Whit 2004

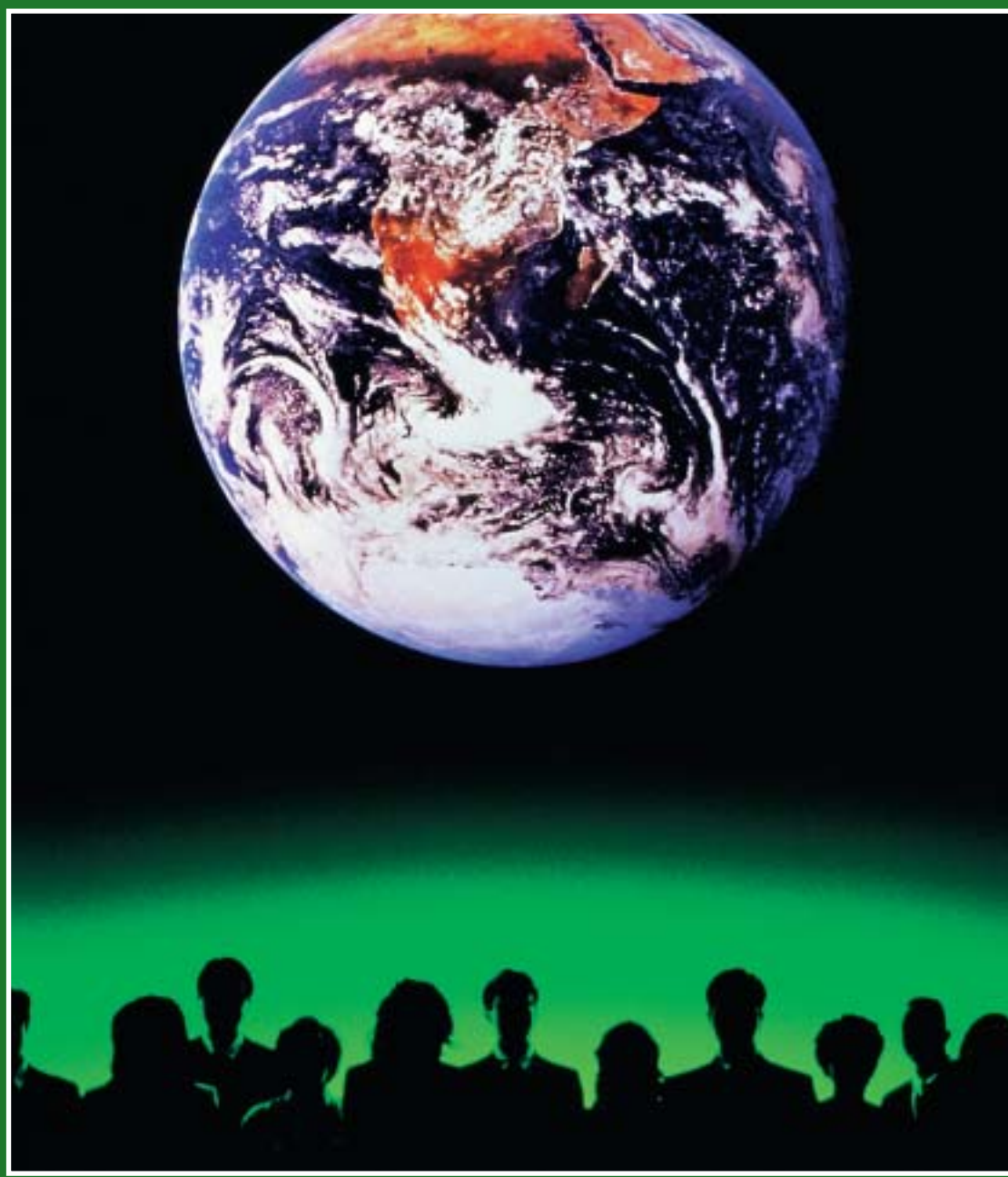
SCIENCE IN PARLIAMENT

Climate Change and Energy

Top-up Fees

Pandemics

Government Use of Science



Do Chemical Engineers Care About Sustainability?

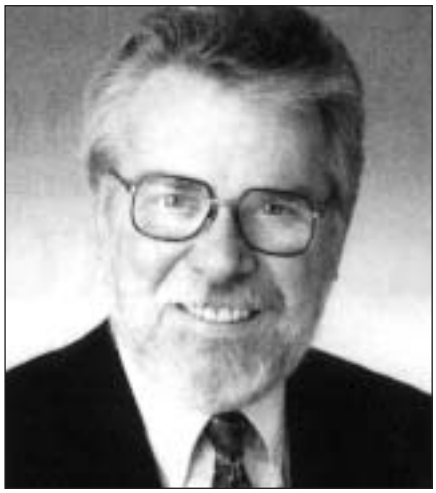
SCIENCE IN PARLIAMENT

The Journal of the Parliamentary and Scientific Committee.

The Committee is an Associate Parliamentary Group of members of both Houses of Parliament and British members of the European Parliament, representatives of scientific and technical institutions, industrial organisations and universities.

Science in Parliament has two main objectives:
a) to inform the scientific and industrial communities of activities within Parliament of a scientific nature and of the progress of relevant legislation;
b) to keep Members of Parliament abreast of scientific affairs.

The Parliamentary and Scientific Committee



Science in Parliament once again catches the flavour of vigorous debate. As the Climate Change discussion intensifies, Lord Oxburgh promotes carbon sequestration as "arguably the most important contribution that the UK could make to the problem of global warming" and challenges the Government to fund this research. Bill Tynan raises doubts about security of supply due to migration to gas as our major energy source, as so graphically illustrated by the BBC "If… the lights go out". Tom McKillop promotes England's Northwest as a centre of world class scientific achievement and enterprise. Chris Patten, as Guest Speaker at the Annual Lunch, and as a supporter of the Higher Education Bill, emphasised that the "top-up" scheme cannot solve all problems created by three decades of underfunding. "This is just the start of a long and difficult road that is vital for our future place in the world." Angus Nicoll questions our capacity to deal with acute epidemic infections and indicates the lack of research funding available for health protection in general and especially for emergencies. Lord Soulsby describes the plague of animal diseases which provide a constant threat and outlines our ability to resist them. The Science Week Seminar introduced jointly with Lord Sainsbury, Beagle2, Ground Stability and a revived Correspondence Column are available for future comment.

Dr Douglas Naysmith MP
Chairman, Editorial Board,
Science in Parliament

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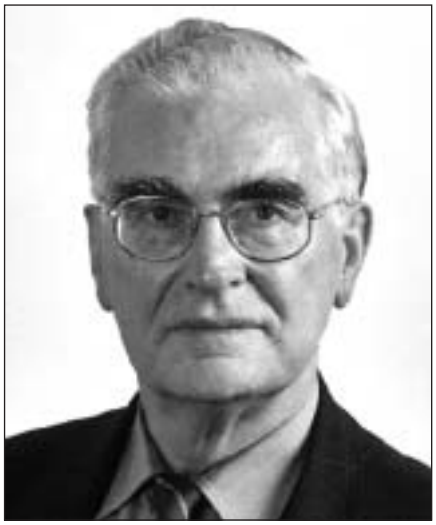
The Goldilocks Planet - CO_2 and Energy Policy

The Lord Oxburgh KBE FRS



A Member of Parliament promoting a new road scheme was asked about the environmental consequences of increased traffic. He replied " negligible – you see the joggers round here – five of them put more CO_2 into the atmosphere than a Porsche". I'm not quite sure what this statement means but at very best it is ill informed and grossly misleading. It is worrying that a respected politician should have so little understanding of the Carbon cycle.

The Carbon cycle is a combination of natural processes that keeps the atmospheric concentration of CO_2 as Goldilocks liked her porridge "just right" – just right that is for the animal and plant communities that have adapted themselves to the Earth that we have today "…. not too hot and not too cold".

CO_2 leaks continuously from the Earth's crust into the atmosphere both directly and by rock weathering. But this is balanced by plants and animals – particularly in the oceans – that extract CO_2 from the atmosphere. Most of this is returned to the atmosphere when an organism dies but a fraction is permanently removed by burial. Fossil fuels contain CO_2 that has been removed from the atmosphere and stored in the crust for millions of years. CO_2 released by burning fossil fuels over the last century roughly represents the accumulation over 100 million years. No wonder the composition of the atmosphere is changing!

So what does this mean for energy policy? We have two reasons for moving away from fossil fuels:

- they will run out and sooner or later alternatives must be found, and, more urgently
- continuing to increase atmospheric CO_2 risks changing our climate with serious ecological, humanitarian and economic consequences

With little prospect of a significant move away from fossil fuels in less than thirty years the future of the world looks bleak – both electricity generation and transport are almost entirely dependent on fossil fuel. Furthermore, developing countries presently use relatively little fossil fuel but as their standards of living rise so will their fossil fuel consumption. For India and China, the two most populous countries in the world, massive indigenous reserves of coal offer a prospect of cheap electricity generation. Unfortunately coal produces about twice as much CO_2 as natural gas for similar amounts of energy.

So what should our strategy be? The Energy White Paper of last year deserves at least two cheers but not quite three. It offers a three-pronged strategy: very roughly it assumes that "intrinsic" UK electricity demand will remain constant over the next 20 years but that actual demand can be reduced by 20% through energy savings. Of the residual demand three quarters is to be met by imported gas and one quarter by renewable sources. This strategy if successful should lead to a significant national reduction in greenhouse gas emissions: non-polluting renewables replace non-polluting obsolescent nuclear stations as they are closed down, and gas replaces the older and dirtier oil and coal power stations. The problem of transport is not tackled.

Unfortunately it hardly matters what the UK does about greenhouse gases since our reductions will be scarcely noticeable compared with the massive increases that developing countries will feel legitimately are their right.

This suggests that an additional fourth prong needs adding to the national strategy. As a priority, ways should be sought to mitigate the effects of burning fossil fuel, by removal and separate disposal of CO_2. These technologies exist but are neither efficient nor cheap. Our own emissions targets could thus be met and help provide for others by developing efficient and cheap CO_2 sequestration technologies for power stations and motor vehicles, and offering them at low cost to developing countries.

Opponents of this strategy argue that it will prolong the use of fossil fuels and create the problem of disposing of the CO_2 in whatever manner. This is not necessarily so. There is an energy cost but no real practical problem in pumping CO_2 back underground into depleted oil and gas reservoirs where it came from. Some CO_2 is present virtually everywhere in underground waters and sometimes in considerable concentrations as in naturally carbonated mineral waters.

The general thrust of Government policies should be supported although questions of security of supply remain to be answered. We should remember that unlike cars, neither joggers nor people who burn wood are adding to the CO_2 problem because they are simply recycling existing atmospheric CO_2! A major effort should therefore now be put into developing and applying the carbon sequestration technology for our benefit and as a major contribution to a global problem.

Energy Supply

Bill Tynan MP

The debate on energy supply and the question of an integrated energy policy has been rumbling on for many decades. The Energy Bill is currently concluding its passage through the House of Lords and its passage through the House of Commons will generate much needed discussion on a vital component of our economy and the well being of the people of this country.

Nuclear energy has been much maligned as a source of energy for a number of reasons; because of the legitimate safety aspects, it is depicted as some sort of nightmare scenario with workers dressed in safety suits, the public conclusion being that it must therefore be dangerous. The issue of nuclear waste and the sensationalist manner, in which the media portray the issue and the industry, has also not been helpful. The nuclear industry in this country has one of the safest records of all power generation. In addition with the Nuclear Decommissioning Agency soon to be created and countries like Finland well advanced in creating ways of dealing with waste, the fears that surround nuclear waste can be dealt with.

The other major energy issue is the environment and the greenhouse gas effect. We are a country committed to reducing CO_2 emissions by 10 million tonnes of carbon a year by 2010 and the nuclear industry at present does, and hopefully into the future will, play a significant role in meeting our obligations. Renewable energy is being promoted as the way forward for reducing carbon emissions and within an integrated energy policy there is, without doubt, a need for energy to be generated from sources such as wind, wave and hydro. To date however production is only around 30% efficient and needs 100% back-up to ensure continuity of energy supply when, for example, the wind does not blow as may happen at any time and for extended periods. That back-up is likely to be gas or coal fired power stations. Coal is seen as a dirty fuel, with CO_2 emissions unacceptably high, and it is essential the industry is given the opportunity to develop and introduce clean coal technology to maintain coal within our energy policy options.

Nuclear power stations are being phased out and all will have ceased to generate by 2025 unless decisions are taken as a matter of urgency to replace them with new build. The Government has committed to "keeping the option open" but it might take up to a decade to plan, design, build and bring to operation new nuclear power stations. It is expected that as the proportion of electricity generated by nuclear power stations falls from the current 25%, while some may be replaced by renewable energy, most will be replaced by gas fired power stations. Each nuclear power station might be replaced by gas power stations emitting around 500,000 tonnes of carbon each a year, the equivalent of cancelling out the savings from 100 million energy saving light bulbs.

Gas will become our major energy source and by 2005/06 we will be a net importer of gas from Russia, the Middle East and Africa. By 2010 we could be dependent on gas for 70% of our energy supply, with much of this gas having to be imported. This would have consequences ranging from the likely need to modify many domestic gas appliances because of difference in quality of imported gas, through to the more serious issue of costs and security of supply. The main gas exporters are in regions not known for their stability. We will thus face risks of interruptions in supply, price fluctuations and the possible consequences of being at the end of the distribution network (witness already domestic gas prices in Northern Ireland that are up to 30% higher than in Great Britain). Additionally given the profits that can be made exporting gas, some states are turning to nuclear generation for their domestic energy needs with all the safety and proliferation fears that brings.

Security of supply must therefore be a major issue for discussion and debate over the next few years. Various organisations are now actively encouraging an informed debate. The newly formed All Party Nuclear Energy Group, often working with other organisations, welcomes debate and discussion as a means to securing a secure, diverse and balanced energy policy. The programme broadcast by the BBC, "If… the lights go out" graphically illustrated the problems we may have if Government get the energy policy wrong. The debate over the next few months is crucial and with issues such as security of supply and meeting our Kyoto commitments facing us we need an informed, evidence-based debate so that the choices we make are the right ones.

An Energy Efficiency Strategy - Plugging the Gap

David Chaytor MP

The 2003 Energy White Paper argued that energy efficiency is the cheapest, cleanest and safest way of achieving the four long-term goals of energy policy. The White Paper is full of good policies and long-term objectives – particularly the acceptance of the need to achieve 60% reductions in CO_2 by 2050 as recommended by the Royal Commission on Environmental Pollution.

However, in some ways the White Paper fell short of expectations and, in fact, was heavily criticised by the All Party Science and Technology Select Committee. So perhaps a few suggestions for improvements are in order.

The biggest surprise of the White Paper is that although it set firm targets for combined heat and power and aspirational targets for renewable power, no targets or goals (aspirational or otherwise) were set for the cheapest, cleanest and safest way of achieving our long-term objectives. Instead words like what is "expected" and "possible" are used in relation to energy efficiency.

This is not only puzzling – it is counter-productive. Already all the major trade associations and energy efficiency industries have written to Members of Parliament saying very clearly that without firm, clear and unambiguous targets, long term investment will be unlikely: banks, board and shareholders will not invest on the basis of warm words – they need the reasonable market certainty provided by firm targets and policies.

The Government now has a duty to set an energy efficiency aim under the Sustainable Energy Act 2003. It is essential that the carbon savings "expected" from energy efficiency in the White Paper will now be specified as the "aim" under that Act. Any failure to do so could result in a loss of confidence by the industry with the resulting falling off of investment.

Achieving the 60% CO_2 reductions by 2050 will be difficult: it will also require much more investment in research and new technology. In paragraph 47 of the White Paper the Government "agrees with the recommendation of the Chief Scientific Advisor's Energy Research group that…. increases in investment in research and development is particularly likely to yield results."

With this in mind it is disappointing that more flesh is not put on this bare bone. The Energy Efficiency Implementation Plan, due to be published shortly, must include measures to rectify this.

One area of new technology given little strategic attention in the White Paper is that of micro generation, including heat pumps (important for dealing with fuel poverty in rural areas not on the gas network), micro CHP, micro wind and micro hydro. These technologies do excite interest at local level. And so a Government strategy to encourage personal investment by individuals and communities in these technologies is needed to increase their uptake over the next 5-10 years. Not only would such investment relieve the pressure on the public purse, and reduce CO_2 emissions, it could also relieve pressure on the national grid and help ensure security of supplies.

The role of the Treasury in any strategy is vital. The Chancellor's 2004 Budget included important proposals to extend the current 5% VAT rate to include heat pumps and micro CHP. The Budget also introduced a new energy efficiency tax allowance for private landlords. Now the Treasury should seriously examine proposals for an energy efficiency stamp duty rebate for homebuyers. This would be an ideal policy for a pre-election Budget in 2005.

Finally, the Energy Efficiency Commitment (EEC) is to be continued at double its present rate. This is very good news. The EEC could be made even more successful with a minor improvement such as special allowances for the installation of new technology. This would provide a kick start for emerging industries at the very time they need it. It would help to generate a virtuous circle of greater demand leading to larger scale production delivering falling prices leading to greater demand for energy efficiency.

This is the key to unlocking the power of energy efficiency to manage the transition to a low carbon economy.

We should all give two and a half cheers for the White Paper. Adopting the measures I have described above would not only be effective in securing CO_2 reductions but would also be popular in electoral terms. That's why a cross party group of parliamentary colleagues has recently formed The All Party Group for Intelligent Energy to raise the profile of energy efficiency in Parliament.

Effective, efficient, cheap, clean, safe and popular with the electorate; this is truly the only intelligent energy policy.

David Chaytor has been the Labour Member of Parliament for Bury North since 1997. He is a member of the Environmental Audit Select Committee and the Chair of the All Party Group for Intelligent Energy.

Science in the North West

Tom McKillop, Chief Executive of AstraZeneca and Chairman of Northwest Science

England's Northwest has a strong tradition of scientific excellence that has delivered some of the world's leading edge ideas and breakthroughs, from the birth of the world's first test tube baby to the splitting of the atom.

Boasting the largest concentration of universities in Europe, with a combined turnover of £1.2 billion, the Northwest hosts one of the strongest research bases in the continent. The combined Northwest universities currently train 69,000 science students and the science base in the Northwest contributes 243,000 jobs and £25 billion in sales to the regional economy.

The vital contribution that science makes to the competitiveness of the Northwest region is recognised by the Northwest Development Agency (NWDA). Through the creation of science parks close to these universities, the flow of ideas and the dissemination of information has dramatically increased, and a number of initiatives have been developed to help accelerate technology and the transfer of knowledge across the small business community.

The importance of science and technology to the Northwest region is also clearly recognised in the Regional Economic Strategy, as providing the impetus for investment and innovation across key business sectors, creating high quality employment and social renewal.

Previously, the agenda for science research was nationally driven with no regional dimension at all. The Northwest has pioneered this issue, being the first region to establish a regional Science Council and Science Strategy.

Northwest Science, the country's first ever science council, was established in 2001 by the NWDA to develop scientific research and development in the Northwest. A partnership of leading business, academic and economic development organisations, Northwest Science, is committed to establishing a common vision and developing a strategy for science in the region.

One of the first objectives at Northwest Science was to produce a long-term strategy that not only created jobs, but also positioned the Northwest as a centre of excellence in scientific research and development, and this was launched in December 2002.

The strategy is focused, and initially the council has worked with business clusters in five of the sectors that also form part of the region's economic strategy. These are Biotechnology, Aerospace, Chemicals, Environmental Technologies, and Nuclear Energy. However, it is fundamental to success that the strategy is modified and updated with the changing and advancing nature of the science and technology sector, or vital opportunities may be missed.

The strategy was specifically designed to ensure that the council builds upon the region's strengths such as Jodrell Bank, the most sensitive high-resolution imaging radio-telescope in the world, and the region's most successful companies, such as AstraZeneca, which has a global research and development facility in Cheshire. In the academic sector, Project Unity brings together the University of Manchester and UMIST to form a new world-class 21st Century University for Manchester, a move that will boost the already excellent university facilities. This has the potential to attract the best students and academics from across the world, ensuring a supply of first-class people for the future of science and technology.

Daresbury Laboratory in Cheshire is internationally recognised for its leading work in accelerator science, physics, engineering and imaging technologies and is showing enormous potential to become a Centre of Scientific Excellence. The development of the world's first Fourth Generation Light Source (or 4GLS) will bring further scientific interest to England's Northwest.

Developed by the scientists at Daresbury and within the region's universities, this is an exciting, world-class project that offers enhanced opportunities for the science community. Coupled with the development of a Science Park and Incubator, this places Daresbury at the heart of scientific research and development, and the Science Council will continue to give high priority to supporting this vital research centre for the Northwest.

There are also many more major science-based projects being developed throughout the region including: the National BioManufacturing Facility, the Northwest Genetics Knowledge Park, InfoLab 21, the National Microsystems Packaging Centre, the National Centre of Excellence in Science and Teaching, an Aerospace Innovation Centre, and a Centre for Environmental Excellence Research and Teaching.

The importance of science and technology to our region is clearly recognised in the Regional Economic Strategy, as providing the impetus for investment and innovation across key business sectors, creating high quality employment and social renewal.

The vision is clear for the Northwest region and there is immense enthusiasm, and a determination to succeed. England's Northwest will be renowned as an area of world-class scientific achievement, creating a magnet for talent and investment, a driver for innovation and enterprise, and a force for delivering benefits to health, the environment, and society.

If you require further information on the projects that the Council is currently involved with please visit www.northwestscience.co.uk.

The Annual Lunch was held on Thursday 5th February 2004.

Lord Waldegrave, Tam Dalyell MP and Chris Patten

Lord Waldegrave of North Hill, the President of the Committee, thanked Dr David Dent, Managing Director of CABI Bioscience for the help given to the Parliamentary and Scientific Committee in the past year. He also thanked Dr Alan Whitehouse on his retirement as Administrative Secretary for his work on behalf of the Committee over so many years and welcomed Professor Peter Simpson, a geoscientist from the Royal School of Mines, as Alan's successor.

Lord Waldegrave introduced the guests including Bob May, President of the Royal Society, Alec Broers, President of the Royal Academy of Engineering, David King the Government's Chief Scientific Adviser, Tony Cleaver, Chairman of the MRC, Peter Ringrose, Chairman of the BBSRC and a special welcome for Keith O'Nions the new Director-General of the Research Councils. He paid tribute to the Government's work on the Science Budget, especially the Research Council funding, where he particularly mentioned the work of David Sainsbury and David King. He commended the Government for recognising that a funding gap exists at universities and for acting on it although this story is unfinished, and represents a vital hole to be filled, creating both threats and opportunities.

Turning to the Guest of Honour, Chris Patten, Commissioner in charge of External Relations for the European Union, he indicated that this is the subject of his address. "Chris Patten, has several jobs and qualifications including Chancellor of two distinguished universities. He maintains an immense job in Brussels as Commissioner and it is not easy for him to get away, but nobody could be better placed to talk about this subject in relation to the British universities, and we all look forward to what he has to say."

Mr Patten introduced his talk and pointed out that the previous week had begun with the vote on the funding of our universities. This drama had stirred debate on university finance for months beforehand. He hoped that a subject of such importance had only just begun and would not slip into the background, leaving our universities to their fate.

He pointed out that as Hong Kong Governor, he was Chancellor of nine higher education institutions and presided over more congregations than anyone should ever wish to aspire to.

Higher education expansion in Hong Kong under his governorship and that of his predecessor Lord Wilson – now Chancellor of Aberdeen and Master of Peterhouse – had involved transformation of a refugee community into a sophisticated and prosperous world-class city.

Chris Patten became Chancellor of Newcastle in 1998, and Chancellor of Oxford last year. His Oxford predecessors provided their own descriptions for the role of Chancellor. "Well, you see," said Harold Macmillan, "the Vice-Chancellor really runs the university and if you didn't have a Chancellor you couldn't have a Vice-Chancellor." For Roy Jenkins, the post was one of "impotence assuaged by magnificence." Chris Patten assumed that he was entitled, indeed expected, to have views on higher education. So he offered four personal reflections fully quoted below, which he hoped would not shock the audience.

First, the "top-up" scheme is not going to solve problems created by three decades of educational under-funding. Those who say that without "top-up" fees we would be better off, that we should strike out on our own, and bankruptcy would make us more courageous – demonstrate the bravado of armchair generals. I do favour increasing university autonomy, increasing independent funding, and supporting taxpayers for specific educational objectives.

I want the Bill to complete its legislative journey and hope friends of higher education in both Houses of Parliament will help, although the Conservative Party has not behaved well or sensibly on this question. It seems to me contradictory to believe in big citizens and a small state – and then to add small universities to the list. Conservatives promise us a re-think. In the meantime, I suggest that the Opposition allow this modestly Tory measure through to the statute book.

Secondly, must we allow prejudices about social equity to pillage our education system? There is no evidence that free higher education has promoted social inclusion. When I attended university on a scholarship in the 1960s, six per cent of my age group did so. Today that figure has risen seven fold. But the balance between students from middle-class and blue-collar backgrounds is the same as before. Free higher education has helped the better-off. Is this the fault of universities?

I would not support lower standards in our universities to compensate for low expectations in many secondary schools. That would impoverish the system and cheat the most able. Many universities – Newcastle and Oxford, for example – broaden access through out-reach activities in schools.

Sir David King and Baroness Walmsley

Admissions policies are designed to bring on those with greatest potential and some universities realise this means giving benefit of the doubt to candidates with less fortunate educational backgrounds. But these efforts do address the problems of our inner city areas where barely one third of students stay on at school beyond the age of sixteen.

The most damaging part of the argument about top-up fees is hostility to the concept of variability which is understood by every student completing university application forms – that universities differ. All deserve esteem but all do not serve identical purposes. Do we expect every university to offer world class research – or do we want to make it difficult for any universities to achieve the best by insisting that all are similar and therefore deserve similar funding? We degrade and demean our greatest national institutions by tarring them with the elitist brush.

