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SELECT COMMITTEE ON
SCIENCE AND TECHNOLOGY

SCIENCE AND TECHNOLOGY
WHITE PAPER

Ordered by The House of Lords to be printed 13 July 1993

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EIGHTH REPORT

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EIGHTH REPORT

13 July 1993

By the Select Committee appointed to consider Science and Technology.

ORDERED TO REPORT

SCIENCE AND TECHNOLOGY WHITE PAPER

1. Last November, the Select Committee published a report, "*Proposed Science and Technology White Paper*" (3rd Report 1992-93, HL Paper 34) setting out their views as a contribution to discussion leading to the White Paper, "*Realising our Potential: A Strategy for Science, Engineering and Technology*" (Cm 2250).

2. The Committee have taken evidence on the White Paper from The Rt Hon William Waldegrave MP, Chancellor of the Duchy of Lancaster, Professor W D P Stewart FRS FRSE, Chief Scientific Adviser and Head of Office; and Mr R Foster, Office of Science and Technology. The evidence is published below.

MINUTES OF EVIDENCE

TUESDAY 13 JULY 1993

Present:

Butterworth, L.	Perry of Walton, L.
Chorley, L.	Platt of Writtle, B.
Dainton, L.	Porter of Luddenham, L.
Dean of Beswick, L.	Renwick, L.
Flowers, L. (Chairman)	Selborne, E.
Gregson, L.	Walton of Detchant, L.
Hilton of Eggardon, B.	Whaddon, L.
Perry of Southwark, B.	

Memorandum by the Office of Science and Technology

1. As the Committee will be aware, the Chancellor of the Duchy of Lancaster recently presented to Parliament the White Paper "Realising our Potential; a Strategy for Science, Engineering and Technology", Cm 2250, May 1993. The Science and Engineering Base is principally covered in Chapter 3 of the White Paper, but policies relevant to the Committee's enquiry are also set out in other chapters (in particular Chapters 2 and 7). Numbers in brackets in the text that follows refer to paragraph numbers of the White Paper.

The Science and Engineering Base

2. The White Paper reaffirms the Government's commitment to basic research, recognising its role as the main funder of such research (3.1-3.8). Consistent with the overall theme of the White Paper, the Government seeks a new partnership between the Science and Engineering Base, industry and Government. Specifically, the Government intends that the intellectual resources of the Science and Engineering Base should be harnessed to improve economic performance and quality of life. Without taking away the need for excellence in basic research, Government funding of the Science and Engineering Base will in future take greater account of the relevance of research to industry and wealth creation (3.9-3.13).

Priority Setting

3. Future decisions on Government funding of the Science and Engineering Base will be taken in the context of the Government's annual Forward Look which will set strategic objectives for Science and Technology over a five to ten year perspective. In preparing the Forward Look, the Office of Science and Technology will draw upon the new Technology Foresight Programme (2.34-2.38).

4. In determining priorities, the Government will also benefit from the advice of the new Council for Science and Technology, and from other sources of external advice, including the two Parliamentary Science and Technology Select Committees. (2.39-2.44).

The Research Councils

5. The White Paper announces a number of changes to the Research Council system (3.14-3.40). The boundaries between the Research Councils will be redrawn, with the creation of three new Research Councils. Each of the six Councils will have a mission statement which recognises the importance of research undertaken to meet the needs of users and support wealth creation. The boundaries between the six Councils are currently the subject of a study being led by Sir David Phillips which is due to make recommendations to the Chancellor of the Duchy of Lancaster later this year.

6. There will be a new framework for managing the Research Councils. A new Director General of Research Councils will assist the Chancellor of the Duchy of Lancaster in taking decisions on funding for each of the Councils, and will be responsible for day-to-day management arrangements. He will be advised by a small standing group of independent experts (3.23-3.29).

Universities

7. The White Paper confirms the continuation of the dual support system, with general research funds for universities continuing to flow through the Education Departments and the Higher Education Funding Councils (3.44). It also re-affirms the criteria (set out in the May 1991 White Paper, Higher Education, A New Framework, Cm1541, May 1991) of plurality, competition, selectivity and accountability to be applied to the funding of university research (3.41-3.46).

8. The Office of Science and Technology continues to monitor, in conjunction with the Research Councils, the Funding Councils and representatives of the university sector, the transfer of dual support funds from the former University Funding Council to the Research Councils.

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[Continued

9. The Government recognises the need for good working links between the two sides of the dual support system. The Government therefore intends to increase cross-membership between the Research Councils and the Funding Councils, and to set up a new co-ordinating committee for the Science and Engineering Base (3.48).

Examination of Witnesses

THE RT HON WILLIAM WALDEGRAVE, a Member of the House of Commons, Chancellor of the Duchy of Lancaster, was examined; PROFESSOR W D P STEWART, FRS, FRSE, Chief Scientific Adviser and Head of OST, and MR R FOSTER, Office of Science and Technology, were called in and examined.

Chairman

1. Chancellor, and gentlemen, thank you very much for coming again. We enjoyed our last meeting with you, and I am sure we shall enjoy this one as well. I am sure you would like to say a few words about the White Paper, which has now appeared, and which kicked us off onto a new phase of our enquiry on priorities for the science base. We are now taking that as read and seeing, so to speak, what we can do with it. No doubt you would like to make some suggestions to us about what we might like to think about. Please, anything you would like to say by way of introduction.

(*Mr Waldegrave*) Thank you, my Lord Chairman. Perhaps the first thing I would like to say is that I gather this is the last time I am likely to appear before this Committee under your chairmanship. Perhaps it is rash to say that, when you might summon me back next week. That may be so, and I do not quite know what the proper formula is, but it has been a very distinguished chairmanship.

