cc PO.

PRIME MINISTER

MAINTAINING THE STRENGTH OF THE SCIENCE BASE

As recorded in David Barclay's letter of 23 May to Richard Mottram, you asked Michael Heseltine and me to let you have by the end of June separate notes on the implications of transferring to the university-Research Council system £20M presently intended for intra-mural research in MOD.

2. What we are examining, I take it, is the net effect for the national interest of stopping £20Ms' worth p.a. of MOD intra-mural research to transfer that sum to my PES block for work in the university-Research Council research base. The aim would be to strengthen those disciplines of at least potential interest to long-term defence needs - both for knowledge and for trained manpower. (In this connection it is worth noting that we spend about four times as much on defence research as the figure in the science budget whereas in France the two sums are about the same.) It would be a distinct and different exercise from the modest (but welcome) expansion MOD have proposed in their "research agreements" with universities where relevance to defence needs is quite properly a major criterion. The exercise we are considering would widen but not abandon the concept of relevance; that is the money should be used to strengthen say chemistry but not anthropology.

3. You ask what research areas might best be supported. I would want to use the money to reinforce current excellence - whether in a university department or Research Council unit - where the wider interests of MOD, and Councils' judgement of scientific quality and opportunity, coincide. It would not be sensible for me to try here to offer a definitive list - that would require joint work by the Councils with MOD. A starting point could be the areas where MOD currently have research agreements

with the universities; I attach that list annotated to show which Research Councils are also supporting work in the field. You will see that the extent of shared interest is so remarkable as to make this further analysis which you have set in hand even more necessary.

4. My starting point for the use of this additional money would be those scientific opportunities that on our present expenditure plans will have to be forgone. The disciplines of interest to MOD are probably mainly within the scope of the SERC who would give high priority to:

- low dimensional structures, including molecular electronics (where novel physics confers some remarkable properties, as I think we shall hear at our seminar on 8 July)

- development of bio-sensors for specified chemical species

- protein engineering

- systems design and control, specifically in the application of computers to mechanical engineering

- development of laser applications

- information technology, and in particular strengthening their contribution to IKBS and the Alvey programme more generally

- a UK-led space science mission.

There are areas in the medical field, too, where there is exciting science to be done likely to be of long term interest to MOD as well as more widely. The Anatomical Neuropharmacology Unit at Oxford is developing work on the organisation of neural circuits in the brain and their relation to information processing and behaviour. More generally in molecular neurobiology

the Council sees great opportunity which at present it cannot grasp. MRC are also working in co-ordination with SERC on protein engineering, particularly the design and construction of novel enzymes and hormones. Other areas of possible interest where they would like to expand include the molecular basis of medicine, work on addiction and possible therapies, depression and the possibility of intervention therapy, and work on man-machine interactions in relation to the Alvey programme.

5. I stress that these are only examples of starting points, illustrative of the extent of common interest. I would want to see close collaboration between MOD and the Councils in defining the precise disciplines and places where the funds should be applied to bring about the strengthening of present excellence. This would accord well with the plans on which I am working with the UGC, the ABRC, and the Research Councils, to bring about greater selectivity in the UGC funding of research. Much of the transferred money would go to the universities, but not necessarily all because there are areas of MOD interest where the country's expertise might be in a Research Council unit or institute.

6. Michael will be able of course to assess the implications for MOD of terminating certain programmes and, obviously, there is room to spell out more fully the advantages to MOD of developing work in particular Council areas. I would expect defence interests to benefit over the longer term from a science base that is not only stronger but more aware of,and alert for, novel science having defence potential; from closer working relations with the Research Councils and the universities, and particularly from the indirect benefits in teaching and postgraduate training in the basic science and engineering disciplines that would follow from the strengthened science base. I would expect there to be strong reinforcement of highly qualified manpower in just those skills that MOD most need. But these benefits would of course be felt more widely than defence, throughout all parts

of employment and over and above the exploitation of any particular pieces of work. I believe the transfer could on balance be a net gain for the national interest as a whole.

7. I favour an addition to the Science Vote, albeit one that is applied to agreed disciplines, rather than specific contracts. The latter have their place and should continue but they are by nature limited in period and purpose and rightly tend to be judged primarily against the specific needs of the contractor and demonstrable defence potential. As I see it we are seeking something rather different - a reinforcement of the science base that can be expected to benefit defence, and other industry more widely, in ways that cannot be explicitly foreseen at the outset. I think this requires giving primacy to the criterion of scientific distinction and promise, as applied in decisions about the Science Budget. It does not necessarily mean, of course, that we are talking just about blue-sky basic research; interest may well focus more on strategic research, to which a good part of the Science Vote is directed.

8. On application I think the SERC have a good record and one that is steadily improving. I have in mind for example the success of their Teaching Company Scheme (which might be developed to cover areas funded by the transfer) and their use of special Directorates where they have brought about a sea change in a number of areas as for example in polymer engineering and marine technology. Similarly MRC have been developing their exploitation policy, as for example through Celltech and NMR imaging. Both Councils would, I believe, be ready and efficient in responding to the request that I would want to attach to this transfer that application should receive particular attention.

9. We are talking, I judge, about relatively small sums - perhaps 3.5% of MOD's intra-mural R and D spend or perhaps about twice that percentage if we discount development expenditure. And we would increase the Science Budget by about 3.5%. These small percentage figures convey little impression of the very

considerable impact and benefit that I believe the PES transfer would secure. I hope you will agree that the proposal should be developed, jointly by DES with MOD with Dr Nicholson's help and oversight, to produce a more detailed note on the basis of which we and our colleagues could reach a decision in the course of our public expenditure discussions in the autumn.

10. I am sending copies of this minute to Michael Heseltine, Robert Armstrong and Robin Nicholson.

KJ

2 July 1984

AREA OF MOD INTEREST FOR RESEARCH AGREEMENTS	COUNCIL SUPPORTING WORK IN THE AREA
Aerodynamics	SERC
Aircraft structures	
Materials eg novel semi-conductors	SERC
Electronics	SERC
Information technology	SERC, MRC, ESRC
Opto-electronics	SERC
Space eg satellite instrumentation, remote sensing	SERC, NERC
Acoustics	SERC, MRC
Physics eg semi-conductor behaviour	SERC
Chemistry	SERC
Medicine and behavioural sciences	MRC, ESRC
Biochemistry	SERC, MRC
Hydrodynamics	SERC
Propulsion	
Control systems	SERC
Mathematics	SERC
Operations analysis	SERC
Marine technology	SERC, NERC
Oceanography	NERC
Meteorology	NERC
Systems design	SERC

Science & Tech

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