

The appointment of the new Chief Scientific Adviser : sixth report : report and proceedings of the Committee with minutes of evidence and appendices / Defence Committee.

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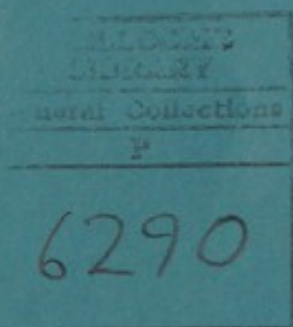
Sixth Report

THE APPOINTMENT OF THE NEW CHIEF SCIENTIFIC ADVISER

Report and Proceedings of the Committee
with Minutes of Evidence
and Appendices

*Ordered by The House of Commons to be printed
19 April 2000*

PUBLISHED BY AUTHORITY OF THE HOUSE OF COMMONS
LONDON: THE STATIONERY OFFICE LIMITED
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DEFENCE COMMITTEE

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The Defence Committee

The Defence Committee is appointed to examine on behalf of the House of Commons the expenditure, administration and policy of the Ministry of Defence (and any associated public bodies). Its constitution and powers are set out in House of Commons Standing Order No. 152.

The Committee has a maximum of eleven members, of whom the quorum for any formal proceedings is three. The members of the Committee are appointed by the House and unless discharged remain on the Committee until the next dissolution of Parliament. The present membership of the Committee is as follows:¹

Julian Brazier TD MP (*Conservative, Canterbury*)²
 Jamie Cann MP (*Labour, Ipswich*)²
 Harry Cohen MP (*Labour, Leyton and Wanstead*)²
 Mike Gapes MP (*Labour/Co-op, Ilford South*)³
 Bruce George MP (*Labour, Walsall South*)²
 Mike Hancock MP (*Liberal Democrat, Portsmouth South*)⁴
 Stephen Hepburn MP (*Labour, Jarrow*)⁵
 Jimmy Hood MP (*Labour, Clydesdale*)²
 Dr Julian Lewis MP (*Conservative, New Forest East*)⁶
 Laura Moffatt MP (*Labour, Crawley*)²
 Peter Viggers MP (*Conservative, Gosport*)⁷

On 16 July 1997, the Committee elected *Mr Bruce George* as its Chairman.

The Committee has the power to require the submission of written evidence and documents, to examine witnesses, and to make Reports to the House. In the footnotes to this Report, references to oral evidence are indicated by 'Q' followed by the question number, references to the written evidence are indicated by 'Ev' followed by a page number.

The Committee may meet at any time (except when Parliament is prorogued or dissolved) and at any place within the United Kingdom. The Committee may meet concurrently with other committees or sub-committees established under Standing Order No. 152 and with the House's European Scrutiny Committee (or any of its sub-committees) for the purpose of deliberating, taking evidence or considering draft reports. The Committee may exchange documents and evidence with any of these committees, as well as with the House's Public Accounts, Deregulation and Environmental Audit committees.

The Reports and evidence of the Committee are published by The Stationery Office by Order of the House. All publications of the Committee (including press notices) are on the internet at www.parliament.uk/commons/selcom/defhome.htm. A list of Reports of the Committee in the present Parliament is at the end of this volume.

All correspondence should be addressed to The Clerk of the Defence Committee, Committee Office, House of Commons, London SW1A 0AA. The telephone number for general inquiries is 020 7219 5745; the Committee's e-mail address is defcom@parliament.uk.

¹ Rt Hon Menzies Campbell CBE QC MP (*Liberal Democrat, Fife North East*), was appointed on 14 July 1997 and discharged on 1 February 1999, John McWilliam MP (*Labour, Blaydon*) was appointed on 14 July 1997 and discharged on 24 November 1999, Dari Taylor MP (*Labour, Stockton South*) was appointed on 14 July 1997 and discharged on 8 December 1999, Michael Colvin MP (*Conservative, Romsey and Waterside*) was appointed on 14 July 1997 and discharged on 3 February 2000, Crispin Blunt MP (*Conservative, Reigate*) was appointed on 14 July 1997 and discharged on 21 February 2000

² Appointed on 14 July 1997

³ Appointed on 24 November 1999

⁴ Appointed on 1 February 1999

⁵ Appointed on 8 December 1999

⁶ Appointed on 3 February 2000

⁷ Appointed on 21 February 2000

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¹ HC Deb, Volume 719, 16 July 1999.

² *ibid.* p. 11, para 1.

³ 'Corporate Research' often works with a military problem but usually without a defined military goal, or work with a technology or military need that is a source of spin-off. 'Applied Research' is aimed at developing solutions for specific military needs, including the development of capabilities for future campaigns.

⁴ *White Paper, Science 1998-2000, Defence Research, HC 516, para 13.*

⁵ *ibid.* para 21, footnote 2, para 41-42.

⁶ *ibid.* para 20, March 2000, para 12-13.

⁷ *ibid.*

⁸ *ibid.* para 12, para 1.

⁹ *White Paper, Science 1998-2000, para 12.*

SIXTH REPORT

The Defence Committee has agreed to the following Report:—

THE APPOINTMENT OF THE NEW CHIEF SCIENTIFIC ADVISER

Background

1. On 4 January 2000, Professor Sir Keith O'Nions took up his duties as the Ministry of Defence's Chief Scientific Adviser (CSA), replacing Sir David Davies.¹ The CSA heads the Department's central scientific staff and is responsible ultimately for all advice given to Ministers on science, technology and operational analysis.² His principal areas of work include—

- *Defence Research*: The CSA is the budget holder for the MoD's £450 million expenditure on 'corporate' and 'applied' research³ (we described these components of research in our report last Session on *Defence Research*⁴). CSA staff also assist, and provide advice to, other organisations within the MoD which set the requirements for new defence equipment and weapon systems, and those who procure such equipment and support it in-service.
- *Equipment approvals*: The CSA chairs the MoD's 'Equipment Approvals Committee' which makes procurement recommendations to Ministers.
- *Nuclear safety and effectiveness*: The CSA is responsible for advising Ministers on the safety of Royal Navy nuclear propulsion systems and the UK's strategic nuclear deterrent, as well as acting as the MoD 'customer' for the nuclear warhead intellectual capability at the MoD's Atomic Weapons Establishment (AWE).

2. The last of these has been much in the news lately, with the Secretary of State for Defence reviewing the safety implications of proceeding with the recently let contract to run AWE sites.⁵ The contract had been awarded to the AWE Management Ltd consortium which included British Nuclear Fuels Ltd, the operator of the Sellafield reprocessing plant. On 29 March, the Minister for the Armed Forces announced that the Nuclear Installations Inspectorate was satisfied that AWE Management Ltd were able to operate AWE facilities safely and effectively,⁶ and that Ministers had decided that the consortium would operate the sites, as contracted, from 1 April 2000.⁷ The CSA's involvement in this affair is not significant⁸ and we have not dealt with these matters in this report.

3. The CSA's organisation is closely involved in the work of the Defence Evaluation and Research Agency (DERA) which is responsible for the majority of the MoD research programmes. We have during this Parliament closely monitored the MoD's changing approach to research and the role played by DERA. Most recently, in our *Defence Research* inquiry we raised a number of concerns about the MoD's research strategy, including the low level of defence research funding and the challenge of accommodating the lead being taken by the private sector in some areas of technology. In our report we also recommended that the MoD's then current plans for a public-private partnership for DERA should not proceed,⁹ primarily because of the likely adverse implications for the MoD's ability to remain an 'intelligent

¹ MoD Press Notice 276/99; 6 July 1999

² Ev p 21, para 2

³ 'Corporate Research' covers work with a military potential but currently without a defined military need, or work with a multiplicity of military needs (such as a research on corrosion). 'Applied Research' is aimed at developing solutions for specific military needs, including the development of capabilities for future equipments.

⁴ Ninth Report, Session 1998–99, *Defence Research*, HC 616, para 15

⁵ HC Deb, 21 February 2000 c1223

⁶ HC Deb, 29 March 2000 c159w

⁷ *ibid*

⁸ QQ 147, 148

⁹ Ninth Report, Session 1998–99, *op cit*, para 121

customer' for its research, its collaborative research programme (particularly with the US) and value for money. The Government's January 2000 response indicated that the MoD was still examining the way in which a public-private partnership might be taken forward,¹⁰ and on 17 April the Minister for Defence Procurement announced revised plans for such a scheme. We will be examining these closely in a separate inquiry.

4. Against that background, this brief inquiry served two main purposes.

- First, we wished to review the appointment of Sir Keith and the work of his organisation, in pursuit of our objective of examining key new appointments in the Department.¹¹ Unlike some other parliaments, the House does not have any formal role in confirming public appointments, which we see as an omission. Nonetheless, we consider it important that the House has an opportunity—presented by this report—to be informed about his appointment.
- Second, we took this opportunity to sustain our monitoring of the further development of the MoD's research strategy, picking up some of the outstanding issues from the Government's response to our Defence Research report, in view of the Chief Scientific Adviser's central role in taking this strategy forward.

The New CSA's Appointment

5. Sir Keith O'Nions was appointed as Chief Scientific Adviser after an open competition.¹² His contract is for three years, with an option for it to be extended by mutual consent for a further two years¹³ (and over many years, the trend has been for appointments to last for five years).¹⁴ His salary of some £110,000 a year¹⁵ is not performance related.¹⁶

6. When we examined the appointment of the Head of Defence Export Services, questions of conflict of interest were important because that postholder usually came from industry and his MoD organisation¹⁷ was involved in supporting the products of particular firms in particular markets. However, with the bulk of the MoD's research placed with DERA rather than directly with academic institutions, such issues have much less significance in the case of the CSA's recruitment from academia. Sir Keith had to give up his membership of the Council of Science and Technology because of that organisation's requirement for its members to be independent,¹⁸ and there were other activities that he volunteered to give up.¹⁹ **Given the importance of keeping current his scientific expertise and perspectives, however, we were pleased to hear that he had not been required by the MoD to relinquish any of his existing academic positions on taking up the post.**²⁰

7. The previous CSA, Sir David Davies, left the Department in Easter 1999. The appointment of his successor—Sir Keith—was announced in July 1999, and he took up his post in January 2000.²¹ We asked why such an important post had remained unfilled, and the MoD told us that another candidate had been identified at interview but had then declined to take up the appointment. This required the Department to relaunch the recruitment exercise, as a result of which Sir Keith was selected in May 1999.²² Although Sir David Davies agreed to stay on until

¹⁰HC (1999–2000) 223

¹¹Last Session, we took evidence from Mr Tony Edwards soon after he took up his duties as the Head of Defence Export Services, and reviewed the work of his Defence Export Services Organisation (Second Report, Session 1998–99, *The Appointment of the new Head of Defence Export Services*, HC 147)

¹²Ev p 21, para 3

¹³Q 15

¹⁴*ibid*

¹⁵Ev p 22

¹⁶Q 21

¹⁷The Defence Export Services Organisation

¹⁸Q 93

¹⁹Q 18

²⁰Q 18

²¹MoD Press Notice 276/99; Q9

²²Ev p 22

30 April, Sir Keith's other commitments prevented him taking up the post until this year.²³ Sir Keith told us, however, that from last August he was able to devote about a day a week to briefings, making visits to DERA and getting up to speed with some of the key issues, and thus helping to minimise the gap in the provision of advice for the Department.²⁴

8. Sir Keith comes to the MoD having had a distinguished career in earth sciences, including holding the Chair of Physics and Chemistry of Minerals and head of the Department of Earth Sciences at Oxford University since 1995,²⁵ and work in geology and geochemistry faculties of universities in the UK, Europe and North America.²⁶ When we asked whether such a specialisation would allow him to deal with the technologies perhaps more typically associated with defence equipment, he told us that—

Science in the Ministry of Defence is immensely broad; it covers everything from mathematics through to material sciences, through technology, and in some areas now really rather advanced studies of the genome and molecular biology and so on ... There is not any single scientist around, to my knowledge, anywhere in the world whose experience covers the whole spectrum in depth; anybody that is appointed will have some real expertise in a narrow part of it, and I have my own expertise in the study of materials and in particular physical or chemical behaviour of materials ... I think the strength that one hopes one might bring to the Ministry of Defence is a broader perspective of science that has come from other things that one has done with one's career ... I have been an adviser on research councils in the United Kingdom, much involved with the National Science Foundation in the US, I was involved with NASA when I lived in the US and subsequently, [and] I am an adviser to the California Institute of Technology, the Max Planck Institute in Germany, Institute Physique de Globe in Paris.²⁷

9. The CSA has traditionally been recruited from outside the MoD, not least in order to benefit from such external perspectives on scientific issues.²⁸ We believe this practice has merit, but we trust in future competitions for this post that internal candidates will not be ruled out. Sir Keith has had no previous involvement in military matters,²⁹ but he believed this could present advantages. He highlighted areas like operational analysis, which involved not just analysis of specific defence scenarios but also mathematical and modelling methodologies which do not need a grounding in defence knowledge.³⁰ He told us that so far he had not found a lack of experience of defence to be any hindrance.³¹ He also considered that skills developed outside the MoD bring a difficult dimension to scientific advice compared to that available to staff within the MoD.³² **The scope of the science covered by MoD research requires the Chief Scientific Adviser to have a depth and breadth of knowledge. Sir Keith seems well-equipped to bring a wide range of expertise to bear on his new work.**

The CSA's Role

10. The CSA's organisation plays an important role in all stages of the equipment procurement cycle³³—the definition of requirements, scientific research, acquisition and in-service support. The CSA is responsible for the corporate research programme managed by his deputy³⁴ and the applied research programme which he delegates to the newly established Deputy Chief of the Defence Staff (Equipment Capability).³⁵ CSA staff are also involved in integrated project teams

²³ *ibid*

²⁴ Q 10

²⁵ MoD Press Notice 276/99

²⁶ *ibid*

²⁷ Q 4

²⁸ Ev p 21, para 2

²⁹ Q 27

³⁰ Q 27

³¹ Q 28

³² QQ 13, 34

³³ Q 67

³⁴ The Deputy Under Secretary (Science and Technology)—currently Mr Graham Jordan

³⁵ QQ 97, 98

in the Defence Procurement Agency and Defence Logistics Organisation, which are responsible for the through-life acquisition and support of particular classes of equipment. This involvement in project teams is not extensive, however, and Sir Keith did not see any danger of conflicts of interest within his organisation when equipment programmes were presented to the Equipment Approvals Committee for consideration.³⁶

11. These various CSA roles have been reshaped in the last year or so, as reforms introduced by the Strategic Defence Review (SDR) have been put in place—the establishment of the Defence Procurement Agency, Defence Logistics Organisation and the Equipment Capabilities organisation, and working within a framework of the new procedures of the smart procurement initiative.³⁷ Sir Keith believed that if the MoD stuck rigorously to the philosophy of smart procurement it should lessen significantly the chance of things going badly wrong after an equipment project's so-called main gate³⁸ approval by the Equipment Approvals Committee.³⁹ He had found the methodology used in technical risk assessments to be sound. He considers that, although the risk would never be reduced to zero, if smart procurement principles were operated across the board the MoD should be able to secure significant reductions in project risks.⁴⁰ More generally, he believed that the MoD's smart procurement initiative and other organisational changes arising from the SDR had produced a healthier climate for managing procurement, with CSA staff being closely involved with those in the applied research programme, the equipment capability area and in integrated project teams.⁴¹ The new procedures and organisational structures of smart procurement should indeed produce a healthier environment for managing the equipment programme, and in our recent inquiry on the MoD annual reporting cycle we heard examples of some of the *potential* savings envisaged by the Department.⁴² Whether risks will be reduced to such an extent that projects will no longer go off the rails, however, will become apparent only when projects exposed to the new regime are delivered. We will continue to monitor closely the MoD's performance in managing risk in its equipment programme.⁴³

12. Within the equipment cycle, one of the CSA's most important and high-profile roles is as chairman of the Equipment Approvals Committee (EAC), which evaluates and approves equipment procurement programmes. In addition to the CSA, the Committee comprises: the 2nd Permanent Under Secretary, as the MoD's Accounting Officer's representative; the Chief of Defence Procurement, as the provider of the equipment to meet the requirement; the Chief of Defence Logistics, representing those who will maintain and support the equipment once in-service; and the Vice Chief of the Defence Staff, representing the equipment's user. The Committee has a collective responsibility for advising Ministers on major procurement decisions, and as its chairman the CSA's contribution is to bring an independent perspective to procurement considerations, encompassing scientific aspects, the choice of technologies, assessments of risk, and the adequacy and appropriateness of supporting operational analyses.⁴⁴

³⁶Q 128

³⁷We reviewed in some detail the components of the smart procurement initiative in our report on *The Strategic Defence Review* (Eighth Report, Session 1997–98, HC 138-I, paras 333–351) and the *MoD Annual Reporting Cycle* (Second Report, Session 1999–2000, HC 158, paras 129–138)

³⁸Under the more streamlined procedures of the smart procurement initiative, the EAC only considers projects at two points—the 'initial gate' after the concept stage, and the 'main gate' after the assessment stage, at which point about 15% of a project's development costs ought to have been incurred

³⁹QQ 122–124

⁴⁰QQ 122–124

⁴¹Q 77

⁴²Second Report, Session 1999–2000, *op cit*, para 132

⁴³Including through the Committee's annual Major Procurement Projects Survey. Our first report in this series was our Eighth Report, Session 1998–99, *Major Procurement Projects Survey: The Common New Generation Frigate Programme*, HC 554

⁴⁴Ev p 22, para 8

13. Procurements worth less than £400 million are usually delegated to meetings of the subordinates of the Equipment Approvals Committee members.⁴⁵ Although only two months in post, the new CSA had already had to chair a meeting at which the Committee had considered two very important programmes: the Beyond Visual Range Air-to-Air Missile (BVRAAM) for the Eurofighter/Typhoon and the MoD's strategic airlift programmes. As chairman, the CSA's job is to "ensure that the advice that goes to Ministers is comprehensive and balanced".⁴⁶ He considered that the quality of the analysis and scrutiny in cases submitted to the Committee had made consensus decisions quickly achievable,⁴⁷ although this represented the reconciliation of often conflicting views at lower levels in the Department. He believed that—

... there has to be some merit in having a Chairman who is clearly representing technical fairness and could not be seen to have a particular Service allegiance. ... It may well be that there is a little more adversarial behaviour at the lower levels now which is extremely healthy. For example, people in the CSA area have a role in scrutiny and analysis of ... what comes from the customer and the procurer. This may be based on some of the same evidence that is emerging low down which may well come from DERA, for example, but it is set up in a way where there really is an independent assessment of that evidence by people in the CSA area ... I can assure you that the gloves come off down there. This is a very healthy thing. It is the quality of what goes on down there that is essential to the smaller group of people [in the EAC] reaching a sound consensus quickly ...⁴⁸

14. The bottom line for the EAC, we were told, is value for money—an assessment of technical capability and the costs of the project.⁴⁹ As part of its advice to Ministers the Committee draws attention to the views of other Government departments such as the Department of Trade and Industry⁵⁰ and the Treasury on, for example, the implications of a particular decision for UK industry.⁵¹ Ministers, however, "may well give a different emphasis to some of those elements",⁵² and inter-departmental consultation also takes place at Ministerial level once MoD Ministers have considered an EAC recommendation.⁵³ Sir Keith therefore drew a careful distinction between the responsibilities of his Committee and those of Ministers—

... we will be alert to industrial impacts because the DTI, for example, may approach us and say "Well, if this particular project was placed in the UK it may have this impact on a capability, or on jobs, and so on." [Ministers'] ... attention will be brought to that [aspect] in the advice that we bring forward. There is a great distinction between that, and offering advice in such a way that it is politically convenient or inconvenient, and I have absolutely no doubt where our responsibility ends. I do not believe there is any confusion in the minds of Ministers either.⁵⁴

The careful limitation of the Equipment Approvals Committee's role to that of an independent source of advice on equipment cost-effectiveness is important and right—it would be wrong for it to have to assess the weight of factors which depend essentially on political judgements in making its recommendations. If Ministers follow a course that does not reflect their advisers' recommendations which are based on value for money, they are required to give a direction to the MoD's Accounting Officer,⁵⁵ who is currently obliged to notify

⁴⁵ MoD 'Smart Procurement Handbook', on MoD website

⁴⁶ Q 113

⁴⁷ Q 72

⁴⁸ Q 116, 117

⁴⁹ Q 120

⁵⁰ In our Seventh Report of Session 1997–98, HC 675, paras 8–10, we called for greater involvement by the DTI in EAC deliberations

⁵¹ Q 120

⁵² Q 120

⁵³ Ev p 25

⁵⁴ Q 131

⁵⁵ Following the Pergau Dam case, the Committee of Public Accounts recommended that Accounting Officers obtain Ministerial directions (and communicate these to the C&AG without delay) when Ministers do not follow advice concerning 'prudent and economical administration, efficiency and effectiveness', to complement already existing arrangements when the regularity and propriety of government expenditure is involved (Seventeenth Report of Committee of Public Accounts, Session 1993–94, HC 155, para xiv). The Government accepted this recommendation

the Treasury and the Comptroller and Auditor General, and thereby the Committee of Public Accounts. While that Committee is primarily concerned with the propriety and value for money of departments' expenditure, our remit extends to wider matters including policy considerations.⁵⁶ We recommend therefore that in future such Directions are also submitted to the Chairman of the Defence Committee.

