

# Monmouth U3A



and



## Group Programme 2017 to 2018

## Science and Technology Group Programme 2017 to 2018

This is a short resume of our meetings from September 2017 to July 2018. Our December meeting was cancelled because of the severe weather, but the rest of the year went according to plan.

It has been a very successful year and we have welcomed several new members into our group. Our topics have covered a wide range of interests and included valuable contributions from new members.

I am very grateful for the help of Guy Moody, Jim Handley and Michael Bone in constructing the programme and writing up reports of the meetings. Having their contribution has broadened the scope of topics and introduced new ideas. We are always open to suggestions for topics or speakers for future meetings or visits and anyone is welcome to join the “Think Tank”.

Thanks are also due to Nick Sanders and Roger Smith who look after the technical side of our meetings, ensuring the audio-visual aids work as well as possible. It is quite a commitment and as Nick has now “retired” from this duty, Roger would welcome help from anyone willing to share the load.

There is no meeting in August and our September meeting will be a visit to the Waterworks Museum in Hereford.

The next meeting in Mitchel Troy Village Hall will be on October 9<sup>th</sup>.

Wishing you all a good summer break,

Valerie Conniff

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## Veteran Trees in the Wye Valley Area of Outstanding Natural Beauty

Speaker Sarah Sawyer. Attendance 36.

Monmouth U3A Science and Technology Group meeting 12<sup>th</sup> September 2017

Most of Monmouth U3A members live in or close to the Wye Valley Area of Outstanding Natural Beauty (WVAONB) but I wonder how many of us know what a 'veteran tree' is? Sarah Sawyer together with Becca Bratt and Jess Vuckovic introduced us to the work that the WVAONB is doing to identify veteran trees and put them on to a computer app to make them available to all of us.

By way of an introduction Sarah briefly described the function of the WVAONB (which is 326 sq km in size and covers two countries and four different local authorities) as, to enhance and conserve the natural resources and landscape for the use and enjoyment of everyone.

Becca Bratt then described veteran trees as being those that, through great age, size or condition, provide exceptional value to the landscape and conservation of biodiversity. They are not necessarily the oldest trees of their type but are the most ecologically significant.

There are basically four types of tree in terms of structure:

- Maiden, which means a normal tree without any major interventions by man,
- Coppice, a tree that has been cut through low down to produce a stand poles which can be harvested as a crop. Some these now neglected coppice trees can have enormous bases which are biologically very important,
- Pollard, a tree cut through at roughly head height to allow small branches and twigs to be used as a fodder resource.
- Dead monolith, a dead but still standing tree that provides a multitude of opportunities for wildlife.

All of these forms of tree can have veteran status.

Veteran trees can be identified by the following features:

- Large girth, greater than 3.5 metres at chest height.
- Decay holes indicative of fungal invasion.
- Trunk cavities, caused by loss of branches or fungal decay.
- Dead canopy.
- Dead wood providing dry habitats on the tree and fallen branches providing damp habitats on the ground.
- Sap runs, indication of external damage, which provide a sugary food source for insects.
- Bark crevices, which can provide refuge for insects as well as bats and birds.

- Fungal fruiting bodies indicating active decay
- Fauna on the trees including insects, birds, bats and surprisingly grass snakes and newts in the wetter cavities.

As can be seen the point of identifying veteran trees is because of their ecological significance in the environment providing and enriching the natural habitat.

Armed with these criteria the WVAONB has been mapping their location for at least 10 years. As Jess described during the summer months she and Becca have been conducting Phase I surveys of 1 km squares in in the WVAONB looking for issues like missing hedgerows, natural meadows and veteran trees (and occasionally getting lost in the process). These data are then digitised during the winter and captured on electronic maps which can be shared with other interested bodies. In addition, they have been using the Viewranger App to design a series of walks that will take you close to or to examples of veteran trees. Most of these maps are not yet finalised but soon you will be able to follow them via your phone or tablet.

Finally, Sarah had us all think about the significance of trees in our lives, firstly by asking us, for example who had read a poem in a wood, drunk a glass of wine in a wood or even who has kissed in a wood? (For some reason, this caused quite a ripple of laughter from those present). In addition, Sarah drew attention to the importance of trees in literature and folklore and our own imaginations. Next year's WVAONB river festival will have trees as one of its major themes.

This was a very informative presentation which will have us all looking at trees in a new light, I believe.

