

Prime Minister

Ref. A08481

PRIME MINISTER

Sir Robert Armstrong seeks your agreement to publish the draft White Paper at A. It is a response to the House of Lords Select Committee Report. Its main conclusion is that ministerial responsibilities for the coordination of science and technology should remain unchanged. But it does make suggestions for improvement at official level. These are summarised at B (below). Agree Sir Robert's recommendation?

House of Lords Select Committee Report: Science and Government
Report of the Official Committee on Science and Technology (STO)

WM
21/5

I attach a report by the Official Committee on Science and Technology which examines the form of the Government's response to the House of Lords Select Committee on Science and Technology, which reported on "Science and Government" in December 1981.

2. The Official Committee makes a number of agreed recommendations for strengthening the official interdepartmental co-ordinating machinery for science and technology, some of which I discuss below. We also analysed, but did not reach conclusions on, the Ministerial arrangements for oversight of science and technology.

3. The Select Committee recommend (IV.11) that a Cabinet Minister should be designated to speak for science and technology (in addition to other responsibilities), though they note that you yourself announced in October 1979 that you would yourself play a co-ordinating role, and answer questions in the House, on broad scientific and technological issues. In our report, we identify a progression of four models for Ministerial responsibility, in addition to the strengthening of the official infrastructure:

Model 1: Ministerial responsibilities unchanged.

Model 2: Basic science remains at DES; a non-executive, non-departmental, Cabinet Minister reviews and co-ordinates Departmental research programmes (on a part-time basis).

Model 3: A Minister of State at DES takes on a co-ordinating role, in addition to his executive responsibility for basic science (with the Secretary of State for Education and Science speaking in Cabinet).

Model 4: A non-departmental Cabinet Minister takes on executive responsibility for the Science Vote as well as the co-ordinating role (again on a part-time basis).



4. On balance the Official Committee thought that the case for a change in Ministerial arrangements had not been made out, and was not satisfied that there was a worthwhile role for a Minister on the lines recommended by the Committee. It was therefore in favour of Model 1. If presentational considerations led you to conclude that it was necessary to accept the Select Committee's conclusions that a Minister should be appointed, then Model 2 would be a workable alternative. On the other hand, experience with appointments or co-ordinating Ministers for a wide range of questions have generally indicated that such remits have not been found to be useful or satisfying by the Ministers concerned.

5. The other recommendations which I draw particularly to your attention are:

- Is not done now*
- (a) The establishment of a system of Annual Reviews of Research (Report, 5.3 and 5.4). } *1/2*
- (b) Acceptance of ACARD's recommendation that it should have new terms of reference, which put emphasis on the application of research and technology in the United Kingdom, wherever the basic discovery comes from (8.5).
- (c) That we should commission a periodic report on Science and Technology by the Chairmen of ABRC and ACARD (8.6). •
- (d) That the Select Committee's main point regarding the remit of a Government Chief Scientist has already been met in Dr Nicholson's appointment, but that he could, with advantage, bear the title of Chief Scientist, Cabinet Office (9.3). •
- No*
- (e) That a Committee of Chief Scientists be established under his Chairmanship with the particular responsibility of co-ordinating Departmental activities in Science and Technology (7.1).

6. Annexed to the report is a draft response to the Select Committee, in the form of a White Paper. This is drafted on the basis that you decide to make no changes in relation to Ministerial responsibility; obviously it will need a certain amount of adjustment if a co-ordinating Minister is appointed. The White Paper is also drafted on the basis that you would wish to make a positive general



response to the Select Committee by re-stating the Government's acceptance of the importance of Science and Technology to the country's future economic performance (paragraph 3).

7. Subject to your decision on the question of Ministerial responsibility, I recommend that the remaining conclusions of the Official Committee should be accepted, and that the Government should publish a response along the lines of the attached draft.

8. The Government has said that it will aim to reply to Select Committees within six months of their report: this period expires on 9 June. In a Written Answer (16 March 1982, to Mrs Renee Short) you said that the Government hoped to publish their response in June: Lady Young has made similar commitments. Accordingly, we should aim to send the White Paper to the printers within a fortnight or so, and to send typescript advance copies to the Select Committee.

9. I have discussed the STO report and the draft reply with the Lord Privy Seal, who has authorised me to say that she is generally content with what is proposed, and with the draft reply. She would like to take part in any Ministerial discussion of the matter.

10. I am sending copies of this minute to all members of the Cabinet.

RA

ROBERT ARMSTRONG

21 May 1982

Some of the recommendations under B (previous page) will not make extra work without extra efficiency - particularly (c) + (d). May we have a word about whether 3 already done not



10 DOWNING STREET

From the Private Secretary

Fixed for 11 June.

LM

MR. WRIGHT

HOUSE OF LORDS SELECT COMMITTEE REPORT: SCIENCE AND GOVERNMENT
REPORT OF THE OFFICIAL COMMITTEE ON SCIENCE AND TECHNOLOGY (STO)

The Prime Minister has seen Sir Robert Armstrong's minute of 21 May, reference A08481. As I have told you on the telephone, the Prime Minister is not entirely happy with the recommendations made by STO for improving the coordination of scientific and technological issues at official level, summarised at paragraph 5 of Sir Robert's minute. She feels that some of these recommendations will simply create extra work without extra efficiency, particularly the recommendations at paragraphs 5(c) and 5(e). She was also surprised by the implication in paragraph 5 (a) that there was not already a system for the annual review of research. She also doubts whether it would help to designate the Chief Scientist in the CPRS as "Chief Scientist, Cabinet Office".

The Prime Minister would like to discuss STO's report, and the draft response to the House of Lords Select Committee's report, with Sir Robert Armstrong. She would like in particular to be given a clearer picture of what work is already done on the coordination of scientific and technological issues. Caroline Stephens here will be in touch to fix a meeting. As you suggested, it would probably be helpful if Dr. Nicholson were to accompany Sir Robert.

I am not copying this minute elsewhere.

W. F. S. RICKETT

24 May 1982

Science and Government : Report by STO

1. Introduction
2. Scope of the House of Lords report
3. Historical Perspective
4. Structure of Government-funded Research
5. Making Policy for Research
6. Ministerial and official organisation
7. Coordination at official level
8. External Advisory Bodies
9. A Government Chief Scientist
10. The Role of Departmental Chief Scientists (DCSs)
11. Civil Servants and Science & Technology
12. Summary

Annexes

- A Summary of Report (HL 20-I)
- B Glossary and Bibliography
- C ACARD and ABRC
- D Departmental Chief Scientists
- E Draft Command Paper
Appendix A, Remit of the Chief Scientist, Cabinet Office

SCIENCE AND GOVERNMENT

Report by the Committee of Chief Scientists and Permanent Secretaries (STO)

1. INTRODUCTION

The House of Lords Select Committee on Science and Technology report on "Science and Government" (HL 20-I) was published on 9 December 1981. The report makes comprehensive recommendations covering, in particular, central arrangements, departmental structure, and the Civil Service. A summary of the Report is at Annex A. The Government has announced that it will respond by June. We have been asked to advise Ministers on a draft Government response and recommendations for action. We now submit our report, to which a draft response is attached (at Annex E). Because terminology is so important, we have tried to define some essential terms: these are at Annex B together with a bibliography.

2. SCOPE OF THE HOUSE OF LORDS REPORT

The main thrust of the Select Committee's report concerns the Government's responsibility to secure an adequate scientific and technological input to policy-making. Such an input has to cover a wide spectrum. At one end lie the pure science disciplines and, at the other, application and development. However the Committee heard from only one major industrial concern. Their attention in taking evidence was thus directed towards science, and although their report refers to both science and technology, they did not widen their scope as much as this might imply. We have taken this omission into account, and have concentrated similarly on science and research and their relation to technology.

3. HISTORICAL PERSPECTIVE

3.1 Following the Haldane report on the organisation of Government (1918) the Lord President (and later the Lord Privy Seal) took responsibility for the Research Councils and the Department of Scientific and Industrial Research (DSIR), thus centralising responsibility for science. Then from 1961 to 1964 there was a Minister for Science, Lord Hailsham who, with a small staff, took over these functions together with sponsorship of the United Kingdom Atomic Energy Authority. In 1962 a committee under Lord Trend recommended changes of organisation for basic and applied science. Its recommendations on the Research Councils were put into effect by the Science and Technology Act 1965, but other proposals were modified. On basic science, the Council for Scientific Policy was set up under DES which thus extended its responsibilities to cover science; on applied science, the Advisory Council for Science and Technology (ACST) was set up under the new Ministry of Technology which also took over the applied research establishments from DSIR.

