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Lichfield Science & Engineering Society

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MD, MA, DPhil

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Dear Members,

What a beautiful autumn. As I begin to write at the very end of November some of the trees are still shining gold. We went to Canada earlier and saw some lovely fall colours but our woods and hedgerows have taken some beating colour wise and they have continued on and on in splendour. A lecture here somewhere: I must stop eulogising but they have been magnificent! So amidst all this, Christmas comes stealthily upon us. Now I have got the trees sorted out we may pass our minds over another good term of Lichfield Science and Engineering Society and give our thanks to the Committee for making it so. Let's take a look backwards to September.

Monthly lectures

91 Members and 6 visitors heard Ian Crawford, Professor of Planetary Science and Astrobiology at Birkbeck, London deliver the opening lecture of the year. Entitled 'The New Science of Astrobiology and the Search for Life in the Universe', Professor Crawford's lecture and answers to our questions kept the audience enraptured until 10.00pm, I think it could have gone on all night. Ian made a hundred thousand million years sound like yesterday as he described the beginnings of planet Earth and the earliest fossils found and then took pains to explain how long it took for organisms of more than one cell to evolve from them. He described the habitable zones that may or may not be found, the research missions, both historically, in the present and his needs for the future exploration of the Universe and in particular Mars. We were left with the conundrum "is there or isn't there life elsewhere and if so is it life as we know it?"

At the October meeting Professor Chris Budd from the University of Bath took us down a path of binomial number systems to arrive at the complexities of the technology which we see and use in our everyday lives. Professor Budd wanted participants for his lecture entitled 'How Maths Shaped the Modern World' at which there were 121 members, 7 students and 7 visitors present. And so with fear in my heart I stumbled forth and I am delighted to report that I got it right. Actually 'it' only involved either raising or not raising my right arm (only recently a possibility) after appropriate questions which no one could possibly have got wrong. One of our members, quicker on the uptake than me found out that the barcode Chris flaunted before us was more of a bra code; it referred to an item of ladies' underwear.

In December Brigadier Timothy Hodgetts, Medical Director, Royal Centre for Defence Medicine, presented his lecture 'Innovation in Defence Medicine'. Luckily we were in the Main House due to the generosity of the Garrick and could accommodate the 142 members, 4 students and 20 visitors present. Tim described how defence medicine has responded to the specific types of combat wounds sustained in different theatres of war and how even during peace, research must continue to make sure of a readiness for the next inevitable attack. He told us how quick the response is to the demands from the front for new equipment and he drew our attention to his newest innovation – [www. Citizenaid.org](http://www.Citizenaid.org) – transferring military knowledge to the civilian community. Here the military are reinforcing the police message 'run hide tell' and adding their own 'treat' – run, hide, tell, treat in an effort to empower the public to do the right thing in bombing, shooting and stabbing incidents. Please have a look at the website and maybe download their app after January 1st.



27th Erasmus Darwin Memorial Lecture

The 27th Erasmus Darwin Memorial Lecture was delivered by Professor Dame Nancy Rothwell, President and Vice Chancellor of The University of Manchester. Dame Nancy's lecture was inspirational and informative, beginning with an overview of her career, her mentors and her early work on brown adipose tissue and energy balances within an individual. From here she moved on to her most recent work on the cytokines and in particular the master cytokine, Interleukin 1. This molecule is an endogenous pyrogen which is instrumental in causing inflammation, an important factor in strokes. Blocking the actions of Interleukin 1 is beneficial in a number of experimental models of brain damage. Dame Nancy's research trials have got as far as phase three and success with an Interleukin inhibitor would be a real breakthrough in the treatment of stroke.

Discussion lunch

This was a sell out and attended by 24 people plus the speaker Jack Hervey. Jack took time out from his PhD research to deliver 'Waste to Biofuels' and discussed the work which is being undertaken in the world of bio photovoltaics. Experimentally some of the electrons from the photosynthetic biochemical pathways are captured and used to produce electrical current and so far this has allowed a radio to work from pots of growing seedlings. Further research will ascertain whether we can use waste products and materials for the growth of useful organisms. Pivotal to Jack's research is the photosynthetic bacterium *Rhodospirillum rubrum* which is interesting and useful because of its ability to use four different modes of metabolism. Jack hypothesises that *R. rubrum* can be grown on slurry to produce high value compounds that would offset the costs of slurry storage and disposal and sustainably produce a useful chemical feedstock. A lively discussion and question and answer session followed.