Guy Moody

## Mind – Monmouthshire

Speaker Chris Bowie. Attendance 28

Monmouth U3A Science and Technology Group meeting 11<sup>th</sup> October 2017

Chris introduced herself as the Chief Executive Officer of Mind – Monmouthshire and explained that it was a local association affiliated to the national charity. Each association varies in its approach depending on the needs of its local environment; with a staff of 27 in the last year it had outgoings of £774,000.

She then described the wider context. From negative and stereotyped images in TV dramas and soaps, mental health is now increasingly being more responsibly viewed e.g. through the efforts of Princes William and Harry. Myths though still need challenging.

Sadly, the figures for people taking their own lives is higher in Wales than the rest of the UK and is growing. There were 393 incidents in 2013 of whom 257 were men. In 77% of cases people were not in contact with any mental health services.

Chris now turned to some of the support schemes offered by Mind locally.

1. 24 properties in Abergavenny offer rent-paid accommodation within the community.
2. 1 professional and 5 volunteers offer counselling services and have a contract with, but no income from, the Aneurin Bevan Trust.
3. Information, Advice and Assistance especially on entitlement to benefits. A welfare rights officer successfully helps cases initially turned down with their appeals.
4. Community Resilience sessions e.g. on understanding anger.
5. Social Prescribing scheme being set up to look at the 10% of patients most regularly visiting GPs with a view to offering them forms of voluntary work as a supportive element to recovery.
6. HiWay Recovery and Beyond Project where groups of 5/6 meet with a counsellor for 6 weeks and then often continue to do so on their own.
7. Changing Minds Project where one to one support is given to 14 to 21 year olds. A second worker is being recruited to help with the arrears position.

Five Ways to Wellbeing which any one can adopt:

- 1 Connect – with groups, facebook, twitter.
- 2 Be active – leads to positive endorphins.
- 3 Take notice – taking in the world around us.
- 4 Keep learning – good for the brain.
- 5 Give – time to someone else.

She welcomed an £11000 donation from Waitrose to be used for giving 800 pupils in years 7 and 8 in local schools some 'tools of resilience'

Whilst recognising that Mental Health is higher on the agenda than ever before, Chris felt that the Welsh Government is not aware enough of the key role played by the voluntary sector.

She readily acknowledged that medication has come on by 'leaps and bounds' allowing many to live normally with their families but also said that the provision of emergency beds

for extreme cases had shrunk too far [being only 10 beds for Monmouthshire though none of these is actually located within the county]

A lot of ground was covered by Chris in a very relaxed and open presentation.

Jim Handley

## More Smoke and Noise

Speaker Phil Charlesworth. Attendance 39

Monmouth U3A Science and Technology Group meeting 14<sup>th</sup> November 2017

With a first degree, a master's and a doctorate plus a lifetime working in aerospace engineering, many people might want to do something entirely different in later life. Not Phil Charlesworth, however, who is a new member of U3A and the Science and Technology Group. He has engaged in a hobby most of us probably didn't know was possible – amateur rocketry.

With a talk entitled “More Smoke and Noise” Phil entertained forty of the Science Group on a dark November afternoon with photographs and video clips of rockets large and small, successful and not so successful.

The first point that Phil emphasised was that it is legal, within certain limits, to produce and launch rockets in the UK. Launching takes place in well-chosen open spaces where those controlling the launch can maintain visual contact with the rocket throughout its flight. The flight itself is governed within by the laws that govern private flying. Safety is paramount on site with a designated range safety officer and third-party insurance just in case.

Propellants for the rockets are available to purchase, and for smaller rockets can be purchased within a relatively modest budget. Not all amateurs will aspire to having a 3D printer which Phil has for producing the more complex components.

Amateur rockets typically have parachutes which are deployed at maximum height to allow a soft landing and the success of the arrangement is often demonstrated by the inclusion of an egg in the rocket which should be unbroken on landing.

Amateur rockets can exceed the speed of sound and reach heights of over 20,000 feet. There is a local club FOG (Fins Over Gwent) which meets every few weeks at Redwick on the Gwent Levels not far from Junction 23A. Visitors are welcome to come and view the spectacle and there is a website [www.fogrocketry.org.uk](http://www.fogrocketry.org.uk)

Michael Bone

Monmouth U3A Science and Technology Group meeting 12<sup>th</sup> December 2017

Cancelled owing to bad weather.

## Richard III - from car park to cathedral

Speaker Rhian Morgan. Attendance 45.

