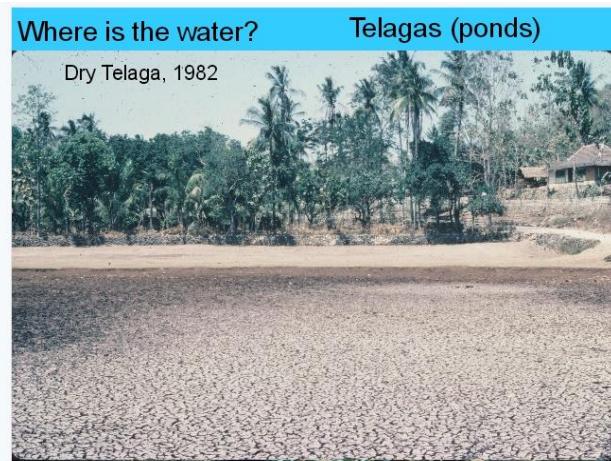
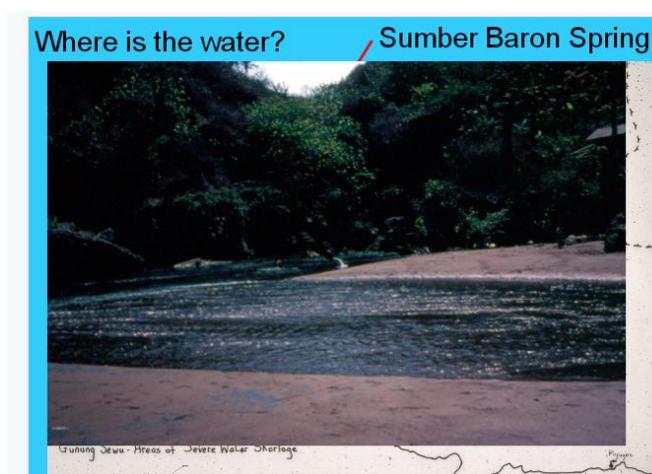
The *Gunung Sewu cave survey report* was written by Tony Waltham, Andy Eavis, Pete Smart, Hans Friedrich and Tim Atkinson as a contribution to the Greater Yogyakarta groundwater reserves project. A second team in 1983 comprised Dick Wells, Colin Boothroyd, Nigel Briggs and Mas Sudiyono, who had been a liaison officer the previous year and was now a strong caver. The team's skills were in cave exploration and surveying, geology and hydrogeology. They flew into Indonesia but knew nothing about the country they were flying into.

## The cave survey

Achievements in 1982-83 included 204 caves explored with 39km of passages mapped and recommendations made for new sites for water supply, the definition of the Baron underground river system extending 36km and draining an area of 400km<sup>2</sup> and the production of an outline geological map. The team found non-karst areas to be highly cultivated with 2 or 3 crops per year; from the Gunung Kidul escarpment to the Wonosari Plateau was dry land and there were rain-fed crops in the Gunung Sewu valleys. Houses had rainwater tanks but ran out in the dry season; cattle were the mainstay of wealth and status and were stall-fed and other industries included tile manufacture.



Current water sources include the Sumber Baron spring on the coast with a 4m<sup>3</sup>/sec flow. A second source are the Telagas (ponds), some of which are artificial but others naturally occurring due to volcanic clays supporting a perched water table. Perennial telagas have fishing poles and are used by cattle but many dry up and the water is not healthy drinking water. A third source is the caves, such as the Kali Bribin, which has a 1.25m<sup>3</sup>/sec river flow and a roof covered with MnO<sub>2</sub> deposits in stalactites. A barrage had been installed with pumping to a nearby hill for distribution from standpipes but it was powered by diesel generators and the money ran out.



The aims of the cave survey were:

- To explore and map the caves to find water supplies;
- To use dye tracing to establish connections and identify regional flow paths; and
- To measure discharges, identify catchment areas and potential pollution from surface inlets.

The speaker then took us on a tour of the underground cave system. The Baron system has a very big cave at Sing Gilap with a stream passage at the bottom of a steep slope, in which hydraulic ram to raise water did not work well; it has 4 or 500m of upstream passage. A little downstream is the Gua Jomblang then further downstream is the Kali Bribin, which has a flow of 0.5-0.75m<sup>3</sup>/sec. Gua Sudong is a tributary cave downstream, which has no shafts but descends steadily to saturation level, with a canyon section cutting through limestone and volcanic mudstone. At Gua Sudong (Dadapaya), the team used a magnetic location device to locate the pool in the cave but it did not work very well with its 30m depth limit. The wet season water level is several metres higher than the dry season level. Gua Bribin has a barrage requiring 1.5km of swimming upstream.

At Kali Suci, the stream goes underground in a blind canyon on at the southern edge of the Wonosari plateau. There is a 60m high shaft entrance to a second set of caves after a level flooded section, from which the river tumbles steeply down to sea level. The canyon ends at saturation level 20m above sea level but 14km from the sea. Discharge is 160m<sup>3</sup>/sec at the entrance, 385m<sup>3</sup>/sec at the start of the flooded section and 680m<sup>3</sup>/sec at the second set of caves. Luwang Ceblok has a pool at saturation level 50m above sea level. It is a drilling target for a larger water supply, where Wonosari Plateau water spills over from one aquifer to another. Gua Lebak Bareng has a 140m shaft at the bottom of karst valleys. It is the deepest cave at 200m with saturation at 75m above sea level. Its flow has been traced to the Baron spring, taking 16 days to travel 16 kilometres, ie a speed of ~1 km/day.

The Gunung Sewu cave survey successfully demonstrated the size of the resource, combining records of rainfall and evaporation with measurements of spring and cave river discharge to estimate storage volumes and an approximate water balance for the 400km<sup>2</sup> Baron catchment. It also resulted in the founding by Mas Sudiyono of the Acintyacunyata Speleological Club, Java's oldest caving club.

