Airbus Launches the New A350
About the Institution of Civil Engineers
As a professional body, the Institution of Civil Engineers (ICE) is one of the most important sources of professional expertise in road and rail transport, water supply and treatment, flood management, waste and energy – our infrastructure. Established in 1818, it has over 75,000 members throughout the world – including over 60,000 in the UK.

About the report
The State of the Nation Report is compiled each year by a panel of civil engineering experts. The report’s aim is to stimulate debate and to highlight the actions that ICE believes need to be taken to improve the UK’s infrastructure. It has been produced since 2000.

This year, six regional versions of the State of the Nation Report – covering Northern Ireland, Scotland, Wales as well as the North West, South West and West Midlands of England – are being produced, in conjunction with the UK-wide publication.

For more information on the background to the State of the Nation Report, contact ICE External Relations:

\[+44 (0)20 7665 2151\]
\[stateofthenation@ice.org.uk\]
\[www.uk-infrastructure.org.uk\]

To read the complete report please visit
\[www.uk-infrastructure.org.uk\]
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.

Michael Dixon's NHM inspires public engagement
with science, as our planet's future depends on a
better understanding of nature. Robert Key says
politicians must recognise that Britain's success
depends on our scientists, technologists and
engineers. Paul Wiles promotes identity
verification using ID cards and the National
Identity Register. Peter Davis's plastics are
recycled or burnt to help close the energy gap.
Graham Hearn's electrostatics sort waste plastics
into clean, single polymer streams, prior
to melting and reforming. Lee
Clayton's UK plastic
cycling plant makes a profit and Roger
Morton's research on novel plastic
separation techniques reduces plastic
disposal in landfill.

The Royal Society of Chemistry's Parliamentary
Links Day is "the foremost scientific gathering in
the Parliamentary calendar" according to the
Prime Minister, while Hilary Benn unites scientists
and policymakers in the fight against poverty and
disease in Africa. Paul Chivers' industrial
revolution replaces metals with composites in the
Airbus A350 wing. Gordon Masterton presents
the State of the Nation, with radical solutions for
infrastructure problems. Visions of Science
emphasise diversity of technique and mode of
expression. Bill McGuire discusses early warning
for tsunami that could prevent a hazard becoming
a disaster. Lord Warner believes that PFI will
underpin the NHS new build, while Allyson
Pollock argues that PFI is built on sand. Aftab
Khan's geophysicists are a declining resource
requiring attention. The Committee is stimulated
by a visit to the Genetics Knowledge Park, while
Philippa Rogers develops the UK/Japan S&T
collaborations, John Freeman considers codes of
conduct for weapons scientists, Michael Bode's
Spaceport locates on the Mersey and Robert Freer
engineers sustainable development.

Following this edition I hand over the reins (ie
chair of the Editorial Board) to Dr Brian Iddon,
MP for Bolton South East. I have enjoyed my
stint in charge of Science in Parliament immensely
and I wish Brian every success. I also want to
thank Annabel Lloyd and Peter Simpson whose
hard work and inventiveness contribute so much
to our journal.

Dr Douglas Naysmith MP
Chairman, Editorial Board,
Science in Parliament
The Natural History Museum: Inspiring public engagement with science

Michael Dixon, Director

At the Natural History Museum we believe the future of the planet depends on a comprehensive understanding of the natural world. We share knowledge, engage people’s curiosity and encourage their enjoyment of the planet with a sense of responsibility for its future. Any organisation delivering such lofty ideals is bound to be complex and the mix of skills, facilities and endeavour enshrined by the Museum is rarely visible. The NHM is a world class collection of natural history specimens and artworks, a centre of scientific excellence, a learning resource, a place of public engagement with science, and an iconic building as well as one of the UK’s leading visitor destinations. Our work also contributes to the delivery of strategic priorities of several government departments.

The Museum is a non-departmental public body (NDPB) and receives grant-in-aid from the Department for Culture, Media and Sport, supplemented by a range of income generating activities that are necessary to fund the activities we undertake. The biggest contributors are scientific grants from the Research Councils and other grant awarding bodies, retail and catering businesses for our 3.3 million visitors, a conference and events business utilising the buildings and gardens and consultancy services based on our scientific and exhibition design expertise, and many other activities also make profitable contributions.

Our Science Group is responsible for the curation of collections of over 70 million biological and geological specimens. Items are loaned for both research and exhibition purposes, with as many as 70,000 being offsite at any one time. Scientific staff publish over 500 peer reviewed articles annually and many are world leaders in their field. We also house about 70 PhD students, for whom there is co-supervision with scientists in UK universities, and MSc students on courses that we run jointly with Imperial College. Our scientists also provide access to information on the world’s biological and geological diversity, principally through our library which probably holds the world’s greatest natural history collection, and by providing identification for specimens collected worldwide. We handle around 45,000 enquiries annually from professionals and the public.

Our Public Engagement Group operates at South Kensington and Tring and through outreach, touring exhibitions in the UK and overseas and our website, which attracts almost a million visits monthly. Annual visits have doubled from around 1.65m to 3.3m since the reintroduction of free admission in December 2001 and we have programmes to attract a more diverse audience. Over 95% of our visitors consider their experience good or excellent. We have established a design consultancy from our touring exhibition business that has worked on high profile, overseas projects and co-designed the UK pavilion at the Expo in Aichi, Japan this year. We also support primary and secondary school curricula and engage in organised educational activities with around 400,000 children annually.

Over 40 years ago the British Museum Act formally created the Natural History Museum as a scientific organisation with the public side run by the Public Services Agency. Nowadays our role in providing education, information and entertainment for our visitors has taken on greater prominence, which is dependent on the extent and quality of our scientific work and the collections that we hold. We recognise that this must be relevant to the issues that concern the general public and provide evidence to inform public debate. Our Darwin Centre provides state-of-the-art conditions for storage of our collections and world-class facilities for our scientists and is used in bringing scientists and the public closer together. Visitors can see our scientists at work on our collections that are used to address new questions about the natural world and engage with them in interactive sessions that are web-cast on a daily basis.

Our public services are closely aligned to government policy. This includes our sponsoring department, DCMS, the DTI/OST 10 year framework for investment in UK science, the UK’s obligations under the convention on biodiversity (CBD) overseen by DEFRA, the commitments to the next generation inherent in DIES policy and overseas capacity building via the British Council/FCO, with whose support. DCMS and the NHM are training the next generation inherent in DIES policy and overseas capacity building via the British Council/FCO, with whose support.

It is an exciting time to have taken over as Director. Our economic value to the taxpayer is proven. For every £1 invested, we generate £4 for the UK economy. The future of the Museum is also about inspiring the scientists of the future. We have been onsite in South Kensington for almost 125 years but our role has never been more relevant or necessary.

1The NHM also operates the Walter Rothschild Zoological Museum at Tring.
A call to arms…

Robert Key MP
Deputy Chairman of the Parliamentary and Scientific Committee

Britain's future depends more than ever before on the success of our scientists, technologists and engineers. Historically, our influence in the world and our prosperity have always been greatest when we have stretched and exploited our intellectual and skills-based advantages in these fields of human endeavour.

It was neither the language of Shakespeare, nor our constitutional and legal arrangements, nor our Westminster model of democracy that caused the people from a group of small islands to rule an empire on which the sun never set and which became the fourth largest economy in the world. No, our global industrial and military might and wealth depended on our pre-eminence in science and engineering and on our financial acumen.

At the start of the twenty-first century we observe electronic engineering and manufacturing processes growing most strongly in China and the Pacific Rim, British university science departments closing, "hard" science subjects struggling in schools and universities because they are "more difficult" than new soft options. Bioscience companies and the research they sponsor are being forced to leave our country in the face of political extremism. All this, while our economy is increasingly dependent on wallowing in our past and on imported energy that we hope will see us through.

It need not be like this. It must not be like this. Parliamentarians can take a lead and make a difference. Of course, neither individual MPs or Peers, nor our Parties, nor the Government will all agree on policies as diverse and ethically difficult as human reproductive technology, energy sourcing, nanotechnology, genetic modification, or climate change. But there are two key ways in which Parliament can promote informed public debate and help our Government and our nation reach sensible policy conclusions.

For one romantic moment, I invite you to set aside the motives of the Party Whips in helping us decide how to vote (for they only act on orders and there is an urgent need to change the timid way all our political parties handle "science"). The truth is that very few of us go through the division lobbies with fully-developed intellectual analyses on the tips of our tongues, eager to justify our votes on stem-cell research or GM crops to our local papers and radio stations.

Along the way we will have been lobbied by postcard campaigns and Early Day Motions promoted by self-justifying single-issue pressure groups and perhaps by a score of serious constituents acting from deep conviction. Please spare me the MPs who tell us their postbags have been groaning with hundreds of letters supporting the way they will vote anyway! I think only once in 23 years have I had more than 100 personal letters about any issue at all, including abortion and the Iraq war.

The first thing each of us can do in debating policy options, in scrutinising legislation and in deciding how to vote is to understand and to properly assess risk. You don't have to be a scientist to do that. But it makes a mockery of science and of logic if we ignore or distort the nature of risk. Is anything at all risk-free? I doubt it. Yet gullible public opinion and understandable prejudice are easily led by tabloid headlines and focus groups. But who is sillier – the consumer who won't shop at a supermarket if they sell GM food or Governments who tell us food containing up to 0.9% GM ingredients is "GM-free"?

Our second mission must be to ensure that policy is based on evidence – for science is politically neutral. Where an issue is overlain by moral or ethical considerations (as in the case of human reproductive technology) the decision on where to draw the line should be taken by Parliament as a whole, not by the loudest pressure groups nor by Whitehall Ministers. To be pro-science is not to be anti-green any more than good Greens are anti-science. Yet that is too often the assumption in the UK – but not, it seems, in Finland or France (new nuclear power stations) or the USA (commonplace GM products), where science is still respected and debated more rational.

Are we Brits really any different? What has gone wrong? It is time for British politicians to take a lead, not run for cover when science is on the agenda.

Robert Key has been Conservative MP for Salisbury (which includes Porton Down) since 1983. He served in the Governments of Margaret Thatcher and John Major. In the last Parliament he was a Member of the Science & Technology Select Committee and until the 2005 General Election he was Shadow Science Minister. He is now a Member of the Defence Select Committee.
Introduction
The UK plans to move to the introduction of ID cards and the creation of the National Identity Register, subject to Parliamentary decision, with the aims of reducing the opportunity for ID theft, simplifying immigration procedures and supporting stronger verification of identity in the use of public and commercial services, both on- and off-line.

ID cards are not a new concept; indeed an ID card was introduced in the UK during the Second World War, and most EU countries have them. However, better ways of securing the card, both when issued and in use, are needed. Biometric technologies are already used with identity cards for these purposes in other countries such as Malaysia and Hong Kong. Also, ID cards using international standards are becoming available for the first time, and the proposed UK identity card could benefit from these and the experience of other countries.

The key components of the proposed ID cards scheme include:

i) a strong enrolment process to ensure that the credentials supplied by the applicant have been checked thoroughly and that he or she has not attempted to enrol previously;
ii) the creation of a National Identity Register (NIR) which will store basic personal information about the person in a secure manner;
iii) the ID card itself which could be used as a stand-alone card for proving a citizen’s identity; and
iv) a verification service to confirm the identity of the cardholder or of the person whose biometric feature is registered on the NIR.

A number of technologies are required to ensure that the ID card operates in a robust way over many years of use. These include long-lasting material from which the card is made, a secure electronic data link between a card and the reader (eg by a contactless method such as in the new range of passports and in the Oyster card in use on the London tube), a Public Key Infrastructure which will ensure the integrity of the data stored in the card chip and finally, the application of biometric authentication to assure that the user has only registered once into the NIR, and that in subsequent use for high integrity transactions, the identity of the bearer of the card is indeed correctly confirmed.

Biometrics
Biometrics may be defined as automated methods of identifying people using a physical, physiological or behavioural characteristic. Some methods have been around for a long time (fingerprints have been a key tool for police forces for over a century), while others have been introduced very much more recently (for example, iris recognition was proposed just over 20 years ago).

All biometric systems start with the stored image of the biometric, which is normally recorded at an enrolment session. Subsequent verification of an individual’s identity relies on comparing a presented biometric feature with this initially recorded biometric, typically using a proprietary pattern-matching algorithm that compares the characteristic elements in that biometric image with similar features stored at the
enrolment. Because of the ever-changing ways in which people respond to the biometric terminal (for instance, they may smile or frown in a facial biometric system), this comparison will never be identical. Hence the need for a criterion for an acceptable degree of matching – the threshold value – which treads a fine line between security and usability. Allied to the selection of this criterion is a requirement to handle those exceptional cases where the individual hasn’t quite been able to reach the threshold for acceptance.

The use to which biometrics are put affects the requirements put on the technology. For over a century, experts have compared the fingerprint marks left at the scene of crime with those obtained from previously arrested criminals. The collection of fingerprints on arrest involves a traditional ink and the rolled finger method with trained police officers guiding the fingers of the person to achieve the best impression. For the past 15 years or so, computer matching systems have been available to support the expert fingerprint examiners. However, a different approach is required for automated biometric systems. For example, optical imaging and even silicon chip sensors are used with the finger placed flat on a glass surface without the need to roll it from side to side. In many of these newer – biometric – systems the image is scanned to identify points where the individual fingerprint ridges either stop or branch into two separate ridges. The supplier of a biometric system will then use these 50-100 characteristic points (called minutiae) on each finger to create a template for that individual’s fingerprint, and use proprietary algorithms to make a comparison between the set of points picked out when the person first enrolled and those identified at the time when their identity is being checked. A matching score can be derived using information from more than one finger and a threshold set based on the risk analysis. Procedures are needed for those people with missing fingers, where the surface ridges have been scarred, etc.

Different biometric technologies provide varying levels of matching performance and are suitable for different uses. Indeed, more than one biometric method can be used to decrease the number of people unable to provide a satisfactory verification; for instance, iris and face recognition can support the use of fingerprint technologies. Iris recognition relies on specialised algorithms working on the fine detail in the coloured part of the eye, in a way that keeps the information constant in spite of the changes in pupil size following changes in ambient light levels. One of the main approaches for automated face recognition uses a merging of a number of base facial images to approximate the image of the individual’s face; the percentage of each of the base images is adjusted to optimise the accuracy of the resulting image. Another approach focuses on distinctive groupings of features relating to specific regions of the face.

The proper application of biometric technologies is at least as important as choosing the correct technology – or mix of technologies. For example, a high quality user interface and an optimised capture environment is necessary to put the person at ease to ensure that the best image is obtained. Security issues need to be addressed so that the biometric system will not accept plastic fingers with an impressed fingerprint or a photograph of a face. Of course, the needs of the elderly and disabled have to be taken into account as well.

Biometrics is an evolving field and we must be aware of what the future may hold for biometric technologies. Although the underlying biometric technologies are mature, commercial systems are constantly being improved with developments in increased usability, higher security against spoofed artefacts, and refining the underlying algorithms. For example, in facial recognition, three-dimensional imaging may reduce the impact of subjects not facing straight-on towards the camera. A key theme of much of this development is in fusing the results from more than one approach, whether it is just in taking two fingerprints or adding the scores from separate iris and fingerprint systems to give more confidence to the verification process.

Summary

Biometric authentication is at the heart of the proposed ID cards. Should the legislation be approved by Parliament, people in the UK will have a method of confirming their identity in a secure manner. The biometric technologies which are under consideration, using face, fingerprint and iris recognition, have been developed over several decades, although improvements are constantly being made. The key, however, will be to ensure that these are introduced in a standards-compliant system, which is secure, easily used by the vast majority of the population and in applications that provide clear benefits to the citizen, the foreign visitor and public and commercial organisations.
Plastic Waste: Toxic Rubbish or Strategic Resource?

Peter Davis OBE, Director General, The British Plastics Federation

This presentation demonstrates that used plastics are a strategic resource that has a life extending beyond their first use. This overview of our Federation shows how much plastic is produced and the very wide range of applications to which it can be put. A summary is also presented of the British Plastics Federation’s views on the priorities for recycling and recovery of used plastics.

The British Plastics Federation (BPF) evolved from the British Plastics Moulding Trade Association (1929-33) and was founded on 21st December 1933, in the same year that an ICI scientist called Gibson discovered polyethylene. This was the starting point for the plastics industry in the UK as a commercial enterprise.

The BPF has shared-cost approach to managing the national plastics industry. We have over 300 member companies with a wide range of commercial activities related to plastic manufacture, ranging from raw materials and additive producers to plastics processors and distributors and machinery suppliers and recyclers. We also have 20 Business Groups and four Market Sector Groups. A brief statistical overview (see page 12) shows the scope and range of the UK plastics industry, and demonstrates the importance of this sector to the national economy.

Resource Efficiency of Plastics

Plastics are extremely resource efficient and make very economical use of the world’s oil production. For example, only 4% of this is used for plastics production, whereas 86% is used for transport and heating. Over the past 10 months plastic material prices have increased by 50-65% as they are directly affected by increases in oil prices. In May 2005 the London Metal Exchange opened a Futures Market in two plastic materials PP and LLDPE. Plastics confer major environmental benefits. They are both durable and lightweight, which minimises waste and helps to save energy in several different ways since the cost of energy used is less than 3% of the cost of a manufactured product and in making transport more energy efficient, for example. The use of 100kgs of plastic in a car to replace heavier materials saves 750 litres of oil over the lifetime of the vehicle.

However, although plastics are taking weight out of cars and thereby providing the potential for more miles per gallon in fuel economies, car manufacturers are adding weight in the form of extras such as air conditioning, electric windows and MP3 players. Plastics packaging prevents wastage by keeping food fresh. Consumers are more upset by spoilt food than they are by over packaging.

Plastics Recovery: Waste Management options

Plastics can be recovered either as material or as energy with five possible options for their ultimate disposal: recover the energy as recycled materials; recover the energy as energy; recover the energy as material and energy; compost biodegradable waste – losing the energy to the environment; and landfill – burying (and losing) the resources.

Landfill is the worst possible option as used plastics are a valuable resource that should not be wasted in this manner. In the UK only 9.3% of recovered plastics are recycled, with only 7.7% used for recovering energy. The equivalent average figures for Western Europe...
are 16.5% and 22.5%. In 1985 only 84,500 tonnes of plastic packaging was recycled. Following implementation of the EU Packaging Wastes Directive, this rose to 344,243 tonnes in 2004. We still have a long way to go. The possible recycling methods available for plastics include the following: mechanical recycling; chemical recycling; feedstock recycling; organic recycling (composting); and energy recycling.

Several examples of important areas of plastics recycling are briefly summarised here.

**Expanded Polystyrene Recycling**

The BPF's Expanded Polystyrene Packaging (EPS) Group is working with Original Equipment Manufacturers (OEMs) such as Panasonic and Hitachi and retailers such as Comet and Dixons to take material back and reuse it. Recycling fish boxes is more challenging due to contamination. We are planning to work with major supermarkets in future. See www.eps.co.uk and www.bpf.co.uk for more information.

**Bottle Recycling**

There has been a 100% increase in the past two years with 10.5% of bottles (48,000 tonnes) collected from the household waste stream – 68% from the kerbside and 32% from return schemes. Collection facilities for plastic bottles are offered by 73% of all local authorities who also benefit financially.

**Bio-plastics/Biodegradable**

These are increasingly fashionable and some retailers have adopted them. They are not the correct solution for products such as pipes however. Claims made for the products need to be checked and bio-degradable plastics can contaminate plastics recycling streams.

**Farm Plastics**

The Government is currently looking at a national mandatory scheme associated with local delivery, for the collection, recycling and recovery of farm plastics. This presents both logistical and economic challenges!

**The Markets for recycled plastics in the UK**

Some typical uses for recycled plastics material are: pallets; underground storage tanks; drains; film and bags; fabrics and fibres; garden furniture; office furniture, stationery; road barriers and cones; and street furniture. Many more applications are under development.

**Energy Recovery – an urgent UK need**

The BPF believes used plastics should not be landfilled as they are a valuable resource. When used plastics cannot be economically recycled with environmental benefits they can perform a valuable role as feedstock in mixed waste for energy from waste incineration. The UK lags far behind Western Europe in energy recovery capacity and in its attitude to energy recovery. The UK has only 19 Energy-from-Waste incinerators for a population of 60 million, whereas Denmark has 32 for a population of only 5 million. "Nimbyism" in Denmark is directed at landfill as it produces methane and can pollute groundwater. The City of Copenhagen landfills only 4% of its waste whereas London landfills over 80% and landfill tax is increasing. London faces a looming crisis since many of the landfill sites it currently uses for waste disposal, particularly in Essex, will close in 2007. The Mucking landfill alone takes 15% of London's waste, about 650,000 tonnes. Its closure will generate 100 extra lorry movements a day, taking the waste elsewhere.

The DTI Secretary of State has recently reopened the public inquiry into the Belvedere Energy-from-Waste Incinerator on the Thames, after the Inspector had given it the green light to proceed. This delay is frustrating when London urgently needs about eight more Energy-from-Waste incinerators in addition to the current two. The Mayor of London wants 80% of London's waste managed within its boundaries by 2020 rather than having to export it. This target is completely unattainable without major increases in both recycling and energy recovery.

**Dispelling the myths on energy recovery**

The European experience shows that increasing the energy recovery capacity does not prevent recycling rates also increasing, as waste is thereby diverted from landfill. UK plastics recyclers are much more threatened by the export of plastic waste to China. Energy recovery does not cause pollution or emit dangerous levels of dioxins. There is stringent Environment Agency control of energy recovery plants and dioxins have an air emission limit of 1 nanogram per cubic metre, equivalent to existing background dioxin levels in urban soils. The annual dioxin emissions for all UK incinerators are one tenth of the dioxins released from bonfires and fireworks on Guy Fawkes night.

**Energy Recovery – growing support**

The UK is now a net importer of energy with shortages predicted if we have a hard winter. The Institution of Civil Engineers and the Renewable Power Association in a joint report in April 2005 said that half of the 30 million tonnes of household rubbish sent to landfill in England could be incinerated and generate enough power to light 2 million homes each year. By 2020 17% of our electricity needs could be generated by energy recovery. Energy recovery provides clean, renewable power, and reduces demands on fossil fuels. Used plastics are "frozen fuel" with a higher calorific value than coal.

In conclusion, used plastics are a strategic resource and should not be landfilled but be recycled. However, if it is uneconomic or impossible to recycle for environmental reasons, the energy should be recovered by waste incineration.
Introduction

The importance of effective, practical and economically viable recycling of consumer products and industrial materials is widely recognised. The proliferation in everyday life of plastics in their various forms, including mouldings, fabrics, packaging materials and films, presents a particular challenge in respect of recycling. In many products plastic often constitutes the largest single mass of material. A crucial stage in recycling plastics is identification and if possible the sorting of waste plastics into clean single polymer streams. This is important for the following reasons:

- Different polymer types are often incompatible in remould/re-extrusion
- Specific plastics are chosen for their mechanical/physical properties
- Toxic and banned additives may be present in some plastics e.g. BFR, Heavy metals
- Pure polymers command higher prices

If separation cannot be achieved prior to melt and reforming, the effective recycling of materials cannot be undertaken. In recent years the need to identify, sort and stream plastic waste has been given extra impetus by directives such as "End of Life Vehicles" (ELV) and "Waste Electrical and Electronic Equipment" (WEEE).

Two of the most successful techniques for plastics identification are spectroscopy and electrostatics. The spectroscopic system uses the fact that wavelengths in the infrared region are absorbed differently by different polymers giving each plastic a unique fingerprint. The electrostatic technique measures the magnitude and polarity of charge generated by the plastic and how quickly it decays from the surface. These techniques complement each other: the system based on spectroscopy gives precise identification but is relatively complex and expensive whereas electrostatics provides a cheap and simple means of streaming basic polymer groups.

Waste packaging

During 2000-2002 the Onyx Environmental Trust sponsored a project at Southampton University to develop an automated pilot-scale system using electrostatic techniques to identify and separate different species of plastics from a mixed waste stream. The objectives were to:

- Separate plastics from non-plastics (cardboard etc)
- Segregate different polymer groups
- Identify presence of toxic and banned substances
- Simple reliable technique and suited to automated line
- Handle the required throughput
- Handle variations in size, differences in shape, contamination, moisture, labels etc.

The pilot rig features a conveyor belt which can be loaded with mixed packaging materials such as plastic bottles, food tubs etc. Plastics are first separated from non-plastics by measuring charge decay time (natural materials such as paper, cardboard and wood exhibit a much faster charge decay rate than plastic). The five main plastics found in packaging; polyethylene (HDPE), PET, polypropylene, PVC and polystyrene are then streamed using a phenomenon known as "triboelectrification" (derived from the Greek verb tribo: to rub).

Triboelectrification describes the electrical charge that is generated when two unlike surfaces are brought into contact and then separated, for example the sole of a shoe and nylon carpet. Positive (+) charge is generated on one surface with negative (-) charge on the other. Depending on their position in the triboelectric series (fig. 1), polymers have their own natural electrical characteristics with some tending to + and others -. When the unknown plastic packaging is brought into contact with a triboelectric probe then depending on the probe head material and the polarity of the static charge produced, the unknown plastic may be identified. A mixture of polyethylene (PE) and polypropylene (PP) for example, which are incompatible polymers in recycling, can be distinguished between using a probe with a PVC head because PE charges + and PP charges -.
simple in operation, relatively inexpensive to produce and has a number of proven and potential applications. The Tribopen was a Millennium Products Award from the UK Government in 1999. The Tribopen, which is currently commercially available, is essentially a small battery-operated hand-held device which, when rubbed across the surface, will distinguish between two different plastic types. It indicates the plastic type by illuminating a small red or green light. It has a single detachable sensor head that can be simply replaced and moved and choice of sensor will depend on the plastic materials to be identified. A typical application would be to separate a mixture of three unknown plastics, say polyethylene (PE), polypropylene (PP) and ABS into three individual streams. In this case, two pens would be required. The first pen could be used to pick out PE (PE giving a red light and PP and ABS giving green). A second pen (with a different sensor head to the first) would split PP and ABS. If there are four unknown plastics in the initial stream then three pens will be required, and so on. Obviously if a large number of unknown materials are present in the initial stream, the Tribopen application becomes impractical and other contaminants and banned substances is essential. This is currently being achieved by a combination of the techniques described below.