Monmouth U3A Science and Technology Group meeting January 9<sup>th</sup> 2018

In a fascinating, fact-filled, hour-long presentation, Dr Rhian Morgan from the Wales Gene Park, related the details of the discovery and subsequent analyses of the 500 year-old skeleton unearthed (almost completely intact) in a Leicester car park in August 2012. A multi-disciplinary team of archaeologists, scientists, genealogists and geneticists worked meticulously to gather the evidence and prove, beyond reasonable doubt, that this skeleton was that of Richard III, the last Plantagenet King of England.

The archaeological survey was funded from a variety of sources including Leicester City Council, Leicester University and the Richard III Society. The hope was to excavate the Grey Friars site and locate the choir of the friary church where Richard III was buried. These hopes were realised and the skeleton unearthed, which had a pronounced curve in its spine, was subjected to rigorous examination and scientific tests, including carbon dating and DNA analysis, leading to the conclusion that the bones were those of Richard III. The only flaw in the whole series of painstaking research was the failure to find a match between the Y chromosome of a living male relative with the Y chromosome of the skeleton, suggesting at least one false paternity in the line. The mitochondrial DNA, which is only passed down through the maternal line, proved a perfect match between the skeleton and two living relatives.

Analyses were also carried out on segments of Richard's genome that can be used to predict hair and eye colour. This was done as there are no contemporary portraits of Richard III and he is usually portrayed with brown eyes and dark hair. The results of the genome tests give a 96% probability of blue eyes and 77% probability of fair hair.

There is a wealth of information on the website of Leicester University about this remarkable project.

Valerie Conniff

## Death of Stereo?

Speaker Dave Scaysbrook. Attendance 50

Monmouth U3A Science and Technology Group meeting 13<sup>th</sup> February 2018

On Sunday 7<sup>th</sup> June 1942 a Handley Page Halifax plane crashed in a field at Welsh Bicknor. From this event David Scaysbrook wove an intriguing story to remember each time we use a microwave oven.

The plane was V9977, a bomber with Rolls Royce Merlin engines but lacking the bomb carrying capacity of the later Lancaster bombers.

Following the successful raid on the German radar site at Bruneval in France on 27<sup>th</sup> Feb. 1942, TRE [the Telecommunications Research Establishment] was rapidly moved from Swanage to Malvern to give increased security. RAF Croome just south of Worcester was where planes used for testing radar were based.

This plane took off with 5 crew and 6 passengers and crashed in a ploughed field near Courtfields and the River Wye. The only witness – Onslow Kirby – saw the plane approach very low over the R. Wye with a wing on fire which then broke off. The plane flipped over on crashing and burst into flames. There were no survivors.

Alan Dower Brumlein, a brilliant electronics engineer, was on board; he had only been invited to fly at the last moment. From being unable to read and write until 12, he carved out an amazing career getting a first class degree in 2 years and then doing ground breaking research and applications in fields such as telecommunications and early TV hardware [eg invented the 405 line approach adopted by the BBC] In all by his death at 39 he had 128 patents in his name.

The plane was involved in testing 2 versions of H2S radar – Klystron and Magnetron. Such was the secrecy of this that the cause of the crash -- a loose tappet on an engine – was only disclosed in the 1960s. Churchill personally declared that the development programme must continue and that news of Brumlein's death must not be disclosed.

The key to the success of H2S was in the development of a cavity version of the Magnetron with an initial wavelength of 10cms later to be refined to about 3cms and 200 kw power. It was fitted under the fuselage of the plane with a reflector facing forward.

This development revolutionised the accuracy and speed of bombing. A 'Fishguard' version gave early warning of hostile night fighters so leading to much reduced losses of planes from January 1943. Meanwhile Coastal command were now able to detect and destroy U boats on the surface and so convoys were much better protected.

The Mark 9 version of H2S was later used in the Suez episode in 1956 and by Vulcans in the Falklands in 1982.

Meanwhile in the 1950s Decca developed their stereophonic sound systems based on another of Brumlein's [expired] patents.

David closed by explaining that domestic microwave ovens also work with a cavity Magnetron with a wavelength of 12.2 but with a power output of 1kw or less compared with the 200kw of the radar equivalent.

Local and national history with a strong science and technology twist!

Jim Handley

## Renewable Energy

Speaker Phil Powell. Attendance 41

Monmouth U3A Science and Technology Group meeting 13<sup>th</sup> March 2018

Gwent Energy Community Interest Company (CIC) is a not for profit organisation that helps communities and individuals benefit from renewable energy. In particular it supports community organisations that lack the skill or the will to implement renewable energy solutions themselves. Phil Powell, the director, outlined for us some of the local projects that Gwent Energy has been involved in including the Mitchell Troy community centre we were meeting in and the Bridges in Monmouth. Whilst providing installations for local communities, Gwent Energy also has an investors' club to help fund its activities which provides a higher than base rate return to its members.