3.2 With the demise of the Ministry of Technology in 1970 ACST disappeared and the organisation of applied science (together with relevant research establishments) devolved on user departments. The decentralisation was accelerated and strengthened as a result of the Rothschild Report of 1971 (Cmnd 4814) on which the Government acted in 1972 (Cmnd 5046). The Lord Privy Seal still retained some responsibility for applied science and was the titular chairman of the Advisory Council for Applied Research and Development (ACARD) when that was set up in 1976; but his responsibilities were

terminated in 1979. In the period since 1974, the position of Government Chief Scientific Adviser was first abolished and then replaced initially by a Chief Scientist CPRS (at U/S level) and then by a Chief Scientist with responsibilities in both the CPRS and Cabinet Office (at D/S level).

3.3 In 1979 the Prime Minister said, in a Written Answer (HC Deb. 29 Oct 1979 cc411-12): "Issues may arise which straddle the responsibility of several Ministers to such an extent that it would not be sensible to ask one of them to take the lead. In such a case I would myself play a coordinating role. I would also, where this was appropriate, answer questions in the House on broad scientific and technological issues involving several Departments."

4. THE STRUCTURE OF GOVERNMENT-FUNDED RESEARCH

Reasons for research

4.1 Departments support research for a variety of reasons. In some cases the work meets a need within departments such as providing information for Government policy-making, including regulatory work and standards making, or support for the purchasing programmes or official services. In others, departments are proxy customers for others (eg local authorities, farmers or certain industrial sectors) who are not able to do their own research and development or, in the opinion of Government, do it inadequately. In these cases, promoting the results of the research may be as important as the research itself.

Basic Research

4.2 Most basic civil science is done in universities and Research Council laboratories. Public financial support for University research is organised in a system of dual funding. One stream of funding flows from the DES Science Budget through grants-in-aid to the five Research Councils which, in addition to running their own institutes and laboratories, give selective support for research and postgraduate training in universities and provide (in Council establishments or through international research bodies) certain central facilities which university researchers use. The other stream flows from the University Grants Committee (UGC) to the individual universities, who generate their own facilities and programmes for fundamental scientific research and provide 'well-found' laboratories for Research Council-supported projects. In both cases, this research is generally aimed at the advancement of knowledge and longer-term objectives rather than at specific applications in the short-term. The aim is to fund it at a level that ensures maintenance of the capacity for basic research, and yields the necessary starting points for applied research, as well as providing trained manpower. The present difficulties in the operation of the dual funding system have been studied by a working party from the Advisory Board for the Research Councils (ABRC) and the UGC; their report is now being considered.

Applied Research

4.3 On the other hand, Government purchase of commissioned research is governed by the customer-contractor principle described by Rothschild. Government departments, as customers, define their requirements, contractors advise on the feasibility of meeting them, and undertake the work. Both Government departments and non-departmental public bodies (including Research Councils and Universities) carry out commissioned research with departmental funds: though some of what is referred to as research is tapping existing knowledge outside Government and is more akin to technology acquisition. Departments also keep in touch with research programmes in the Nationalised Industries. However, there is little coordination or central review of the volume and shape of programmes across departments.

General Research

4.4 The Select Committee suggests (Report IV.31), and **we agree**, that there is a danger that a gap is developing in long-term but directed research, where these two types of research should meet. This is the area known as general (also known as strategic, generic or underlying) research. Rothschild tried to counter this danger when he proposed that contractors would be able to contribute more effectively to their applied research projects if they had some freedom to undertake work which, while being financed by the customer, was not immediately related to a specific programme of work. He proposed a general research surcharge - an average, in money terms, of 10% of a customer's programme - towards this end. The Government accepted this in principle but, at least in the defence field, where it fell to around 3.5% in the late seventies and now runs at about 6%, general research has been well below this level. In other areas the general research surcharge has been omitted entirely or it has been assumed that general research is synonymous with the basic research funded by DES - a principle specifically excluded by Rothschild. General research is not, however, confined to research funded as a surcharge on customer programmes; it can be directly funded by contract in appropriate cases. We **recommend** that ACARD and ABRC should be asked to review this subject.

5. MAKING POLICY FOR RESEARCH

5.1 Central to the Select Committee's recommendations was a concern that Ministers should be able to review more effectively the broad deployment of effort in science and technology, and where necessary bring it more into line with national interests. **We agree** that there is a general problem of developing an overview of the customer-funded work and articulating it with the work supported by Research Councils and Universities. In terms of finance, the problem is a familiar one: how to take a 'horizontal' look at particular types of public expenditure when the main control process operates 'vertically', slicing it into individual departmental programmes, many of them block budgets. At one time, tables appended to the PES Report gave such an analysis of science expenditure, but these were dropped through lack of interest. At present, there is no overall review of government R&D plans in the PES cycle. This is at significant variance to typical private sector practice, where research plans produced by operating divisions and the R&D department are reviewed independently at Board level.

5.2 The Select Committee (IV.16-17) drew attention to the need for a coordinated watching brief to be kept to build up, from the scattered sources of information, an integrated picture of what is being done in science and technology. This accords with their concern that in a very budget-minded system, subjects which are nobody's prime remit may come off the poorer in many separate instances, none disastrous by themselves but giving a serious adverse effect overall.

5.3 The Select Committee recommend a review of the balance, compatibility and thrusts of Departmental R & D plans and imply that this should be undertaken by Treasury (paragraph IV 36). We think that Treasury involvement rather than a Treasury lead is more appropriate but **we recommend** the introduction of a system of Annual Reviews of Research. Departments would prepare a summary of their R & D objectives and plans, to be reviewed by the Committee of Chief Scientists (which we **recommend** in paragraph 7.1 below) with independent advice from ACARD. While information on Research Councils' plans needs to be available, the Reviews should be organised so as fully to allow for the role of the ABRC as advisers to the Secretary of State for Education and Science.

5.4 The analysis required is not a facile choice of areas where more money should be spent; probably overall UK expenditure on R&D as a percentage of GDP is no less than it should be. Skilful value judgments as to allocation of financial and manpower resources are needed - a distinction between vital and dormant areas; identification of gaps and disparities, and of duplications; consideration of the opportunity cost of relinquishing certain efforts. The review should operate with fairly long time horizons, and should avoid intervention in short term plans of Departments.

5.5 It is important to both the well-being of science and technology and the economy generally to get the policy-making machinery right. Only if the economy prospers can particular facets of science and technology be expected to prosper. Contrariwise the country needs to develop excellence in applied science and technology, as the key to economic upturn; our perceived strengths at the moment lie far more in the field of basic research. UK industries, having survived a painful slimming down, are now in a position to move ahead and exploit new technologies - from either civil or defence sources. It is important for the Government to get its own structures and relationships correct since it is the source of funds for practically all basic research and about half of applied work. There is a need for more effective coordination and policy-making for the new research-based technologies (especially for the emerging technologies) such as information technology, space and biotechnology, which often involve problems affecting many departments. Rather than devise ad hoc arrangements for each, there should be a proper system for identifying those of their needs which demand Government action, and for following them up, often on the basis of ACARD reports.

6. MINISTERIAL AND OFFICIAL ORGANISATION

6.1 In the light of the considerations discussed in Section 5 and the Select Committee's recommendations on a Minister for Science and Technology (IV.11) we now review the existing organisational arrangements, particularly those relating to Ministerial responsibility. The problem is one of how best to provide the benefits of centralisation (ie the ability to take an overview of the whole area, thus identifying any gaps and helping to overcome the problems of a distributed system) without its disadvantages - potential duplication and/or conflict. We have looked at various options on the assumption that the overall scale of resources devoted to basic and applied research would remain the same, as would the balance between these sectors. We have identified four models for Ministerial responsibility, all of which are compatible with the other changes, in particular those at official level, which are described later.

Model 1 - An improved version of the Status Quo

6.2 The present system divides responsibility between the Secretary of State for Education and Science who, advised by the ABRC, has responsibility for support of basic civil science; and Ministers in other departments who have responsibility for the application of science and technology and for the conduct or commissioning of applied R&D within their Departmental spheres. Apart from the role of the Prime Minister (mentioned in paragraph 3.3) coordination is limited to the roles of the Chief Scientist, CPRS, and ACARD and STO and their Secretariat. The advantages of this model are that it firmly focuses responsibility for technology with those who have responsibility for its application; and that it links basic science closely with the universities where so much of it is done. **We suggest** measures elsewhere in this report for strengthening the official coordinating machinery, notably:

RESTRICTED

- a. arrangements for Annual Reviews of Research (5.3);
- b. a Committee of Chief Scientists (7.1);
- c. a broader role for ACARD (8.5);
- d. joint Cabinet office and DES secretariats for ACARD and ABRC;
- e. periodic Reports on Science and Technology by the Chairmen of ACARD and ABRC (8.6); and
- f. better coordination of international scientific relationships and of arrangements for disseminating information on S & T (9.4 and 9.5).