2. That is very kind.

(*Mr Waldegrave*) Some on this Committee have already had to listen to me more than they perhaps care to recall since the publication of the White Paper in a number of fora so I will not give a general presentation, because I think that would be coals to Newcastle. I would like to say that Bill Stewart and I regard the current phase as being the implementation phase, and the importance of showing that we mean what we say in the White Paper, by pressing on swiftly with implementation and by putting into action the various changes to the structures that we have outlined quickly; because on the whole, I think it would be fair to say, we have had a pretty favourable response to the general lines of what we are doing. Most of the questions have been, "Well, this looks all right, but are they really going to do it?" We are really going to do it, so it seems to me that the most important thing is for us to show that by pressing on. I thought it courteous to the Committee to mention one thing that we have announced today, which is foreshadowed in the Paper. We have announced today the setting up of a science and engineering base coordinating committee, which is rather important now since the Funding Councils on the other side of the divide are rather more plural than they used to be. We think it is essential that there should be a proper coordinating committee. Bill Stewart will chair that committee with representatives of the four Education Departments in England, Scotland, Wales and Northern Ireland with the Heads of the Research Councils, with the Chief Executives of the Higher Education Funding Councils and, in due course, the new Director General, in the meantime with David Phillips acting

in the role of the new Director General. I mention that simply because it is an important further step, and certain things will in the longer term flow from it, I hope. It shows, I hope, that we are getting on with the job of implementation. Beyond that I do not really want to say very much, except to say that I hope the White Paper represents an opportunity for the science and engineering communities in this country to come together with industry and government to form a new partnership for the longer term. That is the rhetorical rubric, if you like; but, as I say, what matters is the way that it is done. I hope that the Committee will accept that we are pressing on steadily and as quickly as we can to put the new structures in place. Perhaps that is enough from me.

3. Thank you very much indeed. Thank you for sending us a copy of your note about the new committee. Not everybody here has seen it because it has only just arrived, but thank you for the copy I have at any rate. May I kick off by asking something that is very central to our enquiry. There will be quite a number of questions that are not central to our enquiry but relate to the White Paper more generally, and I very much want us to talk about things like that. If we could talk about our own enquiry to start with, it seems to me that a key set of questions concern the new Director General of the Research Councils. I wondered whether we could talk for a few minutes about what his powers will be, what his responsibilities will be, what his accountability will be? If I were the Head of one of the Research Councils now I would be arguing very strongly as an Accounting Officer to be allowed to account direct to the Permanent Secretary, rather than through the Director General, for example, and I hope you would not let me get away with it. It is this sort of thing which I would be very interested, and so would this Committee, to talk to you about.

(*Mr Waldegrave*) My Lord Chairman, if I could just say one or two words about that. The formal structures remain that the Permanent Secretary, Richard Mottram, is the Accounting Officer for all the monies that are then devolved to the Research Councils, and the HORCs are the Accounting Officers for the proper expenditure of those monies. The Director General, who will have direct access to me, will be the principal adviser to me on policy and the division of responsibilities and monies for those Research Councils. We have not abolished the Accounting Officer roles of the HORCs. We have not gone the full direction to what would effectively have been the setting up of a single Research Council. We have, if you like, gone some way to enable there to be a greater power of oversight of the boundaries of overall policy, and more intimate and continuous advice to the Minister about the distribution of the monies to those Research Councils. I hope that we

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[Continued

[Chairman *contd.*]

will get some of the benefits that were argued for by Morris' Review and others in relation to a single Research Council, although we have retained the present structure.

4. That means the Heads of Research Councils could bypass the Director General and go straight to you or to the Permanent Secretary, who would be jointly the Accounting Officer with the Heads of Research Councils if that is the arrangement as it used to be, and the Director General could advise you to do something different, but that is only advisory and he has no executive powers?

(*Mr Waldegrave*) I am the executive power. The Minister is the executive power, as he always was, but the Director General, as a powerful official working for me, will be the person to whom it would very wise for the Heads of Research Councils to pay sufficient attention, because he would be the person advising me.

Lord Dainton

5. Chancellor, what we are all in a sense worried about is, given we now have six Research Councils instead of five, that means more boundaries between Research Councils. We feel in this Committee, and we would like to know your views on it, that the future lies in fact in making boundaries where they exist extremely permeable; and that means that the Director General, using a rather coarse term, must have clout in moving money around and looking at those aspects of science where subjects pervade all Research Councils and, because they do that, can so easily drop between the cracks. Can you give us reassurance on this?

(*Mr Waldegrave*) I accept the analysis. My starting point in all of this was a piece of work that was done for me which showed that within the boundaries of the Research Councils over the last 20 odd years there have been quite marked shifts in priorities. Between the Research Councils, over that similar period, there has been very little overall shift. That seemed to me to strain credibility, and seemed to me to be showing that the boundaries were having a greater influence *prima facie* than was plausible on where the money fell. That is why I believe that the Minister, who after all has the only effective power to make these shifts, should take a greater direct responsibility for it; and that means that the Minister has to be advised by a powerful figure who is a professional and would carry weight in the communities affected if he is going to make decisions that are going to be any good. I did not believe that this could really be delegated away from the accountable person, which is me. If the accountable person is to make sensible decisions he must have a very powerful adviser, which will be the Director General. I did not think that the old system (and this was advice given by quite a number, the Royal Society amongst others) of the arm's length ABRC giving the Minister the let-out, that it was all at arm's length and nothing to do with him, was really right. If there were shifts in the national priorities he should answer for them to Parliament and to select committees and so on, but he must be properly advised. Therefore the Director General post (and we will be going out to advertisements for that post very

shortly) is going to be an absolutely crucial role in the whole thing. I also thought it right, and Bill agreed with this, that he should not report through Bill, he should have direct access to the Minister.

Chairman

6. I think that point is accepted, the point is solely, as far as I am concerned, whether he has power over the Research Councils directly in an executive fashion or whether he only has the possibility of advising the Minister. Being brutal about it, Ministers come and go and we are very happy that you are there but if somebody else was, I am not sure we would be so happy with an arrangement where the Director-General merely had an advisory role.

