Autumn 2004

SCIENCE IN PARLIAMENT

Land Use and Management

Obesity

Exciting Science

Industrial Biotechnology

Minerals and Materials Underpinning Industry

BIO-WISE
Biotechnology at work

Profiting from Industrial Biotechnology

Biology The understanding of living things

+

Technology The ability to apply this understanding to the benefit of industry

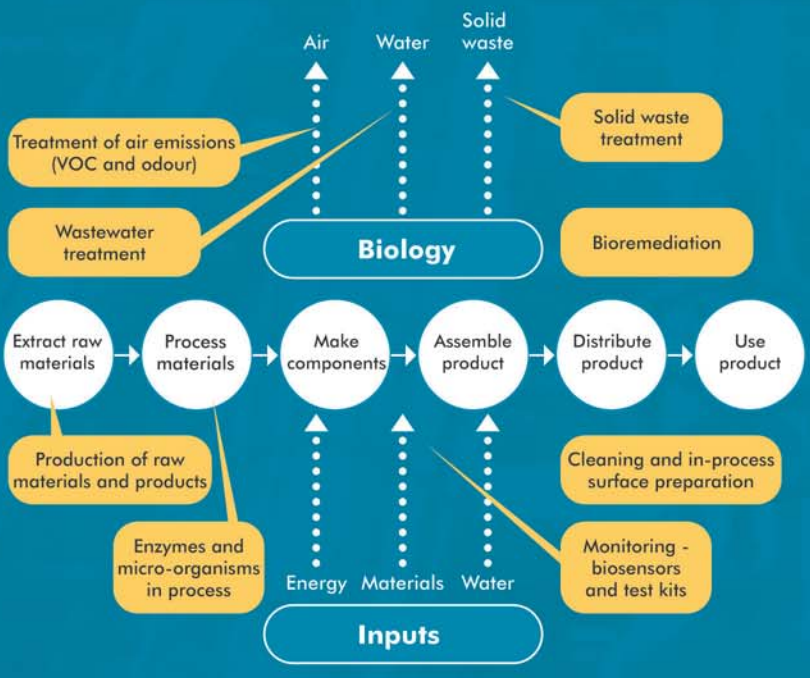
Leading companies are increasingly replacing conventional processes with biological-based options that reduce costs, enhance environmental performance and improve both production processes and product quality.

Known as industrial biotechnology these technologies combine profit with cleaner ways of working.

Industrial biotechnology has been applied across a broad range of sectors and used at every stage of the manufacturing process from materials production to end-of-pipe clean-up.

BIO-WISE, the DTI's industrial biotechnology programme has a wealth of information that helps to improve business competitiveness.

To find out how industrial biotechnology can benefit business visit www.dti.gov.uk/biowise.



Applications of biotechnology during the manufacturing process

dti

Industrial Biotechnology Applications: land remediation • air emission abatement • waterwater treatment • surface cleaning and treatment • biocatalysis • in-process manufacturing • safety, environment and production monitoring

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

In this issue Bill Rammell's Science and Innovation network spans the globe in search of partners for UK Ltd. We learn how obesity is the most important preventable cause of cancer, and the food industry is given three years to introduce voluntary controls or face regulation. Biology is the Future for Catherine Joynson and Alan Malcolm who record a predominance of female students and Brian Iddon's Bolton Technical Innovation Centre brings young people closer to industry.

The late Sir Trevor Skeet, 1918-2004, our Chairman from 1985-1988, promoted scientifically informed government and established the Parliamentary Office of Science and Technology.

Robin Paice insists the very British mess of partial metrication cannot continue and must be resolved by 2009. Lord Haskins and Tim Bennett respond, top-down and bottom-up, to the EU's radical review of the Common Agricultural Policy. Derek Wanless, Robert Pickard and Gaynor Bussell react to a tide of obesity before it swamps the NHS.

Nuna Staniaszek introduces Materials and Minerals for our future prosperity while Novartis presents winning images in Science Beyond Words and Martin Anthony locates Industrial Biotechnology at the core of the UK economy. John Durant's Science Centre Network helps schools to upgrade the UK science base and inform the public on SET issues. Dianne Stilwell reminds us that Einstein Year is coming in 2005. Des Turner posts us his views from Malawi and there is more, much more.

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

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Science and Innovation network – at work

Bill Rammell MP
Parliamentary Under-Secretary of State,
Foreign and Commonwealth Office

Science is crucial to addressing the human challenges of the future, particularly global warming and sustainable development. It plays an ever more important part in the policy of governments, and especially in international relations, as we work for solutions to problems which affect all of us.

Science and innovation are about our world of the future. Science, by its nature, is a global endeavour, with international collaboration helping to extend our understanding of the world around us. But more than that, science shapes our world, driving our economic prosperity and social development and providing some of the tools and solutions to tackle the global challenges of our common future.

Issues at the top of government agendas around the world include global warming and climate change, the security of our energy supplies, poverty and food safety, bio-ethics, sustainable development, ageing populations and rising healthcare costs, the management of disease, particularly HIV/AIDS, and our safety and security. In all of these science can help find a common understanding of the problems we face and the action which we must take to deal with them. Science also provides a way to help developing countries to increase their scientific capacity in order to find solutions to their own problems and make the most of new technologies.

The UK Government has made science and innovation one of its top priorities. Our 10-year investment plan for science – the Science and innovation investment framework announced by the Chancellor in July – will enable us to develop our ambitions for scientific excellence, further create world class research, increase business support for R&D, improve the skills base and develop collaboration with partner funders.

The international dimension is an important component of that plan. Focusing on the international dimension of science and technology is vital to enable the UK to position itself as a leading knowledge economy. We want to promote the UK as the partner of choice for international collaboration, to build international research networks, to help improve our priority setting through international benchmarking, to attract foreign investment through the strength of our science base, and to access high-tech overseas markets.

The Foreign and Commonwealth Office (FCO) Science and Innovation (S&I) network has an important role to play in delivering that vision. This includes informing the development of the UK's science policy within the international context and promoting the UK as the partner of choice. It also includes ensuring that science is fully integrated as a tool of foreign policy, helping to inform our decisions, build new partnerships and shape our world of the 21st century.

The S&I network provides insights into science activity in host countries and an assessment of opportunities and risks for the UK. Our science officers work closely with their commercial and public diplomacy colleagues and other stakeholders to project UK science, technology and enterprise, and to identify opportunities for future investment and collaboration. Three major campaigns last year – DNA50, Innovation UK in Japan and Think UK in China – and "UK Science and Technology for a New World" in North America this year have helped to raise the UK's profile, significantly boosting local awareness of our science strengths. A Year of Science in China in 2005 will keep up the momentum there: and another campaign next year, UK-Singapore: Partners in Science, will seek to encourage greater Singaporean engagement with the UK science base and high-tech companies.

We welcome the opportunity to engage constructively with Parliament on international science issues through the Parliamentary and Scientific Committee and the work of the Select Committees in both Houses and through direct contacts between parliamentarians and members of the S&I network. With the appointment of two new officers in Guangzhou next year the network will have nearly tripled since 2001, greatly enhancing our ability to achieve our strategic priorities. I certainly want the FCO to develop a fruitful collaboration with Parliament on the increasingly wide range of science issues in foreign policy.

More information on the network is at www.fco.gov.uk/science.

Farewell to Chips?

Dr Douglas Naysmith MP

Dr Doug Naysmith is MP for Bristol North West. He is also Deputy Chairman of the Parliamentary and Scientific Committee and Chairman of the Editorial Board of Science in Parliament

The recent Health Select Committee Report on Obesity provoked an almost unprecedented press reaction. Headlines like "Nanny can't wait to slap our chubby wrists", "Big fat lies on obesity [that] we swallow whole" and "Choking on the facts" may, inadvertently, have done the committee a favour. While aiming to discredit the report, these headlines and the articles beneath them drew attention to it and helped to highlight the serious health problem facing the country.

After smoking, obesity is recognised as the biggest preventable cause of cancers, including breast, colon, and bladder cancer. The number of people with diabetes is set to double to 3 million in the next ten years and overweight children are already developing diseases that used to be seen only in the middle-aged.

The Committee spent more than a year taking evidence from a large number of specialists, looking at the experience of other countries, and having discussions and arguments among ourselves. We came up with: a clear statement of the problem; its causes; and 69 recommendations for action. Some of them involve facing up to powerful vested interests, which is why some commentators were keen to knock the report.

We pointed out that one part of the problem, and it is only one part, is the way that food is promoted and advertised. Children are bombarded with messages encouraging them to eat foods that are high in fat, sugar and salt. Today's school lunch box will often contain a bag of crisps, a large chocolate bar and a can of fizzy drink or orangeade – too much sugar, too much fat, too much salt and too many energy-dense calories. The evidence suggesting a role in this for advertising is somewhat flaky on both sides, but it seems obvious to me that firms would not spend huge sums on advertising if it didn't work.

On average, we eat 9.5 grams of salt per day, but there is expert evidence to suggest we should aim for no more than 6 grams – children even less. If we could reach this target it would cut the incidence of heart disease and strokes. But cutting down on salt is not so easy, because much of it comes from fast foods and ready-made meals – and some of them contain astronomical amounts of salt.

Over the last 20 years we have moved to eating much more food that has been prepared for us by others. Snacks, fast foods, prepared meals and dining-out mean it is harder to control the balance of what we eat. Surveys suggest that large numbers of younger people do not know how to cook meals from fresh ingredients – despite the great popularity of TV cooking and celebrity chef programmes.

Because of all this, the Government (through the Department of Health) is asking the food industry to lower the salt content of its products voluntarily. And there have been some good signs, with reductions in bread and soups. But there is a long way to go. The food industry argues that there is no such thing as **unhealthy food** – only **unhealthy diets** – something most people know can be justified in theory but is a long way from how people's lives are lived.

Of course, diet is only part of the problem and only part of the answer. The other part is exercise. The state of Colorado in the US has an excellent Public Health programme called "Colorado on the Move" which even manages to get Americans out of their cars and walking some of the time. Exercise does not have to be 30 violent minutes in an expensive gym five times a week (often followed by a pint or two in the bar afterwards). Walking or cycling to work can make a big impact too.

Now the dust has settled a bit, I think we can look more sensibly at the report and the reaction to it. I think there has been a deliberate plan – almost certainly involving elements of the food industry – to try to lessen its impact. The plan is to make the Government believe that any action to legislate for safer food is bound to be unpopular, and probably unnecessary.

My message to the Government, and to John Reid as he contemplates the coming Public Health White Paper, is to be brave. As we recommended, he should give the food industry three years to introduce voluntary controls and if that fails, direct regulation should follow. If the food industry, as it often claims, is keen to work with the Government and be part of the solution rather than part of the problem, now is the time to demonstrate it.

Biology IS the Future

Catherine Joynson, Science Policy Advisor and
Alan D.B. Malcolm, Chief Executive, Institute of Biology

The recent publication of A-level results has produced the usual outcry about the decline in popularity of the sciences, but not in biology which remains the second most popular subject after English.

The President of the Royal Society and the Minister for Science claim that the 21st Century is the age of biology with which, fortunately for the UK economy, today's teenagers agree.

Biology is the academic subject in which many of us displayed an interest from the earliest age. Toddlers investigate the locomotion and the nutritive qualities of worms, while colourful flowers and small furry animals are attractive and stimulate investigation. We must not be complacent and care should be taken to ensure that this early enthusiasm is nurtured and developed at school.

Schools and colleges should be able to teach the new Salters-Nuffield A-level Biology course from September 2005 that "makes advanced biology seem important to students by developing the key ideas in a range of interesting contexts". The course is based on topics such as lifestyle, health and risk, plant biotechnology, and climate change. This approach has been popular at the pilot schools.

Discussion of ethical and social issues related to genetic screening and the use of animals in research is essential for students who will become future scientists and citizens. Many teachers will also require support and training from a new national network of Science Learning Centres. The first season's programme includes courses on the nature of scientific investigation and the impact of science on society.

Field trips are expensive but should be encouraged, although they are not compulsory, as they enable pupils to discover the relevance of biology to the real world. Advice on risk assessment for those with responsibility for organising field trips and other potentially hazardous activities is essential.

Information and Communication Technology (ICT) provides new insights into biological processes such as animations that demonstrate cell division, protein synthesis and the control of heart rate. Some say nothing can replace the experience of exploring real animal tissue in the classroom, but EC regulations now stipulate that animal parts must be disposed of by rendering or incineration – a costly and time-consuming exercise for teachers.

Student behavioural problems, lack of appropriate equipment and class size are the most common reasons why schools are unable to carry out practical lessons.[1]

Estimates indicate £1.4 billion is needed to raise school science labs to a good standard.[2] An exciting curriculum cannot compensate for inadequate capacity resources. These problems must be addressed urgently.

Despite this, in the recent International Biology Olympiad held in Brisbane, all our team won either Gold or Silver and only the US did better. Biology students taking degrees have increased from 48,000 in 1994-95 to 65,000 in 2001-02[3], in response to the broad range of careers offered in biology.

Many biology graduates pursue other careers, but about 12% in 2000 became research scientists[4]. Rising student debt, the temptation of £20,000 pa as a management consultant, with potential to attain over £100,000 pa, makes a 3-year PhD on around £12,000 pa, followed by a relatively low starting salary, and a lifetime of short-term contracts, an option for only the most dedicated of scientists. Researchers' salaries should be increased to compete with other interesting career options open to recent graduates.

Less than 2% became teachers[5], which is a problem for the next generation of young biologists, whose teacher may lack a first degree in biology. The Institute of Biology consistently promotes teaching as a career.

The predominance of women in biology is unusual, comprising 60% of A-level students, 65% of university undergraduates and 45% of graduate students and 10% of university professors. This means that biology has a special need to organise the return of those who have taken time off for a domestic career break. Sadly for individuals and the economy this problem is nowhere near being solved

The Institute of Directors recently wrote: "At one time, biology and related subjects were regarded with some disdain as 'soft options' for those studying science…and…as having little contribution to make to wealth creation." However, life displays some of the most complex structures and processes known to science, and biologically based activities, such as agriculture and medicine are crucial to the economy. Conservation, improving the environment, encouraging biodiversity, scientific research, feeding the masses, ministering to the sick – that are all biologically based – are needed, are expanding, and improve our quality of life.

The conclusion is obvious – in terms of the wealth and health of this country, biology is the future.

[1] Save British Science. *Survey of Secondary School Science Teachers.* January 2004. Available at: http://www.savebritishscience.org.uk/texts/documents/2004/SBS0401.pdf.
[2] Royal Society of Chemistry. *Report on Laboratories, Resources and Budgets.* 2004.
[3] DfES. Trends in Education and Skills. Available at: http://www.dfes.gov.uk/trends/index.cfm?fuseaction=home.showIndicator&cid=4&iid=23.
[4] Prospects survey. Available at: http://www.prospects.ac.uk/student/cidd/wdgd/charts02/biology.htm#Types%20of%20work
[5] Prospects survey. Available at: http://www.prospects.ac.uk/student/cidd/wdgd/charts02/biology.htm#Types%20of%20work

Bolton Technical Innovation Centre Ltd

A new concept for delivering education in SET to 9-19 year-olds

Dr Brian Iddon MP
Member of Parliament for Bolton, South East

Paul Abbott, a former teacher who always tried to take his pupils beyond the science and technology textbooks, had a dream to create a specialist facility to help nurture innovation in young people from across Bolton. He shared his vision with Lord Puttnam, with the Local Education Authority and with the Northwest Development Agency, and the result is Bolton Technical Innovation Centre Ltd, the first junior incubator in the country.

This is a partnership between the NWDA, who put up £2.2 million for a futuristic looking building which was completed in June, Bolton Metropolitan Borough Council, who provided transport infrastructure improvements and who will provide some of the £0.5 million per annum revenue income that is required to operate the building and Mount St Joseph Business and Enterprise College.

Bolton TIC is not a school; it's a limited company, and I am privileged to be the first Chairman of its slowly expanding Board of Directors. We hope to open the building in the evenings, at weekends and throughout the school holidays, as well as during school term time. Bolton TIC aims to give 9-19 year-olds an out-of-school SET experience, and to support all schools by providing facilities beyond their reach.

Regional industry is being invited to give or loan the TIC state of the art equipment and to second staff to show pupils how to use it. The TIC can become a showcase for new equipment and instruments. Local and regional industry are invited to use the TIC for conferences, exhibitions, and away days. In this way the TIC will bring Bolton's young people closer to industry, and industry can get closer to motivated young people.

The entrance of the TIC is impressive. After entering a reception area the visitor enters a two-storey research and development hall, with a dedicated room for Computer Aided Design. Other ground floor rooms include material preparation areas, storage, a technician base, meeting rooms and a video-conferencing suite. The building is to be wired for state of the art IT. On the first floor there is a 100-seater lecture hall, to be fitted out with advanced audiovisual equipment, and other rooms including a large business incubation suite, meeting rooms and a library.

It is my hope that we can bring famous figures in SET into this building to inspire young and old alike – the equivalent of the Faraday Lecture Theatre in the North West. If we can inspire enough volunteers, I would like to see various science and engineering clubs set up so that young people can pursue a "hobby" without it costing them the earth.

We want 9-19 year-olds from Bolton to use this building whether they show an interest in science or not. This project, which is an experiment itself, is about turning ideas into reality. It is established to nurture innovation and entrepreneurship in young people from every school in the town. It seeks to provide modern design and manufacturing facilities, including rapid-prototyping and 3D visualisation systems, and 3D Computer Aided Design, to enable young people to pursue their ideas. Hopefully, we will be able to fabricate in any material.

A detailed programme has been drawn up for each age group. Primary school children will visit for a day or two, but older children for longer periods. Hopefully, a future school curriculum in science can encompass a visit to the TIC.

Of course, the success of this brave experiment depends on the interest shown by regional and national industry. We are looking for sponsors who are willing to help us to fill our revenue gap. All major sponsors will have their logos on the TIC's publicity materials and at the entrance to the building. We are looking for a major national company to become a major sponsor, but other sponsors are invited to sponsor rooms and equipment in the building.

Bolton's TIC deserves to succeed. If this model for inspiring our future scientists and engineers is successful, it can be replicated. Bolton TIC needs funds, equipment, programmes and volunteers. It needs the expertise, goodwill and actions of people to make it successful. Will you or your company be one of those?

Our contact is Paul Abbott, General Manager, Bolton Technical Innovation Centre Ltd, PO Box 559, Bolton BL4 0WA (Tel. 01204 372204; Fax. 01204 389575, Email: paul.abbott@uktic.org website: www.uktic.org).

Sir Trevor Skeet
1918 – 2004

Chairman of the Parliamentary and Scientific Committee 1985-1988

Trevor Skeet's death on August 14th at the age of 86 brought very unwelcome news to those who knew him well, especially those of his colleagues in both Houses who knew of his dedicated support for the work of this Committee, of which he was a long-serving Member, and eventually its Chairman from 1985-88 and Vice-President in March 1988. What many of us did not know, for he was a very modest man, was the range of his interests and, indeed, his qualifications. Not many Members of the Commons can claim to have studied medicine (which he did at the University of New Zealand before the war), qualified both as a solicitor and a barrister, eventually being called to the Bar by the Inner Temple shortly after arriving in Britain as a Lieutenant in the Navy. Not many of us realised that he was a New Zealander, although his staunch support of the Commonwealth, his Euroscepticism and opposition to the Common Market certainly supported his claim that such individuals "say what we think".

His interest in scientific matters in the Commons became clear when he became secretary of the All-party Group on Minerals and eventually a strong advocate of nuclear power. But it was his belief in a scientifically informed Parliament that undoubtedly aroused his interest in and support for one of the major developments in this area. Trevor Skeet led the first Parliamentary and Scientific Committee delegation's visit to China in 1986 and was a member of the second team which followed this up in 1990. He was among the first to appreciate the significance of China's scientific development and the consequences of that country's eventual demand for energy. He emphasised that the country was "keen to develop its nuclear industry" and that it "had not hesitated to graft on to its political system any advantages inherent in capitalism whenever it interested her rulers".

But his belief in a scientifically informed Parliament led to his unswerving support for the concept of technology assessment which led eventually to the establishment of the Parliamentary Office of Science and Technology. He accompanied the team, which included the late Sir Gerard Vaughan, Dr John Bleby and myself, to Washington and his conviction, intelligence and personal charm played a significant part in building up the support from within the Committee, and eventually in both Houses. This led at first to the voluntary privately funded organisation being established by the Committee, towards which he was one of the nine donors, and finally in 1993 to the formal recognition of POST and its financial support by Parliament.

As a member of the Select Committee on S&T re-established in 1992 Skeet participated in the three significant enquiries which it completed before the next election at which, at the age of 79 he retired, having with great courage challenged and defeated an attempt to unseat him. The late Dr Maurice Goldsmith, a former editor of this journal, once wrote that "we seem in the UK to be able to meld the expertise of the scientific community with parliamentary behaviour to foster the public interest". Some of us would be inclined to share the scepticism expressed by Lord Kennet who, on the same topic, argued that "the discrepancy between the democratic tortoise and the scientific hare is potentially tragic". Both statements express, I believe, views which Trevor Skeet would have shared and to whose relevance he devoted a distinguished Parliamentary career. One of those whom our delegation met in Washington was Dr John Gibbons, then Director of the Office of Technology Assessment. In his address to the Committee in 1991 he quoted a remarkable statement by John Madison. "Knowledge", he said, "will forever govern ignorance, and a people who mean to be their own governors must arm themselves with the power that knowledge gives." In what must be one of his final comments in Parliament Sir Trevor stated, in his analysis of the Select Committee's report on R&D expenditure by the then Government, that "science is almost as important as the air we breathe and the environment in which we work."

The electors of Bedford North may take full credit for their election of a Member who had an enlightened concept of the public interest and the personal courage and determination to serve it. The Parliamentary arena is one in which the conflict between the public, Party and personal interpretations of that interest is unending. Trevor Skeet was a man who respected to the full the Edmund Burke definition of how that interest should be served.

Sir Ian Lloyd

British metrication – how can we escape from the mess?

Robin Paice, Chairman, UK Metric Association

In July the UK Metric Association published its campaign document, "A very British mess", which advocates early completion of the metric conversion process. The report can be downloaded from the internet at www.ukma.org.uk.

Scientists, engineers and industrialists the world over use metric units for almost all research, product design and production. The advantages of the International System of Units over Imperial measures should not need to be rehearsed in a publication read by persons interested in science and industry.

Yet British society remains obstinately stuck in a muddle of incompatible measurement units: litres for petrol and fizzy drinks, pints for beer and milk, metres and kilometres for athletics, miles per gallon for cars, the metric system for school and yet, all too often, still pounds and ounces in the market. The conversion process begun by the Wilson Government in 1965 and carried forward with all-party support has ground to a halt, and there are no current plans to resolve this "very British mess".

