The Office of Science and Technology : scrutiny report 2003 : fourth report of session 2003-04 : report, together with formal minutes, oral and written evidence.

House of Commons

Science and Technology Committee

The Office of Science and Technology: Scrutiny Report 2003

Fourth Report of Session 2003–04

HC 316

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Ordered by The House of Commons
to be printed 23 February 2004

HC 316
[Incorporating HC 1265-i, Session 2002-03]
Published on 4 March 2004
by authority of the House of Commons
London: The Stationery Office Limited
£12.00

The Science and Technology Committee

The Science and Technology Committee is appointed by the House of Commons to examine the expenditure, administration, and policy of the Office of Science and Technology and its associated public bodies

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The current staff of the Committee are Chris Shaw (Clerk), Emily Commander (Second Clerk), Alun Roberts (Committee Specialist); Ana Ferreira (Committee Assistant) and Christine McGrane (Committee Secretary)

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Contents

Contents

Report

Summary

The scrutiny of the Office of Science and Technology (OST) is one of our core functions. This Report is our assessment of its activities in 2003.

The OST has made a welcome attempt to develop a sophisticated set of metrics for analysis of the UK Research Base. These will be used to develop the Department of Trade and Industry's Public Service Agreement Target that relates to the Science Base. The data show that the UK has all-round strengths in research, but that despite recent increases in the Science Budget, it is failing to match the investment of its competitor countries. We argue that the UK's future performance can only be improved through more investment; the data show that British researchers are highly productive.

We considered the OST's role in the Spending Review process. The Science Minister has been encouraging a cautious attitude among the Research Councils which is at odds with comments made by the Chancellor concerning the importance of science and innovation to the economy. We are concerned that the Research Councils may be tempted to submit a cautious proposal that will not stress that increased investment in the Science Base is still necessary.

The Government has conducted a number of reviews in 2003 that relate to science, research and innovation. These have been commissioned, variously, by the Treasury, the Higher Education Funding Councils, the Department of Trade and Industry, as well as the OST. We express concern that these reviews overlap to a great extent and that conducting highly focused reviews will lead to a fragmented approach to policy-making and a lost opportunity to consider more fundamental change.

The OST has set up the Science and Society Directorate and the Science Review Directorate in 2003. Both these are welcome innovations. We are less optimistic about the reconstituted Council for Science and Technology and argue that ad-hoc committees set up by the Chief Scientific Adviser would have more impact.

1 Introduction

1. Our Committee is appointed by the House of Commons to examine the expenditure, administration and policy of the Office of Science and Technology (OST) and its associated public bodies.[1] The OST is a small department, part of the Department of Trade and Industry (DTI) since 1995. It is divided into two parts:

- The Transdepartmental Science and Technology Group, which supports the Chief Scientific Adviser (who is head of OST) in his role of advising the Prime Minister, the Cabinet, the Secretary of State for Trade and Industry and the Minister for Science and Innovation on science, engineering and technology matters; and

- The Science and Engineering Base Group, which supports the Director General of the Research Councils in allocating the Science Budget and in securing the successful operation of the seven Research Councils, which are the OST's principal associated public bodies.

2. The wide responsibility of the OST for furthering science and technology in the UK means that our Committee has a similarly wide brief to examine science and technology issues across Government and outside; but examining the work of the OST and the Research Councils is our primary role. This is manifested in the regular scrutiny of the Research Councils (each will be considered in the course of this Parliament) and the annual scrutiny of the OST. In the course of each session, to inform our annual scrutiny report, we aim to hold evidence sessions with the Secretary of State for Trade and Industry (with Cabinet responsibility for science), the Minister for Science and Innovation, the Chief Scientific Adviser (CSA) and the Director General of the Research Councils (DGRC). On 26 March 2003, Patricia Hewitt, Secretary of State for Trade and Industry, appeared before us (alongside Charles Clarke, Secretary of State for Education and Skills).[2] On 11 November 2003, Lord Sainsbury, Parliamentary Under-Secretary of State for Science and Innovation, appeared with Sir John Taylor, DGRC, and Sir David King, CSA, and the transcript is published with this Report. It had been anticipated that this latter session would consider the Lambert Review of Business–University Collaboration and the DTI's Innovation Review but these were only published on 4 December and 17 December 2003 respectively and will be considered in our OST scrutiny report for 2004.

3. In advance of the session with Lord Sainsbury on 11 November, we submitted a number of preliminary questions as a basis for cross-examination. We are grateful to the OST for providing rapid and considered responses. These are published with this Report.

1 House of Commons Standing Order No. 152

2 Minutes of Evidence, Science and Technology Committee, Session 2002-03, *The Implications for Science of the Higher Education White Paper*, 26 March 2003, HC 416-I

2 The OST's objectives and PSA targets

4. The OST is not a Government department in its own right and thus has no headline Public Service Agreements (PSAs), but one of the DTI's 2002 PSA targets (number 2) clearly relates to the OST:[3] It is to:

> "Improve the relative international performance of the UK's science and engineering base, the exploitation of the Science Base, and the overall innovation performance of the UK economy."

5. This succeeds Objective II from 2000, which is "to make the most of the UK's science, engineering and technology". It contained two, more detailed targets:[4]

- PSA Target 5: Improve the overall international ranking of the UK's Science and Engineering Base, as measured by international measures of quality, cost-effectiveness and relevance.
- PSA Target 6: Increase the level of exploitation of technological knowledge derived from the science and engineering base, as demonstrated by a significant rise in the proportion of innovating businesses citing such sources.

6. The Science Budget for 2003–04 to 2005–06 contains an additional set of objectives, divided into "four key areas where the results of investment from the Science Budget deliver output directly relevant to this wider government strategy for science and innovation".[5] These, along with the OST's operational objectives are shown in Table 1. These objectives for the Science Base are very useful and provide a focus for our scrutiny. Many of them will be addressed in this Report.

3 PSA Target 2 falls under Objective II "Science and Innovation". HM Treasury, *2002 Spending Review: Public Service Agreements* ,July 2002, Cm 5571, p 25

4 HM Treasury, 2000 *Spending Review: Public Service Agreements July 2000,* Cm 4808

5 Department of Trade and Industry, *Science Budget 2003–04 to 2005–06,* December 2002, p 9

Table 1: Objectives for the Office of Science and Technology for 2003–04 to 2005–06.[6]

Key area	Objective
Research	RO1:To continue to improve the excellence, relevance and impact of the knowledge created from Research Council–funded programmes. RO2:To increase research capability and international competitiveness of the UK in new strategic areas. RO3:To increase the dynamism and flexibility of Research Council programmes to respond to changing requirements and opportunities, and to support effectively multi–disciplinary research, new researchers and higher risk research proposals. RO4:To maintain access for scientists working in the UK to the necessary major facilities, databases and supporting laboratory infrastructure that will enable them to deliver world–class research.
Training	TO1:To raise the standard of postgraduate and postdoctoral researchers, and increase their numbers in priority fields experiencing shortfalls or recruitment difficulties. TO2:To enhance their training to better fit them for careers requiring research skills and experience and increase their attractiveness to future employers.
Knowledge transfer	KTO1:To increase the performance of the science and engineering base in exploiting the results of its research. KTO2:To increase the effectiveness of knowledge transfer from Research Council institutes in line with the recommendations of the Baker review of public sector research establishments and the NAO Report on commercialisation of public sector science.
Science in Society	SSO1:To enhance public awareness of the outcomes from and priorities for publicly funded science and increase openness over its management and use through greater engagement and dialogue with the public. SSO2:To increase the reach and impact of activities undertaken by the Research Councils and other bodies funded through the Science Budget by improving joint working between them and other organisations.
Operational	OO1.To complete work on implementation of the recommendations of the 2001 Quinquennial Reviews. OO2.To meet the Government's requirements and targets concerning freedom of information, e-business,(including electronic records management), the modernisation of public services and the promotion of racial and gender equality of opportunity. OO3.To have established the systems to support a co-ordinated performance management system for the Science Budget and the Research Councils in time for the next spending review.

Source: Department of Trade and Industry, Science Budget 2003–04 to 2005–06, December 2002

Science Base metrics

7. The Annual Performance Report for 2003 describes the Department's performance against PSA target 2 as being "on course" and states that "it will take some years before the

6 Department of Trade and Industry, *Science Budget 2003–04 to 2005–06*, December 2002

significant increase in the Science Budget begins to be reflected in a change in the UK's performance".[7]

8. The DTI's Annual Performance Report for 2002 announced that it had commissioned consultants Evidence Ltd to develop metrics for the Science Base and its ranking in the international community. These were intended to replace the "very narrow set of very high-level indicators which gave no information about the detail and dynamism within the Research Base".[8]

9. The Report from Evidence Ltd was published in October 2003.[9] It divided its work into seven themes and its principal findings are shown in Table 2.

Table 2: Performance of the UK Science Base.

Theme	Conclusions
Inputs (including expenditure on research)	The UK is spending less on research as a proportion of GDP (1.8%) than its competitors. It is sixth in the G8.
Outputs (including people and publications)	The UK, with Japan, is second to the US in its share of PhD awards. It has slipped to third in its share of global publications.
Outcomes (research recognition, citations, training and research quality)	The UK gets 11% of global citations behind the US but Germany is closing. It has second place in 8 of the 9 subjects areas. It is third in maths.
Productivity – financial (outcomes and outputs relative to inputs)	The UK is highly productive in terms of PhDs and citations.
Productivity - labour	Second in PhDs awarded per researcher in the G8 and leads in publications and citations per researcher.
People	The UK is weak in the availability of skilled people with research training.
Business expenditure	The UK leads the G8 in business investment in higher education.

Source: Department of Trade and Industry, PSA target metrics for the UK Research Base, October 2003

10. The data are consistent with the widely touted claim that the UK has a strong and internationally competitive Science Base. But far from being "on course" to improve the relative international performance of the science and engineering base, the UK is slipping back in its share of global publications. It is also clear that the UK has a productive cohort of researchers and the Government cannot expect to reverse this trend through improvements in productivity.[10] Increases in the Science Budget in recent years have been less than those in the OST's comparator group and overall Government expenditure on R&D has declined as a proportion of GDP. According to the *Forward Look 2003*, expenditure in cash terms on R&D by civil Government Departments (excluding Funding Councils and Research Councils), will be £1,636 million in 2004–05, only £40 million

7 Department of Trade and Industry, *Autumn Performance Report 2003*, Cm 6067, para 3.4

8 Ev 12

9 Department of Trade and Industry, *PSA target metrics for the UK Research Base*, a report prepared by Evidence Ltd, October 2003

10 As above p 6

higher than the figure for 2001–02 and representing a 2.4% increase over three years.[11] The Evidence Report also draws attention to the weakness of the UK in the availability of skilled people with research training.[12] This is likely to have an adverse impact on the future performance of the Science Base unless it is corrected.

11. The OST says this analysis of the Research Base will be repeated annually and the results will be used as a basis on which to monitor any changes in the relative international performance of the Science Base.[13] While we suspect that a biannual study would be sufficient, the data are interesting and provide a good opportunity to develop useful Government targets. It is surprising, therefore, that the DTI considers that they are "too wide ranging to judge our performance in 'improving the relative international performance of the Science and Engineering Base'".[14] We understand that the DTI is now in the process of agreeing with HM Treasury a small basket of measures against which to measure performance against PSA target 2 and it is expected that this will include "measures covering aspects of scientific excellence, production of trained people and productivity". It seems that the DTI is moving back towards the high level measures it considered were inadequate in 2002. This would be a mistake. We shall await with interest the publication of these measures when they appear "in due course".

12. **We commend the Office of Science and Technology for commissioning research into metrics for the Science and Engineering Base. This will have been of no use if weaknesses identified by the work are not remedied, however. In particular, the Government must heed the warning that, despite increased investment through the Science Budget, UK Government funding for R&D is in decline relative to its international competitors and that UK's share of global publications is slipping. Having developed better measures, the OST should stick with them so that performance over time can be measured.**

13. The Evidence Ltd Report has also identified a few disciplines that "despite remaining strong internationally, are not matching the relative performance levels shown by the rest of the UK disciplines".[15] These are mathematics, physical sciences and engineering, and the social sciences.[16] The Government says that it will be addressing any reasons for these relative weaknesses in SR 2004.[17]

14. These data collected by Evidence Ltd complement the specific reviews of certain disciplines undertaken by the Research Councils, although we have concerns about the piecemeal approach and prefer the comprehensive rolling programme of reviews commissioned by the Engineering and Physical Sciences Research Council and the Particle

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11 Department of Trade and Industry, *Forward Look 2003: Government-funded science, engineering & technology*, Cm 5877, July 2003

12 Department of Trade and Industry, *PSA target metrics for the UK Research Base*, a report prepared by Evidence Ltd, October 2003, p 6

13 Ev 12

14 Ev 18

15 Ev 12

16 Department of Trade and Industry, *PSA target metrics for the UK Research Base*, a report prepared by Evidence Ltd, October 2003, p 7, indicator 3.02

17 Ev 18

Physics and Astronomy Research Council.[18] **We urge the OST to encourage all Research Councils to conduct a rolling programme of international reviews of disciplines within their remits to ensure that the UK retains strength in all research areas.**

3 Spending Review 2004

Prospects for science in SR 2004

15. In the *Times Higher Educational Supplement*, Catherine Coates, who chairs the cross-Council group on the Spending Review, was reported as saying in November 2003 that the Research Councils were gloomy about their prospects for SR 2004. We hope that this has not resulted in a defeatist attitude and that the Research Councils and the OST continue to press the case for science with vigour. Lord Sainsbury is equally pessimistic. In giving evidence, he told us, "I do not think we should be under any illusions. It will be a very tough spending review".[19]

16. It is unclear to us why the Research Councils and the Minister should be gloomy. The OST insists that "no formal guidance has been issued to RCUK on consultation for SR 2004".[20] The Chancellor has been busy extolling the virtues of British science and its value to the economy. In the Chancellor's Pre-Budget Statement on 10 December 2003 he said, "I want Britain to be the best location for science and for research and development".[21] In his speech he made much of the UK's success in riding the global economic downturn. More recently, on 26 January 2004, he said "it is British inventors that have given us the internet, magnetic resonance imaging, the human genome project—all starting from Britain—affirming both our potential as a scientific nation for the future and the need to continue to invest in British science ... we will only succeed if we can build on these inherent strengths and if politicians take the hard decisions making the tough long-term choices that are needed".[22] Given that there have been "discussions between HM Treasury and Research Council staff in Swindon and visits by HM Treasury staff to RC sites", the Research Councils might be expected to be buoyed up by the attention being given to them by the Chancellor and his civil servants at the Treasury.[23]

17. The Chancellor seems to be convinced that the UK's future prosperity is dependent on the strength of Britain's scientific and technological capability and it is reassuring to hear Sir David King's assessment that the Treasury has a "very sophisticated view of investment in the Science Base".[24] This sophistication must be coupled with an awareness that the UK Science Base still needs greater investment, as the Evidence Report reveals. **We hope that the OST makes the Chancellor aware of the data on the Science Base compiled by**

18 Unpublished memorandum submitted by Research Councils UK

19 Q 43

20 Ev 16

21 HC Deb, 10 December 2003, Col 1064

22 Speech by the Chancellor of the Exchequer, Gordon Brown, at the Advancing Enterprise Conference, QE2 Conference Centre, London, 26 January 2004

23 Ev 16

24 Q 53

Evidence Ltd and stresses that the UK cannot be the best place to do science, as he says he wishes, while investment lags behind that of its competitors.

18. While the Chancellor publicly stresses the need to "take the hard decisions making the tough long-term choices", Lord Sainsbury has clearly been watching the Treasury's smoke signals and concluded that SR 2004 will not be generous. Why else would he claim that the Spending Review will be tough? He denied any steer in his answer to our enquiry as to whether the Science Budget for 2005–06, as the first year of SR 2004, might be revised downwards. He said "I do not think we have any indication one way or the other".[25] This issue of future funding is too important to risk misinterpretation: Research Councils must plan on significantly longer timescales than HM Treasury. They need firm, clear guidance to be able to take decisions on financial commitments. It seems that the advice that Research Councils receive from the OST on the generosity, or otherwise, of HM Treasury in Spending Reviews is not always wholly reliable. In giving evidence to us during his introductory session, the new Chief Executive of the Medical Research Council (MRC), Professor Colin Blakemore, revealed that in 2000:

> "The MRC heard from government that there was likely to be a large increase just before – literally a day before – the Council meeting at which funding decisions had to be taken, and awards were made quite generously."[26]

These decisions led to the overcommitment of funds and severe financial constraints at the MRC, as chronicled in our Report on *The Work of the Medical Research Council*, published in March 2003.[27]

19. **The Government has two choices, therefore: either it provides no information on the likely settlement for the Spending Review and leaves the Research Councils to make a case for what they feel the Science Base needs; or it provides clear and unambiguous advice.**

Priorities for SR 2004

20. Research Councils UK has launched a consultation "to build the best case for the continuing funding of UK research in the next Spending Review Period, SR 2004".[28]

21. RCUK has identified a number of cross cutting themes that it intends to employ to demonstrate the opportunities within the UK Research Base. Councils will be considering the extent to which these themes can be supported and expanded in the period to 2005–06 to create a robust platform in order to maximise the added benefit of any new funds. The eight multi-Council themes are:

- Changing Ourselves

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25 Q 44

26 Second Report of the Science and Technology Committee, Session 2003–04, *Chief Executive of the Medical Research Council: Introductory Hearing*, HC 55, Q 6

27 Third Report of the Science and Technology Committee, Session 2002–03, *The Work of the Medical Research Council*, HC 132

28 www.rcuk.ac.uk

- Conditions for Life
- Creativity and Innovation
- Infectious Disease
- Personal and National Security
- Scales of Complexity
- Sustainable Water Management
- Systems Biology: Understanding Life Processes

22. We commend the Research Councils on seeking input on its Spending Review bid. However, it is unfortunate that some of these headings are so imprecise as to be without meaning. None of the themes come with any further explanation of what such research programmes might embrace. This would have been helpful. The OST insists that all eight proposals have met with a favourable response. However, it is impossible, without more information, to find fault with them. **It is not clear to us how Research Councils UK can use the results of its consultation exercise to develop priorities for its Spending Review bid. The scope of the Research Councils' themes for the 2004 Spending Review would have needed to have been fleshed out before meaningful views could be expressed.**

23. We were interested in Lord Sainsbury's views on how the Science Budget should be split between large multi-Council programmes and responsive mode funding, should the Science Vote settlement be more modest in 2004 than it was in 2000 and 2002. His response concerns us. He said:

> "I would personally be very loath to reduce the cross-Research Council themes because that is the way of the future. Getting this multidisciplinary research is one of the excellent things that has been done in recent years. I do not think that would be where I would make any cuts if I had to, which I do not want to do".[29]

24. In effect, he told us that he is prepared to cut responsive mode funding if the money is tight. We understand the temptation of Ministers to hang on to their big initiatives but if he asked the scientific community we suspect he would be told that these programmes are the icing on the cake, and that responsive mode, blue skies research is where the big advances will be made. We wholeheartedly support attempts to improve collaboration between Councils and disciplines but we believe that this can best be achieved by promoting links between research groups and need not involve siphoning off funds from responsive mode funding. If the Government wishes to fund research to support policy objectives then this should be funded from the budget of the relevant Government Department. Lord Sainsbury said that it is important to get the balance between responsive mode and managed programmes right.[30] We agree, but if he considers the balance to be right now, then there is no basis for changing that balance when the budget is tight. Yet this is precisely what the Minister is suggesting. **We urge the Government to give priority to**

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29 Q 47

30 Q 52

sustaining responsive mode funding in its settlement for Spending Review 2004. Scientists working at the cutting edge are best placed to identify the most fertile areas of research, not Government officials.