(*Mr Waldegrave*) He has an advisory role in the sense that any powerful official in Whitehall is an adviser, I mean all constitutional power rests with Ministers accountable to Parliament. What I thought was wrong with the previous situation was there was a curious sense in which the Chairman of the ABRC was neither inside nor outside and was seen by the outside community sometimes in the light of a sort of lobbyist for them and enabled the Minister to distance himself from what were really very important national decisions. This chap should be an absolutely crucial insider exercising power within the Whitehall structure, his power ultimately resting, as all powerful Whitehall people's power rests, on whether his Minister has clout to get through the things. This structure I believe will deliver more steerage for the Research Councils. I do not want him to get involved in the day to day management, that would be silly.

7. There is a semi-official body of long standing, the Heads of Research Councils—HoRCs—in future will the Director-General chair that?

(*Mr Waldegrave*) I would have thought not, no, that in a sense is a lobby of HoRCs and they should get together and make their own pitch. No, he is my man, he is inside. There is a triangle at the top of the Chief Scientific Adviser, the Director-General and the Minister with the permanent secretary holding the formal accountability for the big blocks of money and where it goes. We will direct the system using my constitutional power advised as for lateral issues by the Chief Scientific Adviser and as for the shape and direction and strategy of the science and engineering base by the Director-General. I think that will be a powerful troika which will begin to produce a greater sense of direction but it does mean, over time, some changes, I think, and therefore some trouble probably but I think, by implication, you are saying that perhaps we have not had enough trouble in the past, there has not been enough shifting of things across boundaries.

Lord Dainton

8. There is one further point that still concerns me and I want to make doubly sure, as it were. The Director-General is to be assisted by an expert committee, as I understand it, would it be the intention to make clear to that expert committee that one of its tasks of great importance is to take a view,

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AND MR R FOSTER

[Continued

[Lord Dainton *contd.*]

as it were, horizontally as against the verticality of the divisions of the Research Councils?

(*Mr Waldegrave*) When I referred to lateral or horizontal advice, I was thinking of the Chief Scientific Adviser's right across the board responsibility. Yes, I regard the Director-General, if the sense of lateral or horizontal is across the Research Council, across the science base—as a crucial player, though Bill, as the Chairman of the new co-ordinating committee, will also have a crucial role in bringing together the two sides of higher education in the dual funding system. It is rather a good example of how by moving things from one department to another so they are separate they realise they have actually got formally to co-operate whereas when they were all in one department perhaps they did not do so much. So I hope, it is certainly my intention, that the point of this reform is to get a clearer sense that there is a whole thing called the science and engineering base and we should not be too much worried by the institutional boundaries within it.

Lord Walton of Detchant

9. Perhaps our concern may be that the appointment of the Director-General could, on the face of it, be one which lacks any kind of responsibility or executive power, though I think you clarified some of the issues relating to that. I would like to follow up the point that Lord Dainton raised about the standing group of experts who are to advise him. I think I would like to know what the likely constitution of that group will be; what size it will be; what range of expertise you anticipate being included within that group and whether there will be any cross-representation between that group, on the one hand, and the Council for Science and Technology on the other? Do you think that is something that you would wish to see? I think these are points which are of great interest to the scientific community.

(*Mr Waldegrave*) There is a danger of a plethora of committees, I think.

10. I know that.

(*Mr Waldegrave*) I have slightly backed off in the last few weeks, on further thought, laying down in detail how the Director-General should handle himself. If he is as big a man or woman as I want to get in this job, he will tell me how he wants to do his job. There has been quite a lobby of people saying: "Well I must be on that Committee, and I must be on that" and I have been saying the fellow—I apologise Lady Perry, I keep saying "fellow" by some Freudian slip—the person we appoint to this task should be able to have a look at how best it is done. He or she will want to consult and set up networks, whether that is a formal thing or not, I would rather hope it was not too formal so that we began to get into yet more cross memberships and ex officio applications for membership and God knows what. If he or she does the job properly, they will have to carry weight not just in the science and engineering base community but also with industry because this person has got to make a reality of the closer connection between the Research Councils and the user communities and check that the Research

Councils are not just paying lip service to their new mission statements.

Chairman

11. Will the Director-General's relationship with other departments be through the Chief Scientific Adviser or by the side of him and if the latter how do they divide up their responsibilities?

(*Mr Waldegrave*) There is one formal relationship which was announced, as it were, today which is he will obviously be a crucial member of the Science and Engineering Base Co-ordinating Committee which will be chaired by Bill. So that, in a sense, makes the formal relationship between the rest and the higher education world and the Department of Education. He or she will want to be very closely in touch with Departments in so far as they are user communities. I can imagine a continuous dialogue, for example, with the Ministry of Agriculture, with the Ministry of Defence, with the Department of Health. He or she, the Director-General, will be a bigish player I think in gathering the views of the other Departments about what they expect from the science and engineering base through Bill himself, rather closely in touch with Bill—with the Chief Scientific Adviser—who has the wider responsibility for seeing coherence in the whole of the Government's S&T effort. May I ask whether the Chief Scientific Adviser wants to say anything?

(*Professor Stewart*) Can I make one point, Chairman, about how I think it will work in the future. The Chancellor touched on it when he talked about the tripartite arrangement. Basically we do want this tripartite arrangement: the permanent secretary, the Chief Scientific Adviser and the Director-General of the Research Councils. Not for one to go off in isolation and go his way and the other to go off another way. What we envisage is an arrangement where the three of us together can collectively advise on the best way forward for science, engineering and technology. I look more across Government departments as a whole, developing what the broad strategy of advice for the Chancellor is to be, with the Director-General for the Research Councils very closely involved in ensuring that the Research Councils for their part are able to deliver their sector of overall Government policy.

Lord Dainton

12. Lord Chairman, this sounds very much, I am sure it is not meant to be so, like a troika to me. I wonder if I could come back to a point which the Chancellor was making about the new group which was announced today, the bringing together of the university sector and the Research Council of the science base. I noticed in the memorandum it said there would be a continuing monitoring "... in conjunction with the Research Councils, the Funding Councils and representatives of the university sector...". I presume this is the body which would be doing the monitoring, "...the transfer of dual support systems from the former University Funding Council...". I wonder if I might just ask the question which I know concerns a lot of people which is whether it is now regarded that transfer is over, as it were, and come to an end because of the problems

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[Continued

[Lord Dainton *contd.*]

which have arisen and therefore the monitoring will be primarily an examination of the consequence of what has happened before taking any further action?