**Tribopen**

The use of the electrical or electrostatic properties of a material as a basis for identification and sorting was pioneered at the University of Southampton some years ago. The Tribopen was originally developed at the University with the sponsorship of the Ford Motor Company and uses electrostatic techniques to divide materials into two streams. It is the use of the electrical or electrostatic properties of a material to separate unknown plastics. The Tribopen, which is currently commercially available, is essentially a small battery-operated hand-held device which, when rubbed across the surface, will distinguish between two different plastic types. It indicates the plastic type by illuminating a small red or green light. It has a single detachable sensor head that can be simply replaced and moved and choice of sensor will depend on the plastic materials to be identified. A typical application would be to separate a mixture of three unknown plastics, say polyethylene (PE), polypropylene (PP) and ABS into three individual streams. In this case, two pens would be required. The first pen could be used to pick out PE (PE giving a red light and PP and ABS giving green). A second pen (with a different sensor head to the first) would split PP and ABS. If there are four unknown plastics in the initial stream then three pens will be required, and so on. Obviously if a large number of unknown materials are present in the initial stream, the Tribopen application becomes impractical and a device such as the PolyAna (see below) may be more appropriate. Picking out a single material, such as PVC, from a variety of unknown plastic types would require just two single pens or a double-headed pen (a design for a double-headed pen is under consideration).

**PolyAna**

Like the Tribopen, the PolyAna plastics identification system was developed at the University of Southampton in a collaborative project funded by the Ford Motor Company some years ago and also won a Millennium Product Award from the UK Government in 1999. The key to the PolyAna is an optical cell design and front-end software that enables a laboratory spectrometer to be used on an industrial recycling line by non-technical personnel. It can be used on large items (e.g. car panels) and small objects down to about 10 mm. The 3-second measurement is non-destructive and does not usually require modification or treatment of the sample in any way. The optical cell design directs the IR beam to the sample by means of a series of mirrors. The computer then compares the spectrum of the reflected light with a database or "library" of pre-programmed spectra stored within the computer. Different libraries are available for different applications, and can be easily set up by the user in order to deal with specific materials of interest. This technique has also shown promise in the detection of brominated flame retardants in waste electrical and electronic equipment (WEEE) which are currently being phased out in the EU.

An important aspect of the PolyAna technology is that it enables the user to develop custom databases. This is critically important for the recycling industry because more often than not recycled materials are not pure polymers and a custom database is essential.

**Sliding Spark**

This instrument is essentially a more sophisticated derivative of the old-fashioned burn and sniff techniques used some years ago as a crude identifier of polymers. A high energy spark is used to burn the surface to be identified. This is done by means of a hand-held probe but may be used with an automated probe. The fumes from the burnt surface are then transferred by means of a vacuum line to a spectrometer chamber where they are analysed and the material under test identified. The primary use for this instrument on a WEEE recycling line is for detection of banned or potentially hazardous materials such as PVC, heavy metals and brominated flame retardants.

Further information on the activities of Wolfson Electrostatics can be found on the web at [www.soton.ac.uk/~wolfson](http://www.soton.ac.uk/~wolfson). Email: wolfson@soton.ac.uk
Used plastic – resource for the future

Dr Roger Morton, Director, Axion Recycling Ltd

Axion Recycling Ltd (www.axionrecycling.com) was founded in 2001 to develop new projects in the waste recycling sector. Since then Axion has developed a process design for pyrolysis of mixed waste plastics to produce a hydrocarbon liquid fuel – "Plasoil" and has conducted a great deal of self-funded research and development of novel plastic separation techniques. The business has also carried out consultancy work in related sectors. Clients include:

- UK PVC Recycling Consortium - practical trials of novel recycling methods and implementation of the Recovinyl PVC recycling initiative for the UK PVC industry.
- Hampshire Natural Resources Trust – an ongoing, practical pilot project to test de-manufacturing and separation processes for small WEEE items.
- Stockport Council - kerbside collection trials for mixed plastics from 1800 homes and tests of advanced separation processes for mixed household waste plastic.
- WRAP – major project to develop a process to extract brominated flame retardants from WEEE polymers.
- Greenergy Fuels – practical trials and business planning for production of biodiesel from a range of waste and new feedstocks.

Axion is currently developing a plant of its own to process waste electrical equipment plastics in Sheffield.

This paper is based on Axion’s practical experience of plastic recycling in the UK. It makes the political and environmental case for recycling a wide range of sources of waste plastic in the UK and provides pointers for how legislators can change the way they work to encourage investors in this sector.

People hate wasting plastic
Politicians are well aware that most people in the UK really dislike throwing away plastic.

Axion recently conducted large scale segregated kerbside plastic collection and separation trials in collaboration with WRAP (www.wrap.org.uk) and Stockport Council. As part of these trials we conducted a survey of the residents in the target collection areas. Participation in the survey was very high and the overwhelming response (99%) of residents was that they would be prepared to segregate their plastic for collection on a permanent basis.

Anecdotal evidence indicates that similar opinions prevail regarding other sources of waste plastic such as electrical equipment and construction.

There is plenty of it
There is a huge amount of valuable plastic going to landfill in the UK. Axion’s estimate of the recoverable quantity is:

<table>
<thead>
<tr>
<th>Waste source</th>
<th>Recoverable plastic in the UK (te/yr)</th>
</tr>
</thead>
<tbody>
<tr>
<td>Electrical equipment</td>
<td>300,000</td>
</tr>
<tr>
<td>Construction</td>
<td>200,000</td>
</tr>
<tr>
<td>Vehicle and related waste</td>
<td>200,000</td>
</tr>
<tr>
<td>Household waste</td>
<td>900,000</td>
</tr>
<tr>
<td>Total</td>
<td>1,800,000</td>
</tr>
</tbody>
</table>

Recycling plastics is complex
There are many different types of plastic and most are not compatible with each other. They contain a wide range of additives and colours. Some of the additives used in older products are no longer permitted in new items.

Complex separation processes are therefore required to separate plastic from other materials with which they are often combined such as metals, wood and paper and then to separate within the plastics by polymer type and additive content or colour.

These technologies are developing rapidly. It is now technically feasible to recover and separate most sources of waste plastic in their original form at reasonable cost without resorting to incineration or other thermal techniques.

Life cycle analysis
Mechanical recycling is separation and purification of plastic particles without changing their chemical form by incineration or other chemical transformation.

Life cycle analysis demonstrates that for the great majority of plastic products mechanical recycling is by far the best environmental option. An environmental impact comparison was completed recently for Axion and WRAP by Huisman Recycling Research in the Netherlands. Huisman compared
the environmental impacts of a range of disposal and recycling options for plastics from waste electrical equipment that contain brominated flame retardants. These options included solvolysis, mechanical, feedstock, incineration and landfill and confirmed mechanical recycling as the best option.

Although recycling processes for plastic create some environmental impact themselves (unlike landfill where plastic is assumed to have minimal environmental impact because it does not degrade) the fact that they create useful material which can substitute new polymer saves all of the environmental impact of creating that new polymer.

People are doing it in the UK
There is already a vibrant plastic recycling sector in the UK. For example 40,000te/year of rigid PVC is recycled in the UK. However, with a few notable exceptions, the existing recyclers concentrate almost exclusively on scrap from industrial processes.

It would be a relatively small step for these recyclers to move into reprocessing dirtier, more co-mingled materials such as household plastic or waste electrical equipment. They are deterred by a combination of legislative factors which could easily be solved with a bit of political will.

Firm action needed from legislators
The basic legislative framework for encouraging plastic recycling in the UK is already in place. It is just not working effectively. The following legislation is most relevant:

- Landfill Directive
- Packaging Waste Directive
- End of Life Vehicle (ELV) Directive
- Waste Electrical and Electronic Equipment (WEEE) Directive

Legislators in the UK need to enforce this legislation much more boldly, consistently and firmly than they have to date. If they do, existing plastic recyclers will quickly develop the confidence to invest in the technologies required and the UK sector will quickly become the pride of Europe.

J F C Delleve Plastics Ltd
Lee Clayton, General Manager

I am the manager of the UK’s only commercial scale plastic recycling plant. The company is primarily in business to make a profit for our shareholders from our expertise in processing plastic waste. However, in order to do so we have to be internationally competitive due to the flourishing offshore market for plastic waste with which we must be able to compete effectively.

I am also personally responsible for the following activities: management of the plant, development of new processes, material procurement, overview of Government legislation, product sales from the St Helens plant and polymer utilisation.

The present company was originally called Reprise Ltd and as a result of a recent development involving the relocation of the factory in St Helens costing £4 million, it became the first plant in the UK to recycle polyvinyl chloride (PVC), polyethylene terephthalate (PET) and high-density polyethylene (HDPE) bottles. However, the plant is still underfunded and underdeveloped with respect to the rest of Europe. In the UK 450,000 tons of bottles are produced annually but only 45,000 tons are collected, resulting in wastage of plastic raw materials. This is an indicator of the potential for expanding the business in the UK.

A new partnership project costing £3.5m over three years has therefore been developed with the Waste and Resources Action Programme (WRAP) with the objectives of improving the efficiency of sorting. This enables the plant to handle mixed waste streams derived from waste collections which are now changing to mixed plastics. The new sorting procedures are less labour intensive, are more accurate than and twice the speed of manual sorting and include a new bottle sorting and washing plant.

The capacity of the plant is 20,000 tons per annum and the primary feedstock is mixed bottles. The materials processed include segregated HDPE and mixed bottles. The plant produces feedstock such as PET flake and coloured HDPE flake, with products made from feedstock such as PET non-woven fibre and natural HPDE compound.

The demand for recycled plastics is 7000 tons per year for HDPE pipe and 2000 tons per year for HDPE compound, 6000 tons per year for clear PET flake and 2000 tons per year for multi-coloured PET flake.

New recycled products for 2005 include bollards, decking and fencing.

So why do we recycle? The economic benefits are clear: cheaper feed stocks are obtained, competitive advantage is gained, and end-use manufacturers are not at the mercy of resin producers.

In addition there is a legislative drive from Government on green procurement and businesses that fail to recognise this will lose out.

The public benefits of the St Helens plant can be briefly summarised as follows. The plant provides a convenient UK-based facility as a practical alternative to export for Local Authorities. It is the only plant in the UK equipped to process batches of mixed bottles thus reducing the need for prior segregation of waste streams. There is increased throughput of segregated materials, and for manufacturers a 50% saving on costs of primary raw materials. It also provides an alternative source of supply for other manufacturers of recycled products.

An outline specification of the St Helens plant provides some idea of the economic and social importance of this activity in helping to reach UK and EU eco-environmental targets at the same time as running a profitable business from a site with a relatively small footprint.
The annual throughput is now 20,000 tons of mixed bottles. Forty staff are employed to maintain the continuous operation of the plant for 24 hours a day, seven days a week, which is the target for 2005. The whole plant covers only 100,000 square ft. It is fully registered as a site for handling domestic waste. It is also certified to ship processed material to the Far East and is registered with the Environment Agency to issue Packaging Waste Recovery Notes (PRN’S). These are designed to ensure that industry takes full responsibility for packaging wastes generated as a result of their commercial activities. The achievements of Delleve so far include the diversion of 1000 tons of bottles from export to the UK for processing here; 120 million bottles have been converted into products sold in the UK; 15.2 million bottles have been imported from Europe for processing here to compensate for the shortage of plastic waste resulting from export of UK bottles to the Far East. This is a successful business doing a valuable job in reducing waste delivered to landfill which is increasingly restrictive, and in helping to maximise the re-use of valuable and expensive raw materials.

In discussion the following points were made:

The UK has now become a net importer of energy for the first time, hence plastic waste could provide a source of high quality fuel to help fill the gap. Plastic waste can be mixed with lower grade waste to provide an effective fuel for incineration. Battersea Power Station could become London’s incinerator. Dioxins generated from plastic incineration are only one tenth of the amount generated on Guy Fawkes night. This view was vigorously contested as a dreadful waste of a valuable resource. It might soon be economically desirable to commence mining landfill to recover polymers, methane and plastics. Plastic waste should be buried as remanufactured pipe having 100 years of useful life, not as rubbish. It is a finite resource and just takes some effort to process.

So what do we do now? More recycling should be encouraged, aided by identification of the plastic type used at the manufacturing stage to enable better separation of waste streams. The current practice of exporting most of this product overseas may solve the problem of disposal for local authorities, but may not be in the longer term national interest. Fraud has impacted negatively on the market for waste. Post-consumer plastic waste is a strategic resource with many valuable end uses.

### UK Plastics Industry basic statistics

<table>
<thead>
<tr>
<th>Material processed</th>
<th>4.8 million tonnes</th>
</tr>
</thead>
<tbody>
<tr>
<td>Processing sales turnover</td>
<td>£13.6bn</td>
</tr>
<tr>
<td>Value of direct exports</td>
<td>£3.6bn</td>
</tr>
<tr>
<td>People employed</td>
<td>190,000</td>
</tr>
<tr>
<td>Total number of firms</td>
<td>over 5,000, most very small</td>
</tr>
</tbody>
</table>

### UK Plastics Consumption by Market Sector

<table>
<thead>
<tr>
<th>Market Sector</th>
<th>Percentage</th>
</tr>
</thead>
<tbody>
<tr>
<td>Packaging</td>
<td>36%</td>
</tr>
<tr>
<td>Building &amp; Construction</td>
<td>23%</td>
</tr>
<tr>
<td>Electrical &amp; Electronic</td>
<td>11%</td>
</tr>
<tr>
<td>Automotive and other transport</td>
<td>8%</td>
</tr>
<tr>
<td>Furniture</td>
<td>5%</td>
</tr>
<tr>
<td>Leisure</td>
<td>4%</td>
</tr>
<tr>
<td>Housewares</td>
<td>3%</td>
</tr>
<tr>
<td>Agriculture</td>
<td>3%</td>
</tr>
<tr>
<td>Medical</td>
<td>2%</td>
</tr>
<tr>
<td>Mechanical Engineering</td>
<td>2%</td>
</tr>
<tr>
<td>Clothes &amp; Footwear</td>
<td>1%</td>
</tr>
<tr>
<td>Others</td>
<td>3%</td>
</tr>
</tbody>
</table>

### UK Plastics Consumption by Polymer Type

<table>
<thead>
<tr>
<th>Polymer Type</th>
<th>Quantity</th>
</tr>
</thead>
<tbody>
<tr>
<td>ABS</td>
<td>235kt</td>
</tr>
<tr>
<td>PET</td>
<td>235kt</td>
</tr>
<tr>
<td>EPS</td>
<td>57kt</td>
</tr>
<tr>
<td>PP</td>
<td>764kt</td>
</tr>
<tr>
<td>HDPE</td>
<td>544kt</td>
</tr>
<tr>
<td>PS</td>
<td>260kt</td>
</tr>
<tr>
<td>LDPE</td>
<td>1002kt</td>
</tr>
<tr>
<td>PVC</td>
<td>777kt</td>
</tr>
</tbody>
</table>

*Overview of UK Plastics Industry – the British Plastics Federation (see page 6)*
On Wednesday 22nd June the Prime Minister, Rt Hon Tony Blair MP, praised the Royal Society of Chemistry’s Parliamentary Links Day as a "thriving all-party occasion" which he had been "delighted to attend" during exchanges in the Chamber of the House of Commons at Prime Minister’s Questions.

The day before the Prime Minister had attended the annual Parliamentary Links Day in Parliament which was co-hosted by Dr Brian Iddon MP and Dr Andrew Murrison MP.

The theme was Science and the G8 Agenda which concentrated on the Government’s twin priorities of Climate Change and Africa at the G8 Summit.

"Science will be particularly important in dealing with killer diseases in Africa," said Mr Blair at the Despatch Box "and the science and technology behind dealing with climate change is also crucial."

He added: "That is why it is so important that science forms a strong part of what we do in the G8" and on this point all the UK science community agreed with him.

PM’s Unprecedented Appearance
The Prime Minister's appearance at Links Day, introduced by Dr Brian Iddon MP, was unprecedented and the Attlee Suite was overflowing with MPs, Peers and scientists.

Dr Iddon thanked the RSC for its leadership role in Parliament and observed that no sitting Prime Minister had addressed such an audience of Parliamentarians, scientists and engineers in the House itself in a generation. From the very start it was standing room only.

For his part the Prime Minister praised Links Day calling it "the foremost scientific gathering in the Parliamentary calendar." He added: "This theme you have chosen for this year – the contribution of science and engineering to our policy priorities at the G8 Summit in Gleneagles – could not be more timely. These two issues are, as you know, very important to me and to the government. But most of the problems faced by modern governments cannot be solved by governments alone. Tackling these issues also depends crucially on you: our scientists and engineers."
Science and Engineering Working Together

The Prime Minister's acceptance of the invitation to attend Links Day was recognition of the importance that this Parliamentary event now has for science and engineering. The growing success of Links Day has enabled the most important scientific societies in the UK to work closer together. The Prime Minister himself recognised this when he thanked the RSC's "partner organisations".

Speakers this year came from the Institute of Physics, the Institute of Biology, the Royal Society, the Royal Academy of Engineering, and the Royal Society of Chemistry. Other organisations that have always given strong support to the event include the Campaign for Science and Engineering [CaSE].

"Science Teachers of the Year" Awards

The Prime Minister also presented awards to "teachers of the year" in physics, biology and chemistry to highlight their vital role:

"It is our teachers on whom we depend for inspiring, encouraging and training the next generation of scientists. Progress now depends on knowledge to a degree unmatched in any previous era. Unless we reward and value the people who transfer knowledge from one generation to the next we will suffer the consequences in declining prosperity. And that is why I am delighted to be here, to recognise the excellent work that you have done."

The Prime Minister's contribution to Links Day followed that of the Secretary of State for International Development, the Rt Hon Hilary Benn MP, and preceded contributions from the Government's Chief Scientific Adviser, Sir David King, the Minister for Science and Innovation, Lord Sainsbury of Turville, and other distinguished scientists and engineers.

The Political and Scientific Contributions

In his keynote address Mr Benn spoke about the partnership of scientists and policymakers in the fight against poverty and disease – especially in Africa – and described some of the initiatives being pioneered by the Department for International Development. He paid tribute to the role of Dr Ian Gibson MP's Select Committee in the establishment of a Chief Scientific Adviser at DfID.

Dr Stephen Cox, Executive Secretary of the Royal Society, explained the joint initiative taken by national science academies of all the G8 nations (and other key countries like India) entitled "Joint science academies statement: Global response to climate change" which advocated the building up of scientific capacity, especially in Africa, to train its own scientists.
and technologists and build its own scientific equipment.
Professor Ian Fells, speaking on behalf of the Royal Academy of Engineering, pointed out that by 2023, under present arrangements, there will be only one nuclear power station left in the UK. He made a robust contribution to the morning session advocating a nuclear component to the UK energy mix (as outlined in the Energy White Paper) as well as an increased emphasis on renewables as part of a concerted effort in CO₂ reduction. Concluding the scientific presentations Dr Andrea Jackson of the Royal Society of Chemistry and the University of Leeds used current research to describe the complexities of the carbon cycle in nature.
Sir David King concluded with a survey of the scientific debate on climate change and the narrowing areas of scientific uncertainty on the key issue of global warming caused by human activity and outlined the evolving process of international discussion on climate change – of which the July G8 summit was only one part. The February 2005 conference at the Hadley Centre in Exeter demonstrated a large number of environmental impacts, such as plankton blooms, loss of cod off Scotland, and acidification of the oceans. The high temperatures from the 1940s and 1950s are now our average summer values. Climate change creates further stress, such as life expectancy in Africa, which already has the lowest life expectancy in the world. And it is possible that climate change poses a greater threat to wildlife in Africa than poaching. Sir David also urged all scientific societies to work with the Chief Scientific Officers across Government Departments and with the Select Committees.
Dr Andrew Murrison MP, in winding up, praised the positive impact of such a high profile Parliamentary Links Day and the large number of MPs who had already signed Early Day Motion 328 which noted "the Society's continuing commitment to serve the public interest" by improving the access of all MPs to scientific information and a better understanding of science which its pioneering Parliamentary Link Scheme had been set up over 20 years ago to provide.
Meanwhile the scientists and engineers at this year’s Links Day showed that they stand ready to help deliver the solutions needed to fulfil the ambitious G8 Agenda.
A new industrial revolution is under way as composite materials increasingly replace traditional metals in engineering applications ranging from automotive to marine and construction to aerospace. The attraction is the increase in both strength and stiffness to weight ratios offered by composite or "non-metallic" materials.

Composites are produced from two or more materials, a "reinforcement" material brings the strength and stiffness to the composite, while the resin binds the reinforcement and transfers loads and often protects it from abrasion and impact. This brings direct benefits in the form of: high strength to weight ratio; high stiffness to weight ratio; corrosion resistant materials; and impact resistant materials. These bring other indirect benefits by decreasing weight, for example, which increases fuel efficiency that has the potential to reduce running costs and aircraft noise.

Fibre reinforced composites were invented in the UK several decades ago. It would therefore be a regrettable industrial own-goal not to seize this opportunity to move into the "composite manufacturing age". Airbus' newest aircraft model, the A350, represents that opportunity.

Technology and innovation, as well as a market-led approach, are the foundation of Airbus' success as a European aircraft manufacturer, resulting in its current position as the world's leading aircraft manufacturer. Airbus, since its creation over 30 years ago, has been progressively increasing the ratio of composite materials in each new aircraft model, whilst gaining direct operational experience. It has also played a key role in the research and development of these materials.

As Airbus' Centre of Excellence for wing design and manufacture, Britain, through Airbus UK, has studied the application of composites to wing technology and invested substantially in this field. The DTI supported R&D programmes since the mid 1990s involving many other British companies and specialist bodies that have provided advances and several "demonstrators". These include the study of structural properties and development of low-cost manufacturing and assembly of increasingly larger components.

This led to the opening, earlier this year, of the Composite Structures Development Centre at Airbus UK's site in Filton, Bristol, which forms part of the UK's National Composites Network. The centre also provides capacity for use by other industries.

Airbus is preparing to introduce the new A350, available in two versions, for entry into service in 2010 in response to a demand from its customers for a new aircraft with more range and more seats than its successful and popular A330. The A350-800 will have a range of 8,800 nautical miles, typically seating 253 passengers in three classes and the A350-900 has a range of 7,500 nautical miles, seating 300 passengers, providing the efficiency and economic benefits airlines expect from Airbus. Flight deck commonality brings the crew training and operational efficiency of Cross Crew Qualification (CCQ) and Mixed Fleet Flying (MFF) and the aircraft will have significant spares and maintenance commonality with the A330, whilst new systems will bring more savings in maintenance costs.

The A350 has surpassed expectations since marketing commenced some nine months ago, having already achieved commitments for 130 aircraft from eight customers. With A350 in its product range Airbus expects to win half of the market for 3,000 aircraft in the 250-300 seat aircraft category during the next 20 years. The A350 has 13 per cent more seats, more range, lower fuel burn per seat and lower Cash Operating Costs per seat than its competitor, Boeing's new 787. Early orders received by Airbus have reinforced the company's approach for long range aircraft for the future.

Airbus has been refining the design of the A350 since the start of this year and the aircraft will have 90 per cent new part numbers and 60 per cent of the structure will be of advanced materials, including composites, and third-generation aluminium lithium.

The A350 will be the first Airbus commercial airliner to have composite wings, marking a turning point from metals to composites. This is significant for Britain, the
home of Airbus wing design and manufacture. Carbon fibre reinforced plastic (CFRP) will replace traditional aluminium alloy for the spars and upper and lower surface covers of the wings for the first time. This is a step forward in the application of composites to wings, where composites have previously been used mainly on the leading and trailing edges, with that application extended on the A380 where some of the ribs are of carbon fibre.

The A350 wings represent a springboard for accelerated development of new skills, techniques and expertise in composites and the application of many years of research and development work. The composite components will be made up of several layers of lamina plies with each ply orientated in a particular direction to give a structure optimised for strength, weight and stiffness. "Laying up" is performed with an automated tape layer, requiring minimal manual intervention whilst using unidirectional fibre impregnated with epoxy resin in a "soft" uncured condition.

When the lay-up is complete the component is cured in an autoclave using heat and pressure to produce a "hard" component. This process ensures that each ply is consolidated to produce a monolithic structure during the curing process. The component is then ultrasonically tested using a non-destructive test (NDT) that checks for flaws within the laminate. Some limited machining is then performed, if necessary, to trim the component to size and at interfaces with other components, so ensuring appropriate tolerances are achieved when the parts are assembled.

For the A350, each upper and lower cover will be manufactured as a single piece laminate with a span of 30 metres and a chord of six metres at its widest point. This will be the largest single composite structure ever manufactured for a commercial aircraft and provide the lightest solution. The technology selected will use a two stage curing process due to the size of the component and to overcome the complexities of the wing surfaces that have double curvature. The first stage will produce a "hard" skin upon which stringers in a "soft" condition are then positioned. The second stage will cure the stringers to the skin in a process called co-bonding.

Each spar is C-section in shape and will be attached to the upper and lower covers using fasteners. The front spar is a single component with a 30 metre span from wing-box rib one to rib 39 and will taper from 1500mm at the root to 200mm at the tip of the wing.

The maximum takeoff weight (MTOW) for the aircraft will be 245 tonnes. This induces high loads in the Main Landing Gear (MLG) support structure in the wings; distributing the MLG loads into the covers and inner rear spar. Research and design trade-off studies have shown that when subjected to high input loads, metal structures currently offer the best solutions in these areas.