Do we still want Britain to boast of some of the best universities in the world? Can you imagine an American President slagging off Harvard, Princeton and Stanford, or Yale whose Skull and Bones fraternity house seems set to produce the rival presidential candidates in the land of the free and the class-less. What would our Chancellor of the Exchequer say about the practice at some American Ivy League and public universities of preferential treatment for the children of alumni? How would Mr Brown react to the Harvard Dean of Admissions who argued that they reflect an "ever so slight tip" to the otherwise level playing field. Perhaps he would have commended this as a way of encouraging greater alumni giving here.

My third point is short, simple and very unfashionable. What is the purpose of university expansion? Why make more places available for students? Why insist that 30, 40, 50 or I suppose any other per cent should go to university? We want as many as possible to develop to their full potential requiring different courses and levels of academic rigour. I

support the Government's encouragement of foundation degrees. We want a well-qualified and well-educated workforce which comes at a price we must be ready to pay. Resources are thus spread more thinly and quality suffers which explains why more university places do not equate with higher economic growth.

This distracts attention from two important issues – what is the real purpose of a university education and are universities achieving that aim today? Universities should introduce students to scholarship, to personal intellectual achievement, to knowledge and learning. They are not a rite of passage before joining Clifford Chance or the M and S graduate training programme. Independent universities are part of the infrastructure in an open and plural society, inculcating values of tolerance, moderation and freedom that keep our country civilised.

My fourth point concerns the quality of universities and the intellectual capital of the country required for our well-being. We benefit in Britain and Europe from the intellectual legacy of the last century. What will we be in a position to hand on in our turn?

There is much talk about the disproportionate military power of the United States and Europe. I believe that Europe should pay more for security and play a larger role as peace-keepers in the world. But I neither wish nor expect that Europe should rival America as a military force.

What I worry about more is the gap between American and European universities. Shanghai Jiaotong University recently ranked the world's top 500 universities, based on Nobel laureates, highly cited researchers, articles in "Nature" and "Science", the Science Citation Index-expanded, the Social Sciences Citation Index, academic performance by faculty, with emphasis on the sciences, but less on teaching compared with academic or research performance, and a linguistic bias in favour of publications in English. It looks like a fair comparison which should make Europeans extremely worried.

Dr Ian Gibson MP, Richard Page MP and Lord Waldegrave

Two European universities (Oxford and Cambridge) feature in the top 10 – all the others are American. Two more British universities (Imperial College and UCL) come in the top 20 – all the rest are American, except for the University of Tokyo. The Swiss Federal Institution of Technology in Zurich comes in at number 25, and there are just five other European universities in the top 50 including Edinburgh University.

The USA has 4-5 per cent of the world's population but accounts for 41 per cent of the world's research and development spending. The European Union has 6 per cent of the world's population and accounts for 8 per cent of world research and development expenditure. R & D spending per head is $25 in the EU and $179 in the USA.

Over half of American R & D spending is defence-related, much of it by the private sector. But much is spent on campus which explains why American universities are a magnet to talented young European and Asian academics. The transatlantic differences in academic salaries and supporting services are another important factor in the brain drain.

There is a tendency to think that the research funding gap should be bridged by the private sector. I would like to see more corporate sponsorship and funding. But we should not underestimate that much curiosity-driven "blue skies" research makes the biggest breakthroughs. Most private sector funds support discrete, focused research projects with an identifiable return. That is important, but it would never have led to discovery of the DNA structure.

It is true that American Universities get more private financial support than European ones and only two European universities would feature in a list of the top 150 American beneficiaries of private endowments. American taxpayers also spend more on higher education than British taxpayers.

I hope that the debate about our universities, triggered by the Government's scheme for top-up fees, will not now fall silent. The issues are central to Britain's and Europe's future. The way we tackle these problems will determine what sort of country we become. Mr Blair deserves credit for making a start. However, top-up fees will only scratch the surface. The 30 years' neglect of higher education funding has had a cumulative impact. We may not be guaranteed a spectacular overnight transformation if we suddenly reverse the trend and start to fund universities properly – which may explain why successive governments have not been more generous. In education there is a close relationship between what we sow and what we reap. That is why we must now find the collective determination to address the problem. It is a difficult and long road, but vital for our future place in the world that we set out on and complete the journey.

PREPARATIONS IN THE UK AGAINST PANDEMICS

MEETING OF THE PARLIAMENTARY AND SCIENTIFIC COMMITTEE ON MONDAY, 23RD FEBRUARY 2004

It is not a question of whether but when the next epidemic outbreak will occur in the UK, imported from abroad through increases in travel and transport of animals. Of course there are contingency plans, but how well prepared are we?

Angus Nicoll considers the likely routes for the importation of human disease, the plans in place to deal with any epidemic and what more should be done. Lord Soulsby deals with the subject from the perspective of the protection of animals and changing insect vectors to humans under the influence of global warming, with the general proviso that "Those who do not remember the past are condemned to repeat it", and "It is difficult to make predictions especially about the future" Yogi Berra.

UK Preparedness for Epidemic Threats

Professor Angus Nicoll CBE[1], Health Protection Agency

Infectious diseases are peculiarly good at revealing weaknesses in health care and legal systems and societies. They are a "high risk" area for those responsible for health and things can go very wrong, very quickly. A year ago we had no inkling we were about to be fighting SARS, an entirely new infection that would remove over $20 billion from national economies.

The threats from infectious disease epidemics are rising. Reasons include external factors such as increased travel and movement of goods around the world, accelerating penetration of virgin forests, as well as bioterrorism. Trends in western societies such as decentralisation and ever more complex health care economies have increased vulnerability and are at odds with the production of effective responses to epidemics.

This talk focuses on acute epidemics; SARS, influenza, norovirus, food poisoning and others. It does not deal with slower epidemics of HIV, tuberculosis etc, nor with bioterrorism since according to the HPA's Chairman, Sir William Stewart "Mother Nature is the Biggest Bioterrorist".

Do we have answers to these three crucial questions concerning the UK?

The ability to learn from our own experience?

The ability to learn from the experience of others?

The capacity to deal with epidemic infections?

Learning from our own and others' experiences

Historically the UK has learnt from its own experience. For example, in 1988, following poorly handled outbreaks of salmonella and Legionnaires disease in hospital and the accidental release of smallpox, the Acheson report on public health created Consultants in Communicable Disease Control in every locality, and our national Communicable Disease Surveillance Centre.

A policy of learning only by national experience is inadequate given the serendipity of outbreaks and epidemics. We must also learn from the experience of others where the UK record is more patchy. A robust response to AIDS in the 1980s arose because Sir Donald Acheson (CMO – England), along with the now Lord Fowler saw a clear threat from AIDS that was affecting USA and Africa. The Government dramatically alerted the whole population to the risk. Sexual behaviour improved, rates of key STDs plummeted and the early penetration of the HIV pandemic was blunted. Consequently the UK had significantly lower HIV levels for a decade than comparable European countries. Sadly that effect wore off and numbers of new diagnoses of HIV and other STDs accelerated after 1995.

After September 11th and the subsequent anthrax attacks in America, the UK responded well, requiring the whole approach to health protection to change. The anthrax releases were covert (the perpetrator has never been identified) so that health services became key to detection and response. Working with the CMO's office we established a Health Protection Alerting System for front-line HPA and hospital staff alerting them rapidly to new threats.

However the UK still has lessons to learn. America was particularly

[1] The author is grateful for comments and contributions to the original talk from the following individuals: Ray Arthur, Margaret Chan, Sir Cyril Chantler, Alan Moren, Barry Evans, John Edmunds, Paul Gayford, Roger Gilmour, Sian Griffiths, Paul Gully, Jane Leese, Nigel Lightfoot, Liz Macintosh, Brian McCloskey, Alain Moren, John Wyn Owen, Stephen Palmer, Gunael Rodier, Roland Salmon, John Simpson, Brian Smyth and Pat Troop.

vulnerable where public health was locally weak and fragmented. Consequently the US government provided over $1billion annually for strengthening local public health preparedness. During SARS the public health services in Canada were also found wanting with too many small units, inadequate command and control and therefore little surge capacity. The Canadians are also investing heavily in public health. Local services delivering public health and health protection in England are again being reorganised. Preparedness will improve as the roles of the NHS structures, regional and local government and the HPA develop. Establishing the HPA alone has significantly improved surge capacity and flexibility of response. We are confident that protection will become even stronger over time. However more investment would help the UK respond more quickly.

UK Preparedness

What else can be learnt from SARS? Control in both China and Canada was helped by good public health laws. In England and Wales there is universal dissatisfaction with public health laws that are considered confused and arcane. Last year the HPA consulted for the CMO on whether to make SARS notifiable. The consensus was this would add little as the legal powers that ensued were mostly irrelevant, while surveillance was already working well. Though it is important not to overstate the value of laws controlling infections, both China and Canada found their laws useful, for example in enforcing quarantine behaviour. In the UK the only way to enforce quarantine will be by declaring a national emergency!

In Canada tensions between federal, provincial and local levels generated communication failures and there was confusion over roles and responsibilities. The HPA is helping to overcome this by operating as a single body and the "Five Nations" arrangements which join up the four UK countries and Ireland at the technical level.

Information Systems worked tolerably well in Hong Kong – less so in Canada and both are being strengthened. Here the UK is vulnerable. Currently NHS informatics are not always supportive of health protection. The HPA is investing substantially in informatics but cannot deliver alone. NHS IT systems will have to meet standards so that reporting and alerting for health protection are efficient and automatic. Guarantees are needed that interpretations of the Data Protection Act do not prevent sharing of routine information essential for health protection. The UK has highly capable professionals but manpower is limited and there is a strong case for expanding the numbers of trainees and cadres such as public health (medical and non-medical), microbiology, public health nursing and infectious disease that contribute to health protection.

The first line of UK defence against international outbreaks is control at the point of emergence, be it vCJD in the UK, Ebola in Uganda, or SARS or influenza in China. Hence international defence is essential. International Laws such as the WHO proposals for International Health Regulations must be modernised and European governments should support them. These will compel countries to report all outbreaks that pose international threats, for example. The UK's Department for International Development is excellent in many ways but current mechanisms do not always allow use of the best UK expertise abroad. The second line of UK defence is rarely at borders and airports but in hospitals when they receive cases. Accident and emergency departments and wards must be managed so as not to act as amplifiers of infection as they did for SARS. In both Canada and Hong Kong complex management of staff and patients moving rapidly from place to place prejudiced infection control. High hospital efficiency, running at over 90% bed occupancy is incompatible with effective outbreak control. How will the NHS cope with the next flu pandemic? An important message is that it cannot function normally during epidemics and outbreaks. There are trigger points where normal practice would have to cease.

The UK lacks research funding for health protection in general and during emergencies in particular. There are few resources for the applied R & D work needed to underpin responses to incidents, so when an emergency such as SARS occurs there are no UK funds available for essential research.

Twelve Lessons[2]

1 Pandemics and epidemics are becoming more likely and decentralisation and increasingly complex health economies are increasingly vulnerable.

2 Much has been achieved to strengthen health protection and the UK is better prepared than many other countries though more preparation is needed for epidemic threats.

3 It should be appreciated that for some acute epidemics, such as a serious flu pandemic the response would not be a case of "business as usual", especially in the NHS.

4 For international infections the first and best line of defence will be control in the country of origin.

5 Border controls such as screening travellers are rarely effective and for hospital associated infections such as SARS the second line of defence depends on how the infection is handled in emergency rooms and on hospital wards.

6 UK public health law needs reform and WHO's proposals for strengthening the International Health Regulations deserve support.

7 Consideration must be given on how to deliver health protection for UK-PLC as a whole.

8 Planning is essential but trying to develop detailed plans for every eventuality is unhelpful. It is best to have broad plans based on accepted ways of working, institutional relationships, clear understanding of roles and the people who implement them.

9 Lessons must be learnt from other countries and from our own experience and mistakes.

10 Particular attention needs to be paid to strengthening the routine public health and health protection manpower. At the same time there needs to be better organisation of the resources we have, so as to improve surge capacity.

11 The UK's capacity for international health protection work is underexploited.

12 Explicit needs exist for emergency research and development for example through a Rapid Vaccine Development Facility.

[2] Note these lessons come from the original talk and are not all supported in the abridged text.

Exotic Animal Disease and its Prevention

Lord Soulsby of Swaffham Prior

The Threats

Had anyone suggested that we would be beset by major animal disease plagues at the outset of the century, he would have been considered out of date with medical and veterinary progress and ability to control disease. Yet some 30 years ago the Surgeon General of the US informed the US Senate that infectious disease had been conquered. How wrong he was, both human and animal infectious disease is now rampant and moves with alarming rapidity from country to country, aided by massive increases in travel (millions coming into the UK as tourists, business travellers and refugees) and World Trade agreements.

We recently had Foot and Mouth Disease (Asian strain) for the first time in 30 years and Swine Fever; both are reminders of the devastating effect animal disease can have on livestock, agriculture, the rural economy and human health and happiness. These pandemics should spur us on to prevent animal plagues from entering the United Kingdom.

What are these plagues that threaten? Firstly, there is Foot and Mouth Disease, with several strains of the virus. Their world location is well known, but as with the recent pandemic in the UK, exotic strains can enter the UK via meat and enter meat scraps. Meat and meat scraps fed to pigs are almost certainly the source of Swine Fever in the UK.

Livestock Animals

Cattle plague or Rinderpest was a major pestilence in the 19th century affecting milk supply in town and country. It was brought under control by a slaughter policy and can be eradicated, given the political will and application to do so.

African Swine Fever is a major threat to the European pig industry and has already entered the Iberian Peninsula where it has been controlled by rigorous measures. African Horse Sickness, spread by biting midges, has also entered Europe temporarily but has been controlled.

As an island the UK is presently protected against diseases transmitted by insects. With global warming there is potential for exotic insect and other arthropod species to become established in the UK and help the introduction of exotic diseases. For example, East Coast Fever, a highly pathogenic disease of imported cattle in Africa, is tick transmitted and a related form *(Theileria annulata)* is present in animals in the Mediterranean littoral. The adaptation of transmitting ticks to the UK could have serious consequences.

Other exotic diseases of concern to our domestic livestock are Contagious Bovine Pleuro-pneumonia, Peste des petites ruminants, Rift Valley Fever, Heartwater, various pox diseases, Dourine, Newcastle Disease of poultry, etc. Mention must be made of the avian 'flu (H5N1 strain) currently sweeping countries in the Far East, resulting in death for millions of chickens, either from the infection or in slaughter control programmes. This strain of avian 'flu (H5N1) has not been seen in the East since the mid-1920's. It is highly pathogenic and also has caused human disease and death in people in close contact with infected poultry. There is major concern that the avian 'flu virus will re-assort with human 'flu (1H or 3H types) to produce a virulent (4H type) hybrid 'flu capable of rapid spread. The human population has not been exposed to a 4H strain of 'flu for many years. Import of poultry and products has been banned.

Companion Animals

We must also consider infectious diseases of companion animals. Rabies, once a dreaded disease of dogs and wild carnivores, has been eradicated from Western Europe, although it still rages in India where 15,000 human deaths occur annually and China has 1,000 human cases per year. The success of the oral vaccine to control fox rabies is one of the outstanding examples of disease control in the 20th century and has permitted free movement of dogs and cats into the UK from designated countries. Many tens of thousands of animals have entered the UK without need for quarantine.

Freedom of movement for dogs and cats brings other concerns, namely tropical and sub-tropical infections not established in the UK such as *Leishmania infantum*, a common parasite in dogs in Greece and Spain. It is transmitted by contact and by sandflies and a few UK cases are diagnosed in dogs from the Mediterranean area. We do not know whether our domestic sandflies have the vector potential to establish

Leishmania in the UK. *Leishmania* is a zoonosis and can cause disease in children – as the name *L. infantum* suggests. Heartworm *Direfilania immitis* is found in Southern Europe and the USA. It is an infection of companion animals and has entered the UK even through quarantine. It is mosquito transmitted and the parasite and transmitting blood-sucking fly readily adapt to new climate zones. Thus once a parasite of dogs mainly of the Southern United States, it is now found in Canada.

Wildlife

Prior to vaccination some 50% of foxes died from rabies, now the population is expanding and they are frequently found in gardens, orchards and public recreation places in search of ground rodents, voles, etc or are being fed by householders. They contaminate these areas with their faeces, including ground fruit and vegetables. Foxes are also hosts for a tapeworm, *Echinococcus multilocaularis*, which can cause serious progressive invasive lesions of rodent and man. Dogs must be treated with a tapeworm remedy before entry into the UK which is free of this disease. We get rid of one zoonosis and provide ideal conditions for another.

The Response

The pandemics of Foot and Mouth disease, Swine Fever and avian 'flu require a strong response to prevent introduction of exotic disease. Defra is enhancing strategy for veterinary surveillance in the UK, for a future where risk of significant damage to human health, animal health and the rural economy is mitigated by provision of better disease control measures. These include faster identification of emerging risks, supported by a central data handling system, RADAR (Rapid Analysis and Detection of Animal Related Risks).

Key elements for the surveillance strategy rely upon veterinary surgeons who will be the main data source. However the House of Commons Environment Food and Rural Affairs Committee has recently highlighted the shortage of farm animal veterinarians as a cause of concern if surveillance is to work. Some farms at present rarely see a veterinarian, however private practitioners have set up a scheme requiring further expansion, to collect and distribute disease data. The strategy will develop over the next ten years. The BVA believe the timescale needs review to make sure the proposed developments are completed during the absence of major exotic disease. The cost will be high but not a deterrent in view of previous major disease outbreaks. This surveillance also includes companion animals, horses, wildlife and other animals in zoos and circuses. It will be comprehensive and inclusive. It will deal with the existing weaknesses in surveillance especially where there is poor integration, no overarching strategy, no system of spotting gaps, data are dispersed and hard to collect and prioritisation is not transparent.

Research

Research is necessary to gain an understanding of the potential dangers of disease invasion, to identify warning signs and the capabilities for quick diagnosis. For example, West Nile Fever, was first noted in dead crows in New York which lead veterinarians to identify a virus previously unknown in the USA, an infection spread by mosquitoes causing disease in man and horses and now widespread in the USA.

The vector potential of our domestic blood-sucking flies is also important, how easily could they adapt to be transmitters of exotic tropical diseases? There is need to increase research funding and manpower in the UK veterinary schools. Funding of the order of £25m has been made available over a 5-year period. This should help close gaps in surveillance and research identified by committees of investigation following the major outbreaks of animal disease in the previous decade.

The price of freedom is constant vigilance.

In discussion the following points were made:

Although rabies is prevalent on the Continent of Europe there has been no rabies in the UK since 1921 due to the success of the stringent exclusion measures adopted.

The impact of the Data Protection Act and post-Alder Hay issues, such as tissue retention and storage for scientific purposes, raise major problems which probably require legislative action. This is needed to enable appropriate use to be made of this valuable resource in securing and maintaining the health of the nation.

The management of a population at risk from exposure to an epidemic may greatly affect the outcomes. How will the prevalence of such a disease impact on the health services? Can they sustain a loss of 10% of their staff fit for duty and still maintain a service? In this context the question of potential benefits from making disease formally notifiable was discussed. For example, SARS is notifiable in Hong Kong but not in the UK where flexibility and selection of an appropriate response is more effective in minimising the risk of exposure for the general population. For example, doctors exposed to patients with SARS did not go home thus helping to contain the spread of the disease.

The various avian vectors for transmitting West Nile Virus, such as migratory birds, require constant vigilance. The virus has been noted in the Hebrides, and horses in the Camargue have also been infected by birds.

Will we have to suffer further outbreaks of Foot and Mouth and will we be any better prepared? – the answer to both questions is an emphatic "yes" it will happen again, but we will be better prepared with slaughter on farm premises, better control of meat and greater use of vaccination.

Is the human species overpopulated? – leading indirectly to war, famine and disease, resulting in a battle between macro and micro organisms – with HIV in Africa, especially mother to child transmission and also avian influenza. The response must be to make every effort to use technology to prevent unnecessary death.

THE GOVERNMENT'S USE OF SCIENCE

THE SCIENCE WEEK SEMINAR ON THURSDAY, 18TH MARCH 2004

As part of National Science Week the Parliamentary and Scientific Committee organised a seminar with the theme "the Government's Use of Science". The seminar was co-chaired by Lord Sainsbury of Turville, Minister for Science, and Dr Douglas Naysmith MP, Deputy Chairman, Parliamentary and Scientific Committee, and attracted a capacity audience to the Grand Committee Room.

This year the focus was on the contribution science can make to the work of the Government and government departments. The subjects addressed were the Government's decision making process, help for the Third World, advances in clinical practice and the contribution to the fight against crime.

Report by Robert Freer

Introduction, Dr Douglas Naysmith MP

In introducing the main speakers Dr Naysmith said this annual Seminar in Science Week is one of those occasions where we learn how science and politics meet and how both are being put to good use in the service of us all. Nowadays science and Government are inextricably linked and both need to be more open to public scrutiny and to engage in discussions to establish public confidence. Government is one of the most important investors in science and also one of the largest customers for the results and therefore has a special duty of care for the resources and the scientific infrastructure. Nowadays scientists not only contribute to better informed policy but they are amongst the decision makers, and they are expected to respond more readily to open debate and to support new ideas. The public are better informed now than they were in the past and are no longer readily compliant with Government decisions, but there is still a long way to go.

Improving the Government's Decision Making Process

Lord Sainsbury of Turville, Minister for Science

Lord Sainsbury reminded the audience that at this seminar in previous years we have looked at how science and technology have contributed to our national wealth creation, but today we will concentrate on the contribution to Government and to government departments. Science and technology can contribute in two distinct ways, firstly to good policy making and secondly to the efficient operation of the department. The speakers today will describe their work which is critical to three government departments, Department of Health, the Home Office and the Department for International Development.

Professor Blakemore will describe the work being done to establish a Clinical Trials Agency within the Department of Health which brings together the science base of the MRC and the DoH. This initiative builds on the work of the network for cancer which brings basic research into the NHS. This is a triple success; for MRC, for industry and for the NHS.

Science and technology is essential to the work of DFID, for example in Africa which has the most difficult development situation in the world. Three things are necessary for economic development in Africa. First Africa needs stable governments with a system of law and order. Secondly Africa needs a green revolution to increase agricultural productivity which today is the same as in mediaeval England. Thirdly Africa needs a healthy population; a population which is sapped by malaria and HIV will never be able to get a development programme under way.

In these last two areas science and technology have a key role to play. Science and technology are also important to DoT and DEFRA, especially for environmental problems which we cannot otherwise solve. One example is the important effect of climate change. In their Foresight programme DEFRA has just completed a study of the effects of future climate change on fluvial and coastal flooding.

Defra recognises that policy decisions on scientific issues need to be based on sound evidence.

Following the BSE outbreak the Phillips report made recommendations to the Government on how technical advice and guidance on scientific matters should best be handled by Government and how to improve openness. Guidelines 2000 on Scientific Advice in Policy Making established three principles, first to set up procedures to identify issues at an early stage, secondly shaping policy to draw on the best advice, and thirdly establishing a presumption towards openness.

The second part is particularly important. In the past government departments have relied on their own expertise and resources, but in future it is important to look outside to include national or international sources of advice on all subjects from nuclear safety to social issues. To obtain the basic knowledge and information to underpin its policies the Government invests in research both through the Research Councils, which spend a total of £2.3bn per year, and through the Government's direct investment in civil research which is £1.8bn this year.

In this function of establishing best practice, Sir David King, as Chief Scientific Adviser, has a vital role to advise on set issues and on good practice in provision of scientific advice. The Office of Science and Technology, the Cabinet Office and the Treasury are using their science budgets better, allocating people to manage their research and encouraging exploitation of research. As in industry the Government needs to ensure that Science and Technology are linked into the main policy work of the department. Today most key Government departments such as Defra, the Home Office, and Department of Transport have their own Scientific Advisers to challenge traditional thinking and with the necessary access to provide scientific advice at the top level of policy making.

We are all aware that the liberalisation of trade has meant that countries with low labour costs such as China are developing new industries which are competitive with our own. To stay ahead we need continuous innovation, but innovation itself is competitive and the need to innovate is well understood throughout the developed world. Using patenting and business research and development as criteria of innovation we find that compared with Europe our business investment in research and development is no better than average and well below the level in the USA.

Government support for industry has been improving since 1998. Science R&D will increase to £3bn by 2005/6, tax credits worth £0.5bn are being offered to small and medium companies, and incentives are available for knowledge transfer and for innovation. The Government spends £109bn annually and we need a strategy to exploit the results of scientific research. Gordon Brown has set out a 10-year investment plan for science which will enable the Government and industry to plan ahead and to set clear goals for science research and for knowledge transfer, and especially for encouraging the development of a new generation of well-educated young engineers and scientists.

Science Helping the Third World

Mr Paul Spray, Head of Research,
Department for International Development (DFID)

Mr Spray said that one of the DFID objectives is to halve poverty (a cause of infant mortality) in the developing world by 2015. In the 40 poorest countries in the world infant mortality has actually declined over the last twenty years, and half of this decline is due to the application of science. Also in the same period agricultural production in most of the developing countries (but not in Africa) has increased by 40% due to science and technology despite the population increase.

Science and technology are important but the problems in the developing countries cannot be solved by science alone. It is first necessary to have a politically stable country and a sound infrastructure. For instance, 20 and 30 years ago there were a number of world class research institutions in Nigeria. Now there are none. This has happened mainly because after years of conflicts the infrastructure has collapsed and there is a shortage of power, water and other services. Political stability and personal safety are important. The Ivory Coast and Cameroon are other examples. A new variety of rice has been developed in West Africa by the West African Rice Development Agency (WARDA) which could increase rice production by a factor of 3. But WARDA is located in the Ivory Coast and when the civil war started there in 2002 the scientists left and this has disrupted the programme.

There are three big challenges in DFID's work: agriculture, disease and climate change. Agricultural productivity in Africa has fallen by 5%,

and improving agricultural productivity is crucial. The Consultative Group on International Agricultural Research has about 8,500 scientists and spends $350m on research on the agriculture of developing countries and has successful programmes in Asia and elsewhere.

Tackling disease is a major problem. HIV-AIDS is the one heard about most; 70 million people are likely to die by 2020. DFID contributes £80m per year to research on AIDS but a vaccine is extraordinarily difficult to find. A world-wide collaborative effort is needed to find a workable HIV vaccine. If behaviour patterns can be changed and infection prevented in the first place that is obviously the better solution.