(*Mr Waldegrave*) The transfer is at an end—I cannot bind my successor for the rest of time—we have no further intention of transfers from the—

13. In that direction.

(*Mr Waldegrave*)—university side to the Research Council side. There may, for all I know, be a technical tidying up of the Buforg Group or one thing or another that they make from time to time but no, we do not want to go further down that road. It was a deliberate part of the intention of the White Paper to try and recreate a sense of security now on both sides, on the university side. We obviously considered whether the more radical further transfer which was left as an option in the last Higher Education White Paper should now take place. Higher Education: I came to the conclusion that though there was a certain logic in that in terms of planning for the science and engineering base, there was more likely to be damage in producing a sense of alienation in the universities from their responsibilities for the management of their sides of things. Without it being an integral part of the management of those institutions there would be a potential, I thought, for damage to the science base in the long term.

Chairman

14. Have you considered whether the policy might be reversed?

(*Mr Waldegrave*) The policy up until now?

15. Whether you could transfer money back from the Research Councils to the universities?

(*Mr Waldegrave*) No.

16. Or do you think the optimum point has been reached?

(*Mr Waldegrave*) I think that stability is now more important than any marginal improvement by listening to particular arguments on shifts.

Lord Dainton

17. I agree that stability is necessary now. One might also agree, might one not, that the monitoring might throw up problems which I hope would be subject to careful examination?

(*Mr Waldegrave*) Yes. Indeed, I referred to the Buforg Group who have come to see me, or at least a number of Vice Chancellors came to see me to talk about its recommendations in relation to some of the technical issues. There may well be further issues of that kind from time to time which I would certainly want to listen to. Could I just respond to one other point Lord Dainton made. He used the word "troika" as if it was necessarily a bad thing. Having been the Secretary of State for Health, where I worked with a very successful (it seemed to me) troika of Permanent Secretary, Chief Medical Officer and Chief Executive of the Health Service, I do not think those sorts of relationships are necessarily bad. It provides a certain pluralism in the immediate senior advice to the Secretary of State and it is quite a good thing in some cases.

Baroness Perry of Southwark

18. Chancellor, could I just press you a little on the nature of the coordination role of the new committee. How do you see the coordination of the Higher Education Funding Councils' money and strategy with the Research Councils' strategy? Is this meant to coordinate in subject terms to make sure there is a balance of where the money goes in terms of broad areas, or is it meant to coordinate the quality judgments, which are quite rightly being made by Funding Councils, so that the Research Council money is far more close to where there is quality? Can I press you to dilate a little on your thinking on that?

(*Mr Waldegrave*) It started in my mind with the problem that was put to me (which I think has already largely been addressed, but at the beginning of the year it was not clear that it was going to be addressed) for example by Professor Bhattacharya at Warwick, and well known to some, that universities which won research grants from the private sector or industry were not getting credit for this in Funding Council assessments. Not entirely fair. Funding Councils defended themselves against it, and so on, but there should be a forum where those sorts of arguments can be had out. That is where I starting thinking that we had here two separate sets of organisations which were developing criteria for the application of government money to the science base. It may well be sensible that they have somewhat different criteria, but they should do that explicitly, and they should have a formal way of talking to each other about what they are doing. That would be one set of issues. In the research assessments for example, are the criteria making sense, are the judgments making sense. If the HEFC says theirs are different from the Research Council judgments is that deliberate, or is that just because they have not communicated? The second set of issues: the management of the researchers (and we have said certain things in the White Paper, for example, about the structure of post graduate degrees on advice from a number of sources, including ABRC itself), in that kind of area the responsibility is genuinely shared for how the Research Councils handle their people who are on their fellowships and receive research money for that; and how the universities handle their people really must be talked about in a sensible way. It seemed to me there was a very fundamental set of agenda items where there needed to be really coherent discussion, and that this was best done under an independent chair, and who better than the Chief Scientific Adviser.

Chairman] I wonder whether I could change the topic a little bit and talk about the new set-up of Research Councils with the extra one, and so on. Some of us are worried that the emphasis on wealth creation, and the position of industrialists leaving Councils, may swing things away from the support of basic research too far. Indeed, some of us wonder whether the new boundaries of Research Councils are not going to cause a greater problem than the old boundaries has caused. I know Lord Porter wants to talk to you about this.

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Lord Porter of Luddenham

19. Thank you, my Lord Chairman, you have asked my two questions essentially. I think the scientific community are, first of all, very reassured by the statements in your White Paper of your intention to protect the science base at all costs, and that it is the job of government to do that. This is fine, but when we get down to the nitty-gritty of it the priorities of the science base are going to be determined within the Research Councils. You do seem rather to have loaded the dice in some respects if you are, as you say, going to have a mission statement and an industrial chair. A chairman, as we all know, can be a very powerful member of the committee. If you are going to have an industrial chairman in charge of all of these, are you not afraid that the thing will swing too far, in an admirable direction in the first place but swing too far away from the science base to wealth creation? What sort of an industrial chairman do you envisage? Would it be a scientifically educated one?