When the wing is being investigated using extensive aerodynamic testing in a wind tunnel. This includes shaping the wing surfaces to optimise aerodynamic performance resulting in fuel-saving, which together with close-coupled GEnx engines and a wing droop nose device, similar to that used on the A380, will enhance performance and help to reduce the aircraft's noise footprint. In Britain the low-speed wind tunnel tests are conducted at Airbus UK in Filton near Bristol. The high-speed wind tunnel tests are conducted at ARA in Bedford.

The aircraft surfaces are optimised to cruise at Mach number 0.82 with flexibility to fly up to Mach number 0.85. This is achieved by introducing a new winglet and some re-profiling of wing surfaces, including a leading edge extension (LEX) combined with the droop nose inboard of the engine pylon. Whilst the droop nose was introduced to improve lift, the droop nose and LEX also decrease high-speed drag and reduce the fuel burn penalty from increasing the Mach cruise speed.

The A350 will create 10,800 jobs in the UK aerospace sector and a further 21,600 jobs in the wider economy from induced employment, with Britain playing a full and important role in the programme. As more composites replace metal in future aircraft and the application of composites increases elsewhere, the A350 wing represents a vital step forward in the development of composite industrial technology in Britain.
An assessment of the state of the UK’s infrastructure by the Institution of Civil Engineers

Gordon Masterton, ICE Senior Vice-President

The Institution of Civil Engineers (ICE) is one of the most important sources of professional expertise in road and rail transport, water supply and treatment, flood management, waste and energy. Established in 1818, it has over 75,000 members throughout the world – including over 60,000 in the UK. The 2005 ICE State of the Nation report will be launched on Tuesday 18 October. This annual examination of the UK’s infrastructure is compiled each year by a panel of experts drawn from the various fields of expertise across ICE’s membership.

This year, six regional versions of the State of the Nation report – covering Northern Ireland, Scotland, Wales as well as the North West, South West and West Midlands of England – are being produced, in conjunction with the UK-wide publication. The State of the Nation report is an opportunity for politicians and the public to join the debate about the future of the UK’s infrastructure. Civil engineers are thinking radically about the future of infrastructure, such as turning residual waste into energy and the introduction of road user pricing. The window of opportunity to effect remedies, repairs and renewals is rapidly closing, if society is not to suffer. Some of the key findings of this year’s report include:

Transport
Transport has made little improvement this year, since the quiet demise of the "Ten Year Transport Plan". Sustainable transport may have become better understood, but while the feelings of guilt and worry amongst the public may have increased, spending and decision-making by government has not.

Rail: Network Rail should be commended on the 16% reduction in delays due to infrastructure repairs and maintenance, but its reported underspend in 2004/2005 by about £800 million is worrying.

Roads: Congestion continues to be a major concern of road users in towns and cities across the UK, with delays occurring due to accidents and road works still causing the most frustration. The situation is unlikely to change while car journeys continue to rise and local roads across the UK need maintenance. Journeys on roads are increasing and congestion has to be tackled to create shorter journey times. It is time that a national debate on road charging begins in earnest.

Local Transport: Travellers have to be persuaded that their journey by public transport will be comfortable, affordable and seamless to shift away from our car-first culture. The report supports the encouragement being given to Passenger Transport Executives to improve the safety and security of local transport services, and the important part that integrated local transport is playing in Regional Spatial Strategies.
Aviation: The last 12 months have seen air travel from UK airports continue its climb back to levels before 9/11. The steep growth is adding to the pressure for more runway capacity in all parts of the country but most immediately in the South East. Delivery of road and rail access infrastructure has continued to be hampered by funding and programming delays, threatening efforts to achieve a shift by passengers and airport employees onto public transport.

Seaports: British seaports are as essential to the national economy today as they have always been. 97% of the goods that enter and leave the country do so by sea. The current lack of deep-sea container ports in the UK is already forcing trade to northern Europe, making the goods we buy more expensive. We must start to regard planned new ports as parts of a national network moving goods in and out of the country and not purely as separate commercial entities without any effect beyond their immediate area. Concentrated in the south east, the new major ports will put enormous extra strain on the region’s road and rail networks.

Water & Wastewater
The water we drink in the UK has never been cleaner or safer. But it is also becoming scarcer. Our water supply is being put under pressure by factors ranging from climate change, low rainfall and ageing delivery structure, to changes in the population, urban population growth and the increasing use of appliances such as power showers. The job of renewing the distribution network could take at least 200 years, even at today’s unprecedented rate of investment.

Energy
Another year has gone by without any significant new generating capacity being built. Upgrades to the electricity transmission and distribution networks are taking place at a slow pace. As the UK becomes more dependent on imported gas, the prospect of the nation losing control of its energy supply, and with it a grip on prices and carbon emissions looms ever larger. The only real alternative is to invest very soon in a mixed range of domestic fuel sources, in which nuclear, clean coal and renewable power sources each play a significant part.

Flood Management
The total investment in flood management has increased significantly year-on-year, reaching around £560 million in 2004/2005. The target of providing improved protection to 80,000 properties in the three years up to the end of 2005/2006 is in sight. However, this still leaves many thousands more at significant risk. Recognising the seriousness of the issue, the Government has invested heavily in recent years to repair and improve flood defences, widen coverage of flood warning schemes and produce new flood maps.

Waste
In this country, waste is seen as an end – a dead end – rather than a means. That view has to change. Waste is an energy resource, and at a time when the UK’s own existing sources of energy are dimming, it could help fill the fuel gap, just as it is doing in other European states. National and local government need to assess the technical and economic scope for reprocessing and treatment facilities, and opportunities for communities and businesses to make best use of the resources these facilities produce.

Communities for the future
Affordability of housing continues to be a concern. In 1995, the average house price was three times the average annual salary. 10 years later, it is five-and-a-half times the average salary and out of the reach of most key workers. The Government’s competition, as part of its Homes For All strategy, to design and build "the £60,000 house" is a step in the right direction, as is the decision to allow rural local authorities to set aside land purely for affordable housing to meet local needs.

Sustainability and the environment
A few more admirable initiatives, sound strategies and good intentions – that is as far as progress on sustainability has gone in 2004/2005. Although measures to put sustainability policies into practice are being felt, there has not been much evidence of cultural change at the level of individuals, communities and businesses. Changes to financial incentives can help, but there are obstacles barring progress that can only be broken down if everyone understands that they must play a part in protecting our health, quality of life and prosperity. The UK must overcome the "why bother" mindset to put sustainability at the heart of our infrastructure decisions.

The report can be viewed and downloaded at: www.uk-infrastructure.org.uk

For more information about ICE or the report, you can contact the ICE External Relations team on 0207 665 2151

Wastewater Treatment Facility, Bury, Greater Manchester, United Utilities/MHW
The winning images from this year’s Novartis and The Daily Telegraph Visions of Science Photographic Awards are an extraordinarily diverse and intriguing set of images. Not only is the subject matter of the winning images wide-ranging – including a view of a hatching mosquito, a close-up of salt and pepper, an artist’s impression of a migraine attack and care of a premature baby – but once again the images have the ability to intrigue people with their unusual depiction of everyday occurrences and objects.

It is this ability to capture people’s interest and attention through creative imagery that lies at the heart of Visions of Science. Organised by Novartis, the competition is run with the specific aim of reminding viewers of the breadth, depth and wonder of science. Often, a caption is vital in finding out the story behind the captivating images.

Taken by entrants with a wide range of backgrounds, including professors, doctors, researchers, scanning electron microscopists, artists, photographers and students, we are given a privileged insight into their private worlds of research, discovery and creativity.

The images have been captured using many different techniques from state-of-the-art scientific and computer imaging, to standard and digital cameras, and it is this diversity of technique that allows us to see a view of science that perhaps we have never seen before.

With entry numbers up by 60 per cent this year to over 2,200, judging was as lively as ever, with fierce debate about some images – whether over the content, quality or impact value! As judge and television presenter, Adam Hart-Davis says, “The variety of subjects and styles was splendid and picking the winners was, as ever, extremely difficult, with judges noisily championing a particular favourite photograph.”

The creation of a set of such diverse images comes about in part through the categories that people are invited to enter. The main categories encourage a view of science in various forms including:
Cancer cell movement by Anne Weston – Medicine and Life - winner

Cancer cells can spread through the body in a process known as metastasis. This cancer cell is moving down a pore in a filter. The image was taken at Cancer Research UK.

Kangaroo care of premature baby – People – highly commended

Kangaroo care is a technique used to help premature babies. The baby is held so that it touches the skin on its parent’s chest. This is thought to allow breathing and heart rhythms to be picked up, aiding their regulation in the infant.

Every year, Novartis organises a reception within the House of Commons, giving Members of Parliament a chance to see the images. Details of the reception will follow shortly.

For more information about the touring exhibition and the winning images visit www.visions-of-science.co.uk.
More than anything else, the catastrophic earthquake and tsunami of December 26th 2004 taught us that an effective early warning system is a critical element in any package of measures designed to limit the impact of natural hazards and reduce the risk of disasters. At the very least, the existence of an effective tsunami warning system in the Indian Ocean would have provided coastal communities in Thailand, southern India and Sri Lanka with around two hours warning, slashing the estimated 300,000 death toll by at least a third. Combined with a programme of education focusing on tsunami risk, many thousands of lives could also have been saved in Indonesia, even though inhabitants of the worst affected parts of Sumatra would have had little more than 30 minutes to reach safety.

But what exactly is an early warning system (EWS)? Various definitions exist and the term means different things to different people. To seismologists, an EWS is a radio-based technology that provides several to a few tens of seconds warning, after an earthquake has happened, that seismic waves are on their way. This short, but vital, respite can permit – for example – the automatic shutting off of gas supplies, the switching on of hospital generators, and the opening of fire and ambulance station doors.

To most people in the hazard and risk science business, however, the term early warning relates to a longer-term forecast or prediction that provides information about a hazard before it happens. Even this definition, however, fosters debate and disagreement. Does early warning relate to the identification of the potential for a particular hazard at a specific location, but without accompanying knowledge about when the hazard will be realised, or is it more specific? For example, a probabilistic prediction about a volcanic eruption two days ahead based upon monitoring data. In fact, both can be considered to be early warnings and both have a part to play in reducing the likelihood of a hazard translating itself into a disaster.

In relation to geological hazards, such as earthquakes, volcanic eruptions, tsunamis and landslides, the ideal EWS would comprise a number of different elements designed to provide information and warnings about future hazards at a range of time-scales.

**Threat identification:** The first element involves identifying potential threats capable of impinging upon the country or region in question. Such an exercise would pinpoint, for example, "seismic gaps", where major earthquakes are known to be due (northern Sumatra constituted such a gap prior to December 26th 2004), and explosive volcanoes where geological surveys or the historical record have revealed the potential for another eruption soon. This largely qualitative or, at best, semi-quantitative analysis, however, would not provide any clear guidance on the likely timing of the next earthquake or volcanic eruption.

**Probabilistic forecasting:** The second element of the ideal EWS would zero in on those threats regarded as most serious. A combination of more detailed surveys of past activity and contemporary monitoring would be used to develop probabilistic forecasts of the timing and scale of the hazard under study. Current examples of such forecasts include a 62 per cent probability of an earthquake of magnitude 6.7 or greater striking the San Francisco Bay region by 2032, and a 32 per cent chance of a large earthquake affecting Istanbul in the next decade. Figures like this can work wonders in terms of focusing attention on disaster preparedness and the whole area of disaster risk reduction. The particularly worrying forecast for Istanbul, for example, has prompted a major initiative to ensure that critical facilities such as schools, hospitals and emergency response centres are able to withstand the expected levels of ground shaking.

**Monitoring:** The third element of an ideal geological hazard EWS would be an effective monitoring system designed to provide a short-term warning of the hazard in question. No earthquake has ever been successfully predicted, but
recognised precursors, such as the occurrence of foreshocks, changes in water levels in wells, or increased emissions of radon gas may provide foreknowledge of an imminent event. Monitoring ground surface deformation, which often accompanies the strain increase that precedes a large earthquake, can be accurately and precisely measured using the global positioning system. Determining whether or not a submarine earthquake will trigger a tsunami is not an exact science, but once formed tsunami travelling in deep water can be detected using a system of ocean floor sensors such as those that have operated in the Pacific Ocean since 1964. No volcano erupts without precursory signs, notably swarms of small earthquakes and swelling of the surface as magma makes its way upwards. Consequently, the timing of the start of an eruption can be predicted a few days ahead, allowing time for evacuation and other preparatory measures. The science is still not sufficiently advanced, however, to predict the size or duration of an eruption or the timing of the climactic phase, when most destruction occurs. The monitoring of unstable terrain can be undertaken using the global positioning system, which is capable of detecting accelerations in movement that often precede the formation of a landslide, again allowing time for evacuation and some remedial measures.

The tripartite framework described above constitutes the scientific component of an EWS. While essential, the science component on its own, however, is unlikely to save lives. The ideal geological EWS must incorporate a second hazard management component that is concerned with effective warning dissemination, appropriate public education, and risk reduction. It is now planned to have a tsunami warning system up and running in the Indian Ocean by sometime in 2006, comprising a network of ocean bed sensors capable of detecting tsunamis formed by submarine earthquakes. As in the Pacific, these will be connected by cable to floating buoys that will send warnings via satellite to emergency authorities in the countries at risk. In terms of limiting loss of life, however, such a warning will be worthless unless procedures are already in place to ensure its dissemination rapidly, widely and unambiguously to threatened coastal communities, who have been educated sufficiently about tsunamis to know how to respond. Similarly, without risk reduction measures such as encouraging the growth of protective mangroves and coastal forests, ensuring that properties are set back from the seafront, and designing and constructing buildings better to withstand the impact of tsunamis, the level of damage and destruction will remain very high.

Only when the scientific and hazard management components are in place, and interlocking seamlessly, is any geological EWS likely to achieve maximum effectiveness. This is a goal towards which we can work, but it is one that is likely to take a considerable time to accomplish in many parts of the world. Development of such a system, in many countries, is likely to be hindered by a plethora of factors, including a lack of political will, focus on other priorities, insufficient funding, inadequate technical or scientific skills, and poorly developed institutional responsibilities and capabilities in the hazard management field. In many cases, putting together an integrated EWS along the lines outlined is likely to be dependent, to a large degree, on help and support from international agencies such as the UN and the European Commission Humanitarian Office (ECHO), appropriate departments of developed world national governments, such as DIID, and aid organisations such as the IFRC (International Federation of Red Cross and Red Crescent Societies).

The pivotal role for effective natural hazard early warning systems in minimising the impacts of natural hazards was emphasised in the recent report of the UK Government’s Natural Hazard Working Group* established by the PM in the aftermath of the tsunami. The key recommendation of the report, which recently received the support of the G8 meeting at Gleneagles, was the establishment of an International Science Panel for Natural Hazard Assessment to address the threat of potential natural hazards likely to have high global or regional impact. This would provide the critical first element of a global EWS by identifying geophysical threats capable of affecting more than one state, highlighting those of greatest concern and validating forecasts and predictions about their timing. The Panel, if it comes to fruition, will also play a role in fostering a pro-active approach to tackling natural hazards, which – it is to be hoped – will help to bring about a sea-change in disaster risk reduction.

NHS PFI is not NHS PLC

Lord Warner, Minister of State, Department of Health

Patients expect and deserve bright, modern, clean environments, whether they are funded by public or private funds. The private finance initiative (PFI) and other public private partnerships, such as NHS Local Improvement Finance Trust (LIFT), are allowing us to ensure that more and more NHS patients experience fit for purpose facilities during their treatment.

Thanks to PFI, the NHS is in the middle of the biggest hospital building programme in its history. After years of under-investment, the infrastructure of the NHS is at last being modernised and made fit for the twenty-first century. A total of 80 major PFI hospital building projects worth over £16 billion have been given the go-ahead since 1997. Around a third of these projects – 24 in total – are already built and operational. The great majority opened their doors to patients on or ahead of schedule.

Critics argue that PFI makes these hospitals more expensive and that the investment risk is not in practice borne by the private sector. However, the Government’s spending watchdog, the National Audit Office (NAO) has twice confirmed that PFI delivers value for money. The NAO’s reports on the business cases for the Dartford and Gravesham and West Middlesex PFI schemes confirmed that both projects are value for money, offering savings of £5.1m and £5.5m respectively. Just as importantly, the NAO revisited the Dartford and Gravesham scheme now it is open and confirmed in its report, published earlier this year, that the private sector partner has, to quote, “delivered the facilities and services contracted for, and to a quality that overall has been satisfactory.”

On behalf of taxpayers, the NHS must always make sure it gets best value for money and that money is spent wisely. This includes making sure that the design of buildings is not only fit for purpose now, but that they are suitable for generations to come. The NHS is encouraged to think about how today’s hospital designs will work in the future. Mechanisms requiring this are built into the business case development process for both PFI and public capital funded hospitals.

There are also sensible checks in place to avoid NHS cash disappearing into the private sector due to delays or unforeseen circumstances. In the event of any projects running behind schedule or over cost, PFI transfers risks onto the private sector. Taxpayers do not have to foot the bill of cost overruns, design faults, servicing and maintaining projects over the lifetime of the contract. The private sector is only paid once the facility is built and operational to the agreed standard and is subject to penalties and deductions if ongoing service and maintenance falls below agreed standard.

This is not to say that we cannot do more to make sure public private partnerships evolve to meet the NHS’ changing requirements. NHS LIFT schemes in primary care are already allowing a long overdue investment to take place as part of the extra £1 billion promised in the NHS Plan to renovate GP premises, build new one stop primary care centres and other primary care facilities.

The NHS LIFT approach involves the local health economy – a primary care trust (PCT) or a cluster of PCTs – developing a strategic plan which incorporates its local primary care service needs and relationships with, for example, intermediate care and local authority services. Based on the strategic plan, the NHS runs a competitive process to select a private sector partner for the next 20 years. The NHS and private sector then set up a joint venture company to manage the NHS LIFT project. They all own a share of the company and jointly have an interest in its long-term success. The NHS LIFT approach establishes a long-term sustainable relationship focused on delivering primary care investment and services and involves the private sector where it can add most value.

In all, there are 50 NHS LIFT projects at various stages. These schemes have delivered over 20 buildings already open to patients, with another 10 or so expected to be open during this summer. This level of activity is expected to continue across future years. The next challenge for NHS LIFT is to deliver a new generation of modern NHS community hospitals. These state of the art centres will provide diagnostics, day surgery and out patients facilities closer to where people live and work.

PFI and NHS LIFT are about adopting the best possible approach to delivering universal, comprehensive healthcare in up to date facilities, which is free at the point of delivery. Public private partnerships like PFI and NHS LIFT are not a laboratory for market-based policy, nor are they a means of unnecessarily channelling funds to big business. They are a practical, tried and tested, value for money way of ensuring the “old NHS” gets new facilities fit for the future.
The Private Finance Initiative: a policy built on sand

Professor Allyson Pollock
Public Health Policy Unit, School of Public Policy, UCL

With 677 Private Finance Initiative projects worth £42.7 billion already commissioned and many more in the pipeline, government commitment to PFI could not be clearer. The scale of PFI projects has been matched by the volume and variety of its critics, spurred on by its high costs which have resulted in cuts in services, public exposure of PFI failures and the flaws in the argument. The UK Government accepts that private finance is more expensive than conventional procurement, but argues that the extra costs of private finance are offset by the transfer of risk and responsibility for performance to the private sector. According to the Treasury, "the private sector is better able to manage many of the risks inherent in complex or large scale investment projects than the public sector." Savings in the costs of construction make it cheaper than traditional, publicly financed procurement, because the incentive structure of PFI whereby private firms risk losing their own money, brings benefits that outweigh "any cost involved" in using private finance. Among the alleged benefits of private financing are savings due to the reduced incidence of cost and time overruns when construction projects come in over budget or late.

UK Government procurement policy rests on Treasury claims that PFI has reduced both the frequency and the magnitude of cost and time overruns. According to the Treasury document PFI: Meeting the Investment Challenge, 2003: "PFI projects are being delivered on time and on budget. HM Treasury research into completed PFI projects showed 88 per cent coming in on time or early, and with no cost overruns on construction borne by the public sector. Previous research has shown that 70 per cent of non-PFI projects were delivered late and 73 per cent ran over budget. These data have been used by the Government to face down criticisms of the policy, to inform the Treasury's guidance on PFI appraisal, and to support the whole of government public-private partnership (PPP) policy both in the UK and abroad. More importantly, the data are now incorporated into government guidance. For example, the revised Treasury Green Book, which lays down the rules for evaluating public procurement, requires that all estimates of construction costs in non-PFI schemes are inflated by up to 24% to take account of the risk of cost underestimation and the risk of works taking longer than scheduled. This makes the PFI projects appear to be better value for money.

The UK Treasury cites five research studies as the source of the cost and overrun data. However, the reports themselves acknowledge limitations to the data, that both the Treasury and the NAO ignore. We have recently conducted an evaluation of the five reports which highlights the following deficiencies in the evidence base:

Two of the five reports were based on surveys and consultations with project managers and contain no primary data on cost and time overrun. [National Audit Office reports; Modernising Construction (2001) and PFI Construction Performance (2003)]. A third study was designed to develop a method, not to evaluate cost and time performance and has no data on cost and time overrun performance. [Agile Construction Initiative: Benchmarking Stage Two Study (1999) cited by NAO] The Treasury's own report contains no data to assess cost and time overruns and its methodology is not in the public domain. The fifth study, conducted by Mott MacDonald, a company which acts as a technical adviser on PFI deals, does have data but it is methodologically so flawed and statistically so biased that the conclusions are uninterpretable. The Mott MacDonald Report is the only comparative study of PFI versus conventional procurement. But our evaluation of the data revealed four categories of serious error:

Sample bias. Although 500 PFI deals had been signed at a value of £28 billion, the Mott MacDonald sample was restricted to 11 PFI schemes and 39 non-PFI schemes of which only three PFI and seven non-PFI were standard building schemes. The sample is small and not representative of procurement schemes as a whole. There were too few cases to compare costs and time overruns.

Selection bias. The selection of cases under each procurement route was not done on a like for like basis. Non-PFI schemes were over-represented by unusual and atypical schemes compared with PFI. For example the PFI sample excluded high profile IT and other failed PFI schemes.
Policy time period bias. The conventionally procured project sample includes projects commissioned under much earlier and different policy guidance periods, sometimes several decades earlier, than for PFI projects. They therefore do not benefit from significant improvements to procurement that have been made since.

Bias in baseline measures for cost and time overruns. PFI costs and time overruns were measured at a much later stage in the procurement process than Non-PFI. This has resulted in Non-PFI costs being artificially and wrongly inflated compared with PFI.

The Treasury objective of having "a sound evidence base" for and a "rigorous investigation" of PFI has not been fulfilled. More than 600 PFI projects with a combined capital value of £42.7 billion have been approved or completed but the chief justification for the policy, that it is value for money, is not supported. The data are being applied in the guidance and used in the policy process despite their evident shortcomings. The evidence base underpinning Treasury guidance for the appraisal of PFI is unsound.

1HM Treasury (2004), Quantitative assessment user guide, p. 7
2HM Treasury (2003), PFI: Meeting the Investment Challenge, p. 109
3HM Treasury (2004), PFI: Meeting the Investment Challenge, p. 43

Policy time period bias. The conventionally procured project sample includes projects commissioned under much earlier and different policy guidance periods, sometimes several decades earlier, than for PFI projects. They therefore do not benefit from significant improvements to procurement that have been made since.

Bias in baseline measures for cost and time overruns. PFI costs and time overruns were measured at a much later stage in the procurement process than Non-PFI. This has resulted in Non-PFI costs being artificially and wrongly inflated compared with PFI.

The Treasury objective of having "a sound evidence base" for and a "rigorous investigation" of PFI has not been fulfilled. More than 600 PFI projects with a combined capital value of £42.7 billion have been approved or completed but the chief justification for the policy, that it is value for money, is not supported. The data are being applied in the guidance and used in the policy process despite their evident shortcomings. The evidence base underpinning Treasury guidance for the appraisal of PFI is unsound.

1HM Treasury (2004), Quantitative assessment user guide, p. 7
2HM Treasury (2003), PFI: Meeting the Investment Challenge, p. 109
3HM Treasury (2004), PFI: Meeting the Investment Challenge, p. 43

Visit to the London IDEAS Genetics Knowledge Park, UCL

Wednesday 22nd June 2005 – Report by Robert Freer

Does our health depend on our genes or are our illnesses a consequence of the way we choose to live our lives? If it is our individual genes that make us susceptible to illnesses do we need individual tests and individual cures which are special to us? And if we rely on genetic testing to assess our future health prospects, for instance the risk of heart disease, are there any adverse consequences? One of the practical concerns raised is the possibility that a negative result may lead to a difficulty in obtaining life assurance.

Questions which are seemingly straightforward to the layman do not always have simple answers, and as a step towards understanding such problems a party from the Parliamentary and Scientific Committee, led by the chairman Dr Doug Naysmith, together with other MPs and members, visited the London IDEAS Genetics Knowledge Park at the Institute of Child Health, University College London. The visit was arranged by kind permission of Professor Steve Humphries, CEO of London IDEAS Genetics Knowledge Park and the Director for the Centre for Cardiovascular Genetics at UCL.

In welcoming the party Professor Humphries explained the background to the work London IDEAS is doing on human genetics and testing for disease, and whether or not DNA-based genetic tests for heart disease are helpful.

To be useful in practice a DNA-based test for the risk of any disease must meet three criteria:

- Be predictive over and above established risk factors;
- Be based on risk estimates that are accurate and reproducible;
- Not be associated with negative psychological impact.

Professor Humphries said the presentations and demonstrations would show how the work of the department is directed to meeting these criteria.

The Genetics Knowledge Park network was set up in 2002 as part of the strategy outlined in the Government’s White Paper of June 2003, "Our Inheritance Our Future". The network is based at UCL and includes Imperial College London, and the St George’s medical schools, and also biotech companies and representatives from consumer groups. The objective of the network is to provide the necessary information “to enable all individuals to make informed choices to reduce the burden of disease for which they are at genetic risk”.

