



Lichfield Science & Engineering Society

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H.M. Lord-Lieutenant of Staffordshire

PRESIDENT
Dr Zsuzsanna Nagy
MD, MA, DPhil

April 2017

Dear Members,

An AGM: a time for looking forwards, a time for looking backwards and a time for change. Let me look backwards. For the last three years I have been surrounded and supported by my committee. A committee which is totally committed to the wellbeing of Lichfield Science and Engineering Society, a committee determined that the unique status of this Society is preserved. Each member has given freely of their time, has maintained the highest of standards and has been painstaking in the execution of their duties. I wish it recorded that I am grateful to all who have served, in whatever capacity. As I look forwards I know that under the leadership of Dr Robert Giles the Society is in safe hands and I wish him well.

Within this mailing

You will receive your AGM papers:

1. Your calling notice and advice for the AGM
2. Minutes of the AGM in May 2016
3. This letter as your Chairman's report
4. Notice for the Summer Supper
5. Notice for impending visits

May I remind you that the AGM will begin at 7.30pm and will end at or before 8.00pm. It will precede the May lecture 'Fibre Optics: the past, present and future internet' to be delivered by Professor Andrew Ellis, University of Aston.

Monthly lectures

In January we welcomed Professor Paul Withey from Rolls-Royce to deliver his lecture entitled 'Manufacturing Single Crystal Castings for High Pressure Gas Turbine Blades'. Paul's humorous approach and the fact that he had some single crystal turbine blades for us to hold and pass round made the lecture come to life. Sir Frank Whittle's engines, made entirely of steel, had an operating limit of 450 - 500°C. Modern turbine blades must be able to withstand a gas stream temperature of 1600°C, 300°C above the melting point of the metal, rotate at 10,000 rpm, remove 800hp from the hot gas stream to power the high pressure compressor, use cooling air at 700°C and last up to 5,000,000 miles. Paul explained clearly how the blades made by growing a single crystal of nickel alloy can withstand these requirements. There were 118 Members present along with 1 student and 6 visitors.

In February we welcomed President Dr Zsuzsanna Nagy to deliver her Presidential Lecture entitled 'Memories: hardwired happiness or victims to dementia'. All the pre-bookable seats were taken for this, the third of Zsuzsanna's lectures, and 134 people including 2 students and 1 visitor were not disappointed. Zsuzsanna looked at the structure and formation of synapses describing how, after about 2 years of age, these needed to be consolidated and pruned to leave synapses with about 1000 connections per neuron, building up networks which ultimately lead to cognitive function and individuality. In the new-born synaptic processes take 90 minutes to grow but this time increases to 90 days in the adult. Learning is the modification of synaptic transmission and takes place within the hippocampus where there is most synaptic plasticity. Zsuzsanna looked at false memories, new memories modifying old ones by decaying or inhibiting them, depressed people having negative memory and the importance of sleep. She taught us how the more plastic an area of the brain is the more connections and cells are lost in ageing.

Dr Jonathan Williams brought the March lecture to life with a selection of visual aids. Entitled 'Quantum Metrology for the 21st Century', it sounded a daunting lecture to me. Starting in the nice comfort zone of



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NPL and Bushy House with standards known to us all such as kilogram, metre and second we soon entered the world of caesium clocks and caesium fountains, equations - which I just glossed over - and finally to the completely and utterly radical quantum standards that will come into practice in 2018. My favourite memory will be of Dr Williams introducing us to the apple on his bench and, with much gentleness and good humour, talking us through its mass, via the gravitational pull on it getting to the Newton, expending a Joule by lifting it through a metre and by taking a second for the movement finishing with a Watt. I wish he had taught me physics! He delivered his lecture to 131 members, 2 students and 1 visitor.

April brought the lecture 'The Forth Replacement Crossing – Planning, Design and Construction' which was sponsored by Robina Bettson in memory of Paul. Lawrence Shackman, Queensferry Project Manager, delivered a magnificent presentation to a packed house of 153 Members, 2 students and 3 visitors. This was not just a lecture on building a bridge, but on a whole network of bridges, airports, motorways, motorway junctions, bus routes and water traffic. An education Centre, which it also incorporates, has already hosted 20,000 students and 70,000 visitors. The bridge itself is beautiful and the construction chosen to fit aesthetically with the other bridges behind it. Completion is slightly behind schedule – May 2017 to July 2017- but the estimated cost of £1.45bn to £1.60bn has been reduced to between £1.325bn and £1.35bn, this is attributed to low inflation and good governance.

Schools' lecture

We supported over a hundred Lichfield sixth formers with this lecture given by Dr James Brown, Lecturer in Ageing Metabolism and Admissions Tutor, in the School of Life Sciences at Aston University. He delivered the lecture 'Obesity and Diabetes: the truth about sugar, fat and exercise' and explored the scourge of diabetes type 2 and the level of obesity found within the population. He took the students through the mechanisms of diabetes, which they will need for their examination syllabuses, and encouraged them to look at different methods for measuring the amount of stored body fat. The students were slow during the lecture in volunteering to stand on his scales which measure body fat but there was an endless queue to take part at the end - even removing their socks so that they could take part!