(*Mr Waldegrave*) I feel rather constrained in answering in the presence of Lord Selborne, who has been a distinguished exponent of exactly the kind of chairman I would look for in these areas. My judgment was this: ultimately none of us are going to be able or allowed to provide for basic blue skies research in this country unless the wealth creators in society see the value of it. It will be no good trying to hold off a wave of people when times are tough year after year saying, "This is all a waste of time"; we would lose in the end. Therefore, the right way of doing it is that the commitment of those people to the importance of the basic science has to be integral and organic, if you like. What I was encouraged to find in the year of consultation was that it was not at all difficult to sell this message. In fact, you did not need to sell the message to the best of the industrialists. On the contrary, they were inclined to say to us, "You do what you're best at; we'll do what we're best at, but", they said, "please can we talk about the interactions?" Because in terms of basic science it is clear that the country has to select what it does. Obviously the first cut is on the basis of it being good science. There is no point at all in funding second rate basic science or whatever, whether it is of interest to industry or not. You will still have more good science than you can fund. With the second cut, one of the criteria we are looking at is: are there serious science based industries who employ good scientists themselves and so on who are part of the community who say that this stuff really must be done? The obvious example, and it is the easy one to talk about, is if you talk to the pharmaceutical companies with their often very high grade scientists which they employ, and sometimes the greatest companies are actually run by scientists of a first rate calibre, they will say to you, "Please maintain the science base in these sorts of areas that are going on". They are doing their own critical technology foresight exercises, rather of the kind government is doing, and they know what is growing and they want the people to be trained properly by being trained against the background of this kind of work, but they also have their own views which should not in every case be decisive but which are jolly well interesting about the areas of basic science which they want done. It seems to me that unless we build that alliance for the long

term we are anyway lost because we will not be able to do it as if it is a completely separate cultural activity. I slightly—although I know I talk like that sometimes myself—resist the idea that the basic science is something completely comparable to abstract painting or something which can be wholly separated from everything else.

Chairman

20. It is not quite like that but it is surely through that no science can be supported solely through its application?

(*Mr Waldegrave*) Of course.

21. Simply because basic science comes usually ahead of an application.

(*Mr Waldegrave*) The point I am trying to make is you said it cannot support the basic science by defending it as if it is something else, as if it is applied science. It is not but in the long term you will not be able to get the society as a whole to pay for it unless those who are in the wider science community, who use science products all the time and engineering products all the time, see its value. The best way both of ensuring that they know how important it is and that you are doing the bits that are appropriate to them if things come out of it is to involve them in the decision making. I think the purist scientist will find powerful allies amongst the industrialists.

Lord Porter of Luddenham] I think you perhaps frightened the scientists a bit by emphasising the industrial chairman. The two examples that you have given, Chancellor, Lord Selborne and the pharmaceutical chemists, we have interviewed a lot of pharmaceutical chemists, we know they are dead behind the science base being supported.

Earl of Selborne] Shall we say behind, not dead I think!

Lord Porter of Luddenham

22. They are very alive behind the science base being supported. But if they are all of that calibre I think we would have nothing to worry about, if that is what you have in mind, people who are really knowledgeable about the science side in industry?

(*Mr Waldegrave*) It is difficult to talk about, it is like talking about personalities, it is easier to talk about personalities who are not on your Lordships' Committee. Take Lord Selborne's successor, who comes from a very sharp end, if you like, of the marketing end of the food industry, nonetheless I find a very intimate and powerful relationship between him and Tom Blundell and so on which is working well. Lord Jellicoe was a very distinguished chairman of the MRC, admittedly bringing a wide range of subjects and other experience. I think it is a very useful alliance that can be built there by involving good people who partly are explainers then of what is going on within the science base to the wider industrial world.

23. Could I ask a rather more specific point related to this about the astronomy and particle physics which gets a different treatment altogether. I wonder what is the logic behind this? All the other five Research Councils are for basic, strategic and applied, the first sentence says that but not the astronomy and particle physics, that is basic,

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[Lord Porter of Luddenham *contd.*]

although there is a sentence towards the end of that paragraph which says it must look to its usefulness but why is that considered to be different? Of course it is very important fundamental basic research, astronomy and particle physics, but after all so is the origin of life and similar matters. Why is that particular area singled out, not necessarily to have to look to its application?

(*Mr Waldegrave*) Partly because of the structure of actually how so much, not all but so much, of the science in that area is done in relation to great big international co-operation. If you think of the astronomers with their great co-operative systems of telescopes, you think of CERN and so on, it seemed to me that those things do have a slightly different balance. They are a sort of under-pinning of a slightly different kind. It is difficult to make a story that is convincing in relation to the kind of basic science. If I may just take one phrase which I have become much involved in, namely the discovery of Higgs boson, it is difficult to make a story of how the discovery of the Higgs boson is so intimately connected with immediate potential interest to strategic and generic scientists who may have a further inter-relationship into industry as it is, for example, the equally pure things that Aaron Klug may be doing in LMB where there are indeed people peering over the shoulder of a whole lot of potential user communities. This is more to do with structure. I think it may well be that out of those physics there will be another physics revolution which will then spin off in all sorts of directions. It seemed to me that it was easier to give those people a standing ground of their own.

Chairman

24. Yet it was radio astronomy which led to satellite communications.

(*Mr Waldegrave*) Of course and there will be, out of all those things, things that turn out to be extremely useful. It was very difficult to make a meaningful mission for the cosmologists really that relates to it.

Lord Porter of Luddenham] I just feel that the other scientists, the chemists and the biologists are going to be rather envious that they have to make out this case every time, especially with the emphasis that is now put on it, they are going to have to argue almost for every application about its usefulness and its application.

25. An even more important point for the chemists is, unlike the astronomers who know where to go and unlike a number of other disciplines and engineering who know where to go, chemists do not know where to go because several of the Research Councils will be doing some form or other of chemistry so their subject is split up.

(*Mr Waldegrave*) Every Research Council should be looking to the underpinning of chemistry and indeed of physics and indeed of mathematics, every Research Council. There are also some pragmatic reasons for dividing SERC in that way in that it just seemed to me that the thing was too big now and we were asking a devolved chairman and chief executive to make such specular chalk and cheese judgments between whether we should go on with a subscription to CERN or whether we should be doing more small

science in a different area. It was unfair to devolve and somebody else had to be responsible for that, namely the Minister, ultimately, and therefore we should have these judgments rather more out in the open.

26. Yes.

(*Mr Waldegrave*) I would just like to make one point in response to Lord Porter that I do not at all think that the fulfilment of the Research Council missions means that every piece of research has to show a use. What I do think is that when that Research Council is choosing amongst the competing areas of basic research which will be applying to it for support, it is not irrelevant to consult with user communities to see if they have got anything interesting to say about it. What I heard, coming to me, is industrialists saying: "You must support these characters in the LMB because it would be a piece of national tragedy, they are absolutely first rate, you have to go on supporting them.", so that is relevant.