## Aftermath

In 2014, the speaker returned to Java with Andy Eavis and saw the developments that had taken place following the 2003 devolution of taxation and financial powers to the regions. The Karlsruhe Institute of Technology, working with the regional government had developed a new water supply based on the cave survey, which was serving 81,000 people. The Gua Bribin cave had been dammed to the roof where the previous dam had been to create a 15-20m head as the manganese deposits indicated the cave would hold water. Mechanical turbines were installed to provide mechanical drive to the pumps to raise the water 140m for distribution.

Photographs in slides from the lecture were taken by Andy Eavis, Tony Waltham, Dick Willis and Tim Atkinson.



The headworks of the Sindon Well, 22 September 2014.

**Report by Dave Brook**

## How will minerals feed the world in 2050

**David Manning**

At the Home Counties North Regional Group meeting at Affinity Water in Hatfield, 13 people heard David Manning of Newcastle University and past-president of the Geological Society, talk on **How will minerals feed the world in 2050**.

The speaker emphasised that we need to work with nature to feed the world in which the population is growing, though now at a declining rate. Global population reached 7 Billion in 2012 and is expected to reach 9B in 2050, with Africa doubling its population to 2B over the same period. Population needs mineral resources; gross domestic product correlates with mineral use, particularly construction minerals, and fertiliser minerals are very important. Indeed, mined fertilisers are absolutely essential to support human life since when we remove a crop we effectively mine nutrients from the soil. When we buy food from the supermarkets we are buying nutrients but when we import foodstuffs do we pay enough to replace the nutrients? The price of fertilisers has boomed (and bust), with the price of nitrogen and phosphorus following the oil price, though potassium does not do so.

Phosphate rock is tied in to the post-war agricultural revolution. 16 countries produce 95% of world output (159M tonnes) with China dominant. Other possible sources include apatite and struvite – artificial phosphates from waste treatment. Predictions of peak phosphorus have been made based on analogy with the peak oil concept but they do not take account of the enormous reserves (unlike oil). There are 1,600 known phosphorous mines (extinct, dormant and active) with 3-400 years of reserves and 1,800 years of resources. The peak phosphorus prediction was made before the definition of reserves changed and this resulted in a tripling of reserves. However, we throw phosphorus away all the time and phosphorus pollution is a major issue. We need to act more sustainably, eg by using sewage as a source of phosphorus.

Potash and silica are both significant parts of the dry mass of plants. Both occur in some silicate minerals though their behaviour contrasts geochemically. Potash is about 1% of dry mass, silica up to 10% in rice and 1% in sugar cane. The value of offtake potash has to be added to replace that removed by crops. If not, the nutrient is mined from the soil. 10 tonnes of sugar cane require 100kg K<sub>2</sub>O, costing \$50 to replace.

The UK eats 1M tonnes of bananas per year requiring £1M worth of potash and grows 6M tonnes of potatoes in a good year, requiring £6M worth of potash. Potash demand is such that worldwide potash mine production needs to double to balance present-day offtake. The wealthy countries do not mine the soil, offtake is replaced by fertilisers but in Africa only 10% of the offtake is going back as fertilisers. Africa consumes less than 485,000tpa, with 47 out of 57 countries buying no potash fertiliser and 1.5% of the world's potash production feeds 15% of the world's population.

12 countries produce 99% of world potash production, (33.5M tonnes K<sub>2</sub>O equivalent), dominated by Canada with 30% and there are 10Gtonnes of resources with a projected life of 40 years. The current price is high as the demand in terms of need is high and with production limited to a small number of countries it is a seller's market. World production needs to double and supplies control the market, with 90% of the reserves in North America.

Potash production in the North York Moors National Park started with Cleveland Potash in 1969 and York Potash, which was bought by Sirius and has recently had Australian investment is starting now. All the critical gear will be underground.

### **The challenge**

There are questions as to whether conventional products will be accessible to growing populations and we need to consider how we can use knowledge of geological/soil processes to fill the gap. Alternatives could include potassium salts - sylvite, carnallite and polyhalite with 63%, 17% and 16% K<sub>2</sub>O respectively - and potassium silicates – alkali feldspars, leucite, nepheline and micas with 17%, 21%, 15% and 11% K<sub>2</sub>O respectively.

Feldspars have been examined as a potential source of potash in the past. They are the commonest rock-forming mineral in the earth's crust and weather to form clays – kaolinite +(SiO<sub>4</sub>)<sub>2</sub> +2K<sup>+</sup> in soil solution from syenites and illite +3SiO<sub>2</sub> in soil solution from sandstones. Weathering releases SiO<sub>2</sub> and the Al, which is toxic to plants, is only soluble in very acid or very alkali soils. Feldspar dissolution is very slow in the laboratory and it is the dissolution rate that matters. Comparative rates for other minerals are leucite 10,000x, nepheline 20Mx, muscovite 0.1x and biotite 1x the rate for feldspar. Rates vary with pH.

In trials with leeks, artificial soils work quite well but natural soils don't. The trials used a very pure sand containing no K-bearing minerals from Redhill with a trace of peat compost. Mica proved as effective as KCl, with plant growth extracting the K and the soil feldspars were highly corroded with fungal filaments, bacteria and testate amoebae. In the laboratory, a 1mm feldspar grain will resist corrosion for 1M years but in soil it lasts less than 100 years.

### **Conclusions**

There is a need for sustainable management of soil fertility and conventional fertilisers are expensive and inaccessible. Soil biology needs to be integrated with soil mineralogy and plant growth and offtake are the best indicators of mineral dissolution. Si offtake demonstrates the solubility of silicate minerals and biology makes K from all sources available so silica minerals may be a viable source of future sustainable potash fertilisers.

**Report by Dave Brook**

## **Meetings of the Home Counties North Regional Group**

### **2017**

#### **1. Off Shore Oil Exploration ‘A Brief Life as a Client Representative’**

**Mick McCullough - 19<sup>th</sup> January 2017**

Our first meeting of the year [and AGM] was held the Affinity Water offices in Hatfield. , The presentation was given by Mick McCullough, a HCNRG committee member and a former seismic interpreter and client representative for over 30 years.