The Status of Science in the MoD

15. The CSA's role is an important one, and his organisation needs to be well positioned to ensure that scientific advice gets a proper hearing within the Department. One of his tasks is to chair the Defence Research Committee,⁵⁷ which is required to review and endorse the overall balance and content of the Department's research programme. Its responsibilities involve ensuring that the research programme reflects evolving defence policy and procurement priorities; advising on the appropriate balance between shorter and longer term research; and promoting value for money in defence research.⁵⁸ The Defence Research Committee is due to report to the Secretary of State later in the Spring on the overall health of the MoD research programme, but when we asked for this report we were told that it constitutes 'advice to Ministers'.⁵⁹ We are disappointed that once again the MoD has declined to let us see such an important document, at the heart of a select committee inquiry, citing such grounds. If this is still the Department's position when the Defence Research Committee's report is prepared, the MoD must at the very least distil for us those matters that summarise the state of health of the programme, leaving out if necessary the recommendations and other 'advice' it provides for its Ministerial audience.

16. Sir Keith highlighted his own position within the decision-making machinery of the Department, including his membership of the top level committees in the Department—the Finance Planning and Management Group and the Defence Council—and his personal direct access to the Secretary of State.⁶⁰ This, Sir Keith told us, meant that the CSA had—

... a very high profile and engagement at the most senior levels of the Department ... one is plugged in at a very high level, which is not always true of science and technology elsewhere in government departments.⁶¹

17. Amongst the 130 staff in the CSA's organisation there are a large number of people across a wide range of scientific disciplines, many of whom have already had substantial careers in science and technology in defence establishments, such as DERA.⁶² In our *Defence Research* report, we highlighted the risk that the public-private partnership then proposed for DERA might prevent the scientific expertise of central MoD organisations, like the CSA's organisation, being refreshed with staff from DERA.⁶³ The issue was not properly addressed in the Government's response to our report,⁶⁴ so it was gratifying to note that in this area Sir Keith shared our analysis—

Historically, many people have come into the CSA area during careers principally within DERA ... and then gone back into their research jobs in those organisations ... It is not obvious ... that in the future that is going to be such a normal route for people coming into the CSA area. With a public-private partnership in DERA, one can envisage some different relationships developing, and I think I am going to have to be imaginative in the way in which I refresh and populate the CSA area in the future. It may not be done in the same way

(Treasury Minute 1993–94, Cm 2602, para 13), requiring that directions concerning 'economy, efficiency and effectiveness' be sent to the C&AG.

⁵⁶ Standing Order No. 152

⁵⁷ There is also a similar 'Defence Research Committee (Nuclear)'—Ev p 25

⁵⁸ Ev p 22, para 4

⁵⁹ Ev p 25

⁶⁰ Q 29

⁶¹ Q 29

⁶² Q 75

⁶³ Ninth Report, Session 1998–99, *op cit*, para 94

⁶⁴ HC (1999–2000) 223, p xi

as it has been done in the past.⁶⁵

18. In addition to the CSA and the Defence Research Committee, there are a number of other sources from which Ministers receive external perspectives on the MoD's research programme and the state of science in the Department. Perhaps the most significant of these is the Defence Science Advisory Council, which comprises over 150 external independent advisers across a number of areas of science and technology, drawn from industry and academia.⁶⁶ It peer-reviews the MoD's research programme and meets regularly to formulate advice for the CSA and the Secretary of State.⁶⁷ Other external advisory committees deal with nuclear safety and effectiveness, Gulf War illnesses, biological and chemical countermeasures, research ethics and animal welfare.⁶⁸

19. Sir Keith believed that the Ministry of Defence set a high store on science and technology informing its policy—probably, he thought, more than any other government department.⁶⁹ It is heartening to hear praise for the strength of the MoD's science and technology base coming from a relative newcomer to the Department. The future high profile of these critical elements depends on a sound and adequately funded research strategy.

The MoD's Research Strategy

20. Our defence research report of last year described work under way by the MoD and industry to establish an overarching defence research strategy. Its aim was to lay a knowledge foundation across a broad area of research and technology, so that the MoD could remain an 'intelligent customer' for defence equipment and know-how, and then to identify 'towers of excellence' in particular technologies which should rise above such a foundation. Critically, the strategy seeks to establish for each of these towers of research expertise whether it should be led by industry, the MoD or by others. In our report, we welcomed the methodical approach being adopted, but warned that it would be a missed opportunity if the exercise were not undertaken in a logical manner, with research funding following the strategy rather than the other way around.⁷⁰

21. Since our report, discussions have continued between the MoD and industry to develop further the towers of excellence model, and are expected to continue throughout this year.⁷¹ In its response to our report the MoD told us that—

The level of funding for research must take account of the many other competing calls on resources allocated to defence. The MOD's work on Towers of Excellence is not concluding that defence research can be reduced still further ... The US spends about ten times as much as the UK on research, and about two and a half times as much as the whole of the European Union. Even in the event of a considerable increase in expenditure, the UK would be unable to match that of the US on research. These ratios suggest that we need to be selective about the technologies we develop nationally or on a European basis, and be prepared to use US technologies in other areas ... The purpose of the Towers of Excellence model, therefore, is to be selective in a rational way about the research we should undertake, and about making the necessary choices in partnership with industry. It is not a model for reducing our expenditure on research⁷² ...

However, in terms of the strategy's implications for research funding, the MoD said that it—

... accepts the [Defence] Committee's point that in a perfect world funding decisions would flow from strategy. No organisation, however, can develop strategies in isolation which may

⁶⁵Q 79

⁶⁶Ev p 24

⁶⁷Q 54; and Ev p 24

⁶⁸Ev pp 24, 25

⁶⁹Q 28

⁷⁰Ninth Report, Session 1998–99, *op cit*, para 51

⁷¹Ev p 22

⁷²HC (1999–2000) 223, p vi (paras 58, 59)

be unaffordable. Strategies must take account of funding constraints, but this does not mean that they are necessarily flawed.⁷³

22. The CSA's message to us was similarly double-edged, indicating that he was prepared to defend his research budgets, but that at this early stage in the post he did not see any glaring gaps in the research programme—

The corporate research programme and the applied research programme is under the control of the Chief Scientist by direct delegation from the Permanent Secretary. It can only be modified by the Finance Planning and Management Group, of which I am a member, so I have every opportunity to defend that budget ... I have looked at the research programme [however] ... and I have not found any real horrors, such as "Oh, my goodness, there is this great hole here. There is this new technology developing, it is going to change the world of defence and we have not got a penny of expenditure in it." I have not found areas like that. We are not in a disastrous situation and we are not in a situation where you could say there is great inadequacy in what we are doing.⁷⁴

23. Against the background of the size of the budgets that the MoD makes available for defence research, the new CSA saw it as an important part of his work to facilitate international collaboration⁷⁵ on defence research⁷⁶—

Given the size of our research budget, which is substantial but ... only about one tenth of the United States', in order for us to have the access to knowledge that we require to run defence properly, collaboration is exceedingly important. So, in some ways we are driven on that basis alone to much greater collaboration with Europe, but there is considerable enthusiasm for it there. That, to some extent, offsets the reduction in the amount of money we ourselves have to spend on research.⁷⁷

24. Underlying the whole debate about research budgets, and the future status of DERA, is the inherent difficulty of evaluating the cost-effectiveness of defence research. Sir Keith told us that he wants to be able to develop the measurement of research's value for money—an area where outcomes have been difficult to establish, in the wider research environment as well as in the MoD.⁷⁸ He told us that he was—

... trying to quantify [outcomes] and to put up an appropriate level of defence for science and technology ... on the basis of advice I can get about what our science and technology programme should be doing. This is going to be particularly the case as we move into a public-private partnership for DERA, which is going to shift the equation a bit.⁷⁹

25. The question of value for money and the funding of research is closely tied up with the wider issue of DERA's ownership, which we have discussed extensively elsewhere.⁸⁰ Private ownership may well influence the availability of finance, but it may also have consequences for the MoD's intelligent customer capability, and thus in time for the cost-effectiveness of its research expenditure. The MoD's response to our defence research report acknowledged that impartiality of advice is essential to support intelligent decision-making, and that the only way to ensure this was through direct public funding of core research.⁸¹ The ability of the MoD to retain its intelligent customer status had been raised by many stakeholders during the last consultation process for the originally proposed public-private partnership,⁸² however, and Sir Keith acknowledged that ensuring the research foundation layer remained sufficient for this

⁷³ *ibid*

⁷⁴ Q 46

⁷⁵ The UK's main collaborative partners are listed at Ev p 23

⁷⁶ Q 38

⁷⁷ Q 36

⁷⁸ Q 41

⁷⁹ Q 46

⁸⁰ Ninth Report, Session 1998–99, *op cit*

⁸¹ HC (1999–2000) 223, p vii (para 60)

⁸² *ibid*, p xi (para 94)

purpose would be a challenge.⁸³ Across the research budget more generally, however, the CSA was more relaxed about the ability of the private sector to provide impartial advice—

I do not see any reason why people working in private sector organisations who are giving advice to anybody, government or business, should necessarily be partial. We are accustomed to advice coming from big consultancies in the environmental area ... We get advice extensively everywhere from management consultants, financial consultants, merchant bankers and so on. You may or may not have different views on the partiality or impartiality of their advice, but I am sure that they are engaged on the assumption that their advice will be impartial.⁸⁴

The Chief Scientific Adviser is the figurehead of the MoD's publicly-funded, impartial, scientific advisory capability. He will not be able to discharge his functions properly if he is deprived of access to sufficient staff, of sufficient expertise and with sufficient experience, to enable him to provide advice of the right quality. **The continued ability to retain impartial scientific advice is, as we have made clear time and again, a crucial criterion by which we shall judge whether the future plans for DERA's ownership and structure are appropriate.** We wish Sir Keith well in his new post, and trust that he receives the support he needs to discharge his duties effectively.

⁸³Q 33

⁸⁴Q 82

PROCEEDINGS OF THE COMMITTEE

WEDNESDAY 19 APRIL

[morning sitting]

Mr Bruce George, in the Chair

Mr Julian Brazier
Mr Jamie Cann
Mr Harry Cohen
Mr Mike Gapes
Mr Mike Hancock

Mr Stephen Hepburn
Mr Jimmy Hood
Dr Julian Lewis
Laura Moffatt
Mr Peter Viggers

The Committee deliberated.

Draft Report (The MoD Chief Scientific Adviser), proposed by the Chairman, brought up and read.

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

Paragraphs 1 to 25 read and agreed to.

Resolved, That the Report be the Sixth 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.

The Committee further deliberated.

* * *

[Adjourned till this day at a quarter-past Four o'clock.]

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DEFENCE COMMITTEE REPORTS IN THE CURRENT PARLIAMENT**Session 1997-98**

FIRST REPORT, Peace Support Operations in Bosnia and Herzegovina, HC 403, published on 8 December 1998.

SECOND REPORT, Draft Visiting Forces and International Headquarters (Application of Law) (Amendment) Order 1998, HC 521, published on 2 February 1998.

THIRD REPORT, NATO Enlargement, HC 469, published on 2 April 1998.

FOURTH REPORT, Lessons of the Chinook Crash on the Mull of Kintyre, HC 611, published on 18 May 1998.

FIFTH REPORT, The Reserves Call Out Order 1998, Etc., HC 868, published on 10 August 1998.

SIXTH REPORT, The Defence Evaluation and Research Agency, HC 621, published on 6 July 1998.

SEVENTH REPORT, Aspects of Defence Procurement and Industrial Policy, HC 675 (also Eighth Report from the Trade and Industry Committee) published on 23 July 1998.

EIGHTH REPORT, The Strategic Defence Review, HC 138 (volumes I-III), published on 10 September 1998.

Session 1998-99

FIRST REPORT: The Strategic Defence Review: Territorial Army Restructuring, HC 70, published on 22 February 1999.

SECOND REPORT: The Appointment of the new Head of Defence Export Services, HC 147, published on 31 March 1999.

THIRD REPORT: The Future of NATO: The Washington Summit, HC 39, published on 13 April 1999.

FOURTH REPORT: The Draft Visiting Forces and International Headquarters (Application of Law) Order 1999 and the Draft International Headquarters and Defence Organisations (Designations and Privileges) (Amendment) Order 1999, HC 399, published on 23 April 1999.

FIFTH REPORT: Security of Supply and the Future of Royal Ordnance Factory Bishopton, HC 274, published on 28 May 1999.

SIXTH REPORT: The Reserves Call Out Order 1999 and Progress of Territorial Army Restructuring, HC 860, published on 8 November 1999.

SEVENTH REPORT: The Strategic Defence Review: Defence Medical Services, HC 447, published on 4 November 1999.

EIGHTH REPORT: Major Procurement Projects Survey: The Common New Generation Frigate Programme, HC 544, published on 10 November 1999.

NINTH REPORT: Defence Research, HC 616, published on 10 November 1999.

FIRST REPORT: The OCCAR Convention, HC 69, published on 6 December 1999.

THIRD REPORT: Annual Reports for 1997 and 1998 on Strategic Export Controls, HC 225, published on 11 February 2000.

FIFTH REPORT: The Defence Geographic and Imagery Intelligence Agency, published on 10 April 2000.

MINUTES OF EVIDENCE

TAKEN BEFORE THE DEFENCE COMMITTEE

WEDNESDAY 8 MARCH 2000

Members present:

Mr Bruce George, in the Chair

Mr Julian Brazier
Mr Jamie Cann
Mr Harry Cohen
Mr Mike Hancock

Mr Jimmy Hood
Dr Julian Lewis
Mr Peter Viggers

Examination of Witness

PROFESSOR SIR KEITH O'NIONS, FRS, Chief Scientific Adviser, examined.

Chairman

1. Welcome.

(*Sir Keith O'Nions*) Thank you.

2. I must reassure you, this is not a confirmation hearing; if you are unable to even tell us the answer to who Galileo was and fall on your face we can do nothing whatsoever about it!

(*Sir Keith O'Nions*) I am sorry, what was the question again!

3. Your contract is absolutely secure, I can assure you. However, we do feel, every now and again, that it is necessary to interview incumbents in senior positions, especially as we have produced a report quite recently, as I am sure you are aware, on *Defence Research*. We thought it would be an appropriate time to seek your views, although you have only been in the post for a couple of months. We do not expect you to have found out everything that is going on inside the Ministry—we have been trying for 20 years and failed miserably, so I do not think you will succeed.

(*Sir Keith O'Nions*) That is a very encouraging remark. Thank you.

4. Thank you very much for coming. The Ministry of Defence have told us that you were appointed as the Chief Scientific Adviser because of your "breadth of scientific expertise".¹ I am not in a position to engage in an academic discussion with you, having only just passed O Level General Science, but at first sight it might look odd that in looking at your past research background it appears to have been in earth sciences. I know you are not the first incumbent in this position to be a specialist in earth sciences, but can you tell us what is the peculiar attraction to the Ministry of Defence—apart from well-known perversity—to choose somebody whose background is in earth sciences and not in those areas which one would have thought to have been more mainstream to the Ministry of Defence? I am sure you have been asked this question a thousand times, including at your interview.

(*Sir Keith O'Nions*) Not a thousand times, and perversity may be the right reason, but I will try and give you an alternative possibility, perhaps. Let me

tell you something about earth science in just a couple of sentences, and perhaps that will give you some background. Earth sciences is involved in the study of the planets, the origin of the planets, the solar system, the place of the earth within it, the study of the oceans, climate change and so on. It is immensely broad, and about anything to do with the environment in which we live. So it is rather different from the 19th Century collecting of fossils and tapping rocks with a hammer. Modern earth sciences is, really, a collection of people that come from mathematics, physics, chemistry, from modern molecular biology and biochemistry, applying their skills to understanding the planet and how it came about—the origin of life and our environment. My own particular background is reasonably broad within that. For the last 35 years, until two months ago, I was a full-time academic and researcher, much more at the physics and chemistry side of the subject. On a day-to-day basis, if you had visited my laboratories in Oxford, you would have seen a room bristling with machines looking at surface science, material science, natural materials, mass spectrometers, flashing lights, lasers and so on. So my background is very much applying modern physical and chemical methodology to understanding some aspects of the earth. That is by way of background. Why should the Ministry of Defence be interested in that? Science in the Ministry of Defence is immensely broad; it covers everything from mathematics through to material sciences, through technology, and in some areas now really rather advanced studies of the genome and molecular biology and so on—as you well know from people you have talked to before. There is not any single scientist around, to my knowledge, anywhere in the world whose experience covers the whole spectrum in depth; anybody that is appointed will have some real expertise in a narrow part of it, and I have my own expertise in the study of materials and in particular physical or chemical behaviour of materials. My Professorship in Oxford was called *The Physics and Chemistry of Minerals*. I think the strength that one hopes one might bring to the Ministry of Defence is a broader perspective of science that has come from other things that one has done with one's career, other than the individual research that one has performed and published upon and, probably, what one receives one's academic

¹ See p. 22 para. 3.

