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# Lichfield Science & Engineering Society

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December 2018

Dear Member,

Welcome to my Christmas newsletter, which comes with my very best wishes for an enjoyable Christmas and happy and healthy 2019.

During Sept to Dec 2018 we have had the Erasmus Darwin Memorial Lecture, three monthly lectures, the Annual Dinner, four visits and a discussion lunch - not bad for a £25 annual subscription and a lot of good organisation by your volunteer committee, and there is more to come for the rest of the year.

**The 29<sup>th</sup> Erasmus Darwin Memorial lecture** given by Dame Jocelyn Bell Burnell, titled “**Pulsars: Stars, Cars or Watches**” on Wednesday 14 November 2018 was a sell-out.

A full house in the main auditorium enjoyed an account of the discovery of these flashing stars seen by a radio telescope built and tested by Jocelyn herself (with others). Recorded on rolls of paper charts several miles in length. It was her persistence in searching out the detailed wiggles on these charts which resulted in her convincing her colleagues that these were not Little Green Men.

She went on to describe how Pulsars rotate very fast, have small size, but enormous mass and are neutron stars radiating radio beams from their magnetic poles.

There were fascinating slides and all can be seen again on the LSES website Members Area.

Dame Jocelyn was an unassuming, charming and very practical lady and we were very lucky she came to Lichfield as ten days previously she had been in California to collect the \$3million Breakthrough Prize (which she has given away to help young physics students from disadvantaged backgrounds) and the next day she was off to Dundee as Chancellor of the University to make degree presentations.

**The Human Voice** was the title of the September lecture given by Professor Trevor Cox from the Department of Acoustics, University of Salford and was attended by 131 members and 7 visitors.

Our voice identifies us. Human speech can display many aspects of our background, nationality, locality, perhaps educational background and class and is changing all the time.

Recordings of the human voice have shown varying styles of speech and song. Trevor showed MRI films of the changing shape of the vocal cavities when speaking and pictures of the vocal folds while singing in several styles and volumes

Human voices change with age, and training. Synthetic voices are being developed to communicate with us and copy our style of speech to achieve a completely artificial artistic performance.

Trevor answered questions for about 30 minutes and said he was getting quite hoarse, but said it helps to keep the voice lubricated - he drank about a pint of water during the lecture.

Again, the lecture, slides and recordings are available to Members on the LSES website.

The Paul Bettson lecture entitled **Global Food Security: Food Famine and Fungi** was given by Professor Sarah Gurr from the University of Exeter to a nearly full house, 148 members, twelve visitors.



Crop diseases destroy about 30% of the crops grown in the world and fungi cause most of this destruction. But much more is known about human disease even though none of us will survive without sufficient food.

Diseases of the four main food crops wheat, rice, corn and potatoes have been targeted by fungicidal sprays, but these also cause loss of some beneficial fungi which help roots flourish. Some strains of each of these crops are more resistant than others, so the common practice of planting a single strain works to the disadvantage of yields. Yet, without fungicides crop yields would be much lower. There is a shortage of biologists especially those focussed on fungal disease. (Students please note)

In answer to a question Professor Gurr said that “organic” crops being better was something of a misunderstanding. Organic crops can be sprayed with many inorganic chemicals such as copper salts and the shelf-life of organic crops was also very poor.

“**Overcoming Barriers in Transplantation**” was the title of the December Lecture given by Mr Pankaj Chandak in the main theatre attended by 174 members, 20 visitors and 19 students.

Mr Chandak told us some of the history of transplants, the first transplant and how transplant surgery has become almost commonplace. That does not disguise the fact that these difficult operations are carried out by expert surgeons who take the donors’ and patients’ lives in their hands.

He described some of the improvements that were being made, in the removal of the organ (such as a kidney), preparing it for transplant by essentially keeping the organ alive and fixing the organ into the new body using keyhole surgery and robotics. He also discussed the trials and 3D modelling which can be used to prepare for the operation.

He answered so many questions from the audience that it was almost another lecture. He was thanked by Jenny and with a great round of applause.

A very enjoyable **Annual Dinner** was again held at Aston Wood Golf Club. About 77 members and their guests enjoyed a very pleasant evening and heard an after dinner talk entitled “A Life of Passions” by Mr Peter Buck who is the Engineering Director of Lichfield and Hatherton Canals Restoration Trust. In a very entertaining way he described his experiences in the engineering and construction industry.