Mick started with an explanation of requirements of becoming a Clients Representative, including the relevant qualifications, experience, technological literacy and good communication skills. This has not always been the case and significant changes were made to safety and quality aspects of both equipment and professionals following the Piper Alpha disaster. The Cullen report was the document which brought about a sea change to working practices in the Oil and Gas Industry in the UK. Together with Norway, over the years high health and safety and good working practices have been adopted by all companies working in the North Sea.

This has had a major effect on operations globally and to this day safe working practices are being adopted throughout all industries. Mainly because oil and gas industry requirements cover many industries and their stringent Health and Safety standards required in their contracts have tended to become a norm for many other contracts.

A number of vessels used in recent times and ones Mick has worked on are shown in the photographs below.



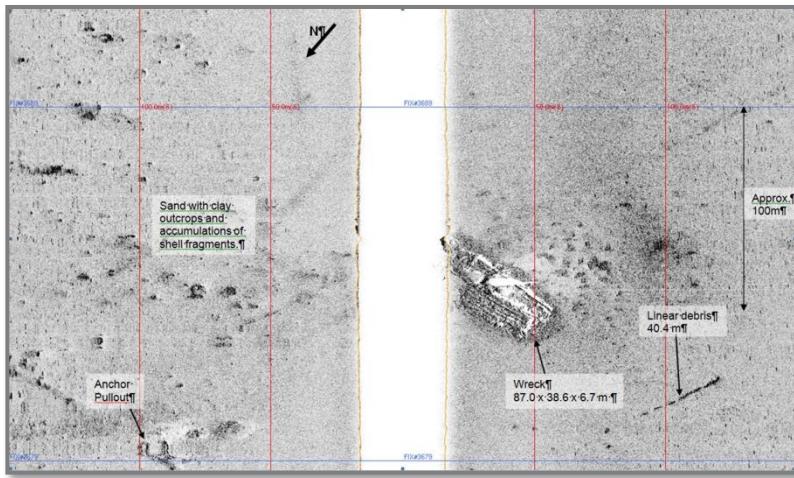
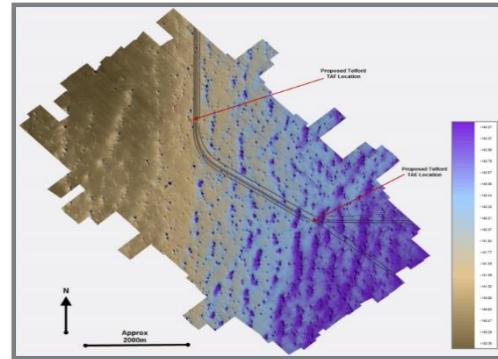
The large vessels have specific requirements in that operations are 24 hours. All equipment is on-board, communications are reasonable (nowadays internet for the client is an essential as well as a private phone line) and the vessel is capable of staying at sea for least 28 days without refuelling, re-watering or re-victualling.

Food, accommodation, welfare and recreation for the client, geophysical and marine crews have improved tremendously. Many of the vessels now being used are purpose built.

Positioning at sea was very important as there were little or no reference points or in line of site bearings. In the early days these used the French Syledis, the American Loran and British Decca main-chains systems in the North Sea. As a check before starting a survey, the system was tied to the known location of a platform. In countries without a navigation chain, the client erected a local navigation system. Syledis was often the preferred system. GPS systems were at best only tertiary and the US military had only 8 satellites in orbit.

All GPS primary, secondary, tertiary and even quaternary systems are now used with a world-wide system of reference stations, thanks to President Clinton, who made the military satellite system available for civilian use. Not only the position of the boat is known but the accuracy is so great that also the position of every piece of equipment being used is known. Positioning is stated at better than +/-2.2m, although this is usually better than +/-1cm but it will depend upon atmospheric conditions, receiver quality, signal blockage and how long you are in any area.

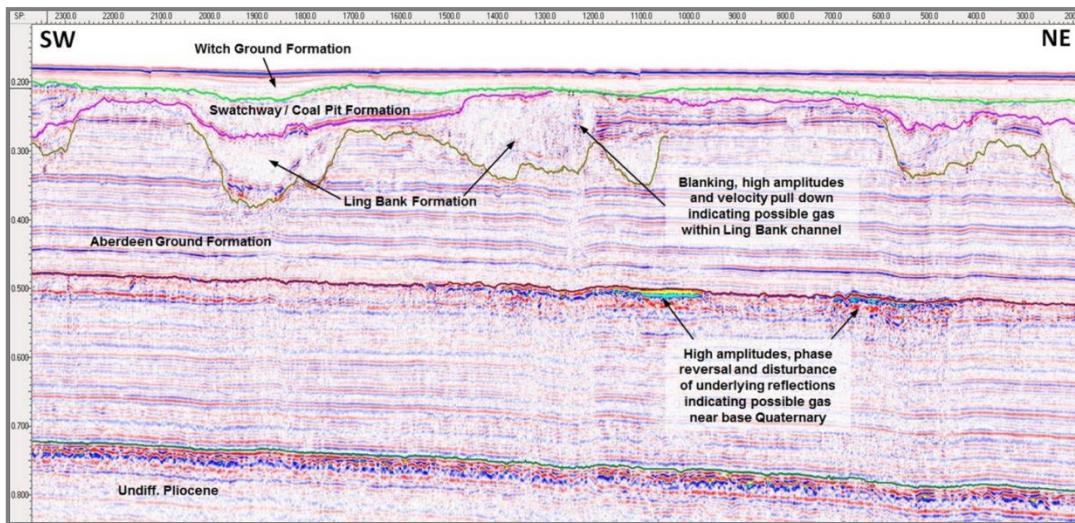
Methods of mapping the sea bed have a vast array. Multi-



The pictures to the left are examples of side scan sonar records, where the sonar looks at seabed features on or just above the seabed out to a distance of 25 m – 600 m from the sonar fish; the resolution being dependent upon the distance and frequency settings.

beam echo sounders are commonplace and, as the name implies, comprise several hundred individual beams which sample a swath of the seabed either side of the centre line with a resolution of better than a centimetre. A map of part of the seabed is shown below and the Tartan area shows the many pockmarks/catastrophic dewatering marks. What is interesting is that these marks align and there seems no underlying or surface cause.