The basic science underpinning the clinical advances is being overseen by Professor Pete Scambler and Dr Maria Bitner-Glindzicz. Professor Scambler is Director of the Genetics Application Unit, London IDEAS, and Head of Molecular Medicine Unit, Institute of Child Health and...
Dr Bitner-Glindzicz is Senior Lecturer and Honorary Consultant in Clinical Genetics at Great Ormond Street Hospital. Although not presented during our visit, other basic research at London IDEAS is also being performed at St George’s (University of London). London is a particularly suitable place to carry out such research, because patients in London come from many ethnic backgrounds, and this diversity provides a range of genetic variations and specific health needs. In fact 36% of children under 16 in Greater London are from non-white ethnic groups.

The visit to the laboratories, led by Ms Kerr Pearce, illustrated the use of the “Pyrosequencer” machine, which is a very high speed and high throughput genotyping analysis platform which facilitates the research work. Genotyping is a technique which identifies a small region of the genome that is linked to the disease of interest, and it is first necessary to increase the quantity of DNA being analysed by means of the “polymerase chain reaction”. This is analogous to a photocopying reaction to amplify a specific area of DNA. The double helical DNA is first separated out to form two separate strands (called “denaturing”) and the region of interest is extended from two primers using the strands as templates. This process is repeated about 35 times and the exponential amplification generates very much larger amounts of the wanted gene. Subsequent sequencing, which is a similar process but uses only one primer, determines the exact nucleotide sequence of the stretch of DNA being analysed.

Developing the results of this work with scientists and the public was the theme of presentations given by Dr Amy Hunter, Genetics Knowledge Park Manager, Dr Gail Davies, Honorary Lecturer, Imperial College, and Dr Ainsley Newson, Postdoctoral Associate, Imperial College. Dr Hunter discussed the response of a number of insurance companies to a female applicant with a family history of breast cancer. Dr Davies described their work on educating schools and the public on genetic knowledge for the future, and Dr Newson considered the practicalities and ethics of personal genomics and the future of clinical genetics.

The visit concluded with a most enjoyable buffet lunch and the opportunity for questions and discussions.

We are most grateful to London IDEAS and to the Institute of Child Health for their kind hospitality in allowing us the opportunity to learn about the work they are doing and for this most informative visit. This research is at the forefront of medical science and promises to provide valuable information in the future for the treatment of diseases.

---

**LETTER TO THE EDITOR**

Sir,

*Science in Parliament* is a splendid publication, so that to criticise one or two articles seems churlish. Nevertheless, the article in the Summer 2005 issue entitled "Steel's fire performance under scrutiny" should not pass without comment. Actually, the scrutiny is used to laud concrete and to promote its use. Now, I have been involved in concrete – research, construction, and investigation of failures – for half a century so that I am, so to speak, pro-concrete, but objectivity should not be sacrificed on the altar of commercial promotion.

Concrete as a material behaves well in fire because it is incombustible, does not emit toxic gases, and offers reasonable insulation against transmission of heat. However, when we talk about concrete as a building material we should not forget that structural elements always contain reinforcing steel so that an important role of concrete is to protect the reinforcing steel against a rise in temperature to a level at which the properties of steel become degraded.

This is why in structural design we are concerned with fire endurance rating, which is the survival time of specific structural assemblies or components. It follows that looking at concrete as the material alone is inadequate. Hence, that statement in the article by Anna Scothern that "failure [in the Windsor Torre in Madrid] was limited to the perimeter steel frame whereas the internal concrete frame survived complete burnout with no collapse" is not sound in structural engineering terms. For requisite fire endurance rating, in addition to the properties of coarse aggregate, the structural engineer needs to consider the depth of cover to any embedded steel and, very importantly, the structural system and design details, including restraint during heating in a fire. Especially in high-rise buildings, robustness and redundancy are essential, this way, alternative load paths will exist and progressive collapse will be avoided. Therein lies safety.

Unfortunately, the article discussed above is not the only example of rather sweeping and one-sided assertions in praise of concrete published in *Science in Parliament*. In the Summer 2004 issue, the sustainable nature of concrete was rather exaggerated. For example, it was said that "the thermal mass of exposed concrete enables it to absorb, store and later radiate heat" and in consequence "the daytime temperature can be reduced by as much as 5°C." This is the same phenomenon as that exploited in the old-fashioned night-storage heaters, but any benefits depend on the time and duration of heating and cooling.

Anyway, in considering sustainability, we should include the consideration of the energy required to produce Portland cement and the associated noxious emissions: the production of 1 tonne of Portland cement results in the emission of 1 tonne of carbon dioxide, if fossil fuel is used. And so on.

I now understand that the two articles to which I have referred were published in association with back cover advertisements in *Science in Parliament*. This may be sound commercial practice, but it would help the unwary reader of the journal to be alerted to the promotional nature of the articles such as those discussed in this letter. I am certainly not advocating censorship, but perhaps a discrete caption or footnote would be helpful.

Having said all that, I would like to laud the excellence of *Science in Parliament*, which I find to be a source of valuable information on a wide range of scientific and technical topics.

Adam Neville FREng, FRSE
A&M Neville Engineering

Editor’s note: The policy has been to invite those organisations who sponsor the front and back covers to contribute a two-page article for the journal.
Geophysics Education in the UK

Professor Aftab Khan, Leicester University, Peter Maguire, President, and Christine Thomas, Education Secretary, British Geophysical Association

Geophysics has emerged as an educational subject in its own right. Observations of the Earth’s physical properties made in laboratories and observatories, from ships, aircraft and satellites worldwide have led to a revolution in our understanding of how the earth works, its hazards and their mitigation. Technological and computing advances have increased our ability to make refined investigations at depth at a variety of scales ranging from the exploration for the oil, gas, water, and raw materials mankind needs for survival, to the location of archaeological remains and environmental monitoring as well as answering fundamental questions about the physics of the Earth. Excellent first degree courses have been developed in a dozen or so universities to provide increasingly employable graduates. However the number of students reading for a first degree in geophysics has fallen by more than 50% in the last 2 decades even though the total number of students has been rising. This decline is only partly explained by falls of 20 % (mathematics) and 40 % (physics) in the number of students doing A levels in the subjects normally required for entry, while Geophysics MSc courses in Earth Science departments have been reduced for financial reasons from five to one.

This rapid decline stimulated a wide-ranging review into "Geophysics Education" in the UK by the British Geophysical Association (BGA), sponsored by its parent learned Societies, the Royal Astronomical Society (RAS) and the Geological Society of London (GSL). Information is being sought from universities and employers, as well as past and present students. The initial findings were presented at the Geological Society on April 22nd by members of a Review Committee drawn from the universities, schools, the oil industry, the shallow geophysics community and the public sector. A full report of the on-going review is expected at the end of the year.

The students (40% female) are of excellent quality with an average A-level grade of B in both Physics and Mathematics. Most embarked on the subject because of scientific curiosity without a specific career in mind. They all found their courses highly educative, lively and informative and thoroughly enjoyed their time at University. The oil industry was the most common employer followed by those in IT, private companies, the public sector, the environment, mining, teaching and research. Their responses indicate that the shortage of applicants is due to the lack of awareness in the schools. They found out about geophysics when searching for something exciting to do.

The oil-related companies who responded varied in size from those employing a few geophysics graduates to those with hundreds. The multinationals recruit worldwide so it is important to continue producing high quality graduates in the UK. There is concern in the industry about the future supply of geophysics graduates from the UK. Employers in the non-oil sector include those concerned with the environment, engineering, water, mining, and archaeological applications in which multi-skilled people are required. The relevant skills are usually acquired five years after completing a first degree in Geophysics, which is an ideal university education as it is broadly based. The base is very fragile at present and there is an urgent need for more R&D to underpin this area of science.

The public sector includes the British Geological Survey, a huge organisation with over 500 geoscientists and a range of thematic programmes requiring geophysicists for 3D investigations on- and off-shore. The Ministry of Defence supports a prestigious research centre on the use of seismology to detect and identify underground nuclear explosions. There are also anxieties about the future supply of graduates in this sector.

There is a danger that the university provision will decline further in response to the fall in applications, the effects of the research assessment exercise (RAE), a halving in the unit of resource, and the declining skills base of the intake. This decline should be arrested and recovery promoted by teaching geophysics in schools nationwide, as demonstrated by enthusiastic physics teachers in two schools that operate seismographs with the aid of Royal Society grants. These enabled them to link up with the "Incorporated Research Institutes for Seismology" Schools’ network in the US. Their recordings of the 2004 Boxing Day Sumatran earthquake responsible for the tsunami received wide press coverage. There is a need for workshops to educate teachers on the merits of using earth examples to illustrate basic physics concepts. Geophysics is an admirable way of enthusing pupils to continue with physical science and mathematics to university level for a wide range of degree courses.
Promoting UK/Japan Science & Technology Collaborations

Philippa Rogers, Science and Innovation Counsellor,
British Embassy, Tokyo

Japan is the world’s second biggest economy grounded, in part, on technological advances. Annual R&D spending totals approximately £90 billion, 3.35% of GDP. And due to recent increased investment in infrastructure, Japan now has some of the world’s best-equipped research centres. This presents huge opportunities for British scientists and engineers. The Science and Innovation team in Japan aims to help realise those opportunities.

Strengthening science and technology collaboration in key areas through bilateral linkages is currently a top priority. We have support for these activities at the highest levels, through the British and Japanese Prime Ministers’ 2003 joint statement on S&T which established the UK Japan Programme on Emerging Technologies. Our flagship project is a unique collaboration on predicting climate change. Launched by the Foreign Secretary earlier this year, the project brings together two of our leading scientific centres on climate modelling with Japan’s Earth Simulator, one of the world’s most powerful supercomputers. This will enable climate modelling to be taken to a new level, allowing state of the art models to be run at unprecedented resolutions. This will give decision makers world-wide a firmer basis on which to assess climate change and its impacts. We were instrumental in bringing these partners together and providing pump-priming funding to get the partnership off the ground. We have also launched initiatives in nanotechnology, fuel cells and the hydrogen economy, structural genomics, gene therapy, sustainable building and “green” chemistry.

A key part of our role is to inform the UK community of technology developments in Japan. The language barrier means that information in English on breakthroughs and opportunities is not readily available. We therefore have a team of bilingual S&T experts who analyse and report on policies and developments in Japanese S&T. For example, Japan is a world leader in developing and implementing new technologies for energy efficiency. We have reported extensively on this, including informing the House of Lords Science & Technology Committee’s recent inquiry on Energy Efficiency. All our reports are available through DTI’s GlobalWatch website (www.globalwatchservice.com).

We also help high-tech UK companies and academics access and benchmark Japanese technology through organising DTI funded missions. A good example is a recent mission on Bioprocessing to look at Japanese approaches to reducing the environmental impact of its chemicals industry using biotechnology. Using our knowledge and contacts of the sector in Japan, we arranged visits to six leading Japanese companies and spent half a day with the leading Japanese academic, Professor Shimizu of Kyoto University. Several companies from the mission are now exploring potential collaborative opportunities in intermediates manufacture, and Professor Shimizu has since visited the UK to discuss academic collaborations.

Over the past 12 months we have organised 8 such missions covering, for example, “smart” textiles, global navigation systems, small scale semiconductor production, and technologies for elderly people. Through this work, we have enabled over 50 UK companies and universities to gain unique access to the expertise of more than 70 Japanese companies and research institutes. The strength of research and technology in Japan, the warmth of the welcome, and the potential and willingness for collaboration usually pleasantly surprise these mission teams.

As well as encouraging UK scientists and engineers to “think Japan”, we are also very active in promoting the UK’s strengths in S&T. For example, we have recently completed a year-long campaign, ”Innovation UK", involving a huge number of special events including lectures by UK Nobel Prize winners and other "science stars", a mobile exhibition, special competitions and a series of "science in the pub" events. Post-campaign research revealed that Innovation UK had positively influenced perceptions of the UK as an innovative country. And this PR work continues. For example, in conjunction with our trade and investment colleagues, we are currently organising a seminar showcasing UK strengths in neuroscience and oncology at BioJapan 2005, the largest bioscience networking event in the Japanese calendar.

Over the next few months, special priority is being given to driving forward new projects under our UK Japan Programme on Emerging Technologies related to the EU and G8 presidency priorities. Three new collaborative initiatives are being pursued in infectious diseases, flooding and coastal defences and aircraft emissions. We have also launched a UK/Japan project on the health and environmental impacts of nanotechnology, aimed at ensuring early international engagement on the issues raised by nanotechnology developments.

In conclusion, we believe the UK/Japan S&T relationship is developing well. But the speed of change is very fast, and the science team in Japan will continue to work hard at identifying and reporting on new opportunities and to use our unique expertise and contacts with the Japanese S&T community to bring the right people together to realise these opportunities.
The Biological and Toxin Weapons Convention Meeting of Experts
Codes of Conduct for Scientists
(June 2005)

John Freeman*

From 13-24 June 2005 the States Parties to the Biological and Toxin Weapons Convention (BTWC) held a meeting of experts to consider the issues surrounding codes of conduct for scientists. This was a topic States Parties to the BTWC had previously not considered in any great detail. It therefore presented some interesting challenges in how to consider the topic of codes of conduct, the extent of activities related to codes of conduct in other areas and by different types of organisations, the relevance of such codes to the prohibitions on biological and toxin weapons, and how to balance the concerns of different actors such as industry, professional associations, non-governmental and other advocacy organisations, and, not least, the views of Government departments and agencies.

These issues were particularly challenging for the UK as Chair for the Meeting of Experts and, later in the year, for the formal meeting of the States Parties (to be held later on 5-9 December).

BTWC Background

The BTWC prohibits the development, production, stockpiling, acquisition, and transfer of biological and toxin weapons. It complements the 1925 Geneva Protocol, which prohibits the use of chemical and biological weapons in war. Negotiations on the BTWC were completed in the early 1970s and it has been 30 years since it entered into force in 1975. Along with the United States (US) and the Russian Federation, the UK is one of the Depositary Governments of the Convention. In addition, as the UK was one of the leading proponents of biological disarmament in the late 1960s, the Convention has a particularly important place in terms of its status and commitment to it both of the UK Government and in the academic and non-governmental arms control community.

At the Fifth Review Conference of the BTWC in 2002 the States Parties to the Convention adopted a programme of work between 2003 and 2005 intended to examine ways in which States could enhance implementation of the BTWC. The programme of work focused on discrete obligations under the Convention. For 2005 it was decided that States Parties would focus on “the content, promulgation, and adoption of codes of conduct for scientists.” Under the 2002 agreement it was determined that the Western Group would hold the Chairmanship of the 2005 meetings (the Eastern Group having held the 2003 Chair, and the Non-Aligned Movement holding the Chair in 2004). It was later decided that the UK would act as Chair in 2005 for these meetings.

The Meetings of Experts and States Parties

The Meeting of Experts and Meeting of States Parties are designed to complement each other. Experts meet for two weeks to consider in detail each issue. This generally involves a wide-ranging discussion among States Parties about the different views on a particular issue, how it relates to recent developments, the advantages and disadvantages of various courses of action, the most appropriate locus for any action, and the sharing of information and details on actual practice.

The focus on discrete topics, such as national implementation legislation in 2003, has required each State Party to examine in detail their existing practices, the rationale for such activity in a given area, and the

*Ambassador John Freeman is the UK Permanent Representative to the Conference on Disarmament in Geneva, and the Chair of the 2005 BTWC Meeting of Experts in June and Meeting of States Party in December.
implementation and effectiveness of such measures. For the UK, which takes its international commitments very seriously, such meetings have been beneficial in themselves by requiring those involved in the implementation of the BTWC to consider how and why the UK does certain things in particular ways. Other States, including many of our key European partners, undertook similar preparatory work for each Meeting of Experts. To date the outcomes from the intersessional work programme have been able to identify good practice, where specific issues require further and more specialised consideration, and where co-operation with other partners might be required in the future. The results included a significant degree of information sharing, awareness raising, and identification of good practice among the States Parties. The outcome of each Meeting of Experts is a report for consideration at the later Meeting of States Parties. It is not the aim or the expectation of States Parties that Codes of Conduct for Scientists be devised, negotiated, or adopted in 2005.

Codes of Conduct for Scientists
At the national level the Foreign & Commonwealth Office took the lead in preparing for discussions on codes of conduct for scientists relating to the issue of biological and toxin weapons. Two seminars hosted by the FCO in December 2003 and June 2004 with representatives of academia, industry, and non-governmental organisations assisted in identifying key themes requiring consideration including the purpose, utility and scope of any codes of conduct, the need for awareness raising and education among the wider scientific community, the role of any existing codes, and the most appropriate initiator of any code of conduct, eg professional body, industry, government, or other organisation.

It was widely acknowledged that the requisite expertise and knowledge on this subject would not necessarily reside in experts attached only to governments. States Parties and experts also had to be aware that codes of conduct were being considered by other bodies and organisations, and in different contexts than that related to the BTWC. For example, in the UK the Royal Society had released its own report and recommendations on the issue of Codes of Conduct prior to the meeting. Participation at the Meeting of Experts could not, therefore, be limited to official representatives of each State Party.

In preparation for the Meeting of States Parties I wrote to each State Party in my role as Chair, prompting them to attend the Meeting prepared for a broad discussion on this topic. Seven questions were identified to provide a framework for the discussions. To provide a single example, States Parties were asked to consider how to encourage universities, industry, research bodies and government to reflect BTWC issues in their own in-house codes of practice and operational frameworks and whether or not there might be a need to consider the introduction of guidance or instructions into existing structures that deal with the safety and ethics of individual experiments and research. The questions were indicative of the kinds of issues on which the Meeting of Experts would need to engage.

The outcome of the Meeting of Experts
At the June meeting 82 of the 155 States Parties to the BTWC were represented. In addition, eight Inter-governmental Organisations, 23 scientific, professional, academic, and industry organisations, and 16 other non-governmental organisations were also present at the meeting. The work of the meeting was organised to ensure adequate time was spent on each of the three areas under consideration (content, promulgation, and adoption) for codes of conduct. After initial statements from States Parties and inter-governmental organisations, the work of the meeting was divided into presentations from relevant scientific, professional, academic, and industry organisations which either I as Chair or interested States Party had encouraged to attend the meeting. These “Guests of the Meeting” brought external perspectives to the issues under discussion and made an extremely valuable input. It included organisations such as the American Society for Microbiology, Association of British Pharmaceutical Industry, the Islamic World Academy of Sciences, and the World Medical Association. To provide one example, the Chief Scientific Adviser to the UK Government, Sir David King, in a very well received address to the Meeting of Experts outlined the Office of Science and Technology’s efforts at developing an overall code on scientific conduct.

At the end of the meeting all the proposals, perspectives, and other points made by those organisations and individuals, and States which addressed the meeting were collated in an Annex to the procedural report. This data will then be considered in the period between the Meeting of Experts and the Meeting of States Parties with a view to States Parties discussing them further.

As a recent participant with my local MP (Andrew Miller) in the Royal Society’s MP-Scientist pairing scheme, I saw for myself the high priority given throughout Parliament to science and technology as a driving force behind the prosperity and wellbeing of the nation. It is of course also true that the UK is not producing sufficient numbers of scientists and engineers. Moreover, and perhaps just as importantly, we need to enhance the general level of public understanding in these areas and great efforts continue to be expended nationally to achieve this. Astronomers, such as myself, have somewhat of a natural advantage here. The level of public interest, particularly among our young people, for all things to do with "space" seems to grow by the day. At Liverpool John Moores University, we have designed, built and now operate the Liverpool Telescope (LT - telescope.livjm.ac.uk) as the World’s largest and most sophisticated robotic telescope. Sited atop the island of La Palma in the Canaries, the LT was funded by the University, the European Regional Development Fund, PPARC and a generous private benefactor (Mr Aldham Robarts) and is a National Facility for astronomy research.

It was always our ambition to bring our work in science and technology to the attention of the public. This took two forms. First of all, we knew that a flexibly-scheduled telescope such as the LT could be used to enable schools to execute their own projects in among the work of the professional astronomers. Thus it was that what is now the National Schools’ Observatory (NSO - www.schoolsobservatory.org.uk) was born whose primary aim is to use astronomy to enthuse students about the study of science, technology and mathematics in general.

With assistance from the DfES and the Institute of Physics, the NSO now has around 500 subscribing member schools across the UK, both primary and secondary, and since October 2004, over 3,000 LT observation requests by pupils have been fulfilled.

We also wanted to have some more "physical" presence (the NSO being largely web-based), ideally in our own locality. This grew into an outline plan for a major visitor centre in astronomy and space research situated between the University’s Astrophysics Research Institute and the university subsidiary company, Telescope Technologies Ltd (which was originally formed to build the LT).

Ultimately we had some of the required funding in place, but siting the centre where we originally intended was problematical. In addition, operating such a centre is well beyond the normal range of experience of any university. On the very day we thought we had reached the end of the road on the project, the local authority brought us together with Mersey Ferries and their parent company, Merseytravel. Just a mile from our Institute is the Seacombe Ferry Terminal. Next to the terminal is the Annexe Building, which when constructed in the early 1930s was of all things the largest multi-storey car park outside London. In recent years it fell into disrepair, but as an art deco listed
building, it could not be demolished. However Merseytravel wished to develop its business at this site and were simultaneously putting together a feasibility study to place a visitor attraction in the Annexe.

So it was that at the end of 1999 we formed a partnership between the University and Merseytravel/Ferries with the aim of jointly bringing our aspirations to fruition. On paper it was perhaps an odd partnership (astronomers and a regional transport body) but the teams’ expertise complemented each other superbly. It took no time for both parties to be convinced that a visitor centre in space and astronomy at this location was likely to be a success and be beneficial to both.

Funding was gradually secured from a variety of sources including ERDF, the Wirral Waterfront (SRB6) initiative, the local authority and Merseytravel itself. The total amounted to around £10m. We had to use the building in a way that made it fit for purpose, enhanced it, but did not violate its aesthetic appeal. Essentially, it is long and thin and on two storeys, with roughly the same exhibition area as the National Space Centre in Leicester. Our concept was to take visitors on a journey out into the Universe, utilising the form of the visitors on a journey out into the vast spiral of dust, gas and around 200 billion stars that make up our Galaxy, the Milky Way, is accomplished via a "wormhole" – based on a theoretical concept allowing one to journey vast distances by effectively short-circuiting space. Here visitors learn that space is not really empty – they see, for example, the otherwise invisible particles in a cloud chamber caused by charged sub-atomic particles that make up "cosmic rays" and view evidence of the magnetic field that threads its way throughout our Galaxy. They also hear and see the story of stars, from birth to (sometimes violent) death and explore the heavens represented on the ceiling via a virtual telescope, before entering a 360º theatre show.

The next transition is onto the second floor and into the wider Universe. Questions asked and answered here include "how did it start and how will it end?", "how large/old is the Universe?" Along the way, visitors can learn more from the NSO area and understand how telescopes as probes of the Universe work. Finally in this zone, perhaps the biggest question of all is asked: "Are we alone?"

The penultimate transition is to a zone that as scientists we found the most challenging of all – the science behind science fiction. We debated this long and hard, weighing up the public interest in UFOs, Dr Who and the like against the absolute requirement not to mislead. In the end we let the designers’ imaginations loose, but the final message is effectively to retain a healthy scepticism and, to coin a phrase, "Don't Panic!".

Emerging into daylight, visitors encounter the "Starchaser" zone, which is now the public home of the UK’s bid to launch a commercial manned spacecraft, with rockets and their associated hardware all around. To the visitor's right, one of the most stunning views across the Mersey to the Liverpool waterfront suddenly reminds them that they are still in fact in Seacombe.

Although it is early days of course, visitor numbers are exceeding expectations. Since opening, on most days the centre has reached full capacity several hours before closing time. Indeed, one of the challenges now is that (ironically) we could actually do with more parking space!
Sustainable development has become a cornerstone of political and social policy and the decisions to be made have implications for engineers responsible for the construction and maintenance of the national infrastructure. The Royal Academy of Engineering (RAEng) that "brings together the most eminent engineers from all disciplines to promote excellence in the science, art and practice of engineering" has responded to this challenge to make engineers, and especially young engineers, more aware of sustainable development, and the contributions they can make, by appointing 26 Visiting Professors in Engineering Design for Sustainable Development at UK universities and by the publication of teaching materials for undergraduates.

Previous publications by the Royal Academy of Engineering for the use of engineering designers have included: The Universe of Engineering - A UK Perspective (2000), The Social Aspects of Risk (2003), and Educating Engineers in Design (2005). The RAEIng's most recent publication is entitled Engineering for Sustainable Development: Guiding Principles, edited by two of the Visiting Professors, Richard Dodds and Roger Venables¹. It was launched before a large audience on 6th September 2005 at a seminar entitled "What do Engineers really need to learn about Sustainable Development?" These Visiting Professors present case studies compiled from their own practical experience, that are based on general principles underlying the practical application of the theme of sustainability. A strong, healthy and just society can be realised by achieving a sustainable economy; by promoting good governance and by using sound science responsibly and living within our environmental limits. This publication is set in the context of the government's report on its strategy for sustainable development entitled Securing the Future (2005) that sets out the principles to be used to achieve this objective.

The concept of sustainable development originated in the 1987 Brundtland report of the UN World Commission on Environment and Development that has become a political slogan with a number of different meanings. The essential point made by Dodds and Venables is the need to ensure that we are all able to continue to live on this planet indefinitely. Engineers have made the world habitable and they are responsible for developing the earth's natural resources to provide us with the infrastructure services we have come to rely on. There are no more unexplored lands and undiscovered continents that we can expand into, we must make the best use of what we have.