Annual dinner

Once again Aston Wood Golf Club sparkled for our annual dinner and after good food and wine we listened to Dr David Beeston describe the changes at Dudley Zoo from its inception to the present day. David explained how the iconic Tecton buildings have been preserved and he looked at various aspects of the endangered species programme. David is Registrar and Research Coordinator and also keeper of the black lemurs.

Visits

The 13th September, the hottest September day for years, took us to JCB. I suppose it could all be summed up by 'no expense spared'. The gleaming white china cups emblazoned with the JCB logo, served by the meticulously attired staff, the big red upholstered superbly comfortable seats in the lecture theatre, videos, where slickness is but a poor descriptive word, led us towards the finished gleaming yellow big diggers all lined up, tested at every step of the way and ready for distribution. The paint was an inch thick at least. After seeing the finished products all being put through their paces on the test track, driven, turned, booms extended and withdrawn again, my group were taken along the production line of the backhoe loaders. This was in parts not such a pleasant experience as the atmosphere was very misty and humid. The facts and figures rolled off the guide's tongue and we watched men, not all that many, robots and lasers creating the parts and then assembling them. One in two of the backhoe loaders in the world are made by JCB.

The museum took us back to the beginnings of JCB. Here we were able to see dancing diggers standing upright on their buckets and mounted over mirrors so we could get a good view of the underneath. From here we moved on to JCB in the worlds of defence, agriculture and demolition.



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The tour can be accessed by the public but what the public don't get is our own Mark Richards. Mark took time out from his heavy workload with Lord Anthony to meet us at the JCB Dieselmex display and describe to us the intricacies of the engine and the changes that have come into engines since the record, which JCB still hold, was set. Mark says if anybody ever beat it JCB would just make another engine and take the title back!

Naturally the two previous and two following nights were cold and clear but the night we went to Sherwood Observatory was cold and wet. However 30 Members had a fascinating evening touring the observatory (and in some cases large areas of Nottinghamshire as well) and hearing Martin Braddock describe the history and development of the optical telescope. The Mansfield and Sutton Astronomical Society started 36 years ago and built not only the machine for grinding their 24" lens but also the observatory from the ground up. They're now thinking of building a planetarium in a local disused underground reservoir. And your Committee think they work hard! 38 intrepid travellers ventured forth on a horrid night in November to the Burton Bridge Brewery. Here the kind, enthusiastic and very knowledgeable co-owner of the brewery, Geoff Mumford showed us how the beers were made and talked about the skills which come into play as they strive to get the beer they want. We finished the night off upstairs in a room above the adjacent pub and played skittles and ate a very nice buffet in front of lovely coke fires. And of course carried out proper scientific testing of the product. Above our heads were gas lights, yes real gas mantles – I haven't seen them since I was in my great grandmother's kitchen! Although we were actually illuminated by modern electricity.

Legacies

LSES has been extremely lucky this year to have been the recipient of three bequests. After much discussion and several false starts your Committee have finally put in place an award of a certificate and £50 to the most deserving science student in several Lichfield schools. The first presentation was at King Edward's on 11th November and two more are planned at other schools in the near future. By combining these monies we trust LSES will be enabled to continue granting these awards for many years and hopefully extend them to other Lichfield schools.

In closing

As we rush speedily to Christmas time, to ringing out the old year and welcoming the new, I would like to wish you all the peace and happiness which you seek, the families and friendships which you cherish, the warmth of your fireside and the time to recover and relax.

The next LSES term begins with Professor Paul Withey on 11th January delivering the lecture 'Manufacturing Single Crystal Castings for High Pressure Gas Turbine Blades'. Come back refreshed and ready to enjoy it.

Carol Hannam
Chairman