Another disease which kills 3,000 people a day is malaria, mostly in Africa and mostly children under 5. Development of a new drug is being lead by WHO, GlaxoSmithKline and the Liverpool School of Tropical Medicine and others and the results look promising.

The third challenge for DFID is climate change. The climate in general is becoming more variable and rainfall in particular is changing. There is an urgent need for more research on the effect of climate change on crops, on public health implications and the management of water systems.

An important aspect of international collaboration is that it involves supporting research institutes in the developing countries themselves. In research work the distinction between countries can be measured by the number of patents per million inhabitants and the number of scientists and engineers per million inhabitants. In the UK we have 68 patents and 2,500 scientists and engineers per million inhabitants, Malaysia has 2 patents and 150 scientists and engineers, and Nigeria has 0.02 patents and 15 scientists and engineers.

DFID believes that providing long-term support for research institutes in developing countries makes a real difference. The Tanzanian National Institute for Health has a reasonably good laboratory record built up over 12 years working with the London School of Hygiene and Tropical Medicine. DFID have supported a study into Vitamin A in Ghana and this support is creating a local facility which can be used for a range of clinical trials. For developing countries with limited library facilities access to international information is vital; DFID have supported a programme which has negotiated country-wide free access licences on the internet to thousands of scientific journals.

What else can DFID do to help developing countries? Promoting complete projects often doesn't work if the projects are foisted on to a host country that does not want them. Support is now only given to anti-poverty measures that the people in the host country want. And science policy may not be the top priority for the local Government. They may have other priorities such as developing their infrastructure.

In some developing countries there is a concern about innovation. For instance, farmers in Kenya still use seed varieties of 20 years ago although there are better varieties available today. There is a need to take modern discoveries and technology into the field. The African Agricultural Technology Foundation is a new initiative which has been set up for this purpose.

Science and Technology are not magic bullets but are vital weapons in this fight against poverty.

Introducing Scientific Advances into Clinical Practice

Professor Colin Blakemore FRS
Chief Executive, Medical Research Council

Professor Blakemore expressed the delight at the Medical Research Council at reading in the newspapers this morning that the Government have pledged an extra £200m over the next four years to the medical clinical research budget.

He explained that the MRC has three main objectives. It is committed to support high quality research aimed at improving human health and has generated the strongest research base in the biomedical sciences. Secondly MRC seeks to produce skilled research workers and finally the MRC promotes dialogue with the public about medical research. In many medical matters today, such as stem cell research, there are ethical considerations and differences of opinion and there is a need to carry the public with us as we develop these techniques.

The MRC is funded mainly by the Government and is accountable to the OST but it is not a Government department and it maintains a strong element of independence. The annual income is £508m, which is 1/40 of the budget of the equivalent body in the US but despite this difference in funding

the work is on an almost equal footing with medical research in the US. MRC are doing well but could do even better with more money. Half of MRC funding goes on university grants and fellowships, and half to MRC institutes. MRC employs 3,300 staff in 40 institutes and supports 3,000 in university training, and 400 mainly clinical training fellowships, 60 career establishment research workers and 1,200 post doctoral scientists. The work of the MRC has supported 23 Nobel prize winners, including Sir Peter Mansfield of Nottingham University who was awarded the Nobel prize for his work on MRI imaging this year.

The MRC also started clinical trials 60 years ago and is now their largest non-commercial funder; established the link between smoking and cancer forty years ago; and produced the first treatment for AIDS twenty years ago. The work objective is that research today will provide for health tomorrow. One example is childhood leukaemia for which MRC organised the first clinical trials 40 years ago when the survival rate was 5%; today the survival rate is 80%. The work also leads to organised partnerships and success with childhood leukaemia led to the establishment of the National Cancer Research Institute, now Cancer UK, which, together with the Wellcome Trust and others, has created a network of specialists working on cancer research. This network of specialists is a model which has been taken as an example in other disease areas. MRC discovered that Epsom salts is an effective treatment for illness resulting in 50,000 deaths of mothers and unborn children every year, and MRC are conducting trials on vaccines for HIV and for malaria in the Gambia, Uganda, and in Kenya.

In this post-genome era it is now possible to begin to understand the relationship between disease and the genetics of individuals and the effects of their life style. The Biobank project is the natural successor to the human genome project and is the most prestigious epidemiological experiment in the world. It is jointly funded by MRC, the Wellcome Trust and health departments. It was launched 3 years ago with a funding of £16m and works with 500,000 volunteers in this country to compare life style with health records. This will lead to better treatments and new approaches to life style. MRC has set up a commercial company MRC Technology to exploit its technical knowledge which has successfully completed 150 licensing deals worth a total of £60m in the last five years.

The development of antibodies is the largest area of cell technology based on MRC work, 8 therapeutic antibodies are in use, and 32 in the late stage of development trials. The work ranges from treatment for breast cancer to treatments for kidney rejection

Clinical research into the cognitive and neurosciences and mental health all help the understanding of how the brain behaves. Brain diseases are a great challenge today because of the ageing population.

Stem cell research has been a particular success because the present permissive climate for medical research workers is the result of public debate which has been better handled than the work to promote GM crops. As a result Britain is now a world leader in stem cell research.

The future of medical research will depend on developing partnerships. The range of problems is becoming more specific, there are fewer trials but they are becoming larger and more expensive. MRC is leading new partnerships to take forward a new agenda using the model of the National Cancer Research Institute for other disease areas. These partnerships will include Government, the NHS, academics, Royal Colleges, funders, industry, carers and patients. The interaction between all stakeholders will ensure that Britain remains a world leader in medical research.

Science in the Fight against Crime

Mr Jim Fraser, President, Forensic Science Society

Mr Fraser explained that there is a difference between forensic science and forensic technology. Forensic science is the application of science in the investigation of a particular crime and the investigation is case-specific, whereas forensic technology is the development of appropriate techniques which are widely applicable and can be used more generally for a variety of purposes. Arguably forensic technology will yield more practical benefits, such as developing devices to improve road traffic safety, and the simpler the technology the easier it is to put into the front line.

Forensic science is applied in many cases of crime such as homicide, rape, fraud and theft and one function is to simplify the complexity of crime and the work of investigation. The legislative framework has encouraged a flourishing of forensic science and has attracted investment from Government for such work as setting up the national DNA database. The legal requirements in solving crimes are constraining and require investigators to think in a linear fashion which is not always helpful in

solving a crime. Evidence needs to be collected at crime scenes, and evidence is important because it is the factual information which the investigator presents in a legal context, but it should not restrict the investigator's thinking in his attempt to make sense of the information.

It is necessary to know how to gain technological benefits without losing sight of the context that might affect the value of the information obtained. Obtaining fingerprints and DNA samples is a well-organised routine procedure based on high grade technology where the UK leads the world. Electronic transmission can send finger prints to a central database that enables investigators to match or eliminate fingerprints taken at a crime scene. This can now be done with other specific evidence such as shoe marks or drug analyses, but there is no consistent approach to apply this technique in volume crimes such as car thefts. This has the effect of making a forensic laboratory available on a chip. There is also a firearms database and a DNA database but DNA information has to be physically transported rather than electronically. Matching DNA samples uses high grade technology interpreted by experienced practitioners and can be either a full or partial match, but the chance of a random match of DNA samples is about one billion to one.

Using a simple piece of software information can now be captured at a crime scene in a more rigorous manner and the benefit of the linear approach is to make the information more valuable when it is being used within the constraints of the legal system.

When the information at a crime scene is collected in an organised and systematic way the information can become more useful. For instance, in a case of burglary simple pieces of software can convert information quickly into more valuable intelligence. Information at a crime scene such as a burglary, collected in a structured way can quickly provide feedback on such local details as how the burglars gained access, what was the method used and what type of property did they steal. This information is particularly useful to those in the front line because the crime can be compared with other similar crimes which have occurred locally or at different times and this comparison may help to solve them.

Forensic science and technology in UK is well established and the challenges in forensic science and technology are not really the problems of technology but are of training and education and of the governance of the technology to improve the criminal justice system and to ensure the public has confidence in what is being done.

Closing Remarks, Lord Sainsbury of Turville

In his closing remarks Lord Sainsbury thanked the speakers for their presentations and said that there is always a danger that the Government focuses too much on the problems, which are always apparent, overlooking the opportunities. The speakers today have set out very clearly the opportunities for both wealth creation and for achieving public goals in the diverse activities of helping the developing world, in medical research and in forensic science all supported by the Government's 10-year investment plan. He thanked the DTI and the staff of the Parliamentary and Scientific Committee who had made this event possible.

During discussion the following points were made:

Is the measurement of patents and of business research and development the best way to assess the contribution of science to the service industries, especially internationally? European methods of measurement may be meaningless in other countries where they measure these things differently. For instance, China is more concerned with developing foreign investment. Separating service and manufacturing industries in terms of research needs may be a disadvantage because productivity is important in both. Small and medium size companies, especially in the less advanced industries, may be in particular need of assistance with research and development. In Germany during the 1970s research scientists were subsidised to work in the smaller companies.

To what extent does DFID work with REDR and similar relief agencies which usually have people on the ground in developing countries with local knowledge? There is a close relationship between human health, livestock health and plant health such that it is not usually possible to solve the problems of a rural economy by treating one part only. GM crops may be particularly useful in Africa and science has a role in persuading farmers to use GM seeds instead of using the free seeds from last year's crop.

There is perceived to be a lack of sufficient funding in hospitals to make research interesting and there are talented people in the hospitals without access to any funding. Research in the physical sciences has benefited the medical sciences, for instance X-rays and MRI scanning came from the physical sciences. Research into preventive medicine is important.

To what extent can research and forensic science be used to prevent crime? An increasing amount of crime is computer-based and we need to alert people to this problem to stay ahead of the criminals.

We cannot solve all our environmental problems by changing our habits. We need science to maintain our standard of living.

Although more science and engineering graduates are produced in the UK than in most other European countries there is a movement by students and graduates away from the "hard" sciences such as physics, chemistry and engineering into biology and IT. The physical sciences are perceived to be connected with our industrial past and we need some new ideas to make them more exciting. Only a small number of graduates will actually become research scientists but we need a long term strategy to provide a positive career structure for research workers.

VOICE OF THE FUTURE 2004

MONDAY, 22ND MARCH 2004 IN THE ATTLEE SUITE, PORTCULLIS HOUSE

The Royal Society of Chemistry is very active in Parliament, co-ordinated by Dr Stephen Benn, the Parliamentary Officer and by Dr David Giachardi, the Chief Executive. On this occasion about 160 participants were selected for invitation from a very highly qualified cohort of younger scientists. They represented a range of universities and scientific organisations, especially those involved with chemical, biological, physical, earth science and medical research.

In addition, there was strong representation from high technology based companies in fields such as defence, medical research, pharmaceutical, aeronautical and geological research and development.

Charles Clarke accepted the challenge of international competition for scientific excellence and the latter's importance in securing high-value innovative business in the UK. He pointed out that the 2002 Spending Review was a start. This was followed by the 2002 Roberts Review of the Supply of Scientists and Engineers, the consultation by the Office of Science and Technology on the sustainability of university research in May 2003, the consultation by HEFCE and UK funding bodies on research assessment in May 2003, the Lambert Review of Business-University Collaboration in December 2003, and the science policy aspects of the DTI Innovation Report in December 2003. There is also an intention to publish a ten-year investment framework for science and innovation alongside the 2004 Spending Review designed to make Britain an even more attractive location for science, research, development and innovation.

Dr Ian Gibson MP, Chairman of the Select Committee on Science and Technology, led a very lively extended Science Question Time in which other Committee Members such as Dr Evan Harris MP, Dr Brian Iddon MP, Mr Robert Key MP and Dr Desmond Turner MP responded for the panel. Dr Gibson warmly thanked all the contributors for their comments and questions, pointing out that the issues raised would help to form the basis for future recommendations from the Select Committee.

Lord May provided a more personal view of the Royal Society in which he stressed the importance the Society places on the selection and management of about 400 leaders of science as an effective method for developing science without imposing arbitrary restrictions.

Dr David Giachardi thanked all the speakers and added a point of his own with examples from his lifetime career in the Chemical Industry in which he emphasised the fundamental importance of science in wealth creation.

Finally, all those invited to this event were treated to a formal meeting of the Science and Technology Select Committee featuring evidence from Sir Alan Wilson, the new Director General for Higher Education at the DfES. There was standing room only at this event.

Do Chemical Engineers Care About Sustainability?

Andrew Furlong
Institution of Chemical Engineers

Chemical engineering is something of a "Cinderella" amongst the scientific professions. Although the man or woman on the Clapham omnibus is largely unaware of the fact, chemical engineering has a significant impact on all of our lives. Chemical engineers are involved in the design and management of many industrial processes and this activity is not confined to the traditional chemical industries. Pharmaceuticals, biotechnology, food and drink, metals, plastics, energy and water are some of the sectors where chemical engineers play a central role. Chemical engineering helps to feed, clothe and keep us healthy. It also keeps us warm, mobile and through its contribution to the delivery of countless consumer products, happy. But as ever, there's a downside. All of this activity presently involves the consumption of finite resources and the generation of waste products. Chemical engineering and the pursuit of sustainable development are inextricably linked. And through their involvement in a diverse range of industries, chemical engineers are integral to the delivery of a sustainable society.

Leading green campaigners, including the chair of the UK Government's Sustainable Development Commission, Jonathon Porritt, have recognised the important role of engineering in the pursuit of sustainable development. In February 2004[1], Porritt frankly admitted to an audience of leading chemical engineers that although environmentalists are generally seen as the "experts" in the area of sustainable development, their contribution was restricted to words rather than actions. He said, "People like me who talk a lot are always looked upon as experts on sustainability. However it's engineers who actually have to deliver the change we constantly push for."

IChemE recognises the challenge implied in Porritt's statement but it is clear that action for change cannot simply be driven from the top down. The individual attitudes and behaviours of chemical and process engineers within some of the UK's leading manufacturing companies will determine the success or failure of the quest for sustainable development. But what do the people at the sharp end really think – do chemical engineers really give a damn about sustainability? IChemE put this question to the test and this paper assesses the response.

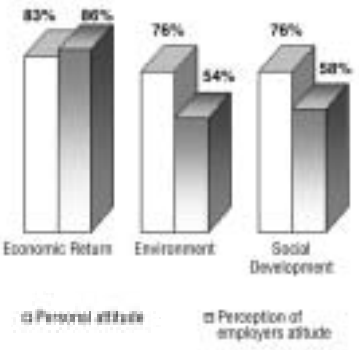
Attitudes towards sustainable development

Sustainability is generally expressed in terms of the "triple bottom line": environmental responsibility, economic return and social development. In December 2003, IChemE surveyed its members in the UK and Eire in order to determine relative levels of commitment to the three components of the triple bottom line.

Analysis of nearly 4,000 individual responses[2] revealed strong support for sustainable development with more than three quarters of members indicating "high" or "very high" importance to all three components of the triple bottom line. When the same group was asked to rate their employers' commitment on the same scale, disparities became apparent.

The need to secure a profitable economic return scored "high" or "very high" importance in both cases. However, chemical engineers clearly believe that their employers give lesser consideration to environmental and social factors as shown in Figure 1.

Figure1: Attitudes towards triple bottom-line components of sustainable development.



Percentages indicate respondents ranking the component as "important" or "very important" compared with their own assessment of their employers' attitude to the same issue.

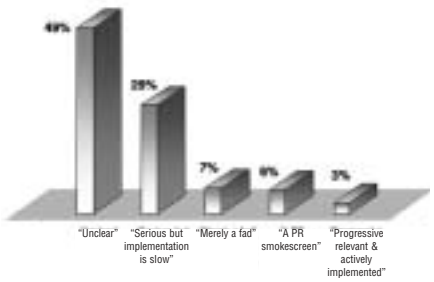
The results are unsurprising and perhaps reflect wider public perceptions. Economic return is the primary consideration. It matters little if your aim is delivering shareholder value or simply just paying the mortgage, the profitability of any process operation is paramount. On environmental issues the 22-point gap gives cause for some concern. Chemical engineers in the workforce regard environmental protection as a key issue but do employers see things in the same way? When it comes to social responsibility employers score

slightly better, perhaps reflecting the current focus on CSR, nonetheless there is an 18-point gap between the employees' own personal attitude and their perception of their employers' attitude towards the same issue.

The wider context

IChemE also asked its members to express a view on the coherence of the national sustainable development agenda being advanced by UK Government. The findings, which echo many of the sentiments expressed in the Sustainable Development Commission's five-year progress report published in April 2004, should provide further food for thought for politicians. Figure 2 reveals that nearly

Figure2: Chemical engineers' attitudes towards the UK sustainable development agenda.



one in three chemical engineers support the view that the sustainability agenda is being "taken seriously by Government" but felt that "progress is slow". 3% saw the agenda as "progressive and relevant" whilst 6% felt that the entire sustainability debate was nothing more than a PR smokescreen to "counter the green lobby". Almost half of the respondents saw the agenda as "unclear". This gives cause for further concern. Professional chemical engineers in the UK have a strong personal commitment to sustainable development and they are well positioned to effect real change, but in the absence of an agenda that is more widely understood progress will remain slow.

Where do we go from here?

In his introduction to IChemE's 2003 Annual Report, the Institution's President, Steven Vranch, captures the views of the chemical engineering community[3]: "As chemical engineers we are frequently called upon to weigh up the economic, environmental and social benefits of the processes that we design and manage. It can be a difficult balancing act and yet our understanding of process systems enables us to make the right judgement more often than not. We know when the risks involved outweigh the potential benefits and we recognise that first and foremost our duty lies with protecting the public interest." IChemE's commitment to the goals of sustainable development are being championed at the highest level, but what in practical terms is being done to take the agenda forwards?

If you can't measure it you can't manage it!

In February 2004, IChemE founded a new multidisciplinary group of professional engineers and scientists drawn from the industrial, research and academic communities[4]. The group is tasked with providing a fresh impetus into the sustainable development debate in the UK and internationally. Its aims are to:

- Encourage the adoption by process industry of formal measurement and reporting systems for sustainability indicators across all three components of the triple bottom line. IChemE's own Sustainable Development Metrics[5] can assist companies in this area.
- Promote sustainable engineering practices with the aim of making it easier for engineers in industry to make more sustainable choices in areas such as energy efficiency and procurement
- Integrate sustainable development teaching in undergraduate degree programmes, accredited courses in the UK and beyond. IChemE has developed new course accreditations to support university departments to this end.
- Raise awareness of the major contribution that chemical engineering can make in securing real progress towards a truly sustainable society.

Conclusion

IChemE's survey of attitudes towards sustainable development in the UK and Eire has revealed strong levels of personal commitment but chemical engineers are not convinced that employers see things in the same way. Process industry commitment to the environmental and social components of sustainable development lags behind that of their employees. IChemE believes that this gap can be bridged through more widespread use of sustainability metrics and reporting.

Chemical engineers perceive the UK sustainable development agenda as confused and unclear. Only a small minority are prepared to support the proposition that the current strategy is "progressive, relevant and being actively implemented". This may be explained by a lack of engagement in the process. Yet chemical engineers are well positioned to make a substantial contribution and Government can only stand to benefit from the active participation of a key professional group that plays a major part in the activities of many of the UK's leading companies.

References:

1. Jonathon Porritt was speaking at the launch of the IChemE's Sustainable Development Subject Group in London on 29 January 2004.

2. Research gathered from supplementary questions contained in IChemE's biennial salary survey conducted between December 2003 and January 2004. 4029 responses were received from chemical engineers in employment in the UK and Eire.

3. Protecting the Public Interest, IChemE Annual Report 2003

4. IChemE's Sustainable Development Subject Group was formed in January 2004

5. See http://www.icheme.org/sustainability/metrics.pdf

For more information on the IChemE's sustainable development work, including energy policy and waste issues contact:

Andrew Furlong, Head of External Relations
IChemE, Davis Building, Rugby, CV21 3HQ
Tel: 01788 534484, email: afurlong@icheme.org.uk

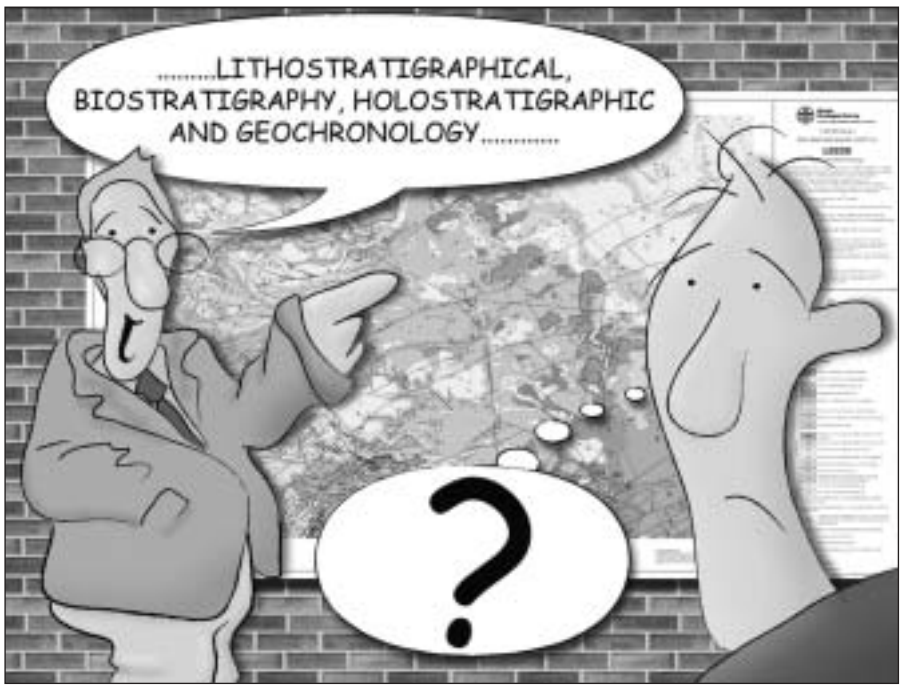
"Thinking like wise men but communicating in the language of the people"

Ian Jackson, British Geological Survey

Communicating?

Geology should be occupying a prominent role at the outset of the 21st century, when "the environment" has a very high profile. But it is not. It is a sad fact that the importance of geology to the environment, human health, property and assets is not well understood outside the geological profession. Geologists and the national geological surveys, research and academic institutions that they work for must accept some responsibility for the lack of public understanding and for the failure to persuade potential customers to make better use of the geological databases that have been so carefully created. The scientific content of the work is dominated by rather complicated, technical and academic maps and reports. The quality of the science is not in question even though it may be rather obscure, remote and inaccessible to the end-user. The scientific paper or geological map represents the final output of the research, and is not seen as a means to an end as there is little or no attempt to communicate the scientific value and application of the work to those outside the profession. It is not surprising therefore that the real importance of geology to the public, to governments and to commerce remains obscure.

We now have new computers with GIS and 3D modelling software, and can devise colourful coverages, dynamic databases and mutating models and place them on the world wide web for all to appreciate. But these are no more intelligible to those outside the geological profession than our earlier products A digital geological map or model remains exactly what it is, a complex technical product. Much less than half of one per cent of society have the expertise or training to interpret it. We have to try harder if we wish to communicate with those outwith a limited group of geoscientific professionals.



Evidence of the problem and some progress?

The majority of politicians and planners in the United Kingdom, for example, are generally unaware of the importance of the swelling and shrinking properties of clay, or the dissolution of gypsum and the impacts these events can have when permitting housing developments that are inappropriate with regard to location and design. Buildings, roads and car parks have been constructed over ground vulnerable to landslip causing death and injury. The importance of including geological knowledge in the prediction of radon-affected areas (radon is the second biggest cause of lung cancer in the UK) is only now being fully appreciated. Lawyers that fail to obtain reports into possible coal mining beneath a property prior to purchase would be deemed professionally negligent. There is no requirement in law however to seek out information on naturally occurring underground voids although the effect

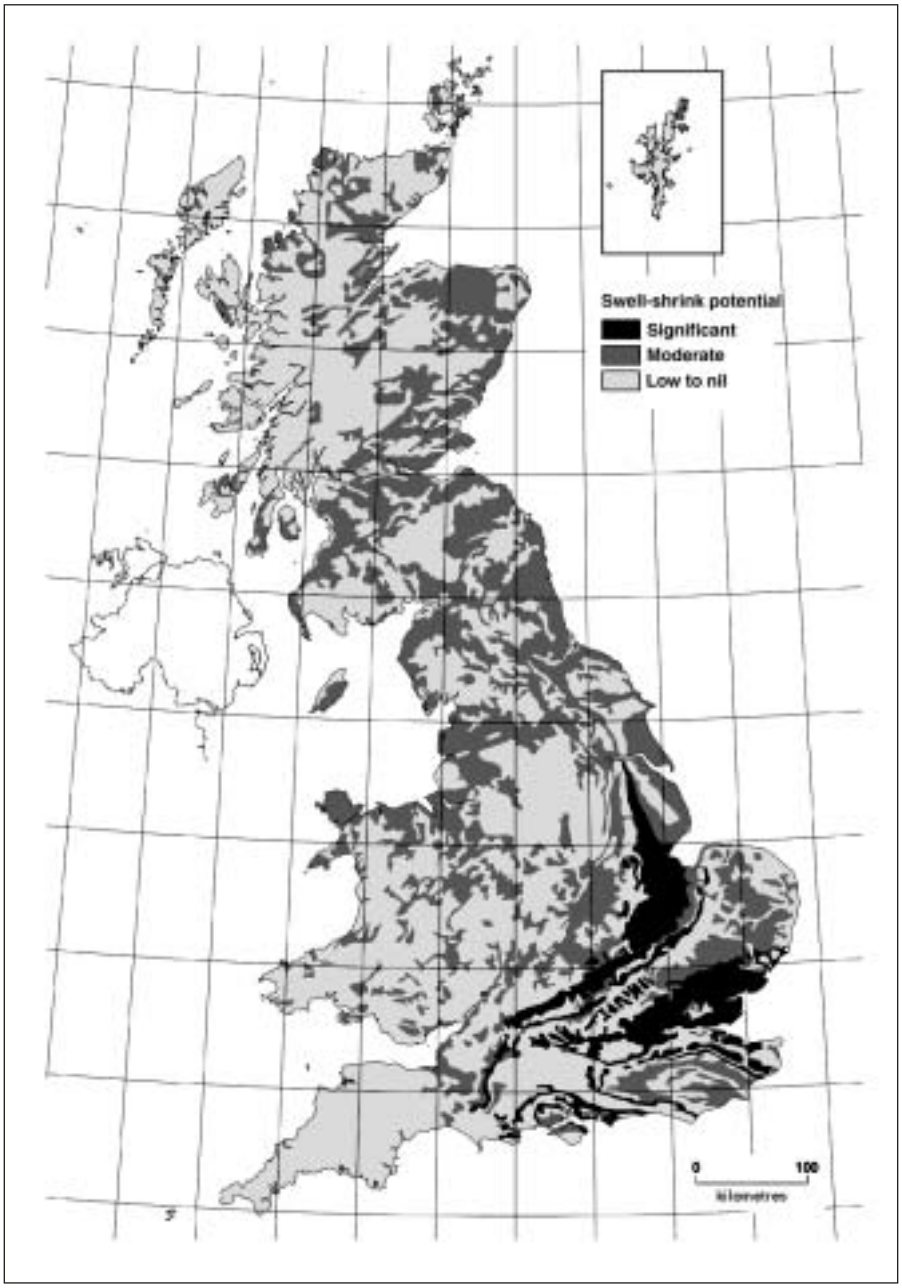
may be equally destructive of property values. An estimate of insured losses due to inherent geological instability in the UK runs into hundreds of millions of pounds, all this in a country where the industrial revolution was founded on the extraction of the coal and minerals, originally mapped geologically by William Smith, and where a national geological survey, the first in the world, has existed for 169 years!