These moves should have a significant impact while minimising the disruptive effects of organisational change: though additional posts will be needed as a result, which we describe in paragraph 6.9.

Model 2 - A non-executive Minister

6.3 The Select Committee recommended (IV.8) that a senior, ie Cabinet, Minister should be charged with speaking for Science and Technology in addition to other responsibilities; but he would not have a supporting department, and would depend on the limited resources of the Cabinet Office Secretariat/CPRS for support. There is a danger that with so little support he would carry little "clout", and would be dependent for effectiveness on his political standing derived not from this but from his other responsibilities. He might well, therefore, be unable to get a grip on the research priorities of the government.

6.4 It seems to us that to be effective such a non-Departmental Minister would require enough support to ensure that he could collate and review Departmental research programmes through the Annual Reviews of Research (5.3), relating them to the programmes funded from the Science Budget; and that he could draw to his colleagues' attention any problems which were hindering emerging technologies, and promote technology transfer. But it is important not to cut across the customer-contractor links, and he would not spend money directly, since Science Branch would remain in DES. His methods would include regular formal reviews of research plans, and bringing people together to discuss any gaps or potential overlaps. This would imply a coordination role in which Departmental Ministers retained their existing powers but the central Minister could raise issues for collective decision. In this way he would seek to ensure that customers (ie research-commissioning branches in Departments) were alive to the needs of Government as a whole rather than constrained by Departmental horizons. While ACARD would continue to report to the Prime Minister, he would have day-to-day responsibility for follow-up on her behalf. The role would be an enhancement of the Prime Minister's present interest in science and technology. It would need to consume at least 20% of the Minister's time, though more could be spent if a "high profile" were adopted. So long as the Prime Minister is prepared to take a coordinating role herself (paragraph 3.3) it is not clear that this arrangement would offer significant advantages over Model 1.

Model 3 - A Departmental Minister of State for Science and Research

6.5 Others argue that the job outlined as Model 2 (paragraphs 6.3-6.4) can only be done by a Minister with direct funding responsibility for support of basic science as well as the coordinating role in respect of its application. If the coordinating role were to be concentrated on applied science at the expense of technology it might be an appropriate role for a Minister of State in the DES. He would either be supported by Science Branch (in his Department,

DES) plus a separate small unit in the Cabinet Office and appropriate inter-departmental machinery (together with an enhanced ACARD) on the analogy of the Minister for Information Technology; or, alternatively, by an expanded Office of Science and Research, covering basic and applied science, within DES. The voice in Cabinet would not be that of the Science Minister, but that of the Secretary of State for Education and Science (who, admittedly, might sometimes be influenced by his wider responsibilities). The comprehensive responsibilities given to the Minister of State by this model would help to emphasise the need to bridge the gap between basic and applied research, and to reduce the 'academic' approach to the former; but widening the responsibilities of DES in this way might be criticised as bringing the applied sector into a Department which only has relatively weak links to industry and other users of technology.

Model 4 - A Central Minister for Science and Research

6.6 It might be argued that even these roles would be too limited, and that there should be a Minister with full responsibility for Science who can coordinate policy on both scientific research and the new and emerging technologies. It seems to us that if there is a need for this wider overview and coordination, it would need to be housed outside DES. The best arrangement would be a part-time Cabinet Minister (perhaps devoting about 30% of his time to the role) backed up by a small unit located in the central departments. This unit would be derived from collocation of the present DES Science Branch, with its responsibilities for the Research Councils, the existing Cabinet Office resources, and the extra staff (see paragraph 6.9) to be devoted to the overview and coordination function.

6.7 The chief advantage of this model is that it avoids an anomalous brigading of science responsibility with any one particular area of technology, while building up the links between applied research and basic science and their advisory machinery (ABRC, ACARD). In particular, it would provide Ministers with the means to concentrate resources for basic science, on expert advice, into areas where it was hoped they would be most productive in the development of new technologies. In essence, the aim would be a mild tempering of the current criteria of scientific timeliness and promise currently applied by the peer review system for allocating funds for basic science, with a market-derived input on the need for strategic research. The model would be criticised for threatening the former; neither is it proven that valid identification of worthwhile strategic areas is possible over the necessary time-horizon, though other nations are attempting just such a treatment.

6.8 But this arrangement would break the important link between science and higher education policies. There are other disadvantages: there is a limit to the number of functions which can be given central status, and to bring science into the centre might be seen as in some way unfair; it might not be possible to find an appropriate Minister with both the time and the inclination for the job; and science in the central department would be more exposed to across-the-board cuts than it would be when brigaded with others. Organisationally, too, this model would raise some tricky problems of responsibility and accountability. It would detract from the role in the CPRS of the present Chief Scientist, CPRS, if he were made responsible for managing the new central unit's effort. It would also add significantly to the Accounting Officer responsibilities of the Secretary of the Cabinet (since no other official could readily assume this function).

Manpower

6.9 Whichever model is adopted the increased coordination we propose will mean that some new posts will have to be created within the overall resources available for science and technology in Government. We think that up to 6 new senior posts will be needed, in addition to the existing 2 PSOs (servicing ACARD and STO) and one CPRS adviser, in the Cabinet Office. These would comprise 2 posts at around AS level (subject to Treasury agreement), one of whom would function as an extra Adviser to support the Chief Scientist in CPRS. and up to four posts at Principal level to deal with the remaining extra functions - coordination and overview of Government R&D effort (paragraph 5.3-5.5); input to the ABRC Secretariat (paragraph 8.3); the coordination of work on scientific and technical information (paragraph 9.4) and of international scientific affairs (paragraph 9.5). We estimate the cost of this central unit at around £0.25 million per annum, and there might be some additional load on departments. The aim would be to achieve enough of an improvement in the effectiveness of spending on R&D to justify this use of resources.

Ministerial responsibility - a Summary

6.10 The progression in the four models, then, is that, in addition to strengthening of the official infrastructure, there are the following variations at Ministerial level:-

- Model 1: Ministerial responsibilities unchanged;
- Model 2: basic science remains with DES; a non-executive, non-departmental, central Cabinet Minister reviews and coordinates the totality of Departmental research programmes;
- Model 3: a Minister of State in DES takes on a coordinating role in addition to his executive responsibility for basic science (with the Secretary of State for Education and Science speaking in Cabinet);
- Model 4: a non-departmental Cabinet Minister takes on executive responsibility for the Science Vote as well as the coordinating role.

7. COORDINATION AT OFFICIAL LEVEL

The Committee of Chief Scientists and Permanent Secretaries (STO)

7.1 The Select Committee (IV.35) feel that STO has proved unwieldy and that machinery at a lower working level should be established. Our remit, in addition to general coordination, comprises responsibility for seeing that scientific questions are brought before Ministers as appropriate and that scientific priorities reflect those of Government as a whole. The records show that we have indeed met infrequently. We feel that the Select Committee give insufficient credit to the existing ad hoc and informal arrangements; but we see advantage in formal, umbrella, machinery, to ensure that the other channels are being used effectively. We do not therefore argue for discontinuation of STO; indeed **we intend** to meet on a more regular basis, probably twice a year. Nevertheless we see the value of a working forum where Departmental Chief Scientists can meet, to supplement their existing informal contacts. Accordingly **we recommend** that STO establish a working group of the Departmental Chief Scientists, to be chaired by the Cabinet Office Chief Scientist; and that it should meet approximately quarterly. The deliberations of this group would be concerned with the overall framework of science in Government, and particularly with coordination of research programmes; DES and the Research Councils should be represented.

Military/Civil Coordination

7.2 We agree with the Select Committee (IV.38) that improved arrangements are necessary for coordination of civil and defence research and ensuring that technology can be transferred from defence to civil applications. To this end, we **recommend** that the Chief Scientist, CPRS, and the Chief Engineer, DoI, should become members of the Defence Scientific Advisory Council; though this does mean that their responsibilities would extend to scientific advice on defence issues. The possibility of links between the civilian departments and the Defence Research and Intra-mural Resources Committee (DRIRC) should also be examined. Other questions of technology transfer should be included in the study of information exchange proposed in paragraph 9.4.

8. EXTERNAL ADVISORY BODIES

8.1 Currently, the Advisory Board for the Research Councils (ABRC) advises the Secretary of State for Education and Science on matters concerning the Science Vote; and the Advisory Council for Applied Research and Development (ACARD) sponsored by the Cabinet Office, advises Ministers at large on research and development. Their membership and terms of reference are at Annex C. The purview of the two bodies runs parallel to the funding structure - ABRC advising on money for scientists to pursue work of scientific excellence and promise in either pure or applied research; and ACARD considering the coordination and development of applied research on both a national and an international basis.