Lord Perry of Walton] There are only a few who are really first rate. When it comes to selectivity, the Medical Research Council used to boast about the view they chose the really bright person and backed him even though the idea he was putting forward had no apparent immediate relevance. It came up quite a lot of time in the history of the Medical Research Council in the 1950s and 1960s.

Lord Porter of Luddenham] People not projects.

Lord Perry of Walton

27. There will be people of that sort in the next 10 years or 20 years who may well be missed out unless that fact is noted.

(*Mr Waldegrave*) I am sure that is so but we are going to be having to make difficult choices and that remains an important way of managing science. Sometimes, however, there will be things where there is 10 to 15 years ahead clearly the possibility of things coming out that we just have to do because they are vital to us. I start from all this on the assumption that we are not going to be able to spend as much money as we want and therefore the choices we make have got to be better informed, they have got to be informed and they have to be open.

Lord Dainton

28. That is a very good reason, I think, for having a separate Research Council for nuclear physics and astronomy because in particular, of course, that is also a great international activity. The mechanism of its funding therefore differs substantially. I can see you are nodding your head but this does give me an opportunity, if I may, to move into another area where also international activities are involved which must be greatly your concern because we put such a lot of money into Europe. I wonder if I could ask you about the 4th framework programme. Some of us have been concerned—particularly those who have been to Europe to discuss these things with the Council of the European Parliament's Science and Technology Committee—by the way in which in European money appears to be allocated (at least the 3rd framework programme is) where excellence does

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not really have the priority it should have over concepts such as social coherence. This appears to many scientists, with hard pressed money, to be a kind of affront to policy. Is there any part of your White Paper and your intention which is to keep an eye on the money that goes to Europe, the way in which it is spent, and also on the problems which are created by our rigid application of attribution?

(*Mr Waldegrave*) This is another big subject, but I will try and be brief. The Chief Scientific Adviser is looking at his watch, before I have started! I am not quite sure in my own mind that the attribution programme is as much of a villain as we all think. As soon as you start to think of alternatives most of the alternatives look worse. The attribution programme says that if we are doing more science and engineering in Europe, more R&D in Europe, that is the commitment of the country by being part of this Community, and it is inevitable if we are serious about it that somewhat more of our taxpayers' money will be spent in Europe than at home and there will be a shift. Is it not sensible to have the people who are responsible for exactly the same areas at home making the judgments and arguing as to whether that thing should expand or not? They are the people who will best be able to judge whether a particular programme, fusion say, should be done on a national basis, or the time has now come that that is basically a European programme. It creates pain in departments because they have to choose, but in a sense that is what it is meant to do. It is meant to say, "Look, we are now shifting the balance somewhat to Europe, so if you're serious about expanding that money you can't expect to have the money at home as well, because we're now European as well as British in this respect".

29. I think the problem is slightly different as seen from the scientists' angle: that if Britain wins more money out of Europe than would be expected then that mark of success is immediately rewarded within this country by less resources at home?

(*Mr Waldegrave*) If you look at it in terms of the total taxpayers' spend by United Kingdom Limited, some of it is spent at home and some of it is spent in Europe. We do indeed, as you say, do rather well. We do not talk *juste retour* in this programme but we do actually do better than *juste retour*, in terms of the money that goes in through the Brussels mechanism and wins more jobs for British scientists than "technically" it should. Therefore what is happening is that there is somewhat of a shift of things being funded from things that the British taxpayer is funding through Europe, rather than things the British taxpayer is funding through the United Kingdom. If it was all just going to increase, and the more we got in Europe the more we did in total, that would be lovely for science but it would not be so good for the taxpayer.

30. Is the extra money, if it is over and above what we are putting in, not coming from the other countries?

(*Mr Waldegrave*) No, it is coming from us. We are a net contributor to the Community.

31. But not for that reason?

(*Mr Waldegrave*) Not for that reason, but in total we are a net contributor.

32. So the encouragement should be for Britain to go out and get more money?

(*Mr Waldegrave*) No, because for every increase in Euro expenditure we pay more. We are a net contributor.

33. I think I will leave that argument in suspense for closer examination.

(*Mr Waldegrave*) Going to the nature of the 4th Framework Programme could I just say, without being boastful about it (and it is not my credit anyway, it is Bill's largely), I think we are in a much better state this time than we were at a similar stage in the negotiation of the 3rd Framework Programme. We negotiated a top-up of the 3rd Framework Programme which irritated me at the end of last year because they had not really managed their programme properly. They ran out of money and so on, so we had to give them more, and we agreed. It was our Presidency so it put us in a reasonably good position, and I think Bill would agree with us, for the next stage of the discussion, which is about priorities in the 4th Framework Programme. The OST then published a good paper on generic technologies, which I think we sent to this Committee, which was welcomed by the then Commissioner and, perhaps more importantly, welcomed by the present Commissioner who is a rather more managerial figure (and I choose my words carefully). I believe that there is every chance now of agreeing a sensible 4th Framework Programme in the timescale that is necessary; and the timescale that is necessary, assuming Maastricht is agreed (and perhaps I should not say that in your Lordships' House), is before the European Parliament is dissolved next year. It has to be agreed by about next May, or otherwise we will be in a terrible muddle.

Chairman

34. Chancellor, I think the 4th Framework Programme is probably the subject of enquiry in its own right, and I do not think we need do it this afternoon. May I change the topic and ask about the relationship between OST and other government departments. We have been disturbed by a number of recent decisions, both before and after the appearance of the White Paper: for example, the DTI's decision to close the Warren Spring laboratory, their decision to terminate the Advanced Technology Programmes, and the Foreign Office's decision to downgrade the Science and Technology Section at the British Embassy in Washington and, indeed, the apparent MoD attitude to have nothing whatever to do with the White Paper, the OST or anything else. These do not encourage us to believe that the OST really will be able to control these warring factions within the British government. I wondered whether you would care to comment?