The British Geological Survey (BGS) has recently confronted the "communication problem" by allocating a greater proportion of its resources to the development of products and services that meet the needs of a wider client base. BGS also has to compete with others for half of its income and strives to become competitive in the marketplace, resulting in an expansion in the range of products using state of the art Information Technology. These include site-specific reports that can be delivered via the web through simple entry of a post-code; Geographic Information System data for local councils, spreadsheets of hazard information for insurance companies and reports and maps that are all explained in plain English.

Beneath our feet

A new BGS atlas illustrating the digital database for the UK, and a national ground stability data service (GeoSure) based on some of the detailed datasets were both released in March 2004. The atlas entitled "Britain beneath our feet" is a well illustrated and straightforward guide to the digital geological data held by BGS. It describes the geology, land and water quality, hazards and resources of Britain. It covers topics ranging from swelling and shrinking clays that can damage house foundations, to the distribution of uranium in stream sediments, to how geology can contribute to flood prediction, and the likely intensity of future earthquakes.

There are 48 themes in the book and each is illustrated with a double page spread containing an overview map of the UK, a thumbnail map showing where the data refers to and an inset revealing what the digital data looks like at high resolution. The text describes applications and formats for the data. GeoSure provides detailed national digital data sets identifying areas of potential subsidence due to geological hazards that can be supplied in a simple report based on postcode, or as searchable digital data. The information comprises a translation of highly technical geological and engineering properties of Britain's rocks and man-made features into an easily understandable description of the potential for ground movement. This information enables a wide range of people to understand the potential causes of subsidence and what effect it might have on their home, office, construction site or planned development. The intention is to upgrade and to digitally compile both existing and new strategic datasets at the national level – from soil erosion potential, to the factors relating to the sustainability of UK energy and carbon balance. The atlas and the GeoSure datasets raise awareness of the wealth of digital data, information and knowledge that BGS holds, because informed planning decision requires knowledge of what is beneath our feet.



A map from the atlas showing the extent of swelling and shrinking clays

To Beagle or not to Beagle

Professor Colin Pillinger CBE FRS
Professor of Planetary Sciences and Head of Planetary and Space Sciences Research Institute, Open University

Whilst the nation settled down, glass in hand, to watch the Christmas edition of Only Fools and Horses, the UK's giant radio telescope at Jodrell Bank began to track Mars across the sky. In the Pillinger household we stared for three hours at a series of featureless stripes on a computer screen hooked into the telescope control room and listened to comments over a mobile phone line. The only excitement was when the link was lost and we had to reconnect, each time fervently hoping contact with Beagle 2 had been made whilst we were offline. But of course it had not.

On Boxing Day Jodrell tried fruitlessly again in the evening. There were fifteen further attempts over the ensuing month to send messages to Britain's errant Mars lander. We strained our ears for just the faintest whimper from the lost dog on the red planet.

Attempts were made to force the spacecraft into emergency communication modes. We pretended not to care by ignoring the beast for ten days, then turning on all the resources we had available to send or receive messages, with help and co-operation gratefully received from NASA's Odyssey orbiter, and the European Space Agency's Mars Express, and Jodrell Bank again.

We finally tried what everybody does when annoyed with their computer: we switched it off and on to reboot the software, hoping it would then start to respond. None of this helped and although we continued to listen until March 11th, we eventually had to admit that our Beagle, unlike many of the canine variety we heard of from their owners, was not returning hungry and unrepentant having been off on a doggy escapade.

It might sound like the Beagle 2 project had its communication strategy completely wrong. In one way that is true. Ideally we should have kept in radio contact with the lander during the descent to the martian surface. We considered this option but the orbiter was the first priority on the Mars Express mission. This could not be put at risk by maintaining contact with the lander during orbit insertion. There were no other satellites in position around Mars to relay messages. We could not spare capacity for a transmitter to signal to Earth as it would have greatly reduced the onboard scientific instrumentation.

In other ways our communications were excellent. The sixteen million hits on the Beagle 2 website on Christmas Day easily beat those for Only Fools and Horses. It showed that the Pillingers were not the only family concerned with the plight of the plucky little dog on Mars. Letters and e-mails of good wishes, hope and condolences rolled in faster than they could be opened. We were told many times of children whose first words on Christmas morning were not "where are my presents?" but "is Beagle 2 on Mars?" and repeatedly that "I, my child, wife, husband, gran or auntie Fanny, have never shown any interest in science before."

These were not comments from those already fascinated by science but just ordinary people who stopped me in the street, accosted me on the tube, shouted from the top of scaffolding, caused queues at the pumps in garages, wanting to shake my hand and hear the latest news of the search.

What we refer to as a Beagle 2 experience was not confined to Colin Pillinger. The Particle Physics and Astronomy Research Council held a meeting to discuss whether the UK wished to participate in ESA's Aurora programme, which is the next phase of martian exploration. We counted fifty people around the table of whom only one had not been publicly cross-questioned about Beagle 2. Even the Director General of ESA had been collared during his skiing holiday. Whilst enjoying the slopes, a fellow skier asked what he did for a living, on receiving the reply "I work for ESA" his interrogator rejoined "you must know Colin Pillinger and all about Beagle 2".

There are some wonderful examples of how the name Beagle 2 has entered common parlance. Robin Cook said there is more chance of finding it than weapons of mass destruction in Iraq. An Observer article on the Hutton Enquiry suggested his Lordship's report "made him look as out of touch as the Beagle 2 Mars lander". The Isle of Man Police, called their investigation "Operation Beagle Two" when seeking those responsible for the murder of a woman in Douglas. Not expecting to make an early arrest then chaps?

Don't let anyone tell you Beagle 2's communications strategy was a failure. No science project was ever like this. We captured the nation's imagination extending from the Queen (who sent a letter) to the stranger who suggested we adjourn to the nearest hostelry so he could buy me a drink. The Princess Royal came personally to the OU to offer commiserations. She said the University was renowned for the breadth of its educational programme but recruiting martians as undergraduates was pushing it.

And why would teenagers be overheard discussing the subtleties of Beagle 2 communication modes 1 and 2 whilst queuing for lunch? We attributed it to

the philosophy of engaging with the public through the media to show science and engineering live, rather than edited highlights. Beagle 2's policy of openness during the landing period (December 17th 2003 to January 31st 2004) brought 3,619 newspaper stories, a factor of five more than the coverage for the Mars Express launch, when we thought 710 articles was going some. Since the project began, we have records of at least 7,000 articles worldwide.

Our web page, beagle2.com, reached over 150 million hits. Compared to the NASA rovers Spirit and Opportunity this may not sound much, but we did not have the might of NASA or ESA. Beagle 2's web team consisting of my daughter Shusanah on leave of absence from her job, admirably demonstrated what could have been achieved with more resources. All the terrestrial channels and satellite services attended every landing and post-landing briefing and we recorded 70 additional interviews that have often been reused and widely distributed.

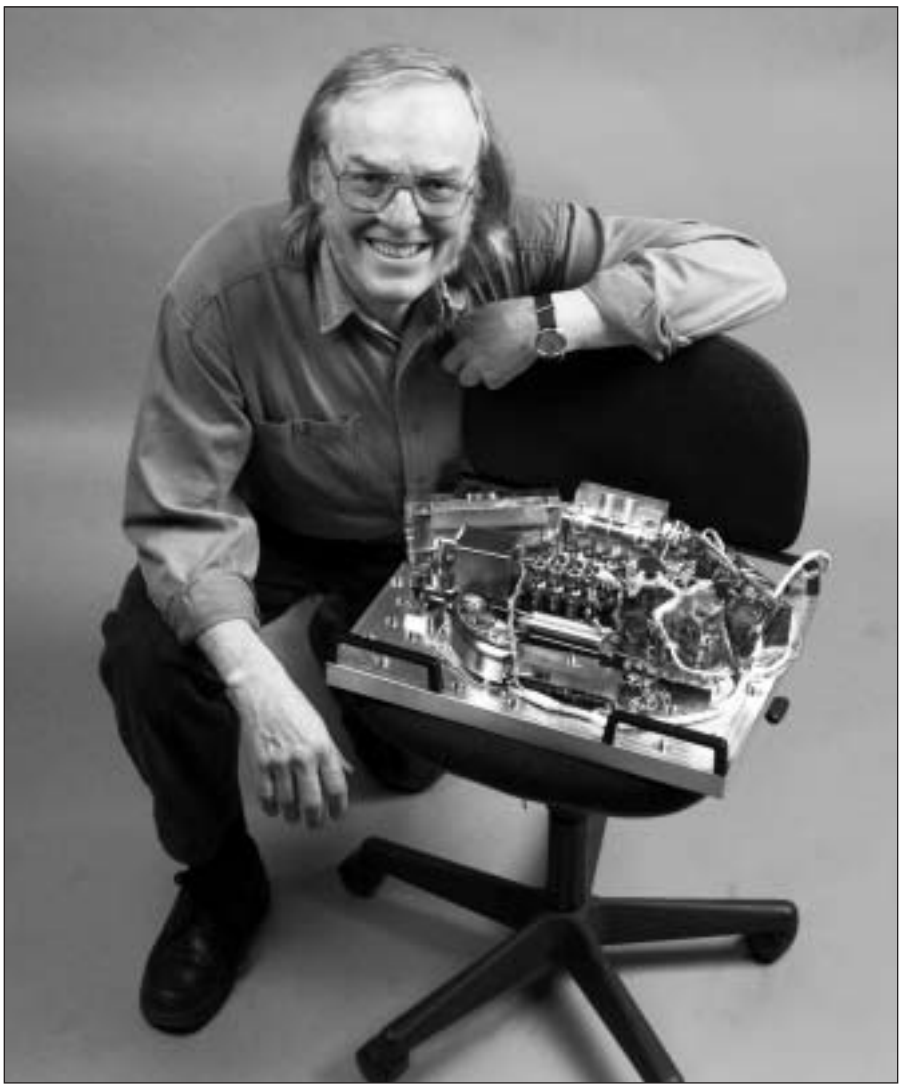
The Beagle 2 publicity was designed to reach as many people as possible and as we had promised to repay those who advanced us money for the project, we hoped this could be recovered as advertising revenue from commercial sponsors. We did this job outstandingly well, the advertising equivalent value for the landing was estimated at over a quarter of a billion pounds.

Charles Clarke is convinced Beagle 2 and Mars Express greatly increased scientific interest and emphasised that we have to look at ways to retain that interest. The best way would be to fly again on a timescale that people can relate to, such as the cycle for World Cups and Olympic Games, which is four years. The project is looking at 2007, and is seeking ways to eliminate the risks we took in 2003. Lord Sainsbury, who is fortunately as disappointed as the rest of us, said "we always recognised Beagle 2 was a high-risk project, we must resist the temptation to do only low-risk projects in the future". He is right because if you want kids to sit up and take notice you have to be doing something they can admire.

A second and indeed a third Beagle 2 could be ready for launch in 2007, with the lander as top priority. We should fly two landers, like NASA, to increase the chances of success. An early decision is needed to reduce risks.

The Beagle 2 scientific package remains competitive for 2007. The lander was carrying specially designed scientific equipment for isotopic analysis of gases and chemical analysis of rocks and soils to help detect whether life ever existed or still exists on Mars, and was not just seeking evidence of the presence of water, as a general indication that conditions for life could have existed. This is the most frustrating aspect from the scientific perspective of Beagle 2's failure. Recent announcements that ground-based telescopes and the Mars Express orbiter have discovered methane traces in the martian atmosphere have ignited debate about whether the gas is biological in origin. Beagle 2 could have helped to distinguish between alternative sources such as microbes and volcanoes.

We must capitalise on what has already been achieved and take another shot at landing Beagle 2 on Mars, with the Prime Minister and Chancellor behind us and united in promoting science and innovation, as proposed in the Comprehensive Spending Review, with the aim to achieve world class results for the UK. Alternatively, as so many have offered donations, opportunities abound for Beagle 2 as a People's Lottery project? Here is a chance for a "Spot the lander" competition, and public debate about "Mars – are we alone in the Universe" that are as cultural as they are scientific.



Spin off from the space programme: the miniatuised Beagle 2 mass spectrometer is now being developed for clinical and environmental use.

Peers Fly South for the Winter

Baroness Walmsley

The seventh of January 2004 was a red letter day for three members of the House of Lords Science & Technology Committee for, along with our Clerk Rebecca Neal, Lord Oxburgh, Lord Mitchell and myself, Baroness Walmsley, set off for the trip of a lifetime to the Antarctic. None of us had been to the Southern Ocean before but all had dreamed of seeing the fascinating continent below the 60th parallel.

The purpose was to research material for the committee's latest inquiry into International Scientific Treaties. The committee is looking at the processes by which science feeds into the treaty process, both at the initial negotiation stage and afterwards. How does the UK Government get its scientific information? How do scientists and Governments decide there is a need for a new treaty? How are treaties monitored? How is scientific uncertainty dealt with? Could any of these be improved? These are some of the questions Sub-Committee I is trying to answer under the chairmanship of Lord (Parry) Mitchell.

At an early stage in the inquiry, when they were submitting their evidence, the British Antarctic Survey invited us to visit their base at Rothera on the Antarctic Peninsula to see how the well-established Antarctic treaties are operating in situ and to talk to the scientists about their work and the way they interact with policy-makers.

Flying off to Rothera with us were Chris Rapley, BAS Director, and John Lawton, Director of the Natural Environment Research Council. John was coming along to inspect and officially open the new Bonner Laboratories recently completed at the base. A number of other BAS scientists joined us for routine visits. Twelve excited people joined the RAF Tristar at Brize Norton. It seemed to us that those who had been to the Antarctic before were even more excited than we were. We were later to discover that the southern continent exerts a powerful hold on those who visit it. No-one is ever disappointed.

We flew via a refuelling stop at Ascension Island to the Falklands where we stayed overnight. Next morning we boarded the BAS Dash 7 for the five and a half hour flight. As we crossed the 60th parallel south, Chris Rapley stood up and welcomed us to Antarctica. It was a bit like crossing the equator though I was glad they didn't try to dunk us in the sea.

As we approached the peninsula the views were spectacular. As it was high summer the sea ice was well broken up and the sea was full of majestic icebergs, white on the top and electric blue below. This amazing bright blue colour was to be seen everywhere ice met water, a trick of the light that produced the most marvellous effects. The granite mountains of the peninsula projected craggily above the snow and the sun shone brightly almost the whole time we were there.

As we approached the base we could see that it looks like a small village of long low buildings with a small airstrip and hangar. Located on the sea shore it has a dock capable of serving BAS's two ice-reinforced ships. It also has a sewage treatment plant, a water desalination plant, a generator building, workshops, living accommodation and offices.

The views from the base are magnificent and none of us could resist taking pictures from our bedroom windows, especially at 2 am when, although the sun never went down, the quality of the light as it sank low in the sky changed to a rosy pink which softened the contours of the glacier across the sound.

The work began immediately with presentations from many of the scientists at the base, a summer complement of between 80 and 120. In the winter it goes down to around 20 to 25.

The following day we were squeezed into immersion suits and insulated wellies and were off in one of the rubber dinghies. We travelled to some of the smaller islands to look at biological experiments on colonisation and to see the seals, penguins and many other birds. Back to the base for supper and more presentations. Catering at Rothera is very important to those who spend the whole year there. However, despite the limitations on fresh food, there is no need to worry. The two cooks did a magnificent job. (One of them was pastry chef at The Savoy before going south!)

The following day we were flying so we had to attend the 7.45 weather briefing attended by pilots and scientists alike every day. Weather forecasting is vital in the Antarctic and at Rothera they rely on the incredible skill of former Met Office forecaster David Lee. When I asked the pilots how good he was they said, "Well, put it this way. He tells the weather what to do!" It's just as well, since getting the weather right is a matter of life or death in these parts.

We boarded one of the four Twin Otters and flew to two of the more remote bases where we landed on skis on the ice and were shown the work being done there. The next day we were put through our paces, taking part in some of the training the scientists have to do before they are allowed out in the field. Abseiling into a crevasse (and climbing out again), driving a skidoo across a sloping ice field, pitching a tent on the ice and sleeping in it overnight, melting the snow over the Primus to make the tea – all of

these delights awaited us.

Although we have no real impression of the hardships endured by the early explorers, we did come away with a clear view of the vital importance of the science done by the British scientists in Antarctica and some very useful material for our Report, which will be published in June.

LETTERS TO THE EDITOR

Sir,

Future Energy Sources

In taking decisions on future energy sources it is essential at this stage to have two or three conferences of an inter-disciplinary nature involving participants with an in-depth knowledge of the relevant subjects, meeting together with appropriate Government officials. Initially the objective would be to assess the present position and predict the long term availability to the UK of conventional sources, including nuclear. A decision should also be taken on whether there is valid evidence to show if global warming is due to carbon dioxide emissions or to a normal climatic change the like of which has taken place over millennia as indicated by the geological record. This meeting should involve economic geologists informed of reserves and cost in relation to coal, oil and gas, as well as nuclear geologists, chemists, physicists and engineers.

The most common objections to the further development of nuclear energy stem mainly from the fear of radioactivity and the belief that there is no safe way to deal with radioactive waste products. Uranium is either mined open-cast or from deep deposits, some thousands of feet below surface. Deposits range from 50 to 1800 million years in age yet are not known to have had any adverse effects on human health. After being utilised the waste could be used as back-fill whence it came, or elsewhere, and made safer than it was originally. Alternatively it could – and should – be stored underground in engineered repositories in suitable geological locations from where it could be recovered for future use. No waste should be stored at surface. Safe location underground, however, requires geological knowledge as well as information on the radionuclides involved, their half-lives, nature of the radiations emitted and their solubilities in groundwater. It is important to note that if the nuclear option is favoured early steps would have to be taken to ensure that uranium exploration is recommenced to ensure the availability of future supplies. It is difficult to comprehend how the Committee on Radioactive Waste Management will not make recommendations on radioactive waste disposal until around 2006 as by then a decision on the nuclear option should have been taken.

The second discussion meeting should be on renewables, their cost comparison and more importantly their reliability compared with conventional energy sources. At present, it is doubtful to expect renewable energy to provide 10% of the country's electricity by 2010 especially as wind power seems to be the preferred option and this has high associated costs in transmission to consumers as well as with the maintenance of turbines. In addition, the intermittent nature of supply would be such that energy storage may well be necessary. One advantage of renewables, if successful, would be less dependence on oil, but this would also favour the petro-chemicals industry in the supply of olefins, aromatic compounds and polymers in the waning days of oil availability which could be before 2020, but, of course, the best way to conserve valuable oil would be to revitalise the nuclear industry.

A third meeting involving selected members of the first two should summarise findings and present conclusions on the best way forward to the Minister for Energy. These should be available in a matter of months, not years.

Yours faithfully,

Stanley Bowie
Professor S H U Bowie FREng FRS FRSE

Formerly head of Atomic Energy Division, Geological Survey and Chief Consultant Geologist to the UKAEA 1955-77, and later to BNFL and the EEC.

Sir,

Mr David Jones, Director of Britpave, tells us (Science in Parliament, Spring 2004) that "what is needed in Britain is a long term vision that goes beyond the current short-term, expensive and ultimately flawed quick-fix solutions". In this instance he is inviting the Government to have the imagination to examine transport solutions that offer a life-span of at least 40 years.

But this long-term vision is needed in every single part of our national infrastructure, which includes not only our roads and railways but also our energy supplies, water supply and flood control, waste management and disposal, housing and urban regeneration and the protection of our environment.

Our national infrastructure is an important and complex asset and its development and maintenance is critical to the well-being and economic prosperity of our country. And we take it all for granted until something goes wrong, when the political response is usually the quick-fix solution which ensures that the next problem will happen sooner rather than later.

There is a better way of doing things.

Planning, developing and maintaining the national infrastructure requires someone who can take a long-term perspective, usually beyond the lifetime of a single Parliament or Government. This can best be achieved by making a non-political appointment of a technical specialist who would have the responsibility of advising the Government on the long-term management of the infrastructure.

The proposed appointment would be that of a Chief Engineering Adviser at the civil service grade of Permanent

Secretary; he would have a role similar to that of the Chief Medical Officer or the Chief Scientific Adviser. He would be employed by the Government, be in touch with the engineering profession and would represent the interests of the people.

The Chief Engineering Adviser would be responsible for preparing advice and implementing policies for the long-term sustainable maintenance and improvement of our national infrastructure. An additional benefit would be that such an appointment should give greater confidence to the public that the large sums of money which need to be invested in the infrastructure would be well spent.

Yours faithfully

Robert Freer
(Robert Freer is writing in a personal capacity)

Sir,

The Calman reforms changed how junior doctors are trained in the UK, by providing explicitly structured time-limited specialist training and removing any explicit requirement to undertake research. The changes have been beneficial to the majority (>90%) of doctors in training, who will ultimately be employed by the NHS in clinical posts. However, the reforms missed an opportunity to benefit the minority (<10%) of doctors in training who will pursue an academic career. There are now substantial disincentives for junior doctors to engage in academic careers, and recruitment to junior positions is falling.

There are two principal problems. Firstly, the length of academic training provides a strong disincentive. After general professional training (typically 2-3 years after graduation), the purely clinical trainee can choose a specialist training program that typically lasts five years, after which a CCST is awarded and the trainee can seek employment as a qualified NHS consultant. In contrast, the academic trainee not only must pursue the same specialist clinical training program, but also scientific training: a PhD (3yrs) and frequently postdoctoral periods of research (1-2yrs) are typically required. The periods of scientific training typically require the trainee to take a substantial pay cut (about 35%); funding is highly competitive and there is no guarantee of continued funding. The clinical component of training has no flexibility and cannot be tailored to the specific research interests of the trainee. Academic training therefore is approximately twice as long as purely clinical training, offers lower pay and less job security.

The second major problem is the lack of systematic support. As academic trainees are typically a minority (<10%) in each medical and surgical speciality, they have little access to peer-group support or ad-hoc networks. The annual assessment that is a feature of the Calman training program is poorly suited to provide guidance for the special career guidance needs of academic trainees, because the panel (and assessment procedure) is strongly biased towards the purely clinical needs of the majority. Responsibility for academic trainees is fragmented between bodies responsible for clinical training (eg the Deanery) and those responsible for scientific training (eg the Research Councils) and so consistent careers advice is frequently unavailable. Joined-up longitudinal career support is desperately required by the majority of academic medical trainees.

Other structural factors may have contributed to a fall in numbers of academic trainees. For example, the large fall in the number of junior lecturer positions available in medical schools has been attributed to the pressure on HEIs produced by the RAE. It is widely believed that the pressure to appoint highly-qualified non-clinical academics to ensure good RAE returns has led to the redeployment of resources formerly used to fund junior lecturer (ie training) posts for clinically qualified staff.

Yours faithfully,

Dr Geraint Rees
Institute of Cognitive Neuroscience

Progress of Legislation before Parliament

Government Bills

Energy Bill: HoL Committee 15, 20, 22 & 27 Jan, 3, 4, 10, 12, 24 & 26 Feb, 2 & 3 March; Report 18, 22, 23, 29 & 30 March; 3R 20 Apr. HoC 2R 10 May.

Health Protection Agency Bill: HoL 2R 5 Jan; Committee 3 March; Report 6 Apr; 3R 29 Apr.

Human Tissue Bill: HoC 2R 15 Jan; Committee 27 Jan-5 Feb; Report awaited.

Patents Bill: HoL 2R 26 Jan; Committee 8, 10 & 11 Mar; Report 23 Mar; 3R 6 Apr. Introduced HoC 19 Apr.

Private Members' Bills

Air Traffic Emissions Reduction Bill: completed all stages HoL.

Dolphins and Other Cetaceans Protection Bill: introduced 31.3.04 under the ten-minute rule by Adrian Sanders MP.

Food Labelling Bill: introduced 22.3.04 under the ten-minute rule by Richard Bacon MP.

Genetically Modified Organisms Bill: introduced under the Ballot by Gregory Barker MP; provisional date for Second Reading 14.5.04.

Rural Broadband Facilitation Bill: introduced 28.4.04 under the ten-minute rule by Ian Liddle-Grainger MP.

Sustainable and Secure Buildings Bill: introduced 7.1.04 under the Ballot by Andrew Stunell MP; 2R 30.1; SC C 3 & 9.3.04; completed HoC stages 30.4.04.

House of Commons Library Science and Environment Section
Research Papers

The following are summaries of papers produced for Members of Parliament.
Information and copies of papers can be obtained from Amina Hossain at the House of Commons Library on 020 7219 6788 or through www.parliament.uk/commons/lib/research/rpintro.htm

The Civil Contingencies Bill

Research Paper 04/07

This Bill would provide a new legislative basis for handling emergencies, including major terrorist incidents. Part 1 of the Bill imposes duties on a wide range of bodies to plan for dealing with possible emergencies. Part 2 would allow the Government to take extensive powers in an emergency, defined as a serious threat to human welfare, the environment or security. The Bill covers the whole of the UK.