Two Committees

8.2 We **consider** that the presence of two bodies in this sector is fully justified by the wide range which they cover, and that no single body would be able to discharge its role satisfactorily (we are at one with the Select Committee (IV.21) in rejecting the notion of any additional bodies). In order to improve coordination, a member of the Secretariat of ABRC should be contributed by the Cabinet Office unit which services ACARD, and a DES official should join the ACARD Secretariat.

The Advisory Board for the Research Councils (ABRC)

8.3 The ABRC has been criticised for dwelling too closely on marginal adjustments to funding, which may have led it to neglect some major policy issues within its remit. We understand however that its recommendations on the distribution of the Science Budget emerge from its 'Forward Look' of the Research Councils where wider and longer term issues do surface. We also note that ABRC has been involved with special studies, namely its own study of postgraduate education, a contribution to the ACARD Biotechnology study, and a current joint study with the UGC on the dual-support system. We **endorse** the view that ABRC should broaden its study of support for science to cover questions affecting the health of basic science as a whole. Opportunity might also be taken of allowing Research Council staff to participate more fully in support for ABRC studies.

The Advisory Council for Applied Research and Development (ACARD)

8.4 The importance of ACARD's remit to advise Ministers and publish reports, and its success in providing access to the Cabinet Office machine for industrialists and outside advisers, seem widely accepted. Most of its reports have been compiled by small working groups which may include

non-members of ACARD. It should continue to report formally to the Prime Minister, though **we consider** it important that there should be clear arrangements for designating a Minister and officials to follow up its recommendations, as discussed in section 6.

8.5 The Select Committee recommend (IV.15) that ACARD extend its coverage and membership, to become a Council for Science and Technology (CST). We understand that ACARD has, in discussion of the Select Committee report, proposed revision of its title to "Council for Research and Technology" and broadened terms of reference. These changes reflect the Select Committee's recommendations, and emphasise ACARD's involvement in the links between pure and applied research. **We recommend** that the terms of reference should be revised as shown in Annex C, paragraph C.8, on the understanding that ACARD should exercise its coordinating function in collaboration with ABRC. However, we think ACARD has established a good reputation, particularly outside Government, and it would be wrong to jeopardise this by a change of title. Accordingly we consider that the title "ACARD" should be retained.

A Report for Science and Technology

8.6 The Select Committee proposed (IV.16) that there should be an annual report on Science and Technology to Parliament, covering scientific opportunities and implications, resource allocations and the cost-effectiveness of research programmes supported by the public sector, bearing in mind the contribution of the private sector. The concept of a periodic Report is attractive, though we believe that a report once every two or three years might be sufficient to meet the need. **We consider** that, in order to ensure that it is an objective critique of events, it could best be presented to the Government by the Chairmen of ACARD and ABRC if they were willing to take on this task. It would form a useful medium to review specific problem areas, establish criteria and assess relative priorities in pure and applied research and in technology. The report would be selective and would not duplicate the existing comprehensive R&D reports provided by some Departments and the Research Councils. The report would also provide an opportunity for public and Parliamentary debate and hence for the evolution of Government policy on science and technology in a steady way rather than the present system which tends to cause major changes at intervals of 7-10 years, depending on the timing of reports which are largely externally generated.

9. A GOVERNMENT CHIEF SCIENTIST (GCS)

9.1 The Select Committee call (IV.12) for re-establishment of a Government Chief Scientist (GCS) post at 2nd Permanent Secretary level, to provide strong central advice on science from within the Cabinet Office: whilst operating in conjunction with the Secretary to the Cabinet and the head of CPRS, he would have the right of direct access to the Prime Minister. As the Committee themselves acknowledge (III.3 and IV.56) the appointment of Dr Robin Nicholson at Deputy Secretary level to the Chief Scientist post with responsibilities both in CPRS and Cabinet Office goes some way towards meeting their points; his terms of reference (at Appendix A of Annex E) cover their main concerns.

9.2 It was largely because Government had already concluded that there was a need for a stronger scientific advisory presence at the centre of Government that the level of the post was raised last year and its remit broadened to put greater emphasis on overall coordination of the Government's scientific interests and effort. At present, Dr Nicholson's post is called Chief Scientist, CPRS. **We recommend** that the broadened remit might be more clearly shown if the post was described as Chief Scientist, Cabinet Office. He should, however, continue to be a member of the CPRS.

9.3 When the previous GCS appointments were made at Permanent Secretary level the system was much more centralised and the responsibilities and range of the GCS were thus wider. It is of course current Government policy that it is not acceptable to confer a certain grade on a post solely on grounds of 'weight' or 'pull'. It is therefore legitimate to conclude that the Government should wait for experience of the new arrangements before making any further changes. Against that, there is the point that if a change is to be made it is best made at the time most likely to ensure full impact within the Government's new response to the provision and coordination of scientific advice. And the grading of the post does have some importance in ensuring that the voice of the Chief Scientist will be properly heard. To some extent the answer depends on the Ministerial option which is to be adopted. At this stage we confine ourselves to **endorsing** the importance of the right of direct access between the Chief Scientist and the Prime Minister, but judge that it will be more usual for the Chief Scientist to advise in conjunction with the head of CPRS and the Secretary of the Cabinet. He should also be available to advise the Treasury as required.

Information on Science and Technology

9.4 The Select Committee express concern (IV.52-53) that not enough effort is put into gathering, coordinating and disseminating the information on science and technology which is available from various sources within the UK and abroad. **We agree** that the existing work needs better coordination. Accordingly, **we suggest** (see also paragraph 6.5, 11.3) that the Chief Scientist, Cabinet Office, in conjunction with the proposed STO sub-committee of Chief Scientists, reports as soon as possible on the effort which Whitehall puts into these areas, with a view to strengthening existing arrangements as necessary.

International Scientific Relationships

9.5 There is also a need for better coordination of international scientific relationships and of the UK appraisal of the scientific programmes of the European Communities, European Science Foundation, UNESCO, NATO, OECD and other bodies. **We recommend** that such coordination should be undertaken under the direction of the Chief Scientist, Cabinet Office.

10. THE ROLE OF DEPARTMENTAL CHIEF SCIENTISTS (DCSS)

10.1 The Select Committee claim (IV.25) that the power and influence of Departmental Chief Scientists (DCSS) has generally declined and that some posts have been eroded and downgraded. They call for at least Deputy Secretary posts in all departments concerned with science or technology, and endorse the Holdgate recommendations on the functions and responsibilities of the DCS. **In our opinion** the role of Chief Scientist should include responsibilities wider than a purely scientific advisory role, including appropriate policy responsibilities. Departments have sought to make satisfactory provision along these lines in their internal structures.

10.2 The Select Committee (IV.23; IV.28-29; IV.36) make some comments regarding specific departments. Annex D discusses these in more detail, but **we do not consider** that the case for a change has been established. Different Government departments naturally have different needs, and there can be no universal pattern. Currently 9 Departments have Chief Scientists named as such but a further 5 with significant numbers of scientific staff do not, though the title of Departmental Chief Scientist may itself be misleading.

Grading of Departmental Chief Scientists

10.3 It is not acceptable to argue for a certain grade on grounds of relative ranking and weight alone; and as Wardale has pointed out, not every grade in the hierarchy need be used in any one structure. The successful functioning of a DCS post is critically dependent on personalities and outlooks - not of just the incumbent DCS but of his colleagues and particularly of his Permanent Secretary. A DCS may be afforded necessary access to top management and to Ministers without bearing the Deputy Secretary label, and this is what has been instituted in MAFF. Conversely, the MOD's Chief Scientific Adviser is a 2nd Permanent Secretary.

11. CIVIL SERVANTS AND SCIENCE AND TECHNOLOGY

11.1 The Select Committee (III.12) feel that other countries have been more successful than ourselves in gearing a technical input to policy. In the UK, the Civil Service has been traditionally based upon a division of responsibilities and structures such that administrators (centrally placed, moving readily between different areas of administration) integrated advice from scientists and technologists (narrowly confined to their specialism, remote from overall consideration of policy and often ineffective in making their points). When scientific and technological factors were relatively simple and often peripheral to decisions this was effective. But the complexity and relevance of such factors and the need to integrate material from different fields of science and to evaluate conflicting evidence have all increased. Following Fulton, the formal distinction between administrators and specialists at the top of the Service has been abolished, and a more consistent use of DCSs as departmental policy advisers has been instituted (with varying degrees of success). Currently the impetus towards bringing those who have both specialist skills and the ability to work effectively as administrators into top policy and advisory posts rests upon implementation of the Holdgate Report, Cmnd. 8032.