Although the report does not discuss population growth, it is relevant to note that our numbers are increasing almost exponentially. In the last 75 years the world population has increased from just over 2 billion to just over 6 billion and planners are now considering the supply of the basic needs of shelter, water, fuel and food to 10 billion people in the foreseeable future. The earth's natural resources are not increasing, they are part of our capital, and we need to ensure that we look after this inheritance carefully.

Dodds and Venables refer to the five forms of capital: Human, Environmental, Social, Financial and Manufactured and they consider that we should strive to live off the interest rather than consume the capital. These factors should be combined in order to achieve economic success, social benefit and high environmental standards. They have selected seven examples to demonstrate how these objectives have been or are being achieved and to encourage others to introduce the concept of sustainable development into their own projects.

The Jubilee River is a new flood diversion channel on the River Thames which carries flood water to by-pass the towns of Maidenhead, Windsor and Eton.

Laundry cleaning products are an example of articles of mass production and consumption where the environmental impact of each stage of the process has to be considered.

The experiment of embedding sustainable development into an organisation has been introduced at Glasgow University. Mobile phones are an iconic electronic symbol of the 21st century and the manufacturers are encouraged to examine the impact of their whole life cycle.

Regeneration of buildings: the Borough Council of Newtonabbey in Northern Ireland decided to renovate a disused mill for use as their new civic headquarters rather than construct a new building.

Catalytic converters: the use of catalytic converters is an example of balancing their practical benefits against the environmental impact of their manufacture.

The energy challenge: the problem is to meet the ever-increasing global demand for energy from sources generating minimal atmospheric pollution.

¹Engineering for Sustainable Development: Guiding Principles.

Robert Freer

Science in Parliament Vol 62 No 4 Autumn 2005
The Committee were also surprised that industry seems largely to ignore the needs of older people, despite the economic strength of this age group. Products are seldom designed with older people in mind, and advertising ignores them. Assistive technology too is proceeding at a disappointing rate.

**Water Management - new inquiry**

Sub-Committee I, chaired by the Earl of Selborne, is now considering Water Management. The inquiry will investigate the future management of water supply and demand in the United Kingdom in the context of demographic and economic development, and climate change.

Written evidence is invited on all issues affecting the future balance of supply and demand. The Committee is keen to hear views on what the causes are of the current problems of water supply, what the projections are for future supply, and where and when serious problems are likely to emerge. They would like to know whether sufficient research is being devoted to predicting and handling possible future scenarios, and whether the responses of Government, the EU, regulators and the industry are adequate.

The Committee would like to know what are thought to be the options for increasing water supply, what are the likely future trends in water demand, and what can be done to manage demand more effectively, and to influence the behaviour of consumers and others. They are interested in the contribution that science, engineering and technology can make towards reducing water use or waste by households, businesses and the public sector.

**Pandemic Influenza - new inquiry**

The Select Committee is following-up its “Fighting Infection” report published in 2003 (HL Paper 138) with a short inquiry investigating the UK’s preparations for a potential outbreak of pandemic influenza.

The Department of Health has stated that "warning signs are increasing that a new influenza virus with pandemic potential is possible and will affect around a quarter of the UK population, possibly resulting in more than 50,000 deaths". The death toll could be much higher according to some experts.

The inquiry will concentrate on contingency planning in the UK, but will also look at what the risk of a pandemic is, and how it can be reduced. The Committee will hear evidence in October and November, aiming to publish before the end of the year.
POST Board – 2005 Parliament

The establishment of POST’s Board after a general election is a protracted process. Two House of Commons select committees (the newly-created Administration Committee and the Science and Technology Committee) make nominations to the Board. Until these committees are themselves created, they cannot make the nominations. Just before the summer recess, the Administration Committee nominated Neil Gerrard MP, (returning) and Mark Harper (new MP for Forest of Dean), while the Science and Technology Committee nominated Dr Des Turner (returning). The four Lords members of the Board had been nominated earlier. They are: Lord Broers, Baroness Greenfield, Lord Oxburgh, and Professor the Lord Winston. The non-parliamentary members of the Board remain Professor Fran Balkwill, Professor Sir Tom Blundell, Sir David Davies and Professor Jim Norton. POST is expecting the remainder of the Commons Board members to be nominated by the end of the summer recess.

Recent POST publication

**Infection control in healthcare settings**  
July 2005  
**POSTnote 247**

Healthcare associated infections (HCAIs) are infections transmitted to patients (and healthcare workers) as a result of healthcare procedures, in hospital and other healthcare settings. Recent years have seen an increase in the awareness of HCAIs, in particular those caused by antibiotic-resistant “superbugs”. This POSTnote describes the nature, spread and treatment of HCAIs. It focuses on challenges for public policy in their detection, prevention and management.

**Current work**

POSTnotes in preparation on:

**Biological Sciences and Health** - Avian flu, National DNA database, Science in Court.

**Environment and Energy** - Sustainable fisheries, Ecosystem services, Household energy efficiency, Cleaner coal, Farmland conservation and Water resource management.

**Physical Sciences, IT and Communications** - Criminal justice system ICT, Mobile phones, Space weapons/space security, and ICT in developing countries.

**Science Policy, etc** - The 24-hour society, Public engagement in science.

**Seminars**

In July POST held a joint seminar with the Wellcome Trust on Bugs, Drugs and Hospitals. The meeting brought together parliamentarians, researchers, healthcare professionals and others to discuss the issues relevant to healthcare associated infections in clinical practice.

On 9th November it will hold a seminar on the 24-hour society.

**Fellows and interns at POST**

Current and recent fellows/interns are: British Ecological Society Fellow Nick Worsfold (Sheffield University/Farmland conservation), Economic and Social Research Council Fellow Cindy Warwick (Oxford University/Water resource management), and Royal Society of Chemistry Fellows Ruth Croxton (Lincoln University/DNA database) and Greg Offer (Imperial College/Future transport technologies). Since June 2005, POST has also welcomed interns Nicholas Cockroft (UCL/Conservation science), Marina Roehrs (St Andrews University/Compiling database on overseas parliaments and science and technology), Lydia Cross (Manchester University/International finance facility), and Susanne Kadner (University of East Anglia/Aarhus Convention).

**International activities**

On 16th July 2005 Dr Chandrika Nath gave a presentation on "ICT and privacy in Europe" on behalf of the European Parliamentary Technology Assessment Network at the 3rd international conference on politics and information systems (PISTA) in Orlando, Florida. In September the Director participated in the second international Science and Technology in Society symposium in Kyoto.
Current Inquiry

Carbon Capture and Storage Technology

Following its first meeting on 20 July 2005, the Committee announced its first inquiry, into carbon capture and storage technology (CCS). It is inviting written evidence on the following points:

1. The viability of CCS as a carbon abatement technology for the UK, in terms of:
   - The current state of R&D in, and deployment of, CCS technologies;
   - Projected timescales for producing market-ready, scalable technologies;
   - Cost;
   - Geophysical feasibility;
   - Other obstacles or constraints.

2. The UK Government’s role in funding CCS R&D and providing incentives for technology transfer and industrial R&D in CCS technology.

The Committee will start taking oral evidence on this inquiry in the Autumn, when it will also announce the remainder of its programme.

Government Responses

The Work of Research Councils UK: Government Response to a Report by the House of Commons Science and Technology Select Committee

Before the new Committee was appointed, the Government published its Response to the Committee’s Sixth Report of Session 2004–05, The Work of Research Councils UK (HC 219). The Work of Research Councils UK: Government Response to a Report by the House of Commons Science and Technology Select Committee (Cm 6598) was published in June 2005.

First Special Report


Second Special Report


Human Reproductive Technologies and the Law: Government Response to the Report from the House of Commons Science and Technology Committee

During the summer recess, the Government published its Response to the Committee’s Fifth Report of Session 2004–05, Human Reproductive Technologies and the Law (HC 491). Human Reproductive Technologies and the Law: Government Response to the Report from the House of Commons Science and Technology Committee (Cm 6641) was published in August 2005.

Further Information

Further information about the work of the Committee or its current inquiries can be obtained from the Clerk of the Committee, Chris Shaw 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.

The Committee has a new website address (www.parliament.uk/s&tcom). All recent publications (from May 1997 onwards), terms of reference for all inquiries and press notices are available at this address.
Debates and Selected Parliamentary Questions & Answers

Following is a selection of Debates from the House of Commons.

A full digest of all Debates, Questions and Answers on topics of scientific interest from 6th June to 21st July 2005 from both Houses of Parliament appears on pages 41 to 46.

Animal Testing

Question and Written Answer on Monday 6 June

Mr Laurence Robertson (Tewkesbury): To ask the Secretary of State for Trade and Industry what assistance his Department is giving to research bodies to encourage them to use scientific research techniques which do not involve animals for risk assessments on chemicals; and if he will make a statement.

Mr. Morley: I have been asked to reply.

Risk assessments on chemicals are carried out according to EU and UK regulatory requirements to provide the necessary data for the protection of human health and the environment. There is currently a legal requirement to use animals for some testing where there is no other method for producing the data. The Government is keen to keep animal testing to a minimum and supports the development of alternative methods which, once properly validated, may be accepted as part of the regulatory system. My Department is supporting the development of alternative methods and strategies that will lead to the reduced use of animals in chemical assessment programmes and is hosting a workshop on this topic in June.

The Government through the Medical Research Council (MRC) and the Biotechnology and Biological Sciences Research Council (BBSRC) funds the National Centre for the Replacement, Refinement and Reduction of Animals in Research (NC3Rs). The Centre provides a UK focus for the development, promotion and implementation of the 3 Rs in biological and biomedical research in academia and industry.

Renewable Energy (S&T Report)

Debate in the House of Lords on Thursday 23 June

Lord Oxburgh rose to move, That this House takes note of the report of the Science and Technology Committee on Renewable Energy: Practicalities (4th Report, Session 2003-04, HL Paper 126). There is now wide acceptance of the reality of anthropogenic climate change and the need to take action urgently. The Nobel Prize-winning chemist Arrhenius predicted in 1903 that the burning of fossil fuels would increase the carbon dioxide content of the atmosphere and cause the Earth to warm. It is the rate of change which matters most, especially in Africa where rapid climate change will impact on the poorest who will be at greatest risk. The report addressed one element of the Government's energy policy as outlined in the 2003 White Paper; namely, the intention that by 2010, 10 per cent and by 2020, 20 per cent of our electricity should be generated from renewable sources – that is from wind, waves, sun and the other intrinsic Earth processes, or from plant life or organic wastes.

Modifications were proposed to the Renewables Obligations Certificates scheme to extend their application until 2020. Regarding security of supply, the Government's blind faith in the security of markets for an essential infrastructure service is surprising. It does matter if the lights go out. Biomass may be burned or used to make liquid fuels opening the door to co-production of food and fuel. If human life is to continue on this planet, secure and sustainable energy sources must be found. Fossil fuels are limited as a stopgap measure, however the contribution from many renewables is limited because technology is presently too primitive to exploit them fully.

Lord Whitty regretted that regulatory authorities and the Treasury are reluctant to intervene in a way that is designed to change personal behaviour and attitudes towards climate change. Without this change the improvements needed in energy efficiency will not be achieved.

The Earl of Selborne described the difficulties he had had in trying to implement a small biomass scheme at farm level. This was not feasible due to the punitive pricing scheme for those who have to sell at the prices required under the scheme. He called for policies that combine nature conservation with renewable energy programmes. He described successful woodchip operations at the farm scale in Denmark and Holland. A renewable energy think small approach is needed to which anyone can make a modest contribution by installing solar panels, for example, inconvenient though it will be to the large electricity generators.

Baroness Sharp of Guildford noted that the Government have increased the annual R&D spend on renewable and low-carbon technologies from £40 million to £70 million. If this issue is of the highest priority, is this really enough?

Lord Haworth is in favour of renewables but not the role in terms of energy mix they are designed to play. He agreed entirely with Lord Whitty that renewables and nuclear together should replace the burning of fossil fuels. He had been under the misapprehension that development of renewables would mean their substitution for fossil fuels. However it emerges that any increase in electricity generated by renewables will be used to replace nuclear power. This will make no difference at all to the sources of climate change.

Meeting the Government's environmental targets will be made much harder over the next two decades by the retirement of 20 per cent of our present generating capacity that is carbon free – namely nuclear.

Lord Jenkin of Roding noted that wind power can sometimes fall by thousands of megawatts in the course of just two hours. This requires immediate mobilisation of fossil fuel generators to meet demand. Problems arising from such imbalances appear unresolved. Funding for transmission from remote renewable generators has not been agreed yet. If there is no transmission there will be no offshore generators.

Lord Methuen noted that CHP take-up in the UK is pathetic compared with European counterparts. Closure of all nuclear generation by 2023 except Sizewell B will leave us almost totally dependent on oil and gas imports
from Russia, the Ukraine and other states less politically stable than the UK. For the UK to abandon nuclear electricity generation in that scenario is madness as nuclear is the obvious candidate for baseload generation. New designs such as the BNFL Westinghouse AP1000 reactor are now ready for exploitation, but there is a serious risk of the intellectual property rights for that design being lost to the UK and sold to the US, thus losing the benefits of our accumulated design expertise. A balanced energy policy with a diversity of reliable energy sources is essential for the future of our country.

Lord Cameron of Dillington described a world-leading small-scale pyrolysis plant and gasification plant that is capable of extracting renewable energy from all non-inert wastes except nuclear, developed by Compact Power.

Baroness Platt of Writtle recommended the appointment of one minister responsible for security of supply. Government policy has split responsibility on this vital issue. The rise in the potential use of nuclear power was welcomed. Coalmine methane should be used rather than let it leak to the upper atmosphere. The Government was urged to act on the many fronts she described.

Lord Chorley described in vivid detail the disfigurement of the landscape by new generation turbines which simply dwarf the landscapes they inhabit.

Lord Winston noted that 50% of the audience at the Cheltenham science festival, and at other science festivals, supported nuclear power.

Lord Dixon-Smith noted that carbon dioxide emissions increased throughout Europe in 2003 and the largest contributor to that was the United Kingdom. He described the South East London Combined Heat and Power plant designed to incinerate waste, provide electricity and heat the houses nearby. However, for lack of a regulatory system not a single house has been heated. That is a scandal. He raised doubts about the benefit of generating electricity in the outer isles to supply London.

Lord Tombs attributed the Government's interest in wind power to the fact that it can be promoted through electricity regulation thus providing a source of funds not subject to Treasury scrutiny. The subsidy for wind power until 2020 will be some £30 billion due to the losing the benefits of our accumulated design expertise. A balanced energy policy with a diversity of reliable energy sources is essential for the future of our country. projections for the contribution of energy crops is over-optimistic. Equal importance was given to the security of electricity supply and that of baked beans. Lord Haworth's and Lord Methuen's criticisms were welcomed, and it was accepted that this makes the UK vulnerable, and a matter for debate. Current Government policies were generally reiterated. Sir Ben Gill has been appointed to take on all the bureaucratic rules that surround biomass schemes. It was expected that generators would react to energy shortages in future by increasing coal and gas usage, thus increasing emissions.

Clean Coal Technology

Question and Written Answer on Monday 27 June

Sandra Osborne (Ayr, Carrick and Cumnock): To ask the Secretary of State for Trade and Industry what steps he is taking to support the development of clean coal technology in the UK.

Malcolm Wicks: The UK's Carbon Abatement Technologies strategy was launched on 14 June. This sets out the work programme needed to support the development of sustainable fossil fuel technologies mainly using coal and natural gas. It recognises that fossil fuels will continue to be a major source of energy for decades to come and that technologies need to be developed and deployed which will radically reduce CO₂ emissions from the use of these fuels. Improved combustion efficiency and Carbon Capture and Storage (CCS) are seen as the key technologies for achieving this aim.

The Government have announced funding of some £25 million towards demonstration of carbon abatement technologies as part of a £40 million package of support for clean energy technologies. Also, in his Budget statement this year the Chancellor undertook to assess support for the development of CCS in the Climate Change Programme Review (CCPR), including the potential for economic incentives.

In addition to this we will continue to fund research and development in this area under the DTI's Technology Programme. Under the Cleaner Coal Technology R and D Programme from 1999 up to 2008, the Government will have committed some £13.5 million in supporting UK industry to develop cleaner coal technologies. In addition to this we are also committing some £3.5 million for UK industry and academia to collaborate with the USA to develop these technologies.

Sustainable Development

Debate in Westminster Hall on Thursday 7 July

The Minister for Climate Change and the Environment (Mr Elliot Morley) introduced the debate which was overshadowed by the dreadful events in central London earlier that day. The public sector spends more than £1.25 billion per year which represents an enormous opportunity for furthering sustainable development, innovation, new companies and new ways of looking at whole-life assessments. During the UK presidency of the EU one of the priorities will be to lead work on promoting sustainable procurement throughout Europe. In October the UK will host a workshop with representatives from all member states to discuss how to improve environmental performance in public procurement across the EU. Various cross-departmental initiatives that are designed to make England cleaner, safer, greener and healthier were then described.

Mark Lazarowicz (Edinburgh, North and Leith) emphasised that this is a UK-wide strategy and
introduced Environment Direct that is linked nationwide to a range of Government strategies designed to encourage people to choose a more sustainable way forward.

Mr Morley referred to the recently launched eco-standard directive from the EU that focuses on energy consumption, especially the stand-by mode which is very wasteful of energy on some TVs.

Mr Geoffrey Clifton-Brown (Cotswold) Oilseed rape and cereals are being exported to other EU countries to be made into biofuel, which is then re-imported. That is crazy, arising from a lack of long-term commitment through the UK tax regime. There are active plans for a biofuel plant in the south-west if they could have that commitment.

Mr Morley said that Sir Ben Gill has been tasked with producing a report on how a biofuel industry can be developed in this country. Funding has been provided to develop the biofuel supply chain.

Mr John Hayes (South Holland and The Deepings) remarked that sustainability has become a watchword that every political speech needs to mention to gain validity. Defining it is altogether more difficult because it is used rather loosely. The Government's planned demolition of 400,000 homes is a negative example of the application of this principle, as many of these could be renovated in a more environmentally sustainable manner and as they are also essential to the character of the area.

Mr David Chaytor (Bury, North) was born and lived in one of those places and many of his constituents still do and want to get rid of them and move into modern, more energy-efficient, sustainable homes.

Mr John Hayes returned to the subject of sustainability and discussed several potential aspects of the classification and re-use of land with potential for sustainable housing development.

Norman Baker (Lewes) discussed the general misunderstanding of the meaning of the term sustainability and its application to common problems. For example, the south-east has a major problem with water resources. A desalination plant is to be built off the coast of Newhaven, yet water metering has not yet been undertaken so someone can leave their tap on all day and pay the same as someone who has the tap off all day. The Government needs to grasp the need for metering. Universal metering is needed, starting in the south-east. It should not be left to water companies to do. A long discussion ensued on the extent to which Government did or did not wish to change the definition and interpretation of sustainability in order to be able to focus in future more on the economic pillar rather than the environmental and social pillars that together support the concept.

Mr Morley concluded with a general discussion on brownfield sites and the benefits and public attitudes towards demolishing or refurbishing housing stock that is in poor condition and several other related issues.

Progress of Legislation before Parliament.

Government Bills

Charities Bill (HL) – 2nd Reading 7.6.05; Committee 28.6.05 & 12.7.05; Report 12.10.05

Commons Bill (HL) – 2nd Reading 20.7.05; provisional date for Committee 25.10.05

Identity Cards Bill – 2nd Reading 28.6.05 – Committee stage 5, 6, 7, 12, 14, 19 & 21.7.05

Merchant Shipping (Pollution) Bill (HL) – 2nd Reading 14.6.05; Committee stage 11.7.05; provisional date for Report 17.10.05

Natural Environment and Communities Bill – 2nd Reading 6.6.05; Committee 21, 23, 28 & 30.6 & 5.7.05; Report 11.10.05

Private Members' Bills

Breast Cancer Bill – introduced under the ballot by Mr Shailesh Vara MP – provisional date for 2nd Reading 20.1.06

Children's Food Bill – introduced under the ballot by Mary Creagh MP – provisional date for 2nd Reading 28.10.05

Climate Change and Sustainable Energy Bill – introduced under the ballot by Mr Mark Lazarowicz MP – provisional date for 2nd Reading 11.11.05

Fishery Limits (United Kingdom) Bill (HL) – introduced by Lady Saltoun of Abernethy – 2nd Reading 16.6.05 – Committee 5.7.05

Food Supplements (European Communities Act 1972 Disapplication) Bill – introduced by Mr William Cash MP – provisional date for 2nd Reading 14.10.05

Management of Energy in Buildings Bill – introduced under the ballot by Dr Alan Whitehead MP – provisional date for 2nd Reading 11.11.05

Pharmaceutical Labelling (Warning of Cognitive Function Impairment) Bill – introduced by Dr Andrew Dismore MP – provisional date for 2nd Reading 12.5.06

Regulation of Laser Eye Surgery Bill – introduced under the ballot by Mr Frank Cook MP – provisional date for 2nd Reading 21.10.05

Parliamentary & Scientific Committee News

Sir Hermann Bondi FRS

Sir Hermann Bondi, who died in September, had been an enthusiastic member of the Committee for many years. He was a guest speaker at two of the Committee's meetings: in November 1970 he spoke on the work and future plans of the European Space Research Organisation; and in October 1982, as Chairman of the Natural Environment Research Council, he was one of three speakers on Environmental Pollution. He represented the NERC on the Committee from 1983-1987 and served as a Vice-President from 1984-1987. On his retirement from that office he was elected a Life Member and regularly attended meetings and the annual lunch.

New Members

We are pleased to welcome the following new members:

Mr Stephen Hammond MP
Dr Keith Winters, Individual member, formerly a representative of AEA Technology
SET for BRITAIN, Scientific and Technical Organisation, represented by Dr Eric Wharton
# UK Parliament - Digest of Parliamentary Debates, Questions and Answers
## 6th June – 21st July 2005

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 38 to 40

## Agriculture
- **Cereal Disease** – 13.7.05 HoC 1036W
- **Fruit Growing** – 6.7.05 HoC 425W
- **National Fruit Collection** – 6.6.05 HoC 259W
- **Potato Ring Rot** – 21.7.05 HoC 1966W

## Animal Experiments
- **Animal Testing** – 6.6.05 HoC 303W, 16.6.05 HoC 549W & 12.7.05 HoC 950W
- **Botulinum Toxin** – 9.6.05 HoC 639W
- **LD50** – 4.7.05 HoC 133W
- **Primates** – 21.6.05 HoC 889W

## Animal Health and Welfare
- **Animal Feed: Waste Food** – 21.7.05 HoL WA262
- **Animal Slaughter** – 13.6.05 HoC 31W
- **Animal Welfare** – 13.6.05 HoC 31W & 20.6.05 HoC 668W
- **Avian Flu** – 14.6.05 HoC 241W & 7.7.05 HoL WA114
- **Bees** – 6.6.05 HoC 250W, 21.6.05 HoC 886W, 4.7.05 HoC 2W & 6.7.05 HoC 413W
- **Birds (Imports)** – 21.7.05 HoC 1947W
- **Cattle Diseases** – 13.6.05 HoC 34W
- **Egg Imports** – 21.7.05 HoC 1954W
- **Foot and Mouth** – 15.6.05 HoC 421W, 28.6.05 HoC 1403W, 5.7.05 HoC 250W & 21.7.05 HoC 141WS
- **Illegal Meat** – 20.6.05 HoC 669W
- **Imports** – 9.6.05 HoC 1380
- **Marine Noise Pollution** – 11.7.05 HoC 650W
- **National Bee Unit** – 27.6.05 HoC 1188W
- **Newcastle Disease** – 21.7.05 HoC 144WS & 1964W
- **Scrapie** – 8.6.05 HoL WA84
- **Seal Products** – 11.7.05 HoC 655W
- **Snaring** – 16.6.05 HoC 561W
- **Veterinary Medicines (EU Directive)** – 28.6.05 HoC 1405W
- **Medicines Directorate** – 21.6.05 HoC 890W
- **Surgeons** – 12.7.05 HoC 960W
- **Surgeons Act** – 21.7.05 HoC 1970W

## Aviation
- **Air Transport (Emissions)** – 21.6.05 HoC 884W
- **Aircraft Carbon Dioxide** – 27.6.05 HoC 1182W
- **Emergency Evacuation** – 14.7.05 HoL WA164
- **Pollution** – 28.6.05 HoC 1413W
- **Seat Spacing and Dimensions** – 14.7.05 HoL WA163 & HoL WA164
- **Hydrocarbons Consumption (International Aviation)** – 16.6.05 HoC 529W

## Biodiversity and Conservation
- **Beavers** – 16.6.05 HoC 550W
- **Canada Geese** – 14.6.05 HoC 241W
- **Cetaceans** – 21.7.05 HoC 1952W
- **Cormorants** – 15.6.05 HoC 420W & 14.7.05 HoC 1154W
- **Dormice** – 5.7.05 HoC 252W
- **Endangered Species** – 16.6.05 HoC 551W & 6.7.05 HoC 415W
- **Regulations** – 27.6.05 HoC 1185W
- **Gardens (Biodiversity)** – 19.7.05 HoC 1520W
- **Hedgehogs/Badgers** – 11.7.05 HoC 649W
- **Northern Ireland: Irish Hares** – 8.6.05 HoL WA91
- **Peat** – 21.7.05 HoC 1965W
- **Rats** – 30.6.05 HoC 1644W
- **SSSIs** – 16.6.05 HoC 561W
- **Whaling** – 7.6.05 HoC 443W, 14.6.05 HoC 244W, 5.7.05 HoC 252W, 6.7.05 HoC 430W & 13.7.05 HoC 1041W
- **White-tailed Sea Eagle** – 30.6.05 HoC 1646W
- **Woodland** – 29.6.05 HoC 57WS

## Biological and Chemical Weapons
- **Bio-contamination** – 20.6.05 HoC 734W
- **Biological and Toxin Weapons Convention** – 5.7.05 HoC 322W & 14.7.05 HoC 1176W