Some might argue that this mess doesn't really matter; that people are used to it and have become bilingual; that it will cause more trouble than it is worth to sort it out; and that it will probably resolve itself eventually anyway. Unfortunately, all these statements are wrong.

The mess matters because it undermines consumer protection, causes mistakes and waste, and leads to accidents and incomprehension. It is not only science and industry which require clarity, precision and certainty. Just as clarity of verbal communication requires that everybody understands and uses the same language, so communication about dimensions and quantities requires that everybody uses the same units of measurement. Sadly, this is not the position in the UK today.

A further worrying consequence of this muddle is a widespread lack of numeracy in the general population and a resulting inability to perform simple calculations such as working out the area of a room to be carpeted or how much fuel is needed to complete a car journey.

Politicians' reluctance to confront the issue derives in part from fears that any solution will cost money, be unpopular, and involve unacceptable erosion of civil liberties. The truth is that the costs of conversion have already been largely met except in the field of road signage, whose cost, though not insignificant, is likely to be modest. The perceived unpopularity could be overcome by a proper campaign of public information. The "civil liberties" argument has been comprehensively rejected by the Courts. The evidence of the last 39 years shows that the problem will not resolve itself of its own accord. Indeed it is becoming entrenched.

So what is to be done? Much depends on key opinion-formers (such as readers of *Science in Parliament*) letting it be known to political leaders in both Government and Opposition that the present situation cannot be allowed to continue and that the conversion process which was begun in 1965 should be completed as soon as practicable – with a target date of 2009.

In order to achieve this it is important that politicians should resist the temptation to score political points by exploiting public misunderstanding and resentment about a change which has never been properly explained or justified to them. In particular the misconception that "Brussels Bureaucrats" have imposed an alien system on an unwilling country needs to be exposed as a myth.

The Government should respond, in a joined-up way and at the highest level, by announcing its intention to complete the metric conversion programme as soon as practicable. This will include strict observance of the 2009 cut-off date for "supplementary indications" (Imperial equivalents on price labels), as well as bringing product description and advertising within the same rules. (As a harmless concession to traditionalists draught beer can continue to be served in pint mugs, but it should also be *permitted* to be dispensed in metric measures). Unit pricing should be per litre (for consistency with off-sales).

On the roads, distance signage should be converted to metres and kilometres (possibly phased over several years), speed limits need to be reviewed and expressed in km/h, and an early date fixed (preferably within about three years) for an overnight change of speed limit signage.

All this will need to be accompanied by a major programme of public information as each stage approaches.

Given the necessary commitment and determination by the Government and with the support of stakeholders and opinion-formers, this programme could be achieved and the UK could join the modern world and become a fully metric country within this decade – thus fulfilling the aspiration of Magna Carta (1215): "Let there be standard measures ... throughout the kingdom."

MEETING OF THE PARLIAMENTARY AND SCIENTIFIC COMMITTEE ON MONDAY, 14TH JUNE 2004

Delivery by Government of rural policy requires fundamental overhaul and Lord Haskins report to Defra contains 33 recommendations that could have a major impact on the manner in which the English countryside is managed in future.
This is one more issue that farmers need to consider as they struggle to restore farm profitability and adapt to the ever-changing needs of the marketplace as they take the industry and their businesses forward.

Managing the Countryside in the Future

Lord Haskins

Rural policies are undergoing more radical change than at any time in the past fifty years. Since 1947 British farmers have been guaranteed prices for most of their outputs and since Britain joined the Common Market in 1973, the European Union (or the EEC as it was then) has bought in surpluses to market needs at favourable prices and then disposed of these surpluses either within or outside the EU, at very reduced prices. Furthermore European farmers have been heavily protected from competitive imports through a range of protectionist barriers.

All this is about to change. The system of subsidising farmers through guaranteed payments for most of their products is about to be abandoned in favour of direct payments, unlinked to the markets. This will create more competitive markets and incentivise farmers to stop producing a crop if it is uneconomic, whereas at present they have to produce in order to earn the subsidy.

Furthermore, negotiations at The World Trade Organisation, (WTO) seem likely to lead to a ban on the dumping of surpluses at "below cost" prices into global agricultural markets, followed by a progressive reduction of tariff barriers to restrict imports.

These changes will have a profound impact on British and European farming. They will force farmers to be much more "market conscious" and therefore to be much more competitive. Farmers will have to assess the economic viability of a crop depending upon the productivity of their land (soil, climate and efficiency) before going ahead. Supermarkets and other buyers of farm produce will be less certain about the continuity of supply and may have to renegotiate more attractive terms with farmers in order to ensure product availability.

As a result total output from British farms is likely to drop, as farmers producing crops on unsuitable soil, with unfavourable climatic conditions and managing small and uneconomic holdings, will choose to go out of production. But despite some reduction in output, British farmers will still be supplying a much larger share of the domestic food market than they were 50 years ago.

Small British farmers can learn from their counterparts in France who have developed a strong long-term position in local markets. And larger British farmers who have been reluctant to co-operate with each other, have much to learn from their market driven co-operative neighbours in Denmark, Holland and France.

The EU has now embarked on policies to deregulate and liberalise agricultural markets, and the scale of this progressive process is momentous.

Alongside this trend there is a rising level of EU interest in the rural/agricultural environment.

Much damage to biodiversity has resulted from the practices of farmers pursuing market subsidies and the EU is determined to tackle this problem by a mixture of regulation and incentives. Regulations restrict the use of agrichemicals which can be environmentally damaging, tackle pollution arising from, for example, silage effluent which can affect the quality of river water, and outlaw waste disposal practices which harm the soil, water and the atmosphere. Existing levels of regulation will rise sharply, especially as the world gets more alarmed about Climate Change and the factors causing it. Farming, and particularly, livestock farmers are significant contributors to atmospheric pollution through emissions of methane and CO_2.

As part of the radical review of the Common Agricultural Policy the EU plans to allocate much of the money previously used to provide agricultural subsidies as incentives to farmers to carry out practices which sustain and enhance the environment. Farmers will be paid to cultivate fields so that they support rather than jeopardise biodiversity. Good husbandry practices will be rewarded. If farmers fail to comply with basic standards of environmental management they could lose the direct payments made to them under the new CAP.

The British Government made a number of institutional changes in 2001, to reflect these radical changes in rural policy. The old Ministry of Agriculture, Fisheries and Food, whose *raison d'être* was to support the interests of farmers, fishermen and the rest of the food industry, was merged with the environmental activities of the Department of the Environment, Regions and Transport. The new department was also given a broader remit for rural economic growth and social stability. The department for the Environment Food and Rural Affairs, Defra, came into existence.

In the autumn of 2002 I was asked to carry out a review of the way the new Department delivered its wide and radically changing remit, as the CAP reforms crystallised. I found that the existing approach to policy delivery was in a mess, with two different Whitehall cultures – farming and the environment – coming together under one roof. A complex network of delivery arrangements has been allowed to grow over a number of years, has a plethora of initiatives and schemes aimed at the countryside. The new department suffers from the chronic Whitehall over-centralised approach to delivery, where the policy makers also take far too much responsibility for the delivery functions. This leads to vast bureaucracies with limited accountability which confuse and frustrate those on the delivery end, result in extensive delivery failures and serious waste of taxpayers' money.

This already unacceptable situation will be exacerbated as the radical reforms of the CAP are introduced. Indeed, without widespread changes to the way Defra goes about arranging delivery of its new and existing policies there is a serious risk of disastrous and expensive delivery failure, with many of the necessary and worthwhile policy objectives being put in jeopardy.

My report was published in November 2003 and the Government fully endorsed it in July this year. The main thrust of the report is as follows:

The need to separate, as much as possible, responsibility for policy making from that of policy delivery. In today's centralised system where policy makers prevail, problems of delivery are insufficiently taken into account or even recognised, leading to widespread delivery shortcomings. In today's muddle there is poor accountability.

As part of this objective, the need, as much as possible, is to devolve the delivery of policy away from the centre and into the regions and local authorities. This will improve accountability and ensure that the delivery of policy reflects and responds to local needs. More flexible, speedy and cost effective services should result.

The need to strengthen the management of the environmental agenda by creating a new integrated Land Management Agency to absorb the existing responsibilities of English Nature, and the environmental activities of the Rural Development Service and the Countryside Agency. This new agency would be responsible for delivering the emerging agro/environmental aspects of the reformed CAP.

The need to make the Regional Development Agencies and Local Authorities much more accountable for the delivery of the economic and social rural agenda.

The need to rationalise and simplify the network of rural agencies and programmes to make them more accessible to the people in the countryside, to reduce bureaucracy and provide better value for money for the taxpayer.

The Government has a daunting agenda; to deliver the reformed Common Agricultural Policy, to balance sustainable farming with a sustainable environment, to help the countryside and farming in particular to become less reliant on state subsidies, to satisfy the frequently conflicting expectations of people in the countryside, to manage a period of great economic and social rural change, to modernise the delivery network, to decentralise and provide reasonable value for the taxpayer.

Quite an agenda!

Farming Today

Tim Bennett
President of the National Farmers' Union of England and Wales

Innovation and improvement characterised agriculture from the outset and are important today. They currently play a major role although legislation is often irrational and driven by emotion, sentiment or fashion rather than scientific principles.

British farming has grappled with devastating problems over the last decade and survivors have endured historically poor returns due to Bovine Spongiform Encephalitis (BSE) since 1996, followed by the huge outbreak of Foot and Mouth Disease (FMD) in 2001.

I am very well aware that as the new President of the National Farmers' Union (NFU) the next few years will be crucial for the future of British agriculture and all its dependents including the farmers, farm workers, their families and the whole food chain, including all those who purchase our products.

I have also been recently involved in reform of the Common Agricultural Policy (CAP) where throughout the 1990s the NFU has led the initially small pro-reform group of European Union (EU) farmers. Margaret Beckett referred to the implications of CAP reform achieved last year as "ground breaking". We have still not reached those who call for further radical reform. Sure, there are some areas yet to be reformed (sugar and dairy for example) but breaking the link between production and subsidy is massively important, not least for "Land Use and Management", our subject today. I sometimes wonder whether some people really do not want the CAP reformed, so fond of it are they as a whipping boy for the ills of the world!

It was the third birthday last week for the Department for Environment Food and Rural Affairs (Defra). A troubled and sometimes tiresome young Department to start with! But it is showing signs of growing up, and it cannot be accused of suffering from too limited a portfolio, ranging from Kyoto to biodiversity, from farming, food and fisheries to bathing beaches! Although there are some fine words in the Department's policy documents, it still has a way to go in appreciating how agriculture can help deliver the sustainability and environmental objectives. Farmers will need guidance, support and understanding – not the dead hand of inappropriate regulation.

Rural delivery is an important part of Defra's objective. Chris Haskins has analysed the problems correctly, separated policy from delivery, trusted the deliverers more than in the past and thrown down a gauntlet to Government. There is a culture in successive governments of centralising power and resources, despite rhetoric to the contrary. The Government's response to Chris Haskins report is due about now, so we will soon know if they are going to shrug off the centrist culture, pick up the gauntlet, and reform and modernise rural delivery by action and not just words.

The new Integrated Agency will have a very important role. It is Chris's view that "compulsory takeovers are more effective than mergers". But the Agency must have balance, merging activities of the Countryside Agency and the Rural Development Service with Wildlife Conservation. It might also be given some of the socio-economic elements of the English Rural Development Programme – another reason why a "Super English Nature" would not be an appropriate vehicle for this task.

A key test for the Haskins reforms will be whether the new funding streams work efficiently. The rural aspects of Regional Development Agencies have performed patchily. If they are to become responsible for planning regional delivery, then they must be more consistently attuned to rural objectives, and the relationship with counties will be vital. Better delivery of funding and better value for the taxpayer must be achieved while also ensuring a coherent approach to economic development regionally.

The NFU has been reviewing its environmental policy against a background of industrial difficulties, European reform, and structural changes in government and the delivery system. Repeated surveys show that the public value farming principally for the care and maintenance of the countryside, and believe that it is in good heart. This traditional link is coming under great pressure as lesser numbers of farmers and workers respond to evolving market needs, thus forcing change in farming practice.

The range of agriculture's environmental priorities is also growing in breadth and complexity, including greenhouse gases, water quality and quantity, soil protection, biodiversity, historic heritage, public access and waste management. Environmental issues are now "centre field" to an extent unthinkable 30 years ago.

What farmers do with their land is central to Government's vision for rural areas but the work they do is undervalued and unrecognised, for example there was been no change in hedgerow length during the 1990s (450,000kms); there were more lowland ponds (up by12,200 to 230,900); the decline in biodiversity has been halted or reversed (farmland bird numbers are now stable and otters are now found in many lowland

rivers); and 95% of English waters are of good or fair biological quality (89% in 1990).

The FMD crisis demonstrated strong links between farming and recreation, valued at £9 billion annually by the Countryside Agency. About 50% of countryside visits generate no income, so providers need better rewards. Nearly 70% of 188,000 kms of Rights of Way are in satisfactory condition. The Countryside and Rights of Way Act 2000 will add a million additional hectares of land, with the SE and NW regions open to the public from 19 September 2004. This may threaten the livelihoods of some farmers who must be protected and helped, but provide opportunities for others.

Our key messages are:

The NFU is committed to leading a modern, competitive, environmentally sensitive and forward-looking farming industry

Farmers currently demonstrate their commitment to environmental protection and improvement

Challenges lie ahead for agriculture that will require a step change in environmental performance as new and revised standards come into force

We wish to work with partners to achieve an environmentally responsible industry that has their confidence and is assured of its viability

Opportunities over the horizon for testing these messages include:

Implementation of CAP cross-compliance - January 2005

Introduction of the new Environmental Stewardship Scheme – early 2005.

Implementation of new agricultural waste regulations – mid 2005

Implementation of IPPC for pig and poultry units above certain size thresholds – 2007 for existing units

Public Service Agreement target for bringing 95% of all nationally important wildlife sites into favourable condition by 2010

Achieve good ecological status for most surface and ground waters by 2015

Public Service Agreement target reversing the long-term decline in the number of farmland birds by 2020

Reduced availability of tools with perceived high levels of environmental impact, such as pesticides

Our principles for better environmental policy and regulation are:

evidence-based policy making

a robust science base

proportionate and targeted regulation

a whole farm context

partnerships

early engagement

foster good practice

reward environmental enhancement

assure viable farm businesses

Environmental concern and action should be based on the precautionary approach. Where there are gaps in scientific knowledge we should act on the information available and adjust regulation in line with improvements in the knowledge base. Policy-making must be evidence-based on scientifically robust data with analysis of the costs and benefits for the options available.

Farmers are recovering from industrial disaster and depression. They need to prepare for and implement reform of the support system and be vigilant for further changes in conditions arising from global trade rules and practice. They must adjust to reformed rural delivery arrangements and meet new environmental regulatory requirements. This has to be delivered while providing what the customer and the public want and develop businesses that are profitable and sustainable in the longer term! These are major challenges and we will need the expert advice of scientists, the support of politicians and the machinery of state, if we are to respond to this ever-widening, somewhat daunting, and sometimes conflicting, agenda.

In discussion the following points were made:

Farmers are fewer but are more efficient and multiskilled. Candidates for entry to the EU in 2007 can help overcome UK labour shortages for harvesting short lived high value crops at short notice. Intensive longer term labour for the milking parlour can also be solved by outsourcing. Training and re-skilling are very poor. Some of the best farm managers never went near an agricultural college.

The US leads production of non-food pharmaceuticals. As techniques are not well understood in the UK, this work is likely to migrate overseas. Whereas the US farming culture is innovative and dynamic, the UK is dominated by regulation. For example the US already has five plants in Kansas for production of biofuels.

What is the science agenda doing to make UK agriculture more competitive? Greater output per hectare is entwined with environmental, aesthetic and cosmetic concerns. The industry is now dominated by consumer power. Farmers are responding to supermarkets that reflect public pressure. Science has lost its way in agriculture with the power and influence of scientists decreasing relative to other professions.

Water quality issues are reflected in CAP changes, especially in the dairy industry and in recognition of the need for water resources uncontaminated by farm wastes. In the USA 30% of irrigation water is wasted and this represents a R&D opportunity. Farming consumes 70% of the world's fresh water and only 5% is drunk.

The UK leads Europe in outdoor pigs and treats farm animals with respect so that UK pork now sells at a premium. Food quality issues predominate in supermarkets. The supply chain model driven by the CAP through farm subsidies is redundant. Farmers respond to customer needs directly. Supermarkets may develop into boutiques selling quality produce from local identified sources. Milk mountains will become a thing of the past. Labelling is important for consumer trust. The size of holdings varies from large in the east to small in the west. This has not impacted negatively on biodiversity as 88% of bird species noted by Rachel Carson as threatened with extinction are now out of danger.

OBESITY AND THE ROLE OF GOVERNMENT IN DIET

MEETING OF THE PARLIAMENTARY AND SCIENTIFIC COMMITTEE ON MONDAY, 12TH JULY 2004

What is the nanny state doing in the local supermarket and in our kitchen?

Confronted for the first time ever with predictions of reduced longevity coupled with increases in overweight and obese people having the potential to overwhelm a reformed NHS, the Government has commissioned the Wanless 2 report. Is this response sufficient and how can the food and drink industry help to improve our nutrition? Derek Wanless sets the scene by outlining the Government's response, Robert Pickard discusses nutrition and Gaynor Bussell provides a response from the food manufacturers to this intractable problem.

The Future Health of the Nation - The Wanless 2 Report and Beyond

Derek Wanless

This is a fascinating time for public health, full of opportunities that are in danger of being missed. They require patience for the groundwork needed to build a physically and mentally healthier UK workforce that can generate economic growth. These are vital roles for Government in public health involving many determinants of health, including obesity. We do not simply need a list of unco-ordinated short-term frenetic activities that can be stopped as easily and quickly as they began.

My 2002 report illustrated the huge prize to be gained with higher productivity from the supply of health services and healthier lifestyles on demand and concluded that action is vital on both. We virtually wrote that first report around the single word "capacity", so powerful is its influence. The headline-grabbing conclusion is that the difference in spending between the worst scenario "slow uptake" and the best "fully engaged" will be £30 billion per year by 2022.

Our target is delivery of financial savings and of health services much better placed to face potentially very difficult decades in the 2020s and 2030s, when more older people could be joined by younger people in need of care, too many of whom have lived unhealthy lives. And don't forget the older people are baby-boomers, pampered since birth and likely to be demanding patients.

The 2004 report set out the changes needed if we move towards full engagement. High productivity in public health as well as healthcare will require adequate workforce capacity having an appropriate and broad mix of skills, extended by self-care and the imaginative use of the knowledge and time of patients. Information handling must be revolutionised and resources redirected to areas of proven effectiveness, supported by enhanced research programmes and better measurement tools.

"How do we get onto the fully engaged path?" That's the question this year's report seeks to answer, based again on lousy information. It's designed to ensure spending is well-directed, whether spent on tackling inequalities, providing support, changing personal behaviours or on more personalised health services. A framework is devised to assess spending.

The report made recommendations that would enable the key determinants to be tackled, including obesity. A sample of determinants was examined to see how close we are to "full engagement" in England. How had targets been set and strategies developed, evidence collected about what works and progress assessed?

We drew conclusions and made recommendations, by no means all for Government. And they're not a "pick and mix" list. They're an attempt to tackle all the most important reasons for our past failures.

The existing conventional definition of "Public Health" seems very narrow and doesn't describe what preventative public health should become in the early 21st century. The definition should be debated and changed to help mobilise widespread support. It should operate through "the organised efforts of society" and additionally "through the organised efforts and informed choices of society, organisations, public and private, communities and individuals". The report is based on that wider re-definition. It recognises that the health of the population is affected by issues and organisations outside the health sector. Not surprisingly, but unhelpfully, medical models of intervention have dominated since 1974.

The key question is why we have done so badly in recent decades in influencing those determinants crucial to prevention. Not for want of reports. Yet we have failed. We examined how targets had been set for our sample of determinants and found inconsistencies in ambition, realism and timescales. The target setting process did not encourage a belief that resource

management was remotely near optimal for any of the major determinants.

We need national objectives for all the major determinants to inform resource planning and priority setting and to drive action in the short and medium term. This will enable progress to be measured and new knowledge and information recycled for use. Research, analytic thinking and consensus building are needed. Sub-groups, children, ethnic groups and the economically deprived may need separate objectives.

Public health objectives require more ambition. The White Paper should propose objectives, plans, budgets and research programmes. One objective should be to stop the obesity rise now, with an increasing pace of reductions into the medium term. Objectives should be based on independent medical and managerial advice. The Government should establish the structure that it will use to obtain advice regularly.

Networks designed to tackle local issues will emerge locally. National objectives should inform local decisions but centrally calculated targets should not be imposed on local organisations. Placing smoking cessation targets on Primary Care Trusts is probably the worst example of this type. Local networks know local problems, priorities and complex trade-offs. Crude bureaucratic administrative systems corrode professionalism, but well co-ordinated and directed central efforts can add value.

Our evidence on cost-effectiveness is weak due to the lack of research funding for public health intervention, the very slow acceptance of economic perspectives within public health, and the lack of a coherent set of Government research priorities. The future research programme will be technically very demanding and will require greater resources and greater expertise and depth in core disciplines.

The need for action is too pressing to excuse inertia and this should help to build the evidence base that must be rapidly incorporated in a comprehensive research programme with an agreed evaluation procedure. The sound methodology being developed by the National Institute for Clinical Excellence should be the base, forcing consideration of costs and benefits and introducing techniques to involve "real" people in making difficult assessments of value.

Capacity problems, the impact of recent organisational change and the lack of alignment of performance management systems limit achievement. Primary Care Trusts (PCTs) have spread resources thinly yet are vital in making new mechanisms – such as new contracts – work to advantage, rather than becoming a bureaucratic nightmare and a diversion away from sound professionalism towards opportunistic point-scoring. Close review and evolution of local structures are recommended; wholesale reorganisation is not.

Our well developed network of primary care providers could provide a unique resource for evaluation and health promotion. If the National Health Service is to be "the best insurance policy in the world", it must start to manage risks like an insurance company. Pooling of resources between PCTs and local authorities should be closely reviewed to see if that produces the expected benefits.

Workforce capacity planning, including attention to significant skill shifts, must encompass the wider public health workforce and take a long-term view, taking into account the way delivery is likely to develop as primary care transforms. The opportunity must be taken to consider what primary care should become over the next couple of decades. How will knowledge of genetic make-up and of individual risk assessment influence personalised health promotion and disease prevention? Information Technology will drive change and marketing techniques will be facilitated and will find their place.