The Holdgate Recommendations

11.2 The Select Committee emphasise (IV.43) the importance of the technological generalist scheme recommended by the Holdgate report. **We note** that this and other recommendations are being carried forward by departments in conjunction with the Management and Personnel Office (MPO). **We strongly endorse** the scheme and also the continuing efforts being made in the secondment and interchange fields. **We suggest** that it would be useful for the MPO centrally to monitor progress on the Holdgate recommendations against objectives agreed with departments and to report to Ministers from time to time, perhaps annually.

Listening to advice

11.3 The Select Committee urge (IV.48) better communication between Government and international sources, professional institutions, and universities, to promote better inwards and outwards flow of information and advice. They also hope for a greater openness on the part of Government and reassurance that the role of advisory bodies is appreciated. We have already recommended (9.4) that there should be a comprehensive study of information exchange and dissemination. **We agree** that Ministers and senior officials should develop their links, both formal and informal, to outside sources of expertise; and that they should ensure that those who give advice know what

use has been made of it, or, if it has to be rejected, why. The Reports on Science and Technology (paragraph 8.6) will provide a useful medium for information exchange.

Non-Departmental Public Bodies ('Quangos')

11.4 Whilst the Select Committee regret (IV.49) the closure of certain non-departmental public bodies (the Aeronautical and the Electronics Research Councils are named) **we note** that Ministers keep all such bodies under review and that bodies should be wound up once their useful lifetime has expired. In the named example, functions were transferred to an existing body (Defence Scientific Advisory Council) and **we consider** that experience to date shows the amalgamation to be a success.

12. SUMMARY

(Numbers in brackets refer to sections or paragraphs in this paper)

12.1 Having considered the scope of the House of Lords report on Science and Government (2) and the features of the present system with respect both to funding and support of research (4) and organisation (6), **we agree** with the Select Committee's diagnosis that, given the crucial importance of science and technology to the country as a whole, improvements to the present arrangements are necessary.

12.2 We have identified needs for improved coordination and awareness of our scientific effort as a whole, coupled with the means to effect change or to weigh priorities so that the maximum potential can be achieved from the given resources. The most significant question is

A: Whether to accept the Select Committee recommendation that a **Cabinet Minister be charged with speaking for science and technology?**

Other important structural recommendations are:

B: Establishment of a system of **Annual Reviews of Research** (5.3);

C: A change in the terms of reference of ACARD (8.5);

D: That periodic **reports** on Science and Technology be prepared by the Chairman of ABRC and ACARD (8.6).

12.3 Turning to other of the Select Committee recommendations on arrangements at senior levels within the Service, we consider:

E: That the Select Committee's main points regarding the **remit** of a **Government Chief Scientist** have been already met in the recent appointment of the Chief Scientist, CPRS. **We feel** that he could with advantage bear the title of Chief Scientist, Cabinet Office. For the time being, **no conclusion** can be drawn as to further change in the grading of the post; we must await experience of the current arrangements (9.3);

F: That the situation in departments with regard to the appointment and deployment of Departmental Chief Scientists is **satisfactory** (10.1).

12.4 We have made a number of more particular recommendations as follows:

G: That work on the **technological generalist** scheme, and efforts on **interchange** and **secondment** opportunities, are carried forward as recommended by the Holdgate report, and that the **MPO makes a progress report annually** to Ministers (11.1-11.2);

RESTRICTED

H: That a study of the **scientific information** available within the UK and from international sources, and the use to which it should be put, is made by the Chief Scientist, CPRS (9.4);

J: That the Chief Scientist CPRS should direct the **coordination of international scientific relationships** (9.5);

K: That this Committee, **STO**, **establish a working forum** of Departmental Chief Scientists, with representation of DES and the Research Councils (7.1);

L: That the suggested cross-membership between bodies concerned with **civil and defence science** be put into effect (7.2).

12.5 We attach a draft Government response to the Select Committee in the form of a White Paper (to be presented by the Prime Minister). This is drafted on the assumption that there is no change in Ministerial responsibilities.

April 1982

HOUSE OF LORDS SELECT COMMITTEE ON SCIENCE AND TECHNOLOGY

SCIENCE AND GOVERNMENT REPORT (HL 20-I, 9 December 1981)

The following is a brief summary of Chapter IV of the Report, "Opinion of the Committee and Recommendations". Numbers in brackets refer to the paragraphs in Chapter IV.

CONCLUSIONS

1. The present system of scientific advice to the UK Government goes a long way to meeting the prime objectives. (6)
2. There is no support for a separate "Department of Science and Technology". (8)
3. It is essential that there is a strong voice in Cabinet for S&T. (9)
4. Both effective Ministerial review of S&T and strengthened provision of advice to Cabinet collectively by a Government Chief Scientist would be substantially helped by a Council of Science and Technology (CST). (15)
5. The power and influence of Departmental Chief Scientists have declined over the past 5 years. (25)
6. There is too rigid a distinction between basic and applied research; the former, funded through the science budget of DES, may have immediate relevance to industry but may be endangered for lack of a full assessment of the implications to Departmental policies. (31)
7. The paucity of scientists and engineers coming through as potential Permanent Secretaries is a structural weakness. (39)
8. Improved mobility of manpower between different sectors of employment is desirable. It must be apparent that secondment is in the interests of the employee. (45, 47)
9. The extra cost of implementing the Committee's recommendations is small and will be more than compensated by the returns from a better application of public expenditure. (55)
10. Many of the functions which the Committee have identified as necessary are in fact being carried out by one means or another. The Prime Minister is her own Minister for Science and Technology. Dr Ashworth approached the Government Chief Scientist role envisaged by the Committee and Dr Nicholson's remit and higher rank go some way to acknowledge this. All the functions of a 'CST' are not being carried out at present, but ACARD has a tendency to interpret its terms of reference as widely as possible. (56)

RECOMMENDATIONS OF THE SELECT COMMITTEE

1. A Cabinet Minister for Science and Technology (in addition to other responsibilities) should be designated. (11)
2. A Government Chief Scientist should be appointed to operate in concert with both the Head of the CPRS and the Secretary of the Cabinet in bringing forward scientific and technological advice of all kinds to Cabinet, whether at their behest or on his own initiative. The GCS should be at least at Second Permanent Secretary level. (12)

RESTRICTED

3. A Council of Science and Technology (CST) should be established to:
 - present an annual "state of the nation" report on S&T to Parliament
 - help Ministers review and concert the national scientific effort
 - fill the gap between advice from Research Councils/universities and Departmental policy/needs of industry
 - spur technology transfer from the defence sector to civil industry. (15, 16, 17)

4. This Council should:
 - be served by a small full-time Secretariat
 - be geared to, but independent of, central machinery
 - have an independent part-time chairman
 - report to the senior Minister speaking for S&T in Cabinet. (18)

5. Membership of CST should cover Government, industry, universities, Research Councils and science and engineering bodies, and also include the Government Chief Scientist, Chairmen of ABRC and UGC, Departmental Chief Scientists, and representatives of the Royal Society. CST should have links with NEDO and the Treasury. (18, 19)

6. CST should absorb ACARD's function and take its place. (21)

7. ABRC should retain its management role but should have a more nearly full-time Chairman who would perform the function of a "Chief Scientist" for DES. (23)

8. Departments concerned with S&T should have a Chief Scientist (at Deputy Secretary level or above) integrated into the decision-making machinery and clear of day-to-day research management. (26, 27)

9. The DOI Requirements Boards provide a model for inter-departmental customer boards and the management of research programmes spanning departmental interests. (32)

10. The Government should consider how to make inter-departmental coordination more effective (perhaps at a slightly lower level than the Committee of Permanent Secretaries and Chief Scientists) to support the CST in helping to define overall Government R&D strategy. (35)

11. Treasury Ministers should be in touch with the Government Chief Scientist when weighing proposals from departments against their cost and benefit. (36)

12. DOI and D.Energy should be represented on the Defence Scientific Advisory Council. The Government Chief Scientist should have a concern with defence, at least as far as identifying links between defence and civil science and their application. (38)

13. A "technological generalist" scheme should be instituted as soon as possible. (43)

14. The proposed CST should give early consideration to international aspects of scientific advice to Government. (52)

DEFINITIONS

- B1. **Science** is the knowledge and understanding of natural phenomena. It is sometimes called **basic science**.
- B2. **Applied** science is the generation of knowledge and understanding of natural phenomena with the object of improving products and processes of practical use.
- B3. **Engineering** is the design, development, manufacture and maintenance of useful goods and services related to them.
- B4. **Technology** is the science of the industrial and practical arts.
- B5. **Research** is the process of enquiry into the natural and man-made world. It is the means of generating new science and technology.
- B6. **Basic** research is carried out for the purpose of advancing scientific knowledge. Such research is also called **Fundamental** or **Pure**.
- B7. **Applied** research is carried out with an end-product or objective in view, eg a new product, process or method of operation (Cmnd 5046, paragraphs 6 and 7). Since practical development of the research is required to attain the end-product, the whole process is normally known as **Applied Research & Development**. A related term is **Engineering research** which is the combination of new scientific discovery with practical design and development (Finniston Report, Cmnd 7794, page 108, Note 2).
- B8. **General** research is undertaken to sustain and enhance the intellectual capital of a research laboratory, eg to carry out necessary fundamental research (which has not been done elsewhere) for an applied R & D project, to test way-out and novel ideas and to maintain and develop skills in experimental techniques (Cmnd 4814, paragraph 15). General research is sometimes called **Strategic**, **Generic** or **Underlying** research.
- B.9 The **Rothschild principle** (Cmnd 4814 paragraph 6) of R&D states that: "The customer says what he wants; the contractor does it (if he can); and the customer pays".