## Biotechnology
- **Bt 10 Maize** – 28.6.05 HoC 1499W
- **Genetically Modified Maize** – 6.6.05 HoC 257W & 14.6.05 HoC 242W
- **GM Animal Feed** – 21.7.05 HoC 1960W
- **GM Crops** – 16.6.05 HoC 553W, 6.7.05 HoC 427W, 14.7.05 HoC 1169W, 18.7.05 HoC 1282W, 20.7.05 HoC 1710W & 21.7.05 HoC 2068W
- **GM Food/Materials** – 7.6.05 HoC 528W, 9.6.05 HoC 629W, 27.6.05 HoC 1360W & 28.6.05 HoC 1505W
- **Monsanto’s Maize** – 9.6.05 HoC 633W & 5.7.05 HoC 354W
- **Toxin** – 14.6.05 HoC 308W

## Bovine Tuberculosis
- **Badger Culling** – 15.6.05 HoC 420W
- **Badger/Cattle TB** – 12.7.05 HoC 951W
- **Badgers** – 7.6.05 HoC 441W, 27.6.05 HoC 1183W & 6.7.05 HoL WA89
- **Bovine Tuberculosis** – 16.6.05 HoL WA139 & 30.6.05 HoL WA31
- **Bovine Tuberculosis** – 21.6.05 HoC 885W
- **Bovine Tuberculosis** – 9.6.05 HoC 1375 & 622W, 13.6.05 HoC 33W, 20.6.05 HoL WA157, 27.6.05 HoC 1317W, 30.6.05 HoC 1637W, 4.7.05 HoC 3W, 7.7.05 HoC 436 & 564W, 11.7.05 HoC 813W, 14.7.05 HoC 1153W, 19.7.05 HoC 1515W & 21.7.05 HoC 1947W
BSE and CJD
Beef Imports – 12.7.05 HoC 951W
BSE – 13.6.05 HoC 33W, 6.7.05 HoC 414W & 20.7.05 HoC 1707W
Variant CJD – 20.7.05 HoC 91WS & HoL WS113
UK Cases – 7.6.05 HoL WA31

Chemicals
EU Presidency (Environmental and Sustainable Development) – 19.7.05 HoC 1108
Hormone Disruptors – 21.7.05 HoC 1961W
Mole-catchers – 27.6.05 HoC 1188W & 28.6.05 HoC 1403W
Parkinson’s Disease – 14.6.05 HoC 308W
PBDE – 28.6.05 HoC 1524W
Pesticides/Chemicals (Royal Commission) – 21.7.05 HoC 1965W
Phthalates – 9.6.05 HoC 634W & 22.6.05 HoC 1107W
Strychnine Hydrochloride – 27.6.05 HoC 1295W

Climate Change
Air Conditioning – 7.6.05 HoC 457W
Carbon Capture – 20.6.05 HoC 696W
Technology – 20.6.05 HoC 716W
Carbon Emissions – 16.6.05 HoC 550W, 12.7.05 HoC 952W & 18.7.05 HoC 1281W
Clean Coal: China and India – 19.7.05 HoL 1355
Climate Change – 6.6.05 HoC 251W, 29.6.05 HoL WA23, 7.7.05 HoC 446, 14.7.05 HoC 1153W & 18.7.05 HoC 1328W
G8 – adjournment debate – 14.6.05 HoC 58WH
G8 – debate – 29.6.05 HoC 1395
Programme – 16.6.05 HoC 22WS
Fuel Emissions – 19.7.05 HoL WA211
Greenhouse Gas Emissions (EU) – 7.7.05 HoC 429
Insects – 21.6.05 HoC 886W
World Climate: Impact of Destruction of Rainforests – 6.6.05 HoL WA42

Construction
Building Regulations (Fire Safety) – 19.7.05 HoC 59WS

Crime
Automatic Number Plate Recognition – 20.6.05 HoC 748W, 4.7.05 HoC 122W & 11.7.05 HoC 759W
Credit Card Fraud – 21.7.05 HoC 2186W
Identity Theft – 7.6.05 HoC 511W, 9.6.05 HoC 656W & 20.7.05 HoC 1723W
Internet Fraud – 16.6.05 HoC 611W
National Identity Register – 15.6.05 HoC 453W
Police Information Technology Organisation – 23.6.05 HoC 46WS
Scanner Technology – 19.7.05 HoC 1622W

Defence
A400M – 21.6.05 HoL WA167
Bowman Communication System – 5.7.05 HoC 257W, 7.7.05 HoC 733 & 21.7.05 HoC 2110W
Defence Science and Technology Laboratory: Key Targets – 13.7.05 HoC 29WS & HoL WS38
Departmental Research – 27.6.05 HoC 1200W
Falcon Secure Trunk Communication System – 5.7.05 HoC 5WS
FRES – 6.6.05 HoC 285W, 27.6.05 HoC 1201W & 21.7.05 HoC 2114W
Military Technology Transfer – 19.7.05 HoC 1105
Nuclear Weapons – 14.6.05 HoC 333W
QinetiQ – 20.6.05 HoC 667W
Unmanned Aerial Vehicles – 6.6.05 HoC 246W, 14.6.05 HoC 334W, 28.6.05 HoC 1401W & 5.7.05 HoC 262W
Watchkeeper – 20.7.05 HoC 86WS & HoL WS104

Defence (Gulf War)
Gulf Veterans – 19.7.05 HoC 58WS & HoL WS75, 21.7.05 HoL 1593
Illnesses – 13.6.05 HoC 1WS & HoL WS49,
Gulf War Illnesses – 21.7.05 HoL WS136 & WA281
Gulf War Veterans: Neuro-imaging Studies – 21.7.05 HoL WA281
US Gulf War Veterans – 21.7.05 HoL WA323

Education
Academic Freedom – 14.7.05 HoL WA163
Academic Research (Commercial Exploitation) – 11.7.05 HoC 827W
A-levels – 14.6.05 HoC 351W
And GCSEs – 5.7.05 HoL 529
Grades – 6.6.05 HoC 326W
Mathematics – 19.7.05 HoL WA204
Physics and Chemistry – 13.7.05 HoL WA145
Chemistry – 11.7.05 HoC 833W
Students – 28.6.05 HoC 1434W
Dyslexia – 11.7.05 HoC 835W
Graduation Statistics – 23.6.05 HoC 943
Higher Education Institutions – 21.6.05 HoC 1009W
International GCSE – 30.6.05 HoC 1701W
Life-long Learning (EUC Report) – 7.7.05 HoL 832S
Mathematics – 21.6.05 HoC 1010W, 4.7.05 HoC 163W, 11.7.05 HoC 840W, 20.7.05 HoC 1723W & 21.7.05 HoC 2057W
Medical Academics – 14.6.05 HoL 1123
Multiplication – 23.6.05 HoC 1170W
Museums – debate – 9.6.05 HoL 1009
Postgraduate Science Degrees – 29.6.05 HoC 1625W
University Admissions – 4.7.05 HoC 176W
Departments (Closures) – 16.6.05 HoL 596W
Graduates – 4.7.05 HoC 176W

Energy
BP Decarbonised Fuel Project (Scotland) – 4.7.05 HoC 2WS
Carbon Capture and Abatement Technologies – 4.7.05 HoC 49W, 7.7.05 HoC 615W & 21.7.05 HoC 1922W
Carbon Sequestration – 4.7.05 HoC 50W, 12.7.05 HoC 852W & 18.7.05 HoC 1337W
* Clean Coal Technology – 6.6.05 HoL 659 & 27.6.05 HoC 1227W
Cleaner Fossil Fuel Technologies – 4.7.05 HoC 1105
Coal Gasification Technology – 4.7.05 HoC 50W
Coal Mining – 23.6.05 HoC 1155W
Coal Reserves (South Wales) – 6.7.05 HoC 460W
Crude Oil Production – 18.7.05 HoC 1338W
Deep Coal Industry – 21.7.05 HoC 1396
Domestic Energy Costs – 23.6.05 HoC 1164W
Electricity Generation – 20.7.05 HoC 1739W
Waste Energy – 20.6.05 HoL WA152
Energy – 14.6.05 HoC 11WS  
Consumption: Domestic Appliances Standby Mode –  
22.6.05 Hol. WA187  
Efficiency – 9.6.05 HoC 1378 & 4.7.05 HoC 4W  
Green Paper – 7.7.05 HoC 443  
Policy – 14.6.05 Hol. WS54, 20.6.05 Hol. WA151 &  
27.6.05 Hol. WA3  
Research – 6.6.05 HoC 306W & 21.7.05 HoC 1926W  
Supply – 7.6.05 HoC 455W  
White Paper – 13.6.05 HoC 77W  
Gas Turbines – 23.6.05 HoC 1165W  
Hydro Electricity – 19.7.05 HoC 1521W  
Hydro Power – 18.7.05 HoC 1340W  
Hydrogen Energy – 21.7.05 HoC 1921W  
Methane Energy – 18.7.05 HoC 1282W  
Methane Gas – 5.7.05 HoC 284W  
Natural Gas – 13.6.05 HoC 81W  
Non-polluting Energy Technologies – 18.7.05 HoC 1346W  
North Sea Oil – 19.7.05 HoL WA219  
Oil and Gas Imports – 4.7.05 HoC 57W  
Oil Imports – 12.7.05 HoC 856W  
Oil Prices – debate – 8.6.05 HoL 836  
Royal Commission on Environmental Pollution – 18.7.05  
HoC 1350W  
Standby Mode – 16.6.05 HoC 562W  

**Energy (Nuclear)**  
Advanced Gas-cooled Reactor Nuclear Power Stations –  
4.7.05 HoC 47W  
Nuclear Fusion – 21.7.05 HoL WA313  
Industry – 7.6.05 HoC 462W  
Installations: Licensing – 19.7.05 HoL WA229  
Power – 7.6.05 HoC 1109, 23.6.05 HoC 929, 12.7.05  
HoC 853W & 20.7.05 HoC 1744W  

**Energy (Renewable)**  
Biofuels – 9.6.05 HoC 1367 & 12.7.05 HoC 952W  
Directive – 13.6.05 HoC 32W  
EU Targets – 20.7.05 Hol. 1467  
Electricity Generation – 13.6.05 Hol. 1064  
Energy Crops – 21.7.05 HoC 1955  
Local Energy Generation – adjournment debate – 6.6.05  
HoC 1101  
Microgeneration – 21.7.05 HoC 1920W  
Onshore Wind Technology – 28.6.05 HoC 1409W  
Renewable Energy – 6.6.05 HoC 372W, 7.6.05 HoC 1115,  
20.6.05 HoC 721W, 22.6.05 HoC 1042W, 23.6.05 HoC  
1156W, 27.6.05 HoC 1234W, 18.7.05 HoC 1348W,  
21.7.05 HoC 163WS & Hol. WS150  
Crops – 9.6.05 HoC 623W  
Planning – 30.6.05 Hol. WA49  
* S&T Report – debate – 23.6.05 Hol. 1787  
Solar Grants Programme – 16.6.05 HoC 616W  
Wind Energy – 21.6.05 Hol. WA166  
Wind Farms – 13.6.05 HoC 85W, 23.6.05 HoC 1155W,  
28.6.05 HoC 1410W, 21.7.05 HoC 1933W  

**Environment (Pollution)**  
Air Pollution – 22.6.05 HoC 1091W  
Aquatic Environment – 20.6.05 HoC 669W  
Asbestos – adjournment debate – 28.6.05 HoC 403WH  
Carbon Dioxide Emissions – 21.7.05 HoC 1951W  
Munitions/Fireworks Production (Land Contamination) –  
30.6.05 HoC 1643W  
Pollution – 12.7.05 HoC 957W  
Smog – 5.7.05 HoC 254W  
Smog Warning – 14.7.05 HoC 1200W  
Trees – 15.6.05 HoC 432W  

**Environment (Protection)**  
Antarctic Consultative Meeting (Swedish Proposal) –  
29.6.05 HoC 1575W  
Biospheres – 12.7.05 HoL WA137  
Carbon Sequestration – 4.7.05 HoC 3W  
Disaster Management – 4.7.05 HoL 413  
Flood Defences – 27.6.05 HoC 1186W  
Global Environment Facility – 27.6.05 HoC 1194W  
Marine Environment – 21.7.05 HoC 1963W  
Marine Noise Pollution – 6.7.05 HoC 476W  
Oil Tankers – 15.6.05 HoC 416W  
Plastic Bags – 7.7.05 HoL 731  
Rainforest – 18.7.05 HoC 1284W  
Roads – 4.7.05 HoC 25W  
Tree Cover – 13.7.05 HoC 1040W  
Trees – 16.6.05 HoC 565W & 11.7.05 HoC 655W  

**EU Meetings**  
Agriculture and Fisheries Council – 18.7.05 HoC 47WS &  
21.7.05 HoC 145WS  
Education Ministers (Informal Meeting) – 21.7.05 HoC  
127WS & Hol. WS124  
Employment, Social Policy, Health and Consumer Affairs  
Council – 13.6.05 HoC 1WS & HoL WS50  
EU Presidency: Informal Competitiveness Council –  
21.7.05 HoC 166WS & Hol. WS127  
EU Telecom Council – 13.7.05 HoC 32WS & Hol. WS39  
REACH – 20.7.05 HoC 1712W  

**Fisheries**  
Cetaceans – 5.7.05 HoC 245W & 11.7.05 HoC 645W  
Cormorants – 13.7.05 HoC 1037W  
Falkland Islands (Fish Stocks) – 14.6.05 HoC 326W  
Fisheries – 23.6.05 HoC 1115W & 21.7.05 HoC 1958W  
Fishing Industry – 9.6.05 HoC 1385  
Strategy Unit Report – 28.6.05 HoC 53WS  
Marine Bill – 7.6.05 HoC 442W  
River Thames – 4.7.05 HoC 11W  
Salmon – 22.6.05 Hol. WA186  
Fishing – 20.6.05 Hol. WA155  
Sea Fish – 21.7.05 HoC 1968W  
Sea Fishing (Restriction of Days at Sea) Order 2005 –  
11.7.05 Hol. WA134  

**Food**  
Acrylamide (Foodstuffs) – 28.6.05 HoC 1496W  
Air Services (Meals) – 27.6.05 HoC 1257W  
Annual Review of Controls on Imports of Animal Products  
– 20.7.05 HoC 89WS  
British Nutrition Foundation – 16.6.05 HoC 634W  
Food Irradiation – 18.7.05 HoC 1461W  
Labelling – 19.7.05 HoC 1671W  
Poisoning – 22.6.05 HoC 1069W  
Standards Agency – 27.6.05 HoC 1358W  
GCSE Food Technology – 13.6.05 HoC 1358W  
Healthy Eating – 20.7.05 HoC 1901W  
Illegal Meats – 7.6.05 HoC 530W
School Meals – 7.6.05 HoC 476W, 21.6.05 HoC 1023W,
23.6.05 HoC 1171W & 20.7.05 HoC 1728W
Soya Milk – 14.6.05 HoC 309W
Trans Fats – 11.7.05 HoC 749W
UK-produced Food – 11.7.05 HoC 656W

Food (Supplements)
EU Regulation (Nutrition and Health Claims) – 7.6.05 HoC 526W
Food Labelling/Supplements – 7.6.05 HoC 526W
Supplements – 20.6.05 HoC WA154
Supplements Directive – 22.6.05 HoL WA184 & 21.7.05 HoC 2162W

Health (Cancer)
Anemia – 27.6.05 HoC 1337W
Anastrozole – 18.7.05 HoC 1379W
Breast Cancer – 6.6.05 HoC 147, 20.6.05 HoC 696W & 843W & 21.7.05 HoC 2146W
Screening – 22.6.05 HoC 1095W
Cancer – 4.7.05 HoC 203W
Deaths – 4.7.05 HoC 192W
Research – 20.7.05 HoC 1896W
Services/Treatment – 27.6.05 HoC 1339W
Treatment – 28.6.05 HoC 1500W, 30.6.05 HoC 1752W, 18.7.05 HoC 1454W, 19.7.05 HoC 1662W & 20.7.05 HoC 1893W
Treatment – debate – 21.7.05 HoL 1631
Cervical Cancer – 5.7.05 HoC 274W
Smear Tests – 15.6.05 HoC 501W
Childhood Cancer – 7.6.05 HoC 525W
Lymphoma – 28.6.05 HoC 1514W
Medical Research Council – 21.7.05 HoC 1930W
Myeloma – 6.6.05 HoC 432W, 12.7.05 HoC 972W, 18.7.05 HoC 1468W & 21.7.05 HoC 1983W
Photodynamic Therapy – 11.7.05 HoC 742W
Prostate Cancer – 6.6.05 HoC 371W
Skin Cancer – 13.7.05 HoC 1146W
Testicular Cancer – 20.6.05 HoC 703W

Health (General)
Abdominal Aortic Aneurysm Screening – adjournment debate – 21.6.05 HoC 227WH
Abortion – 6.6.05 HoC 413W
Allergies – 15.6.05 HoC 499W
Alzheimer’s Disease – 20.7.05 HoC 1889W
Avian Flu – 23.6.05 HoL 1725, 11.7.05 HoC 812W & 21.7.05 HoC 2146W
Bowel Diseases – 13.7.05 HoC 1124W
Cannabis – 27.6.05 HoC 1020
Chlamydia – 20.7.05 HoC 1893W
Childhood Obesity – 16.6.05 HoC 634W
Chronic Fatigue – 15.6.05 HoC 501W
Chronic Liver Disease – 16.6.05 HoC 635W
Colitis/Crohn’s Disease – 6.7.05 HoC 460W
Complementary Medical Practitioners – 20.7.05 HoC 1896W
Complex Regional Pain Syndrome – 13.6.05 HoC 76W
Coronary Heart Disease – adjournment debate – 9.6.05 HoC 1999WH
Dental Health Research – debate – 4.7.05 HoL 486
Diabetes – 20.6.05 HoC 790W
Duchenne Muscular Dystrophy – 6.6.05 HoC 421W, 16.6.05 HoC 636W & 27.6.05 HoC 1355W
Embryos – 18.7.05 HoC 1460W
Foreign Animal Species – 21.7.05 HoC 2174W
Genetic Testing – 15.6.05 HoC 507W
Hepatitis C – adjournment debate – 11.7.05 HoC 672
Herbal Medicinal Products – 21.7.05 HoC 2168W
Human Embryos (Research) – 11.7.05 HoC 728W
Macular Degeneration – 15.6.05 HoC 512W
Malarial Infections – 5.7.05 HoC 352W
MRSA – research – 27.6.05 HoC 1372W
Myalgic Encephalomyelitis – 21.6.05 HoC 952W
Neonatal Care – 11.7.05 HoC 656W
Obesity – 19.7.05 HoC 1676W
Organ Transplants – debate – 21.7.05 HoL 1604
Ovarian Tissue Transplants – 21.7.05 HoC 2174W
Palliative Care – 21.7.05 HoC 2175W
Palliative Care – debate – 7.7.05 HoL 786
Panto-Valentine Leukocidin – 16.6.05 HoC 643W
Streptococcus Testing – 6.6.05 HoC 439W
Venous Thromboembolism – 21.7.05 HoC 152WS & HoL WS164
Virus Outbreaks – 14.7.05 HoC 1201W
Xenotransplantation – 6.6.05 HoC 260W

Health (Infections)
Bacteriophages – 30.6.05 HoC 1752W & 7.7.05 HoC 575W
Clostridium Difficile – 13.6.05 HoC 49W, 89W & 102W, 15.6.05 HoC 502W, 21.6.05 HoC 964W, 22.6.05 HoC 1068W & 1097W, 27.6.05 HoC 1344W, 28.6.05 HoC 1502W, 11.7.05 HoC 717W, 19.7.05 HoC 1663W & 20.7.05 HoC 1895W
Health Care Associated Infection – 13.6.05 HoC 104W, 27.6.05 HoC 1363W, 6.7.05 HoC 454W & 11.7.05 HoC 727W
Hospital Hygiene – 21.6.05 HoC 966W & 22.6.05 HoC 1104W
Hospital Infections – 28.6.05 HoC 1425W, 4.7.05 HoC 86W & 21.7.05 HoC 2169W
Hospital-acquired Infections – 16.6.05 HoC 640W, 29.6.05 HoC 1607W, 30.6.05 HoC 1759W, 5.7.05 HoC 350W, 6.7.05 HoC 433W, 12.7.05 HoC 889W & 981W & 14.7.05 HoC 1189W
Infection Surveillance Data – 13.6.05 HoC 104W & 14.7.05 HoC 1190W
MRSA – 13.6.05 HoC 105W, 28.6.05 HoC 1397W & 1519W & 6.7.05 HoC 456W
National Infection Control Manual – 20.7.05 HoC 1909W
Surgical Site Infections – 20.6.05 HoC 869W

Health (International Development)
Africa (HIV/AIDS/Tuberculosis) – 5.7.05 HoC 266W
Antiretroviral Drugs – 13.6.05 HoC 3W
Brazil (HIV/AIDS) – 8.6.05 HoC 589W
Malaria – 13.7.05 HoC 104W
Malaria/Tuberculosis – 19.7.05 HoC 1577W
Malarial Infection – 30.6.05 HoC 1684W
Polio – 6.7.05 HoL WS21
Eradication – 6.7.05 HoC 10WS

Health (Service and IT)
Allergy Specialists – 20.6.05 HoC 783W
Appraisals (NIHCE) – 30.6.05 HoC 1750W
Influenza – 7.6.05 HoC 530W & 14.6.05 HoC 307W
Pandemic – 7.7.05 HoC 580W
National Institute for Health and Clinical Excellence – 6.6.05 HoC 432W
NHS Research Ethics Committees – 6.6.05 HoC 33WS & Hol. WS35, 13.7.05 HoC 1139W & 18.7.05 HoC 1468W
NHS: Specialised Services – debate – 11.7.05 HoL 955
Positron Emission Tomography Services – 19.7.05 HoC 1677W
National NHS Database – 11.7.05 HoC 734W
NHS: Information Systems – 11.7.05 HoL WA130
NHS (IT Programme) – 8.6.05 HoC 587W

Health (Vaccines)
Anthrax Vaccination – 18.7.05 HoC 1309W
Avian Flu – 18.7.05 HoL WA182
Hepatitis – 30.6.05 HoC 1757W
Hepatitis B – 14.7.05 HoC 1189W & 18.7.05 HoC 1465W
Influenza Pandemic – 5.7.05 HoC 351W
MMR (Students) – 28.6.05 HoC 1518W
MMR Vaccinations – 13.7.05 HoC 1137W
Mumps – 20.6.05 HoC 795W & 19.7.05 HoC 1675W
Tuberculosis – 28.6.05 HoC 1528W
Vaccination – 18.7.05 HoL WA198

Information Technology
E-Government – 6.6.05 HoC 392W
Government Departments: Electronic Attack – 18.7.05 HoL WA188
IT Outsourcing – 14.6.05 HoL WA122
Open Source Software – 15.6.05 HoL WA137
Police Information Technology Organisation – 23.6.05 HoL WS80
Schools: Open Source Software – 14.6.05 HoL WA121

Information Technology (ID Cards)
Biometric Information – 28.6.05 HoC 1448W & 4.7.05 HoC 122W
Readers – 18.7.05 HoC 1212
Identity Cards – 8.6.05 HoC 576W, 9.6.05 HoC 655W, 20.6.05 HoC 757W, 27.6.05 HoC 1242W & 28.6.05 HoC 1451W
Biometric Technology – 13.6.05 HoC 159W & 21.7.05 HoL WA284
Technology – 15.6.05 HoC 449W
Identity Checks (Heathrow) – 9.6.05 HoC 656W

Intellectual Property
Draft European Computer Implemented Inventions Directive – 6.6.05 HoC 305W
Patent Act – 18.7.05 HoC 1348W

International Development
Africa (Poverty) – adjournment debate – 30.6.05 HoC 1466
Africa Commission – debate – 20.6.05 HoL 1484
Fossil Fuels (International Funding) – 29.6.05 HoC 1541W
Horticulture – 12.7.05 HoC 1005W
Water and Sanitation – 20.7.05 HoC 1866W

Medicines and Drugs
Actrapid Insulin – 22.6.05 HoC 1091W & 29.6.05 HoC 1595W
Adverse Drug Reactions – 20.7.05 HoC 1885W
Alzheimer’s – 6.6.05 HoC 413W, 14.6.05 HoC 158, 16.6.05 HoC 630W & 12.7.05 HoC 696
Antibiotics – 7.6.05 HoC 524W & 6.7.05 HoC 448W
Animals – 5.7.05 HoC 243W
Antipsychotic Drugs – 11.7.05 HoC 716W
Clinical Trials – 30.6.05 HoC 1753W
Directives – 21.6.05 HoC 963W, 27.6.05 HoC 1343W & 21.7.05 HoC 2161W
Co-proxamol – adjournment debate – 13.7.05 HoC 936
Counterfeit Medicines – 22.6.05 HoC 1086W, 28.6.05 HoC 1465W, 4.7.05 HoC 206W & 21.7.05 HoC 2148W
Diabetes: Insulin Injection Pens – 9.6.05 HoL 964
Drugs – 4.7.05 HoC 126W
Drugs Blacklist – 20.7.05 HoC 1899W
Erythropoietin – 18.7.05 HoC 1461W
Fluoxetine – 6.6.05 HoC 421W
Herceptin – 6.6.05 HoC 426W & 27.6.05 HoC 1362W
Illicit Medicines – 20.7.05 HoC 1902W
Khat – adjournment debate – 8.6.05 HoC 183WH
Multiple Sclerosis – 16.6.05 HoC 641W
Orlistat – 13.7.05 HoC 1143W
Pharmaceutical Counterfeiting – 28.6.05 HoC 1470W
Pharmaceuticals – 6.6.05 HoC 436W
Rheumatology – 15.6.05 HoC 515W
Ritalin – 6.6.05 HoC 438W
Selective Serotonin Reuptake Inhibitors – 4.7.05 HoC 227W
Seroxat – 13.7.05 HoC 1145W & 20.7.05 HoC 1917W
Simvastatin – 20.6.05 HoL WA152, 13.7.05 HoC 1146W & 21.7.05 HoC 2181W
Traditional Herbal Medicinal Products Directive – 27.6.05 HoC 1383W
Velcade – 28.6.05 HoC 1473W
Zoledronate – 13.6.05 HoC 110W

