

Ri/U3A lectures 2009

Two High Lane members attended this year's lectures. The venue was the refurbished headquarters of the Royal Institution in Mayfair, and although this was the day the American President arrived in London for the G20 Conference, all was quiet in the area.

The lecture hall was packed and seating rather cramped but this did not detract from the three outstanding presentations, each delivered by a most eminent expert.

Volcanic Hotspots and the Environmental Impact by Dr Tamasin Mather

The surface of the Earth consists of tectonic plates in constant motion and at their edges they can collide or tear apart. The volcanoes all around the Pacific Ocean are caused by colliding plates. The mid Atlantic volcanoes are due to the plates tearing apart.

The intensity of the eruptions vary from those continuously erupting with relatively small amounts of steam and ash, to super eruptions which have enormous explosions and devastating consequences. The caldera which is now Yellowstone Park was caused by a super eruption and this will eventually be repeated.

The Global environmental impact of eruptions varies according to their violence but the vast amounts of ash and sundry chemicals thrown into the upper atmosphere by a super volcano can block the sun for several years and can cause a mini Ice Age. Surprisingly however, all the evidence now shows that the constant ejection of volcanic materials to the atmosphere has a beneficial effect in balancing the carbon cycle and therefore sustaining the conditions for life.

Regenerative Medicine by Professor Chris Mason

Conventional medicines are largely management techniques, not cures - eg. Insulin manages diabetes but a cure would need a pancreas transplant which is not an option. Some defective organs can of course be replaced by a transplant but there is always a gross shortage of donors.

The long term future is clearly in regenerative medicine. By using stem cells or healthy cells from another part of the patient's own body, damaged organs can self repair. This is proven technology and whilst it is early days, certain such procedures are already clinically approved and in practice.

It will take several years for the full potential to be realised. Every individual procedure has to be thoroughly tested to satisfy the Regulators that it is safe and effective. Then robotic production methods have to be designed and tested to ensure consistent quality and minimum cost.

How Optics Shaped Physics by Professor Ian Walmsley

From Euclid in the third century BC, through to Newton in the seventeenth and Einstein in the twentieth, scientists have investigated the interfaces of light and matter. In the Middle Ages it was realised that light is a fundamental constituent of the cosmos. Then Newton established the laws of Universal Gravitation by using optical instruments which also demonstrated that light consisted of particles. The form of light's spectrum however, could not be accounted for by conventional physics but diffraction and polarization of light were soon explained using wave models.

In the nineteenth century James Maxwell unified electricity and magnetism by using Faraday's theories of force fields and in the twentieth century Albert Einstein established the theory of Special Relativity and Quantum Mechanics. Research and development are of course continuing in many fields including the use of short pulse, very high energy laser blasts to achieve the extraordinary high temperatures required to initiate nuclear fusion.

Although the last subject exposes the writers' limited knowledge of physics, the three presentations and the subsequent question and answer sessions were extremely interesting and they are really looking forward to attending the 2010 lectures.

Mike and Margaret Snape