Strata profiling can also be done using a variety of techniques including: Pingers, Boomer, Air Gun/Sparker which generate a signal picked up by an array of geophones. These can produce accurate representation of the sea bed strata as shown in the slide below. Core sampling is also undertaken.



Mick's talk concluded with various slides of exploration rigs, sampling equipment and off shore rigs. He summarised the Client's representative role and the importance of having an independent QA manager and data assessor on site.

**Report by Mick McCullough / Stuart Wagstaff**

### **An update to the Geological Society CPD System – John Talbot**

John Talbot from the Geological Society kindly talked to us about the changes to the CPD system which has been in draft for the last year or so. The Society's previous system for CPD had remained unchanged for 16 years, and was based on an outdated weighted points system. The 2017 CPD scheme is a significant departure, with a much broader comprehension of CPD in place and wider range of topics admissible as CPD activities.

The new system is solely time based on hours (no longer a weighted points-based system), easier to understand and use being more encompassing with a greater number of activities are included.

The aspects have been re-categorised with six main categories of activities.

CPD planning and recording will be required for all Chartered Fellows (i.e., for Fellows with CGeol and, or, CSci) and for Fellows aspiring to Chartership. Undertaking and recording CPD is also very strongly advised for other Fellows who are professionally active. As before, CPD is a recursive, reflective system of: PLAN → ACT → REFLECT based on experiential learning.

The new CPD record looks like the figures below and can be downloaded from the Geological Society's website.



## The 2017 CPD System – Log Book¶ (for use from January 2017 onwards)¶

### Contents:¶

- → Personal Development Plan¶
- → Activity Log for ..... [year]¶
- → Summary of Times Spent on each of the main CPD Categories¶
- → Reflection / Discussion¶

¶

Refer to the GSL Website, CPD pages for links to the following documents¶

- → CPD Log book → (this document) → MS Word File¶
- → Guidelines for Completing a Compliant CPD Record → (including the Mind Map and a CPD Category rapid lookup table to assist in compiling the Activity Log) → PDF file¶
- → CPD Mind Map → (standalone version) → PDF file¶
- → A New CPD System for GSL – presentation to RGs → (with presenter's notes) → PDF file¶
- → The Geological Society's CPD System – 2017 onwards → (background information) → PDF file¶

Geological Society's 2017 CPD System – Log Book for Recording CPD									Fellow's Name:.....¶
Table 2 ~ Summary of times accumulated in each of the main CPD categories¶									
Name:.....¶	CPD Year:.....¶	Minimum total hours required:.....¶							
CPD Category¶	On-the-Job¶ (OtJ)¶	Formal Learning¶ (FL)¶	Informal Learning¶ (IL)¶	Professional Practice¶ (PP)¶	Self-directed Study¶ (SD)¶	Other¶ (O)¶	Total time¶	Carry-over¶	
CPD hours¶	¶	¶	¶	¶	¶	¶	¶	—¶	
Additional CD # hours¶	—¶	¶	¶	¶	¶	¶	¶	—¶	
Total hours in year¶	¶	¶	¶	¶	¶	¶	¶	¶	

# CD refers to additional time on career development and work-associated skills enhancement outside the On-the-Job category as indicated in column 4 in Table 3, below. NB If all hours in a category happen to be 'additional CD hours', then do not include them in the box or cell above, ie, in 'CPD hours'¶

Table 3 ~ Minimum amounts of annual CPD for Chartered Fellows in various states of work¶

Work Status of Fellow¶	Min annual CPD, total hrs¶	Min total CPD hours in On-the-Job learning¶	Min total hours on Career Development, excl On-the-Job¶	Max annual carry-over of excess hrs¶
1a Early career (pre-Chartership) Fellows¶	≥ 90¶	30¶	30¶	20¶
2a All Fellows in full time employment, or on sabbatical leave¶	≥ 90¶	30¶	30¶	20¶
3a All Fellows in part time employment (eg, work sharing)¶	≥ 50¶	16¶	16¶	10h¶
4a All Fellows on extended leave (carers, parental leave, prolonged illness, etc) (but with special pre-arranged GSL dispensation; 50% of these hours may, exceptionally be allowed)¶	≥ 40¶	0¶	20¶	8h¶
5a Retired Fellows offering occasional professional services, or who wish to retain their chartered status, and unemployed Fellows¶	≥ 50¶	0¶	0¶	10h¶
6a Retired Fellows not offering professional services, or who do not wish to retain their chartered status¶	Optional¶	0¶	0¶	—¶

NOTES:¶ Once the minimum total hours have been achieved, spread across On-the-Job learning, plus at least 2 other main categories, any additional time can be spread as desired¶

A proportion of Chartered Geologists are selected each year for an audit of their CPD records, in order to ensure that all CGeols are maintaining their records. If you are selected, you will be required to present a written account of your CPD activities.

All information is on the Geological Society's website:

<https://www.geolsoc.org.uk/Membership/members/CPD-and-Training/New-2017-CPD-Scheme/Information-and-Help>

Report by Stuart Wagstaff

## **2. The role of the operations geologist in oil exploration and development**

### **Tullow Oil, London – 25<sup>th</sup> January 2017**

A series of talks titled “The Role of Operations Geologists in Oil Exploration & Development” was held at the UK Head Offices of Tullow Oil Plc, Chiswick Park, London, on Wednesday, 25<sup>th</sup> January, 2017.