4 Research careers and training

25. The OST has two training targets in the 2003–04 to 2005–06 Science Budget (see Table 1): to raise the standard of postgraduate and postdoctoral researchers, and increase their numbers in priority fields experiencing shortfalls or recruitment difficulties; and to enhance their training to better fit them for careers requiring research skills and experience and increase their attractiveness to future employers. The review by Sir Gareth Roberts, President of Wolfson College, Oxford on the supply of people with science, technology, engineering and mathematics skills concluded that "compared to other countries, the UK has a relatively large, and growing, number of students studying for scientific and technical qualifications. However, this growth is primarily due to increases in the numbers studying IT and the biological sciences, with the overall increase masking downward trends in the numbers studying mathematics, engineering and the physical sciences".[31]

26. In its Report on *PSA target metrics for the UK Science Base*, Evidence Ltd concluded that "the UK is weaker than its competitors in terms of the number of highly skilled people with research training. Whatever the measure—researchers or R&D personnel – the UK is one of the lowest ranked among G8 nations, whether relative to population or workforce".[32] These studies suggest that there are plenty of people studying science at university but they are avoiding the physical sciences and engineering and there is a reluctance by science graduates to pursue research careers. The Government decided, in *Investing in Innovation*, the Government's response to Sir Gareth Roberts's Report, to increase the PhD stipend. This initiative is welcome but it is important to determine whether it is having the desired effect. Sir John Taylor told us that no data were available yet on the effect of this decision. We believe that such an analysis should not be delayed.[33] A further issue is the career decisions taken by postgraduates on the completion of their PhDs. This has been a particular concern of ours.

Contract researchers

27. Researchers are the Science Base's greatest asset and it is an ongoing concern of ours that this has not been reflected in their pay and conditions. In particular, in our Report on *Short-Term Contracts in Science and Engineering*, we criticised the fact that in many disciplines half the researchers were not permanently employed.[34] We raised this issue with Lord Sainsbury and were pleased that he stated clearly that "we have too many people on contracts for research".[35] He was keen to emphasise the importance of the EU Fixed Term

31 HM Treasury, *SET for success: The supply of people with science, technology, engineering and mathematics skills, The report of Sir Gareth Roberts's Review*, April 2002, para 0.7

32 Department of Trade and Industry, *PSA target metrics for the UK Research Base*, a report prepared by Evidence Ltd, October 2003, p 6

33 Qq 39-40

34 Eighth Report of the Science and Technology Committee, Session 2001–02, *Short-Term Research Contracts in Science and Engineering*, HC 1046, paras 10, 104

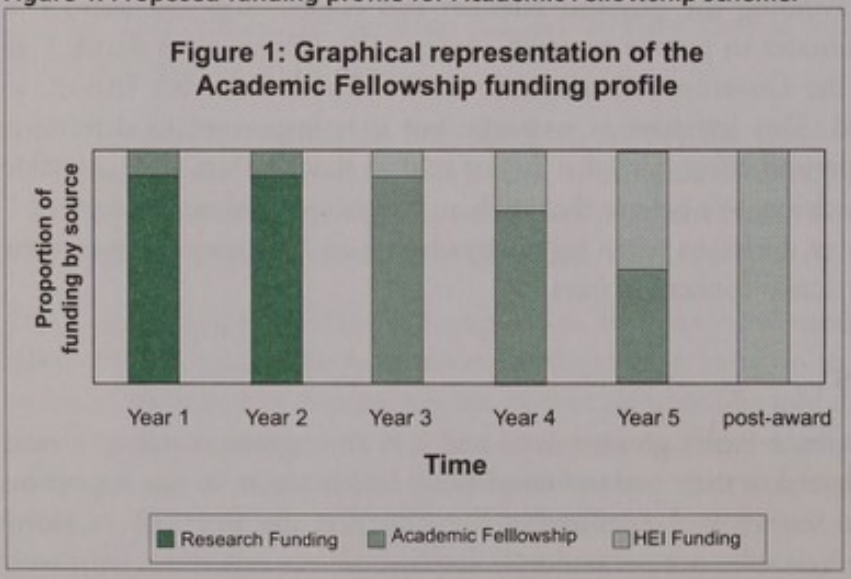
35 Q 32

Work Directive but we are concerned that he did not give greater attention to the impact that funding mechanisms can have in tackling this problem.[36] This is surprising since this is implicitly recognised in *Investing in Innovation*, the Government's response to Sir Gareth Roberts's Report. The Government announced that it would provide funding to create 1,000 new "Academic Fellowships" (200 a year, each lasting 5 years). The aim of the new scheme was to address some of the concerns and issues affecting those who have completed their PhDs and are faced with "unattractive and unstable" career routes into permanent academic posts.

28. The OST published a consultation paper on Academic Fellowships in September 2003. It outlined a proposal for a new scheme that has been developed in response to the Roberts Review, *SET for Success*. It is envisaged that this scheme will be administered by one of the Research Councils on behalf of all the grant-awarding Research Councils and under the banner of RCUK.[37] The Government intends to launch the scheme at the end of February 2004, with proposals being submitted at the end of May. Allocations will be agreed by mid-July, with the first awards commencing in October 2004.

29. OST has proposed a system in which the principal contribution to the fellowship shifts during the 5-year period, from research funder (e.g Research Council), to the Academic Fellowship fund and then to the higher education institution. The fellow must have funding from elsewhere for the first two years. The higher education institution has no obligation to continue the employment after Year 5 but any that do not may be subject to claw-back of funds or sanctions in future years of the scheme.

Figure 1: Proposed funding profile for Academic Fellowship scheme.



30. The Academic Fellowship scheme is well conceived but we worry that institutions *may* be subject to claw-back if permanent employment is not provided at the end of the fellowship. We are concerned that universities will attempt to avoid any commitment to permanent employment. The response to this must be that if such institutions are unable

36 The EU Directive was transposed into UK law as the Fixed-Term Employees (Prevention of Less Favourable Treatment) Regulations 2002 on 1 October 2002. They place no limit on the length of the first fixed term appointment; but any further contract awarded four years or more after the first must be considered open-ended, unless there are objective reasons why this should not be the case.

37 Ev 13

or unwilling to provide open-ended contracts to researchers on completion of their fellowship then they should be considered inappropriate recipients of the grants.

31. OST told us that it was "satisfied that the Research Councils are fully conversant with their obligations under the 'Fixed-term (Prevention of Less Favourable Treatment) Regulations 2002'", and that they "are also fully implementing the standards set by the 1996 Concordat on Contract Research Staff through the terms and conditions of their research awards".[38] We interpret this is being the bare minimum required of them. **We welcome the Academic Fellowship initiative which demonstrates that the Research Councils can directly intervene to create more stable careers for scientists. We believe that the principle of obliging universities to provide open-ended contracts as a condition of securing future grants could be more widely applied as a means for reducing the number of contract researchers.**

32. The final Report of the Research Careers Initiative (RCI, a joint initiative between the OST and Universities UK) was published in June 2003. It recommended that the new Funders' Forum proposed in *Investing in Innovation* should address careers in research, not only of contract researchers, but also of research students and new lecturing staff.[39] This UK Research Base Funders' Forum brings together major research sponsors to share strategic information about their research plans; to consider the financial impact of their plans on the system overall, including its long term sustainability; and to make sure that there is a shared understanding of how all the funding streams for research fit together. From January 2004 the Funders' Forum will also take forward work on the Research Careers Initiative. **We welcome the introduction of the UK Research Base Funders' Forum and hope that it will bring much-needed coherence to public research funding and that it will result in careers in research becoming a more attractive and secure option.**

5 Research Councils

33. The Government's Quinquennial Review of the Grant-Awarding Research Councils (QQR) in 2001 recommended that a new high level strategy group be established to enhance the collective leadership and influence of the Research Councils and secure greater strategic coordination in the funding of science. The review also concluded that:

- The Councils need to develop a clearer identity and purpose, whereby they will be able to establish stronger links with the other major science funding organisations, including the funding councils, Government Departments and the major charities; and
- A closer relationship is needed between the Councils and other key stakeholders, including the universities and the business and public service organisations which use their research and expertise.

38 Ev 17

39 Department of Trade and Industry, *Universities UK, The Research Careers Initiative, Final Report*, 1997–2002, June 2003, para 48; *Department of Trade and Industry, Investing in Innovation: A strategy for science, engineering and technology*, July 2002, para 3.28

34. In response to the Quinquennial Review of the Research Councils, Research Councils UK was launched on 1 May 2002. The venture is led by the Research Councils UK Strategy Group. The membership of this group comprises the Chief Executives of the seven Research Councils and the Director General of the Research Councils.

35. An internal review was held after the first year of RCUK's operation to determine whether the RCUK partnership was on course to deliver its objectives and to identify areas for improvement. It was undertaken in April and May 2003 by external consultants Peter Saraga (formerly of Philips Research Laboratories) and Tony Quigley (formerly of OST). The Review concluded that RCUK had made a promising start.[40] There was a great deal of support for the RCUK concept and goodwill towards making it a success, but it was felt that after only 12 months, it was too soon to determine the long term success of the venture. The Review's 13 recommendations are primarily about clarifying the role of the RCUK partnership and the RCUK Strategy Group and providing clear and consistent messages about the long-term goals of RCUK. The RCUK Strategy Group has agreed these recommendations and implemented a programme of work to deliver the improvements needed.[41]

36. It has been a feature of our scrutiny programme of the Research Councils that they go about their work in different ways, often for reasons that are not apparent. The argument for differences tends to be that their research communities have different demands. We have argued on several occasions that the Research Councils should be more responsive to their communities, so we would not wish to support harmonisation for the sake of it. Nevertheless, some differences in policies and grant schemes are completely unnecessary. These make comparisons between Councils difficult and, more seriously, could create obstacles to interdisciplinary research. A physicist wishing to work at the life science interface should not have to learn the particular processes and terminology of the Biotechnology and Biological Sciences Research Council (BBSRC). It is also important that best practice is adopted by all Councils, where appropriate. For example, a recent trend has been the introduction of peer review colleges by several Research Councils to replace standing boards and committees. The EPSRC made clear to us the benefits of the new system.[42] The BBSRC, conversely, stressed that its community preferred the existing scheme.[43] It was not clear to us why a system would provide advantages for one Council and not another.

37. The OST has commissioned an independent review to look at the first two years of RCUK, as recommended by the Quinquennial Review of the Grant-Awarding Research Councils.[44] We understand that this will report to Ministers in July 2004. **Research Councils UK has been a useful initiative. We look forward to further progress in**

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40 http://www.rcuk.ac.uk/documents/#review

41 Ev 17

42 Ninth Report of the Science and Technology Committee, Session 2002-03, *The Work of the Engineering and Physical Sciences Research Council*, HC 936, para 51

43 Third Report of the Science and Technology Committee, Session 2003-04, *The Work of the Biotechnology and Biological Sciences Research Council*, HC 6, para 26

44 Office of Science and Technology, *Quinquennial Review of the Grant-Awarding Research Councils, Stage Two*, Report by the Review Team, November 2001,Target 7.4

collaboration between Research Councils and greater convergence in administrative procedures and structures.

6 Science across Government

Departmental science reviews

38. OST has begun work on the development of a programme of external review of science funded by Government Departments, following the establishment of a Science Review Directorate within the Office of Science and Technology. This was a recommendation of the Government's science strategy *Investing in Innovation*. The OST aims to review about 12 Departments and complete the first cycle of reviews within three to four years. The first review, of the Department for Culture, Media and Sport, is underway and this will be followed by the Health and Safety Executive and the Office of the Deputy Prime Minister. Each review will take about 10 months. The Reports resulting from each review will be made public.[45]

39. In the course of 2003, our inquiry into the *Scientific Response to Terrorism* concluded that there was a weak scientific culture at the Home Office.[46] Our ongoing inquiry into science and international development will address this issue at the Department for International Development.[47] Good science should be the basis for policies in many Departments. We expect the reviews to throw up some important issues. In our *Annual Report 2003*, we undertook to follow these up as necessary.[48] **The establishment of the Science Review Directorate is a good initiative and we await its outputs with interest. We welcome the OST's commitment to publish the findings of the reviews in full.**

Council for Science and Technology

40. The Council for Science and Technology (CST) was established in November 1993 following the 1993 White Paper *Realising our Potential* as "the Government's premier advisory body on science, engineering and technology policy".[49] It was reviewed in 1998 and reconstituted. Our predecessor Committee considered the effectiveness of CST Mark II in 2001 in its Report *Are We Realising Our Potential?*. It concluded:

> "In its first few years, the CST does not appear to have operated very effectively. In March 1998, the Council was re-established with clearer, more comprehensive terms of reference, increased independent membership and commitments to publish an annual report, its advice and information about its work. Despite these changes, we

45 Ev 15-16

46 Eighth Report of the Science and Technology Committee, Session 2002–03, *The Scientific Response to Terrorism*, HC 451-I, para 40

47 Press Notice No. 39, Session 2002–03

48 First Report of the Science and Technology Committee, Session 2003–04, *Annual Report 2003*, HC 169, para 15

49 Cabinet Office, *Realising Our Potential: A Strategy for Science, Engineering and Technology*, May 1993, Cm 2250; Department of Trade and Industry Press Release, P/98/199, 13 March 1998, Top Level Science Group to Advise Government.

> still received evidence that ACOST [Advisory Council on Science and Technology] was more influential and active."[50]

41. The Government responded by stating that it gave "due recognition and prominence to the Council's distinctive and influential contribution to science, technology and innovation policies".[51] This warm endorsement of the CST's effectiveness is in sharp contrast to the recommendation, accepted by the Government, of stage one of the CST's quinquennial review:

> "CST's work since it was re-established has made some contribution to policy formulation. But its overall impact, like that of its predecessor bodies, has proved disappointing. ... this report recommends that CST should remain in being – but only if the Government and CST's members are prepared to take steps to make it more effective."

Stage 2 of the QQR recommended the reform of the CST and the Government responded in July 2003 with revised terms of reference for the CST:

To advise the Prime Minister on the strategic policies and framework for:

— sustaining and developing science, engineering and technology (SET) in the UK, and promoting international co-operation in SET;

— fostering the practice and perception of science, engineering and technology as an integral part of the culture of the UK;

— promoting excellence in SET education;

— making more effective use of research and scientific advice in the development and delivery of policy and public services across Government; and

— promoting SET–based innovation in business and the public services to promote the sustainable development of the UK economy, the health and quality of life of UK citizens, and global sustainable development.

42. It will be chaired by the Chief Scientific Adviser and by one of the independent members chosen from among the 16 members. The independent chair will take charge of meetings at which CST's members gather to develop advice to Government. The CSA will chair meetings at which CST reports its advice to Ministers.[52] The new body will be re-launched early in 2004.