BIBLIOGRAPHY

1. 'Haldane': Report of the Machinery of Government Committee. Cd. 9230, HMSO 1918.
2. 'Trend': Report of the Committee of Enquiry into the Organisation of Civil Science. Cmnd. 2171, HMSO 1963.
3. 'Fulton': The Civil Service: Report of the Committee. Cmnd 3638, HMSO 1968.
4. 'Rothschild': A framework for Government Research and Development. Cmnd. 4814, HMSO 1971.
5. Framework for Government Research and Development. Cmnd. 5046, HMSO 1972.
6. Review of the Framework for Government Research and Development (Cmnd 5046). Cmnd 7499, HMSO 1979.
7. 'Holdgate': Review of the Scientific Civil Service. Cmnd 8032, HMSO 1980.
8. The Government Response to the Review of the Scientific Civil Service (Cmnd 8032): ISBN 0 7115 0034 7, CSD 1981.

ABRC AND ACARD: MEMBERSHIP AND TERMS OF REFERENCE .**The Advisory Board for the Research Councils (ABRC)**

C.1 The ABRC, formed in 1972 on the demise of the Council on Scientific Policy (CSP), advises the Secretary of State for Education and Science and his responsibilities for Civil Science "with particular reference to the Research Council system" and including "the allocation of the Science Budget amongst the Research Councils and other bodies". (The "other bodies" which receive subventions direct from the Science Budget are the British Museum (Natural History) and the Royal Society - both of which exercise functions in the support of the research; their subventions are relatively small.)

C.2 The ABRC membership comprised (1981) the head of each of the Research Councils and the Chairman of the UGC, the Chief Scientists of the CPRS and of Government Departments with a major interest in the work of the Research councils, a number of independent members drawn from universities (4), and industry (2); several members are also Fellows of the Royal Society. The Chairman is also independent - currently Sir Alec Merrison, Vice-Chancellor of Bristol University.

C.3 The ABRC Secretariat is drawn from the Science Branch of the DES; this comprises two Secretaries at AS and Principal level, each about half time, with an HEO in support, and another Principal with a part-time commitment, eg on project work. Its terms of reference are as follows:

"a. To advise the Secretary of State for Education & Science on his responsibilities for civil science, with particular reference to the research council system, its articulation with Universities and departments, the support of post-graduate students and the proper balance between international and national scientific activity;

b. to advise the Secretary of State on the allocation of the science budget among the Research Councils and other bodies, taking into account funds paid to them by customer departments and the purposes to which such funds are devoted;

c. to promote close liaison between councils and the users of their research."

The Advisory Council on Applied Research and Development (ACARD)

C.4 ACARD, like STO, was established in 1976; it first met in January 1977. Its terms of reference are currently as follows, although ACARD themselves have proposed a revision in the light of the Select Committee Report:

To advise Ministers and to publish reports as necessary on -

i. applied R and D in the United Kingdom and its deployment in both the public and private sectors in accordance with national needs;

ii. the articulation of this R and D with scientific research supported through the Department of Education and Science;

iii. the future development and application of technology;

iv. the role of the United Kingdom in international collaboration in the field of applied R & D.

C.5 Following Dr Spinks' death, Sir Henry Chilver, Vice-Chancellor of Cranfield Institute of Technology, is the present Chairman of ACARD.

Membership is predominantly engineering/industrial although the ABRC Chairman is included and Chief Scientists of Cabinet Office, DEN, DOE, DoI and MOD attend as assessors. During 1981 membership comprised ten representatives of industry, industrial research, and the engineering profession at board member/senior executive level. There is provision for 2 trade union members. Two Principal Scientific officers from the Cabinet Office form the (practically full-time) Secretariat to ACARD; the Chief Scientist, CPRS and CPRS Advisers may also make an input here.

C.6 The Council's published reports, available from HMSO, are:

The Applications of Semiconductor Technology (1978)
Industrial Innovation (1979)
Joining and Assembly: The Impact of Robots and Automation (1979)
Technological Change: Threats and Opportunities for the United Kingdom
Computer Aided Design and Manufacture (1980)
R & D for Public Purchasing (1980)
Biotechnology (1980) (with ABRC and Royal Society)
Information Technology (1980)
Exploiting Invention (1981)

PROPOSED REVISED TITLE AND TERMS OF REFERENCE

C.7 The following revised title and terms of reference have been suggested by ACARD to enable it to carry out most of the tasks envisaged in the Select Committee's report for their Council for Science and Technology.

"COUNCIL FOR RESEARCH AND TECHNOLOGY (CoRT)

To advise the Prime Minister and Ministers and publish reports as necessary on:-

- applied research, design and development in the United Kingdom;
- the application of research and technology for the benefit of both the public and private sectors in accordance with national economic needs;
- the co-ordination of these activities with basic research and associated functions supported through the Department of Education and Science;
- the role of the United Kingdom in international collaboration in the fields of applied research, design and development related to technology".

C.8 As described in paragraph 8.5, these revised terms of reference could be accepted subject to

- a. inserting "developed in the UK and elsewhere" after technology in the fourth line;
- b. inserting "in collaboration with the Advisory Board for the Research Councils" after coordination in the seventh line;
- c. deleting "basic" and "and associated functions" in the same sentence.

DEPARTMENTAL CHIEF SCIENTISTS

A Chief Scientist for HM Treasury?

D.1 The Select Committee noted (IV.36) the Treasury's need for access to expertise on science and technology in its role of agreeing Civil Estimates. Treasury officials doubt whether a single Chief Scientist could advise over the whole range of spending programmes; in any case, decisions on priorities within PES blocks are largely for Departmental Ministers. However, we **recommend** that the Chief Scientist, CPRS should be available to the Treasury for advice when required. We describe in paragraphs 5.3-5.5 a comprehensive analysis of Government spending on R&D which would be a useful tool for the Treasury.

A Chief Scientist for DES?

D.2 The Select Committee thought (IV.23) that the Chairman of ABRC should be invited to perform some of the functions of a Chief Scientist for DES. However, there are existing arrangements for the provision of advice on science teaching at all levels, from HM Inspectorate of Schools in relation to schools and maintained and voluntary further and higher education and by the UGC in respect of the Universities. The DES only commissions a limited amount of educational research. The arrangement proposed would detract from the independence of the Chairman of ABRC and **we do not recommend** it.

A Chief Scientist for the Scottish Office?

D.3 At present there is a Chief Scientist only in the Scottish Home and Health Department. The Committee recommends (IV.28) consideration of the Royal Society of Edinburgh's proposal for a wider Chief Scientist structure. The Scottish Office **conclude** that for a number of reasons it is not a practical proposition. First and perhaps most important, it is impracticable to require a single DCS to deal authoritatively with the whole range of scientific advice which is needed by the five separate Departments within the Scottish Office and to maintain the necessary close contacts with the policy makers in all the diverse areas of work to be covered; it would be difficult, if not impossible, to recruit an appropriate person for such a job. There is already a considerable body of scientific and other research advice available within the Scottish office, geared to meet most of the Scottish office specialist needs. Nevertheless, **it is recognised** that Scottish Departments will require further scientific advice, and that frequently it will not be available in-house. Experience has shown that expert advice is readily available from appropriate committees. In such a way, better and more selective use of expertise may be made than could be achieved from formal links to corporate bodies or societies. Nevertheless, there is no reason why bodies such as the Royal Society of Edinburgh cannot, on their own initiative, identify appropriate departmental interests and approach the Scottish Office directly.

Scientific Advice to MAFF

D.4 The changes in the top structure of MAFF, to which the report refers (IV.29), have been in effect for slightly less than a year. Already, however, **it is evident** that they are working well. The two Chief Scientists, in close cooperation with their Deputy Secretaries and their scientific staff, have improved the coordination of the Ministry's research programmes with its policy interests and have contributed to the increasingly close relationship of the Ministry with the Agricultural Research Council. The new arrangements allow scientific advice to be much more closely integrated into the process of decision making.