Peter Evans, Tullow Head of Geology and Chris Lynch, Lead Operations Geologist, Ghana Development at Tullow led the Tullow Oil team to deliver presentations highlighting the roles of the Operations Geologist in the exploration & development drilling process and their oversight of the tasks of the Mud Logging Geologist, Well-Site Geologist and Logging Crew among others. This included real-time geological analyses, mechanical/drilling decisions like casing and liner depth, the choice of drilling bits as well as drilling fluid selection for specific well sections. The presentations also covered the analyses that are carried out to determine hydrocarbon shows, the correlation of formation tops to seismic data, and hydrocarbon content and quality. Finally, well correlation with previously acquired data to optimise well placement in the zone of interest was presented with real well data from the Jubilee field in Ghana, the flagship of Tullow’s West Africa operated assets, whose 2017 oil production exceeded expectations for the year averaging 89,100 bopd.

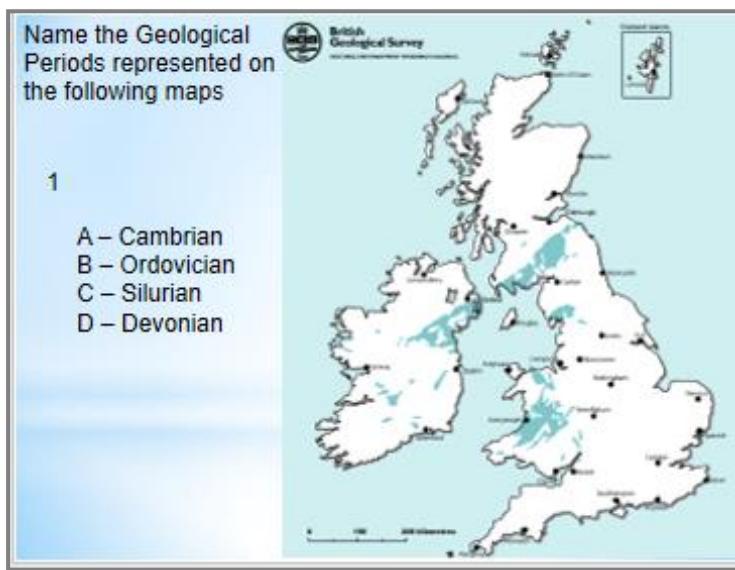
18 members from the Home Counties Northern Region Group (HCNRG) registered for the event which was followed by drinks and refreshments provided by Tullow Oil.

**Report by Femi Tanimola**

### **3. Quiz Night**

### **Stuart Wagstaff - 16<sup>th</sup> March 2017**

This was our first quiz night held at St Albans Museum. This was an entertaining evening where teams answered a range of questions based on geological and geographical themes. Multiple choice as well as directed question were answered in a well fought but friendly competition.



The evening also provided geological specimens from around the world to talk about and discuss with some great mineral and fossil pieces brought along. A fun and educational evening with drinks and pizza provided.

**Report by Stuart Wagstaff**

## 4. Pingos, scours and drift-filled hollows.

**What are they, how did they form and why don't you want one on your site?**

**Dr Jackie Skipper - 25<sup>th</sup> May 2017**

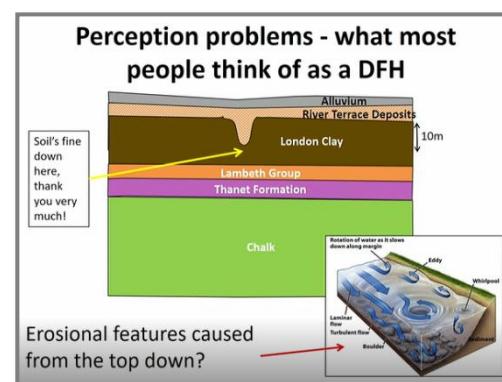
Our main lecture event was held at the headquarters of the Geological Society at Burlington House in London. We had 120 people turn up to hear Jackie speak on this subject which is still relatively juvenile in their understanding across the London Basin. Recent research and site experience in the London area into these seemingly randomly occurring features is gradually leading to a better understanding of where they occur and how they may affect the ground.



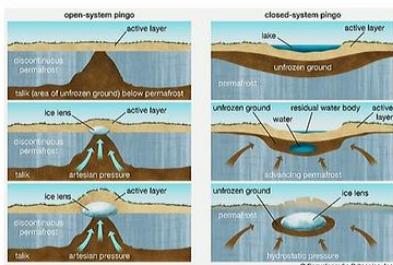
Jackie is a specialist consultant geologist at the Geotechnical Consulting Group, which she was invited to join in July 2007. She has throughout her career been very active as a geological advisor on the ground investigation and construction for many major tunnel projects including Crossrail, Crossrail 2, the Thames Water Tideway Project, the Lee Tunnel, the Northern Line Extension and is on both Geotechnical Review and Formation Expert panels for HS2. Other recent projects include investigations of very large Drift Filled Hollow features and interpretation of the ground for major construction projects throughout the UK, Europe and the Middle East.

These features were first described by Berry and Hutchison in 1979/1980 and have been little researched since until more recent time. There has been much speculation as to how they form commonly being known as 'buried hollows', 'scour hollows' or 'pingos'. They are represented by an unusual thickness of River Terrace Gravel and or Alluvium. There are now over 75 of these features identified in the London area with 26 present in Central London. They are anything from 30m to 500m wide and between 5m and 90m deep and generally not evident from surface features.

Most people think of these as erosional features as shown here. But, they are not just holes though the London Clay as the sediments within can be intact or highly disturbed and we don't know what effects are on the ground beneath. Basic logging can result in distinguishing characteristics being missed such as coarse yellow sand within the London Clay



### What are they then? Pingos (or something like that?)



Up to 70 m high,  
600 m diameter  
mound of earth-  
covered ice found  
in the Arctic and  
subarctic.  
© Encyclopaedia Britannica, Inc.