43. We wish CST mark III well. The emergence of an influential and distinguished scientific advisory body for Government would be welcome but it is hard to be enthusiastic about the latest incarnation of the CST. The views of CST Members during Stage 1 of the QQR were telling: they were unclear whether the advice they were providing was valued.[53]

50 Sixth Report of the Science and Technology Committee, Session 2000–01, *Are We Realising Our Potential?*, HC 200-I, para 36

51 Second Special Report of the Science and Technology Committee, Session 2001–02, *The Government's Response to the Science and Technology Committee's Sixth Report, Session 2000–01*, Are We Realising Our Potential?, HC 361

52 DTI press release P/2003/417, 22 July 2003

53 Quinquennial Review of the Council for Science and Technology, Stage 1, para 25

Until there is a clear demand for its advice, the constitution of the CST is of little consequence. Sir David King has been active in setting up ad-hoc committees to deal with pressing issues, such as foot and mouth disease, energy and domestic terrorism. While Stage 1 of the CST's quinquennial review declares that the CST is there to give insight into the bigger picture and not intended to provide a specialist view, we believe that high level scientific advice for Government would be better achieved using ad hoc committees than through a standing committee of non-specialists.[54] Ad-hoc committees may lack the horizon-scanning capability of a standing committee but this function could be handled differently, perhaps by contracting a body such as the Royal Society or another learned society. **The new Council for Science and Technology deserves a chance to succeed but the Government must not waste another five years. The Government should put it on a year's probation and have the courage to abolish it if it is not working.**

7 Large research facilities

44. Research Objective 4 from the Science Budget 2003–04 to 2005–06 is "to maintain access for scientists working in the UK to the necessary major facilities, databases and supporting laboratory infrastructure that will enable them to deliver world-class research" (see Table 1).

45. The OST's Large Facilities Roadmap says that options for the realisation of a next generation neutron source for Europe are a power upgrade to the ISIS facility (at the Council of the Central Laboratory Research Councils's (CCLRC's) Rutherford Appleton Laboratory); a green field 5 Mega Watt + 5 Mega Watt short and long pulse source (the 'European Spallation Source' (ESS)) or a long-pulse only source with the potential to achieve power levels significantly greater than 5 MW. These and other scenarios, it says, will involve extensive co-operation on neutron policy at a European level.[55]

46. ESS could be the best neutron source worldwide for practically all classes of instruments. A number of countries, including Germany, Britain, France and the Scandinavian countries, are interested in hosting the facility. Yorkshire Forward and the White Rose Consortium is proposing Burn Airfield, near Selby, North Yorkshire, as the site for the ESS.[56] CCLRC's Rutherford Appleton Laboratory in Oxfordshire is another option for a UK bid. Sir John Taylor told us that the OST will canvass "potential providers and the science community to understand what the real time line for producing the next generation source is going to be".[57]

47. The Large Facilities Roadmap states that the UK needs to take a "strategic position as to the best way to maintain access [to large facilities] for researchers and also to manage and fund the investment". It is hard to disagree with this statement; however, we judge that the document fails to make the case for hosting a range of large facilities. On the ESS, the OST told us that at a meeting between Lord Sainsbury and the White Rose University Consortium in July 2003 "it was agreed that the UK would take a more pro-active role and

54 Quinquennial Review of the Council for Science and Technology, Stage 1, para 14

55 www.ost.gov.uk/research/funding/lfroadmap/

56 The White Rose Consortium comprises the Universities of Leeds, Sheffield and York

57 Q 42

lead the agenda in deciding on the timing/location of a next generation neutron source within Europe".[58] We agree that we should be taking the lead; as Lord Sainsbury acknowledges "neutron sources is one of the areas where we have world leading competence".[59] **The Government should acknowledge that the UK science community can benefit from the close proximity of large facilities, and that the prestige and profile of UK science can be enhanced. We urge the Government to provide the political will, and where necessary the finances, to support such ventures.**

48. We will be pursuing this issue with the CCLRC during the Committee's scrutiny session on 29 March 2004.

Fusion

49. The Committee expressed its support for fusion research in its Report *Towards a Non-Carbon Fuel Economy*.[60] As we noted in that Report, Sir David King has been active, and influential, in providing impetus to fusion development, for which we congratulate him. Currently, the world's most advanced reactor is the EU's JET facility at Culham in Oxfordshire, which is due to close at the end of 2004. The next stage in the development of fusion is the ITER reactor, which requires a major international collaboration. There are now two bids for the site: Japan and France.

50. The OST told us that it believed that ITER should be built in Europe "where it stands the greatest chance of success".[61] The European Commission has decided that the French site at Cadarache was preferred. The US says it considers the Japanese bid to be superior.[62] Both these judgements are, we suspect, subjective and the decision will be a political and not a scientific one. **We welcome the Government's recognition of the benefits to the UK from building ITER in Europe and urge it to press the French case. The decision will inevitably be a political one but the science—and thus the success of the project—must not be compromised. Already, Spain has been invited to host the administration of ITER if France is successful. We urge the Government to resist any suggestion that the ITER project should somehow be split between France and Japan.**

8 Cambridge-MIT Institute

51. CMI is a 5–year alliance between the University of Cambridge and MIT, announced in July 2000. It is 80% funded by HM Treasury at a cost of £65 million. Its mission is to enhance the competitiveness, productivity and entrepreneurship of the UK economy:

- By improving the effectiveness of knowledge exchange between university and industry, educating leaders, creating new ideas, and developing programmes for change in universities, industry and government

58 Ev 16

59 Q 41

60 Fourth Report of the Science and Technology Committee, Session 2002–03, *Towards a Non-Carbon Fuel Economy: Research, Development and Demonstration*, HC 51-I, paras 189-191

61 Ev 16

62 Luncheon Address to the Keidanren Tokyo, Japan, by Secretary of Energy Spencer Abraham, 9 January 2004.

- Using an enduring partnership of Cambridge and MIT, and an extended network of participants.

52. In the OST's memorandum to the Committee's annual scrutiny Report 2002, it stated that the OST would be conducting an independent evaluation of CMI. The Committee recommended that this be published but the Government's response gave no undertaking to do so.[63]

53. In a written answer to George Osborne MP, the Secretary of State for Trade and Industry Patricia Hewitt said, "my Department commissioned the review to provide detailed advice and guidance to Ministers on a confidential basis. It was shared in confidence with the Board of the Cambridge MIT Institute Ltd. which is a company limited by guarantee". She also stated that "The DTI's contract with CMI requires CMI to give a full account of its achievements against agreed/stated objectives. DTI will commission an independent review of the CMI project on its termination".[64]

54. In a further answer to Tim Yeo MP, Ms Hewitt said that "I instigated an independent review of CMI in May 2001, and the CMI board accepted and acted upon all the recommendations. The most recent independent audit, in February 2003, found CMI's internal systems and controls and corporate governance practices to be satisfactory and made no recommendations for further action".[65]

55. *Investing in Innovation*, the Government's science strategy, states that while "CMI is now starting to deliver tangible benefits to UK research and business … The Government as major investor (with business co-finance) will continue to require substantial dividends in the form of enterprise education and research for the UK in return for continued backing over the remaining three years of the funding period".[66]

56. We are pleased that CMI's performance has improved, although it is not clear to us that the Government has evidence of "substantial dividends". We understand that the NAO's Report on CMI will be published in March 2004.

57. **The Cambridge-MIT Institute is an interesting initiative and appears to be bearing some fruit, but the £65 million expenditure must be put in context. For the same amount of money, the Government could have provided the Biotechnology and Biological Sciences Research Council with around 5% extra funding over the same period. The investment is only slightly less than the combined cost of the stem cell and sustainable energy programmes in Spending Review 2002. For this reason, we reiterate the importance of making the evaluation of CMI available to us, in commercial confidence if necessary.**

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63 Seventh Report of the Science and Technology Committee, *The Office of Science and Technology: Scrutiny Report 2002*, HC 860, para 48; Third Special Report of the Science and Technology Committee, *The Office of Science and Technology: Scrutiny Report 2002: Government Response to the Committee's Seventh Report of Session 2001–02*, HC 293, p 9

64 HC Deb, 3 June 2003, Col 321W

65 HC Deb, 5 June 2003, Col 531W

66 Department of Trade and Industry, *Investing in Innovation: A strategy for science, engineering and technology*, July 2002, para 5.31

9 Higher education policy

58. The OST is not responsible for higher education, yet it clearly has an interest since a very significant amount of publicly funded research is undertaken in higher education institutions. This is reflected in Lord Sainsbury's responsibilities, as described on the DTI website, which include "DTI interest in education and skills". Alongside the Higher Education Bill, the Government has also initiated several reviews with implications for both the Department for Education and Skills and the OST (see Table 3).Table 3: Government reviews of science and research in 2003.

Review	Sponsoring department	Status
The Sustainability of University Research (dual support)	OST	Consultation closed 30 September 2003
University research assessment	HEFCE	A joint statement by the Funding Councils was published in February 2004
University research funding method	HEFCE	HEFCE announced new funding method on 23 December 2003
University teaching funding method	HEFCE	HEFCE announced new funding method on 23 December 2003
The Lambert Review of Business-University Collaboration	Treasury	Published 4 December, response due summer 2004
The Innovation Report	DTI	Published 17 December

Research funding

59. In May 2003 the OST published *The Sustainability of University Research: A consultation on reforming parts of the Dual Support System*. It looked at ways in which HEIs cost and price their research and Research Councils fund and account for it. The OST has proposed a system in which the Research Councils shift from paying all the direct costs of a project (staff costs, except principal investigator) and 46% of indirect costs to paying 60-70% of the full costs. The OST's consultation suggests that it is a matter for the universities as to how they should allocate their block grant but provides guidance on how much to charge for indirect costs for different types of project. The Science Budget has £120 million for 2005–06 to implement this change. **It is disappointing that the OST will not publish submissions to its consultation on dual support before it publishes its response. It is normal practice for the Government to publish at least a summary of submissions before reporting. It is reasonable that, where the authors have given permission, submissions are published as soon after the deadline as possible. If the Government's decisions are seen to be made in an open and transparent manner, the evidence being used to inform that decision should be freely available as soon as possible.**

60. The Higher Education Funding Council for England's (HEFCE's) consultation on research funding method set out suggested funding levels for departments according to their Research Assessment Exercise (RAE) ranking. It also proposed changes to the volume

measure, used as an indicator of research capacity. One of the most controversial elements is the removal of charitable income, on the basis that it is irrational to use this as a factor when it does not do so for other forms of project income such as that from Research Councils or business. Research charities have tended to argue that the indirect costs of the research they fund should be met by Government. The Wellcome Trust, in its submission to the dual support review, criticised the lack of coordination between the OST and HEFCE. In its announcement of 23 December 2003, HEFCE said that it would "continue work on revising the research funding formula and subject cost weights, for implementation after the next RAE, in close consultation with other research funders including charities and the Research Councils". In the short term, charitable income will continue to be used to calculate research volume.

61. The Government's science strategy *Investing in Innovation* explicitly recognised the importance of charitable funding to the Research Base.[67] Lord Sainsbury recognised that charities could go overseas to spend their money as a result of HEFCE's proposals. It is surprising, therefore, that he did not insist that charities were represented on the new Higher Education Research Forum, set up by the OST and the DfES under the chairmanship of Sir Graeme Davies.[68] **Charities such as the Wellcome Trust have made a huge contribution to UK research and it is important that their interests are represented at a high level in Government. We are concerned that the new Higher Education Research Forum does not include a representative from the research charity sector. We recommend that this oversight is remedied without delay.**

62. The reviews on The Sustainability of University Research and University Research Funding Methods seek to tackle effectively the same important issue – the functioning of the dual support system. It is astonishing that they were initiated and conducted separately. Lord Sainsbury was keen to point out that the results will be brought together but it emphasises the degree to which the two pillars of the dual support system are being considered in isolation. The Minister admitted that these and the other reviews "do interact to a very great extent" and that there was "a ministerial committee looking at this which will pull together all these reports".[69]

63. Lord Sainsbury told us that it was "probably right to do the different reviews".[70] Separate reviews may have been appropriate but we believe that their terms of reference should have been drawn up with reference to each other. The Government has undertaken a haphazard approach to these reviews which has not served science, research and innovation well. **A more coordinated approach to policy-making is needed. Science and research are in danger of being over-reviewed, wasting the time of researchers and lecturers who feel obliged to make responses, and the uncertainty they engender is demoralising for these staff. We can only hope that as a result of these reviews on science, research and innovation a clear timetable for implementation is drawn up.**

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67 Department of Trade and Industry, *Investing in Innovation: A strategy for science, engineering and technology*, July 2002, paras 3.18-3.19

68 HC Deb, 18 December 2003, Col 153WS

69 Q 4

70 Q 4

Research assessment

64. Following the 2001 RAE, the Funding Councils commissioned Sir Gareth Roberts to report on the future for research assessment in the UK. Among his key recommendations were the suggestions that the burden of assessment for institutions and assessment panels linked to the amount of funds the institution is competing for, grade bands to be abolished in favour of a profile of the research strength of each submission, providing for a continuous rating scale. Following a UK-wide consultation on the recommendations of of Sir Gareth's review and related issues, the funding bodies made an initial analysis of responses to identify the main areas of consensus and also where opinion is more divided. The Funding Councils made an initial statement on 11 February 2004, outlining their proposals for the RAE in 2008.[71]

65. In our Report on the Research Assessment Exercise (RAE) in 2002, we expressed concern over the increasing divergence in the dual support system's funding streams; nevertheless we gave our backing to the system on the proviso that the two streams should be better integrated.[72] An alternative model of calculating the university block grant for research on the basis of Research Council income was rejected by us on the basis that it would increase the concentration of research in even fewer universities. We announced, also on 11 February 2004, plans to conduct a short inquiry into the Funding Councils' proposals, following up our 2002 Report.[73]

66. We agree with the Royal Society that it is "unfortunate that the opportunity was not taken to undertake a more fundamental review of the overall public funding of university research".[74] The Royal Society argues that the two distinct strands of the dual support system could be replaced by a simpler system in which, for each university, the sum of a department's funding from the Research Councils, charities and business could used as a basis for calculating the research component of the university block grant. **We are concerned that the Government's piecemeal approach to research funding does not serve UK science well. We shall be monitoring developments in higher education science with interest over the next year.**

Research concentration

67. A recent Report by the Science Policy Research Unit (SPRU) at Sussex University, prepared for the OST, concluded that "there seems to be little if any convincing evidence to justify a government policy explicitly aimed at further concentration of research resources on large departments or large universities in the UK on the grounds of superior economic efficiency".[75] Lord Sainsbury was unable to provide any conflicting evidence and relied on an assumption that because research concentration had increased in recent years was because bigger research teams are more productive.[76] We are concerned that such

71 Higher Education Funding Council for England, *Initial decisions by the UK funding bodies*, RAE 01/2004, February 2004,

72 Second Report of the ScienceandTechnologyCommittee, Session 2001–02, *The Research Assessment Exercise*, HC 507.

73 Press notice no. 19, Session 2003–04

74 The Royal Society response to the OST report on the sustainability of university research, September 2003

75 von Tunzelmann N, Ranga, M, Martin B and Geuna A, *The Effects of Size on Research Performance: A SPRU Review*, June 2003

76 Q16

important decisions about the shape of the UK research landscape are being made without adequate evidence to support them; indeed, they are being made with a complete disregard for the conclusions of an academic study which the OST commissioned. The Russell Group universities will argue that they need to be able to compete on a global scale. What is good for these universities as businesses is not necessarily good for British science. **We welcome the fact that the OST is commissioning academic studies to provide an evidence-based approach to policy-making. It is regrettable, therefore, that having done so, the Minister is content to disregard a study's findings.**

68. An increasing role for the Regional Development Agencies (RDAs) in innovation is being proposed. The *Cross-Cutting Review of Science and Research*, published in 2002, stated that "the RDAs will be best placed to match the needs of regional industry with the existing and potential Science Base in the regions".[77] It has been argued that businesses benefit hugely from having a university research capability in close proximity. We are concerned that this will become less likely if further research concentration is allowed to happen. Lord Sainsbury pointed out that every Government Region has at least one of the top 25 universities in it.[78] He extolled the merits of the universities in the north west and north east, and we would not wish to disagree on this point.[79] However, it is not sufficient for there to be a research university in each Region if these universities do not have capability in all science and engineering disciplines. Sir John Enderby, President-Elect of the Institute of Physics, said recently that "there are large areas of the country where there is no higher education in physics … Not only is there less choice for students but parts of the country are without the expertise provided by physicists".[80] **The UK has a high level of research concentration. Should this trend continue, the UK risks whole regions being devoid of research capability in subjects, particularly the physical sciences and engineering, that underpin innovation. This undermines the Government's attempts to make universities the drivers of the knowledge economy in these areas because many universities that provide research support for regional and local industry and commerce would be starved of funding and their research would become unsustainable. In addition, the increasing prospect of debt is likely to force students to study nearer to home and the option to study physics, chemistry or engineering should not be denied them. It should be the Government's policy to maintain capacity in a full range of disciplines in each region.**

Teaching funding

69. The Higher Education Funding Council for England has consulted on a change in the weighting for teaching. These weightings are used to determine the university block grant (see Table 4).

77 HM Treasury, *Cross-Cutting Review of Science and Research*: Final Report, March 2002, para 231

78 Q 16

79 Q 16

80 Universities fear science courses will disappear, *Daily Telegraph*, 2 February 2003

Table 4: The Higher Education Funding Council for England's proposed change to the subject weighting for teaching.

Price group	Description	Current weighting	Observed cost relativity	Proposed new weighting
A	Clinical subjects	4.5	4.34	4
B1	High-cost laboratory-based science, engineering and technology	2	1.93	2
B2	Other laboratory-based science, engineering and technology	2	1.56	1.6
C	Intermediate cost subjects with a studio, laboratory or fieldwork element	1.5	1.21	1.3
D	All other subjects	1	1	1

Source: Higher Education Funding Council for England, Developing the funding method for teaching from 2004–05: consultation, August 2003/42, Table 2

70. Examples of B1 subjects include chemistry, physics, chemical engineering and material science. B2 subjects include the non-clinical life sciences and other engineering subjects. The current funding method for teaching was first applied to higher education institutions in the allocations for 1998–99. Save British Science calculated that the proposed funding method would lead to a £22 million cut in undergraduate science teaching. It criticised the weightings on the basis that they have been calculated on what universities currently spend rather than what the teaching ought to cost.[81]

71. When asked his views on HEFCE's proposed teaching funding formula, Lord Sainsbury responded that this was "firmly part of DfES's responsibility" and that he has no formal input into the process.[82] If the Minister is responsible for the DTI's interest in education and skills, then either the Department has no interest in these issues or he is failing in his duties. In giving evidence to the Committee, the Chief Executives of both the Medical Research Council and the Biotechnology and Biological Research Council made clear their hostility to HEFCE's proposals.[83] If the Research Councils feel that this an issue of concern, they will have been disappointed to learn that their Minister takes no responsibility for representing their views within Government.