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PROFESSOR SIR KEITH O'NIONS

[Continued]

[Chairman Cont]

accolades for. You would probably need to talk to the committee that appointed me, but I would have assumed that the sort of thing they would have taken into account is the very broad experience I have had in research councils in the United Kingdom. For something like ten years I have been involved in a committee called Individual Merit Promotion which interviews senior scientists across all of the research councils, the Natural History Museum, the Building Research Institute, the Agriculture Institute in Scotland, Kew Gardens—in all these sorts of areas—considers these people and promotes them to what are called Individual Merit Promotion Positions. So over that ten years I have seen, interviewed and made decisions across the full breadth of science, from astronomy and astrophysics, on the one hand, to plant biology on the other. That has given me an enormous experience, and maybe that was considered relevant by the MoD. In addition to that, I have been an adviser on research councils in the United Kingdom, much involved with the National Science Foundation in the US, I was involved with NASA when I lived in the US and subsequently, I am an adviser to the California Institute of Technology, Mr Max Planck Institute in Germany, Institute Physique d'Globe in Paris and so on. So probably I have wasted more of my time on those sorts of activities than many people at this point in their career, and possibly that sort of background was of interest to those that interviewed me for the MoD job. Is that helpful?

5. Yes, sure. I suppose, having come out of academic politics, even the backstabbing in the Ministry of Defence must seem a bit of a doddle.

(Sir Keith O'Nions) I have not seen any backstabbing in the Ministry of Defence.

6. You have only been there two months, Professor.

(Sir Keith O'Nions) However, with 30-odd years in academia—

7. Will equip you for anything.

(Sir Keith O'Nions)—will equip me for anything. Walking through the corridors here reminds me of Oxbridge so much that I feel quite at home.

8. In my long career I have met, in my workplace, megalomania, stupidity, threats of physical violence, and I left academia in 1974 and came here. I find politics quite relaxing compared to an academic staff room.

(Sir Keith O'Nions) I think I am feeling more reassured as time goes on.

9. With all your qualifications, clearly, they made a very wise choice, but your predecessor left last summer. The MoD has managed to survive a long period without your expertise. Why did it take so long to shift over, and what do you have to do to overcome the problem that you were absent for six months?

(Sir Keith O'Nions) I think that is a very reasonable question. The position was advertised, I suppose, more than a year ago, maybe close to two years ago. There was a considerable hiatus in the appointment, but I do not know what interview cycles were gone

through and so on.² Graham Jordan, who is the Deputy Under-Secretary for Science and Technology and an exceedingly able person, with a long background in science, was able to fill in that gap, or that hiatus. I believe that Den Davies, the previous Chief Scientific Adviser was retained until about last Easter, so there were not very many months without a proper steer. I was appointed, if I am correct, more or less about last July, and the Ministry of Defence was extraordinarily helpful in trying to introduce me into the—

10. Culture?

(Sir Keith O'Nions) They almost placed me in the kindergarten and helped me along. From about August of last year onwards I was able to devote about a day a week to briefings, making visits to DERA and getting up to speed with some of the issues of the day. So, probably, the gap without some advice from a person in the leadership position was really not as long as, perhaps, it appears from the appointment cycle. That does not mean to say there are not things to be done. I have not found the shop in disastrous order, I have found the shop in pretty good order.

11. Can I ask you an obstreperous question, if you will forgive me? Our salaries are pretty well-known. I have looked through the documentation and cannot see whether you get more than the head of DERA. Is it more or is it less, and if it is less—

(Sir Keith O'Nions) I have no idea what the head of DERA gets.

12. £140,000 a year. He is the top.

(Sir Keith O'Nions) It is less. My appointment was negotiated within the frame of the advertisement that was placed in the public domain, and I believe is well within the bounds set in that advertisement. To help you a little bit further, I believe it is less than the Chief Executive of DERA.³

Chairman: So we have to look for the advert to find out what band you are in then? We will do that. You have challenged me to look at *The Times*.

Mr Hancock

13. I heard what you had to say at the beginning, which was very interesting, but I am interested in why somebody who has spent most of their life looking at what God created should join the demolition gang at the Ministry of Defence. Why would you want to do that?

(Sir Keith O'Nions) I am not going to challenge you on the point of creationism and whether God created it or otherwise. This is a very heavy debate which goes on in the United States, and this is not a debate I would engage in here. Why should somebody with my sort of background, who has had some success in academic and a life in it, see any sort of challenge in this type of job? I think that is a very fair question, and it is one that I asked myself a great deal about whether I should take the position. Let me put it like this: the breadth of science in the Ministry of Defence and the opportunities that it offers to somebody like me, both in an intellectual and

² See p. 22 para. of Replies from the MoD.

³ See p. 22 para. 2 of Replies from the MoD.

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PROFESSOR SIR KEITH O'NIONS

[Continued]

[Mr Hancock Cont]

practical sense, after a long career in science, is really a privilege. There are rather few jobs where one can get involved in that breadth of science. Defence is an important matter, it does matter, and I believe to provide proper advice to the Secretary of State, to the Department and more widely to Government, does need some of the skills that a person like me should have. I think they are difficult to develop in the scientific community that has, perhaps, been embedded in the pure civil service research establishment. I sincerely believe one needs that sort of advice. It is enormously broad and they are extremely important issues. So, for me, it is a privilege to have the opportunity to attempt this. Why should I give up doing the research that I am doing? I have done one thing with some success for 30-odd years, but I think most of us thrive on challenges. Perhaps one burns bridges in accepting a challenge which is different to that in which one was previously based, but it is one about which, so far, I have no regrets.

Chairman

14. And the rocks will still be there when you go back.

(*Sir Keith O'Nions*) The rocks will still be there long after this Committee stops meeting.

Mr Hancock

15. That is the difference—He made them to last! How long does your appointment run for? Is there an opportunity for you to extend it, or for the MoD to want to extend it?

(*Sir Keith O'Nions*) Yes. At the moment it is a three-year fixed contract. There is an option for this to be extended by mutual agreement for a further two years to five years. I think, to my knowledge, if one looks back over this position, historically, the Ministry of Defence—to use your language—has been rather perverse for 40 years or so in taking its Chief Scientific Adviser from the outside world, as it were—from academia, from the research community—five years has been the typical sort of duration, going right back to the 1950s. So it is a rather long-standing perversity.

16. You bring with you all these skills that you have accumulated over the last 30 years.

(*Sir Keith O'Nions*) Hopefully.

17. How do you intend to maintain your scientific currency? You will be competing with individuals who are bringing issues to you who are actually at the coalface of technological development. Where do you sustain your credibility?

(*Sir Keith O'Nions*) That is very important. It is important that I maintain and sustain credibility in the broader scientific world. In several ways. I am a Fellow of the Royal Society, so I am engaged at the Royal Society and much closer to it in Whitehall than I am in Oxford. So that is a high level scientific community in which I will remain fully engaged. I have a leave of absence from Oxford; I have not severed links totally with Oxford, although, realistically, I am not going to be working at the research bench five days a week. However, I still do

have research students that have to finish their PhDs, so that will go on for a few more years, and I devote time at weekends to assisting them, advising them and helping them. That is not, really, a strenuous thing to do; that sort of science and science advice is almost a leisure activity, so I will remain engaged in that sense, although the amount of personal time that I will devote to research will be, obviously, very much less. One other thing that I do, which the Ministry of Defence agreed to at the time of my appointment, is that I am a Trustee of the Natural History Museum, which is another very large forum of science related to natural history and the environment. The Ministry of Defence agreed that I could remain a Trustee of the Natural History Museum, which I am extremely grateful for. It is a very different activity and rather a welcome one, and the Trustees meet four times a year so it is not terribly onerous. That is another forum in which I will maintain connection. One other thing is that I will also make sure that I attend international scientific conferences, on occasion, to maintain those connections. I may well need to go back to this profession.

18. Were you asked to give up anything that you particularly wanted to keep?

(*Sir Keith O'Nions*) No, I was not, actually. It has been a very good engagement with the Ministry of Defence. There are things that I volunteered to give up and knew that, just from a practical point of view, I would have to give up. For example, I have been much involved in European Union committees through DG XII over many years. That I have stopped. I am presently Chairman of the Individual Merit Promotion Panel for the research councils, which I mentioned before. I have been Chairman of it for five years and a member of that Panel for 10 years. I have opted not to continue with that, and after 10 years on a committee and five years as Chairman, it really is time to hand over anyway. That I am not going to continue. This was a voluntary thing, there was no pressure put upon me. When I wrote to the Ministry of Defence and said that with the appointment I would like to maintain these sorts of involvements they agreed to it without discussion. So I think it has been a very sensible arrangement and not one which has been the result of negotiation.

19. The Chairman was extremely curious about how much you were being paid for this job, and I am sure he will ferret that information out and share it with us.

(*Sir Keith O'Nions*) I will tell you if you ask me.

20. That is not the issue. You will no doubt be aware of the notoriously bad record on procurement and delivery that the MoD has.

(*Sir Keith O'Nions*) I have read a few things in the press.

21. And about projects continuously changing. Is there anything that has been linked to your taking this post on to a better performance from the MoD based on your influence and getting things right?

(*Sir Keith O'Nions*) No, the salary I get is not performance related.

22. Just one final question: were you aware of how big a competition there was for this post?

(*Sir Keith O'Nions*) No.

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PROFESSOR SIR KEITH O'NIONS

[Continued]

[Mr Hancock Cont]

23. Were you satisfied that the ad that you talked about was pitched at a high enough level to be sure that what the Ministry of Defence was trying to achieve and what was, hopefully, going to be achieved in the national interest was good enough?

(Sir Keith O'Nions) I feel it is not my job to pass judgment on the advertisement. I was initially approached by a recruiting agency on behalf of the Ministry of Defence head hunters. It probably does not matter quite what the wording is of an advertisement put out by the Ministry of Defence on this. The broader scientific community knows well the position of Chief Scientific Adviser in the Ministry of Defence; there is a long history of some very distinguished people and some very able people that have done that, and it is one of the jobs that the broader scientific community has its eyes on. Another one, I think, which is very attractive to many—not all—in the scientific community is Chief Scientific Adviser to the Cabinet, the position which Bob May has at the moment. These are positions that are well-known and have a cachet associated with them, so that the availability of that position is, in itself, attractive. So I do not think I could really comment on whether the way in which the MoD has handled this has given the best trawl. You may think it has not trawled very successfully, and that may prove to be the case.

24. Were you aware of a fairly healthy competition?

(Sir Keith O'Nions) I have no idea who else was interviewed for this position, and I made no attempt to find out.

25. I am amazed. I am amazed that somebody in your position, coming from your background, saying that this is one of the jobs that are cherished by your academic equals, was not aware of how many of them were in the ring.

(Sir Keith O'Nions) This would be true if the vice-chancellorship of a university of wherever was available. Things are often performed quietly and one would not necessarily know who else had thrown their hat in the ring. There is a tendency for most people in academics, who have a certain pride to protect, not to walk around boasting that they are being interviewed for a job, because the most likely outcome is that you will not get it. There is a tendency not to be too noisy about an application for it.

Mr Hancock: That is very useful.

Chairman: I am just delighted, when you are telling us you have been involved in selecting people on the basis of merit, that fortunately Committee Chairmen are not chosen on that basis. It is governing party and seniority—and long may it remain like that!

Dr Lewis

26. Sir Keith, according to the MoD, your role is to provide top level advice on science, technology and operational analysis. I have no problem with the first two of those, but it is evident from what you have been saying that you have little or no background involvement with the services.

(Sir Keith O'Nions) This is true.

27. In what way can you provide top level advice on operational analysis?

(Sir Keith O'Nions) Operational analysis is not an area that I have had any involvement with. I had no previous involvement with the military before taking this job, as you well understand. Modern operational analysis has various facets to it. One is, of course, the specifics of defence scenarios, and so on, which is not an area in my expertise, but the methodology by which one does this analysis is mathematical and involves modelling. With a good scientific background, the way in which that modelling is performed, the type of mathematics that is used, the way in which the results are presented and the uncertainties on them, and the risks that may evolve from them is the sort of thing which one can judge in a peer manner.

28. Can I just pursue it a little further by reference to the fact that you said that there is a long tradition in the Ministry of Defence of appointing prominent scientists from the world of academia. That is certainly true. However, when this process started, at the end of the Second World War, with people like Sir Henry Tizard, and the Defence Research Policy Committee, those people—even though they were distinguished external academics—had been involved, not only during the war but even before the war, in defence-related issues. Was there no aspect of former interest or involvement in defence-related issues that was raised in the course of deciding whether you would be given the job?

(Sir Keith O'Nions) I think it was perfectly apparent to both the recruiting agency and to the panel that interviewed me—the Chairman of which was the head of the first Civil Service Commission, and the Chief Scientific Adviser, Sir Robert May, was on the panel, Kevin Tebbit, the Deputy Permanent Under-Secretary was on the panel, Alan Rudge, previously of British Telecom and with quite an involvement with the Ministry of Defence, was on the panel and others (I have not got a list of them but those are the ones I remember)—even before I was interviewed, that I had not had any interaction with defence per se. There are a number of areas which I have had involvement with that are not unrelated. One of the things I did was advise for a number of years on underground disposal of radioactive waste, which is a subject I know quite a lot about. You may say how come you know about that. Well, the whole business of disposing of radioactive waste in the subsurface is what happens to it in the subsurface and how fluid flow may diffuse it and disperse it. That is, really, the subject that I know a lot about. I also have quite a reasonable background in nuclear chemistry. So there are areas that give me a very easy intro into some of the issues, but I think the fact that I have not had any real involvement with the military before was well-known to those that interviewed me, and one has to say that they made their choice on the balance of career background. Can I just add one other thing? I have now known something about the MoD for about half a year and I have been fully immersed in it—probably to just about somewhere between my lips and the bottom of my nose—for a couple of months, and I do not think that I have found the lack of experience of defence before that any hindrance. People are immensely supportive, and the MoD has gone to a lot of trouble to introduce me to these things. I have met all of the Chiefs of

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PROFESSOR SIR KEITH O'NIONS

[Continued]

[Dr Lewis Cont]

Staff. Yesterday I was talking to the Chief of Defence Staff. So there has been a lot of effort to introduce me to those areas. I can sincerely say that I have not found it an enormous hindrance, but I have found that some of the experience that I bring in from the outside about research, about research quality, about measuring research and about some of the technical issues associated with a number of areas of defence, valuable. Of course, decisions are made on the advice that I would give, but advice that others may be able to give as well, so one is advising policy, and the Ministry of Defence is setting a very high store against science and technology and advising its policy—probably more than any other government department, which, frankly, makes this job extremely interesting. Science and technology has a very high profile in the Ministry of Defence.

29. So you do not feel like the archetypal new minister parachuted in amongst experts who are then able to control his activities?

(Sir Keith O'Nions) No, I do not. Do not read that as arrogance, but I think it is worth recalling the way in which the Ministry of Defence treats science and technology. Its Chief Scientific Adviser has charge of a budget called the Research Building Block which is delegated directly from the Permanent Under-Secretary. The Chief Scientific Adviser is a member of the Top Level Committees in the Department, the Finance Planning and Management Group (FPMG as it is called), and a member of the Defence Council, and I have direct access to the Secretary of State. So one is positioned, as Chief Scientific Adviser, in a way that it is very difficult, I believe, and it is not intended, that one should just be rather manipulated into a corner for convenience. Far from it; the intention, I think, is to give a very high profile and engagement at the most senior levels of the department. That is one of the reasons I should have provided to the gentlemen here. That is, really, one of the reasons which makes it a very attractive job. The bottom line is, one is plugged in at a very high level, which is not always true of science and technology elsewhere in government departments.

30. Finally, are there individual scientific advisers to each of the three services? If so, how do you relate to them?

(Sir Keith O'Nions) There are not.

Chairman: Sir Keith, you are far too polite to ask us what our military expertise was prior to coming on to the Defence Committee. It is a very short question and an even shorter answer.

Mr Viggers

31. Turning to research, the Ministry of Defence, I understand, seeks to have a foundation layer of knowledge and research which enables it to be an intelligent customer, and then there are specialist areas—the so-called “towers of excellence”, some of which are within the Ministry of Defence and some of which are without. Can you comment on what you inherited, and how you plan to move that forward?

(Sir Keith O'Nions) The towers of excellence concept has been developed and is being led by the person who is my deputy, the Deputy Under-Secretary for Science and Technology, Graham

Jordan. He has been leading this and still is leading it. What is behind this is a realisation that with a budget for science and technology at the MoD which is probably about one tenth that of the United States, we cannot possibly attempt to do absolutely everything. That is a fact of life. What towers of excellence aims to achieve is to concentrate resource in areas which are deemed to be critical to our defence capabilities and critical to industrial capabilities. This is exactly what the Research Council have done through the Office of Science and Technology. They cannot do everything, they concentrate resources either in a *derigiste* manner or through peer review. This is on-going, it is not implemented. The present state of play is that there have been extensive discussions with industry and industry is being guided by the Office of Science and Technology Foresight Programme. One of their Foresight Programmes (and I shall probably get the name wrong but we can get it right later) is on defence industries and technologies.⁴ That is probably not the precise definition of it. It is part of their Foresight Programme in the OST. The aim is to join towers of excellence—this notion of having concentrated on areas of research expenditure above a integrated knowledge base, which I will return to—with what has emerged from the Foresight Programme through the Office of Science and Technology, to define those areas where industry and the Ministry of Defence research budgets can best be concentrated. There will be a meeting very shortly to move towards an implementation phase of those. That is the present state of play. Do you want me to comment on the knowledge base, or is that sufficient?

32. Can I just follow through the towers of excellence point and ask how many of these will be primarily located within the private sector and how many will be within the government, DERA and elsewhere?