Nuclear and Radiation Hazards
Childhood Leukaemia (Power Lines) – 20.6.05 HoC 785W
Committee on Radioactive Waste Management – 13.6.05 HoC 34W & 29.6.05 HoL WA25
Leukaemia (High Voltage Lines) – 14.6.05 HoC 307W
Nuclear Industry – 13.6.05 HoC 83W
Inventories (Missing Material) – 16.6.05 HoC 577W
Power – 18.7.05 HoC 1347W
Nuclear Waste – 21.6.05 HoC 887W & 918W & 22.6.05 HoC 1040W
Portsmouth – 6.7.05 HoC 428W
Overhead Power Lines – 13.6.05 HoC 94W
Portsmouth Nuclear Accident Plan – 28.6.05 HoC 1399W
Radioactive Waste (Consultation) – 7.7.05 HoC 440
Disposal – 6.7.05 HoC 429W
Management – 23.6.05 HoC 1119W
THORP Plant – 15.6.05 HoC 413W

Science Policy
Business and Industry Skills – 11.7.05 HoC 700W
DEFRA Laboratory Strategy – 14.7.05 HoC 36WS & HoL WS47
Empirical Economics of Standards – 20.6.05 HoC 28WS
European Charter for Researchers – 11.7.05 HoC 701W
Measurement Advisory Committee – 11.7.05 HoC 702W
Parliamentary Links Day – 22.6.05 HoC 797
Research and Development – 30.6.05 HoC 1435, 11.7.05 HoC 843W, 13.7.05 HoC 1145W & 18.7.05 HoL WA197
Research, Technology and Development – 5.7.05 HoC 285W
Science and Engineering Graduate Scheme – 4.7.05 HoC 140W
Science and Innovation Investment Framework – 20.7.05 HoL WS110
Science Budget – 6.7.05 HoC 466W
Science Investment – 7.7.05 HoC 620W & 19.7.05 HoC 1694W
Stem Cell Research – 28.6.05 HoC 1527W
US-UK Technology Transfer – 18.7.05 HoC 1353W

Space
British National Space Centre – 18.7.05 HoC 1337W
European Space Policy – 23.6.05 HoC 1165W
Space Exploration and Research – 5.7.05 HoL WA82
Weapons in Space – 30.6.05 HoC 1738W

Sustainable Development
Deforestation (Brazil) – 12.7.05 HoC 1003W
Forests – 20.6.05 HoC 691W
Future of Transport – 6.6.05 HoC 277W
Rainforests – 15.6.05 HoL 1195
Illegal Logging – 4.7.05 HoL WA64
Review of Sustainable Construction – 7.7.05 HoC 18WS
Spatial Strategy (Water) – 20.6.05 HoC 840W
Sustainability Designing – 8.6.05 HoC 563W
* Sustainable Development – adjournment debate – 7.7.05 HoC 141WH
  Action Plans – 20.7.05 HoC 1714W
  Indicators – 30.6.05 HoC 65WS

Telecommunications and Broadcasting
3G Masts – 18.7.05 HoC 1425W
Airwave – 20.6.05 HoC 747W
Digital Reception (Rural Areas) – 18.7.05 HoC 1363W
Digital Satellite Broadcasting – 23.6.05 HoC 1138W
Digital Switchover – 21.7.05 HoC 112WS
  Adjudgement debate – 5.7.05 HoC 54WH
Digital Television – 13.6.05 HoC 10, 16.6.05 HoC 524W(2), 11.7.05 HoC 964W & 21.7.05 HoL WS123
Mobile Phone Masts – 14.6.05 HoC 275W & 23.6.05 HoC 1138W
Mobile Phones (Children) – 8.6.05 HoC 612W & 28.6.05 HoC 1519W
Mobile Telephones – 7.6.05 HoC 531W
Remote Electronic Voting – 18.7.05 HoC 1305W
Telecommunications Masts – 22.6.05 HoC 1112W, 5.7.05 HoC 403W & 21.7.05 HoC 2097W
  Adjudgement debate – 28.6.05 HoC 345WH
Tetra Transmission – 7.6.05 HoC 522W

Transport
Air Pollution – 9.6.05 HoC 625W
Biofuels – 12.7.05 HoC 994W
Carbon Emissions – 5.7.05 HoC 244W & 20.7.05 HoC 1708W
Fuel-efficient Cars – 12.7.05 HoC 999W
Hydrogen Fuel Cell Buses – 20.7.05 HoC 1794W
New Cars (Emissions) – 8.6.05 HoC 553W
Passenger Transport (Fuel Consumption) – 20.7.05 HoC 1798W
Pedestrian Crossings – 14.6.05 HoC 250W
Pelican and Puffin Crossings – 6.6.05 HoC 278W
Quiter Road Surfaces – 14.6.05 HoC 251W
Renewable Transport Fuels – 9.6.05 HoC 1384 & 7.7.05 HoC 603W
Road Charging Research – 27.6.05 HoC 1268W
  Pricing – 27.6.05 HoC 1269W
  Surfaces – 7.6.05 HoL WA63
  Tax – 7.7.05 HoC 604W
  Transport Fuels – 7.7.05 HoC 606W
Solar-powered Devices – 6.6.05 HoC 279W
Wheel Detachment Incidents – 21.7.05 HoC 2139W

Waste
Farm Plastics – 12.7.05 HoC 953W
Government’s National Waste Strategy – 21.7.05 HoC 147WS
Hazardous Waste – 16.6.05 HoC 553W
Incinerators – 15.6.05 HoC 509W
Packaging – 4.7.05 HoC 9W
Recycling – 11.7.05 HoC 651W & 14.7.05 HoC 1157W
Sustainable Waste Management – 21.7.05 HoC 142WS
Tyres – 30.6.05 HoC 1645W
Waste Disposal – 14.7.05 HoC 1158W
  Definition – 6.6.05 HoL WA41
  Electrical and Electronic Equipment Directive – 18.7.05 HoC 1353W
  Management – 13.6.05 HoC 45W, 15.6.05 HoC 433W
  & 27.6.05 HoC 1190W
Recycling – 28.6.05 HoC 1406W

Water
Water (Bacterial Contamination) – 16.6.05 HoC 646W
Fluoridation – 5.7.05 HoC 367W
Pollution – 13.6.05 HoC 47W
Resources – 18.7.05 HoC 1289W
Supply – 7.7.05 HoL 736
Parliament rejects a proposal on retention of data to prevent terrorist crimes
Following recommendations from the Committee on Civil Liberties, Parliament rejected a proposal from France, Ireland, Sweden and the United Kingdom on the adoption of a framework decision. This concerned the retention of data processed and stored in connection with the provision of publicly available electronic communication services or data on public communications networks. The purpose of the proposal was prevention, investigation, detection and prosecution of crime and criminal offences including terrorism.

Ban on six phthalates
Parliament voted in favour of a permanent ban on six phthalates, DEHP, DBP, BBP, DINP, DIDP and DNOP in toys and childcare articles. Phthalates are used to soften plastic. Since 1999, the use of six types of phthalate have been temporarily banned in the manufacture of toys and childcare articles for children under the age of three because of their carcinogenic, mutagenic and reprotoxic effects. These chemicals are not trapped by the PVC and can be released into the mouth and then absorbed by a child who is chewing a toy. MEPs also called on the Commission to look at other types of material containing these phthalates, especially in the fields of healthcare, food packaging, and floor coverings. They also wanted to limit the use of aromatic ingredients to 0.05% of the plasticized material so as not to encourage children to put the articles into their mouths. Manufacturers use aromatic products to mask the naturally unpleasant odour of phthalates.

Flame retardants: MEPs challenge the Commission
The "comitology" procedure, by which the power to take decisions on mainly technical matters is delegated to the Commission, is throwing up another conflict between MEPs and the European Commission. This time the dispute is over whether to scrap restrictions imposed two years ago on the use of decaBDE, a brominated flame-retardant used chiefly to ensure that electric and electronic devices, such as televisions and computers, do not burst into flames. The Commission wants to lift the restrictions but MEPs adopted a resolution opposing this plan. The MEPs believe the Commission has clearly exceeded its implementing powers and are calling on the Council to oppose the proposal. Brominated flame retardants can have toxic effects on health and the environment. Some of them, penta- and octaBDE were in fact completely banned two years ago. Parliament fought up to the conciliation stage to win a ban on octaBDE and restrictions on decaBDE, pending – for the latter – more precise risk assessments. These do not convince MEPs who note that less toxic substitute products exist, hence the justification for continuing the ban.

Agriculture in the outermost regions
Programmes for agriculture in the outermost regions of the Union will apply from 1 January 2006 or from a date thereafter. The list of products eligible should be a matter for each Member State. Community support programmes should promote improvements to the environment and landscape by sustainable land management.

Patenting of computerised inventions
In a second reading vote on the controversial directive on the patentability of computerised inventions, the EP Legal Affairs Committee is recommending to allow patents on computer-driven inventions to protect the software itself. It is now up to the Parliament to decide.

PAH use to be restricted
A new European directive intends to reduce the use of certain aromatic hydrocarbons. Polycyclic aromatic hydrocarbons (PAH) are constituents in oils, some of which are used as extender oils in the production of tyres, and some of which are classified as carcinogenic, mutagenic and reprotoxic substances. Tyre tread, for example, contains up to 28 per cent of extender oils. These dangerous substances are released into the environment in the form of fine particles through tyre debris. From 2010, producers will have to apply new restrictive norms.

REACH "an asset for European competitiveness"
The EU’s proposed new chemicals package (REACH) will "give a push to competitiveness in Europe" according to Luxembourg’s Minister for the Environment, Lucien Lux, at a REACH workshop where KPMG presented their impact assessment study which concluded that the additional costs to industry were negligible.

Biometrics technology
Biometrics technology, which uses physical or behavioural information to identify a person, is increasingly being discussed as a means to tackle fraud and theft. National debates are under way in several countries on how desirable this technology is. A wider examination of its implications, involving all potential stakeholders, is yet to take place.

European gateway for science education
The European Commission has launched a new European gateway for science education – the Xplora portal – to make science more interesting to young people and encourage them to take up scientific careers. Xplora provides resources for primary and secondary education, and is aimed at teachers, pupils, scientists, communication professionals and others involved in science education. To discover Xplora please visit http://www.xplora.org

Keeping Europe at the forefront of nanotechnology
The European Commission has proposed an action plan for nanosciences and nanotechnologies (N&N) which makes clear what the Commission and the Member States must do in order to keep Europe at the forefront in this field. The Commission has pledged to reinforce N&N within FP7 to include specific support for nanoelectronics under the information society technologies section of FP7 and to boost funding for research into the potential impacts of N&N.
European Union - Digest

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

**Agriculture**

**Commission Regulations:**
- 1294/2005 on organic production of agricultural products – OJ L205(p16)6.8.05
- 1336/2005 on organic production of agricultural products – OJ L211(p11)13.8.05

**Commission Decision** 2005/608/EC on marketing of a maize product genetically modified for resistance to corn rootworm – OJ L207(p17)10.8.05

**First Call** for proposals for the Community programme on genetic resources in agriculture – OJ C183(p21)26.7.05

**Animals and Veterinary Matters**

**Commission Regulations:**
- 943/2005 concerning the permanent authorisation of additives in feedingstuffs – OJ L159(p6)22.6.05
- 1091/2005 on specific control methods for the control of salmonella – OJ L182(p3)13.7.05
- 1292/2005 on animal nutrition – OJ L205(p3)6.8.05
- 1299/2005 on maximum residue limits of veterinary medicinal products in foodstuffs of animal origin – OJ L206(p4)9.8.05
- 1332/2005 on the protection of species of wild fauna and flora – OJ L215(p1)19.8.05
- 1356/2005 on maximum residue limits of veterinary medicinal products in foodstuffs of animal origin – OJ L214(p3)19.8.05

**Commission Decisions:**
- 2005/434/EC on domestic movements of animals from restricted zones – OJ L151(p21)14.6.05
- 2005/436/EC on co-operation for the control of Foot-and-Mouth Disease – OJ L151(p26)14.6.05
- 2005/439/EC on a Community veterinary reference laboratory in the UK – OJ L152(p20)15.6.05
- 2005/472/EC on financing of studies covering food safety, animal health and zootechnics – OJ L166(p12)28.6.05
- 2005/515/EC on the introduction of the Traces system – OJ L187(p29)19.7.05
- 2005/598/EC prohibiting the marketing of products derived from cattle born or reared in the UK before 1.8.96 – OJ L204(p22)8.05
- 2005/603/EC on restricted zones relating to bluetongue in Italy – OJ L206(p11)9.8.05
- 2005/604/EC on brucellosis in Italy – OJ L206(p12)9.8.05
- 2005/617/EC recognising the system for identification of ovine and caprine animals in the UK – OJ L214(p63)19.8.05
- 2005/619/EC on protection measures relating to avian flu in certain Asian countries – OJ L214(p66)19.8.05

**Opinions** of the Economic and Social Committee: humane trapping standards for certain animal species – OJ C157(p70)28.6.05

**Chemicals**

**Commission Directive** 2005/46/EC on maximum residue levels for amitraz – OJ L177(p35)9.7.05

**Commission Regulation** 1048/2005 on biocidal products – OJ L178(p1)9.7.05

**Commission Decisions:**
- 2005/618/EC on maximum concentrations of certain hazardous substances in electrical and electronic equipment – OJ L214(p65)19.8.05
- 2005/625/EC on permitted quantities of methyl bromide – OJ L219(p47)24.8.05

**Opinion** of the Committee of the Regions on EU chemicals policy – OJ C164(p78)5.7.05

**Construction**

**Commission Decision** 2005/610/EC on classes of reaction-to-fire performance for certain construction products – OJ L208(p21)11.8.05

**Defence**

**Commission Decision** 2005/516/EC establishing the European Security Research Advisory Board – OJ L191(p70)22.7.05

**Energy and Nuclear Industries**

**Council Directives:**
- 2005/32/EC on ecodesign requirements for energy-using products – OJ L191(p29)22.7.05
- 2005/33/EC on marine fuels – OJ L191(p59)22.7.05

**Environment**

**Opinions:**
- Committee of the Regions on flood risk management – OJ C164(p11)5.7.05
- Economic and Social Committee on the European Environment and Health Action Plan – OJ C157(p65)28.6.05

**Call** for proposals under a Community programme promoting non-governmental organisations active in environmental protection – OJ C188(p21)2.8.05

**Education and Training**

**Opinion** of the Committee of the Regions on lifelong learning – OJ C164(p59)7.05

**Call** for proposals on Tempus III: Guide for Applicants – OJ C170(p16)9.7.05

**Fisheries**

**Council Regulations:**
- 953/2005 on fishing arrangements between the EEC and Cote d’Ivoire – OJ L164(p1)24.6.05
- 1300/2005 on certain types of fish and vessels engaged in illegal fisheries – OJ L207(p1)10.8.05
- 1147/2005 on fishing for sand eel in the North Sea and the Skagerrak – OJ L185(p19)16.7.05
- 1156/2005 on fishing for roundnose grenadier by vessels flying the flag of Spain – OJ L187(p16)19.7.05
- 1156/2005 on fishing for roundnose grenadier by vessels flying the flag of Spain – OJ L187(p16)19.7.05
- 1170/2005 on fishing for Northern prawn by vessels flying the flag of Lithuania – OJ L188(p25)20.7.05
- 1178/2005 on fishing for Blue Ling by vessels flying the flag of France – OJ L189(p28)21.7.05
- 1189/2005 on fishing for common sole by vessels flying the flag of France – OJ L193(p25)23.7.05
- 1202/2005 on fishing for kelpheards by vessels flying the flag of Germany – OJ L195(p13)27.7.05
- 1262/2005 on fishing opportunities for herring – OJ L201(p23)2.8.05
1265/2005 on fishing for sandeel in certain areas by vessels flying the flag of Denmark – OJ L201(p31)2.8.05
1266/2005 on fishing for anglerfish in certain areas by vessels flying the flag of France – OJ L201(p33)2.8.05
1281/2005 on the management of fishing licences – OJ L203(p34)8.05
1303/2005 on prohibition of fishing for common sole by vessels flying the flag of France – OJ L207(p13)10.8.05
1304/2005 on prohibition of fishing for blue whiting by vessels flying the flag of France – OJ L207(p15)10.8.05
1350/2005 prohibiting fishing for mackerel by vessels flying the flag of France – OJ L213(p318)8.05
1351/2005 prohibiting fishing for Norway lobster by vessels flying the flag of France – OJ L213(p518)8.05
1352/2005 prohibiting fishing for forkearbons by vessels flying the flag of France – OJ L213(p718)8.05
1361/2005 prohibiting fishing for tusk by vessels flying the flag of Spain – OJ L214(p57)19.8.05
1362/2005 prohibiting fishing for forkearbons by vessels flying the flag of Spain – OJ L214(p59)19.8.05
1363/2005 prohibiting fishing for blue ling by vessels flying the flag of Spain – OJ L214(p6119)8.05
1404/2005 prohibiting fishing for anglerfish by vessels flying the flag of Belgium – OJ L222(p827)8.05
1405/2005 prohibiting fishing for common sole by vessels flying the flag of Belgium – OJ L222(p1027)8.05
1415/2005 prohibiting fishing for ling by vessels flying the flag of Germany – OJ L222(p23)27.8.05
1416/2005 prohibiting fishing for cod by vessels flying the flag of Spain – OJ L222(p25)27.8.05

Commission Decisions:
2005/496/EC, 2005/497/EC, 2005/498/EC and 2005/499/EC on the import of fishery products from various countries – OJ L183(p84-99)15.7.05
2005/475/EC on approved zones and farms for fish diseases VHS and IHN – OJ L176(p30)8.7.05
2005/606/EC on Regional Advisory Council for Pelagic stocks under the CFP – OJ L206(p21)9.8.05

Opinion of the Economic and Social Committee on a Community Fisheries Control Agency – OJ C157(p61)28.6.05

Foodstuffs
Commission Regulations:
1148/2005 on maximum residue limits of penethamate – OJ L185(p20)16.7.05
1200/2005 on additives in feedingstuffs – OJ L195(p6)27.7.05
1206/2005 on additives in feedingstuffs – OJ L197(p12)28.7.05

Commission Decisions:
2005/448/EC authorising marketing of foods derived from genetically modified Maize NK603 – OJ L138(p20)21.6.05
2005/457/EC authorising the marketing of isomaltulose as a novel food – OJ L160(p28)23.6.05

Intellectual Property and Patents
Commission Regulation 1041/2005 on the Community trade mark – OJ L172(p45)7.05

IT, Telecommunications and Broadcasting
Commission Regulation 1099/2005 on Community statistics on the information society – OJ L183(p47)14.7.05

Opinion of the European Data Protection Supervisor on Visa Information System and the exchange of data between Member States – OJ C181(p13)23.7.05

Call for independent experts for eContentplus and Safer Internet Plus Programmes – OJ C156(p23)28.6.05

Minerals and Mining
Commission Regulations 1285/2005 on trade in rough diamonds – OJ L203(p12)4.8.05

Public Health and Pharmaceuticals
Council Decision 2005/594/EC appointing four members of the Management Board of the European Medicines Agency – OJ L203(p22)4.8.05
Judgment of the Court of Justice on distinction between medicinal products and food additives – OJ C193(p4)6.8.05

Plants and their Protection Products
Commission Regulation 1335/2005 amending previous Regulation and Decisions on the use of certain substances – OJ L211(p6)13.8.05
Commission Decision 2005/487/EC on the withdrawal of products containing triazamate – OJ L174(p72)7.5.05

Science Policy
Commission Decision 2005/615/EC with regard to national laboratories in certain Member States – OJ L213(p14)18.8.05
Opinion of the Economic and Social Committee on a European strategy for nanotechnology – OJ C157(p22)8.6.05
Calls for proposals:
Structuring the European Research Area. Science and Society: Risk Governance and Ethics; Science Communication; Women and Science – OJ C143(p3)15.6.05
Structuring the European Research Area – OJ C147(p22)17.6.05
European Research Area. Aeronautics and Space: Sustainable Energy Systems; Sustainable Surface Transport – OJ C168(p64)8.7.05
European Research Area. Life Sciences, genomics and biotechnology for health – OJ C168(p54)8.7.05
Integrating and Strengthening the European Research Area – OJ C170(p189)7.05
European Research Area: Global Change and Ecosystems – OJ C177(p34)19.7.05
Structuring the European Research Area – OJ C178(p14)20.7.05

Transport
Council Decision 2005/614/EC on approval of vehicles regarding the protection of passengers in the event of a collision – OJ L217(p12)22.8.05

TSEs
Council Regulation 932/2005 on rules for eradication of certain transmissible spongiform encephalopathies – OJ L163(p1)23.6.05

Waste
Commission Opinions concerning plans for the disposal of radioactive waste – OJ C193(p2)310.8.05
Science Directory

DIRECTORY INDEX

Aerospace and Aviation
Queen Mary, University of London SEMTA

Agriculture
BBSRC
Campden & Chorleywood Food Research Association
Institute of Biology
LGC
University of Newcastle upon Tyne SCI
Society for General Microbiology UFAW

Animal Health and Welfare, Veterinary Research
ABPI
Academy of Medical Sciences British Veterinary Association FRAME
Royal College of Veterinary Surgeons UFAW

Astronomy and Space Science
CCLRC
PPARC
Queen Mary, University of London

Atmospheric Sciences, Climate and Weather
CCLRC
University of East Anglia Natural Environment Research Council

Biotechnology
BBSRC
Campden & Chorleywood Food Research Association
University of East Anglia Institute of Biology
LGC
University of Leeds National Physical Laboratory
University of Newcastle upon Tyne SCI
Royal Society of Chemistry

Brain Research
ABPI
Merck Sharp & Dohme
University of Newcastle upon Tyne

Cancer Research
ABPI
University of East Anglia
University of Leeds
University of Newcastle upon Tyne Queen Mary, University of London

Catalysis
University of East Anglia

Chemistry
CCLRC
University of East Anglia Institution of Chemical Engineers
LGC
University of Leeds London Metropolitan Polymer Centre
Royal Institution Royal Society of Chemistry SCI

Colloid Science
London Metropolitan Polymer Centre
Royal Society of Chemistry

Construction and Building
Institution of Civil Engineers London Metropolitan Polymer Centre
SCI

Dentistry
Queen Mary, University of London

Earth Sciences
University of East Anglia
English Nature
University of Leeds

Ecology, Environment and Biodiversity
AMSI
British Ecological Society CABI Bioscience
University of East Anglia Economic and Social Research Council
English Nature Environment Agency Freshwater Biological Association
Institute of Biology Institution of Chemical Engineers Institution of Civil Engineers
LGC
University of Leeds Natural Environment Research Council
Royal Botanic Gardens Kew Royal Society of Chemistry SCI
Society for General Microbiology University of Surrey

Economic and Social Research
Institution of Chemical Engineers

Education, Training and Skills
ABPI

Academic of Medical Sciences British Association for the Advancement of Science British Society for Antimicrobial Chemotherapy CABI Bioscience Campden & Chorleywood Food Research Association
Clifton Scientific Trust Economic and Social Research Council Engineering and Physical Sciences Research Council
Institute of Biology Institute of Mathematics and its Applications
Institute of Physics Institution of Chemical Engineers
LGC
London Metropolitan Polymer Centre
NESTA Royal Institution
The Royal Society Royal Statistical Society SEMTA

Energy
CCLRC
Institution of Chemical Engineers Institution of Civil Engineers
RSI
SCI

Engineering
Institution of Civil Engineers Institution of Chemical Engineers
LGC
London Metropolitan Polymer Centre
Royal Academy of Engineering SCI

Fisheries Research
Freshwater Biological Association

Food and Food Technology
Institution of Chemical Engineers

Genetics
ABPI

BBSRC
University of East Anglia HFEA
LGC
University of Newcastle upon Tyne Queen Mary, University of London

Geographical Information Systems
University of East Anglia
University of Leeds

Geology and Geoscience
AMSI
University of East Anglia
Institution of Civil Engineers Natural Environment Research Council

Hazard and Risk Mitigation
Institution of Chemical Engineers
RSA

Health
ABPI
Academy of Medical Sciences British Society for Antimicrobial Chemotherapy
University of East Anglia Economic and Social Research Council
HFEA
Institute of Physics and Engineering in Medicine LGC
Medical Research Council
University of Newcastle upon Tyne Royal Institution
Royal Society of Chemistry Society for General Microbiology

Heart Research
ABPI

Hydrocarbons and Petroleum
University of Newcastle upon Tyne Royal Society of Chemistry

Industrial Policy and Research
AIRTO
BBSRC CCLRC
Economic and Social Research Council
Institution of Civil Engineers Royal Academy of Engineering RSA SCI

Information Services
AIRTO
IT, Internet, Telecommunications, Computing and Electronics
CABI Bioscience CCLRC
University of East Anglia
Motor Vehicles
University of Leeds
London Metropolitan Polymer Centre
SEMTA

Oceanography
AMSI
Natural Environment Research Council

Oil
Institution of Chemical Engineers
LG

Particle Physics
CCLRC
University of Leeds
PPARC

Patents
The Chartered Institute of Patent Agents
NESTA

Pharmaceuticals
ABPI
British Pharmacological Society
British Society for Antimicrobial Chemotherapy
Institution of Chemical Engineers
LGC
Merck Sharp & Dohme
Queen Mary, University of London
Royal Society of Chemistry
SCI

Physical Sciences
Cavendish Laboratory
Engineering and Physical Sciences Research Council
London Metropolitan Polymer Centre
National Physical Laboratory
PPARC

Physics
Cavendish Laboratory
Institute of Physics
University of Leeds
National Physical Laboratory
PPARC

Physiology
University of Leeds

Pollution and Waste
ABPI
AMSI
CABI Bioscience
University of East Anglia
Environment Agency
Institution of Chemical Engineers
Institution of Civil Engineers
London Metropolitan Polymer Centre
Natural Environment Research Council

Psychology
British Psychological Society
University of Leeds

Public Policy
British Society for Antimicrobial Chemotherapy
Clifton Scientific Trust
University of East Anglia
Engineering and Physical Sciences Research Council
HFEA
NESTA
Prospect
Queen Mary, University of London

Public Understanding of Science
Academy of Medical Sciences
British Association for the Advancement of Science
British Society for Antimicrobial Chemotherapy
Clifton Scientific Trust
University of East Anglia
Engineering and Physical Sciences Research Council
HFEA
Institute of Biology
Institute of Physics
Institution of Chemical Engineers
Medical Research Council
NESTA
Prospect
Royal Academy of Engineering
Royal Institution
The Royal Society
Royal Society of Chemistry
RSA

Quality Management
CABI Bioscience
Campden & Chorleywood Food Research Association

Radiation Hazards
HPA Radiation Protection Division

Retail
Marks and Spencer

Satellite Engineering
University of Surrey

Science Policy
ABPI
Academy of Medical Sciences
British Association for the Advancement of Science
Clifton Scientific Trust
Economic and Social Research Council
PPARC

Seed Protection
CABI Bioscience

Sensors and Transducers
AMSI
CCLRC

SSSIs
English Nature
Royal Botanic Gardens Kew

Statistics
Royal Statistical Society

Surface Science
CCLRC

Sustainability
CABI Bioscience
University of East Anglia

Technology Transfer
CABI Bioscience
Campden & Chorleywood Food Research Association
CCLRC
FGC
University of Leeds
London Metropolitan Polymer Centre
NESTA
National Physical Laboratory

Tropical Medicine
Society for General Microbiology

Viruses
ABPI
Society for General Microbiology

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

Wildlife
University of East Anglia
English Nature
Institute of Biology
UFAW
Association of Marine Scientific Industries

Contact: John Southerdan, Director
Association of Marine Scientific Industries
4th Floor, 30 Great Guildford Street
London SE1 0HS
Tel: 020 7928 9199 Fax: 020 7928 6599
E-mail: John.Southerdan@maritimeindustries.org
Website: www.maritimeindustries.org

AMSI is a constituent association of the Society of Maritime Industries; the other associations are: Association of British Offshore Industries (ABOI) British Marine Equipment Association (BMEA) British Naval Equipment Association (BNEA) Ports and Terminals Group (PTG)

Academy of Medical Sciences

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

The Academy of Medical Sciences promotes advances in medical science and campaigns to ensure these are converted as quickly as possible into healthcare benefits for society. The Academy’s eight hundred Fellows are the United Kingdom’s leading medical scientists from hospitals, academia, industry and the public service. The Academy provides independent, authoritative advice on public policy issues in medical science and healthcare.

