

FST Christmas Reception

Held at The Royal Society on Tuesday, 7th December 2005

We are grateful to the **Kohn Foundation** for support for this meeting:

Speaker: **The Lord Broers FRS FREng**
Chairman, The House of Lords Select Committee on Science & Technology and
President, The Royal Academy of Engineering

I have been asked to say a few words about my perceptions, as Chairman of the House of Lords Science and Technology Committee and as President of the Royal Academy of Engineering, of the science and technology agenda for the next 12 months based upon what we have been doing for the last 12 months. Inevitably, in fifteen minutes, this can only be the briefest of abstracts

First, I think that it is obvious to all of us that there has been a steady increase in awareness and interest in the issue of climate change and its implications, especially energy where in my mind the issues are as much to do with economic and security factors as they are with climate change and green house gases.

The House of Lords Science and Technology Select Committee has been much involved in energy matters, producing reports in the last 12 months on "Energy Efficiency"¹ and "Radioactive Waste Management"² that followed upon their report in 2004 on "Renewable Energy"³ practicalities.

Energy efficiency is an essential plank of Government's energy and climate change policies but the Committee observed that there was no clear view of how to measure or manage energy efficiency. The Committee recommended a methodology to do this and also pointed out the vast inefficiency of our power generation where in 2003 no less than 61% of the energy content of fuel was either dispersed into the atmosphere as waste heat or lost as a result of the inherent inefficiency of the generating process. Other key issues were the need to raise the standards of our building regulations and the degree to which they are obeyed, and the need better to support research and innovation in the construction industry. Finally the matter of winning hearts and minds. In general in the UK energy still figures low in most people's priorities and it is clear that we need to become a nation of mature, well-informed energy users. We were impressed with the Swedes in this respect.

Inevitably in discussions of energy the question of nuclear power emerges as preeminent. It is not simply a

question of nuclear versus the renewables - that is solar, wind, wave and tidal - we must pursue all of the alternatives. In the Royal Academy of Engineering we have been tackling the economics and practicalities of a wide variety of approaches and I was pleased to see the controversy generated by our report on "The Cost of Electricity"⁴ about eighteen months ago which highlighted the fact that nuclear may in fact be one of the low cost options if one does not load it with the legacy issue created by the appalling mistakes made in the 1960s with the storage of waste. We must learn from these mistakes but then go on to look where we are now not where we were forty years ago.

On the issue of waste itself we have been advocating a more rapid response from CoRWM and one that builds upon the experiences gathered by other countries who are ahead of us on this matter. In particular we have been impressed with the Canadian approach in which shallow storage is followed by deep geological storage in a series of phases which will be commenced only after extensive evaluation of the previous phase had been evaluated and its characteristics confirmed.

In the last year, the Committee also produced its report on "The Scientific Aspects of Ageing"⁵, a subject that is clearly topical because of demographic changes, scientific progress, economic factors such as the cost of pensions and health care, rising expectations, and the opportunity to exploit the UK science base in ageing related research. This is an exciting time in biological research into the causes of ageing, and into what can be done to slow the adverse effects of the ageing process, and improve the quality of life for ageing people. The Committee observed that there are problems with the way research is organised with insufficient coordination between Research Councils and a lack of focus on the part of Government. The Secretary of State for Work and Pensions has been designated as the "Champion of Older People" and yet this Department failed to submit evidence to the Committee. We also observed that we seem to be failing to apply the technologies we already have available to improve the lives of older people. I was

1 <http://www.publications.parliament.uk/pa/ld200506/ldselect/ldstech.21/21i.pdf>

2 <http://www.publications.parliament.uk/pa/ld200405/ldselect/ldstech.89/89.pdf>

3 <http://www.publications.parliament.uk/pa/ld200405/ldselect/ldstech/89/89.pdf>

4 http://www.raeng.org.uk/news/publications/list/reports/Cost_of_Generating_Electricity.pdf

5 <http://www.publications.parliament.uk/pa/ld200506/ldselect/ldstech.20/20ii.pdf>

interested yesterday to be briefed on what has been termed "inclusive design" which is a fascinating field of engineering design that involves thinking about the capabilities, or lack of capabilities, of older people, throughout the design of new products. Take cell-phones for example; an analysis using population data suggest that 21% of the over 50s are in effect excluded from using even the standard phones. Declaring my interest as a non-executive director of Vodafone, I would point out that there has been some progress recently in the introduction of phones that are specifically designed to be simpler to use, but we can go further. These problems could in fact readily be solved if industry and commerce would recognise the enormous potential of the market which older people represent. There are vast opportunities to be exploited.

The Committee also published a report on "Science and Treaties"⁶ that emphasised the importance of international agreements on scientific matters especially in the environment field and in the control of pandemics. We felt that the Chief Science Adviser should play a more important role and be given additional support to fulfil this task.

Looking forward - The Committee's report on Pandemics will be issued next week⁷. I am not going to say anything about our recommendations other than that we have concerns in a number of areas about the adequacy of the present contingency plans.

We are already in the middle of taking evidence in our inquiry into Water - where we are examining the issues of water supply and quality in 2006.

There will be two new inquiries starting next year, one on "Science and Heritage" and a follow-up report on "Science Teaching in Schools". The inquiry on science and heritage will look at the use of science in monitoring the condition of buildings and objects of cultural importance, at the application of scientific techniques to conservation, and at the ways science and technology can enhance public understanding of and access to cultural objects.

The final topic I would like to touch upon in this brief talk is the enrichment schemes which support the teaching of science and mathematics in schools and which open young people's minds to careers in science, technology and engineering. In particular I would like to mention TESS, not to drown you in acronyms, TESS is the Technology and Engineering in Schools Strategy, which started with an initiative pulled together, at the request of Lord Sainsbury, by the Royal Academy of Engineering, the Engineering and Technology Board, and fifteen of the Engineering Institutions, but which has now, again at Lord Sainsbury's request, been broadened to include The Royal Society. The aim is to reduce dramatically the plethora of initiatives, all of which are entirely well motivated, and many of which are extremely good, but which together inundate schools. TESS will provide a

coordinated approach to delivering 'best practice' in these educational support activities with the hope of more effectively motivating young people to pursue careers in technology and science. Sir Alan Wilson is playing a key role from the DFES in defining this programme.

I expressed my own thoughts about our educational system in the HEPI lecture that I delivered in November 2005 and in which I advocated a broader curriculum and a system whereby students should not have to choose their professional specialism until their second or third year at university. In this lecture, I went on to say that "Our four year science and engineering 'master's courses', in part justified because of a perceived slippage in our school education standards, which leaves entrants less well-prepared for highly-specialised university courses, themselves fall between two stools. They are longer than is necessary for those who are not going to be specialists and too short for those who are. The '3 + 2' format, which was more widespread in the middle of the twentieth century in the UK, and which has now emerged in the Bologna agreement, is better suited to future needs." The largest problem that we face, however, is the over-specialization in schools where, amazingly, it is usual for young people to be forced into a choice that ends up with them studying nothing but mathematics and physics, or alternatively no mathematics or physics, from the age of 15. This, in my mind is extremely unfortunate and unique in the world in perpetuating a cultural divide that leaves us with few leaders on either side of the fence with a balanced viewpoint.

I have not mentioned Stem cell research or nanotechnology both of which continue to flourish in the UK despite relatively modest resources - but 15 minutes is not a long time.