(Sir Keith O'Nions) That, really, is to be determined and is intimately associated with what solution emerges, or what emerges in terms of the Public Private Partnership for DERA itself. So I think it is too early to give an answer to that. The Government is committed, and it has committed in the 1999 White Paper, to finding a Public Private Partnership for DERA, so as a working assumption, I think, we could assume that a great deal of this will be in the private sector of one form or another.

33. How do you ensure, as you hinted just now, that the foundation layer is of sufficient quality to enable the MoD to be an intelligent customer?

(Sir Keith O'Nions) Let me be frank, that is a challenge, and it is a challenge which I am going to engage in with a great deal of interest. I do not think it is a matter of debate that we must maintain that knowledge base to be an intelligent customer. I think that is self-evident. We are moving into a period of substantial change with DERA PPP which may change the way in which we have to sustain that knowledge base into the future. We certainly have one at the moment, and that is not a problem. Sustaining that knowledge base to be an intelligent customer is a big challenge. If I may digress, Chairman, for just a moment, last week I was in the

⁴ Defence and Aerospace Systems Panel.

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[Continued]

[Mr Viggers Cont]

United States on what was a visit to nuclear establishments and interlocutors there, but I visited several of the very big research establishments in the United States, the Lawrence Livermore labs, Sandia labs in Albuquerque and Los Alamos in New Mexico. One of the things that I discussed with people there, and in all cases it was a point of great concern, is how this knowledge base is sustained into the future, because it will require appointing people who are very able, who may beneficially develop their careers in the world of industry and the world of academia, in E-commerce, in the Silicon Valleys and so on, yet we need to attract some part of that talent into the Ministry of Defence, or areas which we are supporting, to make our knowledge base. As I say, there is no simple answer to this; we have to ensure that what we can offer these people does have the level of challenge that other career opportunities might have. This is a problem, really—it is not a problem that exists today but it is a problem that is perceived for the future across the Western world. I had my counterpart from Sweden visiting on Monday and he made exactly the same point. So I am happy that we have an ability and a sufficient knowledge base to be an intelligent customer at the present time. Things that would be challenges, even were there no change on the horizon with DERA, and changes at DERA will, in themselves, pose some new challenges. All I can say is that I am alert to this problem, and at least if you recognise the problem we can start to make plans to deal with this.

34. Do you feel that you are bringing a new emphasis to your post?

(*Sir Keith O'Nions*) I think I am. Having had many years of involvement in academic research and research councils, not only in the United Kingdom—I have been fortunate enough to spend a lot of my career in North America and I have been advising widely in Europe, the EU and so on—I think that sort of background and the sorts of very substantial changes that have taken place in the academic world over the last 10 or 20 years in the research world, do bring a perspective to this problem that will be useful. Also, because of the contacts I have in that world which has been undergoing rapid change, I think that will be useful. I hope this does not sound over-confident but I think it does bring a perspective to the Ministry of Defence that probably was not there.

Mr Viggers: No, indeed. It is a rhetorical question, but presumably you will be pressing not only for emphasising areas which you regard as important but, also, the more difficult task of cutting out areas where you feel expenditure is not justified. As I say, it is a rhetorical question.

Chairman

35. Before you make your mind up on DERA I hope you meet Dr Etter in the Pentagon, the senior person responsible. If you push the MoD lines she will send you away with a flea in your ear and boxed ears, I must tell you.

(*Sir Keith O'Nions*) I have just returned from the United States and when I was in Washington last week I did meet Delores Etter, I met David Oliver

and I met Jacques Gansler, and although my visit to the US was not related to DERA at all the subject did cross their lips.

Chairman: I am sure it did.

Mr Cohen

36. Sir Keith, I know it is early days, but can I ask you about your view of the trends in what is going on in Europe in effective defence and research? Firstly, you know there is an effort, really, to try and improve European military capability, and the "Defence Capabilities Initiative" is one of those. Do you see that as coming about through additional research in this country and in Europe as a whole, or is it a matter of just buying commercially and up-dating it and making better use of it? How do you see this sort of trend?

(*Sir Keith O'Nions*) I understand what you are saying perfectly because there is an awful lot behind the question you ask. Let me tackle it in a couple of ways. Let me first make a statement, and that is that we have an increasing number—and I cannot give you the precise number but, if you wish, we can get it to you—of research collaborations in Europe. Historically, we have, of course, extremely valuable and very close collaborations with the United States, but we have an increasing number in Europe. I think one can expect these to increase in the future. These are extremely important as our own expenditure on defence has decreased since the Cold War. Given the size of our research budget, which is substantial but, as I pointed out, is only about one tenth of the United States', in order for us to have the access to knowledge that we require to run defence properly, collaboration is exceedingly important. So, in some ways we are driven on that basis alone to much greater collaboration with Europe, but there is considerable enthusiasm for it there. That, to some extent, offsets the reduction in the amount of money we ourselves have to spend on research. On the broader part of your question, in terms of subsequent integration and development of European defence, I think one can expect that the consolidation of the defence industries will have some impact on that. This is happening so fast now that I do not think I can give you any better prediction than you can make yourself, other than to say it probably is driving everybody, particularly my counterparts in Europe, to think about these matters. The tower of excellence model—ie, concentration of resources and integrating areas between industries and MoD-type expenditure—has resonated with a number of Europeans. Many of them are very interested in it and are signing up, in a sense. So things are moving quite rapidly in those directions, and I think the sorts of models that have emerged from the MoD are really setting the pace. I am sure I have only touched on that.

37. I appreciate that. However, those models are moving towards a degree of specialisation, and I wonder, are other European governments, do you think, heading in that same direction? If they are, then do you need, with them perhaps, to identify the key research areas so that that information is shared and not just in the hands of one group of countries? Has there got to be a co-ordination?

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[Continued]

[Mr Cohen Cont]

(*Sir Keith O'Nions*) You are absolutely right. I would agree with you entirely on that. That is taking place and is on-going. We are completely at one on that point. However, it is a matter of sharing information and, essentially, getting greater leverage on knowledge for the amount of money we invest through sharing.

38. Will you be seeing that as one of your roles—helping to co-ordinate this across Europe?

(*Sir Keith O'Nions*) Yes. At the moment this is being led by Graham Jordan, who is the Deputy Under-Secretary of State for Science and Technology. I am taking a very considerable interest in that, and in many other areas, but I see it as my role to ensure that that goes at the sort of pace that I feel is valuable. Having only been two months in the job I have not myself visited counterparts in Europe to discuss these issues—but I will be, I shall be making a visit to France in the summer—but in these early months my first two substantial visits relating to defence collaboration are to the United States. I will make another one in May and, as I say, I have just made what I thought was a very successful one this last week on nuclear matters.

39. You said in answer to the first question I asked that an increasing number of collaborations—

(*Sir Keith O'Nions*) I am afraid I cannot—I would be interested in the numbers. I ought to get the numbers myself.

40. That would be interesting at some point.

(*Sir Keith O'Nions*) I will do that for you.

41. Do you think, generally—and I know it is, again, early days—that we collaborate as much as we could with other countries, particularly in Europe? Do you think we get a fair deal out of the collaboration schemes that we have had at the moment? Do you think more needs to be done to make sure there is better value for money, in effect, out of those collaborations?

(*Sir Keith O'Nions*) There are several points there. In some areas, such as the nuclear area, our relationships with the United States, with the 1958 Mutual Defence Agreement, are such that our prime overlap is inevitably going to be with the United States in that area, although discussions have taken place with France on this matter and I will be talking to them later this year. More broadly in other areas, I do think we get value for money. I have no doubt about that and I have no doubt that we should seek to increase that. As an aside let me say that one of the challenges always in research and technology expenditure is to make an assessment of value for money. This has been a challenge that the Office of Science and Technology have had to rise to with regard to research council funding. It is not a trivial exercise, it is one that I am going to be looking at more closely. How do you actually measure whether you have spent the right amount or whether you have got sufficient leverage and so on? You can have wisdom with hindsight and say "Had we done that 20 years ago we would have been in a better place today", but I think we do need to improve everywhere (and this is not just a Ministry of Defence statement) and attempt to quantify better the value in outputs. Perhaps there is a distinction between "output" and "outcome"; output can be a report—

and you always get a report, this is no problem—and outcome is what is the real substance of that. I think there is still more effort to be put in across the board on that, and this is not Ministry of Defence statement. Any progress that is made anywhere else in getting the quantification of this value for money is going to be of benefit to us, and it is an area I am interested in and will be putting some effort in. It is a very important question right across the board.

42. I am sure the Committee would be grateful if you would send us the details of those collaboration projects.

(*Sir Keith O'Nions*) I think these are a set of statistics that should be gathered together and I will get them to you.

Mr Cohen: Thank you very much indeed.

Mr Hancock

43. Can I just ask some follow-up questions on that? I was interested in the idea of more research collaboration in Europe. Is it the MoD's belief that that is of a high enough quality, and is there any suggestion that European countries will hold back on what they have developed for their own national interest?

(*Sir Keith O'Nions*) Quality I can answer, but the second question is more difficult. Let me say something about quality. We are in the extremely fortunate position in the United Kingdom, and we are not very good at blowing our own trumpet in the United Kingdom—it is not part of the national character, denigration and gloom comes rather more naturally—but the United Kingdom is exceedingly able in research and technology. Probably, in most areas across the whole breadth of activity, and the Ministry of Defence really does engage in the whole breadth of this activity, we are leading or second, usually, only to the United States. We have an extremely strong base. I think the Office of Science and Technology would state—and I think I would agree—that probably we get higher quality and more research per pound expended, or unit of currency expended, than probably any other country. So I say that, really, as an introductory statement. When we are engaging with another country in research we are engaging from a position of very high quality strength and understand what excellence means. I think there is very little chance of us engaging in aspects of research in any other European country where we feel that it does not meet the standard of excellence, or develop beyond the excellence, that we already have. This, really, is embodied in this concept of towers of excellence as it is moving into a European dimension. Having spoken so long on that I have forgotten what the other part of your question was.

44. The other one was their ability to withhold information in these projects.

(*Sir Keith O'Nions*) If collaborations are set up properly then information is not retained. Obviously, having been in the job only a couple of months I have not put my nose into a very large number of research areas. Having just been to the United States and looking at areas which are, frankly, the most seriously classified in the nuclear area, I think the

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[Continued]

[Mr Hancock Cont]

sharing of knowledge and lack of it is amazing. There is an enormous enthusiasm and warmth for engaging people from this country because of their ability. I do not see any evidence in areas that I have looked—which is a small sample—that we are doing anything but benefiting enormously. Maybe in a year's time I can give you a fuller answer.

Mr Hancock: We will have you back and do some depressing run-downs.

Chairman

45. We have touched on this before, Professor, but when we have introduced our report we have been irritated—paragraph 18 Defence Research—

(*Sir Keith O'Nions*) I am sorry, I have not got it with me.

46. I will read it out. "Defence Research is about enabling the armed forces to stay ahead of continually developing threats from potential adversaries. Spending on it has fallen too far and the MoD must do more to protect the research budget. Within the defence budget the MoD must protect the funds available for its inventive research". When the MoD responded to our report, at paragraph 62 of "Defence Research Fifth Special Report" that we published we said: "We have strong reservations about the further cuts being proposed in the research budget for the next few years. Over-optimistic assumptions on the part of the Department about the extent to which it can safely leave research of the civil sector may put at risk the capability needed for developing new weapons systems." So this is an issue that we presented, the Ministry of Defence gave a reply to that we did not regard, frankly, as being particularly credible and this is an issue that we will return to in the future. So in a way we are alerting you to the fact that we remain to be convinced that the inexorable decline in the defence research and research development budget, which is defended largely on the grounds of "Oh well, the civilian sector does it better anyway", we do not regard as the best way forward.

(*Sir Keith O'Nions*) I do not think I wish to address, unless you press me to do so, that whole range of questions or background to that other than to say I am more than happy that you engage in that question; I think it is the right question to ask. There has been a decline overall in defence expenditure since the end of the Cold War. The research budget has taken its share of those reductions. It is right that the question is asked. Let me give you my first reaction to the state of affairs as I found them. The good news is that the research building block sum of money is identifiable. The corporate research programme and the applied research programme is under the control of the Chief Scientist by direct delegation from the Permanent Under Secretary. It can only be modified by the FPMG, the Finance Planning and Management Group, the highest level, of which I am a member, so I have every opportunity to defend that budget. That is the good news. The second point, which is moderately good news, is that I have looked at the research programme at the present time and I have not found any real horrors, such as "Oh, my goodness, there is this great hole here. There is this new technology developing, it is

going to change the world of defence and we have not got a penny of expenditure in it." I have not found areas like that. We are not in a disastrous situation and we are not in a situation where you could say there is great inadequacy in what we are doing. That is the good news. The other good news is that what happened with DERA during the period of it becoming an Agency and subsequently a trading fund, there is no doubt that there have been substantial efficiency gains in that and the amount of research output has increased per pound of expenditure. I am optimistic that some areas of research we will be able to access through PPP and maintain an involvement and develop a involvement in, which would not be the case in the present situation of DERA. The only other point I would make is the very honest statement about all research expenditure which is you can always spend more, there are no limits. I have spent 30 odd years arguing for more money in every area of science I have ever been in; science is like that. One only really knows if you have not spent enough with hindsight. Let me come back to a point I made to Mr Cohen. There is a challenge across the whole of science and technology—this is not an MoD statement—to measure outputs, to measure outcomes, to quantify things better and to get a better understanding of whether the expenditure really is at the right level for what we are trying to achieve. I hope what you gather from these remarks is that my answer to your question is slightly defensive. That in part is a result of me genuinely not having immersed myself in all the details of it in two months in the job. What I also hope you find in my response is a genuine interest in trying to quantify this and to put up an appropriate level of defence for science and technology as I see fit and on the basis of advice I can get about what our science and technology programme should be doing and this is going to be particularly the case as we move into a Public-Private Partnership for DERA which is going to shift the equation a bit.

47. But how far the shift will take place remains to be seen.

(*Sir Keith O'Nions*) Yes.

Mr Cann

48. I was immensely heartened to hear you talk about outputs and outcomes as being different because every time somebody tells me we have produced a wonderful document I always think to myself that documents do not feed people, they do not build houses, they do not defend anybody and it is the actual production in my view that counts and I agree with you so much I felt I ought to say that.

(*Sir Keith O'Nions*) Thank you.

49. You have come from academia and yet you are now immersed in a Civil Service which I think is about 190,000 people and in the policy-making divisions a lot less. Nevertheless, it must be one heck of a job to avoid duplication, to co-ordinate, to appoint a leader in any given area, for example, terrorism or what-have-you. How are you getting on with that? Are you enjoying that?

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[Continued]

[Mr Cann Cont]

(*Sir Keith O'Nions*) I have not appointed anybody myself yet since I have been in the job in two months. The MoD is a very big and complicated Department. I have not had any difficulty so far in seeing in the areas of scientific and technology advice that I give the way in which they interface more broadly with the Ministry of Defence. I think that is because the Ministry of Defence places its Chief Scientist in a high position. One is a member of the Defence Council, a member of the FPMG, the senior management board in the Department, and there is a very good relationship and effort on behalf of the other Permanent Secretaries in the Department and other staff as well as the Chief of Defence Staff, the Navy, Air Force and so forth. I think because the Chief Scientist is involved at those highest levels it does greatly alleviate the sort of difficulty that you perceive. All I can say is so far I have not experienced great difficulty with that. On the contrary, I have been rather surprised at how easy it has been to engage in some of these areas early on in the job.

50. Let us take as an example the Afghans at Stansted. There must have been an interrelationship between MoD, FCO and the Home Office and probably the local police forces. How is that co-ordinated? Who picks the lead person in advising the people who make those decisions?

(*Sir Keith O'Nions*) It certainly is not me. That is outside the scope of the Chief Scientific Adviser. I would only get engaged if there was a particular element of scientific advice that was required that was not in place. Those sorts of issues will rest with the Permanent Under Secretary, the Chief of the Defence Staff and others. Frankly, I am the wrong person to ask to give you details of that.

Chairman: There will be major areas outside the one that Mr Cann mentioned where there will be blurring between the lines—I think that is what he is getting at.

Mr Cann

51. Who pulls people in?

(*Sir Keith O'Nions*) In areas of scientific advice it is my job to pull people in. Let us set up a hypothetical scientific issue. Let us not make a real one because it may become real in the press. Let us say there was an issue comparable to GM foods in the Ministry of Defence—and please do not invent one—or BSE, an issue of comparable import and impact that was in the Ministry of Defence and clearly involved a scientific input. That would then be my responsibility and the Secretary of State and the Permanent Under Secretary would expect and task me to do that and it would be my job to bring in the sort of advice that we need to do that. Some of it may be present in the Ministry of Defence, some of it might be present in DERA, some of it may require getting experts out there in the academic world and elsewhere to bring enough knowledge to bear on the particular problem and the right sorts of individual. Let me just digress a little bit. If one has an issue of that sort, which I have set up hypothetically, the public always needs to see advice on issues like that which is independent. There is a distinction between independent and impartial. I believe I will always provide impartial advice because I have no axe to grind, I am only

really interested in the scientific truth, but the public needs to see independent advice. I put great emphasis on this and there is all sorts of independent advice already set up, but my job there would be to access advice that had the right knowledge and would be seen by the larger world to have an independence to be credible. I have not answered your question; I have set up a rather hypothetical thing to try and assure you that in an area which is clearly my responsibility I would know how to go about it and do it.

52. So you would be plugged in at the appropriate stage?

(*Sir Keith O'Nions*) I am confident, yes.

53. I am not quite sure that is what I asked.

(*Sir Keith O'Nions*) I am not sure it is quite what you asked, but under the circumstances it is about as well as I can do.

54. Do you advise or do you actually go and see somebody and say, "Oh, by the way, Harry, you ought to be talking about this"?

(*Sir Keith O'Nions*) Both of those. There are formal channels of advice. Most systems have wheels that turn around and one of the big channels of advice which is set up on a routine basis is DSAC, the Defence Science Advisory Council, which is a very large number of external independent advisers that the MoD has that are set in a number of areas of science and technology that meet on a regular basis, formulate their advice and that advice goes to me and the Secretary of State and they also peer review the MoD's research programme. That is advice that is coming in on a routine programmed basis.

Mr Cann: We all know about those. That is called bureaucracy memos, is it not? You said earlier you have got access to the Secretary of State. Does that mean you can ring up his private office and he will see you that day face to face or are we talking about memos?

Chairman

55. He is in the Falklands at the moment, so it is with difficulty.

(*Sir Keith O'Nions*) He is in the Falklands at the moment. Let me say I have seen the Secretary of State several times already.

Mr Cann

56. At your request?

(*Sir Keith O'Nions*) I have had an introductory call at his wish, a meet and greet and I have had meetings with him concerning the Equipment Approvals Committee.