Education Fund

As well as funding the Schools' lecture we have made three further donations from the Education Fund. Greysbrooke School in Shenstone had monies for Science week and Erasmus Darwin House had both funding and practical help from many of our members to launch their Saturday Science Day. The third donation was to St Joseph & St Theresa RC Primary School in Chasetown. They spent it on taking 30 of their year 6 children to 'We're Stuck', a production at The Garrick in which the whole theatre was used and where knowledge of Key Stage 2 Maths was the order of the day. I was most pleased to lend our support here.

Discussion Lunch

24 delegates and speaker Adrian Scattergood just filled the oval table in the Lunar Room at Erasmus Darwin House. Waitrose is careful in its choice and makes sure that the mature shopper is satisfied, easily finding what is wanted on the shelves within the store. The object is not only to lure us into the store but to keep us there and Waitrose starts this immediately with a clear area as the starting point to make us comfortable, and whilst in this 'decompression zone' the shopper is given time to think, elevate their mood and acclimatise. Adrian was challenged on sell by dates and best buy dates but was adamant that these were governed by the strict laws of health and safety. The food not sold in Waitrose is, we found out, decomposed and the energy released used to power their trucks.

Visits

If you omitted to add your name to the list for this visit, I have to tell you that you missed a treat. The Locksmith's House is a tiny gem left, along with its workshop, in the very middle of the modern Willenhall. There were two groups visiting that day and my group of 18 had to be divided into two, the spaces we were to visit being so small.

We began by watching the guide using the double action bellows to stoke up the fire in the forge so that she could make the bar for the bar padlock that this firm of Hodson made from 1750 until the late



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1970's. In 1840 the press used to make the front and back plates of the lock needed 3 people to manipulate it. In 1910, when electricity was put in, the newer machines needed 1 person- much the same problem as today. During both World Wars they switched to making spanners for the war effort. The house, with its warm fires, gas lights and mantles, is a place where time has stood still. The front room had been used by the daughters of the family as a dress shop. They stock piled clothes for ordinary folks and sold only when they felt like it, so stacks of stock are now archived at The Black Country Museum.

The Visits Secretary's predilection for heat and fury was again evident in the recent trip to Encirc in Cheshire. The company is unique in that it not only makes glass bottles and other containers but also fills and dispatches them for their customers. Encirc limited the numbers to fourteen but fourteen there were and Members saw the whole process; sand and cullet going into the furnace, blobs of molten glass dropping into the moulds and in a matter of seconds red-hot bottles going along the conveyors. Then bottles being filled, capped and stacked at unimaginable speed. One of our more exciting days out.

This newsletter will have gone to print before the remaining visits of the term. Such is the enthusiasm for Harper Adams University's Agricultural Engineering Innovation Centre that 51 people are on the list to go and ex-President Rex Harris's hydrogen powered canal boat has drawn so many applications that there will have to be multiple trips. I am sure you will hear about both visits later.

The 2017 Erasmus Darwin Memorial Lecture

The 28th Erasmus Darwin Memorial Lecture will be presented by Nobel Laureate and President of the Royal Society, Venkatraman Ramakrishnan on Thursday 16th November. The lecture will be entitled 'Seeing is believing: 100 years of visualizing molecules'. Tickets will go on sale at LichfieldGarrick on Tuesday 2nd May. LSES members will have one week priority booking which will commence on Tuesday 25th April. The cost has increased to £11 for LSES members and £13 for non-members to accommodate the new £1.50 Garrick levy. The Society will bear the extra 50 pence.

Membership

I am pleased to say that the ticketing system we introduced seems to be working and helpful to some of our Members. May I remind you once again that pre-booked tickets **are for Members only** and if you do pre-book a ticket you still have **to sign in by 7.50pm and collect a Members' ticket** at the desk. The Garrick ticket does not let you into the theatre. We need to know the numbers in the studio in case of an emergency and we cannot leave seats vacant during the lecture if other members are waiting. It has been brought to my notice that some pre-booked seats have not been taken up. I understand that circumstances can easily change but they must be most dire if there is not time to let either the box office or myself know if the tickets are not needed. Please do not abuse the system.

A new initiative

We are in discussions with the bank to set up a new account which will allow Members to pay their subscriptions by bank transfer. There will be more instructions later in the year and cheques will still be accepted.

And in closing

The last three years have been very special to me as I have held, and enjoyed holding, the Chairmanship of this extraordinary Society. We have witnessed a stream of Doctors and Professors and even a Brigadier share with us their expertise, taking us to the cutting edges of Science, Technology and Engineering and I have been privileged to be a part of their audience. I return now to the back benches but am eager to see LSES successful, maintaining its intellect, its companionship, its tolerance and its humour.

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See you there.

Carol Hannam. Chairman