(*Mr Waldegrave*) I hope that is a challenging way of putting it! Can I deal with one where I think we have relatively a success. The Foreign Secretary has told me he does not mind a bit about my mentioning the process that took place after the Foreign Office inspection of the Washington Embassy, because we

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did intervene and the Chief Scientific Adviser talked to the Foreign Office people and we got them to change their plans. The present councillor is now staying there for the next two years and a somewhat bigger S&T mission is going to be maintained there. I have to say, I became convinced in the end that they were right to be looking for some economies. If you looked at the structure of the thing it went back to wartime science sharing to some extent, when the interchange between the countries was largely government to government; whereas now there is a huge emphasis on private sector to private sector and science network to science network. So I do not think they were crazy to be looking at the scale of the operation, but they listened to what we said and they did not scale it down as much as they had intended and I think we thought that was relatively a success for intervention from us. In relation to Warren Spring, we watched that extremely closely, because our standing ground there was not so much whether the DTI chose to re-organise the management of their laboratories—we must all be looking for value for money all the time in the management of things—but whether, in the process, valuable science was going to be lost. The front line for that was of course the DOE because, in a sense, they were a customer for a lot of good science. The Chief Scientist there, Dr Fisk, was closely involved to see whether he was still going to be able to get the science he needed out of the new merged laboratory. In the end he came to the conclusion that it was all right. Bill and my office were ready to intervene, and we would have intervened, if we had been getting from the customers, as it were, the advice that there was to be a serious problem in getting the science needed. We took the view, against the changing needs and the great importance of not wasting money on building new things just because they have always been there (and quite large sums of money here), that this did not look necessarily a bad outcome in terms of the production of science.

35. That sounds rather like fire-fighting, rather than fire prevention?

(Mr Waldegrave) I do not want to manage everybody else's laboratories, that would be crazy. If somebody says, "I've got a £20 million programme [or whatever it was] to build", as a matter of fact I rather take the other way. There are going to be some rows between my department, in due course, and some other departments perhaps because I will want to say, "Do we really need to be building more laboratories at the moment when money is short? Should we not be trying to get better value for money out of the very large number, larger than any other OECD country except for France, of government research establishments that we already have?" My starting point is rather the other way round. If somebody says, "Look, we can save £20 million because we can put things together on the existing big side and so on and so forth, and move people about", then I tend to be rather pleased, because the bricks and mortar are not what I am interested in so much as the science output.

36. Will the Chief Scientific Adviser have right of entry, so to speak, into the planning process and policy formation in other departments?

(Mr Waldegrave) He cannot physically be in every committee right at the beginning of things. He has got to pick—and if I may I will ask Bill to have a word about how he is going to handle it—the big issues that matter in the Department I think. He has got two annual cycles now which give him a crucial standing ground, the first is the production of the annual forward look where each department will have to produce its chapter and be subject to cross-examination by us as to whether it makes sense and how it fits in with the others, what are they going to say on this and so on, real stamping grounds there in terms of the forward look of each Department's programme including MoD. In the EDX cycle, the first meeting of which has just taken place, again the Chief Scientist is there asking Departments what they are going to be bidding for in terms of money for science and taking a view on which he advises EDX through me as to whether that is adequate. So he now has two formal inter-departmental annual cycles which he is at the centre of. That, against the background of the committee structure, which will be reinforced by the independent advice from the Council on Science and Technology, I think gives him a very powerfully increased position.

(Professor Stewart) Chairman, could I just say one thing, if I may, very briefly. The main point is: where are we today and where do we want to get to tomorrow. The difficulties you have alluded to, and other issues, are issue we must address in the future. We have to try to make sure that people like you will be content in the future. That is one of the things that the Forward Look will helpfully bring out. Government will be publishing what departments intend to do in each of their sectors. So that information will be much more openly available than hitherto and more readily amenable to careful scrutiny.

37. Will the Ministry of Defence take part in that?

(Mr Waldegrave) Yes, they will. They will contribute to the forward look and that will be important, I think, in relationship with them.

38. Could we have a word about, I am not quite sure what you are going to call it, the replacement for ACOST.

(Mr Waldegrave) The Council for Science and Technology.

Chairman] I thought you might call it COST.

Lord Gregson

39. I wonder, Chancellor, whether you would like to tell us something further about the Council? Do you remember the original suggestion for the Council for Science and Technology came from this Committee and what we recommended was we should have a proactive council and it should report to Parliament. The first thing that happened was the then Prime Minister decided she did not want anybody reporting to Parliament except her and therefore that provision was struck out. Secondly, of course, although it was intended to be proactive, in its published form, in fact it never was. Indeed the one enquiry that I was involved in, in fact 12 months after we had finished the enquiry sent the first draft report through, 12 months later after it had been

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mutilated by civil servants and hacked about by politicians, it was allowed to be published in a form which bore no resemblance to the original recommendations of the committee. Is it intended the Council will be proactive? Will it report to Parliament? Will it be a free body allowed to comment as the Council for Science and Technology in Japan where it is a matter of the constitution that the Council is allowed to say exactly what it feels, exactly what it thinks and reports to Parliament? Is that going to be the case with this new Council?

(*Mr Waldegrave*) In so far as I have a model for the structure I am trying to create, it is something like the American model really, I forget the American initials, PCAST. It should be the top level place where the science and engineering community can either raise an alarm about something, you know ring an alarm bell, or say: "We need some work on something" and perhaps they will then come to me and say: "Well we want to commission it ourselves" or suggest somebody else does it. I hope, on a pretty regular basis, it will give its views about the health of the science and engineering situation in the country. Now there were then two models as to whether it should be at arms length again, whether it should have a grandee as chairman, and just report in, or whether it should have myself or the Prime Minister as the chairman. I came to the conclusion that in the way things worked in this country there was a danger if it was—however grand it was—a committee slightly separate from the political process it would drift off again and somehow lose the necessary clout and that therefore the political process should be firmly attached to it, the politicians should sit there and listen to what was said. Then ideally it should be the Prime Minister but in the real world of burden which a British Prime Minister carries, it just would not happen, I do not think, so with a Cabinet Minister for Science it seems to me I should chair it. I do not regard it as being my committee. I regard myself as being there to meet the science and engineering grandees of the nation.