To be in character, he wore his stove pipe hat which he passed round at the end to help fund his charity and collected a generous sum.

## VISITS:

### **Visits to Veolia UK, Four Ashes, Wolverhampton on Thursday 23 August and Tuesday 4 September.**

This Company runs the Energy Recovery Facility for Staffordshire County Council and the state of the art building was officially opened in May 2014 at a cost of over £150m. Veolia is responsible for incinerating over 320,000 tonnes of “black bag” waste, primarily from Staffordshire but also from Warwickshire. The energy created from the burning produces enough electricity to power 66,000 homes.

37 members were very professionally welcomed and given an exceptionally informative tour of the facilities. The process engineering network of piping and filtration control systems were particularly impressive. Similarly designed facilities are planned around the country to replace the alternative environmentally unfriendly and costly land-fill sites.

**Visit to The Francis Crick Institute, London on Tuesday 18 September** – this Institute is named after the British scientist, best known for his work on DNA, the molecule that contains the genetic instructions for life.



The Institute is dedicated to understanding the fundamental biology underlying health and disease. Their work is helping to understand why disease develops and to translate discoveries into new ways to prevent, diagnose and treat illnesses such as cancer, heart disease, stroke, infections and neurodegenerative diseases.

20 members had the privilege of being shown around the impressive new building, which was opened in 2016 at a cost of £650m. The open plan design allows the staff, of which there are 1300 researchers and 320 PhD postgraduates, to intermingle and encourage free movement of ideas and information.

We were divided into two parties, one led by Professor Sir Jim Smith, himself, one of the many team leaders at the Crick, the other party was led by two lady researchers working in Jim's team who gave us interesting insights into how each research team worked.

**Visit to the Manufacturing Technology Centre, Ansty Business Park on Thursday 4 October** – 32 members were given an informative insight of this impressive facility established in 2010 as an independent Research & Technology Organisation with the objective of bridging the gap between academia and industry.

The Centre focuses on three areas of technology 1) Component manufacturing, 2) Assembly systems and 3) Data systems. Our visit concentrated on the National Centre for Net Shape and Additive Manufacturing and we were shown many examples of highly complex components, which had been manufactured from powder deposition and laser applications.

The facility represents one of the largest public sector investments in UK manufacturing and now employs over 770 staff, the vast majority of whom are highly qualified professional engineers.

**Visit to Viva Rail, Stratford-upon-Avon on Thursday 22 October** – ten members (strictly limited due to the visitors' being in close proximity to the assembly operations) were given a very "warm" welcome on arrival, having been advised en route that the area was in the grips of a major power failure.

This fascinating Company, founded in 2012, converts the aluminium bodysells, bogies and motors from retired London Underground District Line rolling stock, to diesel powered, battery powered and potentially hydrogen powered trains. The drive and brains behind the venture is Adrian Shooter, former Chiltern Railways chairman and the company currently has over 200 staff.

We saw two trains in the workshop, already in completed London and North West Trains livery, due to be delivered to the Marston Vale – Bletchley line in January 2019. Orders have also been won from Transport for Wales and the West Midlands.

### **Discussion Lunch**

19 members attended a discussion lunch at Darwin House on Wednesday 26<sup>th</sup> September. Bob Giles introduced an open discussion on world population. There has been a three fold increase in the past 80 years to 7.6 billion, due to improvements in human health resulting in increasing life expectancy as well as to high birth rates. The UN forecast is for another rise to 11.7 billion in the next 80 years. It is an intractable problem.

Without major disease, the UN hopes that the world can develop to accommodate all these people. There was much discussion but no easy solutions apart from education, less child marriage and fewer children, and more prosperity.

### **Finally,**

With this newsletter is included: A list of members who have agreed to have their names published. A list of visits for Jan to April with an application form and details of the discussion lunch in February

There are also four interesting and varied lectures before the next AGM in May, I look forward to seeing you.

Best wishes to each of you. Bob

*The photo accompanying this issue of the Newsletter is of Dame Jocelyn Bell Burnell and the Society's President, Professor Peter A Lambert.*