The Sustainable and Secure Buildings Bill

Research Paper 04/10

The Sustainable and Secure Buildings Bill is sponsored by Andrew Stunell, the Liberal Democrat energy spokesman, who came first in the ballot for Private Members' Bills. The Bill elevates sustainability to the highest level for the purposes of the Building Act 1984 by adding three new purposes for which Building Regulations may be made under the Act: to further protection of the environment; facilitate sustainable development; and further the prevention and detection of crime. The measures would apply to England and Wales.

Forthcoming Publications

The Energy Bill

The Energy Bill was published on Thursday 27 November 2003 when it received its formal first reading in the House of Lords. It has now completed all its stages in the House of Lords.

Provisions in Part 1 of the Bill relating to the Nuclear Decommissioning Agency (NDA) will be dealt with in a separate research paper. Part 2 of the Energy Bill relates to renewable energy issues, including the development of offshore renewable energy resources, and the establishment of a mutually recognised system of Renewable Obligation Certificates in Northern Ireland. Part 3 of the Bill relates to energy regulation issues, principally the introduction of Great Britain wide electricity trading and transmission arrangements, known as BETTA. Part 4 relates to miscellaneous and supplemental provisions. Most of the Bill's content relates to the reserved matters, and with exceptions, applies to the whole of the United Kingdom.

House of Commons Select Committee on Science and Technology

Under the Standing Orders, the Committee's terms of reference are to examine "the expenditure, policy and administration of the Office of Science and Technology and its associated public bodies". The Committee was nominated on 12 November 2001.

The Chairman is Dr Ian Gibson (Lab, Norwich North). Other members of the Committee are Paul Farrelly (Lab, Newcastle-under-Lyme), Dr Evan Harris (Lib Dem, Oxford West and Abingdon), Kate Hoey (Lab, Vauxhall), Dr Brian Iddon (Lab, Bolton South East), Mr Robert Key (Con, Salisbury), Mr Tony McWalter (Lab/Co-op, Hemel Hempstead), Dr Andrew Murrison (Con, Westbury), Geraldine Smith (Lab, Morecambe and Lunesdale), Bob Spink (Con, Castle Point) and Dr Desmond Turner (Lab, Brighton Kemptown).

Oral Evidence

The uncorrected transcripts of these evidence sessions are available on the Committee's website.

Science Question Time

The Committee hosted a "Science Question Time" with Lord Sainsbury of Turville on Monday 9 February. The Committee will continue to host such sessions at regular intervals.

Director General for Higher Education: Introductory Hearing

The Committee took evidence from Professor Sir Alan Wilson, Director General for Higher Education, on Monday 22 March.

Current Inquiries

Human Reproductive Technologies and the Law

The Committee announced its terms of reference in March

2004. The terms of reference were informed by a public e-consultation on some of the major issues involved in the inquiry, which ran from January to March 2004 at www.tellparliament.net. The inquiry is looking into how human reproductive technologies are regulated in the UK. The Committee will consider the balance between legislation, regulation and reproductive freedom; the role of Parliament in the area of human reproductive technologies; the ethical framework for legislation on reproductive technologies; the Human Fertilisation and Embryology Act 1990; and the work of the Human Fertilisation and Embryology Authority. A Report is expected early next Spring.

The Use of Science in UK International Development Policy

The Committee announced its inquiry in July 2003. It is examining the extent to which research, technology and innovation is informing Government international development policy and practice and what the impact of Government policy has been in building a relevant science base in developing countries. It is also looking at whether expertise in the UK science base is being utilised effectively in the implementation of this policy. The Committee started taking oral evidence in January 2004. A Report is expected in the Autumn.

Scientific Publications

The Committee announced its inquiry in December 2003. It is examining access to journals within the scientific community, with particular reference to price and availability. The inquiry is also looking at the impact that the current trend towards e-publishing may have on the integrity of journals and the scientific process. The Committee started taking oral evidence in March 2004. A Report is expected in the Summer.

EU Chemicals Legislation

The Committee announced its inquiry in October 2003. Following the publication of the European Commission's proposals for EU chemicals legislation, the Committee is examining what, in order of priority, needs to be amended in the legislation; what the implications would be if these amendments are not made and the role played by the UK Government. The Committee finished taking oral evidence in February 2004 and a Report is expected in early Summer.

The Work of the Council for the Central Laboratory of the Research Councils

The Committee took evidence from the Council for the Central Laboratory of the Research Councils (CCLRC) on Monday 29 March. This was a scrutiny session on CCLRC's work, strategy and expenditure plans, as part of the Committee's ongoing programme of scrutiny of the Research Councils. A Report is expected in the Summer.

Reports

Annual Report 2003

The Committee published its First Report of Session 2003-04, Annual Report 2003 (HC 169), on 20 January 2004. The Report contained details of the Committee's activities in 2003, set against its objectives and core tasks.

Chief Executive of the Medical Research Council: Introductory Hearing

The Committee published its Second Report of Session 2003-04, Chief Executive of the Medical Research Council: Introductory Hearing (HC 55), on 29 January 2004. The Report welcomed the appointment of Professor Blakemore and concluded that he was well placed to address many of the problems faced by the MRC. The Committee was concerned that a leaked memorandum from the Honours Committee, which revealed that Professor Blakemore had been overlooked for an honour because of his public support for research using animals, would discourage other researchers from contributing to a much-needed debate on the issue.

The Work of the Biotechnology and Biosciences Research Council

The Committee published its Third Report of Session 2003-04, The Work of the Biotechnology and Biosciences Research Council (HC 6) on 12 February 2004. The Report examined the work, strategy and expenditure plans of BBSRC, as part of the Committee's ongoing programme of scrutiny of the Research Councils. The Report found much to praise at BBSRC: its strategy closely adhered to priorities set by RCUK, and it was, for the most part, administered transparently and efficiently with the support of its community. However, it highlighted working with other Research Councils and the public as areas for improvement.

The Office of Science and Technology: Scrutiny Report 2003

The Committee published its Fourth Report of Session 2003-04, The Office of Science and Technology: Scrutiny Report 2003 (HC 316) on 4 March 2004. The Report found that the Office of Science and Technology had performed commendably in 2003 but expressed concern that the Science Minister was not making the case for science strongly enough in the Department for Education and Skills. It also pointed to poor collaboration between the Office of Science and Technology and other Government Departments.

Too Little Too Late? Government Investment in Nanotechnology

The Committee published its Fifth Report of Session 2003-04, Too Little Too Late? Government Investment in Nanotechnology (HC 56-I) on 2 April 2004. The Report concluded that the commercialisation of nanotechnology research in the UK in many ways presented a depressingly familiar picture of excellent research that was not being translated to the country's commercial benefit to the same extent as it was in other competitor countries. It accused the Department of Trade and Industry of timidity and poor judgment in not implementing the central recommendation of the expert group it appointed to produce a strategy for the commercialisation of nanotechnology and called for a more directed approach to nanotechnology support, building upon existing UK strengths.

Further Information

Further information about the work of the Committee or its current inquires can be obtained from the Clerk of the Committee, Mr Chris Shaw, the Assistant Clerk, Mrs Emily Commander, or from the Committee Assistant, Ms Ana Ferreira on 020 7219 2792/2794; or by writing to: The Clerk of the Committee, Science and Technology Committee, House of Commons, 7 Millbank, London SW1P 3JA. Inquiries can also be emailed to scitechcom@parliament.uk. Anyone wishing to be included on the Committee's mailing list should contact the staff of the Committee.

Anyone wishing to submit evidence to the Committee is strongly recommended to obtain a copy of the guidance note first. Guidance on the submission of evidence can be found at http://www.parliament.uk/commons/selcom/witguide.htm.

All recent publications (from May 1997 onwards), terms of reference for all inquiries and press notices are available on the internet at http://www.parliament.uk/parliamentary_committees/science_and_technology_com.cfm

House of Lords Science and Technology Select Committee

The members of the Committee (appointed 3 December 2003) are Baroness Finlay of Llandaff, Lord Lewis of Newnham, Lord Mitchell, Lord Oxburgh (Chairman), Lord Paul, Baroness Perry of Southwark, Baroness Platt of Writtle, Baroness Sharp of Guildford, Lord Soulsby of Swaffham Prior, Lord Sutherland of Houndwood, Lord Turnberg, Baroness Walmsley, Lord Winston, and Lord Young of Graffham.

The Reports and Calls for Evidence for the inquiries mentioned below can be found at the Committee's web site www.parliament.uk/hlscience.

Science and International Agreements

Lord Mitchell is chairing Sub-Committee I's inquiry "Science and International Agreements", which is exploring the processes whereby scientific advice and other scientific input are incorporated into international agreements. Oral evidence sessions concluded before Easter, by which time the Committee had heard from ministers from FCO (Bill Rammell MP) and Defra (Lord Whitty).

In March the Committee visited Geneva, meeting representatives from several UN bodies. These included the UN Environment Programme which covers, in particular, agreements on chemicals and endangered species; the World Health Organization on the recent Framework Convention on Tobacco Control; and the World Trade Organization, with its Sanitary and Phytosanitary Agreement which allows for measures to protect human, animal and plant life. The Sub-Committee also visited Brussels, meeting Catherine Day, Environment Director-General, and representatives from Research and Trade Directorates-General. An account by Baroness Walmsley of the visit to Antarctica in January is given elsewhere in this issue.

Michael Collon (collonm@parliament.uk) is the new Clerk of the Sub-Committee, having taken over from Rebecca Neal at Easter.

The Practicalities of Developing Renewable Energy

Sub-Committee II, chaired by Lord Oxburgh, is investigating the practical issues arising if renewable energy sources are to be introduced at the rate proposed in the Government's recent Energy White Paper. The Sub-Committee concluded oral evidence in March, having heard from Stephen Timms MP, the DTI minister responsible for energy matters.

In late January, Members saw two examples of unorthodox electricity generation in East Anglia: from the combustion of straw at Ely power station, and of chicken litter at Thetford power station. The trip gave the Sub-Committee a good idea of how biomass generators operate and some of the issues they face. In March the Sub-Committee had a very informative visit to Woking District Council, which has been a leader in its use of renewable and distributed energy sources.

The report of the inquiry is expected to be published by July. The Clerk of the Sub-Committee is Christopher Johnson (johnsonc@parliament.uk).

Follow-ups

- The debate on the Committee's report "Science and the RDAs: SETting the regional agenda", took place on 29 April.
- Recent Government announcements on a public consultation for statutory regulation of practitioners of herbal medicine and acupuncture are based on recommendations of the Committee's report from November 2000, "Complementary and Alternative Medicine".

Select Committee visits

In February, the Select Committee visited some notable scientific sites in the south west of England. The first stop was the new Met Office HQ in Exeter, following its relocation from Bracknell last year. Members were impressed by the modern building and heard of the latest climate change predictions, how climate warming is attributed to human activity, and some of the possible effects. The National Marine Aquarium in Plymouth hosted

evening drinks, before a meal with several members of the scientific community from the south west. The following day the Committee visited the Eden Project, with a stimulating tour by Tim Smit, CEO of the Eden Project, and Dr Tony Kendle, Director of the Eden Foundation.

At the time of writing, the Select Committee are planning to visit the UK Atomic Energy Authority site at Culham to discuss recent developments in nuclear fusion research.

Further Information

Further information about the work of the Select Committee can be obtained from Christopher Johnson (johnsonc@parliament.uk). A free weekly notice of business of all House of Lords Select Committees is available from Geoff Newsome, 020 7219 6678. The Committee's email address is hlscience@parliament.uk

Parliamentary Office of Science and Technology

Environmental policy and innovation

January 2004 ***Postnote 212***

The Government has recently published a strategy for innovation, which identified opportunities for linking it to environmental policy. The development and uptake of innovative ways to reduce environmental impacts may be stimulated by policies, known as "new environmental policy instruments" (NEPIs). These include the Climate Change Levy and the Landfill Tax. This briefing examines NEPIs and their role in stimulating innovation and improving the environment. It also updates POST's previous work in this area.

Climate change and business

January 2004 ***POSTnote 213***

The Government's Climate Change Programme (CCP) is aimed at reducing UK emissions of carbon dioxide (CO_2) by a fifth, against 1990 levels, by 2010. Several of the measures included in the programme specifically target emissions from business. This briefing outlines those elements of the CCP relevant to business and their impact on reducing CO_2 emissions. It also discusses how the business community has responded to the CCP and outlines options to make policies more effective.

New NHS IT

February 2004 ***POSTnote 214***

The Government has recently signed contracts for a £6 billion modernisation of NHS computer systems in England. This national IT programme has four main parts: electronic patient records, electronic appointment bookings and electronic transmission of prescriptions, along with an upgraded NHS broadband network. However, it involves both managing a large IT procurement and imposing change on the highly devolved NHS. This POSTnote outlines the main projects in the national programme and their potential benefits, then examines key concerns, such as confidentiality, funding and involving clinicians.

Openness and animal procedures

February 2004 ***POSTnote 215***

Several developments – including the introduction of the Freedom of Information Act 2000 - have led to calls for more openness about the costs and benefits of animal procedures. This could require modification of the Animal (Scientific Procedures) Act (A(SP)A) 1986, which restricts disclosure of confidential information about animal procedures. This POSTnote looks at the pros and cons of greater openness, and analyses ways in which greater openness could be achieved.

Scientific capacity in developing countries

March 2004 ***POSTnote 216***

Poverty, disease and environmental degradation hamper development in many countries and science and technology (S&T) can contribute towards addressing these obstacles. However, many developing countries have limited capacity to identify where and how S&T can help to tackle their problems. Development agencies, including the UK Department for International Development (DfID) are looking at ways to assist developing countries to build their S&T capacity as part of reducing poverty. This briefing outlines the link between science, technology and development, and efforts to build developing countries' S&T capacities.

Nuclear power in Iran

March 2004

POST prepared a special briefing (Evidence paper 6) for the House of Commons Foreign Affairs Committee, to inform its Third Report, Session 2003-4, on Iran. This discussed the current and potential future characteristics of Iran's nuclear electricity programme.

Current Inquiries

Areas in which POST is currently working include: Teenage sexual health, Vaccines and public health, Therapeutic stem cell research, Neglected diseases, Renewable energy and Climate change and health.

Staff, Fellows and Interns at POST

Dr Theresa-Jane Squire started as Scientific Adviser (Physical Sciences and IT) and Dr Stephanie Spincer as Scientific Adviser (Energy and Environment).

Helen Wells (ESRC fellow) is working on a POSTnote on

speed cameras. Angharad Thomas, POST's first Institute of Physics fellow, is preparing a briefing on Radio Frequency ID tags and Helen Munn (ESRC fellow) is working on Teenage sexual health.

International Activities

POST has joined with several of the European Parliamentary science and technology offices, and other research institutes, in participating in a new European Commission-funded study on the Institutionalisation of Ethics into Science and Technology policy. This will compare the different approaches taken in several European countries.

OPECST, POST's sister organisation that serves the Assemblée National and the Sénat in France, has the 2004 presidency of the European Parliamentary Technology Assessment network (EPTA). Accordingly, OPECST hosted the annual directors' meeting, attended by the Director and Dr Chandy Nath.

In February, the Director visited the Riksdag, the Swedish Parliament, to assist in planning for the creation of a parliamentary technology assessment service there. This has now become a formal reality – the new service will start work in late August and has already become an associate member of EPTA.

Additional information can be obtained from POST, House of Commons, 7 Millbank, London SW1P 3JA (020 7219 2840).

Also available on the internet at http://www.parliament.uk/post/home/htm

Members of either House can obtain free copies of all published material. Others may purchase copies from the Parliamentary Bookshop (020 7219 3890). There is also a subscription service: details from POST.

Debates and Selected Parliamentary Questions & Answers

Following is a selection of Debates and Questions and Answers from the House of Commons and House of Lords.

A full digest of all Debates, Questions and Answers on topics of scientific interest from 5th January to 6th April 2004 from both Houses of Parliament appears on pages 38 to47.

Climate Change

Climate Change

Debate in Westminster Hall on Tuesday 27 January

Mr David Kidney (Stafford) The debate had been requested in response to Sir David King's article on 9 January in Science in which he had laid out the classic arguments for climate change resulting from human activities such as burning fossil fuels. Sir David had concluded his article by saying: "In my view, climate change is the most severe problem that we are facing today, more serious even than the threat of terrorism." It was claimed in the same article that the UK is in the vanguard of international efforts to reduce emissions of greenhouse gases and the United States of America is not playing its part although with only 4 per cent of the world's population it is responsible for more than 20 per cent of harmful emissions. However Mr Kidney indicated that the article did not emphasise biodiversity. A report had recently claimed that between 15 and 35 per cent of land species of the study area reported on could face extinction by 2050.

Mr Kidney challenged the Minister for the Environment, Mr Elliot Morley, to declare what his Department and the Government are doing to reinforce Sir David's message and what actions are being taken to persuade the US to join the international efforts to protect the world's environment.

Mr John Gummer (Suffolk, Coastal) reinforced the need for Ministers to take every opportunity to raise these matters in future with opposite numbers in the United States.

Mr Kidney continued to raise a plethora of actions and incidences all of which form part of the concerns attributable to a greater or lesser degree to climate change; these included the following issues: the need for Russian ratification of Kyoto, progress on emissions trading in the UK, target definition for emission reduction and its likely impact on economic well being, local agenda 21 strategies in place with 93 per cent of local authorities, reducing energy consumption, recycling, reducing packaging, the Nottingham declaration on implementation of the UK climate change programme, sustainable buildings task group, housing standards as incorporated in the BedZED zero emissions development, and involvement in sustainable development of those most affected such as children through the eco-school scheme.

Mr John Randall (Uxbridge) referred to the possibility of the shut down of the "Atlantic Conveyor" bringing warm water from the Gulf to these shores. He nevertheless accepted the intergovernmental panel views that the earth will warm by a further 1.4^0 to 5.8^0C over the next century, disrupting human society, wildlife and the environment on which we all depend. UK weather patterns will change and species could become divorced from natural habitats in both space and time.

Mr Elliott Morley, the Minister for the Environment,

welcomed the debate, emphasised the importance of Professor King's role in focusing on the science of climate change in a strong speech that attracted media attention and emphasised the efforts being made on several fronts to seek co-operation with the United States.

He welcomed the Nottingham declaration and the importance of engaging young people. Everything is under threat from global warming from polar bears to insects. We must engage more with business through Envirowise, the Energy Saving Trust and others. We also need Russia to ratify the convention. There are transport issues and even companies such as Jaguar now claim lower emissions and fuel economy aided by greater use of light metal, driven by the Governments financial instruments. Increased travel by rail is also helping to contain road transport emissions, although problems remain to be resolved, especially with aviation to bring it within the carbon-trading scheme at the EU level. He emphasised in closing that the costs of not tackling climate change are huge.

Climate Change

Debate in the House of Lords on Monday 9 February

Baroness Miller of Chilthorne Domer rose to call attention for action in response to the recent statement by the Government's Chief Scientific Adviser. The UK Government believes he is right and is trying to show leadership by cutting energy consumption and increasing the use of renewable resources. The Government has failed however to incentivise energy efficiency by domestic users, and business users are confronted by a bureaucratic jungle comprising a complicated set of hurdles and mechanisms so that the opportunity for innovation and investment has been lost.

Lord Hunt of Chesterton: The White Paper was vigorously contested in Whitehall but led to the remarkable conclusion that there should be no firm commitment to any UK energy source but more or less complete and massive reliance on Russian gas for the next 50 years. The Government has many different definitions of "sustainable development" but none contain a prime commitment to security.

Baroness Byford: There seem to be general agreement that increases in greenhouse gas emissions from air traffic could completely neutralise the savings planned under Kyoto.

The Lord Bishop of Leicester: In his maiden speech the Bishop pointed out that next year the UK holds the presidency of the EU and G8 simultaneously. This presents a unique opportunity for the UK to promote Sir David King's suggestion for future greenhouse gas emissions control based on contraction and convergence. Contraction refers to the movement towards a formal stabilization target of emissions that is sustainable; a 60 per cent reduction by 2050 is the often-repeated suggestion. Convergence is the sharing out of permissions to pollute among all the peoples of the earth. Countries would be allocated their share of permits to pollute. Post-industrialised countries emit far more greenhouse gases than those in the developing world, yet have smaller populations. The richer countries could buy permits to pollute from the poorer countries and offer much needed development aid thereby.

Baroness Walmsley took the opportunity to report on her interesting and exciting visit to the British Antarctic Survey Base at Rothera in the Antarctic and to thank BAS for this unique opportunity which neither she, Lord Oxburgh, Lord Mitchell or Rebecca Neal will ever forget. Although global warming and the ozone hole are two separate matters, there is a link and the Baroness, whose background is in biology, proceeded to explain in considerable detail how this arose. It was in the Antarctic that BAS scientists first discovered the circumpolar hole in the ozone layer in 1985, based on ozone research initiated in 1957. The conjunction arises because chlorine-containing gases such as ChloroFluoroCarbons (CFCs) are concentrated during the Antarctic winter in clouds over the South Pole by the strong westerly wind known as the circumpolar vortex, the centre of which is thus isolated and cools to minus 80^0C. When the sun returns in spring the ozone (O_3) reacts with chlorine to form oxygen (O_2), creating the hole. When the stratosphere warms up, this reaction stops and warmer ozone-rich air flows in, thus closing the hole. The link to global warming arises because near-surface increases in CO_2 block surface emission of infrared energy from the earth, allowing the upper stratosphere to cool down and help create ideal conditions for destruction of ozone. The ozone layer is essential as it provides vital protection required by most living organisms, both plant and animals, from high energy ultraviolet-B radiation that is readily absorbed by DNA. Animal skin and plant pigments provide some protection and specialised organisms that live and survive in harsh polar environments are now recognised as a priceless resource for the good of mankind. The Antarctic Treaty group's advisory body, the badly under-resourced Scientific Committee on Antarctic Research, chaired by Professor David Walton from BAS, recently raised concerns about harvesting such organisms for commercial biotechnology applications with environmental ramifications.

Lord Tanlaw: Can the Minister say today what will be the Government's position on nuclear power generation three years hence? It was always assumed that nuclear power would be a major contributor to reducing carbon emissions. BNFL stated recently that in 2002-03 it supplied 17.4TWh (terawatt) hours to the National Grid, thus saving 7.5 million tons of CO_2 emissions. How is the department's climate change programme intended to reduce emissions by 20 per cent without relying on a meaningful nuclear generating capacity and without rationing the growing business use of electricity. Approximately 20 per cent of current electricity demand will have to be replaced by 2010 from clean non-nuclear alternative energy sources. How on earth will that be possible since all existing Magnox nuclear reactors and some of the remaining Advanced Gas-cooled Reactors (AGRs) will be shut down by then? None of the three main political parties have the political will to start a renewed nuclear generation programme. By 2020 the only nuclear industry left will be waste management. As a non-scientist advised by scientists in the All Party Group on

Astronomy and the Near Space Environment, he is unconvinced that global warming is entirely terrestrial in origin since there is increasing evidence that 60 per cent is due to the Sun. Only a new nuclear power programme can provide the UK with adequate flexibility of response to an unknown and unpredictable future that is beyond the scope of short-term politics to deal with.

Lord Methuen: The Meteorological Office is a world leader in weather forecasting and climate change research. The Hadley Centre for Climate Prediction and Research, opened in 1990, is the UK research centre for climate change. Its main funding comes from Defra, with funds from other government departments and the EU. Its mission is to understand the climate system and to represent it in mathematical models to monitor both global and national climate change to enable prediction of future change. The aim of the Meteorological Office is to improve climate change models by quantifying and reducing the uncertainty of prediction. For example, predictions for sea level change for 2100 indicate a rise of from 10 to 90 centimetres between the least and most extreme climate models.

Lord Beaumont of Whitley: According to the Gaia hypothesis the Earth needs to operate between fairly close limits to support life. Whereas terrorist actions with exclusion of nuclear and biological threats are mere blips on the history of mankind, climate change may be of a completely different order. Terrorism is a disease requiring urgent measures but climate change may be mortal.

Lord Oxburgh: The atmosphere and oceans work together to give the earth an integrated central heating and air conditioning system. All life depends on it. If the properties of the atmosphere are changed so that the earth retains more of the heat from the sun it is the same as turning up the earth's thermostat a notch or two. Burning coal and oil for 150 years and releasing carbon into the atmosphere that has been stored in the earth's crust for many millions of years has done exactly that. Evidence from gas bubbles trapped in polar glaciers over hundreds of thousands of years confirm this. Small changes in average temperature are enough to change patterns of global circulation. Technology can combat some of these effects but agriculture will change, possibly leading to famine in badly affected regions. Some changes could be very rapid such as the effects in the UK of the possible shut down of the Gulf Stream with devastating implications for agriculture, wildlife, energy and shipping. The problem is that the trigger point for such an event cannot be predicted in advance.

So what to do? Planting more trees may help a little, but not enough. Developing countries have generally lower per capita production of CO_2 but are also those with most population growth, and have great potential for increased energy consumption as their economies become more prosperous. Their energy will come from the cheapest and most readily available source – coal. For a given amount of energy produced coal releases more CO_2 to the atmosphere than any other fossil fuel and both India and China have abundant supplies for the foreseeable future.

The strategy for the developed world must therefore be twofold, to limit emissions as tightly as possible and to find an inexpensive and efficient means of carbon sequestration. It is possible to remove CO_2 from gases generated by burning fossil fuels and prevent it entering the atmosphere and to make this technology generally available to the developing world at low cost. This is arguably the most important contribution that the UK could make to the problem of global warming. The Government should set carbon sequestration as a prime challenge for the UK research community and make funds available to meet it.

Baroness Sharp of Guildford: Woking began the development of micro-combined heat and power facilities in the early 1990s, post-Rio when Agenda 21 started to appear and was stimulated by the Home Energy Conservation Act 1995. This enabled electricity to be supplied at 1p per unit less than the National Grid and the heating was cheaper too, all supported by a recyclable fund resulting in energy savings of 41 per cent and a 60 per cent saving on carbon emissions. This example could be pursued with advantage by other local authorities.