72. On 23 December 2003, HEFCE announced its revised proposals. It abandoned the idea of splitting price group B but there will still be a shift away from laboratory-based subjects (see Table 5).

81 Save British Science, Press Release, 24 October 2003

82 Qq 6-7

83 Second Report of the Science and Technology Committee,Session 2003–04, *Chief Executive of the Medical Research Council: Introductory Hearing*, HC 55, Q 63; Third Report of the Science and Technology Committee, Session 2003–04, *The Work of the Biotechnology and Biological Sciences Research Council*, HC 6, Q 45

Table 5: Revised teaching funding formula announced by HEFCE.

Price group	Description	Current weighting	Proposed new weighting	Final decision
A	Clinical subjects	4.5	4	4
B1	High-cost laboratory-based science, engineering and technology	2	2	1.7
B2	Other laboratory-based science, engineering and technology		1.6	
C	Intermediate cost subjects with a studio, laboratory or fieldwork element	1.5	1.3	1.3
D	All other subjects	1	1	1

Source: www.hefce.ac.uk/News/hefce/2003/funding.asp

73. The scientific community will have been relieved that HEFCE decided to modify its proposals but it seems they have little to thank the Science Minister for. **The Science Minister has accepted that many issues concerning science, research and higher education are interrelated. It is reasonable to expect that he provide formal input into the deliberations of Ministers in the Department for Education and Skills and be able to articulate the policy as a whole in giving evidence to us. His statements give us no confidence that these issues are being considered by Government in a coherent manner.**

Tuition fees

74. There has been concern about the effect of top-up fees on undergraduate applications in high cost science subjects. There is a danger that universities, faced with financial pressures, will be tempted to cut courses or charge higher fees for students in these subject areas. An alternative scenario was put forward by the Minister of State for Higher Education, Alan Johnson, who told the Education and Skills Committee that it was "a near racing certainty, that chemistry and physics, where they have high infrastructure costs but they need the volume, will charge nothing, or next to nothing, to attract students, and cross-subsidise perhaps from law".[84] We raised this issue with Lord Sainsbury, who told us that this was a matter for universities to decide and that he was more concerned with making young people aware of how exciting and relevant the physical sciences and engineering were.[85] He felt that science would benefit from tuition fees since they would ensure that science courses were funded properly.[86] Properly funded courses are of little value, however, if insufficient students can be attracted to enrol on them.

75. Despite the efforts of the Minister, changing the perception of young people will not happen quickly or easily. In the short term, we will need to buck the market or we will lose large numbers of university departments. Lord Sainsbury rejected any suggestion that the Government should be more proactive:

84 Minutes of Evidence, Education and Skills Select Committee, Session 2003-04, *Ministerial Annual Review*, HC 75-i, Q81

85 Q 13

86 Q 9

> "I cannot see any value or merit in trying to say to universities, 'You have to run courses in which you are not getting people to do it.' In terms of the powers of the government to do that, they are extremely limited. How can we hold universities responsible for their finances if we start telling them they have to run courses where there are not individuals there? The thing that drives it has to be what the young people want to do".[87]

In recent years, the Government has recognised the shortage of science teachers and introduced financial incentives. The Roberts Review identified the serious problems in attracting young people to certain scientific disciplines and recommended that differential PhD stipends be introduced to attract students.[88] This argument was accepted by Government and implemented in Spending Review 2002.[89] It is not clear why Lord Sainsbury is unwilling to consider applying this principle to the undergraduate market. On 23 January 2004, the Institute of Physics (IOP) announced that it would be awarding £1,000 means-tested annual bursaries for physics undergraduates. The IOP has recognised that increased student debt could deter potential physics students. We congratulate the Institute on its decision but the Government should act also. A review of maths education, commissioned by Department for Education and Skills and published in February 2004, has recommended that financial incentives may be necessary to improve the uptake of maths courses post-16.[90] **The Government should consider establishing bursaries for undergraduates to study shortage subjects, such as physical sciences and engineering. These should cover the full cost of the charged top-up fee.**

10 Science and society

76. The Science Budget has two Strategic Objectives relating to science and society initiatives (see Table 6), essentially to enhance public awareness of publicly funded science and increase the impact of activities undertaken by the Research Councils.

77. OST's Science in Society programme provides core funding for the British Association for the Advancement of Science and funds grants for science communication activities through the Copus grants scheme. It also promotes networking and sharing of best practice, for example by funding ECSITE-UK, the network for science and discovery centres. We have considered in the past the Government's expenditure on bodies concerned with the public understanding of science and expressed concern over the direction of Copus, an organisation that has since been disbanded.[91] Research Councils conduct their own science and society activities and spend around 0.5% of their budget in this area.

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87 Q15

88 SET for success, The *supply of people with science, technology, engineering and mathematics skills,* The report of Sir Gareth Roberts' Review, April 2002, Recommendation 4.1

89 HM Treasury, 2002 *Spending Review, Opportunity and Security for All: Investing in an enterprising, fairer Britain, New Public Spending Plans 2003–2006,* para 25.8

90 Department of Education and Skills, *Making Mathematics Count,* The Report of Professor Adrian Smith's Inquiry into Post-14 Mathematics Education, February 2004, para 0.31

91 Fifth Report of the Science and Technology Committee, Session 2001–02, *Government Funding of the Scientific Learned Societies,* HC 774-I, paras 55-63

78. From 2003–04, in addition to the existing £1.25 million annual budget which is set aside for these purposes, a further £1 million per year will be made available among other things to fund the implementation of the recommendations from the science in society study carried out by the British Association (BA) on behalf of the science communication community, commissioned by OST and published in November 2002. OST held a consultation on the BA's proposals and published its response in September 2003. It suggests a number of new initiatives, which are set out in Table 6.

Table 6: Summary of proposed actions by OST.

Science in Society activities database	**Undertake a snapshot survey of science in society activities; establish, on a two year pilot basis, an activities database and web site**
National public surveys	On a biennial basis, undertake a national public survey which will seek to establish, inter alia, the public's participation in existing science in society activity; barriers to participation; the areas of science that interest them; their interests more generally; their awareness of specific areas of science; and their attitudes towards science and scientists.
Needs analysis	Undertake analysis comparing data from the two activities above (science in society provision against need).
Activity evaluation	Seek to establish best practice for evaluating science in society activities and commission research as necessary; further develop evaluation of activities we currently support, including National Science Week and the BA Annual Festival.
Special group research	Ensure that any public surveys we fund provide sufficient data on those groups who are under–represented in science in society activities; Continue to make projects that seek to widen participation in science in society activity a theme of the Copus grants scheme (funded in large part by OST) and include this theme within the OST grants scheme (see below).
Media monitoring	Produce an annual summary of media coverage of science.
Annual providers' conference/forum	Support the establishment of an annual providers' conference/forum; provide a networking fund; establish networking as a theme of the OST grants scheme.
OST work plan consultation	Consult on our science in society programme every two years to coincide with the Government's Spending Review cycle.
OST call for proposals	From 2004–05, consolidate OST grant support into one grant scheme and sub-contract the running of this scheme.
Evaluation of the process	Evaluate this new programme once it is firmly established.
Advisory group	Establish a Strategy Advisory Group to advise us on our programme.

Source: Office of Science and Technology, Implementation of the recommendations in the British Association report 'Science in Society', Annex 1

79. The second of the Science Base targets seeks to improve the impact of Research Council–funded research. We have found in our scrutiny of the Research Councils a need for greater coherence. The BA's Report addressed the science communication community more generally and the role that the Research Councils play is not explored fully. We

believe that Research Councils UK should consider the role they play and how a more collective approach could increase their activities in this area.

80. **We are pleased that the OST has developed a coherent strategy for science and society following the collapse of Copus. We will follow its progress with great interest. The OST must ensure, however, that gathering statistics is not a substitute for action. The UK needs a more effective dialogue on scientific issues and we are looking to the OST to provide the impetus.**

81. The GM debate has shown the importance of the scientific community, and the Government, being on the front foot when scientific controversies arise. The Government's decision to commission a study from the Royal Society and the Royal Academy of Engineering into the ethical and societal issues that may arise from nanotechnology was sensible. A useful activity for the Science and Society Directorate would be to provide a horizon-scanning capability to identify issues such as this in the future and to commission such studies.

11 Scrutiny of the Science Minister

82. While science and technology has been fortunate in recent years in having a long-serving and committed Science Minister in Lord Sainsbury, the House has been less well-served by the position being held by a peer. Although Lord Sainsbury has always been a cooperative witness before our Committee, we feel the House suffers by being unable to question him directly; science questions are handled by the Secretary of State for Trade and Industry. Members are also denied the opportunity to discuss issues of concern in more informal settings in Westminster. We note that the different arrangements for ministerial questions in the House of Lords mean that science questions are seldom raised in that chamber.

83. As a result of these concerns, we asked Lord Sainsbury whether he would be willing to appear before the Committee for a short period on a more regular basis. We are delighted that he has agreed to do so. This will give us the opportunity to discuss more current issues with the Minister. The first session took place on 9 February and covered a range of topical issues. This and future sessions will form the basis of future annual scrutiny Reports, as well as feed into our other inquiries. **We welcome the opportunity to question the Science Minister on a more regular basis. This will result in a more productive dialogue between Parliament and Government on scientific issues.**

12 Conclusion

84. Our formal remit is to scrutinise the Office of Science and Technology and its responsible Ministers. We conclude that in 2003, the OST has in general carried out its functions commendably. Many of our criticisms relate to its apparent inability to punch its weight elsewhere in Government and the Science Minister's apparent unwillingness to involve himself in discussions in other Government Departments whose policy decisions threaten the health and vitality of the Research Base. The Chancellor has recently placed science and innovation at the heart of his plans for Spending Review 2004. The Science

Minister should take this as his cue to make his presence more keenly felt throughout Government.

Conclusions and recommendations

1. We commend the Office of Science and Technology for commissioning research into metrics for the Science and Engineering Base. This will have been of no use if weaknesses identified by the work are not remedied, however. In particular, the Government must heed the warning that, despite increased investment through the Science Budget, UK Government funding for R&D is in decline relative to its international competitors and that UK's share of global publications is slipping. Having developed better measures, the OST should stick with them so that performance over time can be measured. (Paragraph 12)

2. We urge the OST to encourage all Research Councils to conduct a rolling programme of international reviews of disciplines within their remits to ensure that the UK retains strength in all research areas. (Paragraph 14)

3. We hope that the OST makes the Chancellor aware of the data on the Science Base compiled by Evidence Ltd and stresses that the UK cannot be the best place to do science, as he says he wishes, while investment lags behind that of its competitors. (Paragraph 17)

4. The Government has two choices, therefore: either it provides no information on the likely settlement for the Spending Review and leaves the Research Councils to make a case for what they feel the Science Base needs; or it provides clear and unambiguous advice. (Paragraph 19)

5. It is not clear to us how Research Councils UK can use the results of its consultation exercise to develop priorities for its Spending Review bid. The scope of the Research Councils' themes for the 2004 Spending Review would have needed to have been fleshed out before meaningful views could be expressed. (Paragraph 22)

6. We urge the Government to give priority to sustaining responsive mode funding in its settlement for Spending Review 2004. Scientists working at the cutting edge are best placed to identify the most fertile areas of research, not Government officials. (Paragraph 24)

7. We welcome the Academic Fellowship initiative which demonstrates that the Research Councils can directly intervene to create more stable careers for scientists. We believe that the principle of obliging universities to provide open-ended contracts as a condition of securing future grants could be more widely applied as a means for reducing the number of contract researchers. (Paragraph 31)

8. We welcome the introduction of the UK Research Base Funders' Forum and hope that it will bring much-needed coherence to public research funding and that it will result in careers in research becoming a more attractive and secure option. (Paragraph 32)

9. Research Councils UK has been a useful initiative. We look forward to further progress in collaboration between Research Councils and greater convergence in administrative procedures and structures. (Paragraph 37)

10. The establishment of the Science Review Directorate is a good initiative and we await its outputs with interest. We welcome the OST's commitment to publish the findings of the reviews in full. (Paragraph 39)

11. The new Council for Science and Technology deserves a chance to succeed but the Government must not waste another five years. The Government should put it on a year's probation and have the courage to abolish it if it is not working. (Paragraph 43)

12. The Government should acknowledge that the UK science community can benefit from the close proximity of large facilities, and that the prestige and profile of UK science can be enhanced. We urge the Government to provide the political will, and where necessary the finances, to support such ventures. (Paragraph 47)

13. We welcome the Government's recognition of the benefits to the UK from building ITER in Europe and urge it to press the French case. The decision will inevitably be a political one but the science—and thus the success of the project—must not be compromised. Already, Spain has been invited to host the administration of ITER if France is successful. We urge the Government to resist any suggestion that the ITER project should somehow be split between France and Japan. (Paragraph 50)

14. The Cambridge-MIT Institute is an interesting initiative and appears to be bearing some fruit, but the £65 million expenditure must be put in context. For the same amount of money, the Government could have provided the Biotechnology and Biological Sciences Research Council with around 5% extra funding over the same period. The investment is only slightly less than the combined cost of the stem cell and sustainable energy programmes in Spending Review 2002. For this reason, we reiterate the importance of making the evaluation of CMI available to us, in commercial confidence if necessary. (Paragraph 57)

15. It is disappointing that the OST will not publish submissions to its consultation on dual support before it publishes its response. It is normal practice for the Government to publish at least a summary of submissions before reporting. It is reasonable that, where the authors have given permission, submissions are published as soon after the deadline as possible. If the Government's decisions are seen to be made in an open and transparent manner, the evidence being used to inform that decision should be freely available as soon as possible. (Paragraph 59)

16. Charities such as the Wellcome Trust have made a huge contribution to UK research and it is important that their interests are represented at a high level in Government. We are concerned that the new Higher Education Research Forum does not include a representative from the research charity sector. We recommend that this oversight is remedied without delay. (Paragraph 61)

17. A more coordinated approach to policy-making is needed. Science and research are in danger of being over-reviewed, wasting the time of researchers and lecturers who feel obliged to make responses, and the uncertainty they engender is demoralising for these staff. We can only hope that as a result of these reviews on science, research and innovation a clear timetable for implementation is drawn up. (Paragraph 63)

18. We are concerned that the Government's piecemeal approach to research funding does not serve UK science well. We shall be monitoring developments in higher education science with interest over the next year. (Paragraph 66)

19. We welcome the fact that the OST is commissioning academic studies to provide an evidence–based approach to policy–making. It is regrettable, therefore, that having done so, the Minister is content to disregard a study's findings. (Paragraph 67)

20. The UK has a high level of research concentration. Should this trend continue, the UK risks whole regions being devoid of research capability in subjects, particularly the physical sciences and engineering, that underpin innovation. This undermines the Government's attempts to make universities the drivers of the knowledge economy in these areas because many universities that provide research support for regional and local industry and commerce would be starved of funding and their research would become unsustainable. In addition, the increasing prospect of debt is likely to force students to study nearer to home and the option to study physics, chemistry or engineering should not be denied them. It should be the Government's policy to maintain capacity in a full range of disciplines in each region. (Paragraph 68)

21. The Science Minister has accepted that many issues concerning science, research and higher education are interrelated. It is reasonable to expect that he provide formal input into the deliberations of Ministers in the Department for Education and Skills and be able to articulate the policy as a whole in giving evidence to us. His statements give us no confidence that these issues are being considered by Government in a coherent manner. (Paragraph 73)

22. The Government should consider establishing bursaries for undergraduates to study shortage subjects, such as physical sciences and engineering. These should cover the full cost of the charged top–up fee. (Paragraph 0)

23. We are pleased that the OST has developed a coherent strategy for science and society following the collapse of Copus. We will follow its progress with great interest. The OST must ensure, however, that gathering statistics is not a substitute for action. The UK needs a more effective dialogue on scientific issues and we are looking to the OST to provide the impetus. (Paragraph 80)

24. We welcome the opportunity to question the Science Minister on a more regular basis. This will result in a more productive dialogue between Parliament and Government on scientific issues. (Paragraph 83)

Formal minutes

Monday 23 February 2004

Members present:

Dr Ian Gibson, in the Chair

Paul Farrelly
Dr Evan Harris
Dr Brian Iddon
Mr Tony McWalter
Dr Desmond Turner

The Committee deliberated.

Draft Report (Office of Science and Technology: Scrutiny Report 2003), proposed by the Chairman, brought up and read.

Ordered, That the draft Report be read a second time, paragraph by paragraph.

Paragraphs 1 to 84 read and agreed to.

Resolved, That the Report be the Fourth Report of the Committee to the House.

Ordered, That the Chairman do make the Report to the House.

Ordered, That the Appendices to the Minutes of Evidence taken before the Committee be reported to the House.

[Adjourned till Monday 1 March at 4 o'clock.