Huge commitments being made to improve technology will have, as part of their justification, identification of personalised risk profiles. Government must also address the threat to public health research arising from the difficulty of obtaining access to data. Debate is needed about the balance between individual confidentiality and public benefit.

I recommended primary care pilot exercises to assess the benefits of additional resources in information systems, in monitoring risk, in varying degrees of attention and in advisory services directed towards areas of inequality where access is a crucial issue. Many organisations need to be shown the business case and the self-interest from engaging their employees, members and insurees. The NHS, for example, should be showing how to help their employees engage. Private sector organisations can help too by creating markets which capitalise on individuals' concern about their future health. They should be encouraged and not vilified.

A Cabinet member, the Secretary of State for Health, should ensure that action across Government is having its public health impact assessed and that co-ordinated action is tackling the wide-ranging objectives for the determinants of health. So, an objective about obesity in children must produce action in schools on the provision of food and knowledge. Government, in its arms-length bodies' review, must not only eliminate overlaps and ineffectiveness but also address the gaps the review identified as well as the provision of educational messages. Communication needs more marketing professionals to help send the right messages.

The report suggests principles to govern the Government's help to individuals making informed choices; to overcome the lack of information and confusion of messages, for example in food labelling. To check whether messages have been received, believed and understood. To ensure people take account of the wider costs of their behaviour. To help shift social norms, a legitimate activity for a Government when it has worked through and gained commitment for objectives for behaviour change. To find out what works at acceptable cost even those programmes which worsen inequalities in isolation, provided they are accompanied by programmes addressing the resulting inequalities. And to report on progress annually.

Strong, persuasive leadership will make the difference between success and failure. It is most likely to be effective in our society, nationally and locally by establishing aggressive goals, building widespread consensus, encouraging action by the self-interested as well as by the community conscious and driving through voluntary engagement.

It is good news that the Government has reacted with its review of arms-length bodies, consultation and the proposed White Paper. All are welcome but not enough to guarantee success. My report was designed to establish a checklist against which the Government's responses can be judged. But so can the responses of all those who have parts to play if we are to achieve the prize of full engagement.

Obesity and the Government's Responsibility for Diet

Professor Robert Pickard,
Director-General, British Nutrition Foundation

We learn from evolutionary studies that survival belongs neither to the strongest nor to the most intelligent but to those most responsive to change. In a very short space of time, we have created an alien environment for a free-thinking, free-moving caveman. We neither eat, move nor copulate when we want to. Our entire lives are regulated to meet the system requirements of the evolving supraorganism: humanity, bound together by microelectronics where the insect societies used pheromones. In social evolution, individuals relinquish their freedoms in return for an increased security of tenure on life. This is the unwritten contract between population and Government: compliance in return for protection. The first responsibility of Government is to protect the people.

It is generally agreed, amongst the spokespersons for the diet and heath community, that one quarter of the risk of developing cancer and one third of the risk of developing cardiovascular disease is related to the eating of a diet that is inappropriate to the needs of the individual, in terms of genotype and sex, age, activity levels, occupation, lifestyle and cultural behaviour. These illnesses account for some 60,000 deaths a year among the under-sixty-fives and many are preventable. In addition, the micronutrient status of children and young adults is highly variable and suspect: females are disadvantaged with respect to males, and intake levels of vitamins A, B_2 and D, folate, calcium, iron, magnesium, potassium and zinc all require careful investigation.

Obesity, the consequence of too much energy being consumed with respect to energy usage, is the highly visible sign of a much greater and more destabilising malaise: the social construction of a world that uncouples the ancestral equilibrium between diet, activity and health. Frequent movement is not just a means for energy dispersal, it is the default state for an optimised human machine: from the squeezing of veins to assist blood return to the heart to the alternating ballet of the six eye muscles that seizes when the eye is stationary.

Over the period, 1980-1998, only Samoa and Kuwait had higher annual increases in the prevalence of obesity than the United Kingdom. Socially disadvantaged women are twice as likely to become obese as their wealthier neighbours. With the accompanying increase in the early onset of Type II diabetes, the need for action has now become critical.

The requirement of Government is leadership. A UK-wide national policy on diet, activity and health should be established immediately, building on the examples set by the Welsh Assembly Government and the Food Standards Agency in Wales, and the Scottish Diet Action Plan. The Welsh Strategy, initiated in Food and Wellbeing and launched with all-party political support in February 2003, has made tremendous strides in its first year of operation. The key to its success is the will and the means to co-ordinate a total social response to what is a socially generated threat.

A co-ordinating centre should be established in the Cabinet Office or close to it, in terms of cross-cutting authority, and an individual should be charged with its championship. A whole-school food and activity policy should be established in every school and educational institute in the United Kingdom. The British Nutrition Foundation has

constructed a guide on this subject in conjunction with the Department for Education and Skills. The whole population should be educated in the relationship between diet, activity and health. This would involve public service broadcasting and a creative use of all the many disparate activities that are already under way. We can make much better use of the charities and programmes that are already battling in this arena. Above all, Government must identify and reward best practice and successful change.

With regard to industry, Government must encourage adaptation. Every business should have in place a whole-company food and activity policy that influences office design, working practices and meal provision. In such an environment, it should become unfashionable to use a mechanical lift to transport one's own body. Electronic labelling will be needed to support the limited nutritional information that can be placed on-pack. With a code that can be read in-store or at home, the necessary information can be delivered comprehensively in a language of choice, at a pre-selected level of educational experience, in a font that can be read by the elderly and customised for consumers with allergen concerns or specific medical requirements.

Since individuals tend to buy the same basic collection of goods each week, gathering the necessary information on the products would not be as arduous as it may seem at first sight. Food manufacturers need to ensure that the recommended portion sizes of high-energy foods can be easily fitted into a balanced diet. The Food Standards Agency has already indicated that products containing more than 20% all fats, 5% saturates, 10% added sugar or 0.5% sodium, by weight, should be eaten sparingly compared with other components of the diet. In addition, there is a great deal of potential for the development of novel foods and ingredients, such as resistant starches, that could reduce calorific intake from staple foods.

Only when citizens are fully educated by Government and adequately informed by industry can they be empowered to take responsibility for their own health and wellbeing. Government must also encourage and facilitate the leading of a healthy lifestyle. Individuals should eat five portions of plant material per day (especially stem, leaf and fruit) within a balanced and varied, lower-sodium, higher-unsaturated-fatty-acid diet.

Food, by definition, contains the nutrients necessary for growth and the maintenance of life. Whereas all foods are health-promoting, unless contaminated, all diets are not. The debate on healthy food should rotate around the ease with which a recommended serving can be fitted into a balanced diet. Even oxygen is poisonous to humans in high concentrations. Individuals should create opportunistic activity and balance energy input with energy output. In a young woman, 14 g of fat and 274 g of carrot will each generate 100 kcal of energy that will require 13 min of mountain biking or 91 min of sleeping to discharge.

Alcohol should be drunk in moderation; it is, after all, a substance produced by yeasts to reduce the biological competition. The huge absorbent area of the lungs makes the breathing of clean air, not just the avoidance of smoking, imperative for sustained health.

One problem with medicine is that it serves the individual and not necessarily the state: a paradox in protection. Sustaining and replicating genomes, irrespective of their biological suitability for independent survival, accumulates a debt to Natural Selection which used to be paid in infant mortality and now is paid in increasing healthcare costs. The sessile white rat population that we have subsequently established in the wealthier economies of the world may ultimately need a very different diet to sustain it compared with one recreated with an active ancestral caveman in mind.

In the case of obesity, prevention is far, far better than any attempt to cure. The economic and social costs of ignoring the impact of poor diet and inadequate activity on health is incalculable. Have we still not learnt the lesson that any man's death diminishes me, because I am involved in mankind or are we doomed to remain a herding animal that simply aspires to become social? The charge of nannyism is often levelled at Government in a cowardly fashion because it is always easier to do nothing than to make a stand. The extent to which the strong protect the weak is the measure of a true society. Understanding is strength and the well-informed should defend the ignorant. Who better than a nanny to stand between the weak and the world? A Government that abdicates its responsibility for education forfeits its right to rule. What passes for nannyism is simple humanity: but this is only the beginning.

The Food Industry's Response to Obesity

Gaynor Bussell
Nutrition Manager, Food and Drink Federation

The Food and Drink Industry has an annual output of £66 billion, accounting for 15% of the total manufacturing sector and employs 500,000 people, representing 13% of the UK manufacturing workforce and is the largest manufacturing sector in the UK. The Industry is represented by the Food and Drink Federation (FDF) and its members are food and drink manufacturing companies, large and small, and trade associations dealing with specific food and drink sectors

The FDF as part of the UK food and drink chain is committed to being part of the solution to issues on diet and health by forging partnerships in the food chain, providing a choice of foods from which consumers can choose a balanced diet, by ensuring good consumer information and by working with Government and other stakeholders. We are also working with the Office of Communications on advertising to children and the vending industry by bringing a commitment to wider choice, initiating healthy workplace programmes within the industry and reviewing the provision of larger portion sizes

We shall need to work together if we are to progress; not just the manufacturing sector, but the entire food and marketing chain. We shall also need to join up with Government, health professionals and educators to help individuals make better informed decisions about what to eat and how active to be.

The retailers, the hospitality and food service sector, the farmers and manufacturers joined together to respond to the Government's Food and Health Action Plan Problem Analysis. This joint response in June 2003 was a first and the beginning of a long list of similar actions. We intend to take this joined up route wherever possible, because we think it makes it easier for Government and others to deal with us if we have initially agreed our own positions.

Choice is important, not everyone wants a lower fat or sugar product and for some it is nutritionally not desirable (see below). But for the large numbers of people who wish to lose weight or control their weight, there is plenty of choice, and that choice is expanding. As the importance of ingredients such as plant sterols and stanols (for cholesterol lowering), omega 3 oils, pre- and probiotics become better known, industry will continue to innovate and to produce a wider range of functional foods.

Consumer information takes a number of forms, on the pack, from consumer help lines and from specific communications programmes. Industry is keen to ensure labelling is meaningful and objective, but we do not agree with "traffic lights" or profiling, as an individual food can not be deemed good or bad, only whole diets, assessed over several days can be deemed as good or bad. Many brand manufacturers and retail manufacturers voluntarily add extra information such as Salt Equivalents and full nutritional data per 100g as well as per portion .

The food industry is also keen to provide objective factual information such as Guideline Daily Amounts that are based on Government dietary goals. A particular drawback is the space on a label, especially if the information is to be readable and for this reason many manufacturers provide information in other formats, such as web-based or information leaflets.

There are several consumer information programmes produced by FDF eg *foodlink* – about food safety; *foodfitness* – about how to achieve a balanced diet and healthy lifestyle, and *foodfuture* – attempting to give objective information about Genetically Modified and other novel technologies. We use experts in their field to compile the information that goes into these schemes. These are supported by an extensive range of activities countrywide, organised by the food and drink industry.

We contribute to many consultations with the Department of Health, the Food Standards Agency, the Health Select Committee, the Medical Research Council and the National Institute for Clinical Excellence. We shall

continue to engage with Government when the White Paper on Public Health is published. Some of industry's nutrition and communication experts sit on various advisory panels to Government led initiatives such as *Food in Schools* that is trying to develop a "whole school approach to nutrition" and also a panel that implemented and evaluated the food and well being strategy in Wales.

Public health nutrition must be dealt with carefully. Not everyone requires reduced calories, for example there are many people who are malnourished, especially if they have had a spell in hospital. Very active people, the elderly and the very young cannot survive on a diet which is very bulky and devoid of some calorie dense foods. Calorie intake has already fallen dramatically. There is a danger that if calorie intake falls below 1,500, as in some young women, then micronutrients go short. Indeed we are already seeing some serious micronutrient shortages especially amongst children, the elderly and young women.

Deeming certain foods as bad, through nutrient profiling or by applying a red traffic light against them may lead to some people avoiding these foods, thus cutting down on the range of foods eaten which is a sure way to bring about micronutrient deficiencies. It may also escalate an already rapidly increasing problem of eating disorders, from full blown anorexia to bulaemia to a new and emerging disorder where individuals become obsessed with only eating so called "healthy food".

Industry is proposing a Government led, joint multi-media consumer information programme, providing consistent messages on food and health, agreed between Government and partners, as part of its commitment to inform and educate the public, and because we see information and education as an important step in enabling people to change their dietary habits for the better.

The companies in the food chain connect in a direct manner with just about every single person in the country. We take and amplify Government information to a degree never before achieved. The "Think!" campaign might serve as a useful model – industry may be willing to put in funding to run a similar high profile scheme through a number of media outlets. This could be linked to on-pack messages. Details will have to be agreed in discussion with Government. Consumers buy hundreds of millions of food products and services every day and it would be a gigantic step change in the level of communication if only a fraction of these carried health and lifestyle messages or even sign-posted where consumers could get information.

For its part, Government should implement a "Curry style" group comprising a wide range of people with the expertise and ability to develop and implement the forthcoming white paper on public health. It should ensure that pertinent and relevant research on obesity is carried out. Money may be needed to enable such research to take place. It should also ensure health professionals receive adequate training on diet and health. Surveillance is essential and a robust method is needed for evaluating dietary intake trends and increased physical activity levels that should be encouraged. It should also ensure schools allow syllabus time for physical activity and see that there is a whole school approach to diet and health that includes teaching cooking skills and generating enthusiasm for food preparation and diet.

Balanced lifestyle is the best response linked to greater personal accountability in a co-ordinated well thought out strategy; not kneejerk reactions or short term fixes. Individuals need empowering to make an appropriate healthy balanced choice and a long term education process is also vital, including a whole school approach. Society as a whole has to decide to what extent Government should intervene in the food and health debate. Whatever the decision, industry is ready and willing to play its part in delivering solutions.

In discussion the following points were made:

All six of the targets described in the White paper have been missed. Government departments, including the Food Standards Agency, have all failed to curb the tide of obesity set to swamp us all in fat and the impression has been created that no one is directly responsible for the problem or is prepared to do anything about it. There was no obesity during World War 2 when government ration books regulated the purchase from retail outlets of precise amounts of specified dietary components sufficient for an adequate diet. The unfortunate trend that started thirty years ago of closing down health clinics has not helped the maintenance of healthy lifestyles in the general population. The response of the food industry does not appear to extend beyond rather complicated relabelling "improvements". The introduction of an easy to use and understand "Trafffic Light" system, that had recently been unilaterally launched by one supermarket company in response to publicity surrounding the obesity pandemic, was roundly condemned out of hand. Could it be that where one goes others would feel obliged to follow? Since the hormone based wonder drug PYY3-36 does not work, marginal improvements could be achieved by a combination of fat tax, subsidies for fruit in schools, increased physical activity, and reduction in size of portions, but does this amount to an effective strategy to meet an overwhelming problem? The need for manufacturers to provide food that does not cause obesity appears to exceed their competence to manage alone, without the intervention, agreement and direction of a newly constituted committee (but not the existing Food Standards Agency?) located at No10 Downing Street, no less.

Materials and Minerals – the key building blocks for our future prosperity

Dr Nuna Staniaszek, Head of Communications, The Institute of Materials, Minerals and Mining

Materials and the minerals from which they are sourced underpin everything we do and need to survive and enjoy life: housing, roads, transport, communications and a whole range of modern consumer products are fundamental to our everyday lives, and depend on the availability of mineral based components. The economic value of minerals extraction in the UK amounts to some £120 billion per year, which is greater than the contribution from agriculture, forestry and fishing put together. Yet there is no doubt that materials and minerals are taken for granted by society as a whole, and few people have any awareness of how many mineral elements are needed to make an everyday product such as a mobile phone handset, or where they come from, or how they could be recycled.

New materials technology is also fundamental to pushing forward the frontiers in energy, healthcare, telecommunications, IT and security, to name but a few areas. The UK has a significant track record in materials innovation, and current developments in these areas provide huge opportunities for the future. For example, in recent years fuel cell technology has been heralded as a keystone of the future energy economy, potentially offering huge benefits to society and significant economic gain for the UK. Fuel cell technology promises to reduce CO_2 emissions through enhanced conversion efficiency and, in the longer term, to provide the means to implement the hydrogen economy. However, the scale of implementation of fuel cell technology depends critically on a number of materials-dominated factors – improved durability and lifetime performance, and reduced cost – these being the key to dominating future markets.

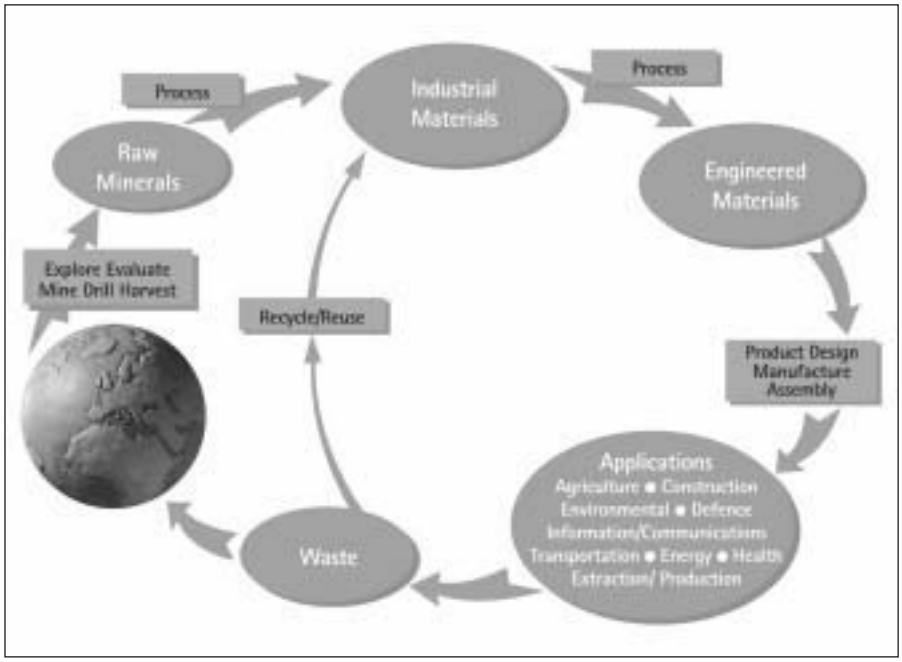
In healthcare, the drive to replace more complex tissues and organs in orthopaedics, dentistry, cardiology, urology, ophthalmology and wound repair, and to reduce the mortality and economic price resulting from implant failure, is fundamentally dependent on the development of new biomaterials and of techniques to monitor their behaviour in the body. Continuing miniaturisation in electronic devices, IT and communications technology makes increasing demands on "functional" materials – the silicon chip, light emitting materials, liquid crystal displays and magnetic materials. One of the keys to competitive advantage is the development of products with increased levels of functionality, and here "smart materials", those which form part of a system which can sense and respond to a changing environment, will play a critical role. In most sectors of business development, materials are fundamental to advancement and gaining advantage.

A global network for materials and minerals

Promoting the importance of materials and minerals, providing support and assistance to individuals and industry concerned with this technology, and fulfilling an educational role are key activities of the Institute of Materials, Minerals and Mining. The scope of this professional organisation encompasses the complete materials cycle, from minerals exploration and extraction, through characterisation, processing, forming, finishing and application, to product recycling and land re-use [see diagram]. Through its local and technical networks, the Institute provides support for the professional activities of its members across all of these sectors, whether in research, industry, business, academia or education. This network is not restricted to the UK – the organisation has a global outlook, with established overseas branches, and engages in collaborative activities with several sister societies in the USA, Far East and Australia. Cross fertilisation of ideas through a global network, overseas interactions and the exchange of information are all beneficial in providing enhanced services to members and increased opportunities for raising the profile of materials and minerals across the globe.

Advancement through knowledge transfer

Access to technical information and knowledge transfer are one of the keys to technological advancement, and these are core services provided by the Institute through information and library services, events,



publications and access to advice from materials experts. The Institute recognises that many companies, particularly SMEs, may not have in-house materials expertise. To provide this support, the Institute's Industrial Affiliate Scheme is a valued service to industry, giving troubleshooting advice and help to companies in the selection of materials and processes for more profitable and competitive products. One of its latest initiatives, supported by the DTI, is a scheme to assist start-up and university spin-out companies in the materials sector.

The organisation works closely with Government and EC departments, particularly in relation to the delivery of new technology to industry. The Institute and its members have been continuously involved in the development of reports in the Materials Foresight exercise, looking at the future materials priorities to enhance wealth creation and the quality of life. The Institute's 16 technical divisions have also been actively developing technology roadmaps in a number of different materials sectors. These have served to reinforce the importance of the role of materials, and the need for this to be recognised to ensure success and competitive advantage in the 21st century.

Inspiring the younger generation

The Institute is also addressing the issue of attracting young people into the profession to ensure a supply of materials and minerals scientists, technologists and engineers for the future. Advancement and innovation can be hampered by the lack of suitably qualified people, and there are many examples of organisations who cannot find individuals with the required expertise in materials. Conversely, those who have graduated with good degrees in materials or mining subjects are open to opportunities in a wide range of careers, not only in minerals and mining operations and materials development and research, but in the business, environmental, consultancy, planning and financial sectors. Historically the study of materials science at university has appealed to young women as well as men, so there are plenty of examples of women who have also achieved satisfying and challenging careers following degrees in materials.

Within its staff, the Institute has an active education team which provides support to teachers at both primary and secondary level, and visits schools around the country to enthuse young people about the subject of materials and minerals, and help them appreciate its relevance to their National Curriculum studies. The Institute has recognised that it is only by reaching young people at a relatively early age that the awareness of materials and minerals as a career option can be developed. During the past year, the Institute's staff team was in contact with nearly 5,000 children in schools all over the UK. A major new initiative launched by the Institute to further boost the profile of materials in schools is a proposed materials AS and A level (or equivalent qualification). This has received substantial endorsement from Institute members, teachers, industry and financial sponsors. A project of this type obviously requires significant investment, and so far financial support is being provided by university course providers, and by individual members of the Institute, as well as through part of the Materials in Schools programme supported by the Gatsby Educational Trust.

Materials are playing an increasingly important role in our everyday lives and our society. Understanding and acknowledging that role, and incorporating advanced materials development in our manufacturing and innovation strategies, is one of the keys to providing wealth creation and commercial success in the future. The Institute is determined to play an increasingly important role in the broader understanding of materials and minerals use, and to support both its members and the community as a whole with the information and networks appropriate to meeting this need.