DRAFT COMMAND PAPER GOVERNMENT RESPONSE TO THE REPORT BY THE SELECT COMMITTEE OF THE HOUSE OF LORDS ON SCIENCE AND TECHNOLOGY ENTITLED "SCIENCE AND GOVERNMENT"

The Government are grateful to the House of Lords Select Committee on Science and Technology for their valuable and stimulating review of the arrangements for scientific advice to government. In general, the Government fully **accept** the main thrust of the Select Committee's report; that the Government has a responsibility to secure an adequate scientific and technological input to policy-making. The Government **concur** with the Committee's outline of departments' need for advice (paragraph IV.2) and their view that what is needed is a strengthening of the centre rather than wholesale reorganisation (IV.6). As the Committee say, the machinery by which advice is to be tendered is less important than the ability, will and perseverance to seek and use such advice.

2. This response, like the Committee's report, covers the fields of science and research, and their relation to technology: but it does not cover the wider aspects of the Government's approach to technology.

3. Excellence in the development and exploitation of science and its applications is essential if the economic prosperity of the country is to be advanced in the coming decades, and if companies based on science and technology are to play their part in providing new employment opportunities. These objectives demand effective management of the limited resources (of both skills and cash) available, and mechanisms for ensuring that Government policies take full account of scientific opportunities and implications. The measures described in this paper are designed to aid the implementation of these objectives, which the Government regard as being of high priority.

Departmental responsibility

4. The Select Committee believe that the integration of science and technology into policy departments is beneficial, and consider that there should not be a separate executive department responsible for all aspects of science and technology. The Government **agree**; it would be wrong to weaken the present responsibility of each Minister for securing the scientific advice he

RESTRICTED

needs and for ensuring that his department commissions a suitable research programme. The changes set out below build upon this responsibility and on the customer - contractor principle for applied research*.

Chief Scientist, Cabinet Office

5. The Committee recommend that a Government Chief Scientist should be appointed at Second Permanent Secretary level (IV.12). The Government **accept** the need for a senior scientist at the centre to fulfil the general role set out in paragraph IV.13 of the Select Committee's report. However, they **consider** that the appropriate title for the post is that of "Chief Scientist, Cabinet Office"; the job description is at Appendix A. As recommended by the Committee (IV.14), the Chief Scientist will have the right of direct access to the Prime Minister (as now). He will continue to be a member of the CPRS and to provide the CPRS with scientific and technological advice.

6. The post was upgraded recently to Deputy Secretary when the present incumbent was appointed. The Government will await experience of the new arrangements before drawing a conclusion as to any further change in the grading of the post. The Government **accept** the Select Committee's conclusion (paragraph IV.14) that the Chief Scientist, Cabinet Office will require a small Unit to support him; this will be established in the Cabinet Office. The costs are within the totals given in paragraph 26.

Central Advisory Machinery on applied research

7. The Select Committee recommend (IV.15-IV.22) the establishment of a Council on Science and Technology (CST), with a remit that would cover the whole of scientific and technological endeavour and its implications for the policies and strategies of Departments and Government as a whole. However, the Committee consider that the Advisory Board for the Research Councils (ABRC) should be retained. The Government **accept** the need for high-level independent advice and for the retention of the ABRC, but **consider** that the improvement in the central advisory machinery should mainly be achieved by encouraging the Advisory Council for Applied Research and Development (ACARD) and ABRC to broaden their fields of study so that there is no gap in the coverage of the research spectrum.

* as described in the Rothschild Report, Cmnd 4814, 1971, accepted by the Government in Cmnd 5046, 1972, and reviewed in Cmnd 7499, 1979.

RESTRICTED

Advisory Council for Applied Research and Technology (ACARD)

8. ACARD has recommended, in the light of the Select Committee's Report, that its own terms of reference should be revised and extended. They should enable it to cover the fields of applied research, design and development and the application of research and technology, together with the coordination of these activities with basic research. The Government **accept** ACARD's proposal, which goes a long way to meeting the Select Committee's recommendations, and have given it the following new terms of reference:-

"To advise the Government and publish reports as necessary on:-

- applied research, design and development in the United Kingdom;
- the application of research and technology, developed in the United Kingdom and elsewhere, for the benefit of both the public and private sectors in accordance with national economic needs;
- the coordination, in collaboration with the Advisory Board for Research Councils, of these activities, with research supported through the Department of Education and Science;
- the role of the United Kingdom in international collaboration in the fields of applied research, design and development related to technology".

Advisory Board for the Research Councils (ABRC)

9. The Government **agree** with the Committee (IV.23) that there should be no change in the ABRC's present role in the management of the research councils and in advice to the Department of Education and Science on that part of civil science supported by the Science Budget. The Government **take note** of the other points made by the Committee about ABRC (IV.23-24). In future, a member of the Secretariat of ABRC will be contributed by the Cabinet Office Unit which services ACARD, and a DES official will join the ACARD secretariat. Joint secretariats of this sort should help to ensure coordination between basic and applied science, and between the two advisory bodies, without disturbing the present distribution of responsibilities.

An Annual Report for Science

10. The Committee proposed that their Council for Science and Technology would submit an annual "state of the nation" report (IV.16). The Government **agree** that such a periodic report would be valuable (though not necessarily as frequently as once a year) and will ask the Chairmen of ACARD and ABRC to present joint reports to the Government. These would, as the Committee recommend, review scientific opportunities and their implications, on a selective basis, as well as reporting on the Annual Review of Research described below. They will not necessarily be confined to activity in the public sector.

Departmental Chief Scientists

11. The Government **accept** the views of the Committee that Departmental Chief Scientists should have a wide-ranging role in Departmental policy making, and should not be too involved in detailed research management, (IV.26). **They consider** however that Departments are in fact making satisfactory provision for scientific advice, though arrangements will continue to evolve to meet changing needs. The Government **do not accept** the Committee's suggestion (IV.25) that the power and influence of Departmental Chief Scientists have declined, nor that all these posts have to be graded at Deputy Secretary level or above. The grading used must reflect the responsibilities allocated to the post and the needs of the Department. A Departmental Chief Scientist may be afforded the necessary access to top management and Ministers even though serving in a grade lower than that of Deputy Secretary. The Government's views on the particular arrangements noted by the Committee are set out below.

HM Treasury

12. The Select Committee noted (IV.36) the Treasury's need for access to expertise on science and technology in its scrutiny of departmental Estimates. The Government **doubt** whether a single Chief Scientist could advise over the whole range of spending programmes; in any case, decisions on priorities within PES blocks are largely for Departmental Ministers. However, the Chief Scientist, Cabinet Office, will be available to advise the Treasury when required. Paragraphs 19-21 describe a procedure for Annual Reviews of Research which should meet the need to address the important questions with which the Select Committee thought a Chief Scientist in the Treasury would be concerned.

Department of Education and Science

13. The Committee suggested (IV.23) that the Chairman of ABRC should be invited to perform some of the functions of a Chief Scientist for DES. However, there are existing arrangements for the provision of advice on science teaching at all levels, by HM Inspectorate of Schools, in relation to schools and maintained and voluntary further and higher education, and by the University Grants Committee in respect of the Universities. The DES commissions only a limited amount of educational research. The arrangement proposed by the Committee would detract from the independence of the Chairman of ABRC.

The Scottish Office

14. The Government have, as recommended by the Committee (IV.28), considered the Royal Society of Edinburgh's proposal for a Chief Scientist in the Scottish Office and **conclude** that the aims of this recommendation can be better achieved by other means. It is impracticable to require a single Scientist to deal authoritatively with the whole range of scientific advice which is needed by the five separate Departments within the Scottish Office and to maintain the necessary close contacts with the policy makers in all the diverse areas of work to be covered; it would be difficult, if not impossible to recruit an appropriate person for such a job. There is, of course, a Chief Scientist in the Home and Health Department. However, Scottish Departments will require scientific advice beyond that available in-house. Experience has shown that expert advice is readily available from appropriate committees. In such a way, better and more selective use of expertise may be made than could be achieved from formal links to corporate bodies or societies. Nevertheless, there is no reason why bodies such as the Royal Society of Edinburgh cannot, on their own initiative, identify appropriate departmental interests and approach the Scottish Office directly.

Ministry of Agriculture Fisheries and Food

15. The changes in the arrangements for scientific advice in MAFF to which the Committee refer (IV.29) have been in effect for slightly less than a year. Already, however, it is evident that they are working well. The two Chief Scientists, in close cooperation with their Deputy Secretaries and their scientific staff, have improved the coordination of the Ministry's research programmes with its policy interests and have contributed to the

RESTRICTED

increasingly close relationship of the Ministry with the Agricultural Research Council. The new arrangements allow scientific advice to be much more closely integrated into the process of decision making. The Government **conclude** that these arrangements should be allowed to stand.