Witnesses

Tuesday 20 November 2001 *Page*

Written evidence

Reports from the Science and Technology Committee since 2001

Session 2003-04

First Report	Annual Report 2003	HC 169
Second Report	Chief Executive of the Medical Research Council: Introductory Hearing	HC 55
Third Report	The work of the Biotechnology and Biological Sciences Research Council	HC 6

Session 2002–03

First Report	The Work of the Particle Physics and Astronomy Research Council *(Reply HC 507)*	HC 161
Second Report	Annual Report 2002	HC 260
Third Report	The Work of the Medical Research Council *(Reply Cm 5834)*	HC 132
Fourth Report	Towards a Non-Carbon Fuel Economy: Research, Development and Demonstration *(Reply HC 745)*	HC 55-I
Fifth Report	The Work of the Natural Environment Research Council *(Reply HC 1161)*	HC 674
Sixth Report	UK Science and Europe: Value for Money? *(Reply HC 1162)*	HC 386-I
Seventh Report	Light Pollution and Astronomy *(Reply HC 127, 2003-04)*	HC 747-I
Eighth Report	The Scientific Response to Terrorism *(Reply Cm 6108)*	HC 415-I
Ninth Report	The Work of the Engineering and Physical Sciences Research Council *(Reply HC 169, 2003-04)*	HC 936

Session 2001-02

First Report	Cancer Research – A Follow-Up *(Reply Cm 5532)*	HC 444
Second Report	The Research Assessment Exercise *(Reply HC 995)*	HC 507
Third Report	Science Education from 14 to 19 *(Reply HC 1204)*	HC 508-I
Fourth Report	Developments in Human Genetics and Embryology *(Reply Cm 5693)*	HC 791
Fifth Report	Government Funding of the Scientific Learned Societies *(Reply HC 53)*	HC 774-I
Sixth Report	National Endowment for Science, Technology and the Arts: A Follow-Up *(Reply HC 276)*	HC 1064
Seventh Report	The Office of Science and Technology: Scrutiny Report 2002 *(Reply HC 293)*	HC 860
Eight Report	Short-Term Research Contracts in Science and Engineering *(Reply HC 442)*	HC 1046

Oral evidence

Taken before the Science and Technology Committee

on Monday 10 November 2003

Members present:

Dr Ian Gibson, in the Chair

Mr Robert Key
Mr Tony McWalter
Dr Andrew Murrison
Geraldine Smith
Dr Desmond Turner

Witnesses: **Lord Sainsbury of Turville**, a Member of the House of Lords, Minister for Science and Innovation, **Professor Sir David King**, Chief Scientific Adviser, and **Dr John Taylor**, Director General of the Research Councils, examined.

Chairman: Thank you, Lord Sainsbury, John Taylor and David King, for coming along today. I am well aware that there are probably going to be divisions in the Lords as well as the Commons and the large ensemble behind you will have to take it as not being impolite; we are doing our duty. We wanted to take up some of the issues today that we pick up from practitioners in science up and down the country, the issues the Committee has raised in its reports, but also talking in various meetings in places up and down the country. I wanted to start off with the Lambert and Innovation Reviews.

The Committee suspended from 4.31pm to 4.39pm for a division in the House

Q1 Chairman: We were expecting the Lambert and Innovation Reviews over the summer and they were delayed.
Lord Sainsbury of Turville: Yes. We had thought late summer would be the period for producing both of these. In the event, they both proved more complicated, particularly the Innovation Review, because it involved other government departments and policies which go across government. Getting agreement on these is more difficult than just working with the parameters of a department. In terms of the ability of the whole of government to make a real impact on the innovation agenda, it is very important that we do have this cross-government look at things. When it comes out, which will be probably within this month, I hope you will see that it has been time well spent.

Q2 Chairman: Will it be in time for the higher education debate which is rumoured to be soon after the Queen's Speech, which brings up aspects of higher education and its interaction with the innovative process? It would seem a shame if the Lambert Report was not part of that debate, would it not?
Lord Sainsbury of Turville: I am not quite certain of the exact timing of it. Clearly, it does relate to that and it has important aspects for that, ideally.

Q3 Chairman: You would have hoped it was here before the Queen's Speech? Higher education is not just about top-up fees, or is it?
Lord Sainsbury of Turville: You would have to tell me that. I think it is going to be about almost exactly the same period. On the current plans, it will be late November.

Q4 Chairman: There are an awful lot of inter-related reviews floating about at the moment. We have the Lambert, Innovation, Research Assessment, Dual Support, Teaching Funding, Research, Funding Method. Do we need this many? Can we not put them all together in any way?
Lord Sainsbury of Turville: It is clear that they interrelate a great deal. We have a ministerial committee looking at this which will pull together all these reports because they do interact to a very great extent. It is probably right to do the different reviews but when you come to make decisions on them you need to pull them all together and look at it in an interrelated way.

Q5 Chairman: You are saying that is being done?
Lord Sainsbury of Turville: That is being done.

Q6 Chairman: An issue that is enjoined at the minute is the new HEFCE funding proposals, the cost weightings for teaching different subjects. Is this an issue within your remit or is it the Minister for Education's remit, because they are complaining out there that they are going to get fewer subjects because of the new weighting formula.
Lord Sainsbury of Turville: That is very firmly part of DfES's responsibility.

Q7 Chairman: You have no input into that whatsoever?
Lord Sainsbury of Turville: No formal input, no. These are things that are discussed but it is straightforwardly a DfES and HEFCE responsibility.

Q8 Chairman: The next question is about top-up fees. Do you see them having an influence on the sciences? The higher education spokesperson said once on Radio 4 that he could foresee that physics

might have to charge less than mediaeval history, let us say, because that would entice people from all sorts of backgrounds to get in. Do you agree with that principle? Do you think that is the way to get people to do physics?

Lord Sainsbury of Turville: There are two different issues. One is you need to make certain that universities can cover their costs of doing a subject. The second question is to what extent the scale of the fees will alter people's desire to do it. These two decisions get interrelated. You cannot say, from the university's point of view, "We will charge virtually nothing" because you need to get people in. Universities are going to have to make some difficult decisions on this and it is going to be very important that they do not take a short term view about it.

Q9 Chairman: Are you signed up to the government policy on higher education fees in terms of developing the sciences in this country? Can you foresee the sciences suffering at all?

Lord Sainsbury of Turville: No. They are likely to benefit because having the sciences properly funded has to be a major concern of any Science Minister.

Q10 Chairman: Are you a Richard Sykes fan, £17,000 a course or 3,000 or 2,000? Where do you sit on that? The more the better, or what?

Lord Sainsbury of Turville: I am not in the best position to make those decisions.

Q11 Chairman: Surely you have to have, as spokesperson for science, some view on this about the development of sciences in an education paper which might become policy, which can influence the number of people going into the sciences?

Lord Sainsbury of Turville: Yes, the particular situation of individual subjects is going to be to some extent within the remit of universities to make decisions. There is the overall policy which I think is right. Within that, it seems to me, it is for universities to make decisions.

Q12 Chairman: You are happy to leave it to individual universities like Imperial, charging 10,000 and another one charging 3,000 for a very similar course?

Lord Sainsbury of Turville: If they are very similar courses, you will not be able to charge that kind of differential.

Q13 Mr McWalter: I think it is astonishingly laid back. I really do. You said in your response to us about closure of science and engineering departments in recent years, "Oh well, the biggest problem in recruitment on science and engineering courses and subsequent closure of university departments is lack of demand from potential students." It seems to me astonishing that you do not feel there is any way in which you can have some input in changing that. In my local university, which was founded as a polytechnic, as a national centre of excellence for engineering, civil engineering has shut; chemistry has shut; maths can only be done as a service course; physics can only be done because it ties in with astronomy and people like doing astronomy. There is carnage all over the system. My colleague from Salford University has seen his chemistry department shut. Meanwhile, we have 700 students doing business studies and almost none of them has gained as much as a bean in 'O' level maths. Demand means low cost courses where students believe there is a very low probability of failure and they have no conception of the kind of benefits that they could get and give to the rest of society if they have a talent but have not done science courses. Meanwhile, you are sitting there saying that it is just a matter of demand. Market forces. That is what you believe in, is it?

Lord Sainsbury of Turville: If you think I was being complacent, I think that is to misrepresent my position. I think this is very concerning. It is not concerning about the total number of people doing science, but within science there is this bias which I think is very serious. It seems to me the way we have to change that is by changing people's approach to those particular subjects. It is not that people are not going into scientific subjects; it is that they are going into particular areas of scientific research and what we have to do is change their view of the important subjects to go into.

Q14 Mr McWalter: You could offer subsidies; you could offer scholarships; you could offer a dynamic way of linking in the financing system with the skills that society demands. None of this is happening. It is not just with sciences. We are not getting social workers either because that is not so well remunerated as business. Is there not a role here for government to be much more proactive about these matters?

Lord Sainsbury of Turville: It is not in our gift to say what the salaries of people are going to be. As a whole, engineers and scientists have rather good salaries. There is a big communication exercise in making certain that those areas which are essentially physics, chemistry and maths are seen by young people to be more exciting and relevant than they are today. We have lots of people going into biology and IT. Why? They are going in because they see those as being the exciting subjects of the future. I think there are equally exciting things going on in the physical sciences and in chemistry. We have the whole development of speciality chemicals. We have nanotechnology. We have a whole series of very exciting subjects and we fail to generate excitement about those.

Q15 Mr McWalter: You do not need to tell me this stuff is exciting, relevant or important. You have a system in which each university takes its own decisions. Each university looks at the fact that some courses are very low cost indeed and they can pile the students very high and sell them very cheap. The result of that is that the subjects where they cannot pile people so high and where there is a higher probability of failing to graduate—taking a maths degree is a tough business; you might fail it. You will not fail business studies, or you are unlikely to—and as a result people are voting that way. They want to

be a graduate first and worry about the discipline afterwards. Each university takes a decision and the result of that is that the whole system is leading to an utter lack of capacity. You say you will keep that under review. How are you going to keep it under review?

Lord Sainsbury of Turville: We are probably producing the highest number of science and engineering graduates, other than France, in terms of the number of scientists and engineers with first degrees. It is not simply that we are not producing enough scientists and engineers. It is the balance of this. I cannot see any value or merit in trying to say to universities, "You have to run courses in which you are not getting people to do it." In terms of the powers of the government to do that, they are extremely limited. How can we hold universities responsible for their finances if we start telling them they have to run courses where there are not individuals there? The thing that drives it has to be what the young people want to do.

Mr McWalter: Film studies. Thank you.

Q16 Chairman: SPRU at Sussex have come out recently with an examination of the results of greater selectivity and concentration of research. There was a group from Leeds as well, I seem to remember. They have said it will not result in economies of scale and it will not serve our science base very well. It will all be concentrated in the south of England and excellence will concentrate in certain places. Does that worry you? Does it give you heartache? Universities UK have said that too. They are concerned about hiving off a research concentration into certain universities.

Lord Sainsbury of Turville: If you look back over the last 10 or even 20 years, you will see that in terms of where the research money goes there has been a fairly steady increase in the amount that goes to the top universities. That is not a question of policy decision; that is a question of what happens if you just accumulate all the decisions made by the research councils. I suspect that reflects some underlying economies which do come from the big research based universities and the fact that it is much easier to do multidisciplinary research with very good people in those settings. I think there is going to be some concentration taking place. The extent to which that is a concentration in the south east of England I am not quite as certain about as other people. If you go round the country, you will find that the top 25 universities have something like 75% of research money. There is one of each of those universities in every region in the country. If you go to the north east, for example, it is not at all clear to me that the universities we have in the north east are not of a very high standard and quite able to hold their own in this world, as indeed in the north west.

Q17 Dr Murrison: The GM debate has come up for a fair amount of criticism, I think it is probably fair to say. I wonder what learning points you have derived from the way in which the GM debate has been conducted?

Lord Sainsbury of Turville: I am not allowed to speak about GM.

Professor Sir David King: Can I broaden the question to include the strategy unit strand, the GM science review strand and the GM debate?

Q18 Dr Murrison: I would rather you just talked about GM.

Professor Sir David King: Each of these is a strand of the GM—

Dr Murrison: Yes, but if you could keep it fairly focused I would be grateful.

Q19 Chairman: Answer in your own way, Professor.

Professor Sir David King: I would find it very difficult to comment on the value of the GM debate without also commenting on the other two. It is critically important to see that the GM debate was a part of a bigger process. We have conducted through the GM science review what many people around the world are writing to me and saying was a unique kind of review. We have broken new ground in doing that. We managed to have a broad range of scientific opinions. As a matter of fact, today I have just been charing another seven hour session of that panel. We managed to use that broad range of opinions to bring the best science to bear to questions raised in the public debate. From the public debate side, the core Willburn report was produced which generated about 19 cogent and coherent questions. We addressed each one of those questions in that report. If you ask me do I think that was valuable, I think it was invaluable as a way of informing government. I do think this government is now better informed as a result of those three strands than any other government in the world currently on these issues.

Q20 Dr Murrison: There are 114 scientists who recently wrote to *The Times* to complain at the way that the debate had been managed. I was wondering whether you empathised with those scientists or whether you felt that they were out of order?

Professor Sir David King: Far be it from me to say they were out of order, but their comments were directed at that one strand, the GM debate strand. I am in the middle now of drawing together the GM science review to look at what the GM debate raised in terms of what further science we can bring to those questions. I am not going to comment myself on the GM debate until we have finished reporting, but my response to that has been published last week in *The Guardian*. My response in general was to say that I felt the letter was misdirected at the Prime Minister. It seemed to indicate that the Prime Minister was not supportive of science and that the exodus, as it was labelled, of GM scientists from this country was something to be laid at his door. I think the very fact of organising these three strands, of making an essentially big investment of government time and effort in the way we have dealt with it, indicates how important it was seen to be in government but also it must be seen that the government was neither taking a pro-GM or an anti-GM stance. That would

be wholly to simplify our response. As you know, the way we might simplify it is by saying that case by case is how this has to be dealt with.

Q21 Chairman: Do you not think your answer in *The Guardian* though was saying more than anything how well British science was doing? It did not address all the strands of the GM debate as such, where your first paragraph started off as a reaction to the 114, which was quite specific. Then you went on to tell us how well we were doing and a bit about the science of the GM debate but nothing much about GM in the context of international agricultural policy, global photosynthesis and all of those issues that are bigger visions where GM might fit in. You did not have any view on that.
Professor Sir David King: My view on that I have just expressed and I hope I can clarify that by saying I do think that the GM science review report, part one—and we are now preparing part two—does carry the whole debate onto a new plane. I do think this is ground breaking so if you are asking me are we in a better position now I think I have answered that very clearly. I believe we are.

Q22 Dr Murrison: Do you think that debates of this sort are likely to be hijacked by special interest groups in the context of the GM debate? It has been said that perhaps the green lobby has had an undue bearing upon this. Clearly, they are interested in the subject. If you do think that, what steps can you take to moderate the opinions expressed so that you produce a balanced report at the end of the day?
Professor Sir David King: I am going to back-track from your question and point out the response of the strategy report which is in essence whether or not farmers grow GMs is not only a question of European Union and government decision making; it is also a question of whether they will see the commercial value in doing this. Whether you have a commercial value or not is going to depend on what the consumer thinks. Since the NGOs that you are referring to have big sway with the consumers, whether they are minority groups or not, they are groups whose views need to be addressed.

Q23 Dr Murrison: They are not representative in any way. They are pressure groups. Whether one agrees with the green lobby or not, one has to accept that they have had a weighty bearing on this debate and we need to have a balanced report or view expressed. The question is how do we go about balancing that to reflect the views of what one might call the moderate, mainstream majority.
Professor Sir David King: I agree that is the question and once we have all got the answer let us proceed down that route.

Q24 Dr Murrison: Can you think of any other similar debates perhaps in the scientific arena that might be addressed in the way that we have addressed the debate on GM?
Lord Sainsbury of Turville: Could I make a comment on your original question which is what should we be learning from these different debates? What we should be learning is that it is extremely important, very early on in these situations, to consider these questions and indeed it is very important for scientists to be concerned very early on with the issues of whether there are particular ethical, health or environmental impacts which come from new technologies. It was because we had done that thinking early on that, for example, in the stem cell debate, we have a much more balanced and sensible debate in this country probably than anywhere else in the world. That can be attributed to the extraordinarily good work which was done on in-vitro fertilisation by Baroness Warnock, going back now 20 years. That is why in the context where nanotechnology was raised as an issue I asked the Royal Society and the Royal Academy of Engineering to do the work, to look at whether there are ethical, health or environmental issues there which would require new regulation or legislation which currently does not exist. That is to me about learning the lessons of the past. You need to do these things upstream and not wait until they impact on the public, because the public will be very concerned if they feel these things have not been thought through by the scientists, particularly early on.

Q25 Dr Murrison: I think probably in a tangential way you are answering my last question. I was wondering whether you saw any other fields that might be approached in the same way that we approached the debate on GM.
Professor Sir David King: Nanotechnology would be one. The basic answer is that you want to be on the front foot, not on the back foot. The government and the public might have been in a better position on GMs if we had discussed this 15 years ago.

Q26 Chairman: What is the essential problem, do you think? Why did we not discuss it? Where is the essential weakness in the whole process of the government, public and science interactions?
Lord Sainsbury of Turville: We have learned. It was not as clear 15 years ago that in these particular situations you do need to think very carefully early on. That is one of the things we have learned from these debates.

Q27 Chairman: Who needs to think early on?
Lord Sainsbury of Turville: Both government and scientists. I do not think this is purely an issue for government because there is an extremely important role for scientists early on to think very hard about the scientific basis of these particular issues I have been talking about. There is not much point in having a debate on nanotechnology unless someone has very seriously thought about what are the environmental impacts, because otherwise one just has a debate which is not based on any credible science. It is very important that the scientists come in early to try to reach a consensus about the actual science.
Professor Sir David King: Could I back up what Lord Sainsbury has just said by reminding you that BBSRC met in 1994 to discuss GMs in relation to possible public responses and did pinpoint this as an

area where some sort of public debate was required, but this was not picked up at the time. This underlines the point that the scientific community needs to draw attention to this but the political system needs to follow through as well.
Dr Taylor: Another example is the current activity going on under Foresight, looking at the future research on cognitive systems between brain science, neuroscience, on the one hand, and artificial cognitive systems on the other.