57. The Chairman did a fairly good job on that!

(*Sir Keith O'Nions*) I am yet to have an unexpected crisis where I have said I really must talk to the Secretary of State. I have no doubt that if I had an issue of that sort I would be able to see him.

58. Is that in your Charter?

(*Sir Keith O'Nions*) That is in my Charter.

59. That you can see the Secretary of State face to face if you think it is necessary?

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[Continued

[Mr Cann Cont]

(Sir Keith O'Nions) It is written down in terms of my job description and I do think that is important.

60. May I ask your views on what seem to be called asymmetric threats. Which do you think is the biggest one to us—chemical, biological or what?

(Sir Keith O'Nions) I want to be cautious about what I say here because sometimes if you rather publicly state what you perceive to be a very big threat—

61. I understand that. If you want to draw the line there then that is fine.

(Sir Keith O'Nions) No, I am not going to draw the line there. I just want to make it clear why I am going to be cautious in what I say and I think under less public circumstances I am prepared to say more than I am going to say now, but I want to be cautious not to make a statement about things that I may perceive to be a threat, which are not generally viewed as threats in the public domain, which may not have a very beneficial effect.

Chairman

62. Are you organisationally involved in that issue?

(Sir Keith O'Nions) Let me just take a step backwards and this is a general statement as a scientist, this is nothing to do with MoD. Every technological advance, every scientific discovery from the invention of the wheel to the sequencing of the human genome which will be completed within a year or so usually goes ahead and is welcomed on the basis of the benefit that it gives to mankind and the benefits are self-evident. The invention of the laser gives everybody a compact disc player. The sequencing of the human genome is going to have huge benefits in health and so on. Every one of these technological advances from the wheel onwards provides somebody with the opportunity to make something offensive out of it, whether it is a chariot with the wheel, whether it is very unpleasant use of lasers, and I leave it open for you to guess what people may do with the genome information. It is most certainly my job to be well abreast of these areas and to anticipate the offensive capability that other people may acquire and to advise and ensure that we have things in place to defend against them. Let me come to your question with that background, Mr Cann. Within those areas that are well understood to be of concern, yes, I think chemical/biological is an area where we must put a great deal of effort in anticipating what our aggressors may do, the technical ability they may have and ensure that we have defence against that. On that particular issue I would say that I am extremely satisfied at the present state of development of our research in the United Kingdom. It is my job to be abreast of these things and I do not think I want to explore other areas where threats may arise where maybe they do not actually already exist.

Mr Cann: I did not see much mention of it in the SDR. Maybe I missed it.

Chairman

63. That is before the Professor's time. We commented on the absence of anything serious in the SDR on asymmetric threats.

(Sir Keith O'Nions) In the first couple of weeks in the job I did sit down and I thought about emerging technologies and how it may impact upon us in the coming decades and I am ensuring that we have appropriate measures in hand.

Mr Cohen

64. Are these defence initiatives in these emerging threat areas just to defend troops or are they being extended to defend the population as a whole, which is the trend?

(Sir Keith O'Nions) Both, as is perceived to be necessary.

65. So you will not make a difference in pursuing that?

(Sir Keith O'Nions) No, I will not make a difference. I think defence is the defence of the nation and if the nation is being represented by armed forces in areas of greater threat then the defence they need is maybe greater than the nation that is left back at home, but if the threat impacts upon the nation as a whole then the defence of the nation is what it is all about. No, I am not prepared to make a simple hard and fast distinction.

Mr Viggers

66. Chairman, I am reassured by the comment just made by the Professor, but I think the issue is of such importance that in order that we as a Committee might know that the statement he has made is fully justified, it might be appropriate for us to go into closed session and ask for further information.

(Sir Keith O'Nions) I am well prepared to do that. I hope you understand my reticence not to explore in detail areas which could prove to be unhelpful.

Dr Lewis

67. We heard earlier that there are no separate scientific advisers to the individual Services. Do you think that scientists are sufficiently at the heart of the policy-making machinery of the MoD and are they sufficiently involved in operational matters?

(Sir Keith O'Nions) Yes, they most certainly are. In terms of being at the heart of policy, I will just reiterate that the Chief Scientist Adviser for the Ministry of Defence is plugged in at the highest level, he is on the senior management groups, the Defence Council and so on. In terms of the way in which science and technology interfaces with and is close to our Service requirements, as you know, the Ministry of Defence has a customer capability area which is led by Sir Jeremy Blackham and this is to define capability and there is a large science and technology input into that area that involves some of my own people as well. So science and technology is involved at the point of equipment capability requirement. In terms of procurement, which is the area of the DPA headed by Sir Robert Walmsley, there is a great deal of science and technology involvement there through

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[Continued]

[Dr Lewis Cont]

integrated project teams. These interface with people that I have direct responsibility for and that also requires a great deal of input from DERA on operational analysis and so on and people in my own area have a scrutiny role in looking at technical risk and assessing that within that area. Then, in terms of equipment approvals, I chair the Equipment Approvals Committee. The Equipment Approvals Committee has a customer representation through the Vice Chief of the Defence Staff, it has a procurement representation through Sir Robert Walmsley, it has an accounting officer representation through the Second Permanent Under Secretary, and the Chief of Defence Logistics is also a member of that Council and I am there as the Chairman, but I am also there in the role of having a particular input on science and technology, technical risk and so on. It is certainly my experience that the scientific advice area is intimately involved in all of those ways and I think in a very healthy manner.

68. Presumably you are the only scientific voice on the Defence Council at the very top of the MoD. Is that right?

(Sir Keith O'Nions) Yes.

69. So if you were sitting in on a meeting of the Defence Council and if you were a bit uneasy about the way in which pressures were being put on you by the non-scientists on the Defence Council to go down a certain route, what sort of net or chain of contacts of a scientific nature within the defence establishment would you then be able to exploit in order to verify your hunches and take your doubts further?

(Sir Keith O'Nions) Not everybody on the Defence Council is technically ignorant. That is the first thing. Although I am the only one that has a main career in science, there are other members there who understand technical issues very well. So one is unlikely to be in a position where other people are unable to engage in that debate. However, taking your point, if I felt that I was unable to articulate my concerns adequately at that level and felt that I needed greater advice, then I think, firstly, I would make the PUS well aware of that and then in my armamentarium, if it was necessary, I have the Advisory Committee of independent scientists and in some areas I would go and use the professional societies, like the Royal Academy of Engineering and so on. This is a hypothetical thing, but in effect I have a great deal in my armamentarium to bring in from the outside. I do not envisage this situation arising. To some extent an important part of my job is to take areas of science and technology that may be rather complex and involved but articulate them to Ministers and others in the Department in a way that the issues are teased out and easily understood. I view that as my job. I would view it as something of a failure on my part if I failed to do that at that sort of level. That is the personal statement, but I hope I have addressed more specifically your concern.

70. My concern is still about this problem of disconnection between you as the top scientist and what is actually happening in the individual Services. It may be that I am stuck in the past with the rather simple structure, in the late 1940s, that I studied academically, where if he felt, at the top level, unhappy about the advice that he was being given by

people who, of course, understood to some extent the technical and scientific issues but had other items on their agenda, your counterpart 50 years ago would have been able to speak to the scientific adviser to the RAF or the Navy or the Army and say, "What is really going on here in this Service? I have a bad feeling about the direction in which they are pushing me at the top"; and you cannot really do that.

(Sir Keith O'Nions) I think things have moved on a great deal. The term "joined up" is a popular one everywhere. Joint services is a reality. Procurement is made on behalf of all the Services. Logistics is now organised through Sir Sam Cowan, as of last year, jointly on behalf of the Services. Capability requirement to specify the equipment we want is joint across the Services and scientific advice is engaged in all of those and again joint across the Services.

Chairman

71. You really have to add "and perfect co-ordination" between the Ministry of Defence and International Development. We know the theory, but the theory and the reality are not always congruent.

(Sir Keith O'Nions) These changes are big changes and new changes for the MoD. I have no engagement with the past. All I would say at the moment is that I think the present is working very well, but ask me again in a year's time. I have just been reminded that the Services have operational analysts in each of the Services, but I think that is not quite the point you were making.

Mr Brazier

72. Just to furnish a particular example, America still has separate Services arrangements, although they are obviously bigger. With the Apache helicopter the Marines took the view that this was a fundamentally flawed concept and pulled out of it, so flawed that they went for a re-run of a 40-year-old model rather than have to become involved in it. As far as one can make out, obviously since then there have been some reservations as a result of what is happening, Kosovo and so on, no debate of this kind ever took place in the British MoD in looking at the various options. There was a single integrated team that decided Apache was definitely better than the revamped Cobra and the inability of individual Services to take different views and play advocates for different roles would be the kind of thing my colleague is suggesting.

(Sir Keith O'Nions) I cannot help you on history and legacy. I am very well aware of how the present situation works, how equipment capabilities are defined, the way in which information is brought together to the Equipment Approvals Committee which I chair and I have been through a round of that already on some significant equipment items and I am therefore well aware of how that advice is communicated to Ministers under the Secretary of State. All I can say is that there is so much in place at the present time that individuals may have different views and prejudices, but the quality of analysis and scrutiny that has gone on in those areas that I have seen at the moment is such that in my role as chairing

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[Mr Brazier Cont]

the Equipment Approvals Committee the quality and depth of the material and analysis that has come forward has made a consensus decision achievable rather quickly.

Mr Cann

73. How does it compare with Oxford?

(Sir Keith O'Nions) It is very similar!**Mr Brazier:** I am not sure I find that comfortable.**Dr Lewis**

74. I am sorry to be persistent but I am still not happy about this. You have slightly sidestepped what I said about having individual scientific advisers in the Services to go—

(Sir Keith O'Nions) I have not sidestepped it, I have just said there are not any.

75.—about that problem by saying that it is all done so much more on a joint basis these days. Fair enough, but I still return to my basic point which is: even on a joint basis, do you have a net of people equivalent to yourself at a lower level with whom you can pursue worries and doubts you have? The whole thrust of my questioning should have been fairly clear from the beginning. I am worried about the idea of someone coming from outside with a negligible defence background, surrounded by experts in a highly structured bureaucratic environment with a very detailed defence background and then not having people of similar independence and objectivity at lower levels to check out your hunches and concerns. Surely the strength of your post and importance of your post, as you yourself said earlier, is that you bring a degree of independence and objectivity to bear on that structure. What I want to know is how can you do that in isolation unless you have a network of contacts lower down to whom you can turn to explore any doubts that may have arisen in the course of your work when you are trying to be independent and objective?

(Sir Keith O'Nions) Let me meet that head on. I have 130 staff that I am directly responsible for in the CSA area and amongst those there are (I can let you know the precise number) a large number of very able people across a wide range of scientific disciplines, many of whom have had substantial careers in science and technology in defence establishments, such as top equipment establishments or DERA and, as career scientists within the Civil Service structure. Most certainly have had much greater engagement with defence issues than myself. These are in main building and there is some very high quality there and that advice is on tap and is part of my organisation, so when I talk about the Chief Scientific Adviser or CSA I was really talking more generally than me. The CSA area in the MoD really means 130 people. It really is substantial, with a huge amount of ability and I am in daily consultation with all of these people; the Deputy, Graham Jordan, is in the next office. I have bilaterals with individuals across the spectrum of that organisation regularly. More broadly than that, I have the Defence Science Advisory Committee which is this machine peer-reviewing our research programmes, providing very helpful overviews of a

whole number of areas, but then beyond that I have the academic world that I come from, from the Royal Society and so on where I can get very immediate consultation.

76. Can you just explain a little more about how this structure is integrated at the lower and more practical levels?

(Sir Keith O'Nions) Can I just take one or two examples to give you an indication?

77. Yes, please.

(Sir Keith O'Nions) I am the person responsible for this part of a budget called the research building block which is delegated from the Permanent Under Secretary. It is divided into two parts, a corporate research programme and an applied research programme. The management of those two programmes is delegated to my deputy, who is the DUS(S&T), and to Admiral Blackham, who is the DCDS(EC). This can be corrected at a later date—I am still not very good at the acronyms. There is a crossover between that equipment capability area which has the applied research programme and the CSA area; there is a cross-fertilisation of individuals advising from the CSA area on expenditure in the applied research area and Admiral Blackham's area. It is rather more fluid than it was even six months ago. I give you that as an example of an area where we have not got Chinese walls between what is called the CSA area and equipment capability areas and integrated project teams in the Defence Procurement Agency. People on my particular staff are engaged in integrated project teams with the equipment capability area which means they are wearing more than one hat and I feel this is extremely healthy. I think if you had asked this question a year ago you may have got a better answer than you have got now, but what I can tell you is it is different. This is not something that I have had a big influence on obviously in two months; it was changes that really came into place last year through really major structural organisational changes in the MoD and I believe it is very healthy.

78. Would you say that the main scientific expertise within the MoD resides in your network of scientists in the MoD, or in DERA, or in the Equipment Capabilities Organisation or somewhere else?

(Sir Keith O'Nions) In terms of number, DERA is 11,000 people, so one has to say there are more individuals involved in science and technology in DERA than in any other part of the organisation. There are people with science backgrounds in the Defence Procurement Agency and also in the equipment capability area. The CSA area is numerically small relative to DERA. I am the customer for research from DERA that comes into the MoD, so the CSA area is really a customer for research and we are using the results of research and advice that comes from DERA, but in terms of numbers of people involved in undertaking generation of scientific knowledge rather than using scientific knowledge, DERA is where the vast majority are at.

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[Continued]

[Dr Lewis Cont]

79. But your scientists in the CSA—as customers and not as people generally undertaking research themselves—still have a need to refresh their own scientific skills. How do they do that?

(*Sir Keith O'Nions*) Historically, as I have said, many of the people have come into the CSA area during careers principally within DERA, which is this very large body, perhaps in defence intelligence or in the atomic weapons area and elsewhere, but the majority are from that background, and historically they have come in for some years and then gone back into their research jobs in those organisations. As I have said earlier, both in the US from my trip last week and my own view is that it is not obvious—let me just say, the present situation is okay—in the future that that is going to be such a normal route of people coming into the CSA area. With a PPP on DERA, one can envisage some different relationships developing and I think I am going to have to be imaginative in the way in which I refresh and populate the CSA area in the future. It may not be done in the same way as it has been done in the past. Do not read too much into that. All I am saying is that I am seeing the same challenges that other countries are facing. I think your question is an extremely important one; refresh is essential and it is an area which I shall be considering very carefully along with my counterparts in other countries.

80. You have partly anticipated my next question which was to ask whether you thought the MoD had enough civilian scientists, whether there were any particular areas of shortage and how you could persuade more people with the right skills to join the Department?

(*Sir Keith O'Nions*) I think this is a question for the future. We may need to engage more civilian scientists. At the moment I am not sure. It may be part of facing the future. In terms of attracting them into the Ministry of Defence, the bottom line is one will have to offer them challenges which are comparable to challenges and opportunities that they may have in other things they may do with their lives. Ask me in a year or two's time and it may be more obvious how I am going to address that.

81. Finally, the Services themselves: do you think they do enough to recruit scientifically-qualified people and do they do enough to train their own personnel as scientists?

(*Sir Keith O'Nions*) That is a difficult question for me to answer. I do not know enough about the depth of recruitment in the Services, but I can offer a couple of pieces of information that are directly relevant to it. You are probably well aware that the Minister for Armed Forces has a steering group looking into training in the broadest sense of the Armed Services. I am a member of that steering group and I am rather happy to be a member of that steering group because it is an extremely interesting question how, for the next century, with the enormous changes in technology and abilities that Armed Forces are going to require, what is the optimum form of training and what is the best use of resources and facilities that we have for training and therefore recruitment and questions such as lifelong learning for members of the Armed Forces and so on. This particular steering group is at an early stage, it has met once and it meets again fairly soon. I am extremely interested in this

simply because of my academic background and I think it is a profoundly important question. I think it is being addressed very sensibly, and it is not being addressed and motivated by cost savings or anything as simple as that. It is really being driven by the fundamental question of what is the appropriate training for Armed Services in this century. That has only touched very slightly on the core of your question, but it is one where I am engaged and therefore can give some facts.

Chairman

82. As we are talking about DERA, the Mark II or Mark X version, I am not sure which it is, of DERA, where a few thousand of DERA staff will remain within the MoD, two or 3,000, and the rest will be floated off into some kind of limbo, you mentioned earlier a distinction you made between independent and impartial. Would that floated-off group, which could be controlled by the American, French, German, Japanese, any one or a combination of these and companies who have an interest in defence directly or indirectly, fall within your definition of either impartial or independent? The question I want to ask is that you are more likely to be able to trust those people who are part of the MoD structure than those whose salaries are paid by the private sector who, with the best will in the world, are going to be straining to be either impartial or independent. Have you given any thought to these sort of problems?

(*Sir Keith O'Nions*) I understand your question. I think they are concerns that are entirely valid for you to address to me and sensible points to make. Let me start at the beginning and say that we do not know what the outcome of the PPP is going to be, we do not know what number may be retained. There are three areas on which more information is expected to come to the Minister of Defence Procurement's Steering Group on this and there are three options which I am sure you have come across probably too many times already. There is an option called reliance where the great majority is in the private sector, there is an option called a minority sale and there is an option called core competence where part of DERA is retained and part of it is privatised and the sort of numbers of people that you mention may or may not be the number that is retained, but those are numbers that you may have heard about. No decision has been made, so we do not know as yet what will be there. However, we do know that the Government is going to have a PPP solution for DERA, so some significant part of it will be in the private sector, hence your question is entirely valid. *A priori*, I do not see any reason why people working in private sector organisations who are giving advice to anybody, government or business, should necessarily be partial. We are accustomed to advice coming from big consultancies in the environmental area. There are probably more serious things done in private consultancies in the environment than there are in government research establishments—I mean the broader parts of the environmental consulting—and I think we are not seriously questioning the impartiality of their advice. Yes, they are getting paid for it and it is their careers and we are accustomed to that. We get advice extensively everywhere from

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[Chairman Cont]

management consultants, financial consultants, merchant bankers and so on. You may or may not have different views on the partiality or impartiality of their advice, but I am sure that they are engaged on the assumption that their advice will be impartial. So *a priori* I do not see any reason personally—this is a personal view—that advice one had from a private sector organisation should be partial.

83. Perhaps you could detect my look of bemusement.

(*Sir Keith O'Nions*) I sense a slight response of disbelief!

Mr Brazier: If you are dealing with a banker or an accountant or any of these other groups, they have a huge client base and lots of different areas they are involved in. Some of the people involved in working for DERA are working in very limited fields in which the only other job openings and opportunities are among defence contractors. If you have a civil servant in DERA, he is subject to strict rules as to what he can do after leaving DERA and so on. If you have a private company it is very hard to apply Civil Service terms and conditions and the prospect of an order or a consultancy coming along—there is a huge difference between this very limited, narrow pool on the one hand and the kind of groups you have drawn a comparison with on the other, I would suggest.