Lord Dixon-Smith: The UK has 1 per cent of the world's population and 2 per cent of its emissions. The problem therefore cannot be solved by the UK alone. The cost of trying to tackle the issue is less than the likely cost of doing nothing. Only one flood over the top of the Thames Barrier predicted for later this century could result in an immediate loss of £30 billion in London alone, without consideration of flood damage elsewhere. The Government are pledged to reduce CO_2 emissions below the 1990 level by 20 per cent by 2010.

They have benefited in reaching this target from privatisation of electricity supply resulting in a surge in gas generation of electricity which is more CO_2 efficient than coal; and the run down of the steel industry. However the inefficient wind farm programme with an output capacity of only 30 per cent of installed capacity will not compensate for the closure of nuclear power stations. Road and air transport emissions are likely to rise. The Severn Barrage based on proven technology with a 120-year life was last reviewed in the 1990s and considered too expensive. The Minister is asked to reconsider the economic basis of this scheme in light of the current climate of much lower interest rates.

Lord Whitty: The UK Government has signed the United Nations Framework Convention on Climate Change. Ratification of the Kyoto Protocol now depends on Russia since regrettably the United States has opted out. Sir David King's article in Science places grave responsibility on the Americans who demonstrate corporate and business enthusiasm but need political commitment, since although the US has only 4 per cent of the world's population it is responsible for 20 per cent of global emissions. Their present targets would do nothing to reduce that proportion. The US and UK G8 presidencies and the UK presidency of the EU should be used to make climate change central to UK political objectives. Keeping the nuclear option is important. If a substantial portion of power is from wind at different sites on these islands it is

unlikely to be intermittent. It is as reliable as many fossil fuel or nuclear power sources. Other contributions on sourcing and use of energy must be made to meet the Energy White Paper and targets beyond Kyoto from 2020 to 2050; a 20 per cent reduction by 2020 and a 50 per cent reduction of carbon use by 2050.

Lord Bhatia: How will hydrogen for vehicles be produced? Nuclear energy was going to be the supplier of hydrogen. How will hydrogen be produced in future?

Lord Whitty: Hydrogen will be produced by any available source of electricity although it is true that hydrogen could be produced efficiently by nuclear power. Use of fossil fuel for aviation has escaped all restriction so far. The fuel is untaxed, aviation is excluded from Kyoto and no alternative non-fossil based fuels are proposed. The White Paper contained the proposal that aviation could join in the European Emissions Trading Scheme. Aviation could become one the biggest contributors to global emissions.

Crime and Terrorism

Internet Hackers

Question and Written Answer on Friday 12 March

Michael Fabricant (Lichfield): To ask the Secretary of State for the Home Department what measures he plans to increase the number of arrests of hackers who send viruses via spam advertising.

Caroline Flint: The investigation and arrest of individuals who disseminate viruses is a matter for law enforcement. Where individuals are discovered to have disseminated viruses which cause the unauthorised modification of data they can be prosecuted under Section 3 of the Computer Misuse Act.

We have set up the National Hi Tech Crime Unit (NHTCU) as part of the National Crime Squad to combat national and transnational hi-tech crime within or which impacts upon the UK. This includes the investigation of hacking and virus writing. The Unit, together with the specialist units within local forces which also deal with such investigations, have established good international links with overseas industry and law enforcement, necessary to follow the evidence trail to discover and prosecute the perpetrators of such offences.

There have been a number of successful prosecutions against virus writers and disseminators.

In December 2003, the UK introduced new controls on unsolicited direct marketing e-mails, under the Privacy and Electronic Communications Regulations. Direct marketing e-mails may not now be sent to individual subscribers without their prior consent. The new opt-in rules do not apply to direct marketing e-mails sent to corporate subscribers (eg limited companies and other organisations). However, all direct marketing e-mails, regardless of who they are sent to, are required by the regulations to contain proper sender and contact details for opt out purposes.

The Scientific Response to Terrorism

Debate in Westminster Hall on Thursday 18 March

Dr Ian Gibson (Norwich, North) opened the debate offering great respect to the people of Madrid who have said "enough is enough", following atrocities on their railway system. Indeed many people thought something similar had happened this morning when Parliament Square was closed off, thankfully caused by a spilled chemical container after a crash that had potential for release of a noxious gas, but it could have been the type of event we all dread.

The Committee considered the scientific and technological content of countermeasures against biological, chemical and radiological terrorism; national and international co-ordination of surveillance of dangerous chemicals and pathogens; response policy; public communication on threats and terrorist acts; relevant research and controls; and ethical codes for scientists engaged on research on pathogens and chemical substances.

Dr Gibson, in characteristic style, commended the previous day's Budget where science had been mentioned "perhaps more times than I have had hot dinners in a month" notably in relation to terrorism, health and climate change.

For a precise definition of terrorism, Dr Gibson commended the comprehensive statement provided by his local branch of the Halifax, "the use, or threat of use, of biological, chemical and/or nuclear force or contamination by any person(s), whether acting alone or on behalf of or in connection with any organisations(s) or government(s), committed for political, religious, ideological or similar purposes including the intention to influence any government(s) or put any sections of the public in fear."

The Select Committee is concerned with the use of science and technologies in the war against terrorism. In this role the Committee addresses three main points in the report. The first of these concerns Openness and Security. The role of the Committee "is to allow the public to see that that there is proper, open scrutiny of processes in this place" in a general sense and its purpose is not to disclose or "discover dreadful secrets". Sir David King, the chief scientific adviser, nevertheless had to inform the enquiry that "I can say less in public about what we are doing than my counterparts in the United States." Some people thought the Committee were out of order for conducting the enquiry.

This country already has much previous experience of handling terrorist attacks but would nevertheless benefit from the creation of a new Home Office defence research centre so that people could readily access new information in a systematic way about scientific discoveries related to terrorism. For example the Centres for Disease Control and Prevention in Atlanta maintain contact with every city and township in the United States. The overall effect of maintaining such a high profile national centre of this type is pervasive throughout society and probably helped Mayor Giuliani to react so decisively and effectively to the attack on the twin towers. The question is are we also as ready and

organised for such an attack in this country?

Mr Robert Key (Salisbury) emphasised the need for a change of attitude towards secrecy by taking the British public into the Government's confidence, and having more full-scale exercises like the London exercise at Bank tube station. For example, the US Department of Homeland Security website has recently deployed the national incident management system NIMS thereby providing abundant and very detailed information to everyone. This country could move forward more swiftly in that sort of area. The safety and security of research centres and those who work there on essential animal experimentation is also of concern. In the United States there is federal and state legislation on the topic which, if applied in this country, could have prevented what happened to Huntingdon Life Sciences.

Geraldine Smith (Morecambe and Lunesdale) questioned the capability of the Government to prevent or deal with chemical, biological, radiological or nuclear attack. It is only a matter of time before a major CBRN attack is launched on a major Western city. A research facility is now required that is similar to the defence-related centre at Porton Down but which is focused on CBRN attacks on the civilian population, since Porton Down is entirely military and has no home defence remit.

Bob Spink (Castle Point) indicated that the inquiry had discovered that it is not clear who in Government is responsible for determining which threats the UK responds to and in what priority or how risk assessment informs Government policy. Unless a single high level ministerial appointment is now made "the buck must stop with the Prime Minister".

Dr Brian Iddon (Bolton, South-East) referred to the Anti-terrorism, Crime and Security Act 2001 and the need for clarification on access to chemicals entered on the so-called Australia group list (highly toxic chemicals, such as ricin, viruses, rickettsiae and bacteria) that is the present legal requirement and the later Salisbury list, about which the public are not allowed to be told much. It would seem that toxic chemicals other than natural products should be contained in the latter list. The Australia group list contains none of those, not even organophosphates-nerve agents, such as sarin, which terrorists used on the Tokyo underground. Scientists are still waiting for the Government to set a minimum standard of compliance with the 2001 Act. Also, very difficult questions requiring long range foresight on vetting of foreign students, the transfer of risky technologies and the ethics attached to their publication in the scientific literature, remain to be resolved.

Mr Tony McWalter (Hemel Hempstead) focused on the report's deficiencies which arose from a failure of the Committee to engage in discussion with Government representatives who are more intent on keeping Government motives, policy and knowledge out of the public arena in order to thwart terrorism. For example, one of the leaders of the research councils told the Committee that they would engage the Government in discussion "if only we could find someone sensible to talk to". The UK representatives on water were presented by the Committee with the American viewpoint promoting openness but replied, "We disagree". There was no argument , no discussion, no depth – that is what is wrong with our report and the Committee and the public are therefore none the wiser about Government policy.

Beverley Hughes, the Minister for Citizenship and Immigration, opened with a statement that the Government take the threat of terrorism very seriously indeed and protecting the public and national security is probably the Government's most important duty. The threat evolves continuously and the Government must seek out the best scientific expertise and apply it as effectively as possible to every part of the Government's counter-terrorism programme. She welcomed the view that there is no need for a department of homeland security based on the US model. The key to solving the complex issue however is to find a way to bring all strands of the counter-terrorism strategy together. Scientific expertise and capability forms part of the total response to disasters, however they are caused, including the terrorist threat, and the scientific contribution should not be located therefore in a centre exclusively dedicated to home defence which would require replication in order to be able to respond effectively to all eventualities.

Dr Gibson pointed out that the need was for a virtual centre based on the National Cancer Research Institute model as outlined in the Chancellor's speech the day before and not one based on bricks and mortar.

Beverley Hughes responded that she had difficulty in distinguishing between a centre for home defence, virtual centres and the cross-government and cross-discipline methodology adopted by the Government.

Effective scientific co-ordination requires that best use is made of governmental scientific expertise, that scientific resources are built up in key areas, and that the best use is made of the knowledge base and capabilities outside Government, especially in industry, academia and among international allies. Scientists from the Defence Science and Technology Laboratory and the police science development branch were seconded into the Home Office to provide scientific support and maximise synergies. The need to improve the quantity and quality of science in the Home Office, a Committee recommendation, was acknowledged and the appointment of Professor Paul Wiles as chief scientific adviser to the Home Office with links to the cross-Whitehall network of chief scientific advisers, represents part of the response. A Home Office-led cross-government civil counter-terrorism research programme is now under way to identify gaps, list and assess them, ensure research is undertaken to fill them by relevant Departments who retain responsibility for commissioning and delivery of research in a cross-government approach.

Geraldine Smith re-emphasised that in a matter as serious as terrorism there is also a need for someone to take ultimate charge.

Beverley Hughes responded that both the Prime Minister and Home Secretary have ultimate ministerial responsibility. She also acknowledged that the response to the Committee had got off to a bad start. The Department recognised that thirty years of Irish terrorism have created an experienced

and mature public who are not prepared to allow the threat of terrorism to alter the course of their daily lives. The newly-created Joint Terrorism Analysis Centre have responsibility for assessing the level of threat which is sector specific not in the general colour coded way used in the US. Public communication is under review to assess the extent to which security information can be placed in the public domain without thereby also increasing the risk from terrorism. GPs are being trained by the Health Protection Agency, a vetting scheme is under review, the current list of dangerous substances is in practical use although only the older one is legally binding, seven very large scale live exercises have been undertaken with 30 smaller table top exercises in support. Seven counter-balance exercises on CBRN and resilience have also been undertaken since last year.

Miscellaneous

Light Pollution and Astronomy

Debate in Westminster Hall on Thursday 12 February

Dr Ian Gibson (Norwich, North) particularly thanked the Royal Observatory at Greenwich for enabling the Select Committee to see the night sky, or what is left of it in the London area, through a telescope. He also thanked Mr Tom Harris (Glasgow, Cathcart) for his persistence in pursuing this issue through the ballot.

There were 120 submissions of evidence from people, many of whom are alarmed at the extent to which the night sky is being ruined by the increase in light pollution. According to Professor Sir Martin Rees, the Astronomer Royal, the case for controlling light pollution has scientific, educational, environmental, aesthetic and economic dimensions. He indicated that Mr Miliband (South Shields) might have benefited from looking through a telescope at the right moment in his career.

It is the view of the Select Committee that modest changes in the planning and regulatory system could stem and indeed reverse the current trend. Light pollution is a cross-cutting issue between several Departments and he congratulated Yvette Cooper, the Parliamentary Under-Secretary of State, Office of the Deputy Prime Minister, in winning the raffle to address the debate and looked forward to her "exploding like a star from the firmament".

The Government's reply to the recommendations in the report had been described as a "Yes, Minister" script but without the jokes.

Sky glow attributable to aircraft vapour trails had led to an Early Day Motion 1688 appealing to the Government to work at national, European and international level to reduce and eliminate tax concessions received by the aviation industry in the form of tax-free fuel and VAT-exempt products.

The ODPM is not considering making light pollution a statutory nuisance or trespass despite the advice of the Committee, even though the UK is one of the world's worst light polluters. Environmental health officers are concerned that a dramatic increase in workload would arise if they took on this responsibility. The Government approach has been condescending, while agreeing with the findings of the report, they do not appear to agree with the recommendations.

The Government have an energy policy, including energy conservation. Approximately one gigawatt of electricity is wasted illuminating the sky, which results in corresponding emission of approximately one million tons per year of CO_2. Full cut-off, high pressure sodium lighting comes highly recommended in this respect. It costs the Government and developers nothing. It is all about choosing the right appliances and installing them sensibly.

As far as children are concerned they are apparently inspired by only two scientific subjects – dinosaurs and space. Both provide very important opportunities to encourage and enthuse children in adopting a science-based course of studies leading to a future career in science on which the economy depends. By blanking out our skies we also lose prospective scientists and engineers.

Ms Yvette Cooper, the Parliamentary Under-Secretary of State for the Office of the Deputy Prime Minister, said that given the wide-ranging nature of the report, help had been received from many departments in preparation of the response.

The issues around air travel were considered more appropriate for discussion in the context of the aviation White Paper.

A series of tensions are recognised, urban versus rural, lighting versus crime, home security issues between housholders.

Regarding planning system and statutory nuisance, the campaign to Protect Rural England's "Night Blight!" report includes a survey showing that 39 per cent of district and unitary councils contacted already had a specific light pollution policy in their local plan.

The intention is to set out guidance as an annexe to planning policy statement 23 on planning and pollution control, with the intention to send a clear signal to local planning authorities that they should take the issue of light pollution as seriously as other types of pollution when they consider planning applications and when they draw up development plan documents. The intention is that every local authority should have development plan policies on external lighting.

On the matter of existing lighting, the Highways Agency has been working to make the most of new technology and replace low-pressure sodium lighting with better light sources.

The Department for Environment, Food and Rural Affairs consulted on whether light pollution should be treated as a statutory nuisance for "Living Places: Powers, Rights and Responsibilities". The debate on the issue is continuing and

will have to be considered as part of the consultation process. A regulatory impact assessment is also needed for new legislation. People are becoming increasingly interested in the topic that causes tensions over what can be delivered. She commended the Select Committee for raising such an interesting topic.

Biodegradable Plastic Bags

Question and Written Answer on Tuesday 24 February

Mr Peter Ainsworth (E Surrey): To ask the Secretary of State for Environment, Food and Rural Affairs what steps she is taking to encourage the use of biodegradable plastic bags.

Mr Morley: Government are not taking steps to promote the use of biodegradable plastic bags. The use of degradable plastics that are made from fossil fuel, and specifically designed for disposal with no beneficial recovery potential, runs counter to the Government's aim to increase recycling. In addition, if disposed of in landfill rather than, for example, being composted, biodegradable waste breaks down to release methane, a highly potent greenhouse gas.

The Government do support the development of biodegradable plastics from non-fossil sources. The Government-Industry Forum on Non-Food Uses of Crops has concluded that there is an opportunity to produce compostable packaging materials in the UK. Defra is currently drawing up a Non-Food Crops Strategy. A draft is expected to be issued for consultation later in 2004.

A-level Chemistry

Question and Written Answer on Friday 5 March

Lord Colwyn asked Her Majesty's Government how many students applied to study A-level chemistry last year; and what they are doing to promote an increased take-up of chemistry as a GCSE and A-level subject.

The Parliamentary Under-Secretary of State, Department for Education and Skills **(Baroness Ashton of Upholland):** The total number of GCE A-level chemistry examination results for students in schools and colleges in 2003 was 32,319.

We are committed to improving science teaching and learning in schools to encourage more young people to study science subjects post-16 and making sure that all young people understand the relevance and importance of science to the world around them. We have a £51 million partnership with the Wellcome Trust to set up a national network of science learning centres to provide training for science teachers and science technicians. The science strand of the key stage 3 strategy aims to improve the quality of learning and teaching in the classroom by investing in teachers' professional development, promoting approaches to science teaching and learning that engage and motivate students.

QCA have reviewed the programme of study for science at key stage 4 to ensure we are providing a core of science learning that is relevant to all students. A new GCSE, Science in the 21st Century, is currently being piloted. In 2002, we introduced a GCSE in applied science.

Nanotechnology

Question and Written Answer on Thursday 11 March

Michael Fabricant (Lichfield): To ask the Secretary of State for Trade and Industry what the Government's policy is on nanotechnology; and if she will make a statement.

Ms Hewitt: The global market for nanotechnology is forecast to exceed $1,000 billion within the next decade and it is vital that the UK is a strong player in this market. My noble Friend the Minister for Science announced our investment of £90 million in our Micro and Nanotechnology Manufacturing Initiative in July 2003 to help industry harness the commercial opportunities offered by nanotechnology. £50 million will be spent on collaborative R&D projects and £40 million on a new network of micro and nanotechnology facilities. This will help business build on the UK's excellent track record in small-scale science and win a share of this developing market. This activity will build on the substantial and wide-ranging investment we are already making through the Research Councils. We expect to invest a further £100 million in our science base for nanotechnology-based research over the next few years.

In addition in December 2003 I launched the "Innovation Report: Competing in the global economy: the innovation challenge, December 2003". This report describes a range of new DTI products to support technological innovation which are already being applied to support UK interests in nanotechnology.

It is the policy of this Government to be open about our approach to new technologies, to acknowledge uncertainties and to ensure that the public are engaged in the decision making process. To address any potential concerns the Government commissioned the Royal Society and the Royal Academy of Engineering to carry out an independent study to make sure we are able to benefit from the advances that nanotechnology promises with the right regulatory safeguards and protections in place. The study will also be used to inform policy on what safeguards might be required over and above existing legislation and guidance.

UK Parliament - Digest of Parliamentary Debates, Questions and Answers

5th January - 6th April 2004

The references are to Hansard, giving first the date of publication, either HoC (House of Commons) or HoL (House of Lords), and finally the column number in Hansard.

**Denotes selected Debates and Questions and Answers of particular interest which are reproduced on pages 31 to 37.*

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Euro-News

Commentary on science and technology within the European Parliament and the Commission.

Fair Treatment for people with MS

The European Parliament adopted a draft own-initiative resolution concerning the discrimination on health care to which Europe's multiple sclerosis sufferers are subjected. Multiple sclerosis is a debilitating and unpredictable illness. There is no known treatment. Nevertheless important progress has been made over the last twenty years in understanding and improving quality of life for sufferers. The treatment available varies within and between member states. Disparities can exist in access to medicine, medical refunds, or any psychological, financial or other aid a suffer may need.

The European Commission could only respond that this is a matter where powers lay entirely with Member States. MEPs regard this answer as unfair and inadequate and have proposed a European strategy to combat the disease. MEPs argue that the main goal of the health authorities in the EU should be to guarantee equal access to therapies and treatments as well as the provision of optimum services, through co-ordinated programmes drawn up in conjunction with the World Health Organisation. They also believe that patients' organisations, in particular the European Multiple Sclerosis Platform, should have a key role.

GMOs – co-existence

MEPs focused on the difficulties of separating genetically modified organisms (GMOs) from conventional organisms in food and animal feed. In general terms, MEPs are demanding stricter and more effective protection for organic and conventional farmers against accidental contamination of their crops and seeds. They highlight the need for EU common regulations on co-existence (instead of leaving the issue under subsidiarity rules, as the Commission suggested recently) and argue that GMO producers should have some kind of civil liability for any contamination of organic and conventional products.

The House called "for rules to be established without delay at Community level on the co-existence of genetically modified crops". MEPs also ask for the European Parliament to be included in this process under the co-decision procedure. The resolution adds that Member States should have the free choice to restrict GMO cultivation in certain geographic areas if they wish.

MEPs also urge the Commission to bring forward "a proposal on Community-wide civil liability and insurance in respect of possible financial damage in connection with co-existence".

Another recommendation adopted by the House "calls on the Commission and the Member States to include workable and legally enforceable civil liability provisions for sufficient insurance cover on the part of the applicant as a component of the authorisation procedure for placing GMOs on the market, so that claims by persons affected can be dealt with adequately and quickly in the event of damage."

GMOs in seed production

The new EU directive of June 2003 introduced a tolerance level of 0.9% of accidental GMOs in conventional crops. Should this threshold be exceeded, the producer will have to indicate it on the product label. MEPs support this measure but also share one of the main concerns among farmers: the potential presence of minute traces of GMOs in conventional seeds, which makes it practically impossible today to achieve 100% non-genetically modified crops. The European Commission has recently drafted guidelines suggesting a tolerance level for the adventitious presence of

GMOs in seeds (between 0.3% and 0.7%, depending on the type of seed). MEPs say that a limit value for the labelling of GMO impurities in seed should be set and they "call on the Commission to stipulate the labelling of GMOs in seed at the technically reliable detection threshold".

Green light for nuclear package directives

Currently nuclear safety is primarily the responsibility of the Member States. In view of upcoming EU enlargement Parliament adopted a non-binding resolution on a directive setting out basic obligations and general principles on the safety of nuclear installations. This was contrary to the Commission's proposals that sought to expand its competence in nuclear safety control. Parliament indicates that responsibility for the safety of nuclear installations should remain with national safety authorities.

MEPs underlined that nuclear facilities should be managed in technical, regulatory and operational respects according to EU state-of-the-art practice. Exposure of the public and nuclear industry workers to ionising radiation should be the lowest level that is technically achievable.

Tougher action on pollution from ships

Under new rules, marine pollution by ships will be a criminal offence. In order to police this directive MEPs demanded that a European coastguard be set up and instructed the Commission to present a proposal for such a coastguard. Amendments were adopted on definition of illegal discharges and creation of an EU public online database on illegal discharges and ships which do not comply with the directive.

Happy landing for Europe's Single Sky

The House adopted a conciliation agreement between Parliament and Council that paves the way for a single system of traffic control in Europe known as the Single Sky. The agreement will lead to better safety conditions for air travel as well as ensuring that Europe's airspace is used more efficiently. It also takes account of the needs of all users both civil and military.

Cutting back on packaging waste

The House adopted a conciliation agreement on reducing packaging waste. The amount of discarded packaging that pollutes the environment should be cut sharply following a deal reached between MEPs and EU Governments. Under a revised directive, there will be a substantial increase in the recycling of packaging waste, raising the minimum recycling target for such waste from 25% to 55% by 2008.

New EU Centre to fight communicable diseases

Parliament adopted at first reading a report on the establishment of a European Centre for Disease Prevention and Control, whose main task will be to combat risks of epidemics, had benefited from the start from a wide consensus. This was further strengthened by the current avian flu outbreak. The Centre, funded by the Community budget and based in Sweden, should be operational by 2005. It will have a highly qualified team of 35 people in the first year rising to 70 after two years and a budget of around €48 million for its first three years.

Agreement reached on phasing out POPs

The production and use of persistent organic pollutants (POPs), as well as trade in these substances must be phased out, and health and environment put first. This was the message Parliament sent when adopting a first reading compromise to a proposed regulation on POPs, thus ensuring that the regulation can enter into force quickly. MEPs tightened up the measures the Commission is proposing the EU should take to comply with the global Stockholm Convention on POPs, signed in May 2001. Parliament also established detailed provisions regarding waste containing or contaminated by any of these pollutants. The best known POP is DDT. Others include aldrin, chlordane, hexachlorobenzene, dieldrin, endrin, heptachlor, mirex, toxaphene, polychlorinated biphenyls (PCB), chlordecone, hexabromobiphenyl, polychlorinated dibenzo-p-dioxins, and dibenzofurans (PCDD/PCDF).

European Union - Digest

The references are to the Official Journal of the European Communities (OJ), Adopted Legislation from the L Series (OJL) and Proposals and Opinions from the C Series (OJC).