The Institute of Materials, Minerals and Mining is one of the UK's major engineering institutions, established by Royal Charter in 2002. It was created from the merger of the former Institute of Materials and Institution of Mining and Metallurgy, both of which had roots going back to the 19th century. Based in London, the Institute has over 20,000 members, with over a quarter of its membership outside the UK. Full details about the Institute and its activities are available on the Institute website at **www.iom3.org**

VISIONS OF SCIENCE

Science Beyond Words

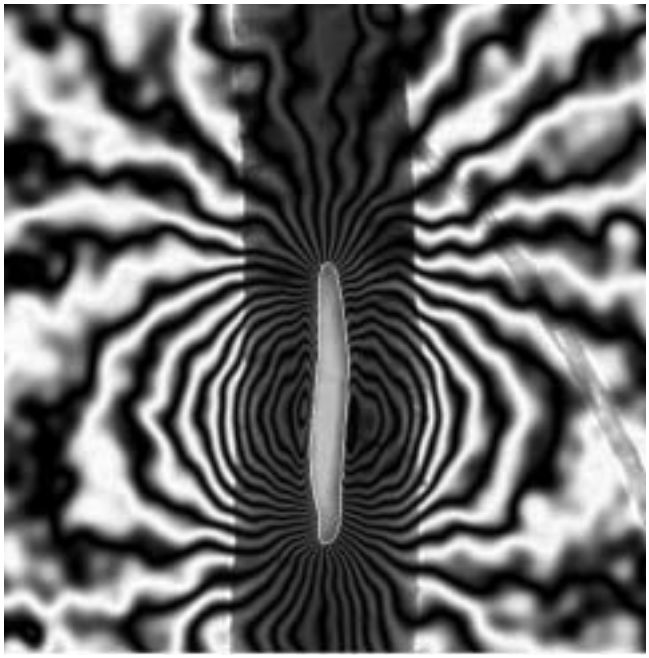
Rarely are nanotechnology, medicine, natural history, botany and pharmacology discussed in one breath, let alone described as "startling, amazing and beautiful". However, this is exactly what the winning images in the 2004 Novartis and The Daily Telegraph Visions of Science Photographic Awards can achieve for science.

With skill and creativity, winning photographers and scientists in the Visions of Science Photographic Awards have delivered an extraordinary set of images that cover a wide range of scientific disciplines. What is admirable is the way that the images show us what is often complex science in arresting and memorable ways. And a comparison of the intriguing images with their captions shows us that there are many scientific wonders that words cannot capture nearly as well as pictures.

Drummond Paris, CEO of Novartis Pharmaceuticals UK says, "It is difficult to say whether it is the extraordinary visual impact of the winning images that impresses me most this year or the breadth and depth of science portrayed, but what is clear is that each image is truly a Vision of Science."

What is inspiring about these images is that they communicate a vast amount of science in an appealing way, and this is what Visions of Science is all about. We learn from words, but we certainly learn from pictures too. This set of winning images from the Visions of Science Awards prompts us to stretch our perception of science and shows us that there are some scientific concepts that words cannot capture.

The Awards are run by Novartis as a means of encouraging interest in science and more debate about scientific issues. Entries are encouraged in a number of different



On this page, Dr Rafal Dunin-Borkowski, from the Department of Materials Science, at the University of Cambridge shows us how iron crystals are used as a catalyst in the process of growing carbon nanotubes and we are given a glimpse into the creation of these so called "nanocomposite materials".

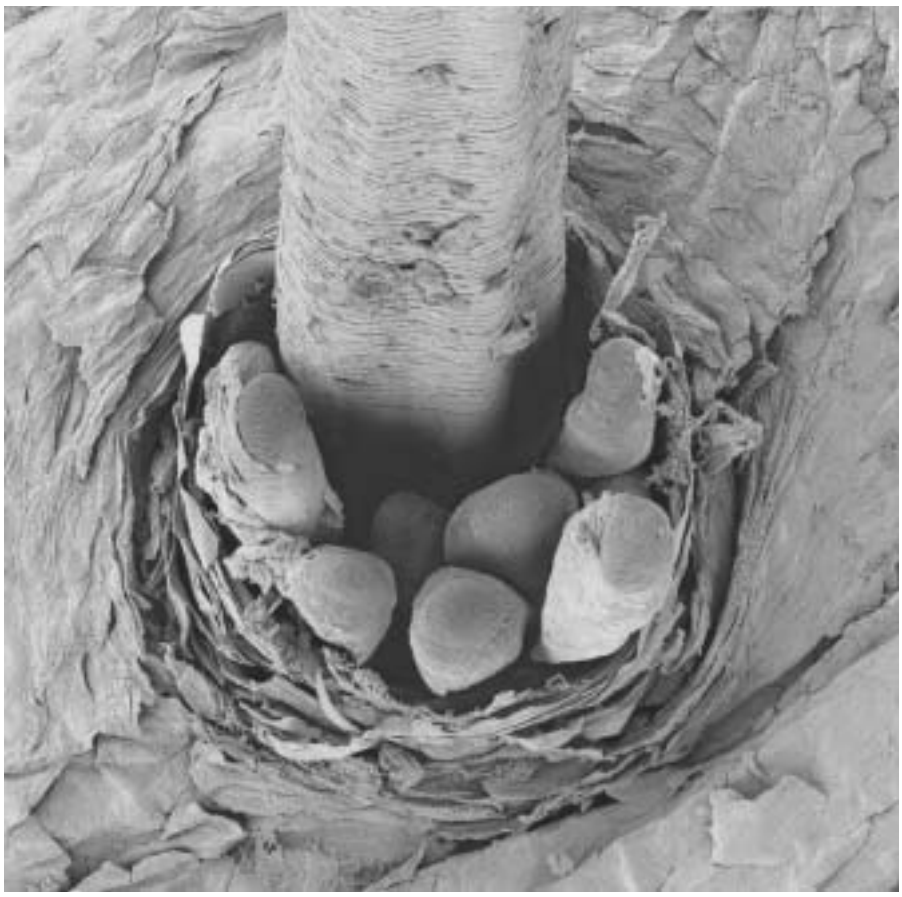
In Robert Anderson's image, we see vortex motion. The shape of all vortices is the same whether found in water going down a plug hole or at the heart of a destructive tornado.

categories, including Close up, Art, People and Action.

Every year, a touring exhibition of the winning images is produced and thousands of people are able to see these images in science and arts venues around the country. Once again, the exhibition will begin at the Science Museum, London from 6 October-17 November. The exhibition also visits the Glasgow Science Centre, W5 science centre in Belfast, Thinktank in Birmingham and the Life Science Centre in Newcastle.

The Awards are run each year by Novartis, with The Daily Telegraph as the key media partner. Prize money and advice comes from the Science Photo Library.

To many, these intriguing images are stunning in their own right, but when viewed with an insight into what they are showing, we see the full power of photography at work.



Stephen Gschmeissner's scanning electron microscope image of eyelash mites gives us a view into the unseen world – albeit not one that we may want to acknowledge! It shows a group of the tiny parasites that live on our eyelash hair follicles, feeding on dead skin cells.

Felicia Webb's powerful image portraying obesity, taken from her portfolio, reminds us of the growing issue of obesity amongst young people.

Every year, Novartis organises a reception within the House of Commons, giving Members of Parliament a chance to see the images. At last year's reception, Dr Brian Iddon won a digital camera for a school within his constituency. Details of the 2005 reception will follow.

This year, in recognition of the important role that imagery plays in medicine, Novartis has produced an exclusive portfolio of Visions of Science images, with a focus on health. This beautifully produced book is available FREE to Members of Parliament who reply to Visions of Science Portfolio, Novartis Pharmaceuticals UK Ltd, Frimley Business Park, Frimley, Camberley, Surrey, GU16 7SR.

To find out more about the Awards and the touring exhibition visit **www.visions-of-science.co.uk**

Third biotech generation targets industrial growth and sustainability

As the 21st century progresses the third biotechnology generation – industrial biotechnology – is set to establish itself at the core of a competitive and sustainable UK economy. Here, Dr Martin Anthony of the Department of Trade and Industry's Bioscience Unit, outlines the main drivers and on-going progress being made towards the development of a European and UK policy framework.

Just as the pharmaceutical industry and agriculture have been transformed by biotechnology, observers are predicting even greater impact across other industrial sectors. By 2010, growing demand for novel bio-based tools and products may result in an estimated global output from industrial biotechnology of €1,500 billion (outpacing pharma-biotech output by €680 billion) and could account for one-fifth of the world's chemical output by value[1,2].

Industrial biotechnology uses living cells like moulds, yeasts or bacteria, as well as enzymes to improve manufacturing and product quality. There is growing evidence, at both international and domestic levels, that these enabling technologies have significant performance benefits compared to conventional options – including increased conversion efficiency, product purity, lowered energy consumption and reduced waste generation – and that their application provides new solutions to old industrial problems that are cleaner, less polluting and less energy intensive.

Increasingly, policy developers (OECD and EU) are recognising that industrial applications of biotechnology can deliver strategic solutions to the twin challenges of competitiveness and sustainability at every stage of the manufacturing process from raw materials through to end-of-pipe and clean-up (see inside front cover).

Industrial biotech – the international perspective

Policy decisions within the major industrial economies are moving towards greater adoption of industrial biotechnology. Japan, for example, is seeking to derive 30 per cent of its chemical production from the bio route while the US has already adopted a "bio-energy initiative" to accelerate the development of biotechnologies. The US is, however, more cautious over in-process applications and American commentators have suggested that Europe may well be more farsighted here. Ambitious environmental targets within Europe are also providing added impetus, encouraging further innovation and adoption in this area.

European developments

Europe is a major player in the world's industrial biotech sector boasting 1,500 new biotech companies based on life sciences R&D, and has a 70 per cent share of the world enzyme industry with major developers and adopters in key industries such as the chemicals sector. Over the last three years there has been increased public and private sector investment and growth in the number of national support mechanisms. Commentators have, however, pointed to the need for a "European industrial biotechnology initiative" to build sufficient critical mass to face the challenges ahead. Included here is the need to improve the co-ordination of research and the fiscal and regulatory environments that would promote the uptake of industrial biotechnologies across different sectors.

The UK is helping lead developments within Europe to improve investment, partnering, and promotion of industrial biotechnology. Increasingly, Europe is recognising the significant potential for industrial biotechnology to contribute to the Lisbon, Barcelona and Gothenburg objectives for promoting economic growth and employment. For example, the European Commission's recently published *Environmental Technology Action Plan* stresses the importance of industrial biotechnologies for the sustainable development of our society, and it may well feature in the next EU R&D Framework Programme (FP7).

EuropaBio (the European Association for Bioindustries[3]) together with trade bodies for sectors such as chemicals, paper and pulp and textiles recommended that the EU form a strategic alliance to define a European approach for industrial biotechnology and establish a stakeholder-led European Technology Platform.

In response to this vision July 2004 saw the EC announce[4] the setting up of an industry led Technology Platform on sustainable chemistry bringing together leading chemical industries with the new emerging biotechnology sector. This new Technology Platform is an initiative by CEFIC, the European Chemical Industry Council, and EuropaBio. It is a multi-stakeholder forum and is designed to develop a European strategic research agenda and carry out joint research projects. Sitting below this overarching platform is a technology sub-platform or "pillar" devoted to industrial biotechnology. Over the coming months the respective stakeholder communities involved will be developing a detailed vision and action plan for industrial biotechnology across Europe.

Also playing to the industrial biotechnology agenda is the recently launched European Plant Genomics and Biotechnology Platform[5] whose overall policy objective includes the move towards a zero waste, emission neutral bio-based economy where biomaterials such as fine chemicals and pharmaceuticals will be produced from renewable, plant based materials, reducing greenhouse emissions and waste.

UK developments

To inform deliberations on future UK policy direction and to help guide strategic UK investment, including support under the Department of Trade and Industry's Technology Programme, the Bioscience Unit established an Industrial

Biotechnology Task Force (IBTF) in December 2003 to develop a 2015 vision. The focus is on bio-based industrial tools and products; acknowledging, but not duplicating DTI/DEFRA work on non-food crops. Its aim is to scope the technical and commercial opportunities, identify barriers to success and advise on measures to promote greater collaboration and growth. A report, setting out a 2015 vision for UK industrial biotechnology with suggested actions, will be published in early December 2004.

The UK – Europe's bioscience leader

The UK is an ideal place for business to reap the benefits of industrial biotechnology. Accounting for just under half of all European biotechnology companies, the UK bioscience sector is the largest in Europe and placed second globally behind the USA.

Supportive economic and political conditions, coupled with a world-class science base and a well-established industrial supply base, provide an enviable platform for industrial biotechnology R&D and commercialisation.

Relevant emerging science areas where the UK is thought to be particularly strong include extremophiles, high-throughput screening, isotopes for industrial applications (potentially five years ahead of the US), microbial solutions, plant-based solutions, physics-based biotechnology and bioremediation (particularly metal remediation and nuclear waste treatment).

The UK also has internationally recognised centres of expertise, such as the National Non-Food Crop Centre (www.nnfcc.co.uk), and technology transfer mechanisms typified by three relevant Faraday Partnerships[6] – including the UK Centre of Excellence for Biocatalysis (www.pro-bio-faraday.com) – Biotechnology Exploitation Platforms[7] to exploit publicly funded bioscience research in bioremediation [Beacon Bio BEP] and bio-based environmental technologies [EnVision BEP], and the Centre for Novel Agricultural Products (www.cnap.org.uk) exploring the potential of industrial products from plants.

Strong links between research and the domestic supplier base and export active companies of over 100 specialist companies[8], have contributed to the strong penetration of industrial biotechnology with practical inroads made in biomaterials, enzyme production, biosensors, biocleaning, surface coating, product authentication, waste management and remediation technology arenas.

However, many of these are SMEs and lack the critical mass to expand and take full advantage of the opportunities presented without a framework of support.

UK Government Actions

Regarded by other EU countries as an exemplar, UK Government actions have stimulated this sector for several years. The DTI's Bioscience Unit has, for example, raised awareness of the benefits of industrial biotechnology and encouraged commercial application of novel biotechnologies since 1994 through its Biotechnology Means Business and BIO-WISE (www.dti.gov.uk/biowise) programmes while collaborative R&D has been supported through LINK programmes.

Independent research has indicated that UK companies across a wide range of industrial sectors made savings in excess of £350 million between 1995 and 2001 as a result of incorporating industrial biotechnology into their business model, many of those received support directly from BIO-WISE. In particular, the BIO-WISE "Demonstrator projects", funded by the DTI, formed an important component of the programme, helping to disseminate the benefits of biotechnology in real working industrial settings.

Current commercially viable Demonstrator Projects include the recycling of metals from scrap computers and mobile phones, use of glowing bacteria to test contaminated land, replacing toxic coatings with seaweed extract to prevent metal corrosion and handheld biosensors that detect pathogens in sewage and ammonia in water.

Passing on best practice in this way has encouraged the continued expansion of industrial biotechnology in the UK and is helping our manufacturing sectors sustainably reduce cost, boost product quality, and cost-effectively comply with environmental legislation (see text box).

For further information visit www.dti.gov.uk/biowise.

BIO-WISE Demonstrator Projects have helped industry comply with existing environmental legislation:

A demonstration of Biopolymer Conversion coatings for the prevention of corrosion *(End of Vehicle Life Directive)*

Bio-electrochemical technology for the recovery of precious metals from electronic scrap metal *(Restriction of Hazardous Substances in Electrical and Electronic Equipment (ROHS) Directive and Waste Electrical and Electronic Equipment (WEEE) Directive)*

Field testing and evaluation of Rapid On-site Toxicity Audit System (ROTAS™) *(Landfill Directive)*

Sensor technology for rapid environmental ammonia monitoring (STREAM) *(Water Framework Directive)*

1 *EU Life Sciences and Biotechnology:'A Strategy for Europe' (2002).*
2 *Uptake of White Biotechnology by the Chemical Industry (2001), McKinsey analysis.*
3 *Relevant EuropaBio position papers and profiles on industrial biotechnology can be found at: http://www.europabio.org*
4 *For futher details see Europabio's press release http://www.europabio.org/PRWB.htm.*
5 *For futher information see Europabio's press release http://www.europabio.org/PRGB.htm.*
6 *Faraday Partnerships are alliances of organisations and institutions dedicated to the improvement of the competitiveness of UK Industry through the research, development, transfer and exploitation of new and improved science and technology.*
7 *Biotechnology Exploitation Platforms are consortia that aim to create new opportunities for the exploitation of the intellectual property arising from publicly funded bioscience research in the UK through the capture and protection of IP, and the creation of new and viable IP portfolios.*
8 *Companies whose core business (i.e. first or secondary product/service) is industrial and environmental biotechnology according to the BIO-WISE Suppliers Survey and database.*

The ECSITE-UK Science Centre Network

John Durant
Chief Executive, At-Bristol
Chairman, ECSITE-UK

The Government's new Strategic Framework for Science aims to make the UK "the most attractive location in the world for science and innovation".[1] Achieving this goal will involve the combined efforts of the country's scientists, innovators and policy-makers; but it will also require the strong support of the country's science educators and communicators.

Fortunately, it is not just our scientific community that already punches above its weight internationally; so, too, does our science communication community in the broadest sense. Across Europe and far beyond, the UK is widely – and rightly – seen as a highly active and innovative centre of informal science communication. Science broadcasting, lecturing and writing all thrive here, as do a host of other initiatives – from science fairs and festivals through science & art initiatives of all kinds to science on the buses and science on the underground.

A key asset for science communication today is the country's national network of science centres and museums. Thirty years ago there was a mere handful of specialist science museums, most dating from the 19th century. In the 1980s several new hands-on science centres were founded; and in the 1990s, the National Lottery fuelled the construction of 14 major new regional science centres, radically enlarging the UK's science centre resource. Today the UK has the largest and strongest science centre network in Europe. Four-fifths of the population lives within one hour's drive of at least one science centre. The 80 members of ECSITE-UK, our national network organisation, together welcome more than 11 million visitors annually through their doors.[2]

Why does all this matter? Well, for one thing the science centres are important economic contributors in their own right – for example, through urban and rural regeneration; and of course through leisure and tourism. But even more importantly, the science centres have a vitally important part to play in helping to strengthen the UK science base. ECSITE-UK members are ideally placed to help deliver two key objectives within the Strategic Framework for Science: creating a more responsive supply of science, technology, engineering and mathematics skills to the economy; and building public confidence in and engagement with science and technology.

So far as skills supply is concerned, the most important thing to say is that the UK's science centres represent a £500 million capital investment in interactive, enquiry-based learning environments that are demonstrably motivating for young people of all abilities and backgrounds. The fact that these environments are *not* like school is undoubtedly an important factor in their success. Science centres don't compete with schools; rather, they offer complementary experiences and opportunities in support of better overall learning outcomes.

Individual science centres' programmes meet the needs of local and regional schools and communities – typically, a quarter to a third of science centres' visitors are pre-booked educational groups. Additionally, programmes devised and managed by ECSITE-UK have national reach. For example, ECSITE-UK's *sciZmic* programme links school-based science clubs to 20 local science centres/museums, providing special events, a website and resource pack, and direct links to the materials and support available from, eg, Young Engineers, Salters' Chemistry Clubs and RSPB Wildlife Explorers. ECSITE-UK's *Meet the Scientist* programme marries research scientists to science-communication mentors, to develop *Meet the Scientist* events for families and school groups in six science centres distributed nationally.

The new National Network of Science Learning Centres (NNSLC) is creating further opportunities for partnership. NNSLC is a national initiative co-funded by the Department of Education & Skills and the Wellcome Trust. It is designed to support science teaching through a regional programme of innovative continuing professional development courses. Science centres are involved in several of the new Regional Science Learning Centres;

indeed, Science Learning Centre South West is being led by At-Bristol in partnership with the University of Bristol and the University of Plymouth. Starting in January 2005, we shall be offering CPD courses across the South West that exploit to the full the strengths of hands-on and experiential learning in helping school teachers, learning assistants and lab technicians to achieve better results in the classroom.

If the UK is indeed to become the most attractive location in the world for science and innovation, then we shall have to strengthen the relationship between science and society at many different levels. All agree that more and better dialogue between scientists and the wider public is a vital ingredient in building public confidence in science. What is not yet so widely recognised, however, is that science centres are ready-made hubs in the community for such dialogue. They are well-dispersed, highly visible and readily accessible; they are centres of excellence in popular science communication; and their independent charitable status gives them a high degree of credibility with the public.

Our sector is already involved in public engagement activities of many different kinds. For example, as long ago as 1994 the Science Museum London organised the UK's first national consensus conference on plant biotechnology; and today, the Science Museum's recently opened Dana Centre organises a wide variety of deliberative programmes on science and society issues. Similarly, At-Bristol has hosted deliberative debates on topical scientific issues in collaboration with the Food Standards Agency and the Human Genetics Commission; and we have recently been contracted to deliver a multi-site public engagement programme as part of a European "Network of Excellence" on biodiversity in Europe.

The experience of the innovative *GM Nation?* consultation in 2003 has led to calls for more "upstream" public engagement on key science and society issues in the future.[3] To be effective, it is suggested, public engagement should start much earlier at a point in the innovation cycle where options are not firmly fixed and innovators can genuinely learn from and respond to emerging public priorities and concerns. We should be using our science centres as regional forums for upstream engagement of this kind. An upstream *Nano Nation?* initiative, for example, might usefully feature co-ordinated dialogue events in science centres throughout the country, with opportunities for local exchange, exchange between regions and regular feedback to policy-makers. We urgently need to get better at proactive engagement activities of this sort if we are not to have important areas of science-based innovation mired in decades-long confrontation and dispute.

I make no apology for the fact that my vision of the role of science centres nationally is very upbeat. But at the same time it would be foolish of me to pretend that there are not real challenges ahead. Our sector is not yet reaching all parts of the community: geography is still a barrier to access in many parts of the country (the solution here, in my view, is not the creation of many more centres but rather more and more effective outreach from existing centres); and a great deal of work needs to be done to remove other (eg economic) barriers to access. Science centres are independent institutions that depend upon admission income; but we need to find economically viable ways of making it possible for people on lower incomes to visit us regularly.

This leads me to the biggest of all the challenges we face, which is the quest for long-term financial sustainability. The closure of The Big Idea in Irvine, Scotland earlier this year and the recent announcement of the (hopefully temporary) closure of The Earth Centre in Doncaster are proof enough, if proof is needed, that many science centres around the country are struggling financially. At root, this is because there never was a coherent national plan for long term support of science centres from the public sector. Around the world, science centres thrive best on a mix of earned income, fundraising and public sector support. UK science centres are highly entrepreneurial – on average, we earn a significantly higher proportion of our operating costs than do our continental European partners – but our educational and public engagement activities cannot realistically meet all of their costs at the "point of sale".

Techniquest in Cardiff enjoys the support of the Welsh Assembly. Earlier this year two Departments of Government in Westminster offered a limited amount of financial support to five of the English Millennium science centres only through to March 2006; and over the summer, the Scottish Executive announced a (distinctly more generous) package of revenue support for the four surviving Scottish science centres over a two year period. As I write, parallel discussions are under way between W5, the Millennium science centre in Belfast, and the Northern Ireland Office. It is vital that revenue support of this kind is now extended – across the entire sector, and beyond 2006. Also, it is important that we do not stumble into a "two-tier" system, with one (higher) level of funding for science centres working under the devolved administrations in Scotland, Wales and Northern Ireland and another (much lower) level of funding for those working in England.