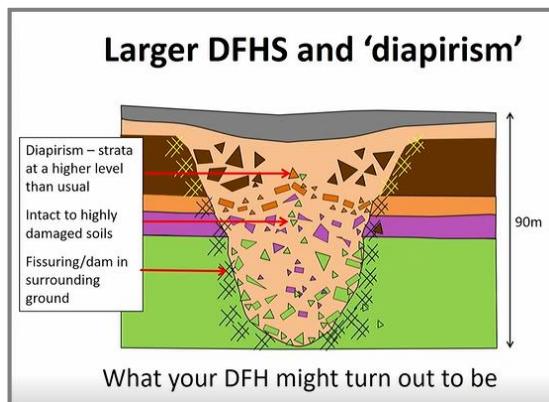
Features caused from the bottom up

Current thought is that these features are likely to be Pingos which have a modern day analogy as shown in this diagram and photograph. Growth of ice from 'the bottom up' can lead to an intermixing of sediments and later collapse when the ice melts can give rise to confusing ground conditions. The soils against the side of the feature which have remained intact would suffer from deformation and strength characteristic changes.

Such features have been found during the construction of the Bakerloo Line Tunnel, Blackwall Tunnel, Olympic Park, Lower Walbrook, Lee Tunnel.

Engineering hazards include but not limited to: pile bore collapse, pile failure, settlement, cross strata contamination, and hydraulic connectivity

In order to get a better understanding of these features, sites require more detailed investigation with accurate logging by geologists who know what to look for and how to identify the melange type material. Appropriate drilling techniques are a key element in recovering appropriate samples.

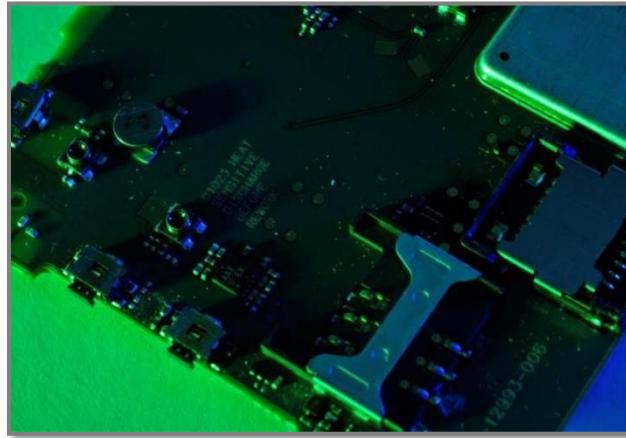


**Report by Stuart Wagstaff**

## 5. The secret life of your mobile phone: Metal supply and digital devices

**Andrew Bloodworth – 13th July 2017**

Up until the mid 20<sup>th</sup> Century, very few metallic elements in the periodic table had any practical use. Since then, mankind has broadened its pallet of useful metals enormously to take in so-called ‘rare’, ‘critical’, ‘exotic’ or ‘technology’ materials, including rare earth elements, platinum group elements and others, from antimony to zirconium. This expansion has been pulled along by the development of new digital technologies and their almost magical appeal to billions of consumers across the globe. This talk used the ubiquitous mobile phone to illustrate the importance of these metals and to explore issues around supply security and ‘criticality’. This included a look at ideas related to metal supply from geological and other sources, and may challenge some commonly-held assumptions relating to non-renewable mineral resources and physical scarcity. The human factors that influence metal availability and the environmental limits to our conspicuous consumption of these vital raw materials was analysed.



As BGS Science Director for Minerals and Waste, Andrew is responsible for all BGS research related to mineral resources and the geological disposal of radioactive waste. Andrew is also responsible for BGS activities in Wales and SW England and spends part of his time in Cardiff. Andrew’s own interests include resource security, critical minerals and the impact of mining on the developing world. He has worked extensively in Africa and was formerly Mining Advisor to the UK Department for International Development. Andrew is a Chartered Geologist and an Associate Member of the Royal Town Planning Institute. He is on the Management Board of the Brussels-based Minerals4EU Foundation and a member of the Executive Board of Sêr Cymru National Research Network for Low Carbon, Energy and Environment. He is also a member of the UK Minerals Forum, the Confederation of British Industry Minerals Group and the Mineral Resources Expert Group of EuroGeosurveys.

## 6. Perspectives on land contamination

### Seamus Lefroy-Brooks - 8th November 2017

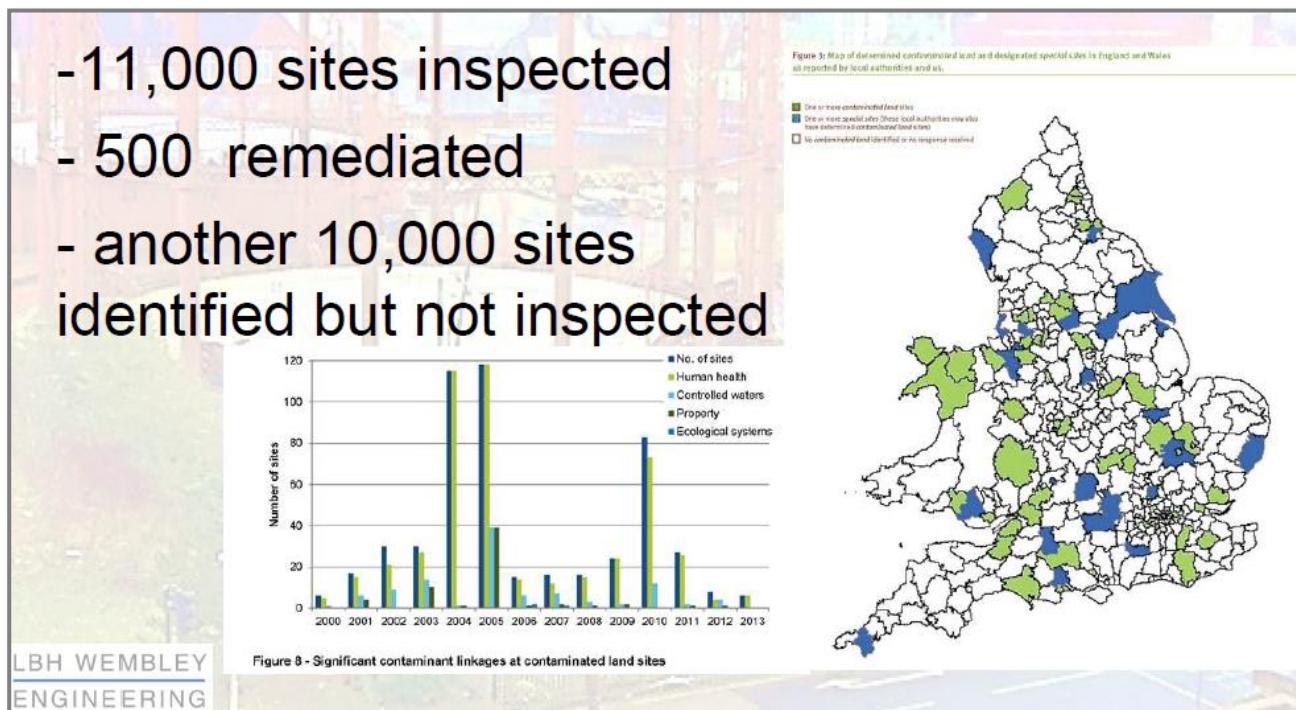
Seamus, Director of LBH Wembley, kindly delivered a talk on the formation of The Geological Society Contaminated Land Group and the time line of contaminated land assessment.