Few of us would doubt the impact that industrialisation has had on the atmosphere and Phil reinforced this with some sobering statistics on the increase in carbon dioxide (CO<sub>2</sub>) levels over the last two centuries. Background CO<sub>2</sub> levels actually contributed to a warming of the earth's atmosphere that allowed life to be sustained but as the level has risen to over 400 parts per million the warming effect has become excessive with atmospheric temperatures predicted to rise as high as 57°C in the future. This is clearly not compatible with most current life forms,

Despite this bleak prospect Phil outlined some the practical steps that can be taken by individuals and companies to offset the rise in CO<sub>2</sub> levels. These include the use of solar panels with battery storage for domestic users to biomass, hydroelectric schemes and fuel cells for larger industrial users. Sadly, the technology to support renewables is not British nor even European it is Chinese. The Chinese despite having a reputation for a coal-based economy are investing heavily in renewables and have the most advanced technical solutions currently available.

Phil ended his presentation with the positive effects that electric cars could and will have in the future with low costs and low pollution. The talk was followed by a lively discussion which included the Leeds-based hydrogen energy experiment, the truth or otherwise of the estimates of the CO<sub>2</sub> levels in the atmosphere and the merits of using solar roof tiles as opposed to solar panels.

Guy Moody

## Research into Parkinson's; from lab to patient and back again

Speaker Emma Lane. Attendance 42

Monmouth U3A Science and Technology Group meeting 10<sup>th</sup> April 2018

About 100,000 people in the UK have a diagnosis of Parkinson's Disease and although there are cases of early onset there is a significantly higher risk for those over 60. With this sobering statistic, the Science and Technology Group listened to a fascinating talk by Dr Emma Lane, a researcher at the School of Pharmacy and Pharmaceutical Sciences in the University of Cardiff.

The general symptoms of Parkinson's had been recognised for a long time prior to James Parkinson giving his name to the disease some two hundred years ago. Although still referred to as Parkinson's disease it is now recognised as a syndrome with symptoms including:

- stooped posture
- tremor
- slowness or rigidity of movement
- facial musculature making smiling more difficult

It is a progressive disease and a third of those diagnosed are likely to develop impairment of cognitive processes. There are treatments available which are effective in inhibiting many of the symptoms but have longer term side-effects.

We heard how the underlying causes of the syndrome have yet to be established but there are many factors which appear to predict likelihood of developing the symptoms. What is known is that a common characteristic is the reduced ability of the brain to produce dopamine.

Dr Lane's work started with research on rats and on ways of increasing the production of dopamine within the brain. She has worked as part of an international team looking at possible treatment options.

There are many strands to the research and it seems unlikely that there will be a sudden and dramatic breakthrough but the audience was left with a reasonably positive message for improved treatment options in the foreseeable future.

Michael Bone

## How the bees of Wales are helping us combat hospital superbugs and inspire the next generation of scientists

Speaker Les Baillie. Attendance 32

Monmouth U3A Science and Technology Group meeting 8<sup>th</sup> May 2018

The speaker was Professor Les Baillie of the School of Pharmacy and Pharmaceutical Sciences, College of Biomedical and Life Sciences at Cardiff University. After working in the NHS, at Porton Down, where he developed a vaccine against Anthrax, and in the US Naval Medical Research Centre, Les arrived at Cardiff.

The first part of his talk focused on “How bees are helping us combat hospital superbugs” He started to look at the properties of honey as part of a wider examination of the DNA makeup of various plants. New Zealand Manuka honey has a higher than usual level of hydrogen peroxide [or bleach!] and other antibacterial factors and hence its potential health benefits in countering infections.

After sampling 250 samples of Welsh honey 2 hives were found at Tywyn near Aberystwyth where the honey was akin to Manuka. From this, work has concentrated on identifying the DNA sequences of the plants whose pollen was collected by those bees. It was found for example that dandelions contain chemicals capable of killing the Zika virus.

The next step was to set in train plans to produce a bee friendly city in Cardiff so hives first appeared on the roof of their own building and later on 6 other university buildings. At other schools and sites hives appeared and new bee keepers were trained. Meanwhile concurrently new flower beds have been created in a variety of city locations to focus on those plants like white clover known to be used by the Tywyn bees. Research continues apace!