If the right sort of partnership can be secured over the coming months, I have absolutely no doubt that the UK's science centres will play a full and important part in delivering the national strategy for science and innovation.

[1] "Science & innovation investment framework, 2004-2014, HM Treasury, July, p. 1.
[2] For further details, see: www.ecsite-uk.net
[3] See for example, James Wilsdon & Rebecca Willis,"See-through Science. Why public engagement needs to move upstream", Demos, London, 2004.

Einstein Year is coming!

Dianne Stilwell
PR and Public Awareness Manager, The Institute of Physics

"When a man sits with a pretty girl for an hour, it seems like a minute. But let him sit on a hot stove for a minute – and it's longer than any hour. That's relativity."

When Albert Einstein came up with this quote nearly a century ago he probably never thought it would appear on a greetings card – nor that that card would provide the inspiration for an unlikely alliance between London rap artist, DJ Vader, and the Institute of Physics. The Institute used Vader's track "Einstein – not enough time" to announce to the media that Einstein Year is coming in 2005.

2005 has been designated by the United Nations as International Year of Physics, marking 100 years since Einstein published papers on three of his most important discoveries – Brownian motion, the photoelectric effect and the theory of special relativity (leading to the iconic equation $e = mc^2$).

The Institute of Physics in the UK and Ireland is celebrating this centenary as Einstein Year and is using the anniversary to raise the profile of physics in a bid to attract desperately needed students to the subject and make the wider public aware of the ways in which physics touches and improves our everyday lives.

Caitlin Watson, Einstein Year co-ordinator, is constantly looking for ways to take physics to new audiences during the Year. She says that the track by DJ Vader will help the Institute take the subject to new areas and to help make the topic more relevant for young people.

Nationally, the Institute plans some big projects. Physics will be travelling the country with three "Lab in a Lorry" vehicles. Provided by the Schlumberger Foundation, the lorries will tour schools and other public venues with a cargo of real interactive physics experiments and enthusiastic physicists. More hands-on physics will be available through a major new travelling exhibition funded by PPARC and EPSRC and will be installed in museums and galleries that do not normally host science exhibits.

One of the British Association for the Advancement of Science"s contributions to the Year is "**UNI*verse***," a poetry competition inspired by physics, which will culminate during next year's National Science Week in March – which coincidently encompasses Einstein's birthday on March 14 – another date that the Institute is determined to mark in a big way.

"We are currently working with a major national company to hold an Einstein birthday party for 400 children at a local football ground" says Caitlin, "There will be physics party tricks and games – all designed to make physics approachable and not scary. We'd like to replicate this idea with other companies around the country, Einstein Year provides an ideal opportunity for businesses in the UK to be more proactive – engaging and enthusing young people in the subject.

"As well as sponsoring high profile national activities there will be opportunities to provide community-based activities such as open days, talks, staff competitions and link-ups with schools – local events are key; without them there will be no Einstein Year. And the more events there are, the greater the number of people who will be inspired."

Parliamentarians haven't been forgotten; the Institute is working with POST (the Parliamentary Office of Science and Technology) to arrange Parliamentary exhibitions during the Year. The Einstein Year website (www.einsteinyear.org) will have details of all activities happening throughout the Year, both local and national. Check it regularly for events being held in your constituency and be inspired by Einstein and physics in 2005.

DJ Vader with the inspiration for his "Einstein rap"

POSTCARD FROM MALAWI

Dr Desmond Turner MP

Members of the Science and Technology Select Committee paid a brief visit to Malawi in June, an unusual sort of destination for a "works outing" of this committee, but it was in the context of our investigation into the use of science in UK international development policy.

Malawi is a relatively small and beautiful African country but is the 13th poorest country in the world and the UK input to the country through DFID is vitally important, an annual spend of £56 million out of a total of £220 million of external aid that Malawi receives every year. The DFID programme is centred on health and agriculture.

We looked at both of these areas, in which scientific support is both crucial and problematic. The need for appropriate levels of technology and support was vividly illustrated by the major health problems of the country which are malaria and HIV/AIDS. Both need basic science to underpin health service provision and both were seriously impeded by the shortage of scientific capacity, both in equipment and human resources.

A visit to the central hospital in the capital Lilongwe showed up the problems. It is probably the largest hospital in the country and was swamped with patients, nearly all of whom were suffering from infections associated with AIDS. Beds were jam packed even on the verandahs which were never intended to be used as wards and there was only one nurse to care for every eighty patients. The pathology labs were extremely basic and starved of essential materials. Only the most basic laboratory investigations were possible and only then if the reagents were available.

Within the grounds was the first centre for the new programme of anti retroviral (ARV) treatment. It is one of only three such centres in the country and they had to train staff to carry out AIDS testing before the programme could be extended. Upwards of 2 million people are HIV+ in Malawi and the first phase of the ARV programme can only support 15-20,000. Fifty centres are planned which shows the scale of the challenge in capacity building that is involved.

The capacity issue ran through everything that we saw in health, exacerbated by a drain of trained staff to richer countries, mainly the UK because of the extremely low salaries paid in Malawi.

Those of us following agricultural issues had the pleasure of being accompanied by the real Harry Potter – Dr Harry Potter in charge of the DFID agriculture programme for Malawi. Malawi has only one rainy season a year, whereas other countries closer to the equator enjoy two. There is normally a degree of famine during the dry season as the crop is not sufficient to last until the next harvest. The pattern of agriculture involves traditional methods on very small plots and pest control is inadequate. Losses in storage to pests accentuate the problem and farmers have been reluctant to adopt simple low-tech storage solutions that can dramatically reduce the losses in storage. There is very little applied research into Malawi's agricultural problems and reluctance on the part of farmers to adopt the results of the work that has been done. Food shortages and poor diet combine with the prevalence of malaria and HIV/AIDS to make health problems worse.

We met with the Malawi National Commission for Science and Technology who told us that they had a strategy for science and technology research and Malawian development. Sadly they had no money to carry it out so it remains a paper strategy.

We visited a higher education institute, the Blantyre Polytechnic, where once again the deficiencies in capacity were apparent, whether it was the ancient, outdated laboratories or the lack of PhDs on the staff. Despite these deficiencies thanks to the British Council's Higher Education Links programme with Strathclyde University there was some highly valuable work going on, a striking example of which was a study into the identification and means of elimination of disease-causing protozoan organisms from drinking water supplies.

It was quite clear that scientific research has a vital part to play in a country such as Malawi, not necessarily the sort of ground-breaking fundamental science that wins Nobel prizes, but practical applied research to solve serious problems on the ground. We all felt that the UK through DFID could make an enormous contribution through the appliance of science in its work in Malawi.

Science and the 10 Year Strategy

"Links Day has made a positive contribution over many years to maintaining a dialogue between the scientific and engineering community and Parliament."
The Prime Minister

The Royal Society of Chemistry's annual Parliamentary Links Day, which has long been the largest scientific event of its kind held at the Houses of Parliament, traditionally gives MPs and Peers the opportunity to hear briefings on the current state of scientific research, on general scientific issues and to meet scientists from throughout the UK. Links Day was co-hosted this year on the usual bi-partisan basis by **Dr Brian Iddon MP** and **Dr Andrew Murrison MP**.

This year's event on 22nd June was not only the biggest yet held in the House – it was standing-room only from the moment it began as the Attlee Suite in Portcullis House was filled to capacity – but this year it offered an unprecedented interaction between Government, Parliament and the scientific community at the very highest level.

The **Prime Minister** himself contributed to this year's event as did the **Rt Hon Baroness Amos,** Leader of the House of Lords, **Sir David King,** the Government's Chief Scientific Adviser, **Dr Ian Gibson MP**, Chair of the Commons S&T Select Committee, the Science Minister **Lord Sainsbury** and many other leading figures from the major science and engineering organisations.

The Government's impending Comprehensive Spending Review – which has since produced a significant boost for science – formed a very timely backdrop for this year's Parliamentary Links Day whose general theme was The 10 Year Framework Strategy for Investment in Science.

Opening the morning session **Dr Brian Iddon MP** praised Links Day for its pioneering role and welcomed the involvement of all the societies taking part.
The Rt Hon Baroness Amos gave the Keynote Address, and spoke of the forthcoming Spending Review

"In an increasingly competitive global economy, it is essential that Britain invests in the science and skills that are needed to compete in high value added, high tech, science-driven products and services… We cannot achieve our ambitions without partnership with the scientific community and our co-funders of the science base such as business and charities. I would like to take this opportunity to thank the Royal Society of Chemistry, Dr Brian Iddon MP, Dr Andrew Murrison MP and all those who have contributed to ensuring the success of this event."
The Chancellor of the Exchequer

"I applaud the fact that the science and engineering community has joined together for this year's Links Day to explain to Members of Parliament the enormous range of expertise that our scientific and engineering community embodies, and how this can best be used in the future. I am glad to support Parliamentary Links Day and I congratulate the Society on its continuing efforts to bring science into Parliament."
The Leader of HM Opposition

and the investment strategy the Government was following.

Short presentations on different aspects of the 10 Year Strategy were given by **Dr Julia King** of the Institute of Physics, **Lord Broers,** President of the Royal Academy of Engineering, **Dr Peter Cotgreave,** Director of Save British Science, **Professor Julia Goodfellow** on behalf of the Institute of Biology and **Dr Simon Campbell,** President-elect of the Royal Society of Chemistry.

Dr Ian Gibson MP spoke about the active work of the Commons Science & Technology Select Committee, as did **Lord Winston** from the perspective of the Lords Select Committee.

At this point, by pre-recorded video link the **Rt Hon Tony Blair MP** addressed Links Day. In the course of his remarks he outlined the Government's commitment to making Britain a world-class centre for scientific research and excellence and praised the Society for organising an event as worthwhile as Links Day.

He was followed by **Sir David King FRS,** the Government's Chief Scientific Adviser, who spoke authoritatively about the role and scope of UK research and its impact on the wider world as well as fielding questions from the audience. Winding up the morning session **Dr Andrew Murrison MP** praised all the contributions and said it was more vital than ever that Parliament and the science and engineering community maintain a close dialogue with each other.

Teacher of the Year Awards

Lord Sainsbury, Minister for Science, speaking at the Links Day luncheon hosted by

Lord Lewis of Newnham, outlined the Government's commitment to science education and confirmed the Government's readiness to work with all the scientific bodies represented at Links Day to improve the science curriculum and strengthen the science base.

Dr David Giachardi, the Society's Chief Executive, outlined the Society's role in Parliament and with **Sir Harry Kroto,** the Society's President, to hand **Lord Sainsbury** then presented a series of awards to Science Teachers of the Year drawn from the three major scientific societies for physics, biology and chemistry as well as special awards to the first ever holders of the Westminster Fellowship schemes organised by the Royal Society of Chemistry and the Institute of Physics in conjunction with the Parliamentary Office of Science and Technology.

"It is all the more important that Members of Parliament should be able to benefit from non-partisan assistance of the kind offered by professional scientific bodies like the Royal Society of Chemistry with its proven commitment to the public interest."
Rt Hon Speaker Martin MP

The State of the Nation 2004

A personal opinion by Robert Freer

Every year the Engineering Committee of the Institution of Civil Engineers makes a technical assessment of the condition of the national infrastructure (such as the roads, railways and water supply) and prepares a report, called the State of the Nation, that describes the present condition of the various national utilities and the progress that has been made in improving them since the previous report.

The report is presented to MPs, peers and leaders of local authorities and industry who help to maintain the infrastructure. This year it was launched by Douglas Oakervee OBE, President of the Institution of Civil Engineers, before a large audience in the headquarters in Great George Street on 15th July 2004. The report makes an assessment of the present situation and puts forward technical proposals for future infrastructure improvements.

Maintaining the national infrastructure is no different in principle from what we all do in our own homes. Noticing problems as soon as they occur, locating and solving the source quickly, and then planning ahead to try to avoid them in the future. This requires forward planning, logical analysis and careful expenditure that are all equally important.

This year the report provides the reader with an overview of the infrastructure and an individual assessment of each utility. It covers roads, railways, seaports, waste management, energy supply, community housing, water supply and waste water treatment and flood management. Each section is awarded a grade ranging from A (Good) to E (Bad), for the current operating condition and the contribution it makes to the promotion and development of sustainability in our economy. No A grade was awarded this year.

The overall comments are the most disappointing aspect of the report. There is no improvement since last year when the previous report said, "words like review, consider, consult and explore abound in various Government White papers, but no one seems to be actually doing anything." This year the report specifically identifies a lack of joined-up thinking in Government and of co-ordinated action on the ground, and emphasises that "short term populist decisions cannot deliver a viable future." The overall grade for the infrastructure is D+ (Poor) for performance and C (Average) for sustainability.

Waste Management is highlighted this year. Each year local authorities collect a total of 34 million tonnes of Municipal Solid Waste from domestic households, most of which is dumped in landfill sites that is unsustainable in the long term. The alternatives include thermal recycling, thereby recovering energy from waste, and physical recycling to recover anything that is re-useable. The report identifies a need for between 1,500 and 2,300 new facilities for the treatment, recycling and disposal of 430 million tonnes of waste from all sources, but recognises the public's adverse reaction to waste treament plants sited close to their homes. The report sees "a plethora of government initiatives" but a "lack of leadership to change our attitudes to the way we manage waste". Also "the sheer volume of legislation from Government is creating a climate of uncertainty." This year's performance grade is D, the same as last year, but the sustainability grade is reduced from C last year to D this year.

This year the transport section has been expanded to include airports and seaports for the first time, in addition to roads and railways, reflecting the importance of freight and passenger traffic to our economy. The railways have improved from D last year to C- this year but the report recommends that management should consider the underlying issues of culture and process, and states that "the biggest obstacle to progress is the adversarial nature of the industry." The national road system is awarded a C+ (as last year) with encouraging signs of progress and the observation that bypasses which once attracted opposition are now recognised for making a positive contribution to traffic flow and congestion reduction.

Seaports (awarded B-) are particularly important because "the UK handles more goods by sea than any other nation in Europe." The report points out that "container traffic is increasing 4-5% per annum but by 2006/08 we will run out of space to handle the extra volume." The complexity and slowness of the planning approval process for new port developments are criticised and attention is drawn to the Dibden Bay project in the Southampton docks that took eight years and cost £45m in the planning process alone before permission was refused earlier this year. In contrast a port extension in Le Havre was completed from planning to operation in eight years. The report recommends that "we need a proper balance between environmental, social and economic factors."

Airports are especially relevant this year because the Government's White Paper on "The Future of Air Transport" was published in December 2003. The White Paper sets out a 30-year framework for new runway capacity in the South East and at key regional airports. The report points out that "it is essential that new airport capacity is matched by parallel improvements to road, rail and public transport networks." Getting people and cargo to and from an airport is just as important as providing more runways.

Water supply and wastewater treatment are the star performers and are awarded B+, as last year. We enjoy a supply of drinking water which is of very high quality, our rivers are cleaner than they have been since the beginning of the Industrial Revolution and our bathing beaches are clean. But all this needs more money to be spent by the water companies to maintain the present system and the present high quality of the supply. Water resource planning is very long term and some companies include new reservoir schemes in their programmes This expenditure will lead to an increase in water bills but is subject to review by the Government. If the Government considers that the price increases will be unpopular and is tempted to reduce the investment then this could have serious consequences for our water mains, treatment works and sewers.

Flooding has been in the news this summer, and there is concern that this may recur more often in the future. The report classifies the management of floods as C+, which is encouraging because the past twelve months have seen improvements in the management of flood risk and flood warning systems. The report expresses concern specifically about the number and quality of engineers entering the profession. Improvements will only occur if graduates see better career opportunities in the future.

Energy featured prominently in last year's report and again this year, although the grade has descended from D+ to D. The report draws attention to the Government's focus on electricity supply which is only a minor part of our total energy consumption. The Government apparently believes that a combination of energy efficiency, emissions trading and more electricity from selected renewable sources will meet their targets to reduce emissions of greenhouse gases and make up for reduction in supplies from conventional fuels. This view is not shared by everyone in the industry. Our traditional reliance on a number of different indigenous fuels for our power stations is likely to change in the future as we will need to use more imported gas to make up for the shortfall from nuclear and coal fired power stations when they are taken out of service. Relying on more gas will require the construction of more terminal points to receive tankers and pipeline landfalls and will require more storage facility construction.

Last year the report called for more Government support for R & D work for the nuclear power industry similar to that given to the renewables industry. This year there is no sign that this has happened or is even being considered. There is therefore a real possibility that the lights may go out.

Part of the purpose of this report is to inform, to stimulate debate and hopefully to guide future thinking and assist in making the necessary decisions to ensure that we can build and pass on a secure infrastructure to the next generation. It will be very unfortunate if this does not happen.

Robert Freer is a civil engineer but the opinions expressed are his own and not necessarily those of the Institution of Civil Engineers

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BOOK REVIEWS

The Miracles of Exodus

By Colin J. Humphries
Continuum, 2003, £16.99 ISBN 0 8264 6952 3 (HB)

I cannot recollect reviewing a book with such unequivocal enthusiasm. As I began to read, my attitude was transformed from dutiful reluctance to intense interest, to fascination, culminating in excitement!

The author, an eminent scientist in his own primary discipline of physics at Cambridge University, diversifies his powers of critical thinking to develop a multidisciplinary analysis of the Biblical texts describing the Exodus of the Israelites from slavery in Egypt. But this is no arid scientific exegesis. The reader is taken through a thrilling detective story, written in a style which grips the imagination and fascinates the mind. For example, the account of the preparation for the journey from Egypt

draws parallels with the "Mission Impossible" films, which, as he says, pale into insignificance compared with the second mission impossible of Moses.

> "In Moses' original mission impossible he twice defied death at the hands of one of the most powerful men in the world, the pharaoh of Egypt, first at his birth and then again after he killed the Egyptian slave master. In Moses' sequel, he masterminds the great escape of the Israelites from Egypt in the face of overwhelming odds. Tom Cruise's sequel involves deadly viruses; Moses' sequel involves deadly viruses and much, much more….Tom Cruise's Mission Impossible 2 uses some astonishing effects; Moses' Mission Impossible 2 includes a real-life special effect, the crossing of the Red Sea, which is so awesome that it totally dwarfs everything in the Tom Cruise film." (pp 97-8).

This adventure story is recounted by Humphreys with an intellectually thrilling analysis of original texts subjected to scientific criticism from disciplines including physics, chemistry, biology, geography, history, archaeology, anthropology, medicine and linguistics. The fundamental questions he seeks to answer are:

Is the story of the Exodus coherent and consistent?

Is it factually accurate?

Can we understand the "miracles"?

Has the text been misinterpreted?

Can we reconstruct the Exodus route and find the true Mount Sinai?

The conclusions are affirmative. They range from many a "Resounding Yes" to other more scientifically tentative but generally very convincing endorsements.

Detailed, rigorous examination of the original texts in the light of scientific knowledge, interspersed with reference to historic and recent travellers' tales and experiences gained from personal visits to key sites, explain "miraculous" events, such as the parting of the waters of the Red Sea to allow the Israelites to cross and the subsequent deluge which destroyed their Egyptian pursuers. Accounts of the horrific plagues which afflicted the Egyptians, which, in my own previous reading, I had trivialised as symbolic legends, are shown to be realistic descriptions of sequences of natural phenomena, extraordinarily accurate in their detailed precision. The story of the Exodus with so many extraordinary events, such as the transformation of bitter water into sweet, are similarly explained.

The book thus provides an intellectually exciting and challenging account of all aspects and details of the saga of the Great Exodus from Egypt to the Promised Land. Much of the critical analysis explains previous perceived inconsistencies. The accuracy and relevance of the original historical accounts are affirmed and enhanced. But there are also novel conclusions and challenges – especially the hypothesis concerning the location of Mount Sinai. The evidence adduced in this book suggests that the "real" Mount Sinai, the holy Mountain, associated with God's encounter with Moses and the Ten Commandments, is not in the Sinai Peninsula but is Mount Bedr in Arabia. The implications are far-reaching. As Humphreys says: "If my theory is correct – and I believe the evidence is strong – history books, maps, footnotes in Bibles, biblical commentaries, and travel guides to the Middle East will all have to be rewritten…" (p.338).

A detailed Bibliography and comprehensive Index provide convincing additional reference material to substantiate the scientific interpretations of the events described in the Bible, the conclusions to be drawn and their far-reaching implications.

The author identifies areas for further study, with particular reference to the validation of his hypothesis concerning the site of Mount Sinai. Sadly, the location in Saudi Arabia is currently "forbidden territory" for such research: a prohibition which seems to violate the spirit of free scientific enquiry which is the premise which inspires this book.

Challenges to accepted knowledge is one of the most valuable assets of science and no field of knowledge should be exempt: only by pursuit of truth can our understanding of history, the natural world, and our own humanity, including the spiritual dimension, be furthered. Scientific studies such as this intellectually exhilarating book broaden our understanding of history and of the world in which we live and they open new horizons in the search for truth. In so doing, they challenge us to rethink previously held ideas, beliefs and prejudices.

The author concludes by suggesting that scientific understanding of events which may appear as "miracles" does not reduce a sense of wonder but enhances it. If the extraordinary events described in the account of this historic journey can each be scientifically "explained", there still seems to be an aspect of the miraculous in their timing. He draws no conclusion about the question of divine intervention or whether the amazing sequence of events can be seen as chance or the results of some great design. As a scientist, he leaves it up to the reader to decide. But I venture to suggest that the issues on which we, the readers, have to decide, will be some of the most important we will ever have to address. It is with that challenge that I urge you to read this book and I do so with confidence that, whatever your personal verdict on the issues and conclusions, you will certainly have a fascinating intellectual journey as you travel with the Israelites and share their amazing experiences during their great Exodus.

The Baroness Cox

Prostate Cancer - Understand, Prevent and Overcome

By Professor Jane Plant CBE
Virgin Books Ltd, 2004, £16.99, ISBN 1 85277 188 4

Prostate cancer will soon be the most common cancer for men; indeed autopsy studies indicate that the vast majority of elderly men have abnormal growths in their prostate, although most of these had not progressed to become clinically apparent cancers. This book should therefore be essential reading for all, particularly in view of the widespread ignorance of the subject. The book provides an understandable description of the biology and a translation of the words that you will encounter from doctors. It also provides practical advice, from someone with first hand experience, on how to choose your doctor and work with them and with family and friends to make the right choices. Which medical treatment is right for you: the likely consequences, good and bad. It would be easy to focus on some of the dietary advice, which may initially seem extreme, and then dismiss the whole book. This would however be wrong: the author of this book is not a crank or someone promoting an alternative product. Jane Plant is a distinguished geochemist, whose own research had been very successful in identifying how variations in soil composition in different geographical regions could be responsible for specific localised health problems in livestock and in human populations. When diagnosed with breast cancer herself, she then turned her scientific mind to address the questions that had become of vital personal importance: "Why me?" "What can I do about it?" The undoubted huge success of medical research over recent years has generated perceptions that inadvertently lead many to incorrect answers to these questions. It is widely believed that the explanation is all "in your genes" and therefore there is nothing that you can do about it. Early hope that specific cancer-causing genes would be identified and the cancers then cured by gene therapy has proven to be extremely naïve.