Chairman: The idea of getting independent or impartial advice from somebody who is paid directly or indirectly by British Aerospace or Lockheed Martin—

Mr Brazier: Or whose next job may be with them.

Chairman

84. Absolutely, and offering advice on one of four contending bids, one of which is British Aerospace/Lockheed Martin, it would require some kind of philosopher king and somebody of such integrity as to be unknown to normal human beings to be impartial and independent and honest in circumstances like that. We will cross swords later on that, Sir Keith. I am sure there will be ample opportunity.

(*Sir Keith O'Nions*) It sounds as if there may be!

85. To some people on the Committee, at the mention of Europe they salivate; in my case it is DERA, where the mentioning of the word DERA brings the worst out in me.

(*Sir Keith O'Nions*) I am not ungrateful for you moving on to another point.

86. You said you had one courtesy meeting with the Secretary of State. He is a barrister, Speller is a former trade unionist, Baroness Symons is a trade unionist and Moonie is a professional psychiatrist or psychologist, so he is good to work on or vice versa one might say. How do you get over to people who are not natural born scientists the kind of things that you know about and feel they need to know about? What fora would you have to bring to their attention?

(*Sir Keith O'Nions*) I have had meetings with all the Ministers at an early stage. I have had a conversation with Baroness Symons on a number of occasions now. I have had discussions with the Secretary of State on Equipment Approval

Committee matters, communicated to him the advice from our last meeting and I know you will not ask me what the advice was because it would be inappropriate. I met with Dr Moonie the day after he was in the job and I had a very engaging conversation, he has quite a good science and technical background, I chatted with him over a number of issues, and also I have had a variety of discussions with Mr Speller. In terms of how I communicate with them, this is part of my job. I have taught undergraduates since the end of 1970 until December 1999 every term and part of my job is to communicate science and technology in a way that is understandable, absorbable and which individuals can engage upon and that differs according to the background of the individual. I do not wish this to sound arrogant, but it is the case with any profession, you package and present information in a different way for a different audience and I think that is a very important part of my job. There is very little merit in showering somebody with a lot of technical jargon when he is unaware of that area. All I can say is it is my job to do that to the best of my ability and I have not really seen any difficulty so far in my discussions with Ministers. In fact, it is a terrible thing to say, but one feels like one is almost on the same team.

87. I am sure Lewis will be great. The people he normally deals with are lying on their backs in a darkened room. I hope you are not in that horizontal position when you are giving him advice.

(*Sir Keith O'Nions*) Me too!

88. The Government's Response to our Report, paragraph 60, indicated that the Defence Research Committee would from now on report annually to the Secretary of State on the overall health of the defence research programme. Can you tell us a little bit more perhaps. When is it intended to make its report to the Secretary of State? What kind of things will be reported and what will the level of classification of that document be because you know if it is legible to non-specialists, we would like to have a look at it as well.

(*Sir Keith O'Nions*) That is very reasonable.

89. Reasonable, but it is not going to be granted, I must say.

(*Sir Keith O'Nions*) I can only say a little bit about this and it may well be that I have to send you some more information by a note and that is because the Defence Research Committee meets twice a year. It met last Autumn before I was in post and it meets again in about a month's time. I have not yet had the opportunity to engage with the Defence Research Committee. Consequently, I really cannot give you an overview of how that operates and what my view of the efficacy of that Committee is, which I will be happy to do in writing.

90. If you would not mind.

(*Sir Keith O'Nions*) You are right, it is expected that I report to the Secretary of State on an annual basis on the research programme for defence. This I will not be doing until significantly later in this year. Yes, you anticipate something that is going to happen. I am also full of anticipation. I am afraid that is about as much as I can tell you. I have just had a note from my private secretary, sitting very

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[Chairman Cont]

helpfully behind me here, that tells me that the report will actually be considered at the spring meeting which is in about three weeks' time.

91. By which time you will have read it.

(Sir Keith O'Nions) I think you can be reasonably sure of that.

92. There are precedents because the Defence White Paper was delayed until the Secretary of State was able to put his views into it and I think the same quite clearly ought to apply in your case as well.

(Sir Keith O'Nions) What I cannot tell you is how much of it is classified. I think you are asking me whatever can be brought forward to you you would like to see and I will take that on board and most certainly let you know what you can expect to see.

93. You mentioned you would give us a little bit of information on the Defence Research Committee, perhaps you could give us some information too on the Defence Science Advisory Council, whether there is any overlap. If you can give us an indication too of the range of committees, not just that you belong to but where you interface with and receive advice from, I think that would be very helpful.

(Sir Keith O'Nions) We will move on from the DRC. The DSAC, Defence Science Advisory Committee, is rather large and is presently chaired by Clarricoats. I have met and talked with him. He is just resigning now, he has come to the end of his period as chairman of that Committee, and his replacement I view as extremely important. I have talked with him about his views of the Committee and how it works and he has obviously put a very large amount of effort in, well beyond the number of days that one would have anticipated the chairman to put in. I think he has a very positive view of the working groups that have worked under him. At the present moment we are looking to appoint a new chairman and I can tell you that I am thinking at this stage whether there are any benefits in modifying the structure of that advisory committee and that is not the same statement as saying that I have any concerns about what it has done in the past but times are moving on, things are changing, there are new challenges and we have talked about some of these already when I was asked what do I see as those sorts of areas that may be the asymmetric challenges, I think you called them, for the future. Those sorts of considerations are leading me to look quite closely at what DSAC may do and how it may be structured. I want to emphasise that there is no subtext to that that I have any concern about the quality of what they have done. However, it may be that some of their advice may be usefully articulated in a different way, it may be that there is a value in overview statements, it may be there are some aspects that could be a bit closer to the public domain and so on. I am considering those sorts of things. It is an extremely important area of independent scientific advice to the Ministry of Defence. The present Chief Scientist, Sir Robert May, and the Office of Science and Technology have emphasised broadly across Government the importance of independent scientific advice, the importance of anticipating issues, the importance of opening up important scientific issues to a wider group of people. There are probably more restrictions in defence on that. I was

a member of the Council of Science and Technology before taking this job but obviously I had to resign because the members of that are independent and I am very sensitive to those sorts of considerations. I am looking at the nature, quantity, quality, openness of scientific advice we have got and the value of those people, of peer reviewing our own research programmes. Your question was broader than that and I have gone on rather a lot on that particular point. You were looking for other committees that may feed in to—

94. To the advisory system for you and for Ministers. There is no need to reply now, you can drop us a note if you would not mind.

(Sir Keith O'Nions) Those are the principal ones. Let me just add one point.

95. Of course.

(Sir Keith O'Nions) I do not think it is necessary, and I have no intention, trying to keep individuals in the employ of the Ministry of Defence to cover every potential eventuality and scientific issue that we have to deal with. On some issues my view will be to go out to professionals in the Royal Academy of Engineering broadly and take their advice on an ad hoc basis. We have just done that, for example, with a report on the Faslane shipyard where we have just used a Fellow of the Royal Academy of Engineering under the auspices of that on a particular issue relating to safety on the Faslane shipyard. That is extremely valuable, you have outstanding professional advice that is independent and so on. Does that give you a flavour?

96. That is very helpful.

(Sir Keith O'Nions) I will give you a specific list of formal structures that are in existence.

Chairman: Thank you.

Mr Viggers

97. What role does your organisation have in shaping the direction of the MoD's research programme? I am thinking specifically of the Corporate Research and for the Applied Research linked more directly to particular weapons systems. Do you review these on a regular basis or on a rolling basis?

(Sir Keith O'Nions) That programme is reviewed, and I am Chairman of the committee that does that, twice a year. As I say, I am responsible for the research building block budget which includes the Corporate Research Programme and the Applied Research Programme and I have responsibility and delegation for both of those. I sub-delegate them, as I described earlier in the evidence I have given, but twice a year one formally is reviewing those and once a year reporting it to the Secretary of State. Obviously it is an ongoing process of anticipating developments.

98. Who takes the decision as to whether a contract should be let for research inside or outside the Ministry of Defence, the same committee?

(Sir Keith O'Nions) On the Corporate Research Programme, at the moment most of those are delegated to DUS(S&T), Graham Jordan and further down. On the Applied Research Programme

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[Continued]

[Mr Viggers Cont]

that is delegated to DCDS(EC) but in person it is Vice Admiral Sir Jeremy Blackham. He has involved members of my organisation to do that for him. That is formally the delegation. Some areas I am looking at much more closely myself and those are particularly in areas that you might expect. In the nuclear area I am already engaging much more closely in what is involved but I am not letting the contracts myself. Contracts for things like AWE, the Atomic Weapons Establishment, that is through the defence procurement, through DPA, and I am not letting those contracts, that is not part of the research building block.

99. What is done to monitor and review the soundness of past decisions and the value of those contracts outside the MoD specifically?

(Sir Keith O'Nions) There is our own internal judgment of whether the thing was a waste of money or good value for money and so on. The DSAC is a very, very important part of peer reviewing the efficacy of the research that we have commissioned and undertaken. I described to you previously Peter Clarricoats and we are looking for a new chairman. I think it is extremely important we do that and, as I said, I am taking the opportunity to consider with these changes whether we need to do more in making that assessment than we have done in the past. It comes back to the point I made earlier, that it is a much more general problem across science and technology. It is quite easy to measure outputs in the academic world, the number of peer review papers in the literature, where you can have bibliometric analysis and so on and there are real methods you can produce. What we are really interested in is outcomes and I believe we have more to do in evaluating outcomes broadly across science and technology, and that probably includes my own area as well.

100. Have there been any significant problems?

(Sir Keith O'Nions) I think after two months in the job I really cannot put my finger on things where I can say "this has been a huge problem" because a lot of the research is long term and runs for many years. I am not aware of any major problems so far but you cannot take that as saying there are none. Again, if you address that question to me in a year's time I think I can give you a fuller answer and will be well prepared to do so.

Chairman: I will send you a list of my A-Z of procurement foul-ups, Sir Keith, it is interesting.

Mr Cann: You did not get an X though, Chairman, did you?

Chairman: No, it was the V I left out. I should have said Vickers' Challenger I which should have been the first on my list but I forgot to include that.

Mr Cann

101. Two questions. I am going to read the first one because it is difficult. To what extent do you take the lead in shaping the research programme, and to what extent do you just respond to the requirements determined by the MoD equipment customer?

(Sir Keith O'Nions) That is a good question. Shall I give you an expression of intent?

102. Please.

(Sir Keith O'Nions) Because being new in the job I view it as my role to lead and determine and approve what the research programme should be.

103. Yes. That is it? We will have to have this gentleman back in a year's time, Chairman.

(Sir Keith O'Nions) Formally I do have delegation for the whole RBB budget, which is the CRP and the ARP, and I am the Chairman of the Defence Research Committee so formally it must be my job. It is not my nature to lean back and let the world roll over me. Is that a sufficient answer at the present time?

104. Yes. Secondly, ABM, because we were briefed quite comprehensively in Washington about the Americans' fear of North Korean technology enabling rogue states like, say, Iraq, to actually land missiles, certainly on their continent and of course on us.

(Sir Keith O'Nions) Yes.

105. They are proposing to bring in two interceptor sites with about 100 interceptors on each and they are saying, also, we understand, that if we wish to join in we could have a site set somewhere in North Europe which would enable us to do the same, at a cost of about £3 billion spread over ten years between the nations of the European Union. It would not be too much of a burden, one would have thought. You must have been doing some work on this matter. Are you worried about the fact that when the Americans tested it, I think four out of five missiles missed?

(Sir Keith O'Nions) Yes. Let us not stray into areas that we ought to have a more confidential discussion about.

106. Sure.

(Sir Keith O'Nions) The present posture of the UK is I believe the correct one and that is that we are actively assessing the threat, we continue to be assessing the threat, and through a programme called TRRAP, which you may well have come across—it is a Technology Readiness and Risk Assessment Programme—this programme is really to assess the technology that is required and to acquire the knowledge that is necessary if it is deemed necessary to deploy for this. This seems to be a very sound thing to do so that we really have knowledge and we are making a technical assessment of what is involved in ballistic missile defence in the broad. At the moment the view is that any decision to deploy would be premature and I think that is correct. Now, beyond that, how much further would you like me to go?

107. Just who is in the lead in monitoring this business?

(Sir Keith O'Nions) I am the principal for an agreement. I will get this right. I will look at my notes for the first time so far which means I have got a chance of at least getting one thing right.

Chairman

108. You will be reminded if you have made other mistakes, not by us.

(Sir Keith O'Nions) Do you think so?

109. I am sure the gentleman behind you will tell you you should not have said that.

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[Continued]

[Chairman Cont]

(*Sir Keith O'Nions*) Chairman, I feel you are on my side. I am the principal for a 1985 Strategic Defence Initiative Memorandum of Understanding with the United States in the area of BMD, ballistic missile defence. As the principal of that I will meet with my counterpart in the United States periodically and share information and exchange on collaborative research and so on. I think probably what this tells you is that we are engaged, we are assessing things properly and I think the present posture that I expressed is the right one.

Mr Cann

110. We are asking the right fellow.

(*Sir Keith O'Nions*) I think you may be asking the right person. I hope you will accept it probably is not sensible to go further on the point.

Mr Brazier

111. I would like to move the spotlight back, if I may, to the Equipment Approvals Committee.

(*Sir Keith O'Nions*) Sure.

112. You have already partially answered quite a large chunk of the question I was going to ask. Could you remind us briefly who exactly is round the table and what they are each bringing to it? You have mentioned several of the members already.

(*Sir Keith O'Nions*) Yes, I did it from memory before.

113. Absolutely.

(*Sir Keith O'Nions*) Now I will give you the facts. If the two agree I will be absolutely delighted, it will suggest I still have a few connected neurones. On the Equipment Approvals Committee I am the Chairman, and it is really my job to ensure that the advice that goes to Ministers is comprehensive and balanced.

114. Yes.

(*Sir Keith O'Nions*) Obviously I would bring to that Committee detailed advice on scientific and technical matters and particularly technical risk assessment and so on but, as Chairman, my job is broader than that rather than to represent a particular interest.

115. Right.

(*Sir Keith O'Nions*) The other members, there is a military customer interest, and this is the Vice Chief of the Defence Staff, Sir Peter Abbott. The interests of the accounting officer, the Accounting Officer for Military Defence is Kevin Tebbit, the Permanent Under Secretary. The interests of the accounting officer are met by the Second Permanent Under Secretary, Roger Jackling. The supplier is represented by the Chief of Defence Procurement, Sir Robert Walmsley. In terms of support and whole life costs, and it is extremely important that we look at whole life costs of things, the Chief of Defence Logistics, CDL, General Sir Sam Cowan is present for that. That is it, that is the Equipment Approvals Committee. What I add to that is that most of the work that is done is actually done outside of Committee. The Committee receives a lot of high quality advice and cannot do better than the very

high quality advice, technical assessment, risk assessment, cost estimate of whole life costs and so on that is done, that is fed to it. It is the quality and depth of what is done outside Committee that enables that small group to operate, but that is presently the membership.

116. Thank you. In fact, you hinted that you do not see any conflict between, on the one hand, bringing your scientific background to the Committee but, on the other hand, the much broader role that you have to achieve as Chairman to deliver the Committee?

(*Sir Keith O'Nions*) As a person I have no problem with it whatsoever. I have chaired many, many committees with lots of very able people on them and I hope I bring an integrity to it which is welcome in a personal sense. In terms of looking at it from the outside as a Committee, does that have the right sort of balance, the right structure and so on? I think it is not bad. I think there has to be some merit in having a Chairman who is clearly representing technical fairness and could not be seen to have a particular service allegiance. That is not suggestion for a moment that any of them would, but I think in terms of an outside view of the balance of that Committee I think it looks pretty good.

117. Just focusing for a moment on the issue of consensus and reaching a common view. As somebody who wrote about it when it was most heavily restructured, and I know it has been since in 1986, it has been twice since, it seems to me that the members look a pretty well balanced lot. The query I have for you though is if you compare what is going on in the EAC at the top with all the various structures underneath that have scientific and technical advice, as gradually they all become joined up, I put it to you there is a worry that there is going to be a consensus that starts at the bottom and works all the way up to the top. The old single service for all their faults, I am not defending the old system but the one real merit of the old system of having single service approaches was that a radical view could be pushed by one service and the debate could be heard right up to top table.

(*Sir Keith O'Nions*) That is interesting because it may well be that there is a little more adversary and adversarial behaviour at the lower levels now which is extremely healthy. For example, people in the CSA area have a role in scrutiny and analysis of making an independent view of what comes from the customer and the procurer. This may be based on some of the same evidence that is emerging low down which may well come from DERA for example, but it is set up in a way where there really is an independent assessment of that evidence by people in the CSA area that is undertaken in another area. I can assure you that the gloves come off down there. This is a very healthy thing. It is the quality of what goes on down there that is essential to the smaller group of people reaching a sound consensus of view quickly because if great uncertainties are left, if the Committee is faced with "Well, group A thinks this and group B thinks this and we do not know how to bridge that gap" then the Committee cannot operate as effectively if there are those tensions.

118. It does always reach a common view?

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[Continued]

[Mr Brazier Cont]

(*Sir Keith O'Nions*) I do not know if it always does because I have only been involved in one. I can happily tell you, and I do not think I am divulging anything that I should not, the last Equipment Approvals Committee reached a consensus in quite good time and was unanimous in its conclusion.

119. Can I just go back to something you have just said. I gave a very bad example supporting my colleague Julian Lewis then by looking at an example, the issue of the Apache, of somebody trying to stop something. The process you have just described is about individual impartial scrutiny which is a good thing but it could be argued that there is almost too much of it now in MoD, the story about the project team in the PE who have been audited by seven external and internal different bodies with different briefs in less than 12 months. A much better example is to look at a particular radical idea. It is very easy to have outside people stopping something, my worry about the present system is that with so little left at the single service levels it is very difficult for a radical idea, a radical positive idea that the consensus does not like, to be promoted and championed to the point where it ever has a chance to fly. Let me give you a very old historical example, the views that the Royal Artillery took immediately before the last war about having integral spotters developing spotter planes and so on for use within the Royal Artillery which eventually became the Army Air Corps. Now the air force at the time obviously had a very strong vested interest in stopping that and one could see a joint committee thinking "this is a bad idea" and killing it. Where are the right ideas going to come from outside the consensus in this structure?

(*Sir Keith O'Nions*) I do not think I want to go down that avenue very far because I do not have enormously helpful things to say other than the present structure, under which we operate, which I have given endorsement to. To the extent that I have seen it so far, maps off very clearly the goals set out in the Strategic Defence Review, in the SDR, which have been well accepted by many of our allies and are viewed as something of a model where an important element of that is cross service consideration and deployment and so on. The present structure maps clearly from that, and I believe is effective. I do not think it is right for me to say more than that, not that there are vast things that I am not prepared to divulge, it is merely that I have not been part of the history prior to the SDR. I am much more a creature of the SDR world.