Q28 Chairman: What do you think of issues like, for example, the man and woman on the terraces who would say, "What is the point of putting something on Mars on Christmas day and all the money that has gone into that?"? How would you justify that to them, if they knew?
Lord Sainsbury of Turville: The man or woman in the street, you will discover, on Christmas morning if this thing lands and works is very enthusiastic about it because people see this as an exciting area of science. There is the basic question that you always have to answer, which is when you are doing basic science what is the justification for it? There I think you have to say to people, "The issue is, if you want downstream the benefits of science which everyone can see, you have to understand you will not get those unless you put in the research and the money to understanding the basic science of any area, because you will not get the applied research unless you know the fundamental science."

Q29 Chairman: If you were teaching an 'A' level class and they asked you, "What was the whole thing about getting on the moon, Neil Armstrong and all that? What advantages did that bring to human kind?" what would you say?
Lord Sainsbury of Turville: I would say none whatsoever. It was a purely political gesture.

Q30 Chairman: It cost a lot of money.
Lord Sainsbury of Turville: It cost a lot of money and it may have captured the imagination of people but its scientific validity is negligible.

Q31 Chairman: Mars is not going to be like that. We will wait and see.
Lord Sainsbury of Turville: There is a real scientific issue with Mars and this is space exploration which will really answer questions. The point I was making about a man in space is that it is an extremely expensive way, in most cases, of answering scientific questions. That will become increasingly clear in the future. Space exploration done by robotic means, which is what we are quite good at in this country, is a much better way of doing it.

Q32 Chairman: Let us talk about research contracts. You will know this Committee put out a report which was welcomed by many people, not least the thousands of research contractors up and down this country. Do you think much has happened since we raised those issues and the media picked up on them? Do you think we have too many research contractors or too few?
Lord Sainsbury of Turville: I think it is undoubtedly true that we have too many people on contracts for research. That goes back a long way to periods when people were very uncertain about the funding of universities. If you look over the last 20 years at the numbers of people teaching and doing research at universities, the entire increase has been picked up in terms of contract research staff. I do not think that is an efficient way to do it. It was done by vice-chancellors because it gave them flexibility. It has taken a lot of time to wean people away from that kind of approach, but the European Directive will probably make it inevitable that we do move away. We are greatly helped by that Directive.

Q33 Chairman: If you were in front of an audience of research contractors and they said, "What has changed since you became Minister?" what would you say is different and will make their future lives or contracts better? The European Directive?
Lord Sainsbury of Turville: The European Directive is bound to make a difference.

Q34 Chairman: It is one we are going to obey, is it?
Lord Sainsbury of Turville: We obey all of them. That is sometimes the problem.

Q35 Chairman: We are very slow in responding to some of them.
Lord Sainsbury of Turville: This one is very important and we will. I think that will make a huge difference. The work that Gareth Roberts and others have done already on this at least has made certain that vice-chancellors and others are aware of this issue. There has been some movement to try and move away from this, although it is not as quick as I would like.

Q36 Chairman: There is not a graph which shows me over 10 or 15 years how the research contract numbers are going to go down in Gareth Roberts's report, or have I missed it? Somebody has to say there are too many and we are going to move it that way. A government obsessed with targets seems very reluctant to have a target in this area. Why is that?
Lord Sainsbury of Turville: I think it would be very difficult to establish exactly what level it should be at.

Q37 Chairman: That is what you are paid for. You are paid to make that judgment, are you not, as to where we should be taking it? You are not paid, I know, but if you were.
Lord Sainsbury of Turville: I do not think that would alter my sense of what I should be doing. As a whole, I am not certain how you would make that calculation because it is to do with flexibility and so on. I have no hesitation in saying it is far too high and we should try to bring it down. I have no doubt it will just have to come down because of the European Directive.

Q38 Chairman: You do accept there is a suspicion in that community who want to go into that arena of scientific endeavour without showing positively where it is going to be that they might be discouraged from taking up a career?
Lord Sainsbury of Turville: Yes. There are all sorts of issues here on top of it being a career directive, but we have to get it down, for sure.

Q39 Chairman: The £12,000 that was put into recruitment was very welcome. It was a huge sea change and recognised the problem. Has it made any difference to recruitment? Have you measured that yet? Are we getting them queuing up?
Dr Taylor: I do not think we have data that you can ascribe to the change in that.

Q40 Chairman: Are you collecting data though?
Dr Taylor: We shall be collecting that data but one of the key issues there is not so much numbers as quality. It is the quality that is harder to assess. What will be happening over the next two or three years is looking at how the attraction of the top quality people is affected by the stipends and also how we are able to target areas of shortage and areas of difficulty, which is just starting up now.

Q41 Mr Key: There are some concepts in science that are just so huge, so long term, so expensive, with so little immediate, practical application that it is really challenging for any ministers to say, "Chancellor, you must fund this." How are we doing with the European spallation source? It seems to me that this is one of the most important areas of British scientific research and indeed European and global scientific research but I am not convinced that the government really thinks it is important. Perhaps all ministers, especially the Chancellor, should visit Culham or Rutherford Appleton and see what is going on there. Can you reassure us about this? Would the UK want to bid for the European spallation source?
Lord Sainsbury of Turville: We are in a new world on this in that we do now have a 10 year road map of the projects that we think are the priority projects. We used to just take them one at a time to try to avoid doing anything when they came up, but we no longer do that. On the European spallation source, there is a real issue as to whether the best strategy is to go now to the next generation or to extend what is currently being done. As a whole, the best opinion is that we should upgrade what we have here and abroad and that a next generation will come within five to 10 years, as a likely time frame. The policy we have is that we cannot in this country give access to our scientists to all the equipment they would like to use. We have to say that some things we will do on an international basis. In some cases we will produce it and let other people use it. In other cases, it will be done abroad and we will use it there. In the European spallation source, this is a case where we should be playing a very active part in the decision about what should be done next, because neutron sources is one of the areas where we have world leading competence. It should be one of the areas we look at very seriously, where we might be the leader in doing this. That is why I have said that we must take the leadership role in this debate because it might be one of the areas which we should take a lead on. There are a large number of decisions that would have to be made before we get to the point where we say to the Chancellor, "This is one where we are going to need some extra money." The first is what is the next generation going to be. Do we want to bid for it? What resources will that involve us in and there are other decisions down the line as to where we put it and so on. The key decision at the moment is are we taking a leadership role in that debate and the answer is we are now. I think CCLRC are holding a conference early in the new year, bringing together people to have that debate.

Q42 Mr Key: I wonder if Dr Taylor could tell us a little more about that?
Dr Taylor: CCLRC has the lead role for providing neutron facilities, alongside others, for anybody in the science community who needs to do that. We can be under no doubt of the importance that we attach to providing those neutron facilities because we funded both the ISIS extensions to continue to provide the research community in the UK with absolutely leading facilities. We also put additional money into ILL in Grenoble alongside so the provision of neutrons in the short to medium term is right there. Those actions are agreed by all of the European partners. Everybody has said those activities are the first priority for the future of neutrons. We have been doing a lot of canvassing and discussing around Europe at the timing of ESS and we have asked CCLRC to consult widely with potential providers and also with the science community to understand what the real time line for producing the next generation source is going to be. In the context of the large facilities road map, where we have tried to lay out the various different claims on large scale funding in the future, we want to position the ESS issues there alongside all the other things they will have to compete with.

Q43 Chairman: Could we ask you about the mood around the research councils, which has been described as "gloomy"—I am not sure that is true—about the SR2004 spending review? Would they be justified in thinking that about the spending review? How successful are you at lobbying on behalf of the community? You have been successful in the past, undoubtedly.
Lord Sainsbury of Turville: There is no doubt this will be an extremely tough spending review. That has been made very clear to everyone, even government. Within that, we think there are some extremely important things to be done for the science base and also in terms of innovation policy within the DTI. We will be arguing strongly for that, but I do not think we should be under any illusions. It will be a very tough spending review.

Q44 Chairman: Have you even thought the amount of money you have asked for might be revised downwards?

Lord Sainsbury of Turville: I do not think we have any indication one way or the other.

Q45 Chairman: You must have had nods and winks, Minister, surely?
Lord Sainsbury of Turville: If there were nods and winks about it going down, I would simply ignore those. I do not think I have had any nods and winks about it going down. Equally, I have not had nods and winks about it going up either.

Q46 Chairman: If there was a debate, would you keep the funding levels of the research councils up and scrap the big enterprises? How would you handle that situation? What is the policy, if you had to cut back?
Lord Sainsbury of Turville: The cross research council themes?

Q47 Chairman: Yes.
Lord Sainsbury of Turville: I would personally be very loath to reduce the cross research council themes because that is the way of the future. Getting this multidisciplinary research is one of the excellent things that has been done in recent years. I do not think that would be where I would make any cuts if I had to, which I do not want to do.

Q48 Chairman: Have the Treasury said to you that they are very pleased with the investment that has been made over the last few years through the spending reviews, or have they not said anything, or what? How have they looked at the money that has gone in? Do they feel it is money well spent? Have you been patted on the back by Gordon Brown and the Treasury?
Lord Sainsbury of Turville: I do not think that is how it works.

Q49 Chairman: How does it work?
Lord Sainsbury of Turville: They certainly would not pat you on the back because that might be interpreted as committing them in some way to more money in the future. They have not made any criticism either, so I conclude from that that they are satisfied that this money has been well spent.

Q50 Chairman: Is there anything specific where you would say particularly well spent, where we should be proud and it has been worth fighting for? That would be handy for us because we all get asked where the money has gone and what has been done with it. What would you highlight as the big successes?
Lord Sainsbury of Turville: There are some areas where we are putting in the investment now which will keep us at the leading edge. I give as an example the e-science programme which I think has been extraordinarily successful and is making this country probably the leader in e-science and the grid. Not only do I think we have been doing some extremely interesting work on this, but I think it has been seen by other countries as a model of how you do this. We also have 70 companies now involved in the programme which the DTI has funded alongside this. You have companies like IBM saying that they will put worldwide research into this area into this country. That is an example where John's championship of e-science has proved extremely valuable.

Q51 Chairman: This may be the last time, John, we face each other here. I am sure we will miss each other dearly. Would you like to add to that as you come to the end of your regime?
Dr Taylor: In terms of things to highlight from the science point of view, it is not just cross council programmes involving all the councils; it is the way that the councils have moved towards identifying that several of them need to work together to do something which they, between them, believe is very high priority. Whether that is the new energy programme, genomics, a range of new things that are coming along the pipeline, there are a number of areas where increasingly councils themselves are saying that doing these things together is absolutely key to the way that we see science going in the future. We will publish quite a major document in December which is the councils' view for where they see science going between them, not matched by individual organisations, and I think that is going to be a very sound foundation for the spending review bids and negotiations.
Lord Sainsbury of Turville: If you take those three programmes which were the 2002 e-science, the genomics and the basic technology, they have all been extremely successful. The basic technology one has been a huge success. I think there are something like 400 projects in there, all about addressing this area of basic technology which will be extremely important in the future. Again, another area where there has been some real momentum given to it.
Professor Sir David King: Faced with your question, I was scribbling down "infrastructure" because one of the areas that had become absolutely dilapidated in our higher education institutions was the infrastructure for research. That is the most clear benefit that has emerged. There are many areas of science which are turning out to be utterly brilliant but I would always caution against the timescales involved, in terms of the science investment and the return on that investment. Certainly in terms of the last spending review, for most of the science and its emergency, it is too early to say.

Q52 Chairman: In terms of convincing the Treasury and getting a good response next time, what about responsive mode funding? Where does that fit into it all? How successful has that been, having mentioned that as one of the defined things you have done?
Lord Sainsbury of Turville: I was not making a particular distinction. My own view is very much that this is a question of balance. We need very good responsive mode funding and we need some directed funding in almost all the research councils. Sometimes they have drifted off, one way or the other, to try and make it all responsive mode, or they have fallen into bits too much through directed and own institutioned. Both of these are usually a mistake; it is the balance which is the key to it.

Q53 Chairman: Do you think the Treasury is asking too much to get some kind of result in three or five years? Do we need a longer time span given what you said, Professor King? What time span do the Treasury work within or do they say, "That is it. You have had long enough. Shove off. You are getting no more"? I am sure it does not work like that.
Professor Sir David King: My belief is that the Treasury has a very sophisticated view of investment in the science base and in the long term process that we are talking about. We have measures and we can see how well we are doing. We can put that into the Treasury in terms of citations, publications and so on. On these measures, the UK is retaining a remarkably high international profile. We are also looking at measures in terms of wealth creation, in terms of improved science policy generation and so on. All of these measures are there; it is a matter of following these measures as a function of time and understanding the long term nature of the investment.

Q54 Chairman: But the Treasury does not operate like that, does it? It works on three or five year cycles for results, does it not?
Professor Sir David King: I believe that number 10 and number 11 have a long term view on this.

Q55 Chairman: Long term? 20 years?
Professor Sir David King: 10 or 20 years.
Lord Sainsbury of Turville: We can also point to certain areas where the thing is beginning demonstrably to change. The question of knowledge transfer from the science base demonstrably has shifted. There has been a big cultural change in our universities and some very exciting stuff is now coming out of that. I would also argue that there is an interaction between the money that goes into the science base and what happens in companies. I do not think it is totally coincidental that as we have moved up the funding of the basic science so we have turned the corner on the question of business R&D. Business R&D is an absolutely key indicator of the innovation and the economy. Having been going steadily down, it has now flattened out and is marginally beginning to go back up. That is partly due to the fact that we are putting more money into the science base.

Q56 Mr Key: One of the most interesting projects you have undertaken in recent years is the Cambridge MIT programme, but you have been pretty tough on them. I was quite surprised in the policy document *Investing in Innovation* that you said the government would continue to require substantial dividends in the form of enterprise, education and research for the UK in return for continued backing. That was a couple of years ago and there are only two years to run now. How will you measure that dividend?
Lord Sainsbury of Turville: There are a whole lot of areas where you may not be able to quantify it economically, but you can see whether it has been successful or not. One of the most obvious ways is to the extent that they are influencing knowledge transfer and education in other universities. It has been disappointingly slow to start with but I think it is now beginning to really move forward. We have two excellent directors, one American, one British. Just take the knowledge integration communities which are now being set up, which are all about this area of knowledge transfer. We have four of these in the areas of silent aircraft, systems biology, basic computing and connected worlds. I think these are beginning to be the kind of projects which could be hugely influential in the future in changing some of the ways we do things on knowledge transfer.

Q57 Mr Key: The big problem we have is we do not really know what is happening on there in the programme because, in answers to Parliamentary Questions, we are told that the Department has commissioned a review into this but that it is on a confidential basis, so we do not know what is happening here. It all seems a bit secretive. Is there any reason for that? Why can we not be more open about this?
Dr Taylor: I think CMI themselves have been doing a lot of very open communication about what they are now setting out to do with KICs for example, with their knowledge transfer networks and with their undergraduate programmes, and we have been really encouraging them very strongly to do that. They are also now working on specific metrics focused around the question, "What are the things that you will have done that only could have happened through this style of collaboration between the two institutions?"
Lord Sainsbury of Turville: I do not think we need to worry about this. There is a National Audit Office report being done now on how CMI was set up, monitored in the first two years, and an on-going evaluation of CMI's performance. There is a draft report in preparation and it is going to be published before the end of the year, so I think that should give you a very clear evaluation of where we have got to.

Q58 Mr Key: But, Minister, the information you are giving to the NAO is not going to be based on the premise that quite a lot of it is confidential.
Lord Sainsbury of Turville: I do not think you have that option with the National Audit Office, do you?
Mr Key: I am relieved! Thank you.

Q59 Dr Turner: It is clearly too soon for you to state whether it has actually been a success or not. Leaving that aside, have you considered extending the principle and, perhaps, marrying Oxford with Stanford or Princeton with Norwich—if they get terribly desperate? Do you think that it was a pity that the original proposal was not put out to tender?
Lord Sainsbury of Turville: We are very keen to see as many of these international linkages between universities in different countries, and there are a whole series of these now which we would wish to encourage to go forward because I think linking universities across the world like this is very productive in terms of research and also has quite a lot of educational benefits. Of course, there was

never any question of it being a tender situation for the MIT Cambridge proposition because MIT made it very clear there was only one proposition on the table which they were interested in which was a link with Cambridge. The decision was, "Do you want to do it, MIT Cambridge, or not?" There was not any other option.

Professor Sir David King: I think it is too early to evaluate whether CMI is a good model to take forward. As Lord Sainsbury said, it got off to a slow start, and I think we are all aware of that. However, I have been over to the States and of course I do know Cambridge quite well. I think it is now absolutely in top gear so whatever was going to come out of it is likely to happen over the next couple of years and that is how we should judge it. What will emerge, and here I support Dr Turner's point, is that it is going to be quite difficult to measure because it is very largely a meeting of two cultures, and the lessons that are learned from that is going to come from how well those two cultures pick up best practice from each other and how much of that is transported, but certainly I would stick my neck out and say right now that the undergraduate exchange part of the scheme has gone exceptionally well. I have talked to groups of undergraduates from both sides that have spent a year in the other institution, and both in terms of their culture shock and transition and also in terms of how the teachers of those students have learned from the process, already quite a bit has emerged.