Jane Plant astutely realised the failings of the standard answers and set about applying her own scientific background, taking a wider view of the evidence in search of more substantive answers. Her own work had taken her around the world and she became aware that breast and prostate cancers were incredibly rare in rural China and Japan. This was not due to different genes: migrant populations, such as Japanese in North America, acquire the same incidence of these cancers as seen in Western societies within a very short period. The same trends are even apparent in Westernised cities in the East. This clearly implicates an environmental problem rather than variations in genes. A careful examination of Eastern lifestyles then identified fundamental differences in diet that appeared to fit nicely with considerable experimental evidence. Interwoven within the subsequent explanation is the remarkable story of the personal journey of the author – in the opposite direction – a Western woman who adopted the dietary principles of an older Eastern culture in order to successfully control her cancer. From this are derived a series of practical recommendations, each supported by detailed scientific evidence. It is stressed that these are to empower the patient to take some control to help them work with conventional medical treatments, and certainly not as a replacement.

The book refers to the recent overview of cancer research in the UK compiled by the National Cancer Research Institute, and how this highlighted the relative neglect of the important issues of patient care and cancer prevention. What is not stated is that the critical issues identified in this book were hardly mentioned in the NCRI overview. How could an accomplished scientist evaluate all of the evidence and yet arrive at conclusions so different to that of the collective establishment? It would be foolish to dismiss this due to her lack of specialist knowledge. It may be wiser to concede the value of thoughtful considerations from a distinguished scientist from outside the field, unbiased by dogma, prevailing fashions or vested self-interest (other than that of someone who had become a consumer of this science). A potential mediator of the effects of diet was highlighted in this book, the same factor is also receiving considerable attention from the US National Cancer Institute and most of the major pharmaceutical companies, but it was not even mentioned by our NCRI: who is out of step? The real value of this book is that it empowers the reader with knowledge; it answers the question – there is something that you can do about it, not just those who have cancer, but all of us who wish to do something to reduce our risk.

Professor Jeff Holly,
Professor of Clinical Sciences,
University of Bristol

Parliamentary & Scientific Committee News

New Members

We are delighted to welcome the **Association of British Healthcare Industries** and the **Association of Marine Scientific Industries** as members of the Committee, represented by Aoife Kilkenny and Paul Ridout.

Sir,

Meeting the 60% Challenge

There have been several excellent contributions to the energy debate in recent editions of Science in Parliament, all of which recognise the urgent need to act to reduce carbon dioxide produced by burning fossil fuels.

The Lord Oxburgh (Volume 61 no2: The Goldilocks Planet – CO_2 and Energy Policy) makes a powerful case for carbon capture and storage (sequestration) in depleted oil and gas reservoirs. Indeed, since he penned his article the Government has launched a consultation exercise on the topic, and there is little doubt that large scale sequestration is becoming an increasingly viable option, both technologically and perhaps politically. However, we must avoid putting all our eggs in the sequestration basket, not least because fossil fuels are after all finite. Surely if we are really serious about sustainable living we will need to continue to develop energy sources which exploit those elements which will be around for millions of years, namely sun, water and wind.

Certainly I would add my voice to that of David Chaytor (Vol 61 No2) in applauding the Government's aim, set out in the recent Energy White Paper, of cutting carbon dioxide emissions by 60% by 2050. However, as David Chaytor suggests, whilst the aim is worthy, the White Paper is short on detail of how to meet the challenge of a 60% reduction. There is, nevertheless, recognition in the White Paper that to achieve this aim will require the unprecedented use of partnerships at the local level.

Such a partnership has sprung up in Norfolk and goes under the name of CRed (carbon reduction). CRed, which operates from the School of Environmental Sciences at the University of East Anglia, is an all-embracing partnership, which includes businesses (large and small), schools, local authorities and individual householders. All those who participate in CRed are signed up to carbon reduction measures, ranging from simple commitments to install energy saving light bulbs, to bolder large scale activities such as the construction of renewable energy power plants.

CRed argues that to meet the 60% challenge we must adopt a holistic approach, which marries a concerted effort to reduce energy consumption with a step-change in the level of energy generated by renewable sources. This will require a relentless awareness-raising campaign designed to spread best practice in energy efficiency until a critical mass is reached. At this point carbon reduction actions, such as switching off lights and TV standbys, will have become as ingrained in the public's mind as the need to wear seat belts.

The recent opening of the Scroby Sands offshore wind farm off the coast of Great Yarmouth is testament to the Government's commitment to the construction of large scale renewable development. The 30 turbines will produce enough power to provide electricity for around 41,000 homes. But think how many more householders could benefit from this and other renewable developments if properties were CRed homes, incorporating a full range of energy saving measures. The figure would look better still if the households made full use of micro renewables, such as combined heat and power units, solar collectors and photovoltaic panels. This scenario really would represent low-carbon thinking in practice.

We politicians have a great opportunity to help deliver this vision by putting carbon reduction at the centre of the new building regulations. Incorporating at least one form of micro-renewable and higher standards of insulation in all new buildings will ensure that large scale renewable projects make a real impact on our energy needs.

Indeed, at the current rate of expansion in renewable energy sources, without a significant decrease in our overall consumption, we will almost certainly miss the Government's other major energy target of meeting 10% of our energy needs from renewable sources by 2010.

There are two other very pressing reasons why we should seriously consider adopting CRed's holistic approach, whilst being cautious of the sequestration route, and those are the issues of security of supply and volatility of world energy markets. Whilst it is probably advantageous from a global perspective to develop clean technologies for coal, oil and gas power plants in China and other developing countries in order to meet their domestic needs, this does not, however, ensure the lights will stay on in the UK.

On current projections by 2020 around 70% of our electricity will be generated by gas. What's more 90% of this gas will come from imports, largely from locations in Russia and North Africa. In essence we will be heavily dependant on imported gas from nations and companies not exactly noted for their stability. This does not help us plan a secure future for our people and our economy; therefore we must take action at home to avoid a culture of dependence on others for our domestic energy needs.

According to gas supplier Centrica, gas prices are likely to be 50% higher over the next two years, and there is little doubt that the days of cheap energy are numbered. This represents an opportunity and a threat to consumers and the Government. As consumers we could take the CRed route and use energy in our homes more sensibly in order to keep energy costs down, or we could simply pay more and take to the streets in protest. Equally the Government could devise policies to protect the fuel poor, whilst racheting up energy saving (carbon reduction) across the policy spectrum whilst redoubling its efforts with renewable energy at the macro and micro levels, or it could simply sit on its hands and leave it to the market.

Because of the multiplicity of energy guzzling technologies we have devised to service our 21st century lifestyle, we are presented with a complex and multi-faceted challenge to which there is no simple single answer. We must not fall into the trap of thinking a big fix is just around the corner, but rather act on many fronts and imbed carbon reduction measures across the policy spectrum and in the minds and actions of all our people.

Anthony Wright MP (Great Yarmouth)

Sir,

UK-Russian Scientific Collaboration

In early May, the Royal Society held a Russia Day to celebrate the success of UK-Russian scientific collaboration in the area of Materials Science. As well as celebrating success, the day highlighted major new opportunities for the UK science base. The tone of the meeting was set by the opening addresses from Lord Sainsbury of Turville and Professor Andrei Fursenko, the recently appointed Russian Minister for Education and Science, both of whom enthusiastically stressed the potential benefits of collaboration. However, it was the four short joint presentations by UK scientists and their Russian partners, which underlined the real value of joint research. The topics were very diverse, ranging from highly controlled self-igniting chemical reactions to the use of high-pressure carbon dioxide to make new materials for supporting the growth of artificial organs. Nevertheless, the key points from all of these presentations were remarkably similar.

The collaborations are genuine scientific partnerships. Together the partners are doing science, which neither group could have done independently.

The partnerships have been remarkably long lasting, greatly outliving their initial funding.

In all cases, success has been achieved with very modest funding from the Royal Society, which the partners have succeeded in leveraging many-fold to create sustainable new research directions.

For the second part of the day the participants split into a number of lively working groups, which then reported back, in a plenary session. Given the diversity of workshop topics, the conclusions were surprisingly unanimous.

In the past, the drivers for Russian science were very different from those in the West. This has resulted in many discoveries and developments, which have no counterpart in the UK.

It has been these unique developments, which have underpinned the success of existing collaborations.

There is still a wealth of unexploited directions in Russia but time is running out because the Russian scientific skill-base is ageing and still contracting.

We must act quickly to seize these opportunities before they disappear. The key is young UK researchers who have recently started their scientific careers. These are the scientists who have the vision and initiative to drive new directions in science.

There is a need is to bring together young UK and Russian scientists to initiate scientific collaboration. The British Council is pioneering this approach with a pilot meeting in Moscow to initiate collaboration in Green, Environmentally Sustainable Chemistry in March 2005.

Another way that this "need" could be met is by extending the Royal Society's networking agreements with OST to Russia. The networks, which were set up in 2003, at present extend to the following countries: India, China, S. Africa and S Korea. They consist of one-to-one meetings or small seminars and workshops in clearly defined topics.

In conclusion, we believe that there is a real need to target strategic funding to encourage and pump prime collaboration between young UK and Russian Scientists. This is a major and unique opportunity. We must capitalize on it, to the benefit of UK science, before our competitors realise the possibilities. The cost will be modest but the potential pay off is enormous.

Professor Martyn Poliakoff FRS
Professor Steve Howdle
School of Chemistry, The University of Nottingham..

House of Commons Library Science and Environment Section
Research Papers

The following is a summary of a paper produced for Members of Parliament.
Information and copies of papers can be obtained from Susan M Brown at the House of Commons Library on 0207 219 4856 or through www.parliament.uk/commons/lib/research/rpintro.htm

The Health Protection Agency Bill

Research Paper 04/47

The Health Protection Agency was established on 1 April 2003, as a Special Health Authority under the NHS Act 1977. The aim of the Health Protection Agency Bill is to establish the Agency as a non-departmental public body, incorporating the National Radiological Protection Board and thereby formally bring together all the elements of health protection and emergency planning to provide a comprehensive protection system.

The Health Protection Agency Bill would provide the Agency with a wider range of functions than those presently available to a Special Health Authority.

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.

Scientific aspects of ageing

Sub-Committee I, chaired by Lord Sutherland of Houndwood, has started to hear evidence for its inquiry into the scientific aspects of ageing. The Committee will investigate the ageing process and how science and technology can help mitigate the effects of illnesses or disabilities associated with growing old, and assist the elderly in adapting to the challenges of, for example, restricted mobility and deteriorating senses. The focus will be on how healthy life expectancy can be increased, and independence for the elderly retained for longer. The Committee will not be looking at economic aspects of ageing, such as the funding of pensions.

Tom Kirkwood, Professor of Medicine at the University of Newcastle's Institute for Ageing and Health, has been appointed as Specialist Adviser to the inquiry. He delivered the 2001 Reith Lectures entitled "The End of Age". A one-day seminar in September introduced Members to some of the main issues. Participants came from academe, charities, and business, to provide a stimulating discussion.

The Call for Evidence was published on 20 July, with a deadline for submission of written evidence of 4 October. Oral evidence is expected to be heard until February 2005. Michael Collon (collonm@parliament.uk) is the Clerk of the Sub-Committee.

New inquiry – Energy efficiency

Baroness Perry of Southwark is chairing Sub-Committee II's investigation of the Government's targets for increased energy efficiency. In particular, the Committee will examine the Government's recently published energy efficiency "Plan for Action" which details ambitious reductions in energy use.

The Government aims to reduce carbon emissions per unit of GDP ("carbon intensity") by 4% a year until 2050. Half of the additional carbon savings required to meet this target are to come from energy savings. The domestic sector is expected to account for one-third of projected savings, by improving insulation, and the efficiency of boilers, lighting and appliances. Business and industry are expected to deliver two-thirds of savings, largely as a consequence of the incentives provided by carbon emissions trading. The inquiry will look at how science and technology can be used to meet these goals, and at whether the Government's policies are likely to be effective. A further important aspect will be the reaction of the public to energy saving measures.

Professor Roland Clift, Director of the Centre for Environmental Strategy at the University of Surrey, has been appointed as the Specialist Advisor. A seminar is being held on 19 October, which will give Committee Members an opportunity to engage in informal discussion with representatives of Government, industry, academe and public bodies.

The Call for Evidence was published on 22 July. Evidence will be heard from November. Christopher Johnson (johnsonc@parliament.uk) is the Clerk of the Sub-Committee.

Radioactive waste

The Select Committee is following-up previous investigations on the handling of radioactive waste. This short inquiry is concentrating on the Government's new body, the Committee on Radioactive Waste Management (CoRWM), set up in 2003, which has been tasked with finding a long-term solution for managing high and intermediate level waste.

The Select Committee visited an open meeting of CoRWM in September. Members of both committees met over lunch, and the Chairman of CoRWM, Gordon MacKerron, gave a presentation on the work of CoRWM. Evidence will be taken later in the Autumn, with a short report to be published towards the end of the year. Contact the Committee's Specialist Assistant, Jonathan Radcliffe (radcliffej@parliament.uk), for information regarding this inquiry.

Select Committee is 25

The Science and Technology Select Committee was established in the 1979-80 session of Parliament, with its first report published in July 1980 on "Electric Vehicles". The report begins "The Committee have conducted an enquiry into the potential of electric vehicles in the light of future energy shortages." *Plus ça change, plus c'est la même chose!!* The Committee presciently saw how technology might be used to best effect. Paragraph 100 has: "The area where the Committee would like to see new support is in work on hybrid vehicles. […] The hybrid can capitalise on the improvements in [internal combustion] engines and allow them to work at maximum efficiency."

Plans to celebrate twenty-five years of influential reports and holding Government to account are under discussion, and details should be available in the next issue.

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

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 (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 Wednesday 14 July. The Committee will continue to host such sessions at regular intervals.

Annual Session with the Secretary of State for Trade and Industry

The Committee took evidence from the Rt Hon Patricia Hewitt, Secretary of State for Trade and Industry, on Wednesday 14 July.

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. Terms of reference include 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. The Committee started taking evidence on 14 June. A Report is expected in the 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 finished taking oral evidence in June 2004. A Report is expected in the early Autumn.

Research Assessment Exercise

The Committee announced its inquiry in February 2004 in response to the unveiling of proposals from the Higher Education Funding Councils. The inquiry follows up the Committee's Report on the Research Assessment Exercise (RAE) published in April 2002. The Committee concluded in this Report that the RAE needed to be reformed to make it fairer, avoid perverse incentives and impose fewer costs on institutions. It felt the RAE should continue, but only as a part of a broader higher education research funding strategy in which its side effects and disadvantages were offset by other mechanisms. The inquiry is looking at whether the new scheme will provide a robust and reliable system of research assessment, the burden and cost it places on higher education institutions and the implications for higher education more generally. The Committee finished taking oral evidence in June 2004. A Report is expected in the early Autumn.

Beagle 2

The Committee announced its inquiry in May 2004. It will follow up the recommendations from the Commission of Inquiry on Beagle 2 relating to the funding and management of the mission. In particular, the Committee will look at the role of the Department of Trade and Industry, the Office of Science and Technology, the European Space Agency, the British National Space Centre, the Particle Physics and Astronomy Research Council and others in providing support to the project. It will not focus upon the technical reasons for the lander's failure. The Committee finished taking oral evidence in July 2004. A Report is expected in the Autumn.

Reports

Scientific Publications: Free for all?

The Committee published its Tenth Report of Session 2003-04, Scientific Publications: Free for all? (HC 399-I) on 20 July 2004.

The Committee concluded that the current model for scientific publishing is unsatisfactory.

The Report recommended that all UK higher education institutions establish institutional repositories on which their published output can be stored and from which it can be read, free of charge, online. It also concluded that further experimentation with publishing models is necessary. The Report criticised the UK Government for failing to respond to issues surrounding scientific publications in a coherent manner. The Committee was not convinced that the Government would be ready to deal with any changes to the publishing model and called for the formulation of a strategy as a matter of urgency.

Director General of the Research Councils: Introductory Hearing

The Committee published its Ninth Report of Session 2003-04, Director General of the Research Councils: Introductory Hearing (HC 577), on 5 July 2004.

Government Responses

Sixth Special Report

The Committee published its Sixth Special Report of Session 2003-04, Government Response to the Committee's Fifth Report, Session 2003-04, Too little too late? Government Investment in Nanotechnology (HC 650) on 23 June 2004.

Seventh Special Report

The Committee published its Seventh Special Report of Session 2003-04, Government Response to the Committee's Sixth Report, Session 2003-04, Within REACH: the EU's new chemicals strategy (HC 895) on 19 July 2004.

Further Information

Further information about the work of the Committee or its current inquires can be obtained from the Clerk of the Committee, Chris Shaw, the Second Clerk, Emily Commander, or from the Committee Assistant, 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

Parliamentary Office of Science and Technology

Recent POST publications

Vaccines and public health

June 2004 ***POSTnote 219***

Summarises trends in outbreaks of disease and vaccine uptake within the UK. Issues addressed include public attitudes, vaccine availability and vaccine safety.

Handling uncertainty in scientific advice

June 2004 ***POSTnote 220***

Examines how uncertainty is best handled in the provision of scientific advice, in decision-making and in communicating with the public.

Regulating stem cell therapies

June 2004 ***POSTnote 221***

Details recent developments in this field and considers future regulatory options.

Assessing the risk of terrorist attacks on nuclear facilities

July 2004 ***POST report 222***

At 136 pages, the longest report ever published by POST, prepared in response to a request from the House of Commons Defence Select Committee in July 2002 in its report on Defence and Security in the UK. A four page summary is also available.

Strategic Environmental Assessment (SEA)

July 2004 ***POSTnote 223***

SEA is the subject of new legislation implementing a European Directive. The briefing outlines its aims, scope and requirements.

The European Research Area

July 2004 ***POSTnote 224***

Examines the extent to which involvement in the European Research Area may help the UK to achieve its own R&D goals.

Radio Frequency Identification (RFID)

July 2004 ***POSTnote 225***

Provides an overview of the technology, its current and prospective uses, and outlines the factors limiting its uptake, including privacy concerns.

Dyslexia & dyscalculia

July 2004 ***POSTnote 226***

Presents recent research on dyslexia and dyscalculia and outlines current educational policies relating to both.

NHS Genetic Testing

July 2004 ***POSTnote 227***

Looks at the prospects for genetic tests and testing technology and examines a series of policy, organisational and ethical issues raised by current and possible applications.

Drug tests

September 2004 ***POSTnote 228***

Explores the prevalence of drug use, the types of test currently available, their reliability, and the extent of their use.

EU Chemicals Policy

September 2004 ***POSTnote 229***

Describes the REACH (Registration, Evaluation and

Authorisation of CHemicals) proposals currently before the European Parliament and examines their likely impact on competitiveness, world trade and animal welfare.

Current studies

These include: Drugs for neglected diseases; UK climate change and health; Organ transplants; Data protection and medical research; The role of Research Ethics Committees; Alcohol and public health; Availability of prescription drugs; Future of UK gas supplies; Plutonium: waste or resource?; Materials in housing construction; Nanotechnology – risk and opportunity; Digital television; e-Science and the Grid; Mobile phones; Open source software; Post-school science education; Public sector use of forecasting and futures studies; and Energy efficiency.

Work with Select Committees

Dr Theresa-Jane Squire prepared a briefing for the House of Commons Culture, Media and Sport Committee on digital convergence and the BBC Charter. Dr Peter Border prepared a briefing for the House of Commons Culture, Media and Sport Committee on doping in sport.

Seminar

Speed Cameras – The Speed-Hazard-Risk relationship revealed

Dr Phyllis Starkey MP, Chair of Parliamentary Office of Science and Technology (POST)

Speed cameras are a key part of the Government's strategy for reducing road casualties. There are over 6,000 speed camera sites in the UK. Their use generates widespread debate, with over 100 parliamentary questions posed in 2004 alone. A Parliamentary Seminar was hosted by the Parliamentary Office of Science and Technology in the Macmillan Room, Portcullis House on Thursday 1st July 2004, to introduce a new POSTnote (No 218 Speed Cameras, May 2004), prepared by Helen Wells with assistance from the Economic and Social Research Council who funded her Fellowship with POST.

The audience, who filled the room, were addressed by four speakers, Professor Steve Stradling of Napier University Transport Research Institute, Edinburgh, where he holds the Chair of Transport Psychology; Richard Brunstrom, Chief Constable of North Wales and Head of Road Policing, Association of Chief Police Officers (ACPO); Ruth Harper, BRAKE road safety charity, and Andrew Howard MBE, Head of Road Safety, AA.

The motivation for the meeting appeared to be driven by the need to combat negative press comment such as "Ban Greedy Speed Cameras" or "Cash-Making Speed Cameras Slammed". The meeting regarded speed cameras as generally beneficial to the public. The use of speed cameras as a source of funding was therefore dismissed by all of the speakers whose critical comments were reserved for technical aspects of their installation and management. Examples were given where motorists are confused by poorly located road signs and changing speed limit regimes along a highway and, although they might be aware that restrictions apply and cameras are present, the actual speed restriction at any point may be in doubt or difficult to ascertain.

A more fundamental issue was raised relating to risk analysis and hazard reduction. The Speed-Hazard-Risk relationship is not well understood and reflects poor training in basic mathematical concepts. For example, whereas motorways reduce the hazards in motoring, thereby enabling higher average speeds with lower risk, the opposite may be true of our urban and rural road networks where accident blackspots abound. The very existence of a blackspot is the main driver for the installation of speed cameras to reduce speed and therefore reduce risk. It may be impossible to do anything to remove or reduce the primary hazard responsible for the blackspot. Some of the discussion focused on the perceived need for more cameras, especially at locations where hazards exist but the requisite number of fatalities has yet to be recorded as evidence that cameras are needed to control speed.

Staff, Fellows and Interns at POST

The following fellows and interns are currently working at POST: Kristelle Haslam (radioactive waste classification), Masahiro Uemura (biomass energy), Will Marshall (post-school education), David Berry (open source software), Alice Farrands (the role of research ethics committees), Sarah Cant (data protection and medical research).