It was not until the 1960's where contaminated land was seen as a nuisance and waste land and brownfield issues were soon head of discussion in the 1970's and 1980's. Waste was dumped where convenient, and stated that the least expensive way of disposing of waste was either up the chimney or down the river! Several major incidents of contamination occurred through the 1960's and 1970's such as the Chromium leaks in California, Mercury and Cadmium in Japan and various incidents in Holland which led to the formation of the Environmental Protection Act, formation of Greenpeace and the introduction of the ICRCL. During the 1990's there was an over reaction to the assessment and remediation of contaminated land which resulted in overly precautionary measures being adopted from about 2000. Since 2010, attitudes have changed in the light of a better understanding and hence there has been an effort in re-building confidence. There have been many documents produced for the assessment of contaminated land some of which are shown below.

1981: Geol Soc, 1981-1985: NATO CCMS, 1986: ICE, 1992: IEMA, 1993: LC&R, 1994: IBC, 1995: DOE Guidance, 1995: SAGTA, 1995/97: CIRIA, 1986-1996: National Rivers Authority, 1997: RSC & BGA, 1999: NHBC 4.1, 1999: SiLC, CL:AIRE, JISCMAIL & UKELA, 2000: SNIFFER, 2001: AGSCLWG, 2002/4: CLEA, 2003: CIEH, CIRIA CL WEB, 2003: EICCLWG & Law Society, 2004: Building Regs & SGVTF, 2007: HPACLRAF, 1999-2008: English Partnerships, 2008 BGS Georisk, 2009: SoBRA, 2010: Fera SP1002, 2001:RoGEP, 2017 NQMS.

These documents generally dealt with the assessment of contaminated land and further assessment was introduced with regards to gas risks, UXO and Asbestos which a whole range of 'emerging contaminants'.

The talk highlighted the definition of contaminated land and the legal framework for their assessment. The diagram below illustrates the number of sites inspected and those remediated.



The importance of geologists was recognised although not appreciated by many practitioners. We now have established professional qualification such as Chartership and RoGEP which are of growing importance and recognition. One third of the UK geologists work in contaminated land and nearly two thirds of the Land Forum are geologists. Geologists tend to be passionate about their subject and have a desire to undertake thorough research. They can hypothesis and develop models which makes them good people to assess the ground.

The slides below show thoughts on the future and why remediate.

# the Future ?

*"Tighter Controls of industrial emissions mean that future contamination of land should be less than in the past. However, the historical legacy is large and will remain" – Uk Groundwater Forum 1995*

GROUNDWATER IN THE UK  
A Strategic Study  
Issues and research needs

Quality • Quantity • Sustainability

FWR (Formerly Environmental Research Group)  
NRA (National Rivers Authority)  
Sniffer (Sustainable Groundwater Management)  
GEES (Groundwater Environment Engineering Society)

June 1995 FR/GF 1

UK Groundwater Forum

# why remediate?

*"As the worst contaminated sites are remediated and in-situ solutions become better understood, trusted and accepted, the contaminated land game could well turn to one of long term management, rather than remediation.*

*A rise in sustainability awareness may also drive this shift. As more and more sites are remediated or come under management plans, we could well see the current human health focus change to an environmental focus." – Chris Hillman 2015 NZ*

The lecture was concluded with the resolution of the Geology Society from its formation in 1807 and where we are 210 years on with the formation of the Contaminated Land Group.

*That there be forthwith instituted a Geological Society for the purpose of:*

1. *making geologists acquainted with each other*
2. *stimulating their zeal*
3. *inducing them to adopt one nomenclature*
4. *facilitating the communications of new facts*
5. *ascertaining what is known in their science*
6. *ascertaining what remains to be discovered*

## *210 years later*

Apply good geological science to steer

- decision making
- policy
- guidance

Report by Stuart Wagstaff

### 7. Quiz Night

#### Mick McCullough - 6<sup>th</sup> December 2017

This was our second quiz night held at St Albans Museum. This was an entertaining evening, three teams attended and answered a range of questions based on geological and geographical themes [although there seemed to be a strong bias to Scotland!]. Multiple choice as well as directed question were answered in a well fought but friendly competition hosted by our Mick.

As our previous event, the evening also provided geological specimens from around the world to talk about and discuss with some more great mineral and fossil pieces being brought along. A fun and educational evening with drinks and pizza provided.