120. A final question: when you are trying to resolve the argument, the balancing of the various factors, some of them scientific and technical, some of them financial, against the operational need, on what principle are you seeking to balance these apples and pears? The underlying question behind that, in doing so, as both scientific advocate and the impartial chairman, how do you see the balancing of the apples and pears as a process?

(*Sir Keith O'Nions*) The bottom line for the EAC is really value for money. It is the assessment of the technical capability, costs of the project, in life costs and so on. We do include as part of the advice that we give to Ministers views that may come from other Government Departments, Government

Departments such as DTI and the Treasury and others, who inevitably always have a view, we factor those in. There are views expressed also often from those Departments, for example, and elsewhere on relationships between the particular decision on European industry and American industry and so on. These things are formulated in the advice and given to Ministers. Ministers may well give a different emphasis to some of those elements, and that is their job to do so, than we have in formulating our advice. Our advice must be comprehensive and make clear those broad issues. The bottom line is value for money.

121. Having outlined all the factors that Ministers can rebalance if they wish to, it ends nonetheless with a firm recommendation from you as to a particular course?

(*Sir Keith O'Nions*) Yes, there is not much point if it does not.

Dr Lewis

122. The history of Defence Procurement is littered with examples of projects where the costs escalated massively and the delivery times overran considerably. Smart Procurement of course is a concept that is meant to address this and, therefore, presumably is central to the activities of the Equipment Approvals Committee. How much importance does your EAC give to the dangers of these risks when it is considering what equipment to approve, and what techniques do you have available to identify, measure and minimise the risks in any given project?

(*Sir Keith O'Nions*) I think that is an extremely good question and I will not conceal anything that I understand or have seen from it. The first thing I should say is that projects often run for a long time so there are most certainly procurement things that go back to days before Smart Procurement existed and so on. In terms of how we are operating on present decision making, I am very impressed with Smart Procurement as a concept and I believe that if we can maintain the requirements for projects and approvals, as described in Smart Procurement, we will be in better shape than we have been. Just to remind you of two of the elements. There is an initial gate and main gate concept and really only two points now where the EAC will report to Ministers. Between the initial gate, at which the key capability is defined and assessed, and the main gate the expectation is that on some projects up to 15 per cent of the costs may be expended. This is so that by the time we reach the main gate the risk, costs and time in service are sufficiently well understood and the uncertainties within them constrained to the point where they can get through a main gate. Now you may respond and say "Well, that sounds all very nice, that is easy to describe, you can write a little glossy pamphlet on this" but there is more to it than that. There is a great deal understood, and I have looked quite carefully at the methodology used in technical risk assessment, and it is very sound. You can assess risk, you do know whether there is a 50 per cent chance of the thing failing or one per cent, we can tell the difference. So technical risk assessment is extremely important and can be done and is part of

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[Continued]

[Dr Lewis Cont]

the main gate decision. An assessment of whole life costs and procurement costs, uncertainties on them, the tools available for that do exist and are better understood. This is all part of the input to the EAC in determining whether something is ready for a main gate decision. I cannot defend or justify anything that has happened in the past, and I am sure you will not expect me to do that, but it is my belief that if we do rigorously stick to the philosophy of Smart Procurement, which is underpinned by a great deal of understanding in the world and rigour that has been brought to bear, we should much mitigate the risk of things going badly wrong post main gate decision.

123. I know it is early days.

(Sir Keith O'Nions) It is very early days. This sounds very positive, this is the academic analysis of procedure.

124. Have you any ideas as to the ways in which risks of this sort might be reduced even further or is it too early to say?

(Sir Keith O'Nions) Let us be pragmatic, you will never reduce risk to zero. It may be highly desirable to have risk reduced to zero but may I volunteer that there is not even zero risk involved in buying your washing machine, the delivery van may crash, it may be delayed, there is never a zero risk in the procurement of anything and that is unattainable. What we would like to do is to reduce the levels of risk to those that are acceptable in the procurement of things more common in everyday life. One has to realise that in developing and acquiring very advanced equipment, which we want for our armed forces, that is mandated through the SDR, the risks are going to be higher than the risks involved in purchasing a washing machine or a CD player. The challenge is to bring those risks down to an acceptable level. Your question is are there things which we can do further to reduce the risks of things going wrong? I think at the moment if we can make the Smart Procurement principles operate generally across the board we should have a significant improvement on where we have been. That is not quite the same as saying no but I think there is enough in the principles behind Smart Procurement to use the knowledge and understanding we have of reducing the risk of procurement to the point where it is valuable and obviously as understanding develops that will be incorporated. I am satisfied that we if we do the job properly the risk should be acceptable. One has to be realistic and say they will not be zero.

125. For a moment I felt that the washing machine example was a good instance of what we were talking about earlier—

(Sir Keith O'Nions) I have had a lot of problems with washing machines.

126. —which was your ability to package the information you are going to impart according to the perceived intellectual level of the recipient.

(Sir Keith O'Nions) You get an immediate apology if—

127. Shall I just conclude by asking about the Integrated Project Teams which are an essential part of Smart Procurement? It is a fact that some of your staff are involved in those teams in certain projects.

(Sir Keith O'Nions) Yes.

128. When those projects then come up before your EAC is there a danger of a conflict of interest because some of your own scientific staff have been involved?

(Sir Keith O'Nions) I think not actually. Integrated Project Teams have not really made a big difference to the so-called CSA area. It has not changed it in a structural sense. It has emphasised focus on certain objects and members of my staff are advising some of those, which is the right and proper thing to do. There are limited resources, you do not want to duplicate the same resource unnecessarily, and there are individuals who can provide the sorts of specialist advice that is needed to those IPTs and I am very happy that they do so. Your question is, is their level of involvement and integration into that at such a level that the CSA area loses its ability to have some independent scrutiny of what is going on? My answer to that is no. I think it is right of you to be alert to that. I am alert to it and at the moment I think it is at a healthy level and not at a dangerous level. I have no difficulty with the question, it is a very sensible question. An apology about the washing machine.

Dr Lewis: Accepted.

Chairman

129. We are not used to asking sensible questions. Two questions for written answers because time is very pressing. You have been in post for two months, some very high profile projects have come before the EAC, for instance BVRAAM and airlift. I am not going to put you on the spot by asking you what happened.

(Sir Keith O'Nions) I would not tell you anyway.

130. You would not tell me anyway, no. What I want to ask you is this, is not the EAC project approval list, is it category A above £400 million, then approve, recommend and then they say—this is the dangerous bit—then Ministers? What I want to ask you to put down on paper, it will require a politically correct answer, after discussion, is how does the EAC deal with politics such as employment, industrial aspects, elections coming up, the need to maximise support?

(Sir Keith O'Nions) Okay, now I am sensitised.

131. Right.

(Sir Keith O'Nions) I am absolutely clear that it is not our job to get involved in politics or where there is an election coming up or any of that. I have had no indication whatsoever from my engagement with Ministers that they would even expect us to address that. Let me assure you that Ministers at the moment actually want advice from the EAC that it is equipped and proper to provide. However, in providing comprehensive advice we will be alert to industrial impacts because the DTI, for example, may approach us and say "Well, if this particular project was placed in the UK it may have this impact on a capability or jobs and so on." We alert Ministers to that in our advice because we are aware of it, it has broader implications and so on. Their attention will be brought to that in the nature of the advice that we bring forward. There is a great distinction between that and offering the advice in such a way that is politically convenient or inconvenient and I have

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[Continued]

[Chairman Cont]

absolutely no doubt where our responsibility ends. I do not believe there is any confusion in the minds of Ministers either. That sounds extremely positive but that is an honest view.

132. It is an honest view, I am not sure it is the right one. I asked Sir Robert Walmsley this, who like you is very good at appearing before the Committee. You must have watched his favourite video of him appearing before us.

(*Sir Keith O'Nions*) No, I have not, I am afraid.

133. You ought to. You do not need to though, you could send him one of your's. I did ask him how many times a decision by the EAC has been reversed? Just to test the skills of the Ministry of Defence in giving non answers I would ask you this, and the answer will be advice to Ministers, we do not tell anybody but it would be really interesting to know historically, i.e. in the last ten, 15 or 20 years, how many recommendations by the EAC to either Ministers in the Ministry of Defence or to Cabinet Committee or Cabinet have been reversed? I think any Government that has the slightest pretensions to transparency and honesty should not find difficulty in answering that question. I would be delighted if they could but I would be staggered if they could.

(*Sir Keith O'Nions*) You have a request to me to ascertain whether it would be possible to bring those observations to you?

134. Yes, absolutely.

(*Sir Keith O'Nions*) Let me say I will make the right inquiries in the right places.

Chairman: Your colleague is smiling behind, I think he has already worked out the answer.

Mr Brazier

135. Actually there is an interesting example, the celebrated case of the Merlin when the Permanent Under Secretary signed the report for the Public Accounts Committee that the permanent staff in the Ministry were not happy with the decision. In a case like that would the Chief Scientific Adviser, you will probably want to come back to us in writing, be signing the slip as well?

(*Sir Keith O'Nions*) Sorry, signing which slip?

136. The approval slip, as with any Government Department.

(*Sir Keith O'Nions*) That would be to the Chief Accounting Officer, would it not?

Chairman

137. We will never get the answer if it goes to the Chief Accounting Officer.

(*Sir Keith O'Nions*) I think the accounting officer must have responsibility. I do not have a very big cheque book in my desk drawer that I have spotted, so I am sure it is not my responsibility.

138. The penultimate question, again this is for reflection, how would you wish to be judged after your tenure of office has expired? The last question, a really easy one, will come from Harry Cohen.

(*Sir Keith O'Nions*) How would I like to be judged?

139. Yes?

(*Sir Keith O'Nions*) I think one would expect to be judged, that is the first thing. Here is a personal aspiration. Yes, it is a great challenge for me and a privilege to use the experience of a career in giving advice to part of the nation that I deem to be very important and I am sure the rest of you do here. I guess I would like to be judged alongside a goal that I would like to see the advice, quality of advice, based on science and technology in the area of defence to be as good or better than that provided anywhere in Government anywhere in the world. Now there is a task. You can judge me against that.

140. We will. When Sir Robert Walmsley was in your chair after he appeared before us I narrated to him Harry Truman's last words on leaving office and offering some advice to Eisenhower. He said "Poor Ike, he will sit here and say 'Do this, do this, do that, do that' and absolutely nothing will happen". I hope you will be able to make things happen in a structure where sometimes making things happen can be neutralised by conflicting interests and so on.

(*Sir Keith O'Nions*) I know your point is a serious point and it is taken as a serious point. All I can say is that most of my career has not been involved foot dragging and I have achieved some things. As I say, measure me against that aspiration.

141. There are some real pros in there.

(*Sir Keith O'Nions*) Thank you. I thought I was going to get an under arm bowling.

Chairman: It will spin four ways before it reaches you.

Dr Lewis: From Harry Truman to Harry Cohen.

Mr Cohen

142. The buck stops here. In the one minute remaining I want to raise the issue of nuclear safety which is an important matter.

(*Sir Keith O'Nions*) Yes, it is.

143. I will roll the points up together and do it in a broad way. I am asking for broad answers anyway.

(*Sir Keith O'Nions*) Yes.

144. There are lots of organisations in the field—Nuclear Installations Inspectorate, AWE, MoD itself—firstly, what is your role in that?

(*Sir Keith O'Nions*) Yes.

145. The second point is that the Secretary of State recently announced a safety review of Aldermaston after they got fined for discharging contaminated water into the ground. Presumably this inquiry will be conducted by the MoD itself, does that mean you, and will you be involved in that safety review?

(*Sir Keith O'Nions*) Yes.

146. Then on nuclear weapons itself and the submarines, is your concern there about the effectiveness or safety or both? I just throw in again, there are important issues here of, for example, the Russian syndrome, decaying, accidents, the decommissioning problem, what is your view?

(*Sir Keith O'Nions*) You have covered a lot of ground there. It could be an agenda for a second hearing.

Mr Cann: It usually is when Harry asks a question.

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[Continued]

Mr Cohen

147. Put them on the agenda, that is right.

(*Sir Keith O'Nions*) Let me be quite brief. As Chief Scientific Adviser to the Ministry of Defence I am ultimately responsible for all scientific advice that goes to the Department and the Secretary of State. Within the specific area of nuclear safety, the prime responsibility for nuclear safety in AWE is with the line management at AWE, however I would be considered as a source of advice if necessary. There is an important distinction there and it is a real one. Also, the line management has responsibility to the regulators. There is a thing called the Defence Nuclear Safety Committee, which is an independent committee, I am not involved in it. It is chaired by Sir John Cadogan at the moment and it is only external members and it reports directly to the Secretary of State. My staff provide a secretariat to that but let me be very clear they provide a secretariat, the members of the Committee are independent and do report to the Secretary of State on defence nuclear safety. You mentioned nuclear weapons, there is a Nuclear Weapons Safety Advisor who is an external consultant and provides advice. He is a weapons safety champion, to put it into relaxed parlance. He reports his findings directly to me and to the Chief of Defence Procurement and to the Chief of Defence Logistics and, unsurprisingly, to the First Sea Lord because of the SSBN capability. That is how weapons and safety and nuclear safety in general is looked after. I think it is a pretty secure, robust framework. I would hope that you take an interest in this. The public at large needs to be assured that these issues are being taken seriously and you have a measure of independence in these matters and I am pleased you take an interest in them. You came specifically to issues about AWE management.

148. Yes.

(*Sir Keith O'Nions*) The contract for the Atomic Weapons Establishment is let by the Defence Procurement Agency, so you really need to have Sir Robert Walmsley sitting in this hot seat rather than me. Any considerations about the present and new arrangements in the light of the events of which you are only too aware that have appeared in the media, that is first and foremost a Defence Procurement Agency responsibility. However, as Chief Scientific Adviser I would be available for advice should it be

deemed necessary in an area of safety but I have made it clear that in awarding the new contracts my people, CSA area people, were involved in defining the requirements for that contract and safety is the number one priority. I hope that has given you a sense of my indirect involvement really.

Mr Cohen: My colleague has given me a time bomb of a question here.

Chairman: It is not from me, it is from Dr Lewis.

Mr Cohen: It says: is your Department, you or your people, working on a successor to Trident?

Chairman

149. I think you had better be quiet on that one.

(*Sir Keith O'Nions*) No, no.

150. Is that the view from behind, would you turn around and seek advice on this one?

(*Sir Keith O'Nions*) The SDR is explicit in this regard and it is a public domain issue. The SDR requires to maintain the Trident deterrent and to maintain the ability to sustain it into the future and have the potential, if necessary, to design a replacement. That is what is being carried out.

Dr Lewis

151. Good.

(*Sir Keith O'Nions*) I think that is a direct answer to your question.

Chairman: You are talking to the Chairman of Labour's CND here.

Mr Cohen: Thank you for the clarity.

Chairman

152. Can I say thank you so very much. We can reassure you that if this was a genuine confirmation hearing you would not have any difficulty, with the one exception of your comments on DERA, I might say.

(*Sir Keith O'Nions*) Or lack of it.

153. I am sure after a couple of years in the MoD you will slightly reverse what WC Fields said on his death bed: "On the whole I would rather be in Oxford". Thank you so much.

(*Sir Keith O'Nions*) Thank you very much.

Memorandum submitted by the Ministry of Defence

1. This memorandum has been prepared in response to the Committee's request for information on the responsibilities of the MoD Chief Scientific Adviser.

2. The role of the MoD Chief Scientific Adviser (CSA) and of the central scientific staff in the MoD is to provide advice on science, technology and operational analysis at the highest level within the Department. Reporting to the Permanent Secretary, CSA is responsible ultimately for all such advice given to MoD Ministers (including direct access to the Secretary of State as necessary) and other members of the Defence Council. CSA provides a clear top level focus for defence science and technology. The tradition of filling the post from outside MoD emphasises the need to retain a broad external perspective.

3. Sir Keith O'Nions was appointed as MoD CSA on a term contract with effect from 4 January 2000. He has previously held professorial positions at Columbia University, New York; Cambridge University, UK; and Oxford University, UK. He is a fellow of the Royal Society and was knighted in the 1999 Queen's Birthday Honours for his services to earth sciences. MoD conducted an open competition for the CSA post

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and Sir Keith was selected on the basis of his breadth of scientific experience obtained in the UK and US, through membership of the joint UK Research Council's Individual Merit Promotions Committee, and his extensive involvement with EU, UK and US research programmes.

4. CSA chairs the Defence Research Committee, which is required to review and endorse the overall balance and content of the Department's research programme. Its responsibilities involve ensuring that the research programme reflects evolving defence policy and procurement priorities; advising on the appropriate balance between shorter and longer term research; and promoting value for money in defence research.

5. As regards scientific expertise within the Department, the level of civilian manpower within the MoD is the responsibility of the Principal Establishments Officer—the Deputy Under Secretary (Civilian Management), DUS(CM)—currently Mr Michael Legge. In respect of scientific and engineering personnel, he takes advice from CSA's deputy, the Deputy Under Secretary (Science and Technology), DUS(S&T)—currently Mr Graham Jordan—who is a career civil servant and head of profession for the Defence Engineering and Scientific staff.

6. CSA's relationship with DERA is as the main top level recipient of both the research services which DERA supplies to the MoD, and of advice on technical matters in support of CSA's advisory role outlined above. This includes advice in support of the Equipment Approvals Committee's scrutiny of procurement proposals. CSA is also currently the (non-executive) Chairman of the DERA Board, although this will be reviewed in due course once a decision has been made on the precise form of the DERA Public Private Partnership.

7. The MoD central scientific staff take the lead in setting up and monitoring international collaborative research. DUS(S&T) is the UK principal for most international agreements, although in some cases it is CSA himself.

8. The MoD Equipment Approvals Committee (EAC) is the formal process for evaluating and approving defence equipment procurement programmes. CSA's role is not to present cases for approval, but to chair the EAC, which has a collective responsibility for advising Ministers on major procurement decisions. CSA's contribution includes bringing an independent perspective to procurement considerations, encompassing scientific aspects, the choice of technologies, assessments of risk, and the adequacy and appropriateness of supporting operational analysis.

9. The Smart Procurement initiative, and the establishment of the Defence Procurement Agency and Defence Logistics Organisation (including their Integrated Project Teams) and the Deputy Chief of Defence Staff (Equipment Capability)—DCDS(EC)—organisation do not directly affect CSA in organisational terms. CSA staff do, however, work in close partnership with these other areas and are involved in the changes introduced by Smart Procurement. For example, as part of Smart Procurement, more business has been delegated to the two-star level among CSA's staff as with others. Relevant CSA staff have also become associate members of Integrated Project Teams.