International Activities

Dr Angharad Thomas and Dr Chandy Nath represented POST in Oslo in May for the start of the first joint project run by the European Parliamentary Technology Assessment network (EPTA), on information communications technology and privacy. Prof David Cope and Dr Chandy Nath participated in the first European Science Open Forum in Stockholm in August, where Prof Cope represented EPTA and gave a joint presentation with the American Association for the Advancement of Science on parliamentary technology assessment (PTA). Prof Cope and Dr Nath also participated in the first seminar organised by the new Swedish PTA network.

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 7th June to 16th September 2004 from both Houses of Parliament appears on pages 44 to 50.

Waste Management Policy (EUC Report)

Debate in the House of Lords on Tuesday 22 June

The Earl of Selborne stated that the one solution fits all approach presented in the EU document *Towards a Thematic Strategy on the Prevention and Recycling of Waste* is fundamentally flawed. Definitions, baseline data, impact assessment and reporting were either absent or varied between member states. At the UK level there was a lack of strategic thinking, a failure to implement EU legislation in a timely fashion, and poor co-ordination in Government. The Technical Adaptation Committee is an expert committee but in the absence of any clear policy from the EU on the landfill directive was also obliged to undertake that additional policy role by default. Substantive definitions accepting the operation of a directive should be decided at policy level and not at expert level. These remain unresolved as shown when taking a battery out of a car for example. Is it then governed by the End of Life of Vehicles Directive, the Waste Electrical and Electronic Equipment Directive (WEEE), the Battery Directive or the Hazardous Waste Directive? How can anyone plan when definitions are not agreed? Baselines require data and a start date for any target set. The European Environment Agency has a central role and responsibility for this. Co-ordination in the UK should be led within Defra in co-operation with the Environment Agency, the DTI and the Better Regulation Task Force, with a single website and one unit. The data, definitions and objectives are all inadequate. Consistent implementation across Europe requires Commission attention and the UK Government needs to upgrade the ability to transpose directives into UK law.

The Parliamentary Under-Secretary of State, Department for Environment, Food and Rural Affairs (Lord Whitty) emphasised that a holistic and strategic European approach to waste management is required. The UK has been involved in several Directives. The WEEE directive was particularly successful where the UK leads and will be completely transposed into UK law by the end of the year. Defra hope that the task force's recommendations will be adopted. It is important to ensure progress is made although the best way forward is sometimes difficult to identify. The waste implementation programme is important for local government. Over one million tonnes per annum of hazardous waste will continue to be accepted in 15 merchant sites and 10 in-house sites when co-disposal ends. The Strategy Unit report *Waste Not, Want Not* forms the basis for improving co-ordination of interdepartmental responsibilities. Work is ongoing with other member states on the batteries objective to clarify definitions and also on improved data collection and recycling targets.

Nanotechnology

Debate in Westminster Hall on Thursday 24 June

Dr Ian Gibson (Norwich, North) pointed out that the Science and Technology Committee has been considering nanotechnology for some time. Prince Charles was the first to mention it when he expressed his concerns that replaced those surrounding genetic modification overnight. It covers things that are very small, such as 10^{-9} – the atomic rather than the molecular scale as described by Eric Drexler in 1986 in his book "Engines of Creation" where he described Richard Feynman's vision of nanomechanics creating atomically precise products such as new atomic level drugs designed to cure cancer for example.

Dr Desmond Turner (Brighton, Kemptown) criticised the UK venture capital market for still failing in part of their mission over a five year period to bring innovative companies to market and likewise the timidity of the Department of Trade and Industry (DTI) in providing capital support for small and medium-sized enterprises. especially when close to market.

Dr Ian Gibson agreed that the report focuses on this point where the DTI has responsibilty for turning the UK science base research brass into commercial gold as completely negative. Their response to the suggestion that the DTI take a lead with proof of concept funding, as in Scotland, by providing loans to high-tech companies proving innovative developments was as follows: "Not accepted. There is no evidence at present to justify such an intervention." On the other hand, things seem to happen elsewhere in California and also Germany through their Fraunhofer Institutes whereas in the UK there is only frustration that requires a positive response from the DTI in terms of tax credits and moving to proof of concept.

The supportive scientific response to the report, as exemplified by the Institute of Physics, to the fifth report "Too little, too late? Government Investment in Nanotechnology" was "Too true." The point is that the DTI has not responded fast enough to provocation by John Taylor the previous director general of the research councils. Lord Sainsbury has described a composite package that would generate a total of some £540 million over six years from 2003. Is it enough to take matters forward in a competitive world? What do people out there think? Investment must be focused on one or two world-class nanofabrication centres of excellence, as recommended by John Taylor, or fall behind. However the

Government have reduced the Government's co-funding component to only £90 millions and want to scatter it far and wide by "adjusting" the main Taylor report while actually rejecting the need for the two facilities that form the main conclusions of his report. Furthermore several people from nanotechnology centres said that regional development agencies were off-beam and had not engaged with nanotechnology, some had not engaged with science and technology at all. It seems that nanotechnology does not rate as highly as microtechnology in the Department of Trade and Industry. The Government has put the cart before the horse by announcing the main elements of a strategy before appointing a strategic expert advisory group and need to appoint a champion in the DTI to make progress. Leadership, focus and support are needed for the areas in which Britain can excel and work to develop British industry.

Dr Brian Iddon (Bolton, South-East) is the first Chairman of and has written an article about the Bolton Technical Innovation Centre (TIC) for this edition of *Science in Parliament*. The TIC provides out-of-school experience for all Bolton's nine to 19-year-olds in science, engineering and technology, using state-of-the-art equipment. The TIC is funded by the Northwest Development Agency under Sir Tom McKillop, chief executive of AstraZeneca, and was recently visited by Bob Mehalso of Microtech Associates that is about to set up production facilities in the north-west on the old Plessey site in Liverpool. He described engineering as either top-down or bottom-up. Nanotechnology is an example of the latter and is positive as holes are constructed from individual atoms or molecules whereas the former arises from negative engineering implying loss of metal achieved by drilling holes.

Excellent production facilities are already being developed jointly by Imperial College and University College, London. The Rutherford Appleton laboratory near Oxford already has world class facilities. Further development of both sites would enable British nanotechnologists to compete with other world-class centres of which six already exist in Germany. Failure to compete with these will inevitably increase the brain drain overseas. The development of nanotechnology will also be inhibited if science departments continue to close. The Molecular nanotechnology (MNT) network also requires strengthening of its leadership and the director given real powers. The network will only last for three years resulting in funding going to near market topics in microtechnology rather than nanotechnology which requires a longer development time. Scientists, with hands-on control of the money are needed to work in, not with, RDAs.

The Minister for Industry and the Regions (Jacqui Smith) responded that despite being an economist, she recognised that RDAs are an area where there is a need to develop technical expertise. Chemistry, biology and physics courses should include modules on nanotechnology. Government is widely regarded as a source of funding for innovation due to market failure, whereas the current shortfall in funding may be due to a lack of sound business cases. Government funding should be reserved only for situations where there is market failure, not poor business cases. It is important that genuine public concerns about the technology are addressed and unfounded fears dispelled. Many organisations play a role in this: the Health and Safety Executive, the Department for Environment, Food and Rural Affairs, the Environment Agency, the Royal Society and the Royal Academy of Engineering. The study is the first of its kind internationally and has attracted attention from the United States and Japan. It is one area in which the UK is leading the way.

Carbon Capture and Storage

Debate in the House of Commons on Tuesday 13 July

Mr Bob Blizzard (Waveney) believes that carbon capture and storage holds the key to one of the most important issues underlying debates on the Energy Bill that is currently being considered.

Too much carbon dioxide is being produced. As it is not easy to reduce emissions quickly it is therefore necessary to consider capture of the CO_2 produced by coal and gas-fired power stations and other major industrial sources and store it underground without any leakage in depleted oil and gas reservoirs as in Weyburn, Canada and in the Sleipnir gas field in the Norwegian sector of the North sea. The latter complies with the Convention for the Protection of the Marine Environment of the North-East Atlantic (OSPAR) regulations.

The process is also being piloted in Texas where the Frio formation could store between 200 and 350 billion tonnes of CO_2 – 30 years worth of the 7 billion tonnes that are created through human activity each year, without risk of escape, as opposed to earlier suggestions about dumping in the deep ocean that are not considered here.

A survey by the Tyndall centre for climate change in Manchester found that nobody they contacted had ever heard of Carbon Capture and Storage (CCS). Conflicting views are emanating from the DTI where on the one hand the Minister for Energy said last week that it is difficult to envisage CCS becoming viable before 2020, whereas his own Department's report of September last year "Review of Feasibility of Carbon Dioxide Capture and Storage in the UK" said that "earlier deployment could occur to tie in with the pattern of electricity plant replacement. In addition CCS in combination with Enhanced Oil Recovery could be implemented by 2010."

There is a need for immediate action on this issue if the 2010 and 2050 CO_2 reductions targets are to be met. As a short term fix all coal-fired power stations could be closed and substituted for gas, that is likely to be a very unpopular move. Alternatively there are only two other options – CCS or a new generation of nuclear power stations. Complex arguments are presented in which combinations of options are discussed in the UK context. However a big global win is proposed for introduction of CCS in the fast growing energy users, China and India that are mainly reliant on increased coal consumption.

In summary, the usage policy and political advantages are emphasised in the hope that CCS be given a chance to make significant contributions to reduction in CO_2 emissions worldwide.

The Minister for Energy, E-Commerce and Postal Services (Mr Stephen Timms) congratulated Mr Blizzard on his work as chairman of the all-party group on the offshore oil and gas industry that is highly appreciated by those he represents and also by the UK Offshore Operators Association. Feasibility studies on CCS as a means of CO_2 disposal and of achieving enhanced oil recovery have been undertaken. The 2020 date referred to is the current target. Distinction is made between capture and storage. No one has yet demonstrated a fully integrated carbon capture and storage process. That is why the USA will spend $1 billion over the next decade on the FutureGen project. The British Geological Survey has estimated that storage for the UK's current annual CO_2 emissions could be provided for well over 100 years. That would provide ample time to develop new, reliable fossil-free power generation technologies. Hydrogen production is an important issue although it will be generated intially from burning fossil fuel.

REACH

Debate in Westminster Hall on Thursday 9 September

Dr Ian Gibson (Norwich, North) introduced the sixth report of the Select Committee on Science and Technology, "Within REACH:the EU's new chemicals strategy". This European initiative seeks to register, evaluate and authorise the use of chemicals – REACH – and to establish a European Chemicals Agency. A fast, efficient and workable process is needed to test and screen chemicals and the Government support a one substance – one registration scheme. Compulsory information from companies about consortia is also required. Mechanisms are required to ensure appropriate use of animals in tests. The goal is an effective and functional European chemicals industry. The report was published on 12th May following four evidence sittings involving for example, the World Wildlife Fund, the British Retail Consortium, the British Union for the Abolition of Vivisection (BUAV), Dr Delbeke the European Commission's director-general of the Environment, Mr Liikanen the European Commissioner for Enterprise and Information Society, the Chemicals Industries Association, the Minister for Rural Affairs and Local Environmental Quality, and the European Chemical Industry Council.

The possible detrimental effects of the 400 million tons of chemicals sold each year is probably where the Europeans are coming from and the reason for the legislation. Bill Bryson's excellent book "A Short History of Nearly Everything" addresses aspects of the problem such as lead that featured in the lives of many people and still does. REACH abolishes the distinction between new and existing chemicals. A one tonne threshold has been suggested as the starting level for testing that will result in 30,000 chemical substances entering the REACH process, thereby creating a huge body of work for a lot of people and need for resources that requires prioritisation. This work could commence by using computational techniques to distinguish between highly toxic low production chemicals and high production low risk chemicals that can be dealt with later. Animal test data should be shared between companies re-organised to form consortia that can lead to one substance – one registration thus reducing the need for repetitive animal testing. The Fund for the Replacement of Animals in Medical Experiments (FRAME) has emphasised the need for alternative methods to animal testing based on historical studies of chemicals and related substances, thereby saving the lives of many animals.

REACH has provoked new discussion on a huge spectrum of opinions on animal experimentation that is presently unresolved but has much broader implications for scientific progress in genetics and human health. For example, Sir John Sulston's work is notable for contributions to the human genome that necessitated prior work on animals and resulted in several Nobel Prizes for generating results that will help to improve the health of human beings.

Richard Ottaway (Croydon, South) particularly thanked the Parliamentary Office of Science and Technology for its constructive note on REACH; he shares the view of the Select Committee that the current legislative framework for chemicals is inadequate. The Government's three objectives of streamlining the system, minimising animal testing and maintaining or enhancing competitiveness have a long way to go as bureaucracy is growing, animal testing will probably increase and the Government have no idea where they stand on industry's competitiveness.

The Minister for Rural Affairs and Local Environmental Quality (Alun Michael) stated that Richard Ottaway, the official Opposition spokesman was correct in stating "there is some way to go". REACH is one of the most important proposals to emerge from the European Commission for a long time. The Co-operative bank's image of three polar bears sharing a cup of tea makes the point that some household chemicals affect the Arctic environment and wildlife. Positive contributions have been made by the chemical industry, environmentalists, manufacturers, retailers and animal welfare organisations in co-operation with officials from Defra, focused on environment and health and the DTI, involved with industry and productivity. The UK more than any other country has very impressively emphasised the need for a single approach rather than a process based on sectional arguments between different interests. The BUAV and the Royal Society for the Prevention of Cruelty to Animals (RSPCA) have both made constructive contributions that exceeded their specific organisational interests. The UK supports substitution in principle, supported by constructive discussions, co-chaired by Alun Michael and David Sainsbury, with stakeholders such as the Chemical Industries Association, the Confederation of British Industry and Greenpeace. Control is also an issue, but REACH can be developed in a workable and proportionate way to ensure the desired level of protection without placing unnecessary burdens on industry. The need for REACH arises from the the lack of basic information on the possible risks that continued use of the majority of the approximately 30,000 chemicals on the EU market may pose. Further inter-related issues under investigation include prioritisation, registration, imports, chemicals in products, impact assessment, endocrine disruptors, removal of substances from the market, impurities, impacts on global warming and bureacracy. Defra as a member of

the interdepartmental group on the three Rs – replacement, refinement and reduction in the number of animal experiments, will be developing policy in that area.

Science and Innovation Investment Framework

Questions and Written Answers on Wednesday 15 September

Sue Doughty (Guildford): To ask the Secretary of State for Trade and Industry what qualitative analysis was undertaken in the preparation of the paper Science and Innovation Investment Framework 2004–2014, published in July, to determine the likely consequences of the proposed investment strategy on the types of research projects undertaken in the United Kingdom.

Ms Hewitt: A range of analysis was used in the preparation of the Science and Investment Framework 2004–2014 including a public consultation to which around 200 responses were received from individuals and organisations including businesses, charities, higher education institutes and representative organisations. The framework builds on the substantial work of the DTI Innovation report and the Lambert Review of Business-University Collaboration, both published in 2003. The proposed investment strategy does not attempt to determine the types of research projects that should be undertaken. Allocation of funding to specific projects will continue to be governed by excellence and relevance to the needs of potential users and the nation. The framework identifies the strategy to underpin the Government's ambition, shared with its partners in the private and not-for-profit sectors, is for the UK to be a key knowledge hub in the global economy, with a reputation for outstanding scientific and technological discovery as well as turning the knowledge into new products and services.

Science Expenditure

Sue Doughty (Guildford): To ask the Secretary of State for Trade and Industry if she will estimate the proportion of the United Kingdom total science spending which is fully independent of commercial interests; and what trends the Government have identified relating to past and future variations in this proportion of science spending in the UK.

Ms Hewitt: The Government's commitment to the continuing excellence of UK science was reinforced by the outcome of the 2004 Spending Review, in which it announced annual real growth in the public science base of 5.8 per cent, through the DTI and DfES, which will see it climb to over £5 billion by 2007. That is more than a billion pounds more than this year and nearly double the expenditure in 1997. The Government fully recognise the role that public and private organisations including businesses and charities play in the investment of the science base. As outlined in the Science and Innovation Framework 2004–14, we aim to further encourage collaboration between the various organisations. No estimate has been made of the proportion of the total spend which is fully independent of such interests.

Research Councils

Question and Written Answer on Thursday 16 September

Dr Gibson (Norwich N): To ask the Secretary of State for Trade and Industry if she will estimate the proportion of Research Council grants that will go to staff costs when research councils move to funding the full economic costs of research.

Ms Hewitt: On currently available data, Research Councils estimate that staff costs, including staff directly employed on the grant such as research assistants, make up approximately 40 per cent of the Full Economic Cost (FEC) of current grants. Permanent academic staff (Principal Investigators and Co-Investigators) represent approximately one third of this figure.

The Government have allocated an additional £200 million per year from 2007–08 (£120 million from 2005–06) to pay more for each Research Council project. As stated in the "Science and Innovation Investment Framework 2004–14", the Government intends that Research Councils should pay close to 100 per cent of the FEC of their grant funded research, taking account of capital funding streams, by the beginning of the next decade.

Progress of Legislation before Parliament

Government Bills

Energy Bill: received Royal Assent 22 July.

Health Protection Agency Bill: received Royal Assent 22 July.

Human Tissue Bill: completed HoC stages 28 June; 2R HoL 6 September; Committee Stages started 15 September.

Patents Bill: received Royal Assent 22 July.

Private Members' Bills

Sustainable and Secure Buildings Bill: received Royal Assent 22 July.

The following bills are on the list for Second Reading on Friday 15 October:

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.

Marine Wildlife Conservation Bill: introduced 16.6.04 under the 10-minute rule by John Randall MP.

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

UK Parliament - Digest of Parliamentary Debates, Questions and Answers

7th June – 16th September 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 40 to 43.*

Agriculture

Apples – 16.9.04 HoC 1662W
Common Agricultural Policy – 20.7.04 HoC 123W
Copper – 24.6.04 HoL WA152
Curry Commission Report – 22.7.04 HoC 403W
Global Food Consumption – 28.6.04 HoC 2W
Horticulture – 22.7.04 HoC 397W
Lambs – 15.9.04 HoL WA193
Livestock Grazing – 15.7.04 HoC 1299W
Orchards – 15.6.04 HoC 790W, 17.6.04 HoC 1101W, 18.6.04 HoC 1124W, 24.6.04 HoC 1468W, 12.7.04 HoL WA131, 22.7.04 HoC 476 & 8.9.04 HoL WA160
Organic Crops: Pesticide Residues – 24.6.04 HoL WA156
Renewable Transport Fuel Obligation – 22.7.04 HoC 418W
Rural Strategy – statement – 21.7.04 HoC 329

Animal Experiments

Animal Experiments – 18.6.04 HoC 1159W, 29.6.04 HoC 198W, 1.7.04 HoC 388W & 13.7.04 HoC 1018W
Animal Research – 6.7.04 HoC 665W
Animal Rights Activists – 7.7.04 HoC 741W
  Extremism – 10.6.04 HoC 557W
  Extremists – adjournment debate – 7.7.04 HoC 263WH
Animal (Scientific Procedures) Act 1986 – 1.7.04 HoC 17WS & HoL WS14
Botox Toxicity – 22.7.04 HoC 574W
Botulinium – 7.7.04 HoC 742W & 22.7.04 HoC 574W
Chemicals Regulation – 16.9.04 HoC 1663W
LD50 Tests – 7.7.04 HoC 753W & 22.7.04 HoC 597W
Medical Research (Animals) – 15.9.04 HoC 1632W
Scientific Procedures on Living Animals – 7.9.04 HoC 106WS

Animal Health and Welfare

Animal Medicines – 14.7.04 HoC 1139W
Animal Welfare Strategy – 24.6.04 HoC 86WS
Antibiotics (Pigs) – 5.7.04 HoC 435W
Anticoagulant Rodenticides – 22.7.04 HoL WA91
Bovine Brain Diseases – 16.6.04 HoC 946W
Cattle Diseases – 14.6.04 HoC 700W & 15.6.04 HoC 879W
Draft Animal Welfare Bill – 14.7.04 HoC 65WS & HoL WS61
Exotic Birds – 8.7.04 HoL WA112 & 12.7.04 HoL WA132
Feeding Stuffs Regulations – debate – 23.6.04 HoL 1338
Foot and Mouth – 29.6.04 HoC 158W & 16.9.04 HoC 1668W
Greyhounds (Welfare) – adjournment debate – 7.6.04 HoC 116
Illegal Meat Imports – 2.7.04 HoL WA50 & 19.7.04 HoC 10WS
Import of Animal Products for Personal Consumption – 8.7.04 HoL WA114
Prescription-only Medicines (Vets) – 15.7.04 HoC 1290W
Queen Bees – 24.6.04 HoC 1435
Squirrels – 12.7.04 HoC 895W
TSE (England) (Amendment) Regulations 2004 – debate – 8.9.04 HoL 668
Urban Foxes – 12.7.04 HoC 896W
Veterinary Antibiotics – 15.9.04 HoC 1581W
Veterinary Laboratories Agency – 14.7.04 HoC 66WS
Veterinary Practices – 24.6.04 HoL 1391
Whales – 16.6.04 HoC 954W
  Sonic Threats – 15.9.04 HoL 1169
Wild Animals: Enzootic Diseases – 7.9.04 HoL WA152

Aviation

Air Quality (Heathrow) – 20.7.04 HoC 22WS
Air Transport – 8.6.04 HoC 175 & 16.6.04 HoC 931W
Aircraft Emissions – 22.6.04 HoC 1314W & 16.7.04 HoL WA153
Aircraft Seats – 8.6.04 HoC 283W
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  Emissions – 22.7.04 HoC 399W
  External Costs – 22.7.04 HoC 647W
  Fuel – 5.7.04 HoC 471W
  Global Positioning System – 16.9.04 HoL WA207
  Health Unit – 7.9.04 HoC 1116W
  In-flight Weather Satellite Systems – 16.9.04 HoL WA208
Civil Aircraft (Safety) – 21.7.04 HoC 263W
Launch Investment – 30.6.04 HoC 279W
Royal Commission on Environmental Pollution Report – 25.6.04 HoL WA167

Biodiversity

Ancient Trees – 10.6.04 HoC 501W
Biodiversity and Geological Conservation – 8.9.04 HoC 117WS
CITES – 16.9.04 HoC 1664W
  Contravention – 22.7.04 HoC 470W
EC Water Framework Directive – 16.6.04 HoC 948W

Endangered Species: Imports – 5.7.04 HoL 68 & 21.7.04 HoL WA54
Flora and Fauna Extinction – 9.6.04 HoC 440W & 29.6.04 HoC 158W
Galapagos Islands – 21.6.04 HoC 1188W
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Protected Bird Species – 9.6.04 HoC 441W
Red Squirrels – 23.6.04 HoL WA133 & 14.7.04 HoC 1143W
NE England – adjournment debate – 8.9.04 HoC 316WH
Squirrels – 16.6.04 HoC 952W
Trade (Endangered Species) – 15.6.04 HoC 836W
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Whaling – 17.6.04 HoC 1103W