Agriculture

Council Conclusions on strategy for a European action plan for organic food and farming – OJ C34(p3)7.2.04

Animals and Veterinary matters

Council Regulations on:
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a system for the identification and registration of ovine and caprine animals – OJ L5(p8)9.1.04

Commission Regulations on:
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Commission Decisions on:
residues in food of animal origin – OJ L6(p38)10.1.04

movements of vaccinated animals from protection zones – OJ L7(p47)13.1.04

import conditions of semen, ova and embryos of bovine, porcine and equine species – OJ L10(p67)16.1.04 & OJ L57(p27)25.2.04

measures in relation to avian influenza as regards the importation of birds – OJ L27(55)30.1.04

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model health certificates for movements from third countries of dogs, cats and ferrets – OJ L65(p13)3.3.04

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tests for the detection of antibodies against bovine brucellosis – OJ L68(p36)6.3.04

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Council Regulations on the single European sky – OJ L96(p1)31.3.04

Commission Regulation on common basic standards on aviation security – OJ L10 (p14)16.1.04

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Council Directives on good laboratory practice – OJ L50(p28&p44)20.2.04

Commission Directive on maximum residue levels for fenamiphos – OJ L14(p10)21.1.04 & corrigendum OJ L28(p30)31.1.04

Dangerous Goods

Council Directive on major accident hazards involving dangerous substances – OJ L345(p97)31.12.03

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Commission Decision on the implementation of the Preparatory Action on the Enhancement of the European industrial potential in the field of security research – OJ L67(p18)5.3.04

Education and Training

Council Decisions on:

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eLearning programme 2004 to 2006 – OJ L345(p9)31.12.03

Commission Decision on a second general system for the recognition of professional education and training – OJ L32(p35)5.2.04

Outlook Opinion of the Committee of the Regions on the role of universities in local and regional development – OJ C73(p22)23.3.04

Energy and Nuclear Industries

Council Directive on the control of high-activity sealed radioactive sources and orphan sources – OJ L346(p57)31.12.03

Council Decision on scientific and technological co-operation between the European Atomic Energy Community and the Swiss Confederation – OJ L32(p22)5.2.04

Commission Decision on co-operation agreement between Europan Atomic Energy Commission and the Republic of Kazakhstan in the field of nuclear safety – OJ L89(p36)226.3.04

Commission Opinion on disposal of radioactive waste arising from the decommissioning of Bradwell Nuclear Power station – OJ C18(p4)23.1.04

Environment

Council Decision on monitoring Community greenhouse gas emissions – OJ L49(p1)19.2.04

Commission Decision on monitoring and reporting greenhouse gas emissions – OJ L59(p1)26.2.04

Council Conclusion on 2003 Environment Policy Review – OJ C8(p5)13.1.04

Opinions of the Committee of the Regions on:

environmental life-cycle thinking – OJ C73(p51)23.3.04

Opinions of the Economic and Social Committee on:

integrated pollution prevention and control – OJ C80(p29)30.3.04

environmental life-cycle thinking – OJ C80(p39)30.3.04

a European environment and health strategy – OJ C80(p51)30.3.04

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Council Regulations:

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on measures for the recovery of cod stocks – OJ L70(p8)9.3.04

on measures applicable to fishing activities in the Antarctic – OJ L97(p1&16)1.4.04

on the protection of deep-water coral reefs from trawling in an area north-west of Scotland – OJ L97(p30)1.4.04

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Commission Regulations on:

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Commission Directives on:

methods of analysis for control of the levels for certain contaminants in foodstuffs – OJ L332(p38)19.12.03

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methods of analysis for control of the level of tin in canned foods – OJ L42(p16)13.2.04

amending list of plastic materials and articles intended to come into contact with foodstuffs – OJ L71(p8)10.3.04

Opinion of the Committee of the Regions on proposal for a regulation on official feed and food controls – OJ C23(p14)27.1.04

Genetically Modified Organisms

Commission Regulation on unique identifiers for genetically modified organisms – OJ L10(p5)16.1.04

Intellectual Property and Patents

Opinion of the Economic and Social Committee on proposal for a Directive to ensure the enforcemet of intellectual property rights – OJ C32(p15)5.2.04

IT and Telecommunications

Commission Decision on marine radio communication equipment – OJ L16(p54)23.1.04

Maritime and Marine

Council Conclusions on EU strategy to reduce atmospheric emissions from seagoing ships – OJ C8(p3)13.1.04

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Commission Directives on:
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Commission Decisions on:
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substances contained in plant protection products – OJ L37(p27)10.2.04; OJ L46(p32&p35)17.2.04
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Commission Recommendation on a co-ordinated Community monitoring programme to ensure compliance with maximum levels of pesticide residues in products of plant origin – OJ L16(p60)23.1.04

Public Health and Pharmaceuticals

Council Resolution on pharmaceuticals and public health challenges – focusing on the patients – OJ C20(p2)24.1.04

Safety of Toys

Commission Decision on toys and childcare articles made of soft PVC containing certain phthalates – OJ L55(p66)24.2.04

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Council Decisions on:
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Commission Regulation on aid for research and development – OJ L63(p22)28.2.04

Opinion of the Committee of the Regions on investing in research – OJ C73(p69)23.3.04

Opinions of the Economic and Social Committee on:
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Council Directives:
Annexes to Council Directive 94/55/EC with regard to the transport of dangerous goods by road – OJ L18(p1)26.1.04
relating to speed limitation devices of certain categories of motor vehicles – OJ L44(p19)14.2.04
carbon dioxide emissions and fuel consumption – OJ L49(p36)19.2.04

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Commission Regulation on monitoring of transmissible spongiform encephalopathies in ovine and caprine animals – OJ L333(p28)20.12.03

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Council Directives on
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waste statistics – OJ L90(p15)27.3.04

Opinion of the Committee of the Regions on prevention and recycling of waste – OJ C73(p63)23.3.04

Opinion of the Economic and Social Committee on prevention and recycling of waste – OJ C80(p47)30.3.04

Parliamentary & Scientific Committee News

New Members

We are pleased to welcome **John Barrett MP, Michael Connarty MP, David Drew MP, Andrew Lansley MP, James Paice MP and Simon Thomas MP** who, having taken part in the Royal Society "pairing" scheme, have joined the Committee.

We are also pleased to welcome the **HFEA** (Tim Whitaker) as a scientific member; **Royal Holloway** (Professor Mike Green) as a university member; **Lawson Software** (Professor Peter Grindrod) as an industrial member; and **The Kennel Club** (Dr Jeff Sampson) and **Manches LLP** (Elizabeth West) as associate members.

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University of Leeds

Medical and Biomedical Research
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British Society for Antimicrobial Chemotherapy
University of East Anglia
King's College London
University of Leeds
Medical Research Council
University of Newcastle upon Tyne
University of Surrey
UFAW

Mining, Minerals and Metal Production
Rio Tinto plc

Motor Vehicles
University of Leeds
London Metropolitan Polymer Centre
SEMTA

Oceanography
Natural Environment Research Council
OSIL

Oil
Institution of Chemical Engineers
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Optical and Ophthalmic Products
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Particle Physics
CCLRC
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Physical Sciences
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Engineering and Physical Sciences Research Council
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National Physical Laboratory
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Physics
Cavendish Laboratory
Institute of Physics
University of Leeds
UMIST
National Physical Laboratory
PPARC

Physiology
University of Leeds

Pollution and Waste
CABI Bioscience
University of East Anglia
Environment Agency
Institution of Chemical Engineers
Institution of Civil Engineers
King's College London
London Metropolitan Polymer Centre
Natural Environment Research Council
OSIL

Psychiatry
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LGC
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Radiation Hazards
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Retail
Marks and Spencer

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University of Surrey

Science Policy
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British Association for the Advancement of Science
Clifton Scientific Trust
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Institute of Physics
Institution of Chemical Engineers
LGC
Medical Research Council
Prospect
Royal Academy of Engineering
Royal Institution
The Royal Society
Royal Society of Chemistry
The Science Council
UFAW

Seed Protection
CABI Bioscience

Sensors and Transducers
CCLRC
UMIST

SSSIs
English Nature
Royal Botanic Gardens

Statistics
Royal Statistical Society

Surface Science
Aston University
CCLRC
UMIST

Sustainability
CABI Bioscience
University of East Anglia
English Nature
Environment Agency
Institution of Chemical Engineers
Institution of Civil Engineers
SCI

Technology Transfer
Aston University
CABI Bioscience
Campden & Chorleywood Food Research Association
CCLRC
King's College London
LGC
University of Leeds
London Metropolitan Polymer Centre
National Physical Laboratory

Tropical Medicine
Society for General Microbiology

Viruses
King's College London
Society for General Microbiology

Water
Campden & Chorleywood Food Research Association
University of East Anglia
Environment Agency
Freshwater Biological Association
Institution of Chemical Engineers
Institution of Civil Engineers
LGC
University of Newcastle upon Tyne
OSIL
Royal Society of Chemistry
SCI
Society for General Microbiology

Wildlife
University of East Anglia
English Nature
Institute of Biology
UFAW

Academy of Medical Sciences

Contact: Mrs Mary Manning, Executive Director
Academy of Medical Sciences
10 Carlton House Terrace
London SW1Y 5AH
Tel: 020 7969 5288
Fax: 020 7969 5298
E-mail: apollo@acmedsci.ac.uk
Website: www.acmedsci.ac.uk

The Academy of Medical Sciences is an independent interdisciplinary body representing the medical science community and those involved in healthcare. Its 700 Fellows include clinical academics, non-clinical scientists, veterinary scientists, dentists, nurses and the professions allied to medicine. The Academy's prime purpose is to promote the translation of medical science into clinical practice for patient benefit. It provides authoritative advice and comments on a multitude of public policy issues that involve the biomedical disciplines.

AIRTO

Contact: Professor Richard Brook
AIRTO : Association of Independent Research & Technology Organisations
c/o CCFRA, Station Road, Chipping Campden, Gloucestershire GL55 6LD.
Tel: 01386 842247
Fax: 01386 842010
E-mail: airto@campden.co.uk
Website: www.airto.co.uk

AIRTO represents the UK's independent research and technology sector - member organisations employ a combined staff of over 20,000 scientists and engineers with a turnover in the region of £2 billion. Work carried out by members includes research, consultancy, training and global information monitoring. AIRTO promotes their work by building closer links between members and industry, academia, UK government agencies and the European Union.

Association of Medical Research Charities

Contact: Diana Garnham, Chief Executive
Association of Medical Research Charities
61 Gray's Inn Road, London WC1X 8TL.
Tel: 020 7269 8820 Fax: 020 7269 8821
E-mail: info@amrc.org.uk
Website: www.amrc.org.uk

The Association of Medical Research Charities (AMRC) works to advance medical research in the UK and, in particular, aims to improve the effectiveness of the charitable sector in medical research. There are over 100 member charities within the Association: in 2002/2003 their combined expenditure on biomedical research in the UK was £660 million. AMRC provides information, guidance and advice to medical research charities and information and data on the activities of the charity sector in medical research to government, the media and decision-formers.

Aston University

Contact: Lucas North
Marketing Officer
Aston University
Aston Triangle
Birmingham B4 7ET.
Tel: 0121 359 3611 ext 4316
Fax: 0121 359 4664
E-mail: l.north@aston.ac.uk
Website: www.aston.ac.uk

Aston is a leading technological university with excellence in teaching and research in its chosen fields. All of its research is of direct relevance to industry and commerce and it has a strong record of research collaboration. The latest research assessment exercise shows that more than 85% of Aston's academics are rated as undertaking research of national and international standing.

Biotechnology and Biological Sciences Research Council

Contact: Dr Monica Winstanley,
Head of External Relations
BBSRC, Polaris House, North Star Avenue
Swindon SN2 1UH. Tel: 01793 413204
E-mail: Public.Affairs@bbsrc.ac.uk
Website: www.bbsrc.ac.uk

The BBSRC is the UK's leading funding agency for academic research in the non-medical life sciences and is funded principally through the Science Budget of the Office of Science and Technology. It supports staff in universities and research institutes throughout the UK, and funds basic and strategic science in: agri-food, animal sciences, biomolecular sciences, biochemistry and cell biology, engineering and biological systems, genes and developmental biology, and plant and microbial sciences.

British Association for the Advancement of Science - the BA

Contact: Sir Roland Jackson Bt, Chief Executive
The BA, Wellcome Wolfson Building,
165 Queen's Gate, London SW7 5HE.
E-mail: Roland.Jackson@the-BA.net
Website: www.the-BA.net

The BA is the UK's nationwide, open membership organisation dedicated to connecting people with science, so that science and its applications become accessible to all. The BA aims to promote openness about science in society and to engage and inspire people directly with science and technology and their implications.

Established in 1831, the BA organises major initiatives across the UK, including the annual BA Festival of Science, National Science Week, programmes of regional and local events, and an extensive programme for young people in schools and colleges.

British Ecological Society

Contact: Dr Hazel J Norman
British Ecological Society
26 Blades Court, Deodar Road, Putney,
London, SW15 2NU
Tel: 020 8871 9797 Fax : 020 8871 9779
E-mail: hazel@BritishEcologicalSociety.org
Website: www.BritishEcologicalSociety.org

The BES is an active, successful and independent scientific society. It aims to promote the science of ecology worldwide. It supports the ecological research and education communities to ensure that they remain vibrant and productive, thus generating new knowledge, skilled people and a greater appreciation of the science of ecology in the wider community. The Society publishes internationally renowned journals, organises Europe's biggest annual meeting of ecologists, provides advice to policy-makers and opinion formers, has an active programme of educational initiatives and provides grants.

British Pharmacological Society

Advancing molecules into medicines.

Contact: Sarah-Jane Stagg
British Pharmacological Society
16 Angel Gate, City Road,
London EC1V 2SG.
Tel: 020 7417 0113
Fax: 020 7417 0114
E-mail: sjs@bps.ac.uk
Website: www.bps.ac.uk

The British Pharmacological Society's 2,500 members are trained to study drug action from the laboratory bench to the patient's bed-side. Our members come from academia, industry, hospitals and regulatory authorities and government bodies. Our aim is to improve the quality of life by developing new medicines to treat and prevent the diseases and conditions which affect millions of people and animals. Inquiries about drugs and how they work are welcome.

The British Psychological Society

Contact: Dr Ana Padilla
Parliamentary Officer
The British Psychological Society
33 John Street
London WC1N 2AT
Tel: 020 7692 3412
Fax: 020 7419 6922
Email: anapad@bps.org.uk
Website: www.bps.org.uk

The British Psychological Society is an organisation of over 34,000 members governed by Royal Charter. It maintains the Register of Chartered Psychologists, publishes books, 10 primary science Journals and organises conferences. Requests for information about psychology and psychologists from parliamentarians are welcome.

British Society for Antimicrobial Chemotherapy

Contact: Tracey Guest, Executive Officer

British Society for Antimicrobial Chemotherapy
11 The Wharf, 16 Bridge Street,
Birmingham B1 2JS.
Tel: 0121 633 0410
Fax: 0121 643 9497
E-mail: tguest@bsac.org.uk
Website: www.bsac.org.uk

Founded in 1971, and with 800 members worldwide, the Society exists to facilitate the acquisition and dissemination of knowledge in the field of antimicrobial chemotherapy. The BSAC publishes the *Journal of Antimicrobial Chemotherapy* (JAC), internationally renowned for its scientific excellence, undertakes a range of educational activities, awards grants for research and has active relationships with its peer groups and government.

British Veterinary Association

Contact:Chrissie Nicholls
7 Mansfield Street, London W1G 9NQ
Tel: 020 7636 6541
Fax: 020 7637 4769
E-mail:chrissien@bva.co.uk
www.bva.co.uk

BVA's chief interests are:

* Standards of animal health
* Veterinary surgeons' working practices
* Professional standards and quality of service
* Relationships with external bodies, particulary government

BVA carries out three main functions which are:

* Policy development in areas affecting the profession
* Protecting and promoting the profession in matters propounded by government and other external bodies
* Provision of services to members

Building Research Establishment Ltd

Contact: Dr Jeremy Hodge
BRE, Garston, Watford WD25 9XX.
Tel: 01923 664000 Fax: 01923 664010
E-mail: enquiries@bre.co.uk
Website: www.bre.co.uk

BRE is the UK's leading centre of expertise on buildings and construction, and the prevention and control of fire and other risks. BRE is owned by the Foundation for the Built Environment, an independent charitable organisation with a mission to champion excellence and innovation in the built environment.

Expertise includes:

- Design standards
- Construction
- Material properties
- Whole life performance
- Benchmarking
- Testing and Certification
- Energy usage
- Environment
- Fire
- Security
- Natural hazards
- Expert witness

CABI Bioscience

Contact: Dr David Dent, Managing Director

CABI Bioscience, Bakeham Lane, Egham, Surrey TW20 9TY.

Tel: 01491 829080 Fax: 01491 829100

E-mail: bioscience.egham@cabi.org
Website: www.cabi-bioscience.org

CABI *Bioscience* is a new breed of international organisation specialising in sustainable agriculture, the conservation of biodiversity, invasive species management and industrial and environmental bioremediation. Globally the work of CABI *Bioscience* focuses on the farmer and his need to adapt and respond to the changes and challenges of the markets - these may be for organic produce, a route to transgenic production, or dealing with the effects of climate change or alien invasive species in a safe and sustainable way.

CABI *Bioscience* UK is one of a network of 6 global CABI *Bioscience* centres and a division of CAB International, a 42 member strong UN treaty-level organisation. Its sister enterprise is CABI *Publishing*, a leading international life science publisher.

Campden & Chorleywood Food Research Association

Contact: Prof Colin Dennis, Director-General
CCFRA, Chipping Campden,
Gloucestershire GL55 6LD.
Tel: 01386 842000 Fax: 01386 842100
E-mail: info@campden.co.uk
Website: www.campden.co.uk

A independent, membership-based industrial research association providing substantial R&D, processing, analytical hygiene, best practice, training, auditing and HACCP services for the food chain worldwide.
Members include growers, processors, retailers, caterers, distributors, machinery manufacturers, government departments and enforcement authorities. Employs over 300; serves over 2,000 member sites; and has a subsidiary company in Hungary. Activities focus on safety, quality, efficiency and innovation. Participates in DTI's Faraday Partnerships and collaborates with universities on LINK projects and studentships, transferring practical knowledge between industry and academia.

Cavendish Laboratory

The Administrative Secretary, The Cavendish Laboratory, Madingley Road, Cambridge CB3 0HE, UK.
E-mail: dhp24@phy.cam.ac.uk
http://www.phy.cam.ac.uk

The Cavendish Laboratory houses the Department of Physics of the University of Cambridge.

Its world-class research is focused in a number of experimental and theoretical diverse fields.

Astrophysics: Millimetre astronomy, optical interferometry observations & instrumentation. Astrophysics, geometric algebra, maximum entropy, neutral networks.

High Energy Physics: LEP, SPS & future LHC experiments. Detector development. Particle physics theory.

Condensed Matter Physics: Semiconductor physics, quantum effect devices, nanolithography. Superconductivity, magnetic thin films. Optoelectronics, conducting polymers. Polymers and colloids. Surface physics, fracture, wear & erosion. Amorphous solids. Electron microscopy. Electronic structure theory & computation. Structural phase transitions, fractals, quantum Monte Carlo calculations Biological Physics.

Chartered Institute of Patent Agents

Contact: Michael Ralph -
Secretary & Registrar
The Chartered Institute of Patent Agents
95 Chancery Lane, London WC2A 1DT
Tel: 020 7405 9450
Fax: 020 7430 0471
E-mail: michael.ralph@cipa.org.uk
Website: www.cipa.org.uk

CIPA's members practise in intellectual property, especially patents, trade marks, designs, and copyright, either in private partnerships or industrial companies. CIPA maintains the statutory Register. It advises government and international circles on policy issues and provides information services, promoting the benefits to UK industry of obtaining IP protection, and to overseas industry of using British agents to obtain international protection.

Clifton Scientific Trust

Contact: Dr Eric Albone
Clifton Scientific Trust
49 Northumberland Road, Bristol BS6 7BA
Tel: 0117 924 7664 Fax: 0117 924 7664
E-mail: eric.albone@clifton-scientific.org
Website: www.clifton-scientific.org

Science for Citizenship and Employability, Science for Life, Science for Real

We build grass-roots partnerships between school and the wider world of professional science and its applications

- for young people of all ages and abilities
- seeing science as creative, questioning, human
- bringing school science added meaning and motivation
- locally, nationally, internationally (currently between Britain and Japan)

Clifton Scientific Trust Ltd is registered charity 1086933

Council for the Central Laboratory of the Research Councils

Contact: Natalie Bealing
CCLRC Rutherford Appleton Laboratory
Chilton, Oxfordshire, OX11 0QX
CCLRC Daresbury Laboratory
Daresbury, Cheshire, WA4 4AD
Tel: 01235 445484 Fax: 01235 446665
E-mail: enquiries@cclrc.ac.uk
Website: http://www.cclrc.ac.uk/

CCLRC is the UK's strategic agency for scientific research facilities. It supports leading-edge science and technology by providing world-class, large-scale facilities, which are used annually by more than 12,000 researchers worldwide. These advanced technologial capabilities, backed by a pool of expertise and skills across a broad range of disciplines, are exploited by universities and industry alike. The annual budget of CCLRC is some £130 million

University of East Anglia

Contact: Mary Pallister
Science Communications Officer
University of East Anglia
Norwich NR4 7TJ

Tel: 01603 593007
Fax: 01603 259883
E-mail: m.pallister@uea.ac.uk
Website: www.uea.ac.uk

From award-winning technology translating speech into sign language, to internationally-renowned climate research, and from the intricacies of diseases such as cancer to the large-scale hazards of earthquakes and volcanoes, UEA scientists are carrying out world-class research and teaching. A strongly interdisciplinary science cluster: Biological Sciences, Chemical Sciences and Pharmacy, Environmental Sciences, Computing Sciences and Mathematics.

Economic and Social Research Council

Contact: Lesley Lilley,
Senior PR and Parliamentary Officer
Economic and Social Research Council,
Polaris House, North Star Avenue,
Swindon SN2 1UJ
Tel: 01793 413119 Fax 01793 413130
exrel@esrc.ac.uk
http://www.esrc.ac.uk

The ESRC is the UK's leading research and training agency addressing economic and social concerns. We pursue excellence in social science research; work to increase the impact of our research policy and practice; and provide trained social scientists who meet the needs of users and beneficiaries, thereby contrbuting to the economic competitiveness of the United Kingdom, the effectiveness of public services and policy, and quality of life. The ESRC is independent, established by Royal Charter in 1965, and funded mainly by government.

Engineering and Physical Sciences Research Council

Contact: Dr Claire Graves,
Public Affairs Manager
EPSRC, Polaris House,
North Star Avenue, Swindon SN2 1ET
Tel: 01793 444459 Fax: 01793 444005
E-mail: claire.graves@epsrc.ac.uk
Website:www.epsrc.ac.uk

EPSRC invests more than £500 million a year in research and postgraduate training in the physical sciences and engineering, to help the nation handle the next generation of technological change. The areas covered range from mathematics to materials science, and information technology to structural engineering.
We also actively promote public engagement with science and engineering, and we collaborate with a wide range of organisations in this area.

English Nature

Contact: Dr Keith Duff,
Chief Scientist
English Nature
Northminster House, Peterborough,
PE1 1UA
Tel: 01733-455208
Fax: 01733-568834
E-mail: keith.duff@english-nature.org.uk
Website address: www.english-nature.org.uk

English Nature is the Government's wildlife agency working throughout England. With our partners and others we promote the conservation of wildlife and natural places.

We commission research and publish scientific papers which underpin the development of policies and programmes to maintain and enhance biodiversity

Environment Agency

Contact: Prof Michael Depledge,
Head of Science
Rio House, Waterside Drive, Aztec West,
Almondsbury, Bristol BS32 4UD
Tel: 01179 142984
Fax: 01179 142673
E-mail: michael.depledge@environment-agency.gov.uk
Website: www.environment-agency.gov.uk

The Environment Agency is responsible for protecting and enhancing the environment in England and Wales. We contribute to sustainable development through the integrated management of air, land and water. We commission research to support our functions through our Science Programme that is based on a 5 year plan developed through consultation.

Freshwater Biological Association

Contact: Dr Roger Sweeting,
Chief Executive.
The Freshwater Biological Association, The Ferry House, Far Sawrey, Ambleside,
Cumbria LA22 0LP.
Tel: 015394 42468 Fax: 015394 46914
E-mail: info@fba.org.uk
Website: www.fba.org.uk

The Freshwater Biological Association is an independent organisation and a registered Charity, founded in 1929. It aims to promote freshwater science through an innovative research programme, an active membership organisation and by providing sound independent opinion. It publishes a variety of specialist volumes and houses one of the finest freshwater libraries in the world.

Fund for the Replacement of Animals in Medical Experiments

Contact: Professor Robert Combes,
Scientific Director
FRAME, Russell & Burch House
96-98 North Sherwood Street
Nottingham NG1 4EE
Tel: 0115 958 4740 Fax: 0115 950 3570
E-mail: bob@frame.org.uk
Website: www.frame.org.uk
Registered Charity No.: 259464

FRAME considers that the current scale of live animal experimentation is unacceptable, but recognises that the immediate total abolition of all animal experimentation is not possible. FRAME advocates the Three Rs approach, with the long-term aim of eliminating the need for live-animal experiments altogether, through the proper development, validation and acceptance of replacement alternative methods.

Institute of Biology

Contact: Prof Alan Malcolm, Chief Executive
20 Queensberry Place, London SW7 2DZ
Tel: 020 7581 8333
Fax: 020 7823 9409
E-mail: a.malcolm@iob.org
Website: www.iob.org

The biological sciences have truly come of age with the new millennium and the Institute of Biology is the professional body to represent biology and biologists to all. A source of independent advice to Government, a supporter of education, a measure of excellence and a disseminator of information - the Institute of Biology is the Voice of British Biology.

The Institute of Mathematics and its Applications

Contact: Lisa Wright, Personal Assistant to Executive Director
Institute of Mathematics and its Applications
Catherine Richards House, 16 Nelson Street
Southend-on-Sea, Essex SS1 1EF
Tel: 01702 354020
Fax: 01702 354111
E-mail: post@ima.org.uk
Website: www.ima.org.uk

The IMA is a professional and learned society for qualified and practising mathematicians. Its mission is to promote mathematics in industry, business, the public sector, education and research.
Forty percent of members are employed in education (schools through to universities), and the other 60% work in commercial and governmental organisations.
The Institute is incorporated by Royal Charter and has the right to award Chartered Mathematician status.

Institute of Physics

Contact: Public Relations Department
76 Portland Place, London W1B 1NT
Tel: 020 7470 4800
E-mail: public.relations@iop.org
Website: www.iop.org

The Institute of Physics is an international learned society, publisher and professional body. It represents the physics community to government, legislators and policy-makers. Key activities include:
Scientific publishing and electronic dissemination of physics
Setting professional standards, awarding professional qualifications, validating higher education courses
Promotion of physics through conferences, education, policy advice and public debate
Support for physics in schools, colleges and universities

Institute of Physics and Engineering in Medicine

Contact: Robert Neilson, General Secretary
Fairmount House, 230 Tadcaster Road,
York, YO24 1ES
Tel: 01904 610821 Fax: 01904 612279
E-mail: r.w.neilson@ipem.org.uk
Website: www.ipem.org.uk

IPEM is a registered, incorporated charity for the advancement, in the public interest, of physics and engineering applied to medicine and biology. It accredits medical physicists, clinical engineers and clinical technologists through its membership register, organises training and CPD for them, and provides opportunities for the dissemination of knowledge through publications and scientific meetings.

Institution of Civil Engineers

Contact: Neal Weston,
External Relations Manager
One Great George Street, Westminster,
London SW1P 3AA, UK
Tel: 020 7222 7722
Fax: 020 7222 0973
E-mail: Neal.Weston@ice.org.uk
Website: www.ice.org.uk

ICE aims to be a leader in shaping the engineering profession. With over 70,000 members, ICE acts as a knowledge exchange for all aspects of civil engineering. As a Learned Society, the Institution provides expertise, in the form of reports and comment, on a wide range of subjects from energy generation and supply, to sustainability and the environment.