Q60 Dr Turner: Do you have any concern that MIT might be getting more out of this than the United Kingdom? Have you got any further plans for expanding US university activities into Britain—not necessarily on the same model? You might want to look at different models.

Lord Sainsbury of Turville: There are quite a lot of universities—I cannot give you the names of the various groups but there are certainly a whole series of other links.

Dr Taylor: Princeton and Stanford.

Lord Sainsbury of Turville: I do not think we have put any resources into them but I think they have been established. My impression is they have been rather useful. There is certainly one which links Southampton, Oxford and a whole series of universities in America which sounds to be extremely productive.

Dr Taylor: On the CMI model, I think one of the other things we will certainly be monitoring as it goes forward is it has provided an opportunity in the knowledge transfer context to identify very early on collaborative research which is very likely to lead to something exploitable, and to try a new model of knowledge transfer which is getting alongside such a project very early on, rather than waiting until the research is done and going through the classic knowledge transfer material after that. So I think that will be an interesting thing to look out for.

Q61 Dr Murrison: Earlier this year, OST published their dual funding review which is called "The sustainability of university research consultation on the falling parts of a dual support system", which I understand came up for some criticism from the Wellcome Trust. In particular, they were concerned about the lack of co-ordination between OST and HEFCE. Do you think that specific criticism was reasonable or not?

Lord Sainsbury of Turville: We have broken these issues down into a number of different studies. As I said at the beginning, we are now pulling this all together because I think you do need to. This is really where we go on the RAE and where we go on the sustainability argument, and the third question is really how do you take account of what I think is a common desire to incentivise closer working between the research base and industry, and I think you cannot take these three issues separately which is why we are now trying to pull them together, having done the consultations through a ministerial group.

Q62 Dr Murrison: Do you think that pressure on universities to recover the full costs of research will lead them to turn down charitable funding or not?

Lord Sainsbury of Turville: It turns obviously on this question of partly how government money is put into the system and whether that is seen as providing some of the overhead and infrastructure for charitable funds. Clearly, if they do not get any of their overheads, they have to look very carefully at that in terms of their total overview of it, but trying to get more and more the different funding bodies funding on the same basis is clearly a good way of trying to get efficiency into the system.

Q63 Dr Murrison: I wonder what assessment you have made of the likelihood that major research charities might decide to move their funding overseas as a result of the changes proposed?

Lord Sainsbury of Turville: That is obviously always a possibility, but we talk to them a great deal and I think it is very important that the government is seen to be playing its part in providing things like the infrastructure and so on, and possibly part of the overheads, to underpin and make that work possible.

Q64 Chairman: Professor King, you sent letters to the Permanent Secretaries of lots of departments asking them how they handle scientific information. Have you had responses from those Permanent Secretaries?

Professor Sir David King: The letters that went out from my office were letters really not asking them quite in that way but letters dealing with the use of science in policy making. Clearly there will be follow-through on those letters, but the real follow-through comes from my science review team going into departments.

Q65 Chairman: That was a bit cheeky, was it not, to challenge Permanent Secretaries? Were they not doing that anyway? They always tell us they are when we talk to them. Have you suspicions that there are some strong and weak departments in that area?

Professor Sir David King: Absolutely. There are weak and strong departments and my job, or that part of it for which I am responsible to the Prime Minister and the Cabinet for the conduct of science across government, is to see we raise the game in each government department. I do not see it as cheeky: I see it as very much part of my job.

Q66 Chairman: Good. So did you start off with the soft options first, and which were they then? I presume you wanted to get your feet under the table.
Professor Sir David King: I suppose the soft option was going in, first of all, to see each of the Permanent Secretaries in turn, and the letter came afterwards.

Q67 Chairman: So which departments have you started off on first? Or have you done them all at once?
Professor Sir David King: As I say, the key to the process is the science review so, if I could bring that into your question, the science review team has now been formed; it is a new directorate in the Office of Science & Technology, and we are going in at the moment to DCMS, and that review process has now started.

Q68 Chairman: Have you found any science in the DCMS yet? It is like the weapons of mass destruction question. Is there any science going on?
Professor Sir David King: Absolutely, Chairman, there is quite a lot, for example, in the various museums that are funded through DCMS, and so of course what we want to see is that the kind of quality control that the RAE represents is maintained in spending across all government departments, including DCMS, where there is a substantial budget going into the Natural History Museum and particularly other museums. The British Library is very much there for scientists and technologists to use. What I believe is happening already is the fact that the science review team is on its way.

Q69 Chairman: Which is the next one you are looking at?
Professor Sir David King: HSE.

Q70 Chairman: And which will be the last one?
Professor Sir David King: After HSE we have not yet decided but we certainly expect to go through twelve government departments, and I hope that we will be able to do it in a three or four year timescale, but the point I am making is that the mere fact that we are going in provides a back-up to my letters to the Permanent Secretaries and to other actions being taken, in particular the appointment of chief scientific advisers in government departments.

Q71 Chairman: Has every department got one?
Professor Sir David King: Many departments now have chief scientific advisers since the letters went out, and I am very pleased to say that the cadre of chief scientific advisers that we have now formed is a very powerful group within government covering expertise over the whole block, and I do think that if you go into Defra you will find that Professor Howard Dalton is playing a very significant role; the most recent appointment is in the Department of Transport where Professor Frank Kelly has been appointed, one of the country's leading applied mathematicians and experts in integrated systems, and I think he has a tremendous role to play.

Q72 Chairman: Do not you find it strange in this 21st century that we are only getting to that stage now of government departments having chief scientific advisers given that scientific knowledge that we are always hearing about?
Professor Sir David King: Responsible to their Secretaries of State and responsible to myself. You will know quite a bit about the Civil Service; it takes quite a while to change this tanker round.

Q73 Chairman: Lastly, in the DCMS, I have never understood why those museums are part of the remit of Culture, Media and Sport. Why not the DfES, or the Education Department? How is the decision made?
Professor Sir David King: There have been on-going discussions about where they should be placed. The British Library, for example, is under discussion at the moment. I think museums are seen to be part of British culture, Chairman.
Mr Key: If I may help, as the first Minister in that new Department when it was created, it was quite simply that the new Department has as its remit to subsume the Office of Arts and Libraries, which included galleries and museums.

Q74 Mr McWalter: Lord Sainsbury, you published a report last Thursday on the scientific response to terrorism in which we said there was a weak scientific culture in the Home Office and their response I suppose was basically "none of your business". Are you on our side or theirs?
Lord Sainsbury of Turville: I thought Professor King was being extremely tactful—

Q75 Chairman: I thought that!
Lord Sainsbury of Turville: There is an uneven quality of scientific expertise across government, and I would follow his tact in not pointing to particular areas, but I think making certain that every Department has a chief scientific adviser of a high calibre which will often mean, in fact very largely mean, bringing in someone from outside who has recent experience of doing science at a high level and making certain that what that person is feeding in at the top level of decision-making in the Department is absolutely fundamental, and not by any means universal.

Q76 Mr McWalter: I think you are saying you agree with us!
Professor Sir David King: Yes, but I would like to add that the Home Office has achieved as scientific adviser Professor Paul Wyles, and he is an outstanding person for that position—a criminologist of very significant international stature—so there are more problems, but while we have that position we are moving.

Mr McWalter: So it is going to get better. One of the things is that in the House of Commons we can ask questions about our arts as often as we like but we do not have science questions at all, and of course that means that the profile of the science is much lower than it is for arts. Do you not think it is about time that we restructured things so that we put science centre stage in terms of government policies by having a nominated slot for it?

Q77 Chairman: For example, why do we not have a session with you once every month for thirty minutes in which we would be quite prepared to show you a few of the questions so you are prepared, and then we can bring science up the agenda and get some of the issues which are out there into the arena of the Commons?
Lord Sainsbury of Turville: I would welcome any way we can bring science more to the fore in terms of people understanding what was happening and being able to question it, because I rarely get questions in the House of Lords. I get questions on virtually everything else, and it would be rather nice to have some questions on science as well.

Q78 Chairman: So you would welcome an approach through the usual channels?
Lord Sainsbury of Turville: Yes. If there is a forum you would like to have I would be very happy to look at it, because I am very conscious that being in the Lords does take away the opportunity in the House of Commons.

Q79 Mr McWalter: We are in danger of agreeing too much here perhaps! Dr Taylor, this relates to our report on the Medical Research Council which created a certain amount of waves. We described Biobank as "politically driven", and in a response in the Lords Chamber that was said to be a rather low level form of abuse. Would you agree with that? Obviously we did have concerns about the way the project has received funding. Did you think those concerns were valid?
Lord Sainsbury of Turville: You should understand, John, that that was my comment!
Dr Taylor: I think Biobank is a very important joint project. It was funded over a long period of time, not at the expense of other things, and it is absolutely fundamental to getting the benefits from all of the genome and post genome research through into healthcare and so on. So I think Biobank was absolutely a first class project, and I do not think it has been funded at the expense of other things: it has been funded very carefully with other partners and has been dealt with extremely carefully with other partners in a very open kind of way, so it is something we are very supportive of.

Q80 Chairman: Dr Taylor, as your parting shot to this Committee, with your experience of research councils and the problems of getting them interacting together and RC(UK) coming up and so on, do you think merging them would be a solution to many of these problems with disciplinary research and so on? What is your view?
Dr Taylor: We have thought about this very hard since I chaired the quinquennial review about three years ago. One of the options on the table clearly was to merge all the councils and to have one. The advice that we all received and I think agreed with was they are working very well; they are not that broken that they need to be abolished and taken away; if you did set up a single council you would spend probably two or three years re-inventing substructures because you could not possibly do it with one peer review community and so on, during which time you would have a tremendous planning blight when everybody would take their eye off the science ball at a time when science has hardly been so fertile with so much going on, and you would also lose what I think is a very valuable set of advisers and councillors—namely, the councillors of the individual Research Councils, who bring a tremendous level of expertise and outside input to the whole process. So what we have decided to do and what we are doing is now to say to the councils and the chief executives, "You must make sure that where you need to work together to get the science done your organisations, your cultures and processes do not get in the way", and that is right at the top of the list of each of the chief executive's objectives, so science is moving and changing and the very clear message from the Research Councils (UK) process is we have to go and do what the science needs. Wherever you draw the boundaries they will be wrong within six months or a year, so we have to instead get a culture which can work across them very flexibly and fluidly. I think we have made major steps with RC(UK) in beginning that whole process and of getting the culture of councils and their staffs and chief executives really working together and understanding that and driving them forward, and I think the review we will have next summer will be a very good opportunity to see how well they are doing.

Q81 Chairman: Thank you very much, and, Dr Taylor, thank you for all you have done for British science in your term of office. We have appreciated all your hard work and it has been enjoyable working with you on platforms across the past years.
Dr Taylor: May I also say thank you very much to the Committee. With one or two notable exceptions you have been extremely helpful and supportive!

Q82 Chairman: There is always time! Lastly, you may have noticed that Colin Blakeman, the new executive of the MRC, is considering whether to allow sciences to use their funds to pay for publication charges levied by giving access to journals. Would you support this? This whole question of free access is bubbling up now, and the astronomical cost of libraries having to buy and scientists being denied the right to be allowed access freely to information. What is being done about that? How is that being addressed?
Dr Taylor: We are looking at it, as we always said, very carefully in the Research Councils. It is quite a complex set of issues so Research Councils are going away and looking at how these new publishing

opportunities affect each of their communities, so we do not have an immediate position one way or the other, but the openness of publication is very important; the access to published material is very important; the whole process of getting peer reviewed top quality publication is also very important and, as one moves to open access and open publication systems where the author pays essentially for the refereeing process in many cases, the impact on the quality and the reliability of publications and, indeed, on individual scientists' careers, because their careers depend quite significantly on their publishing record. There are lots of issues that need to be looked into quite carefully, but we are aware it is a live issue.

Chairman: We have come to the end and there is going to be a vote in a minute, so it is perfect timing as usual. Thank you all. Lord Sainsbury, we will write to you to make suggestions how we might enjoin on these issues on a more regular basis than now, and that extends to other offices too, because I think it gives a hearing to many people in the public who do not read all the right papers and journals, so that is good. Thank you for taking the time to come, and we will see you soon, hopefully.

APPENDIX 1

Memorandum from the Office of Science and Technology

PERFORMANCE OF THE SCIENCE BASE

1. *The Committee would like a statement on the recent report by Evidence Ltd on PSA target metrics for the UK Research Base*

The Office of Science and Technology's PSA target is "to improve the relative international performance of the UK's science and engineering base". Previously, OST had a very narrow set of very high-level indicators which gave no information about the detail and dynamism within the Research Base. OST commissioned a report from Evidence Ltd to develop a wide-ranging set of indictors to benchmark the UK performance in science and engineering against that of its international competitors. This bench-marking exercise is providing OST with the evidence base required to develop a basket of headline indicators and targets for our 2003–06 Public Service Agreement.

In summary the report indicates the very strong relative international performance of the UK SEB in terms of achievement, productivity and efficiency. The report has also illustrated a very few disciplines that despite remaining strong internationally, are not matching the relative performance levels shown by the rest of the UK disciplines. Naturally we will be discussing any issues with the relevant Research Councils.

On many indicators the UK is second only to the USA and where the UK has been overtaken in individual disciplines by other nations, we still have a more consistent performance across fields than those countries. This strong international performance has been achieved with lower average investment compared to our competitors and with a relatively lower availability of people with research training and skills.

2. *What action does the Government plan to take as a result? Will the Government respond formally?*

The report was a piece of analytical work commissioned by the Government for its own use and therefore the Government will not be responding formally. The report is now being used to develop our PSA targets, these are currently in discussion with Treasury.

The work will be repeated annually and the results will be used as a basis on which to monitor any future improvement or decline in the relative international performance of the UK's science and engineering base on an annual basis. A significant change in a metric would be a prompt for further investigation, but it is important to avoid a mechanistic response to the data.

DUAL SUPPORT FUNDING REVIEW

3. *Is the review considering ending dual support?*

No, the review did not propose ending the dual support system. A small number of responses to the consultation document suggested the need for a wider review of the system, but a larger number expressed support for retaining dual support. Ministers have yet to decide on actions in response to the OST and other consultations but will look to respond publicly as soon as possible.

4. *The Science Budget provides for an extra £120 million a year to fund the change. How was this figure arrived at? Could this figure change as a result of the review?*

The figure of £120 million was provided as part of the SR 2002 settlement as part of a move towards the sustainability of HEI research. We will be examining data on funding flows within the research base in order to avoid unintended consequences. The proportion of Full Economic Cost which should be met by Research Councils, bearing in mind the contribution which government already makes through other funding streams, will be a matter for further consideration, though decisions on future funding will need to be considered as part of the next Spending Round.

5. *Will the responses to the consultation be published?*

The Government intends to publish its response to the consultation in the next few months. In line with Department practice the responses to the consultation will be made available to the public on a similar timescale except where the authors have asked for their views to be withheld.

Research Careers

6. *In the proposed scheme of academic fellowships, who would administer the scheme and hold the budget?*

As currently envisaged, this scheme will be administered by one of the Research Councils on behalf of all the grant-awarding Research Councils and under the banner of RCUK. The ringfenced budget would therefore be allocated to the administering body. Details are yet to be formalised.

7. *The Working Group was comprised of project grant funders. Why were there no representatives from the Funding Councils or universities?*

The remit of the working group was to develop a working Fellowship scheme and so the membership was comprised of organisations with experience in this field. The consultation process has been developed in order to seek the views of a wide range of stakeholders, including the Funding Councils and HEIs.

8. *What progress has been made in setting up a Funders Forum? Will the recommendation of the Research Careers Initiative that the Forum has a subgroup on careers be implemented?*

The Research Base Funders' Forum has been established. It's first meeting took place on the 26 September 2003. The Forum will meet next on 4 December 2003 to discuss the responses to the public consultations addressing university sustainability. From January the Forum's core group will meet on a quarterly basis. A wider plenary group of Funders' will meet annually.

Sir Gareth Roberts has been invited to address the Funders' Forum in January 2004 on the Research Careers Initiative and to discuss how this issue may be taken forward with their support.

Higher Education Science Departments

9. *Is the OST concerned by the closure of science and engineering departments in recent years? If so, what steps will be taken in the short and medium and long term to reverse this trend?*

Sir Gareth Roberts' report "SET for success" showed that the biggest problem in recruitment onto science and engineering courses and subsequent closure of university departments is lack of demand from potential students. The Government's response to the Roberts report shows we are taking these issues seriously. We are attracting more qualified scientists into school teaching, and investing in the science curriculum so that science grades will improve, thereby increasing the pool of talented students wishing to study science at a higher level.

We are also increasing postgraduate stipends to encourage more talented graduates to take up research. Our plans to allow universities to charge up to £3,000 for their courses will enable universities to invest in better laboratories, research and science pay.

Ultimately the closure of individual departments is a matter for individual Higher Education Institutions, and within Government primarily a matter for DfES, but clearly we would be concerned if the closure of Departments were to lead to a loss of UK research capacity. This is something we keep under review. We acknowledge the Committee's comments in its recent report on the work of EPSRC, to which the Government will be responding in due course. OST's role is to ensure we maintain research capacity not only across individual disciplines but across the science and engineering base as a whole.

CAMBRIDGE-MIT INSTITUTE

10. *The Committee would like a statement on the performance of CMI? What plans are there to continue funding beyond 2005–06?*

CMI is currently the subject of an NAO study which is looking at how CMI was set up and monitored in its first two years, and the on-going evaluation of CMI's performance. A draft report is in preparation. The intention is for this to be published before the end of the year.

CMI is an innovative, ambitious and challenging project with the potential to generate great academic and economic benefit for the UK. During its first two years of operation, it has funded a wide range of projects including research into future technologies; research into competitiveness, productivity and entrepreneurship; undergraduate exchanges; the promotion of skills relevant to industry; and investment in a network between a number of UK universities to share CMI's work.