In parallel the project has become a catalyst for “inspiring the next generation of scientists”. Thus, in various schools in and around Cardiff and Newport the overall aim of ‘growing our own scientists’ is being spread by stimulating and retaining youngsters’ curiosity. Beyond schools there are community projects such as at the Blogs Centre in Grangetown. Further afield the message about bees and their potential for getting youngsters hooked on science is being spread across Wales via local WI branches and their contacts with local schools.

If all this was not enough Cardiff is now encouraging similar projects in Africa at Universities in Namibia and Zambia.

With concerns that European funding may not be replaced, Les explained how 10% of the profits from 3 new small companies will be fed back into project funding. Lip Balm and Welsh brewed tea are two of them but the one that appeals to Les most is a specialist brewery whose Bang On beer has a honey extract. Next step is to use yeast from bees in the brewing.

An excellent talk, very well presented.

Jim Handley

## Welsh Dinosaurs

Speaker Cindy Howells. Attendance 31

Monmouth U3A Science and Technology Group meeting Tuesday June 12<sup>th</sup> 2018

Cindy Howells, (Curator in Palaeontology, National Museum of Wales, Cardiff) started by putting in context the geological events giving rise to the conditions where dinosaurs came into existence before progressing to the most recent exciting discovery of the oldest Jurassic dinosaur ever found in the UK.

Footprints of dinosaurs and their bone fragments have been found in the area between Cardiff and Porthcawl since the first discovery by T.H. Thomas in 1879 at Newton Nottage. Discoveries of dinosaur fossils are limited to this area because of the nature and young age of the rocks here. In 2014 at Lavernock Point in the Vale of Glamorgan two brothers found several rocks containing long straight bones whilst fossil hunting after a cliff fall on the beach. About 40% of the animal's bones were found including the skull, claws, teeth and footbones. The serrated tooth confirms this is a carnivore and as some of its bones are not fully formed, it is believed to be a juvenile. Some of the fossilised bones were found in the correct position but others had been separated by scavenging sea urchins, suggesting its body had been washed out to sea and settled on the sea bed. A year later in 2015 the missing foot was found by another fossil hunter at the same site.

Research from a study of the layers in the cliffs where the remains were discovered has confirmed that they are 200 million years old. It is a completely new species of dinosaur and has been named *Dracoraptor hanigani*. It is related to *Tyrannosaurus rex* but lived 130

million years earlier and was **much** smaller, being only the size of a large dog. The fossils are on display at the National Museum of Wales in Cardiff together with a reconstructed 3d model.

Valerie Conniff

## Please Don't Buy an Electric Car

Speakers Professor Alun Vaughan and Professor Averil Macdonald. Audience 48

Monmouth U3A Science and Technology Group meeting July 10th 2018.

This dramatic title attracted nearly fifty members of the Science and Technology out of the warm afternoon sunshine into Mitchel Troy Hall.

Professor Alun Vaughan and Averil Macdonald are not only academics with special knowledge of the topic but also members of Monmouth U3A.

The speakers made a lively and thought-provoking presentation explaining that most people are very reluctant to sacrifice the mobility that a car provides but drivers do wish to reduce roadside pollution and carbon dioxide emissions. They are therefore attracted to the possibility of buying an electric car. It sounds like a perfect solution.

There are inevitably snags. The first and most obvious is that electric vehicles only cut pollution at the point of use. While electricity generation is increasingly green we are still heavily dependent on nuclear and fossil fuel burning capabilities.

More significant is that there is barely sufficient generation capacity for our current needs without the mass adoption of electric cars. It's not just generation of electricity that could be a problem but the whole infrastructure of transmission and distribution down to the last mile of cable in your street. Much of the electricity grid was installed at least fifty or sixty years ago.

Work is being done to improve both the generation and distribution capabilities but there seems little chance of it being able to keep up with mass adoption, even with increased demand management through smart meters.

The presenters offered an alternative – hydrogen powered cars, buses and goods vehicles based on fuel cell technology. The only waste product is water vapour. Contrary to normal assumptions it is safer than petrol. There is already limited use of hydrogen by operators of buses and lorries. Japan and Germany are making significant progress with their hydrogen supply facilities. Furthermore, in the UK, hydrogen could be supplied through our domestic gas system with the benefit of reducing CO2 emissions from heating systems.

In conclusion, the speakers acknowledged that there aren't many options for alternative vehicles at present so but an electric car if you must, but hope that not too many other people do, or we could all have a problem with black-outs.

Michael Bone