King's College London

Contact: Caroline Quest
Director of Knowledge Transfer
King's College London
8th Floor, Capital House, 42 Weston Street
London SE1 3QD
Tel: 020 7848 6792
E-mail: caroline.quest@kcl.ac.uk
Website: http://www.kcl.ac.uk

King's is a multifaculty university with excellence in education, humanities and law, a diversity of provision in health and life sciences and a distinguished tradition in natural sciences and engineering. The College encompasses the international standing of the Institute of Psychiatry and brings together three world famous names - Guy's, King's and St Thomas' - in the UK's largest medical and dental schools.

LGC

Queens Road, Teddington
Middlesex, TW11 0LY
Tel: +44 (0)20 8943 7000
Fax: +44 (0)20 8943 2767
E-mail: info@lgc.co.uk
Website: www.lgc.co.uk

Setting standards in analytical science

LGC is the UK's leading independent analytical laboratory providing chemical and DNA-based analysis, diagnostic services, reference standards, R&D, method development, consultancy and training to both the public and private sectors. LGC operates in a diverse range of markets including foods, pharmaceuticals, biotechnology, environment, chemicals and petroleum.

Under arrangements for the office and function of Government Chemist, LGC fulfils specific statutory duties and provides advice for Government and the wider analytical community on the implications of analytical chemistry for matters of policy, standards and regulation.

LGC is based in Teddington, Middlesex, with other UK operations in Runcorn and Edinburgh, and facilities in France, Germany, Italy, Poland, Spain, Sweden and India.

University of Leeds

Contact: Dr W E Lewis,
Director of Research Support Unit
Research Support Unit, 3 Cavendish Road,
Leeds LS2 9JT
Tel: 0113 3436028
Fax: 0113 3434058
E-mail: w.e.lewis@adm.leeds.ac.uk
Website: http://www.leeds.ac.uk/rsu

The University of Leeds is among the largest research universities in Europe. We have some 3000 researchers, including postgraduates, and an annual research income of more than £70m. Research activity extends across nine faculties representing most core disciplines and often crosses traditional subject boundaries. In the last Research Assessment Exercise, we had 35 schools rated internationally or nationally 'excellent'.

London Metropolitan Polymer Centre

Contact: Alison Green,
London Metropolitan University
166-220 Holloway Road, London N7 8DB
Tel: 020 7133 2189
Fax: 020 7133 2184
E-mail: alison@polymers.org.uk
Website: www.polymers.org.uk

The London Metropolitan Polymer Centre provides training, consultancy and applied research to the UK polymer (plastics & rubber) industry. The training courses are delivered through a programme of industrial short courses and customised courses and these, together with distance learning and other flexible delivery methods, lead to qualifications ranging from technician to Masters level. Recent research successes include a WRAP sponsored programme to develop new commercial applications for recycled PET.

University of Manchester Institute of Science and Technology

Contact: Colin Cooper
UMIST, PO Box 88, Manchester M60 1QD
Tel: 0161 200 3062 Fax: 0161 200 8824
E-mail: colin.l.cooper@umist.ac.uk
Website: www.umist.ac.uk

Manchester's UMIST is the 6th top research university in the UK. Winner of 3 Queen's Prizes for Higher Education, 2 Queen's Awards for Export Achievement and 2 Prince of Wales' Awards for Innovation, UMIST has an international reputation. Centres of excellence include Environment, Life Sciences, IT, Telecommunications, Management, Manufacturing, Materials and Energy. UMIST VENTURES Ltd is the commercial arm of UMIST.

Marks & Spencer Plc

Contact:
David S Gregory
Michael House
Baker Street
London
W1U 8EP.

Tel: 020 7268 8247
E-mail: david.gregory@marks-and-spencer.com

Main Business Activities
Retailer - Clothing, Food, Financial Services and Home.
544 stores in 29 countries worldwide.
Employing 67,133 people.

We offer our customers quality, value, service and trust in our brand by applying science and technology to develop innovative products and services.

Medical Research Council

Contact: Elizabeth Mitchell
20 Park Crescent, London W1B 1AL.

Tel: 020 7636 5422 Fax: 020 7436 2665
E-mail:
elizabeth.mitchell@headoffice.mrc.ac.uk
Website: www.mrc.ac.uk

The Medical Research Council (MRC) is funded by the people of the UK through taxes. We are independent of government, but work closely with the Health Departments, the National Health Service, and industry, to ensure that the research we support takes account of user needs as well as high scientific quality. The MRC has funded the work which led to some of the most significant discoveries and achievements in medicine in the UK.

Merck Sharp & Dohme Research Laboratories

Contact: Dr Ruth M McKernan
Director

Neuroscience Research Centre
Terlings Park
Eastwick Road
Harlow
Essex CM20 2QR

Tel: 01279 440426
Fax: 01279 440178

E-mail: ruth_mckernan@merck.com

www.msd-nrc.co.uk

Drug discovery for brain diseases.

National Physical Laboratory

National Physical Laboratory
Queens Road, Teddington
Middlesex TW11 0LW
Tel: 020 8943 6268 Fax: 020 8943 6458
E-mail: enquiry@npl.co.uk
Website: www.npl.co.uk

The National Physical Laboratory (NPL) is the United Kingdom's national standards laboratory, an internationally respected and independent centre of excellence in research, development and knowledge transfer in measurement and materials science. For more than a century, NPL has developed and maintained the nation's primary measurement standards - the heart of an infrastructure designed to ensure accuracy, consistency and innovation in physical measurement.

National Radiological Protection Board

Contact: Dr Michael Clark,
NRPB Scientific Spokesman
Chilton, Didcot, Oxfordshire OX11 ORQ.
Tel: 01235 822737 Fax: 01235 822746
E-mail: pressoffice@nrpb.org
Website: www.nrpb.org

To advance by research the acquisition of knowledge about the protection of mankind from radiation hazards.
To provide advice to the government on the acceptability to the UK of standards recommended or proposed by international bodies, and on their application.
To provide information and advice to those with responsibilities in the UK in relation to the protection from radiation hazards, either of the community as a whole, or particular groups.

Working in partnership with the Health Protection Agency

Natural Environment Research Council

Contact: Sheila Anderson,
Head of Communications
Polaris House, North Star Avenue
Swindon SN2 1EU
Tel: 01793 411646 Fax: 01793 411510
E-mail: requests@nerc.ac.uk
Website: www.nerc.ac.uk

The UK's Natural Environment Research Council funds and carries out impartial scientific research in the sciences of the environment. NERC trains the next generation of independent environmental scientists.

NERC funds research in universities and in a network of its own centres, which include:

British Antarctic Survey, British Geological Survey, Centre for Ecology and Hydrology, Southampton Oceanography Centre and Proudman Oceanographic Laboratory

University of Newcastle upon Tyne

Contact: Dr Douglas Robertson
Newcastle upon Tyne NE1 7RU
Tel: 0191 222 5347 Fax: 0191 222 5219
E-mail: business@ncl.ac.uk
Website: www.ncl.ac.uk

The University of Newcastle is a member of the Russell Group of research-intensive Universities. The University has undergone a major restructuring and expansion since 2002, with increases in undergraduate, postgraduate and international student numbers, as well as sustained growth in research income. The University has a well balanced portfolio of research funding across all sponsor groups and has one of the highest levels of research projects funded by UK Government Departments and very significant levels of EU activity. In 2002 it was identified as one of the top Universities in the UK for technology transfer.

OSIL

Contact: Paul Ridout
South Down House, Station Road,
Petersfield, Hampshire GU32 3ET
Tel: 01730 265015
Fax: 01730 265011
E-Mail: paul.ridout@osil.co.uk
Website: www.osil.co.uk

OSIL specialises in the provision of high quality products and services for the marine, freshwater and meteorological measurement community. These include supply of laboratory/field instruments, service and calibration, sampling equipment, seawater calibration standards, oceanographic survey, data collection and interpretation. Our expertise ranges from inshore and coastal waters to full ocean depths. OSIL maintains close links with academic scientific centres.

Particle Physics and Astronomy Research Council

Contact: Dr Catherine Ewart,
Head of Corporate Affairs
Particle Physics and Astronomy Research Council
Polaris House, North Star Avenue
Swindon, Wiltshire SN2 1SZ
Tel: 01793 442115 Fax: 01793 442125
E-mail: catherine.ewart @pparc.ac.uk
Website: www.pparc.ac.uk

The PPARC is the UK's strategic science investment agency that directs and funds research in national and international programmes in fundamental physics.

It is this research into fundamental physics that lies behind some of the major technological advances of the 20th Century, and delivers world leading science, technologies and people for the UK.

Prospect

Contact: Jenny Thurston,
Deputy General Secretary
Prospect House
75 – 79 York Rd, London SE1 7AQ
Tel: 020 7902 6705 Fax: 020 7928 7418
E-mail: jenny.thurston@prospect.org.uk
www.prospect.org.uk

Prospect is an independent, thriving and forward-looking trade union with more than 105,000 members. We represent scientists, technologists and other professions in the civil service, research councils and private sector.

Prospect's collective voice champions the interests of the engineering and scientific community to key opinion-formers and policy makers and, with negotiating rights with over 300 employers, we seek to secure a better life at work by putting members' pay, conditions and careers first.

Queen Mary, University of London

Contact: Dr Malcolm Sims,
Innovation and Enterprise
Queens' Building, Mile End Road
London E1 4NS
Tel: 020 7882 3119 Fax: 020 7882 5128
Email: m.sims@qmul.ac.uk

Queen Mary, University of London, incorporates the St Bartholomew's and Royal London School of Medicine and Dentistry. Queen Mary's outstanding research strengths cover the spectrum from Electronic Engineering to Preventive Healthcare. It is home to world-renowned specialist centres including the Centre for Commercial Law Studies, the Interdisciplinary Research Centre in Biomedical Materials and the William Harvey Research Institute.

RIO TINTO

Contact: Terry Friese-Greene
Technology Group Consultant
Rio Tinto plc
6 St James's Square, London SW1Y 4LD
Tel: 020 7753 2467
E-mail: terry.friese-greene@riotinto.com
Website: www.riotinto.com

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The Royal Academy of Engineering

Contact: Tom McLaughlan,
Director of Communications
29 Great Peter Street
Westminster, London SW1P 3LW
Tel: 020 7227 0500 Fax: 020 7233 0054
E-mail: mclaughlant@raeng.co.uk
Website: www.raeng.co.uk

Founded in 1976, the Royal Academy of Engineering promotes the engineering and technological welfare of the country by facilitating the application of science. As a national academy, we offer independent and impartial advice to Government; work to secure the next generation of engineers; pursue excellence; and provide a voice for Britain's engineering community. Our Fellowship - comprising the UK's most eminent engineers - provides the leadership and expertise for our activities, which focus on the importance of engineering and technology to wealth creation and the quality of life.

Royal Astronomical Society

Contact: David Elliott
(Executive Secretary)
Royal Astronomical Society
Burlington House
Piccadilly
London W1J 0BQ
Tel: 020 7734 4582
E-mail: de@ras.org.uk
Website: www.ras.org.uk

The Royal Astronomical Society is a learned society founded in 1820. It exists to encourage and promote astronomy and geophysics. Expertise of members covers most aspects of astronomy, astrophysics, space science, solar physics, studies of the upper atmosphere, planetary science and geophysics.

Royal Botanic Gardens, Kew

Contact: Prof. Simon J. Owens
Keeper of the Herbarium
Royal Botanic Gardens
Kew, Richmond, Surrey TW9 3AE
Tel: 020 8332 5212 Fax: 020 8332 5278
E-mail: S.Owens@rbgkew.org.uk

ALL LIFE DEPENDS ON PLANTS

The mission of Kew is to enable better management of the Earth's environment by increasing knowledge and understanding of the plant and fungal kingdoms - the basis of life on Earth. Kew is fundamentally a scientific, amenity and eductional organisation devoted to increasing knowledge and public understanding of plant and fungai diversity - how it came to be, what its current status is, how it can be conserved for future generations, and how it can be used in sustainable ways for human benefit.

Royal College of Veterinary Surgeons

Contact: Andrea Samuelson,
Head of External Affairs
Royal College of Veterinary Surgeons (RCVS)
Belgravia House, 62-64 Horseferry Road
London SW1P 2AF.
Tel: +44 207 202 0725 (Direct)
+44 207 222 2001
Fax: +44 207 202 0740
E-mail: a.samuelson@rcvs.org.uk
Website: www.rcvs.org.uk

"Promoting and sustaining public confidence in veterinary medicine". The Royal College of Veterinary Surgeons (RCVS) is the regulatory body for veterinary surgeons in the UK and is responsible for the registration of veterinary surgeons, for monitoring standards of veterinary education and for professional conduct. The Government regularly consults the RCVS on a range of legislative issues including animal welfare, control of animal disease and veterinary certification.

The Royal Institution

Contact: Dr Gail Cardew
Head of Programmes
The Royal Institution
21 Albemarle Street, London W1S 4BS
Tel: 020 7409 2992 Fax: 020 7670 2920
E-mail: ri@ri.ac.uk Website: www.rigb.org

The Royal Institution has a reputation established over 200 years for its high calibre events that break down the barriers between science and society. It acts as a unique forum for informing people about how science affects their daily lives, and prides itself on its reputation of engaging the public in scientific debate. The Royal Institution has a range of activities all under one roof, from programmes for schools and a forum for the general public, through to a heritage programme, an arts–science initiative, a media centre and state-of-the-art chemistry labs.

The Royal Society

Contact: Dr David Stewart Boak,
Director Communications
The Royal Society, 6-9 Carlton House Terrace,
London, SW1Y 5AG.
Tel: 020 7451 2510 Fax: 020 7451 2615
Email: david.boak@royalsoc.ac.uk
Website: www.royalsoc.ac.uk

Founded in 1660, the Royal Society is an independent academy promoting the natural and applied sciences. It aims to:

- strengthen UK science by providing support to excellent individuals
- fund excellent research to push back the frontiers of knowledge
- attract and retain the best scientists
- ensure the UK engages with the best science around the world
- support science communication and education; and communicate and encourage dialogue with the public
- provide the best independent advice nationally and internationally
- promote scholarship and encourage research into the history of science

The Royal Society of Chemistry

Contact: Dr Stephen Benn
Parliamentary Affairs
The Royal Society of Chemistry
Burlington House, Piccadilly, London W1V 0BN
Tel: 020 7437 8656 Fax: 020 7734 1227
E-Mail: benns@rsc.org
Website: http://www.rsc.org
http://www.chemsoc.org

The Royal Society of Chemistry is a learned, professional and scientific body of over 46,000 members with a duty under its Royal Charter "to serve the public interest". It is active in the areas of education and qualifications, science policy, publishing, Europe, information and internet services, media relations, public understanding of science, advice and assistance to Parliament and Government.

The Royal Statistical Society

Contact: Janet Lindley
12 Errol Sreet, London EC1Y 8LX.
Tel: 020 7614 3933
Fax: 020 7614 3905
E-mail: j.lindley@rss.org.uk
Website: www.rss.org.uk

The RSS is much more than just a learned society. We lead the way as an independent source of advice on statistical issues, and through our links with government, academia and the corporate and voluntary sectors, play a crucial role in raising the profile of statistics. We have a powerful voice at Royal Commissions, Parliamentary Select Committees, and at public consultations, offering our own unique view on just about anything, from freedom of information to sustainable development.

The Science Council

Contact: Dr Sarah Ball,
Chief Executive Officer
The Science Council
76 Portland Place
London W1B 1NT
Tel: 020 7470 4830 Fax: 020 7470 4937
E-mail: enquiries@sciencecouncil.org
Website: www.sciencecouncil.org

The Science Council has a membership of over 20 professional institutions and learned societies covering the breadth of science and mathematics. Its purpose is to provide an independent, collective voice for science and scientists and to maintain standards across all scientific disciplines. There are specialist groups for policy issues relevant to science in education, environment, health and society. In 2003 the Science Council was granted a Royal Charter and launched the Chartered Scientist (CSci) designation in 2004.

SEMTA

Technology Skills For Productivity & Performance

Contact: Nicolas Heslop
Public Affairs Manager
SEMTA, 22 Old Queen Street,
London SW1H 9HP
Tel: 020 7222 0464 Fax: 020 7222 3004
E-Mail: nheslop@semta.org.uk
Website: www.semta.org.uk

SEMTA (Science, Engineering and Manufacturing Technologies Alliance) is the Sector Skills Council for the science, engineering and manufacturing technology sectors. We have become one of the first fully-licensed SSCs.

Our **Mission** is 'to ensure that our sector has the knowledge and skills required to meet the challenges faced by the workforce of the future.'

Our sectors account for a significant proportion of the UK economy. There are about two million people employed in about 100,000 establishments in the core Science, Engineering and Technology sectors, currently contributes over £74 billion per annum – about ten per cent – of total UK GDP.

Society for general Microbiology

Contact: Dr Faye Jones,
Public Affairs Administrator
Marlborough House, Basingstoke Road,
Spencers Wood, Reading RG7 1AG.
Tel: 0118 988 1843 Fax: 0118 988 5656
E-mail: pa@sgm.ac.uk
Website: http//www.sgm.ac.uk

SGM is the largest microbiological society in Europe. The Society publishes four journals of international standing, and organises regular scientific meetings.

SGM also promotes education and careers in microbiology, and it is committed to represent microbiology to government, the media and the public.

An information service on microbiological issues concerning aspects of medicine, agriculture, food safety, biotechnology and the environment is available on request.

Society of Chemical Industry

SCI
where science meets business

Contact: Mr Richard Denyer,
General Secretary and Chief Executive
SCI, International Headquarters
14-15 Belgrave Square, London SW1X 8PS
Tel: 020 7598 1500 Fax: 020 7598 1545
E-mail: secretariat@soci.org
Website: www.soci.org

SCI is an interdisciplinary network for science, commerce and industry. SCI attracts forward-looking people in process and materials technologies and in the biotechnology, energy, water, agriculture, food, pharmaceuticals, construction, and environmental protection sectors worldwide. Members exchange ideas and gain new perspectives on markets, technologies, strategies and people, through electronic and physical specialist conferences and debates, and publish journals, books and the respected magazine *Chemistry & Industry*.

University of Surrey

UniS
University of Surrey

Contact: Pauline Elliott
University of Surrey, Guildford,
Surrey, GU2 7XH
Tel: 01483 689905
Fax: 01483 683948
E-mail: information@surrey.ac.uk
Website: http://www.surrey.ac.uk/

The University of Surrey is one of the UK's leading professional, scientific and technological universities with a world class research profile and a reputation for excellence in teaching and learning. Ground-breaking research at the University is bringing direct benefit to all spheres of life - helping industry to maintain its competitive edge and creating improvements in the areas of health, medicine, space science, the environment, communications, ion beam and optoelectronics technology, visual multi media, defence and social policy.

Universities Federation for Animal Welfare

UFAW
Established 1926

Contact: Dr James Kirkwood,
Scientific Director
The Old School, Brewhouse Hill
Wheathampstead, Herts. AL4 8AN.
Tel: 01582 831818. Fax: 01582 831414.
Email: ufaw@ufaw.org.uk
Website: www.ufaw.org.uk
Registered Charity No: 207996

UFAW is an internationally-recognized independent scientific and educational animal welfare charity. It works to improve animal lives by:

- supporting animal welfare research.
- educating and raising awareness of welfare issues in the UK and overseas.
- producing the leading journal Animal Welfare and other high-quality publications on animal care and welfare.
- providing expert advice to government departments and other concerned bodies.

SCIENCE IN PARLIAMENT

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Science Diary

The Parliamentary and Scientific Committee

Contact: Annabel Lloyd
020 7222 7085

www.pandsctte.demon.co.uk

Meetings (Members only) held in Boothroyd Room, Portcullis House

Monday 14 June 17.30
Land Use and Management
Speakers: Lord Haskins; Tim Bennett, President, NFU

Monday 12 July 17.30
Obesity and the Government's Role in Diet
Speakers: Derek Wanless, Prof Robert Pickard, British Nutrition Foundation; Gaynor Bussell, Food and Drink Federation

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The Royal Institution

21 Albemarle Street, London W1S 4BS

For further information visit www.rigb.org or telephone 020 7409 2992

Events held at the Royal Institution

Unless otherwise stated tickets cost £8 (£5 concessions)

Wednesday 2 June 19.00
The Human Trace
Archie Baron, Tom Murray and Brian Sykes

Thursday 3 June 19.00
Our Genetic Future
Prof Colin Blakemore, Dr Matt Ridley and Dr Ron Zimmern

Tuesday 8 June 19.00
The Essential Turing
Dr Jack Copeland

Monday 14 June 19.00
How we can Save the Planet
Dr Mayer Hillman

Wednesday 16 June 19.00
Parkinson's Disease: Current Treatment, Future Hope
Prof Tipu Aziz and Dr Jane Byrne

Tuesday 22 June 18.30
Minerals and Water: Making and Shaping Continents
Dr Kate Wright, Katrina Austen and Andrew Walker
£5

Wednesday 23 June 19.00
London's Latest Landmark: The Gherkin
Paul Kalkhoven

Thursday 24 June 19.00
From Pansies to Palm Trees: the Future of our Gardens?

Thursday 1 July 19.00
Cross Fertilisation: the Hidden World of Pollen
Dr Madeline Harley and Rob Kesseler

Saturday 3 July 12.30-16.00
The Number Crunch
Johnny Ball, Chris Budd and Simon Singh
Adults £5, children £2

Tuesday 6 July 19.00
Wheezes And Sneezes: An Allergy Epidemic?
Prof Santa Ono

Thursday 8 July 19.00
Dragon Bone Hill: Probing the Mysteries of 'Peking Man'
Dr Noel Boaz

Tuesday 13 July 19.00
True to Form: From the Largest Telescope to Everyday Life
Dr David Walker

Wednesday 14 July 19.00
Games Computers (Cannot) Play
Dr Graham Kendall

Thursday 15 July 19.00
Kiss and Tell: Breaking the Silence on Sexual Health
Dr Kevin Fenton, Neil Gerrard MP and Lisa Power

The Royal Society

6-9 Carlton House Terrace
London SW1Y 5AG

Events held at the Royal Society unless otherwise stated

Contact Froniga Lambert:
020 7451 2574

froniga.lambert@royalsoc.ac.uk

http://www.royalsoc.ac.uk/events

Pre-registration is essential for Discussion Meetings

Monday 14 and Tuesday 15 June (all day)
Discussion meeting
Catalysis in Chemistry and Biochemistry
Organised by Sir John Meurig Thomas FRS, Professor M Wyn Roberts and Sir Ronald Mason FRS

Tuesday 15 June 18.00
Medawar Prize Lecture
The Truth about Science
By Professor Peter Lipton

Monday 5 - Thursday 8 July
Summer Science Exhibition
Open to the public: Monday 5 July (18.30-21.30); Tuesday 6 July (11.00-16.30); Wednesday 7 & Thursday 8 July (10.00-16.30)
No pre-registrations or tickets required

Monday 19 and Tuesday 20 July
Discussion meeting
Beyond Extinction Rates: Monitoring Wild Nature for the 2010 Target
Organised by Dr Andrew Balmford, Professor Peter Crane FRS, Dr Rhys Green and Professor Georgina Mace OBE FRS

The Royal Academy of Engineering

29 Great Peter Street
London SW1P 3LW

For further information, visit *www.raeng.co.uk* or telephone 020 7227 0500

Thursday 10 June
Academy Awards Dinner
Drapers' Hall, London EC2

Thursday 17 June
Annual Research Forum
The Royal College of Physicians NW1

Wednesday 26 June
Risk Debate
Church House, London

Wednesday 30 June
Summer Soirée hosted jointly with Rolls-Royce
At Rolls-Royce, Derby

Tuesday 13 – Thursday 15 July
Sustainable Development Summer School
The University of Edinburgh

The Royal Society of Edinburgh

22-26 George Street,
Edinburgh EH2 2PQ

Tel. 0131 240 5000, Fax: 0131 240 5024

events@royalsoced.org.uk

Apply on-line for tickets
www.royalsoced.org.uk

All events are free, require tickets, and take place at the RSE unless otherwise stated.

Tuesday 1 June 18.00
The Reliability of Fingerprint Identification
Mr Bruce Grant, Head of the Fingerprint Bureau, New Scotland Yard; Professor James Starrs, Law and Forensic Sciences, The George Washington University, Washington DC and Dr James Thorpe, Director, Forensic Unit, The University of Strathclyde

Thursday 3 June 17.30
The Coming Century - Ten Trends to Back
Miss Frances Cairncross CBE FRSE, Management Editor, The Economist

Wednesday 23 June 14.00
Scottish Agricultural and Biological Research Institutes Lecture
Biotechnology, Organic Farming and Shaping our Agricultural Future
Professor Monkombu S. Swaminathan FRS, UNESCO Chair in Ecotechnology and President, Pugwash Conferences on Science and World Affairs
At Bonar Hall, University of Dundee
Further information and tickets available from Sarah Stephens, Science Communication Officer, Scottish Crop Research Institute, Invergowrie, Dundee DD2 5DA.
tel: 01382 560 000; e-mail: s.stephens@scri.sari.ac.uk.

SCI

14/15 Belgrave Square,
London SW1X 8PS

Contact: conferences@soci.org or 020 7598 1562

Tuesday 29 June – Thursday 1 July
Retrosynthesis and Heterocyclic
Aston University, Birmingham

Sunday 4 – Wednesday 7 July
Ion Exchange 2004
Churchill College, Cambridge

Royal Pharmaceutical Society of GB

Contact: Judith Callanan
020 7572 2261

science@rpsgb.org.uk

Wednesday 9 - Friday 11 June
International Analytical Validation and Regulatory Issues for the Pharmaceutical Industry
Hilton Hotel, York

Saturday 12 June
Chinese Herbal Medicines
Royal Botanic Gardens, Kew

Monday 14 - Wednesday 16 June
Photostability of Drugs and Drug Products
Royal Pharmaceutical Society, London

Science in Parliament
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Editor:	Professor Peter Simpson
Editorial Assistant:	Mrs Annabel Lloyd

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