10. The Committee's ninth report 1998–99, and the MoD evidence submitted for it, dealt with the Department's strategic approach to defence research, with particular reference to the "towers of excellence" model being developed in partnership with industry. Discussion between MoD and industry have since taken place, led by DUS(S&T) and we have now agreed a process for bringing together our respective research strategies and defining priorities for the construction of "towers" within available resources. This work is likely to continue through to the end of 2000.

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**Replies from the MoD to written questions following the Oral Evidence Session of 8 March 2000
(3 April 2000)**

The Committee wished to know why there was a gap filling the CSA post between Sir David Davies leaving and Sir Keith taking up appointment. The recruitment campaign to select a successor to Sir David Davies identified a suitable candidate at interview during the summer of 1998, but the individual declined to take the appointment during the autumn and the search for candidates had to be re-launched. Sir David Davies kindly agreed to continue to serve as CSA until 30 April 1999. The final selection interviews were conducted in May 1999 and unanimously recommended the appointment of Professor Sir Keith O'Nions as the preferred candidate. Due to existing commitments Sir Keith was unable to take up the appointment until the new year. He did so on 4 January 2000, having undertaken a series of briefings and induction into the Department in the interim.

SIR KEITH O'NIONS SALARY

The appointment is in the Permanent Secretary pay range (£101,254–£173,828 from 1 April 2000) and Sir Keith's current salary lies within the band of £110,000–£115,000. Individual pay awards for 2000–01 have yet to be determined.

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[Continued]

INTERNATIONAL COLLABORATIVE RESEARCH

As stated in the Ministry of Defence's earlier Memorandum on Defence Research, the UK's most significant collaborative relations for research are with the US, through four umbrella MOUs. These are: a technology, research and development project MOU (TRDP); an MOU on the framework for advanced concept technology demonstration co-operation (ACTD); an exchange of scientist and engineers MOU; and the master information exchange MOU which has a series of subordinate information exchange annexes covering particular topics. In addition there is an MOU on Strategic Defence Initiative/Ballistic Missile Defence (SDI/BMD).

The Ministry of Defence undertakes research both in bilateral arrangements and within wider, multi-national fora. There are significant numbers of joint programmes and information exchanges with the following countries or organisations:

Country/Organisation	Number of programmes
Australia	44
Canada	9
United States	128
France	85
Sweden	26
Netherlands/Norway	25
Germany	17
TTCP	89
NATO	65
WEAG/EUCLID	30
GARTEUR	8
Miscellaneous multilateral:	
Involving US	36
Other	5

Co-operation under NATO takes place under the Research and Technology Organisation which has six panels dealing with the spectrum of research topics. These panels are: Studies and Analysis; Systems Concepts and Integration; Sensors and Electronics; Information Systems Technology; Applied Vehicle Technology and Human Factors and Medicine. There are also more than a hundred identifiable activities underway under these panels in the form of working groups, explanatory groups, symposia and lecture series.

The Technical Co-operation Programme (TTCP) is a successful research forum which is now over 40 years old and allows the UK to benefit from flexible joint programmes and information exchanges with the US, Canada, Australia and New Zealand. Also, a tripartite Chemical and Biological Defence (CBD) MOU with the US and Canada concentrates on high priority immediate topics and on the practicalities of co-operative development and procurement.

The Western European Armaments Group (WEAG) is an informal grouping of European Defence Ministers providing policy direction for armaments and research issues. European Co-operation for the Long-term in Defence (EUCLID) is based on competition and contracts placed on lead contractors, usually with some industrial funding. GARTEUR is a European aerospace forum involving UK, France, Germany, Netherlands, Spain, Sweden and Italy.

Technologies covered by these research programmes include:

- Energetic Materials and Plasmas
- Electronic Materials
- Structural Materials and Structural Effects Analysis
- Chemical and Biological Materials
- Sensor Systems
- Computer Applications and Information Processing
- Photonic/Optical Materials and Devices
- Electronic and Electrical Devices
- Human Sciences
- Defence Analysis
- Signature Control and Signature Reduction
- Electronic Warfare and DEW Systems
- Computing Technologies

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- Operating Environmental Issues
- Communications and CIS Related Technologies
- Integration and other Systems Issues
- Guidance and Control Systems (Weapons and Platforms)
- Design Aspects (Weapons and Platforms)
- Lethality and Platform Protection
- Propulsion and Powerplants
- Signature Related Materials and Materials for Smart Structures
- Manufacturing Processes/Design tools/Techniques

ADVISORY COMMITTEES

The *Defence Scientific Advisory Council (DSAC)* is an advisory body offering independent advice to Ministers and senior officials. It is chaired by Professor Peter Clarricoats and has over 150 members drawn from industry and academia. It reports annually to the Secretary of State. It also sets up working parties comprising some of its members, to draw up advisory reports on particular scientific topics from time to time.

The other main bodies providing the department with external advice on scientific or research matters are as follows:

- *Nuclear Research Advisory Council (NRAC)*. The NRAC reviews the Atomic Weapons Establishment (AWE) nuclear warhead research and capability maintenance programme. The Council also examines AWE's programme of international collaboration. NRAC submits an annual report to the Chief Scientific Advisor on the AWE nuclear warhead research and capability maintenance programme to enable him to advise the Secretary of State on its relevance to the UK weapons programme; quality; sufficiency in maintaining an independent nuclear capability; cost effectiveness; and collaboration with allies. Membership comprises an external chairman (currently Sir David Davies) and two or three external members, to serve for four years renewable biennially. Assessors are also appointed for areas of specialist advice.
- *Defence Nuclear Safety Committee (DNSC)*. The DNSC is the result of a 1998 merger of the Nuclear Weapons Safety Committee and the Nuclear Powered Warships Safety Committee. It is an Advisory Non-Departmental Public Body and as the Department's premier nuclear safety committee, its role is to advise the Secretary of State, other Ministers and officials on matters relating to the safety of the Defence nuclear programme. The DNSC comprises 12 independent Members, including the Chairman, presently Professor Sir John Cadogan CBE FRS, who enjoys direct access to the Secretary of State.
- *Medical Research Council Gulf War Illness Research Programme Steering Committee*. The purpose of the committee is to keep research relevant to the Gulf War veterans under review. It monitors progress and maintains the scientific direction of the programme by considering the recommendations of the MRC Gulf War Epidemiological Studies Research Liaison Committee; progress reports from the grant holders under this scheme; and organises workshops and scientific meetings in specific areas where this is considered appropriate. The committee advises on behalf of the Council on matters relating to Gulf War veterans on which a formal MRC view is needed. The Committee is chaired by Prof A M McGregor and MoD is represented on the Committee. The Committee formally reports to the Council which provides advice to MoD as appropriate.
- *The Independent Panel on Vaccines Interactions* was established to scrutinise all aspects of proposals for research into the potential adverse effects of interactions between the vaccines and tablets which could have been administered to Service personnel at the time of the Gulf conflict, and to ensure that the programme is conducted in an objective and scientifically sound manner. The Panel is chaired by Professor Donald Davies, Director of Clinical Pharmacology, Imperial College School of Medicine, who was appointed in January 1999. The Panel has met on four occasions since December 1997. The frequency of the meetings is dictated by the research programme. Dr Norman Jones, Royal British Legion and Professor Malcolm Hooper, Emeritus Professor of Medicinal Chemistry, University of Sunderland, were nominated to the panel as representatives of the veteran's groups. The Panel fulfils an independent supervisory and advisory role and does not produce reports.
- *Advisory Group on Medical Countermeasures* was formed in February 1998 in response to the then Secretary of State for Defence's wish to have independent advice on the medical aspects of countermeasures against chemical and (principally) biological weapons. It is chaired by Professor Peter Blain of the Department of Environmental and Occupational Medicine at the University of Newcastle upon Tyne with up to seven independent advisers and representation from the

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Department of Health and MoD. The AGMC works closely with the Surgeon General and provides periodic reports to the Secretary of State. The frequency of meetings is determined by the business in hand, but it currently meets twice yearly.

- *MoD Navy Personnel Research Ethics Committee* is chaired by Professor M de Burge Daly, has nine independent members and two Naval members. It reports to the Navy Surgeon Commander in Gosport. Its purpose is to provide ethical scrutiny of all non-clinical research that involves human subjects conducted by or on Naval personnel.
- *DERA CBD Ethics Committee* is chaired by Professor M H Lader with eight other independent members and four members from DERA. Its main purpose is to make independent ethical assessment of research projects undertaken at CBD, Porton Down which involve human volunteers.
- *DERA Centre for Human Sciences Ethics Committee* is chaired by Professor J H Coote with eight other independent members in addition to five from DERA. Its main purpose is to protect subjects of research from possible harm, ensure they are aware of their legal rights and to approve experimental work involving the participation of human subjects.

Both DERA ethics committees report to CSA initially.

- *Animal Welfare Advisory Committee*. This independent Committee was appointed in 1996 in response to public and Parliamentary concern over the use of animals in research experiments. Its purpose is to keep under review animal care and welfare arrangements within DERA. The Committee is chaired by Dr Jeremy Lucke, a past President of the Royal College of Veterinary Surgeons and has two other members. Since August 1998 the Committee has been an Advisory Non-Departmental Public Body. It reports annually to Minister (DP). Its report is placed in the libraries of the House of Commons and House of Lords.

THE DEFENCE RESEARCH COMMITTEE

The Defence Research Committee (DRC), which is chaired by CSA, is not an external advisory committee. It is an internal MoD body, although the Chairman of the DSAC is invited to attend meetings. It is required to review and endorse the overall balance and content of the research programme. Its responsibilities also include ensuring that the research programme reflects evolving defence policy and procurement priorities; advising on the appropriate balance between shorter and longer-term research, and promoting the search for value for money in research. It has a counterpart nuclear body, also chaired by CSA, called the Defence Research Committee (Nuclear).

The DRC is to submit, during the spring, a report to the Secretary of State on the overall health of the defence research programme. This report will constitute advice given to Ministers in confidence.

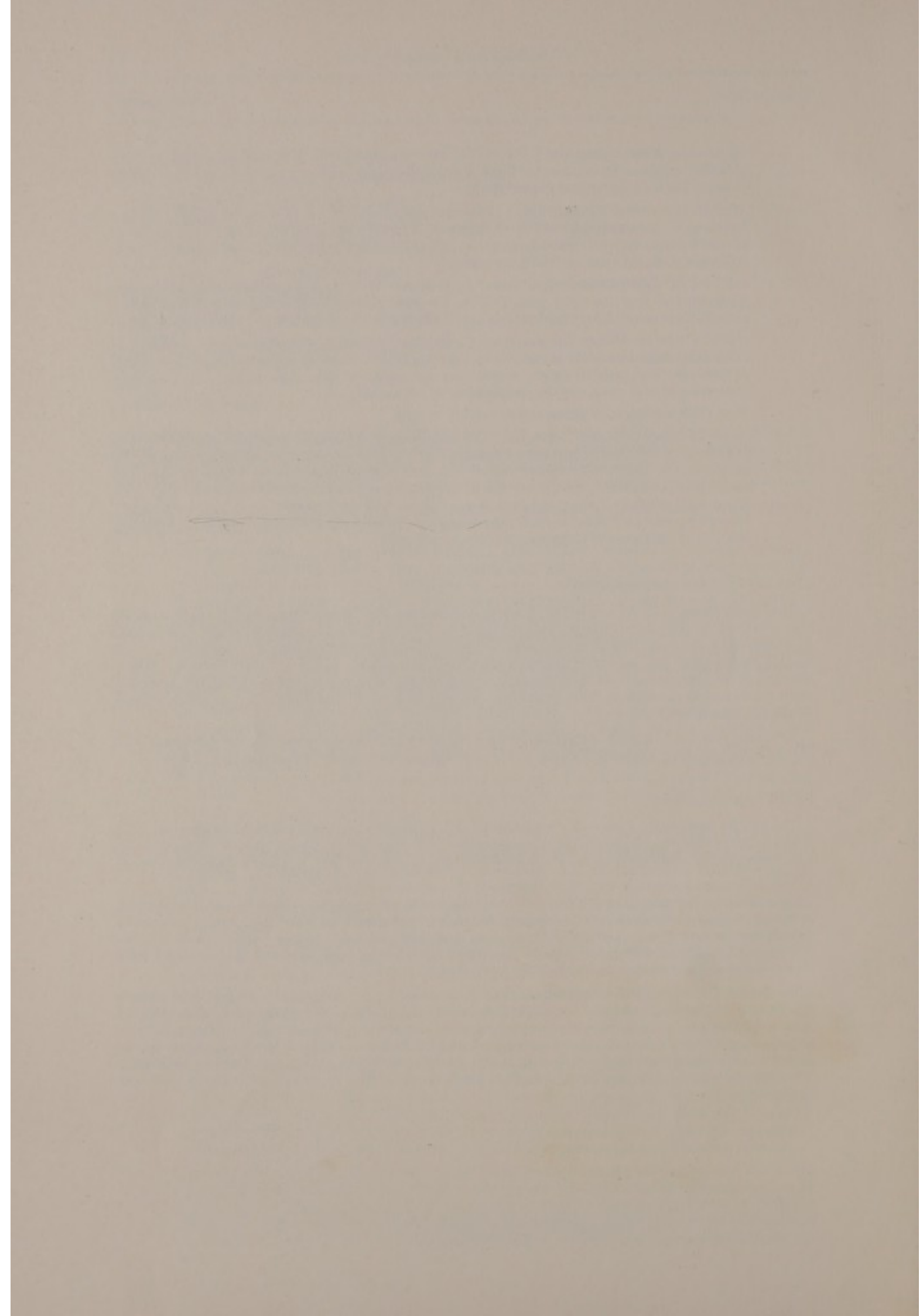
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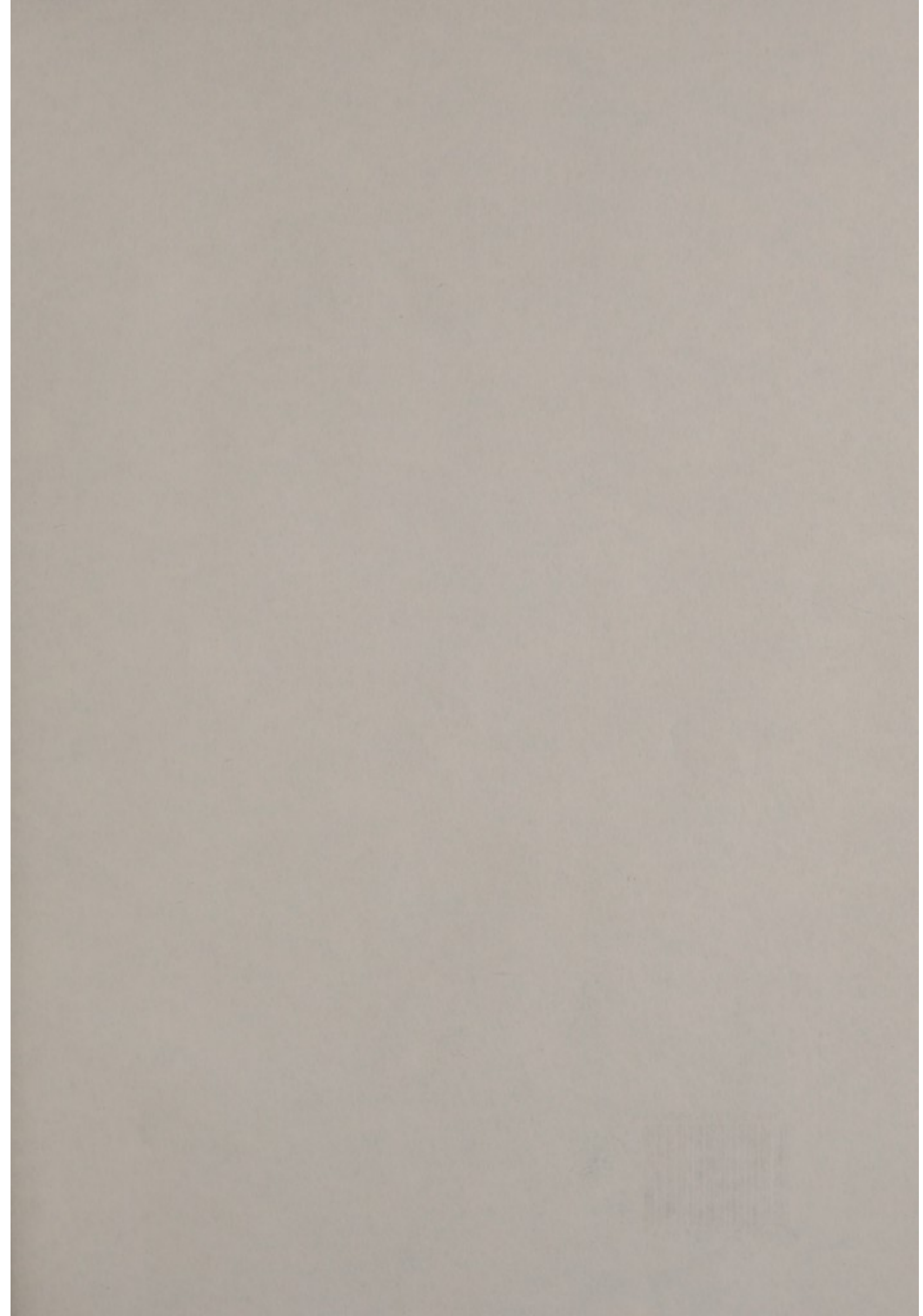
The MoD's Equipment Approvals Committee (EAC), chaired by the Chief Scientific Adviser, provides advice to MoD Ministers on investment in equipment projects and related matters. The EAC does not advise other Ministers or other committees. By convention, official advice to Ministers is not made available to Parliament.

Decisions on investment on which the EAC makes recommendations are also subject to Treasury approval (although individual decisions may be delegated to the MoD). As well as the Treasury, other Government Departments are consulted at official level and their views are taken into account in EAC advice to MoD Ministers. Consultation also takes place at Ministerial level, as appropriate, once MoD Ministers have considered the EAC's recommendations, before a final decision is reached.

In all cases, the Department's Accounting Officer (who is represented on the EAC) also has to be satisfied that the expenditure that is proposed meets the requirements of propriety and regularity and offers value for money. Ministers may decide in certain circumstances to pursue a course of action that fully meets those requirements but differs from the action recommended by the EAC. If, however, Ministers decide to pursue a course that requires them to give a direction to the Accounting Officer, the latter is obliged to notify the Treasury and also the Comptroller and Auditor General, who will in turn inform the Public Accounts Committee.







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