R&D Funding: mechanisms and principles

16. The Committee are concerned that there is too rigid a distinction between basic and applied research, and that certain areas of research are being neglected. The Government **note** this concern and will ask ACARD and ABRC to review the links between basic and applied research and, in particular, to look at the arrangements for long-term but directed research - often known as "general research"* or, as termed in paragraph IV.30 of the Committee's report, "strategic research".

Inter-Departmental Coordination

17. The Committee consider that more constructive use of the general machinery for interdepartmental coordination is required (IV 34-35), and that there is a place for a forum at a level below that of the current Committee of Permanent Secretaries and Chief Scientists. The Government **accept** this proposal and are establishing a Committee of Departmental Chief Scientists, chaired by the Chief Scientist, Cabinet Office. This group will be concerned with the overall framework of science within government, and particularly with coordination of research programmes; arrangements will be made for DES and the Research Councils to be represented.

18. The Committee recommended (IV.37-38) enhanced coordination between civil and defence research programmes, and further efforts to ensure that inventions developed by defence research are exploited for the benefit of the economy. The Government **accept** the need for improved coordination and to achieve this, the Chief Scientist, Cabinet Office, and the Chief Engineer and Scientist, Department of Industry, will join the Defence Scientific Advisory Council as the Committee recommends (IV.38), and also the Defence Research and Intramural Resources Committee. At a lower level, Department of Industry and other civil departments are invited to join in the MOD's reviews of the programmes of their research establishments. Ministry of Defence officials are already involved with the appropriate Department of Industry Research

* The Rothschild Report, Cmnd 4814, 1971

RESTRICTED

Requirements Boards and will continue to be drawn into other departments' research-commissioning arrangements.

Annual Reviews of Research

19. A central theme of the Select Committee's recommendations (see, for instance, paragraph IV.36) was the need for more effective review of the broad deployment of effort in science and technology. In a financial context, the problem is a familiar one: how to take a horizontal look at particular types of public expenditure when the main control processes operate vertically by slicing expenditure into individual departmental programmes. At present, there is no overall review of Government R&D plans in the Public Expenditure Survey (PES) cycle. This is a significant contrast to typical private sector practice where research plans produced by operating divisions and by the R&D department are reviewed independently at Board level.

20. The Government have therefore **decided** to introduce a system of Annual Reviews of Research. Departments will submit a summary of their research programmes and budgets, to be reviewed inter-departmentally, with independent advice from ACARD, during the early months of the year; this timetable would allow Departments to revise their plans during the next PES cycle in the light of the results of the Review.

21. The analysis required will not be a facile choice of areas where more money should be spent. In the Government's view, overall UK expenditure on research and development as a percentage of GDP is sufficient. Skilful value judgements as to allocation of financial and manpower resources are, however, needed. This will involve distinguishing between vital and dormant areas, identifying gaps, disparities and duplications, and considering the opportunity cost of relinquishing certain areas of research. The emphasis will be on review of long-term plans.

Civil Service Issues

22. The Select Committee emphasise, in paragraph IV.39-IV.42, the need for changes in attitudes to science and technology in the Civil Service and more generally. They endorse the technological generalist scheme described in the

RESTRICTED

Report of the Holdgate Committee* and call for a greater flow of scientists and others in and out of the Civil Service. The Government **note** the general points made and will follow them up in implementing the Holdgate recommendations which are being carried forward by departments in collaboration with the Management and Personnel Office (MPO)‡. The MPO will monitor progress on the technological generalist scheme and other recommendations against objectives agreed with departments, and will report to Ministers. Continuing efforts will be made to ensure that secondment and interchange arrangements succeed, and that staff are clear that such wider experience will be of real benefit to their careers.

External communication

23. The Select Committee were concerned (IV.48) at evidence which described as inadequate the current channels of communication between Government and the scientific and technological community. They recommend a review of relationships with outside bodies. The Government **accept** the importance of keeping these channels of communication open and effective. Indeed, the Government is probably more reliant on external advice in relation to science and technology than in relation to almost any other area. The Government **do not consider** that new formal machinery to articulate the formation of this advice is required, but will always consider carefully advice from scientific societies and engineering institutions as to issues which require further study. It is the Government's general policy to keep the structure of advisory bodies under regular review and to wind them up once their useful lifetime has expired. Such reviews will not overlook the wider benefit, in terms of understanding of Government, that membership of such bodies can bring.

24. The Committee also express concern (IV.50) - repeated in the subsequent debate in the House of Lords - over the lack of feedback to those who have given advice. The Government **agree** that members of advisory committees and similar bodies should always receive some indication of the outcome of their advice, particularly if it cannot be accepted.

25. The Committee also comment (IV.51-53) on the need to improve relations with the engineering profession, especially in the light of the establishment

* Review of the Scientific Civil Service (1980) Cmnd 8032,

‡ The Government Response to Cmnd 8032, CSD 1981.

RESTRICTED

of the new Engineering Council (on which the Committee will no doubt have more to say in its further report on Engineering Research and Development); and on the need to improve the machinery for receipt and dissemination of scientific information from abroad. The Government **note** these points; international links will be a particular concern of the Chief Scientist, Cabinet Office, in his strengthened role.

Costs

26. As the Committee say (IV.55), there will be some cost in establishing these improved arrangements for central coordination of science and technology. The Government estimate that around 6 new senior posts are required, which will cost about £1/4 million. These new posts will in the main be concerned with support to the Chief Scientist, Cabinet Office, in the improved review and coordination roles described in this Paper, and in servicing ACARD and ABRC. The Government believe that the benefits of improved decision-making will more than justify this cost, which will be contained within the overall resources available for science & technology in Government.

A Central Minister for Science

27. The Committee **recommend** (IV.11) that a Cabinet Minister should be designated to speak for Science and Technology, in addition to other responsibilities. But, as they note (II.13), the Prime Minister has herself said, in a Written Answer (HC Deb. 29 Oct 1979 cc411-12) "Issues may arise which straddle the responsibility of several Ministers to such an extent that it would not be sensible to ask one of them to take the lead. In such a case I would myself play a coordinating role. I would also, where this was appropriate, answer questions in the House on broad scientific and technological issues involving several Departments".

The Government believe that the stronger machinery at official level outlined above, together with this role of the Prime Minister, means that scientific or technological issues are unlikely to be lost or forgotten. They do not believe that there is - within the British system of Cabinet Government - at present an identifiable and viable role for a coordinating Minister, and accordingly, **do not agree** with the Committee's recommendation.

28. The Government are confident that the revised arrangements set out in this response will lead to more effective articulation of the UK's very

RESTRICTED

considerable efforts in science and research, at all levels from basic research to product development, with other activities of government. They are in no doubt of the importance of science and technology in assuring the well-being of the people of the United Kingdom.

27 April 1982

THE REMIT OF THE CHIEF SCIENTIST, CABINET OFFICE

The Chief Scientist provides scientific and engineering advice for the CPRS and the Cabinet Office generally. He sits on the principal Committees which deal with the scientific and technological issues that come before Government except for those which are solely the concern of a single department. He is the Government's scientific representative on many international occasions.

A.2 **Cabinet Office.** The Prime Minister and the Secretary of the Cabinet looks to the Chief Scientist, Cabinet Office, to provide, or organise the provision of, advice on scientific and technological matters, or scientific and technological aspects of other issues, which come to the Cabinet Office.

A.3 **CPRS.** The Chief Scientist, Cabinet Office, is a member of CPRS and is responsible for providing scientific and technological input to CPRS studies. However, he is not constrained by title and has the opportunity to contribute to issues which are not overtly scientific or technological.

A.4 **Government Committees.** The Chief Scientist, Cabinet Office, is ex officio a member/assessor of the Advisory Council for Applied Research and Development (ACARD), the Advisory Board for the Research Councils (ABRC), and is also a member of the Committee of Chief Scientists and Permanent Secretaries. The Chief Scientist is the prime link between ACARD and the Government and plays a central role in planning ACARD's work.

A.5 **International Affairs.** The Chief Scientist, Cabinet Office, has a general responsibility for coordination of international scientific and technological relationships, covering in particular:

- a. The UK's bilateral scientific and technological agreements with other countries.
- b. The European Community R&D Budget. The Chief Scientist is UK membre titulaire on CREST (the Committee that advises both the Council of Ministers and the Commission).
- c. The Chief Scientist is often asked to attend (or accompany Ministers attending) general fora on scientific and technological topics organised by bodies such as the OECD, UNESCO, etc.
- d. The research plans and budgets of other international organisations.