Reported by Stuart Wagstaff

## Field Meetings of the Home Counties North Regional Group

2017

### 1..Guided tour of the Geological Society, London - John Wong 25<sup>th</sup> August 2017

A well-attended trip to see the famous geology reception desk, the Lower Library, Arthur Holmes Room, William Buckland Room, Janet Watson Lecture Theatre, Council Room and the Upper Library, along with many historical paintings and decorative building stones, and, of course, the famous William Smith's 1815 geological map of England and Wales as described in Simon Winchester's book The Map that Changed the World.



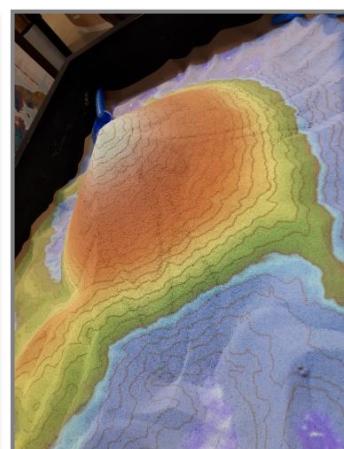
### 2..Guided tour of the British Geological Survey in Keyworth

John Wong - 19<sup>th</sup> September 2017

Following a lengthy drive a full complement of numbers attended this event to the HQ of the British Geological Survey. In the entrance, the opportunity to build sand terrains started the day with much fascination and the competition was soon on to see who could build the highest mountain and the deepest sea; winner sown in the photos below!

The day started with an overview of the Geological Survey, what they do and how they do it. This was a fascinating insight into how data for the UK geology is collated and what the data is used for. Our guide took us through the recent advances in data management and how this data is used and shared by anyone who wishes to use it. It was surprising to see who and why companies use this service and how valuable the data is to our understanding of the subsurface UK. The philosophy of

the National  
Geoscience  
Data Centre  
[NGDC] was  
explained  
along with how  
data was  
deposited and  
how the data  
was accessible  
with extensive  
online search  
facilities.

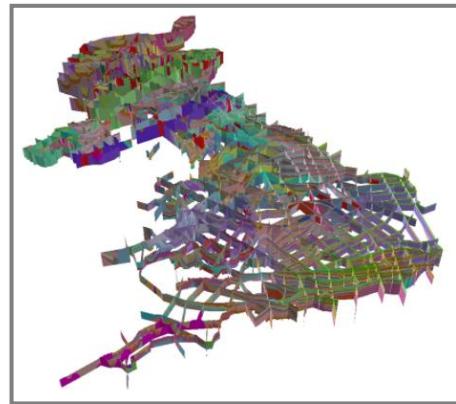


The BGS Library was our next port of call and this is collection of some 2 million books and references from home and overseas geology [not all on view to the public and some held at different locations]. We were able to view some of the oldest maps

an impressive  
collection of some 2 million books and references from home and overseas geology [not all on view to the public and some held at different locations]. We were able to view some of the oldest maps

held for the UK and reference material was made available relevant to the Home Counties. We also heard the humorous story about how the statue of Hercules lost ‘his bits’ and how they were reinstated in all their glory!

The core store was undoubtedly the highlight of the tour with an impressive 20,000km of core stored within their warehouse. The photographs below only go part way to show the impressiveness of this collection. Cores from all around the UK are digitally catalogued [most photographed in high definition] and held for inspection and research. Cores and cuttings are also stored for work undertaken in the North Sea for the oil industry.



Lastly, we were led back to the teaching room where the latest 3D mapping and cross section software was showcased. This software utilises the data for the borehole records held and produces a series of fence sections across the country and extrapolates geological cross sections through your area of interest. This was a powerful tool, but still in relative infancy. Although available since 2016 via download, the hope is that this new mapping tool will be rolled out in the next 12 months or so.



Finally we were left to our own devices to explore the geological walk through time and the book/gift shop. The new walk represents three billion years of Earth's history squeezed into a 130-metre-long stone concourse, every step bringing you about 25 million years closer to the present day. The new Geological Walk at BGS Keyworth was officially opened on 17 May 2012 by Sir John Beddington, Government Chief Scientific Adviser.

And how could we forget Hercules in all his glory!

**Report by Stuart Wagstaff**

## Note from the editor

The Group is pleased to report that the regional heats of the Geological Society's School Geology Challenge 2018 were hosted by Bishops Stortford School in Kettering in February 2018, the winner being the team from Aylesbury Grammar School. The national finals 2018 were held at Burlington House on 22 March 2018, with teams from as far as Northern Ireland and Plymouth. The Group's Chair, John Wong attended in support of our regional winners and was delighted to report the success in the finals of our regional representatives.

HCN regional heats in 2019 will be held at Aylesbury Grammar School.

Unfortunately, we also have to report that the meeting planned for 21 June has had to be cancelled. However, your Committee will continue to work hard to try to ensure that you have as full and interesting a programme as possible.

Although I am no longer able to attend meetings as I would like, I have agreed with the Committee that I will continue to edit the Newsletter. To do this, I would much prefer to have reports on meetings from someone who was at the meeting (or even from the speakers if that is not too great an imposition). These need not be very long as I recognise that the reports that I have prepared in the past have been more comprehensive than might be expected from the generality of those attending (you are, I know, all busy people). Without such reports, the Newsletter will end up being much shorter and generally comprise a record of the abstracts of meetings and the speakers' biographies taken from the flyers prepared to advertise the meetings.

It would be very useful, therefore, if anyone who is willing to do a short report of a meeting they propose to attend would let the Chair know their intention and forward that report to me ([davebrookgeo@hotmail.com](mailto:davebrookgeo@hotmail.com)) and I will use my best endeavours to ensure a more timely production of the Newsletter than I have been able to do in the past.

Your Committee would also appreciate your letting them know of particular speakers or topics that you would like to hear and of field trips in which you would like to participate, particularly if you know of anyone willing to lead them or are able to do it yourself.

I wish you all a pleasant and prosperous continuation to 2018 with an interesting and varied programme for the Group.

**Newsletter Editors - Stuart Wagstaff (with my thanks for stepping in to report on events in 2017) and Dave Brook**