Successful pilot work on PRAXIS (training Technology Transfer Practitioners) and UROP (Undergraduate Research Opportunities Programme) has led to discussions to expand those programmes across the UK.

The Knowledge Integration Communities (KIC) that are now underway will provide valuable models of how University—Company Knowledge Exchange can be best developed. The model aims to accelerate the progress from concept to product by ensuring that all parts of the value chain are in place and communicating effectively:

- undergraduate students who are well versed in both basic skills and knowledge of the new technology, masters level students who have more advanced technical knowledge that is intimately coupled to the skills needed for entrepreneurial endeavour, new research undertaken from the outset with a consideration of use, and new ways of engaging with industry (both large, medium sized and small) to see that their future needs fully inform the work in universities, and results of university work are effectively transferred to industry. The four current KICs are:
  - Silent Aircraft; Systems Biology; Pervasive Computing; Connected Worlds.

CMI and OST are engaged in detailed work on assessment, evaluation and metrics in order to clearly articulate what CMI has achieved and what it expects to deliver—near-term products with traditional and unique aspects; replicable (successful) models. Independent evaluation commissioned by OST will complement this work.

Many of the projects funded by CMI have a three-year span. It is therefore rather early to reach conclusions about the value its outputs will have over the longer term. Under the current contract, funding will continue until November 2006. CMI's aim is for successful activities to become self-sustaining. There are currently no plans for core funding to be continued.

HGC AND AEBC

11. *The Committee have asked for a statement in the activities and performance of these bodies in the last year.*

HGC

HGC was established following a comprehensive review in May 1999 by the UK Government of the regulatory and advisory framework for biotechnology.

HGC's role should also be seen in the context of other advisory and regulatory bodies in the regulatory and advisory framework for human genetics. HGC will not direct these bodies or interfere with their lines of accountability, but will work with them and help form links between them.

It works within the context of devolution settlements for Scotland, Wales and Northern Ireland.

Its aims include to support Government's needs in the areas of:

- advisory and regulatory framework;
- managing change; and
- advice to Ministers.

The Government has recently restated its commitment to ensuring that key safeguards are in place around genetics and health and that these anticipate and reflect public concern. The Human Genetics Commission has a critical role to play here. They have published two major reports, one on the use of genetic information, the second on direct genetic testing. The Government has warmly welcomed its work as a valuable basis for developing future Government policy on genetics.

In conducting its work, the HGC has been a model of openness and transparency. It has sought innovative ways of engaging the general public and ensuring that people with genetic conditions are represented. Awareness of the HGC is high. It recently commissioned a "perception audit" involving parliamentarians, journalists, experts and organisations with an interest in genetics about how they judged the Commission and its work. Most who responded felt that it was important to have an advisory body like the HGC.

AEBC

The AEBC's third year has seen the Government respond (December 2002) to its second major report, Animals and Biotechnology. The Chair and several members of the AEBC have spent a great deal of time and effort over the past year working on the GM public debate steering board which published its report, GM Nation? The Findings of the Public Debate in September 2003. The other main bit of work for the AEBC has been its third major report, Coexistence and Liability, due to be published shortly, which will address key issues raised by the possible commercial production of GM crops.

SCIENCE REVIEW DIRECTORATE

12. *What progress has there been in setting up a Science Review Directorate? Have a programme and timetable been drawn up?*

Background to the Science Reviews

Earlier this year in response to a recommendation in the government's publication "Investing in Innovation: A Strategy for Science, Engineering and Technology" (July 2002), OST launched a new programme of Science Reviews to externally scrutinise the quality and use of science (including social science) in government departments.

Aim of the Science Reviews

The Science Review aims to generate a clear picture of how Departments use and quality assure science with a view to making recommendations for improvement where necessary and to identify and disseminate best practice across government.

Focus of the Science Reviews

Broadly speaking each review will assess how effectively departments:

1. Horizon scan—to identify future science-related issues;
2. Develop a clear, overall science strategy;
3. Review and harness existing research and identify gaps and opportunities for future research;
4. Commission and manage new research;
5. Ensure the quality and relevance of departments' sponsored work;
6. Use research and scientific advice in formulating policy;
7. Publish results and debate their findings and implications openly;
8. Share, transfer and manage knowledge;
9. Have implemented Guidelines 2000 and the Code of Practice for Scientific Advisory Committees; and
10. Use, maintain and develop scientific expertise (within the department itself and in the scientific community—capacity and capability building).

PROGRESS TO DATE AND WORK-PLAN

The Director for the new SRD was appointed and took up post at the end of May 2003 when work on the Science Reviews began in earnest. The plan is to review about 12 departments and complete the first cycle of reviews within three to four years. Each Science Review will take about 10 months.

The Department for Culture, Media and Sport (DCMS) is the first government department to be reviewed. The review is underway with publication of the review findings scheduled for spring 2004.

The second review—of the Health and Safety Executive—is scheduled to begin in mid November, followed by a review of the Office of the Deputy Prime Minister (ODPM) to begin in the Spring Decisions on the timing and order of further reviews have yet to be made . . .

13. *Will the results of the reviews be made public?*

Yes.

Large Facilities

14. *What progress has there been in establishing the case for a European Spallation Source?*

The UK is a world leader in Neutron Scattering. Currently, the key UK support for this field occurs through its investments in ISIS, at the CCLRC Rutherford Appleton Laboratory in Oxfordshire, and ILL at Grenoble.

It is widely accepted that, some time in the future, there will be a next generation neutron source within Europe. There are a number of possible scenarios for this next generation source, one possible project is commonly known as the European Spallation Source (ESS).

In the UK, a group of Universities (Leeds, Sheffield and York) called the White Rose University Consortium (WRUC) have proposed a site for the ESS near Selby in Yorkshire.

A meeting between Lord Sainsbury and the White Rose University was held in July 2003. It was agreed that the UK would take a more pro-active role and lead the agenda in deciding on the timing/location of a next generation neutron source within Europe.

However, the eventual timescale and location for the development of a next generation neutron source is not yet clear. A meeting convened by the CCLRC will be held early next year with key international partners to share views on a likely timeline and to consider respective science policies and funding strategies.

15. *What is the Government's policy on the location of ITER? What plans are there to maintain the UK's strength in fusion?*

The Government has always been of the view that ITER should be built where it stands the greatest chance of success. In our opinion this means in Europe. Studies of the technical merits of the French and Spanish sites cannot discriminate between them and we expect either will win if put to the international forum. Consequently the UK is neutral to the France vs Spain decision and has been urging a bilateral deal between the two parties. This is the subject of further discussions at next week's (10 November) Competitiveness Council and again at the 27 November Competitiveness Council.

UK fusion scientists expect to make a significant contribution to ITER through their involvement in its construction and operation. It is also our desire to run a complementary national fusion research programme which may involve continued operation of the JET facility at Culham Science Centre. The precise size and shape of this programme will be dependent on the resources available from EURATOM and EPSRC.

Spending Review 2004

16. *What guidance was issued to RCUK by the OST on its consultation for SR 2004?*

No formal guidance has been issued to RCUK on consultation for SR2004. However, the OST Working Group which is developing the Spending Review submission and supporting evidence base for the Science Budget includes several key members of RCUK cross council groups, including the chair of Stakeholder Engagement Group. Through this mechanism, RCUK's consultation is closely coordinated with the overall development of the submission.

17. *What input has the OST had from the Treasury?*

OST officials meet their Treasury counterparts regularly in a number of different fora, formal and informal. These have been supplemented by discussions between HMT and research council staff in Swindon and visits by HMT staff to RC sites. OST will continue to work closely with Treasury on development of the Spending Review bid over the coming months. In addition, the Treasury has begun work with all departments on the spending review process, including issuing guidance and running seminars.

18. *What discussions have there been between the OST and the Treasury to ensure that the profile of the Science Budget allocations does not lead to severe fluctuations in the funds available for new Research Council grants?*

OST will be seeking to secure the best possible settlement for Science and Research, within the context of the Government's wider priorities. We have not yet entered into detailed discussions of the make up or profile of the submission. We note, however, the Committee's concerns in this area.

SCIENCE IN SOCIETY

19. *The OST's proposals following the BA's review set out a range of new activities. Will these be undertaken in house or contracted out?*

OST will be contracting out most of the new activities for two reasons:

(i) it does not have the staff resources to do so in-house;

(ii) many of the new activities, such as the development of a science and society activities database and the design and conduct of a national public survey, require specialist skills which are not held in-house. Having just completed a competitive tender process, OST is about to appoint a programme manager to ensure that all of the activities are delivered to specification.

20. *What funds are available to undertake this work?*

The BA recommended an ongoing cycle of information gathering, analysis and evaluation. We estimate that the first cycle will last around 18 months and have allocated £500,000 to its delivery. In addition to this are the funds we have allocated to the funding of high quality, high impact public engagement projects (including the core funding we provide to the BA itself). In the current and next financial year these will total £3,132,344.

RESEARCH COUNCILS UK

21. *What conclusions did the internal review of RCUK draw? What plans are there to make these public?*

When RCUK was launched in May 2002, the RCUK Strategy Group requested that an interim review be carried out after one year to determine whether the RCUK partnership was on course to deliver its objectives and to identify areas for improvement. An independent review was undertaken in April and May 2002 by external consultants Peter Saraga (formerly of Philips Research Laboratories) and Tony Quigley (formerly of OST), both of whom were closely involved with the Quinquennial Review of the Research Councils (QQR) in 2001.

The main conclusion of the Review is that RCUK has made a promising start, achieved some key deliverables, and is broadly on course to meet all of the QQR objectives. There is a great deal of support for the RCUK concept and goodwill towards making it a success. However, the Review also concluded that Councils are still learning and adapting to working within the RCUK framework and that after only 12 months it was too soon to determine the long term success of the venture.

The Review makes 13 recommendations, which are primarily about clarifying the role of the RCUK partnership and the RCUK Strategy Group and providing clear and consistent messages about the long-term goals of RCUK. The RCUK Strategy Group has agreed these recommendations and implemented a programme of work to deliver the improvements needed.

The final report and implementation plan were published on the RCUK website on 18 July (http://www.rcuk.ac.uk/whatsnew.asp).

22. *Is the OST satisfied that the Research Councils are taking sufficient action to address the issues surrounding contract research staff?*

OST is satisfied that the Research Councils are fully conversant with their obligations under the "Fixed-term (Prevention of Less Favourable Treatment) Regulations 2002", which came into force on 1 October of that year. They are also fully implementing the standards set by the 1996 Concordat on Contract Research Staff through the terms and conditions of their research awards.

OST delegates the management of staff to the employing Council. We believe that those Councils that have contract research staff are looking both to comply with the law and to ensure that contract research staff are managed responsibly, having regard to each of such Council's particular circumstances.

November 2003

APPENDIX 2

Supplementary memorandum from the Office of Science and Technology

METRICS FOR THE SCIENCE BASE

1.(a) *Having established more sophisticated metrics following the report from Evidence Ltd, what more specific targets will be established for the research base?*

The Evidence Ltd report established a wide basket of metrics for measuring the health of the UK science and engineering base. This is a helpful piece of evidence in many respects but, in itself, is too wide ranging to judge our performance in "improving the relative international performance of the Science and Engineering Base", which is our Public Service Agreement target agreed with HM Treasury. We are now in the process of agreeing with HM Treasury a small basket of measures against which to measure this. We expect these to include measures covering aspects of scientific excellence, production of trained people and productivity. These are not yet agreed but will be published in due course.

(b) *The report showed a relative weakness in the physical sciences, particularly engineering. What evaluation has there been of the reasons for this?*

We will be looking into why physical sciences and engineering are relatively weak to see whether there is any action we should take, including recruitment of world-class scientists from other countries, or increasing the supply of young scientists, new facilities or extra funding. Obviously, any specific measures will be subject to the Spending Review settlement next year.

Whilst the Evidence Ltd report noted a relative weakness in the physical sciences and engineering, it is important to note that the UK's share of citations in both disciplines remains high—4th, behind the USA, Germany and Japan, in each field—and that in the physical sciences there is evidence of a recent growth in citation share, with the UK gaining on those ahead of it.

SPENDING REVIEW

2. *Among the proposed multi-Council themes for Spending Review 2004 are:*

- Changing Ourselves;
- Conditions for Life; and
- Scales of Complexity.

(a) *What research are these intended to encompass?*

(b) *What comments have RCUK received so far into the merits of these suggestions?*

(a) These three multi-council themes are part of a wider library of single- and multi-council themes which are being presented during the SR2004 process, showing that the Research Councils and AHRB are not "opportunity limited" in undertaking exciting new science and research. These three multi-council themes, along with five others, have been discussed by each Council's normal advisory structure. These three themes encompass the following research:

Changing Ourselves: This programme is based on two contrasting phenomena: on the one hand advances in medicine, biology and technology are increasingly allowing us to take control of our bodies and health; while on the other hand there is a considerable body of evidence associating different lifestyle and behavioural factors with health. The research programme will study the causes and consequences of changes in behaviour and, in addition, research change in technology and medicine, to improve health.

Conditions for Life: Through the exploration of the Earth, the extreme conditions that support life will be identified. The characterisation of other planetary systems and the indirect detection of cool Earth sized planets will enable us to understand how common life sustaining conditions are within the Universe. Combined with an understanding how life arises, the range of environments life can develop in and the likelihood of survival, it will be possible to quantify the probability of life in the Universe.

Scales of Complexity: Interactions with complex systems affect every aspect of daily life from the transport system, having your child immunised, adapting to changing weather conditions or assessing the value of your share portfolio. Understanding the behaviour of such large complex, typically non-linear, systems is of critical importance to modern society. The interactions between the components give rise to an overall behaviour that cannot be easily be understood in the terms of the behaviour of the individual components. The goal is to move beyond an understanding, to an ability to intervene effectively in their behaviour.

(b) As part of the consultation process, RCUK have received comments from a wide variety of stakeholders including industry, their representative bodies (such as the CBI), the public and the wider academic community. All eight multi-council themes have met with a very favourable response, with some

respondents expressing a great interest in the specific outcomes from the research and how it will affect them. For example, the CBI commented that "complex systems was flagged up as being particularly important for a range of businesses".

SCIENCE ACROSS GOVERNMENT

3.(a) *How many Departments have yet to appoint a Chief Scientific Adviser? What are the timescales for new appointments? The science strategy says that Professor King will be involved in the appointment process. What has this meant in practice?*

The Cross Cutting Review of Science and Research recommended that Departments which conduct or commission an appreciable amount of research should have a Chief Scientific Adviser accountable to the Secretary of State and Ministers for science procurement and advice within the Department. The Foreign and Commonwealth Office and HM Treasury do not have science budgets and have not appointed a CSA on those grounds. Cabinet Office has no CSA but does have a Chief Social Researcher. DCMS is presently awaiting the outcome of the review by OST's Science Review Directorate before deciding whether and on what basis to appoint a CSA. Several Departments (such as DfID, DWP and the Forestry Commission) have appointed existing postholders to the role of Departmental CSA.

Sir David King has been consulted on the appointment of several departmental Chief Scientific Advisers. In practice this means that his views are taken into account—the GCSA does not have the final word on such appointments.

(b) *On what basis were the first Departments chosen for the programme of science reviews?*

A number of factors were taken into account. These included:

- The potential for the reviews to add value to Departments' procurement and use of science.
- The opportunities to establish a base of best practice.
- The build up of the review team.

FUSION

4. *What scenarios have been developed for UK fusion on the basis of the site chosen for ITER? Does it make any difference which site is selected?*

The international ITER partners are in the process of selecting the location for the facility. The choice is between a Japanese site at Rokkasho and an EU site at Cadarache. The decision is expected to be made by the end of this year, There are two options, each of which has specific consequences for the UK fusion programme.

Scenario 1—ITER in Japan: If ITER goes to Japan, the Japanese Government will contribute 48% of the cost of ITER, leaving 12% for the EU to fund once the other international partners have contributed. There will be fewer synergies with the European fusion programmes if the facility is located in Japan.

Scenario 2—ITER in France: If ITER goes to France, the EU will contribute 48% of the cost of ITER, with 36% coming from the European Commission and 12% from France. This will leave little additional money in the current Framework Programme budget for Accompanying Programmes. In this situation, the UK fusion programme will be more focussed on supporting and contributing to the ITER project.

We are strongly of the view that ITER should come to Europe. As well as the long-term industrial and economic benefits, its proximity to the UK will allow us to make a significant technical contribution. It will also maintain Europe's lead in this field and ensure that our European partners continue their strong support for fusion. We will be making the case for an Accompanying Programme from increased Framework Programme funding.

5. *Do you have any more details on the Research Forum announced on 24 November, ie members, terms of reference, operation and time to establishment?*

The Higher Education Research Forum has been set up under the chairmanship of Sir Graeme Davies, Vice Chancellor of the University of London. The Forum will create a sounding board for the Ministerial Group implementing research reform and promote dialogue on key issues including the link between teaching and research, and developing greater research collaboration. The Forum will bring together representatives of key stakeholders in the sector (Vice Chancellors, HEFCE, Research Councils, Teaching, Business, Regions and Learned Societies) and will be encouraged to gain views from as wide a range of interests as possible. The Forum will start work later this year in the expectation that it will conclude in the early summer of 2004.

December 2003

Printed in the United Kingdom by The Stationery Office Limited
3/2004 913410 19585

ISBN 0-215-01575-4

Distributed by TSO (The Stationery Office)
and available from:

TSO
(Mail, telephone and fax orders only)
PO Box 29, Norwich NR3 1GN
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