Biotechnology

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GM Food – 28.6.04 HoC 35W
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GM Products – 1.7.04 HoC 362W

BSE/CJD

Blood Donation and vCJD – 22.7.04 HoC 77WS & HoL WS52, 9.9.04 HoC 128WS & HoL WS104
Blood Transfusion – 6.7.04 HoC 6087W
BSE – 5.7.04 HoC 437W
Transmissible Spongiform Encephalopathies – 20.7.04 HoC 12WS
Variant CJD – 10.6.04 HoC 555W & 9.9.04 HoC 1358W

Bovine TB

Badger and Deer Carcases – 19.7.04 HoL WA18 & 7.9.04 HoL WA151
Badgers – 22.7.04 HoC 469
Badgers and Bovine TB – 10.6.04 HoL 379
Bovine TB – 17.6.04 HoC 1097W, 22.6.04 HoC 1289W, 6.7.04 HoC 627W, 12.7.04 HoC 883W & 7.9.04 HoL WA151
Irish Bovine TB Experiment – 16.6.04 HoC 952W
TB Testing: Collection of Roadside Carcases – 12.7.04 HoL WA131

Chemicals

Air Fresheners – 16.6.04 HoC 994W
Aldehydes – 21.6.04 HoC 1264W
Chemicals – 21.6.04 HoC 1270W
DecaBDE – 6.7.04 HoC 629W
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Tax – 21.6.04 HoC 1191W
Phthalates – 7.6.04 HoC 106W
Pregnancy:Exposure to Toxic Chemicals – 7.6.04 HoL WA13
* REACH – adjournment debate – 9.9.04 HoC 325WH
Sulphuric Acid – 7.6.04 HoL WA13

Climate Change

Air Traffic: Emissions – 29.6.04 HoL WA19
Carbon Dioxide Emissions – 22.7.04 HoC 470
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EU Emissions Trading Scheme – 17.6.04 HoC 1101W
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Energy Performance of Buildings Directive – 21.7.04 HoC 29WS
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Defence

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Atomic Weapons Establishment, Aldermaston: Laser Facility – 12.7.04 HoL WA124
Bilateral Defence Acquisition Committee – 10.6.04 HoL WA49
Defence Diversification – 12.7.04 HoC 904W
Defence Industry – 7.6.04 HoC WA8
Defence Research and Development – 12.7.04 HoC 989W
Delivering Security in a Changing World: Future Capabilities – statement – 21.7.04 HoC 343
European Defence Agency – 21.6.04 HoC 71WS & 22.6.04 HoL WS56
Explosion Mitigation Technology – 15.6.04 HoC 809W
Faslane – 16.6.04 HoC 938W
Future Aircraft Carrier – 6.7.04 HoC 642W, 19.7.04 HoC 1WS & HoL WS3
Future Joint Combat Aircraft – 10.6.04 HoL WA48
Light Multi-role Vehicle – 5.7.04 HoC 573W
Manufacturing – 21.6.04 HoC 1064
Nimrod Project – 21.6.04 HoC 1177W
NITEworks – 14.9.04 HoL WA183
Nuclear Submarines – 10.6.04 HoL WA50 & 22.7.04 HoC 527W
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Trident Replacement – 16.6.04 HoC 939W

Defence (Gulf Wars)

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Health (General)

Health (International Development)

Health (Service)

Health (Vaccine)

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Sustainable Development

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Speed Cameras: Installation Criteria – 30.6.04 HoL WA22
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  Health Impacts – 13.7.04 HoL WA143

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  Incineration – 8.7.04 HoL WA111
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  Electrical Equipment – 8.7.04 HoC 782W
  Incineration – 13.9.04 HoC 1421W
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* Management Policy (EUC Report) – 22.6.04 HoL 1195

Water

Domestic Water Conservation – 5.7.04 HoC 438W
EC Water Framework Directive – 14.6.04 HoC 611W
Fluoridation – 21.6.04 HoC 1273W, 28.6.04 HoL WA5 & 7.9.04 HoL WA137
Housing – 24.6.04 HoC 1465W
Waste Water – 7.6.04 HoC 234W
Water Treatment – 5.7.04 HoC 447W

Euro-News

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

Alternatives to animal testing

The European Centre for the Validation of Alternative Methods (ECVAM) of animal testing, which is part of the Commission's Joint Research Centre (JRC), has seen an increase in its budget from €25 million under FP5 to €35 million under FP6 It is still struggling to keep up with demand. In eleven years sixteen methods have been validated and that normally takes three years. Two more are undergoing peer review. Alternative testing methods not only reduce animal suffering but are also cheaper and more efficient.

For further information on ecvam, please visit:
http://ecvam.jrc.it

Zoonoses

Zoonoses are diseases that can be transmitted from animals to people and are responsible for some of our most serious public health problems. A new Network of Excellence, MED-VET-NET, funded under the "Food quality and safety" thematic priority of the Sixth Framework Programme (FP6) will unite medical and veterinary expertise in the fight against zoonoses. Control of these diseases is presently hampered by lack of co-operation between medical and veterinary scientists. MED-VET-NET will receive €15 million from the Commission over the next five years and will involve 150 scientists from 10 EU countries, leading to a virtual institute integrating veterinary, medical and food science.

For more information, please visit:
http://www.medvetnet.org/

European Research Council

One of the most far-reaching research priorities for the next sixth month Dutch Presidency is promotion of fundamental research with the possible creation of a European Research Council (ERC). The ERC has already received broad political and scientific support and everyone is agreed that it would have to be a small, simple and transparent council, with as little bureaucracy and regulation as possible. Industry has a special need for fundamental research as it underpins innovation and both fundamental and applied research are important for the Seventh Framework Programme (FP7) and need financial support. The conventional idea that industry requires applied research lacking innovative content is completely misplaced.

For more information, please visit:
http://www.cordis.lu/netherlands/home.html

Going Dutch

Other priorities for the Dutch Presidency, that is already committed to competitiveness and innovation, include economic growth, investing in human capital and development of sustainable technologies. "Knowledge workers" will receive "special attention" as the Dutch propose to stimulate researcher mobility through exchange programmes to include researchers from third countries and to focus on portability of student finance. On the other hand, achieving the Community Patent, although considered an important component, is seen as too difficult at this stage and progress will depend on the outcome of bilateral talks between Member States.

For more information, please visit:
http://www.cordis.lu/netherlands/home.html

Women Scientists

The Enwise (ENLarge Women in Science to East) final report provides a much needed and detailed analysis of the role of women in science in Central and Eastern European Countries (CEECs) and the Baltic States. The report calls for action from the Commission, the European Parliament, the Council of Ministers and national authorities. According to Eurostat, in a number of CEECs the participation of women in science is close to 50%. However the harsh reality is that in those fields where one finds the highest proportion of women scientists, one also finds the lowest research budgets and the oldest infrastructure. This report appears to to be short on recommendations on what to do about it.

To access the Enwise final report, please consult the following web address: http://europa.eu.int/comm/research/science-society/highlights_en.html

Technology Platform for Sustainable Chemistry

There is an urgent need to boost chemical research and innovation in Europe. The establishment of innovative public-private partnerships in strategic areas of research through the use of so-called technology platforms is a stated Commission priority, and the latest players to take the initiative are the chemical and biotechnology industries. The European association for bioindustries, EuropaBio, has now teamed up with CEFIC, the European chemical industry council to establish a new technology platform. It is now recommended that a European Technology Platform on Sustainable Chemistry be established to galvanise and focus collaborative research, development and innovation activities relating to the European chemicals industry.

For more information, please consult the following Web address: http://www.cefic-sustech.org/files/publications/ETP_sustainable_chemistry.pdf

Endocrine-disrupting Chemicals

The CASCADE (chemicals as contaminants in food) Network of Excellence, established in February 2004 under the Food quality and safety priority of the Sixth Framework Programme (FP6) is now operational. The objective of the network is to provide Europe with excellent research, risk assessment and training on the effects of endocrine-disrupting chemicals in food.

For further information on the CASCADE NoE, please consult the following Web address:http://www.cascadenet.org
To find out more about EU endocrine disrupter research, please visit:
http://europa.eu.int/comm/research/endocrine/index_en.html

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).

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British Association for the Advancement of Science - the BA

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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
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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
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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. IPEM is licensed by the Science Council to award CSci and by the Engineering Council (UK) to award CEng, IEng and EngTech.

Institution of Civil Engineers

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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: Dr Alison Campbell
Managing Director of KCL Enterprises
King's College London
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E-mail: alison.campbell@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

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Director of Research Support Unit
Research Support Unit, 3 Cavendish Road,
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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
Waterside House
35 North Wharf Road
London
W2 1NW.

Tel: 020 8718 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 66,000 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
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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
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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 in a national survey as one of the top Universities in the UK for technology transfer.

OSIL

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Petersfield, Hampshire GU32 3ET
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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
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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: Sue Ferns,
Prospect Head of Research and Specialist Services, Prospect House
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www.prospect.org.uk

Prospect is an independent, thriving and forward-looking trade union with 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

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Rio Tinto is a leading international mining company which focuses on exploration for first class ore-bodies and the development of large, efficient long-life mines capable of sustaining competitive advantage. Principal products (aluminium, borates, coal, copper, gold, iron ore, titanium dioxide, uranium, nickel, talc, salt, diamonds and silver) provide the materials necessary for economic progress and prosperity in the developed and developing world.

The Royal Academy of Engineering

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29 Great Peter Street
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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

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Royal Astronomical Society
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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
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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
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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

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The Royal Institution
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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

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Director Communications
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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

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Parliamentary Affairs
The Royal Society of Chemistry
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E-Mail: benns@rsc.org
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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

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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

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The Science Council has a membership of over 25 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. We are active in science policy issues including science in education, health, society and sustainability. In 2003 the Science Council was granted its Royal Charter and in 2004 it launched the Chartered Scientist (CSci) designation as a measure of high standards in the practice, application, advancement and teaching of science.

SCIENCE IN PARLIAMENT

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All enquiries to the Parliamentary and Scientific Committee, 3 Birdcage Walk, Westminster, London SW1H 9JJ. Tel: 020 7222 7085

Members wishing to take the front or back covers, advertise in the journal or appear in the directory listing should contact Mrs Annabel Lloyd, Tel: 020 7222 7085.

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Science Diary

The Parliamentary and Scientific Committee

Contact: Annabel Lloyd
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www.pandsctte.demon.co.uk

Monday 25 October 17.30
Risk Perception and Risk Assessment versus Hazard Reduction
Speakers: Alastair Evans, Lloyds; Professor Phil Dale, John Innes Research Centre; Dr Chris Elliott, Pitchill Consulting

Monday 15 November 17.30
"Standing on the Shoulders of Giants"
Speakers: Professor George Smith, Oxford University; Professor Sir David King, Chief Scientific Adviser; Dr Julia King, Imperial College

Monday 13 December 17.30
Animal Contributions to Science and Society
Speakers: Sir John Sulston, Sanger Centre; Philip Conolly, Coalition for Medical Progress; Robert Hubrecht, UFAW

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)

Monday 1 November 19.00
Nanotechnology: Can something so tiny promise something so big?
Prof Richard Jones, Prof Raymond Oliver and James Wilsdon

Tuesday 2 November 19.00
Science, Business and Education: which way forward?
Lord Sainsbury, Prof Paul McMillan, Prof John Holman and Adrian Smith

Wednesday 3 November 19.00
Is Homo Sapiens just another animal?
Prof Steve Jones

Wednesday 10 November 19.00
The Science of Beauty
Noella Gabrielle, Dr Jean Graham and Dr Armand Leroi

Tuesday 16 November 18.30
Thinking outside the Box: Creativity in Science
Dr Daniel Glaser and Dr Lauren Stewart
Ticket**s £5**

Wednesday 17 November 10.30-16.30
Your Good Health: how does science keep us healthy?
Prof Ron Eccles, Dr Graham Jackson, Prof David Reid & Prof Gordon Wilcock

Wednesday 17 November 19.00
Good-time Girls: the evolution of female promiscuity
Dr Olivia Judson

Tuesday 23 November 19.00
Chemical Reactions
Dr Paul Harrison and Dr Daniel Osborn

Wednesday 24 November 19.00
Journey to the Heart of the Sun
David Whitehouse

Wednesday 8 December 19.00
Beauty in the Bubbles: popping the cork on champagne
Frédéric Panaïotis

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 1 and Tuesday 2 November 2004 (all day)
Discussion meeting
Engineered foams and porous materials
Organised by Professor Anthony Kelly CBE DL FREng FRS, Professor Bill Bonfield CBE FRS, Professor Bill Clyne and Professor Arthur Willoughby

Tuesday 9 November 18.00
Ferrier Prize Lecture
Magnetic brain stimulation: what can it tell us about brain function?
By Professor Alan Cowey FRS

Wednesday 24 November18.30
Francis Crick Lecture
Genes, worms and the new genetics
By Dr Julie Ahringer

Thursday 9 December 18.30
Science, complexity and the nature of existence
By George Ellis

Monday 17 and Tuesday 18 January 2005 (all day)
Discussion meeting
Genetic variation and human health
Organised by Professor David Goldstein, Dr Michael Stumpf and Professor Nick Wood

Monday 14 and Tuesday 15 February (all day)
Discussion meeting
The fundamental constants of physics, precision measurements and SI base units
Organised by Dr Terry Quinn FRS and Professor Keith Burnett FRS

British Society for Antimicrobial Chemotherapy

Contact: Philippa McCoy
Tel: 0121 633 0410
E-mail: pjmccoy@bsac.org.uk

Tuesday 30 November
Joint Meeting with the Specialist Advisory Committee on Antimicrobial Resistance and the Alliance for the Prudent Use of Antibiotics
What can Professionals and the Public do about Antimicrobial Resistance and Prescribing?
At Royal College of Physicians, London

The Royal Academy of Engineering

29 Great Peter Street,
London SW1P 3LW
www.raeng.co.uk, Tel 020 7227 0500

Wednesday 17 November 15.30
A Celebration of UK Engineering Research & Innovation
at the Excel Exhibition Centre, Docklands London, organised by the EPSRC and The Royal Academy of Engineering

Tuesday 23 November 18.00
The Cambridge MIT Institute & its Silent Aircraft Initiative
Professor Michael Kelly FREng FRS, Executive Director of the Cambridge MIT Institute
APEG, the Associate Parliamentary Engineering Group
House of Commons, Room 6

SCI

14/15 Belgrave Square,
London SW1X 8PS
Contact: conferences@soci.org or 020 7598 1562

Wednesday 3 November
Membrane Chromatography - Applications in the bioseparations industries

Thursday 18 November
Fibres in Concrete: To use or not to use?

Tuesday 30 November
Environmental and Human Health Effects of Endocrine Disrupting Chemicals

Wednesday 1 December
Organic Synthesis: Oxidation and Reduction (YCP review mtg)

Thursday 2 December
ADME for Ag - Predicting and designing physicochemical properties for crop protection agents

Friday 3 December
Organic Synthesis: Oxidation and Reduction (YCP review mtg)
Glasgow University

Wednesday 8 – Friday 10 December
22nd SCI Process Development Symposium
Churchill College, Cambridge, UK

Tuesday 14 December
Advances in Non-Aqueous Colloids

Tuesday 11 January
AGM and Meeting on Diffuse Pollution of Water

Thursday 20 January
Contribution of PFA/Calcined sewage sludge

Thursday 3 – Friday 4 February
Chemistry for Non-Chemists
Aston University, Birmingham, UK

Tuesday 8 February
Ammonia losses to the atmosphere

Wednesday 9 February
Electronic Laboratory Notebooks: Challenges and Solutions
SCI

Tuesday 15 February
Cosmetics and Colloids

Royal Pharmaceutical Society of GB

Contact: Judith Callanan
020 7572 2261
science@rpsgb.org.uk

Monday 22 – Wednesday 24 November
Tabletting Technology
Crowne Plaza, Cambridge, UK

Wednesday 24 November
Integration, inter-professional training and innovation in education in pharmacy
Royal Phamaceutical Society

Friday 26 – Saturday 27 November
Neonatal and Paediatric Pharmacists Group Annual Conference
Assembly Rooms, Newcastle

Thursday 2 December
Genomics, proteomics & metabonomics in drug discovery and development
Royal Pharmaceutical Society

Tuesday 14 – Wednesday 15 December
PAT Conference: FDA Workshop
Royal Pharmaceutical Society

Wednesday 16 February
Amorphous materials; a good friend or bad enemy?
Royal Pharmaceutical Society

Monday 21 – Wednesday 23 February
Stability Testing of Pharmaceuticals
Crowne Plaza, Cambridge, UK

Wednesday 23 – Thursday 24 February
Biopharmaceutics and Drug Delivery
Royal Pharmaceutical Society

Institution of Mechanical Engineers

Thursday 4 November
2004 Rolls-Royce Lecture
Contact Maria Powell 020 7973 1290
Email m_powell@imeche.org.uk
One Birdcage Walk, London

Monday 8 November
Engineering Challenges at the Dawn of Wave and Tidal Energy
Seminar organised by the Power Industries Division
Contact Kristina Barton 020 7973 1304
Email k_barton@imeche.org.uk

Thursday 18 November
The Management Dimension of Engineering Product Development
Seminar organised by the Management Group
Contact Madeline Willis 020 7973 1260 Email m_willis@imeche.org.uk

Wednesday 24 November
Human Performance – The Designer's Role
Seminar organised by the Nuclear Power Committee of the Power Industries Division
Contact Kristina Barton 020 7973 1304
Email k_barton@imeche.org.uk

Thursday 2 December
Thinking in Time and Space – Triz and Creative Problem Solving, an Introduction
Workshop organised by the Manufacturing Industries Division
Contact Vicky Fuller, 020 7973 1251, v_fuller@imeche.org.uk

Thursday 9 December
Nanotechnology
Seminar organised by the Structural Technology and Materials Group
Contact Georgina Shaw 020 7973 1291
Email Georginas@imeche.org.uk

Science in Parliament
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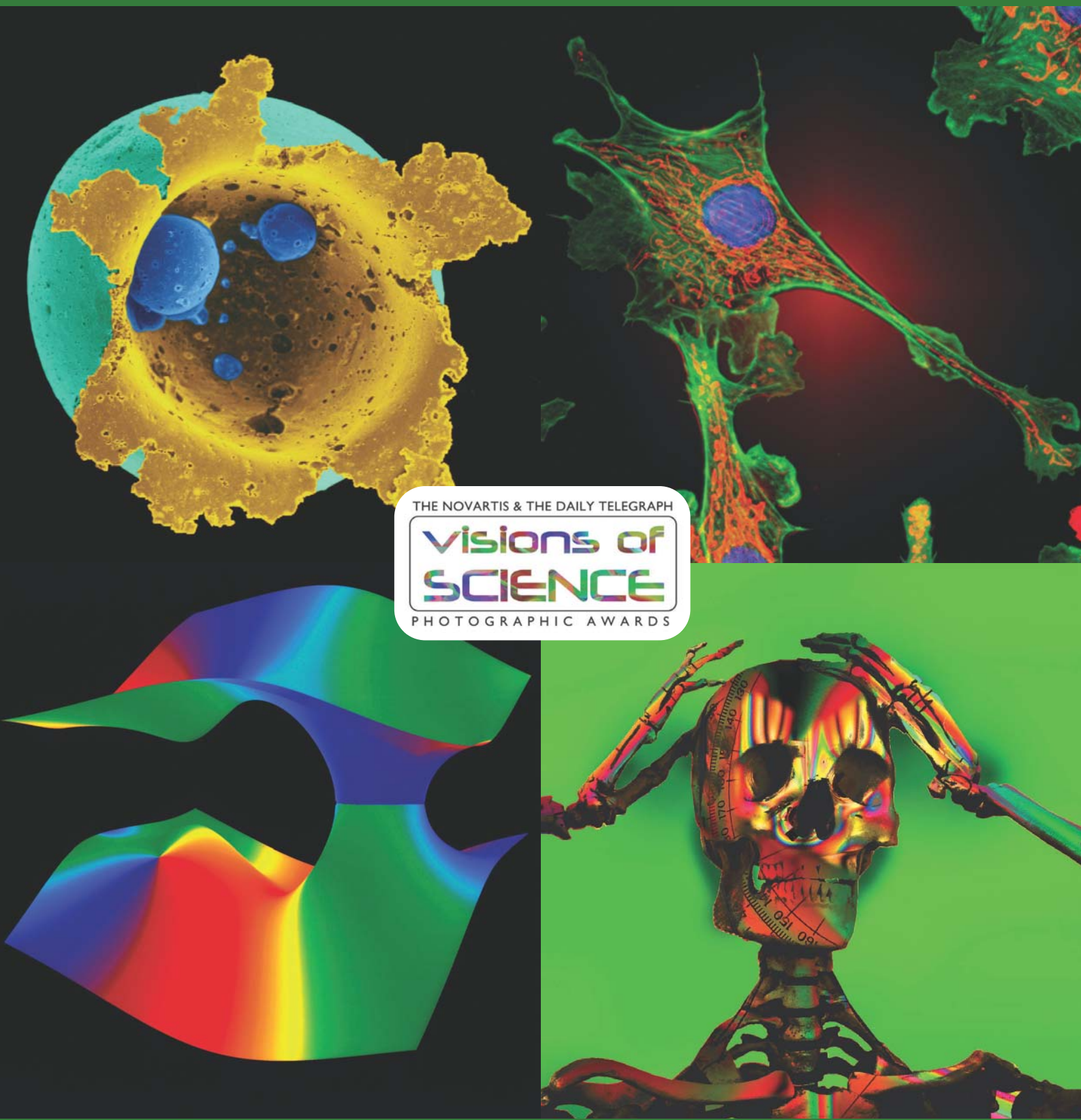
The Novartis and The Daily Telegraph Visions of Science Photographic Awards

Visualising drug delivery by David McCarthy

A polymer microcapsule acts as a "carrier" of smaller microcapsules, allowing different drugs to be delivered to different places in the body.

Growth cones by Dr David Becker

This highly magnified image reveals the dynamic life of cells in culture, as they extend growth cones to move around, interact with other cells and investigate their environment.



Crystal waves by Michael Berry

This image contains a wealth of information about waves of polarised light travelling through a crystal. The colours represent the direction of the polarisation and the shapes of the surfaces show how the speeds of the waves depend on their direction.

Stress by Cong Cong Bo

Stress in plastics can be revealed by viewing the objects under polarised light. Here the coloured bands from stresses in plastic stationary when viewed under polarised light, are used to represent human stress.