Association of the British Pharmaceutical Industry

Contact: Dr Philip Wright, 12 Whitehall, London SW1A 2DY
Tel: 020 7747 1408 Fax: 020 7747 1417
E-mail: pwright@abpi.org.uk
Website: www.abpi.org.uk

The Association for the British Pharmaceutical Industry members brings together companies in Britain producing prescription medicines both through manufacture and supply as well as research and development (R&D). The ABPI’s mission is to represent the pharmaceutical industry operating in the UK in a way that:

- assures patient access to the best available medicine;
- creates a favourable political and economic environment;
- encourages innovative research and development;
- avoids unfair commercial returns

British Ecological Society

Contact: Nick Dusic, Science Policy Manager
British Ecological Society
26 Blades Court, Deodar Road, Putney, London, SW15 2NU
Tel: 020 8871 9779 Fax: 020 8871 9779
E-mail: nick@britishecologicalsociety.org
Website: www.britishecologicalsociety.org

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

Biotechnology and Biological Sciences Research Council

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

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

British Association for the Advancement of Science - the BA

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

The BA is the UK’s nationwide, open membership organisation dedicated to connecting people with science, so that science and its applications become accessible to all. The BA aims to promote openness of people directly with science and technology and their implications. Established in 1831, the BA organises major initiatives across the UK, including the annual BA Festival of Science, National Science Week, programmes of regional and local events, and an extensive programme for young people in schools and colleges.

Association of Independent Research & Technology Organisations (AIRTO)

Contact: Professor Richard Brook
AIRTO: Association of Independent Research & Technology Organisations
c/o CCFRA, Station Road, Chipping Campden, Gloucestershire GL5 6LD.
Tel: 01386 842247
Fax: 01386 842010
E-mail: airto@campden.co.uk
Website: www.airto.co.uk

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

Association of Marine Research Charities

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

The Association of Medical Research Charities (AMRC) works to advance medical research in the UK and, in particular, aims to improve the effectiveness of the charitable sector in medical research. There are over 100 member charities within the Association: in 2003/2004 their combined expenditure on biomedical research in the UK was £634 million. AMRC provides information, guidance and advice to medical research charities and information and data on the activities of the charity sector in medical research to government, the media and decision-formers.

The Academy of Medical Sciences promotes advances in medical science and campaigns to ensure these are converted as quickly as possible into healthcare benefits for society. The Academy’s eight hundred Fellows are the United Kingdom’s leading medical scientists from hospitals, academia, industry and the public service. The Academy provides independent, authoritative advice on public policy issues in medical science and healthcare.

British Pharmacological Society

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

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

The British Ecological Society (BES) is an active, successful and independent scientific society. It aims to promote the science of ecology worldwide. It supports the ecological...
The British Psychological Society

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

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

British Veterinary Association

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

BVA's chief interests are:
- Standards of animal health
- Veterinary surgeons' working practices
- Professional standards and quality of service
- Relationships with external bodies, particularly government

BVA carries out three main functions which are:
- Policy development in areas affecting the profession
- Protecting and promoting the profession in matters propounded by government and other external bodies
- Provision of services to members

CABI Bioscience

Contact: Dr Joan Kelley, Director, CABI Bioscience
CABI Bioscience, Bakeham Lane,
Egham, Surrey TW20 9TY
Tel: 01491 829080 Fax: 01491 829100
E-mail: bioscience.egham@cabi.org
Website: www.cabi-bioscience.org

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

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

Campden & Chorleywood Food Research Association

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

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

Cavendish Laboratory

The Administrative Secretary, The Cavendish Laboratory, Madingley Road, Cambridge CB3 0HE, UK.
E-mail: dpb24@phy.cam.ac.uk
http://www.phy.cam.ac.uk

The Cavendish Laboratory houses the Department of Physics of the University of Cambridge. Its world-class research is focused in a number of experimental and theoretical diverse fields:
- Astrophysics: Millimetre astronomy, optical interferometry observations & instrumentation. Astrophysics, geometric algebra, maximum entropy, neural networks
- Biological Physics

BSAC publishes the Journal of Antimicrobial Chemotherapy (JAC), internationally renowned for its scientific excellence, undertakes a range of educational activities, awards grants for research and has active relationships with its peer groups and government.

BSAC for Antimicrobial Chemotherapy

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

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

The Chartered Institute of Patent Agents

Contact: Michael Ralph - Secretary & Registrar
The Chartered Institute of Patent Agents
95 Chancery Lane, London WC2A 1DT
Tel: 020 7405 9450 Fax: 020 7405 9451
E-mail: michael.ralph@cipa.org.uk
Website: www.cipa.org.uk

CIPA's members practise in intellectual property, especially patents, trade marks, designs, and copyright, either in private partnerships or industrial companies. CIPA maintains the statutory Register. It advises government and international circles on policy issues and organises conferences. Requests for information about patents and patent lawyers from parliamentarians are welcome.

Clifton Scientific Trust

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

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

We build grass-roots partnerships between school and the wider world of professional science and its applications:
- for young people of all ages and abilities
- experiencing science as a creative, questioning, human activity
- bringing school science added meaning and motivation, from primary to post-16
- locally, nationally, internationally (currently between Britain and Japan)

Clifton Scientific Trust Ltd is registered charity 1090933

Council for the Central Laboratory of the Research Councils

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

The CCLRC is the UKs strategic agency for scientific research facilities. It also supports leading-edge science and technology by providing world-class, large-scale experimental facilities. These advanced technological capabilities, backed by a pool of expertise and skills across a broad range of disciplines, are exploited by more than 1100 government, academic, industrial and other research organisations around the world each year. The annual budget of the CCLRC is c. £130 million.
University of East Anglia

Contact: Science Communication Officer
University of East Anglia
Norwich NR4 7TJ
Tel: 01603 593007
Fax: 01603 259883
E-mail: press@uea.ac.uk
Website: www.uea.ac.uk

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

Economic and Social Research Council

Contact: Lesley Lilley,
Senior PR and Parliamentary Officer
Economic and Social Research Council, Polaris House, North Star Avenue, Swindon SN2 1UJ
Tel: 01793 413319 Fax: 01793 413310
exrel@esrc.ac.uk
http://www.esrc.ac.uk

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

Engineering and Physical Sciences Research Council

Contact: Lucy Brady,
Head of Marketing and Communications,
EPSRC, Polaris House, North Star Avenue, Swindon SN2 1ET
Tel: 01793 444174 Fax: 01793 444005
E-mail: lucy.brady@epsrc.ac.uk
Website: www.epsrc.ac.uk

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

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.

Environment Agency

Contact: Prof Michael Depledge,
Head of Science
Rio House, Waterside Drive, Aztec West,
Almondsbury, Bristol BS32 4UD
Tel: 01454 284433 Fax: 01454 284301
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.

Health Protection Agency

Radiation Protection Division (formerly NRPB)
Contact: Dr Michael Clark
Radiation Protection Division Scientific Spokesperson
Chilton, Didcot, Oxon OX11 0QO
Tel:01235 822737 Fax: 01235 822746
Email: pressoffice@hpa-rp.org.uk
Website: www.hpa.org.uk/radiation

The Radiation Protection Division was formed on 1 April 2005 when the National Radiological Protection Board merged with the Health Protection Agency, under the provisions of the Health Protection Act 2004.

As part of the Centre for Radiation, Chemical and Environmental Hazards, the Division carries out the Agency’s work on ionising and non-ionising radiations. It undertakes research to advance knowledge about protection of people from the risks of these radiations: provides laboratory and technical services; runs training courses; provides expert information and has a significant advisory role in the UK.

Human Fertilisation and Embryology Authority

Contact: Tim Whitaker
21 Bloomsbury St
London WC1B 3HF
Tel: 020 7291 8200
Fax: 020 7291 8201
Email: tim.whitaker@hfea.gov.uk
Website: www.hfea.gov.uk

The HFEA is a non-departmental Government body that regulates and inspects all UK clinics providing IVF, donor insemination or the storage of eggs, sperm or embryos. The HFEA also licenses and monitors all human embryo research being conducted in the UK.

English Nature

Contact: Dr Keith Duff,
Chief Scientist
English Nature
Northminster House, Peterborough,
PE1 1UA
Tel: 01733-433208 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: Lesley Lilley,
Senior PR and Parliamentary Officer
Economic and Social Research Council, Polaris House, North Star Avenue, Swindon SN2 1UJ
Tel: 01793 413319 Fax: 01793 413310
exrel@esrc.ac.uk
http://www.esrc.ac.uk

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

Engineering and Physical Sciences Research Council

Contact: Lucy Brady,
Head of Marketing and Communications,
EPSRC, Polaris House, North Star Avenue, Swindon SN2 1ET
Tel: 01793 444174 Fax: 01793 444005
E-mail: lucy.brady@epsrc.ac.uk
Website: www.epsrc.ac.uk

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

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.

Environment Agency

Contact: Prof Michael Depledge,
Head of Science
Rio House, Waterside Drive, Aztec West,
Almondsbury, Bristol BS32 4UD
Tel: 01454 284433 Fax: 01454 284301
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.

Health Protection Agency

Radiation Protection Division (formerly NRPB)
Contact: Dr Michael Clark
Radiation Protection Division Scientific Spokesperson
Chilton, Didcot, Oxon OX11 0QO
Tel:01235 822737 Fax: 01235 822746
Email: pressoffice@hpa-rp.org.uk
Website: www.hpa.org.uk/radiation

The Radiation Protection Division was formed on 1 April 2005 when the National Radiological Protection Board merged with the Health Protection Agency, under the provisions of the Health Protection Act 2004.

As part of the Centre for Radiation, Chemical and Environmental Hazards, the Division carries out the Agency’s work on ionising and non-ionising radiations. It undertakes research to advance knowledge about protection of people from the risks of these radiations: provides laboratory and technical services; runs training courses; provides expert information and has a significant advisory role in the UK.

Human Fertilisation and Embryology Authority

Contact: Tim Whitaker
21 Bloomsbury St
London WC1B 3HF
Tel: 020 7291 8200
Fax: 020 7291 8201
Email: tim.whitaker@hfea.gov.uk
Website: www.hfea.gov.uk

The HFEA is a non-departmental Government body that regulates and inspects all UK clinics providing IVF, donor insemination or the storage of eggs, sperm or embryos. The HFEA also licenses and monitors all human embryo research being conducted in the UK.
The National Endowment for Science, Technology and the Arts

Contact: Nicky Edwards
Policy & Public Affairs Manager
Fishmongers’ Chambers
110 Upper Thames Street, London EC4R 3TW
Tel: 020 7645 9500
Fax: 020 7645 9501
Email: nicky.edwards@nesta.org.uk
Website: www.nesta.org.uk

NESTA (the National Endowment for Science, Technology and the Arts) is all about innovation. Through a range of pioneering programmes, we invest in talented people and ground-breaking ideas. On a wider scale we work to improve the climate for change in this country, acting as a catalyst for change and helping the UK to fulfil its potential.

University of Newcastle upon Tyne

Contact: Dr Douglas Robertson
Newcastle upon Tyne NE1 7RU
Tel: 0191 222 3347 Fax: 0191 222 3219
Email: business@ncl.ac.uk
Website: www.ncl.ac.uk

The University of Newcastle is a member of the Russell Group of research-intensive Universities and is enjoying substantial growth in student numbers and 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 EU activity. It was recently identified in a national survey as one of the top Universities in the UK for technology transfer.

Particle Physics and Astronomy Research Council

Contact: Nigel Calvin
Policy and Public Affairs Manager
Particle Physics and Astronomy Research Council
Polaris House, North Star Avenue
Swindon, Wiltshire SN2 1SZ
Tel: 01793 442176 Fax: 01793 443225
Email: nigel.calvin@pparc.ac.uk
Website: www.pparc.ac.uk

The PPARC is the UK’s strategic science investment agency that directs and funds research in national and international programmes in fundamental physics. It is this research into fundamental physics that lies behind some of the major technological advances of the 20th Century, and delivers world leading science, technologies and people for the UK.

Medical Research Council

Contact: Elizabeth Mitchell
20 Park Crescent, London W1B 1AL
Tel: 020 7636 5422 Fax: 020 7436 2665
Email: elizabeth.mitchell@headoffice.mrc.ac.uk
Website: www.mrc.ac.uk

The Medical Research Council (MRC) is funded by the UK taxpayer. 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 the public’s needs as well as being of excellent scientific quality. As a result, MRC-funded research has led to some of the most significant discoveries in medical science and benefited millions of people, both in the UK and worldwide.

National Physical Laboratory

National Physical Laboratory
Hampton Road, Teddington
Middlesex TW11 0LW
Tel: 020 8943 6880 Fax: 020 8943 6458
Email: 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.

Merck Sharp & Dohme Research Laboratories

Contact: Dr Ruth M McKernan
Neuroscience Research Centre
Terlings Park
Eastwick Road
Harlow
Essex CM20 2QR
Tel: 01279 440426 Fax: 01279 440178
Email: ruth_mckernan@merck.com
Website: www.msd-nrc.co.uk

Drug discovery for brain diseases.

Prospect

Contact: Sue Ferns,
Prospect Head of Research and Specialist Services, Prospect House
75 – 79 York Rd, London SE1 7AQ
Tel: 020 7902 6639 Fax: 020 7902 6637
Email: sue.ferns@prospect.org.uk
Website: www.prospect.org.uk

Prospect is an independent, thriving and forward-looking trade union with 104,000 members. We represent scientists, technologists and other professionals 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.

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
• ensure the UK engages with the best science around
• attract and retain the best scientists
• fund excellent research to push back the frontiers

It aims to:

- The Royal Society promotes the natural and applied sciences.
- Founded in 1660, the Royal Society is an independent academy promoting the natural and applied sciences – the basis of life on Earth. Kew is fundamentally a scientific, amenity and educational organisation devoted to increasing knowledge and public understanding of plant and fungal 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.

Contact: Prof. Simon J. Owens
Tel: 020 8332 5212
Fax: 020 8332 5278
Email: s.owens@kew.org
Website: www.kew.org

SAVING THE WORLD’S PLANTS FOR LIFE

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, programmes for schools and a forum for the general public, through to a heritage programme, programmes for schools and a forum for the general public, through to a heritage programme, programmes for schools and a forum for the general public, through to a heritage programme...
The Royal Statistical Society

Contact: Mr Andrew Garratt
Press and Public Affairs Officer
The Royal Statistical Society
12 Erol Street, London EC1Y 8LX.
Tel: +44 20 7614 3920
Fax: +44 20 7614 3905
E-mail: a.garratt@rss.org.uk
Website: www.rss.org.uk

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

The Science Council

Contact: Dr Sarah Ball,
Chief Executive Officer
The Science Council
210 Euston Road, London NW1 2BE
Tel 020 7611 8754 Fax 020 7611 8743
E-mail: enquiries@sciencecouncil.org
Website: www.sciencecouncil.org

The Science Council has a membership of over 23 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. We now have over 10,000 Chartered Scientists.

The University of Surrey

Contact: Katy Leivers
University of Surrey, Guildford,
Surrey, GU2 7XH
Tel: 01483 683937 Fax: 01483 683948
E-mail: information@surrey.ac.uk
Website: http://www.surrey.ac.uk/

The University of Surrey is one of the UK’s leading science, engineering and manufacturing technology sectors. SEMTA (Science, Engineering and Manufacturing Technologies Alliance) is the Sector Skills Council for the science, engineering and manufacturing technology sectors. Our Mission is ‘to ensure that our sector has the knowledge and skills required to meet the challenges faced by the workforce of the future.’ Our sectors account for a significant proportion of the UK economy. There are about two million people employed in about 100,000 establishments in the core Science, Engineering and Technology sectors, currently contributes over £74 billion per annum – about ten per cent – of total UK GDP.

UFAW is an internationally-recognized independent scientific and educational animal welfare charity working to improve animal lives by:
• supporting animal welfare research
• educating and raising awareness of welfare issues in the UK and overseas
• producing the leading journal Animal Welfare and other high-quality publications on animal care and welfare
• providing expert advice to government departments and other organizations.
Science Diary

The Parliamentary and Scientific Committee
Contact: Annabel Lloyd
020 7222 7085
www.scienceinparliament.org.uk

Wednesday 26 October 17.30
From the Green to the Gene Revolution: a 21st century challenge
Speaker: Dr Norman E Borlaug

Monday 14 November 17.30
Risk Management
Speakers: Professor Sir Colin L Berry, Professor Susan Owens and Professor Ragnar Lofstedt

Tuesday 29 November
Visit to NPL

Monday 23 January 17.30
Hospitals of the Future
Speakers to be confirmed

The Royal Institution
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.

Wednesday 2 November 19.00
Your brain: the final frontier?
Prof David Nutt and Prof Nikolas Rose

Wednesday 16 November 19.00
Stroke – a demographic time-bomb
Prof Peter Rothwell and Prof Charles Wolle

Wednesday 23 November 19.00
Live or die: the secret is in our genes
Prof Adi Kimchi and Iain McNeilh

The Royal Society
6-9 Carlton House Terrace
London SW1Y 5AG
For further information visit www.royalsoc.ac.uk/events; email events@royalsoc.ac.uk or call 020 7451 2518/2683.

Wednesday 26 to Thursday 27 October
Discussion meeting
Extreme natural hazards

Thursday 27 October 18.30
Prize lecture – Clifford Paterson Lecture
Optical science in the fast lane
Professor Wilson Sibbett CBE FRS

Thursday 10 November 18.30
Public lecture – 11th Hartley Lecture
Measuring our future: the role of sustainability metrics
Professor Richard Darton

Monday 14 to Tuesday 15 November
Discussion meeting
Quantum catalysis in enzymes – beyond the transition state theory paradigm

Wednesday 23 November 18.30
Public lecture
Einstein vs. Newton debate
Chaired by Professor Lisa Jardine

Monday 5 to Tuesday 6 December
Discussion meeting
New directions in liquid crystal science

The Royal Academy of Engineering
29 Great Peter Street, London SW1P 3LW
For further information visit www.raeng.org.uk/events or contact events@raeng.org.uk

Tuesday 1 November 18.00
UK Focus for Biomedical Engineering
Annual Lecture
Innovation in Medical Technology – Global Reality and UK Promise

Wednesday 9 November 09.30
Radical Innovation in Advanced Nanomaterials

Wednesday 9 November 13.30
Energy Seminar Series
Security of Energy Supply

Wednesday 9 November 18.00
Mobile Communications Lecture Series
Innovations for the Commercialisation of CDMA for Wireless Communications and Future Directions

Monday 12 December 18.30
Annual Hinton Lecture
Guest Speaker: Lord Browne

The Royal Society of Edinburgh
22-26 George Street, Edinburgh EH2 2PQ.
Tel: 0131 240 5000
Fax: 0131 240 5024
events@royalsoced.org.uk
www.royalsoced.org.uk
All events require registration and take place at the RSE.

Monday 7 November
Composite Individuality: A Gaian View
Dr Lynn Margulis

Science in Parliament Vol 62 No 4 Autumn 2005
Thursday 1 December
Discussion Forum
Earth, Wind, Fire and Water:
Tsunami

Monday 19 December
Edinburgh Lecture
Inside Surgery from Without:
Therapeutic Interventions from Images
Sir Alfred Cuschieri FRSE

Monday 23 January
Discussion Forum
Science Meets Religion
Professor Simon Conway-Morris and
Professor Wentzel van Huysteen

Monday 6 February
The Gannochy Trust Innovation Award
Prize Lecture

SCI
14/15 Belgrave Square
London SW1X 8PS
Contact: conferences@soci.org or
020 7598 1562
Events at SCI unless otherwise stated

Tuesday 8 November
PET in Neurology: Clinical Research
and Drug Development

Tuesday 29 to Wednesday 30 November
Plants as Factories for Bioactive Compounds

Friday 2 December
Frontiers of Research at the Polymer
Chemistry-Organic Chemistry Interface

Wednesday 22 February
Omega 3 – on the brain – the impact
of nutrition on human behaviour

Tuesday 28 February to Wednesday 1 March
Chemistry for Non Chemists

Royal Pharmaceutical Society
Contact: Judith Callanan
020 7572 2261
science@rpsgb.org

Monday 28 to Wednesday 30 November
Tableting technology for the pharmaceutical industry
De Vere University Arms Hotel, Cambridge

Tuesday 7 February
Challenges in small scale manufacturing
at AstraZeneca R & D, Charnwood,
Loughborough
Royal Pharmaceutical Society and
Academy of Pharmaceutical Sciences

Monday 13 to Wednesday 15 February
Stability Testing of Pharmaceuticals
The Moller Centre, Cambridge
Pharmaceutical Society, London

Institution of Mechanical Engineers

Tuesday 1 November
Materials for a Greener Environment – Reduce, Reuse, Recycle and Recovery
Contact Georgina Shaw 020 7973 1291,
g_shaw@imeche.org.uk

Friday 4 November
Sustainability for Engineering
Contact Madeline Willis 020 7973 1260,
m_willis@imeche.org.uk

Tuesday 29 November
Fuel Cells – Industrial Application
and Modelling
Contact Victoria Gatt 020 7973 1316;
v_gatt@imeche.org.uk

Science in Parliament
Published by the Parliamentary and Scientific Committee, 3 Birdcage Walk, London SW1H 9JJ.
Published four times a year. The 2005 subscription rate is £65.00. Single numbers £16.25
ISSN 0263-6271
All enquiries, including those from members wishing to take the front or back covers, advertise in the journal or appear in the directory to Mrs Annabel Lloyd, Tel 020 7222 7085
Copyright ©2005 by Parliamentary and Scientific Committee. All rights reserved. None of the articles in this publication may be reproduced, stored in a retrieval system or transmitted in any form, or by any means, electronic, mechanical, photocopying recording or otherwise without the prior written permission of the copyright owner.
Typeset and printed by APR Print and Design Ltd

Science in Parliament Vol 62 No 4 Autumn2005 61
Liquid crystals by Karen Neill – Close-up – highly commended
The orientation of molecules within a liquid crystal can be seen by viewing the crystals using polarised light. Regions that have the same colour have the same orientation of their constituent molecules.

Salt and pepper by David McCarthy – Close-up - winner
This image of a whole peppercorn with a grain of sea salt offers a close-up glimpse of the structure of simple everyday products we use on our food.

Migraine attack by Debbie Ayles – Science meets Art - winner
Migraine attacks can cause a variety of visual symptoms (aura) as well as the notorious stabbing head pain. This is a representation of a barn seen during an attack, painted by an artist and migraine sufferer. Visual symptoms often include flattening and overlaying of images, pulsating kaleidoscopic colours and sparkling white "stars".

Shrimp cleaning the teeth of a lizard fish by Jim Greenfield – Action - winner
This tiny shrimp fearlessly enters the mouth of a fish to clean its teeth. Fish value this service as the shrimp removes and eats harmful parasites. The shrimp lives in the sea anemone in the background. Fish recognise the anemone as a cleaning station, and when they need a clean they approach it and open their mouths, encouraging the shrimp in.