40. Will it publish?

(*Mr Waldegrave*) It will publish, yes.

41. Unfettered?

(*Mr Waldegrave*) Oh, yes.

42. It has never been allowed to in the past.

(*Mr Waldegrave*) Any Minister who tries to fetter the kind of people I want to appoint to this committee will find either they will resign the next day or he will be a madman.

43. It had a marvellous appointment when it was first founded, ACOST.

(*Mr Waldegrave*) I just kept a slight loophole for it sometimes not to publish just in case it did want to launch out—as well it might—into some area of national security, as it well might, well then it is conceivable it will be a report that was not published. I think we said in the White Paper something like "normally anything will be published".

44. There can be very few areas now where national security is an issue now that the Iron Curtain has disappeared, can there?

(*Mr Waldegrave*) Yes but—I am now going to get into trouble with somebody—say the grandees of the

physics world had some views to give about nuclear weapons safety, it is just conceivable they might want to say: "We want to look at this".

Chairman

45. It will not be censored for reasons of national embarrassment rather than national security?

(*Mr Waldegrave*) No, I hope that the kind of people whom the Prime Minister will ask to serve on this Committee will not be very amenable to that.

Lord Walton of Detchant

46. I would like to raise a question about the constitution of the committee. This has caused some anxiety I think in the science community. You have been extremely reassuring about the kind of people whom you hope to see appointed to the chairmanship of the various Research Councils and I have to say, from past experience, as a member of the MRC, I found that system of having an executive who was a scientist and an independent chairman a very valuable one. I think the scientific community has been concerned about this Council lest it might be loaded in the ultimate with industrialists who would be seeking short termism and practical consequences of research to the detriment of the interests of long term basic science. I think that is an anxiety of which I hope you will be aware and which has been expressed in a number of quarters.

(*Mr Waldegrave*) I am aware of it. The kind of industrialists—and I wanted some real heavy weight industrialists on it—are those who have been saying to me: "You do understand that our industries rest ultimately on science and engineering". They sometimes say, of course, that they are too big, they rest on the world's output of science and engineering not just the United Kingdom's. The object of all this exercise is to bring together those businesses who are likely to be with us still in ten years' time, that is those businesses who are spending enough on R&D with those who are in the science and engineering base. I am not interested in putting on the Committee those who are unlikely to be with us in ten years' time because they are not spending enough on R&D.

Chairman

47. Could I ask you two, I hope, quite quick questions to wind up, Chancellor. The White Paper has a very striking sentence—and I quote—"The Government will continue to allocate public resources to science and engineering on the scale necessary to finance the policies in this White Paper." What does this mean?

(*Mr Waldegrave*) When I asked my officials what to say in answer to this question which was quite likely to come they said: "Minister, it means what it says"! I do not know whether the Committee would regard that as a wholly satisfactory answer. It would be foolish of me, as a Minister going into what I think is going to be much the toughest expenditure round since 1979 (and I say that avowedly), to give any rash promises about resources. That sentence and that paragraph does at least mean that we are aware that there are resource implications of the policies we are setting out. It would be irresponsible today to be able

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to say to you that I can guarantee to produce any particular outcome for the budget.

48. What I wondered and also hoped, instead of being handed down, "This is your money, do what you can with it", was whether there was going to be a serious attempt to evaluate the programme desired and see how much the nation could afford in the light of the priorities so expressed?

(*Mr Waldegrave*) There will be, and that is certainly the approach, both for my budget and for the wider spend on S&T by the government, that we will be attempting, but it will be hard pounding this winter.

49. I greatly welcomed the fact that you asked for increased parliamentary scrutiny on the government science policy, and I am sure both Houses of Parliament welcomed that. I wondered whether there was anything you thought that this Committee could do that it does not do to help bring this about?

(*Mr Waldegrave*) I think there is a potential role for this Committee and both Houses of Parliament, which is to react to what I want to build into a proper annual cycle of analysis of the nation's S&T health, and of the plans of government insofar as government spends nearly half the money on R&D in the country. What I want to do is try and make the forward look the centre of an annual national debate about this subject, somewhat along the analogy of

the defence White Paper, or the White Paper which the present Governor of Hong Kong has produced in relation to the environment. If we can achieve that then we would have done something useful, but it does mean that the select committees will have to play quite an important role in that. I would hope to bid for annual debates in my House at least, but certainly on that subject. I would hope that there might be a process of annual cross-examination about what the forward look meant and so on, and was it satisfactory.

50. That is extremely helpful. Thank you very much. I do not know, Mr Waldegrave, whether there is anything you would like to add that we have not covered—it has been a very full session?

(*Mr Waldegrave*) I suppose the only thing I want to reinforce is that there is only so much that government can do to bring the horse, of British industry, to water. If the horse refuses to drink, the horse will die. It is essential to get across the message that industry must take its own responsibilities. We are trying to build a proper networking with them in a Japanese-like way, if you like, with cultural *mutatis mutandis*, but ultimately the industrial side must, I hope, respond.

Chairman] Thank you very much indeed. It was good of you to spend so much time with us, and your colleagues too.

The history of the United States of America is a story of growth and expansion. From a small collection of colonies on the eastern coast, it grew into a vast nation that stretched across the continent. The early years were marked by struggle and conflict, but the spirit of independence and self-determination prevailed. The American Revolution was a turning point, leading to the birth of a new nation. The years following were a period of rapid growth and development, as the United States expanded its territory and influence across the continent.

The American Revolution was a defining moment in the nation's history. It was a struggle for freedom and self-governance, fought against the British Empire. The revolutionaries sought to establish a new form of government, one that was based on the principles of liberty and justice for all. The Declaration of Independence was a bold statement of their intentions, and the Constitution was a framework for the new nation. The years following the revolution were a period of rapid growth and development, as the United States expanded its territory and influence across the continent.

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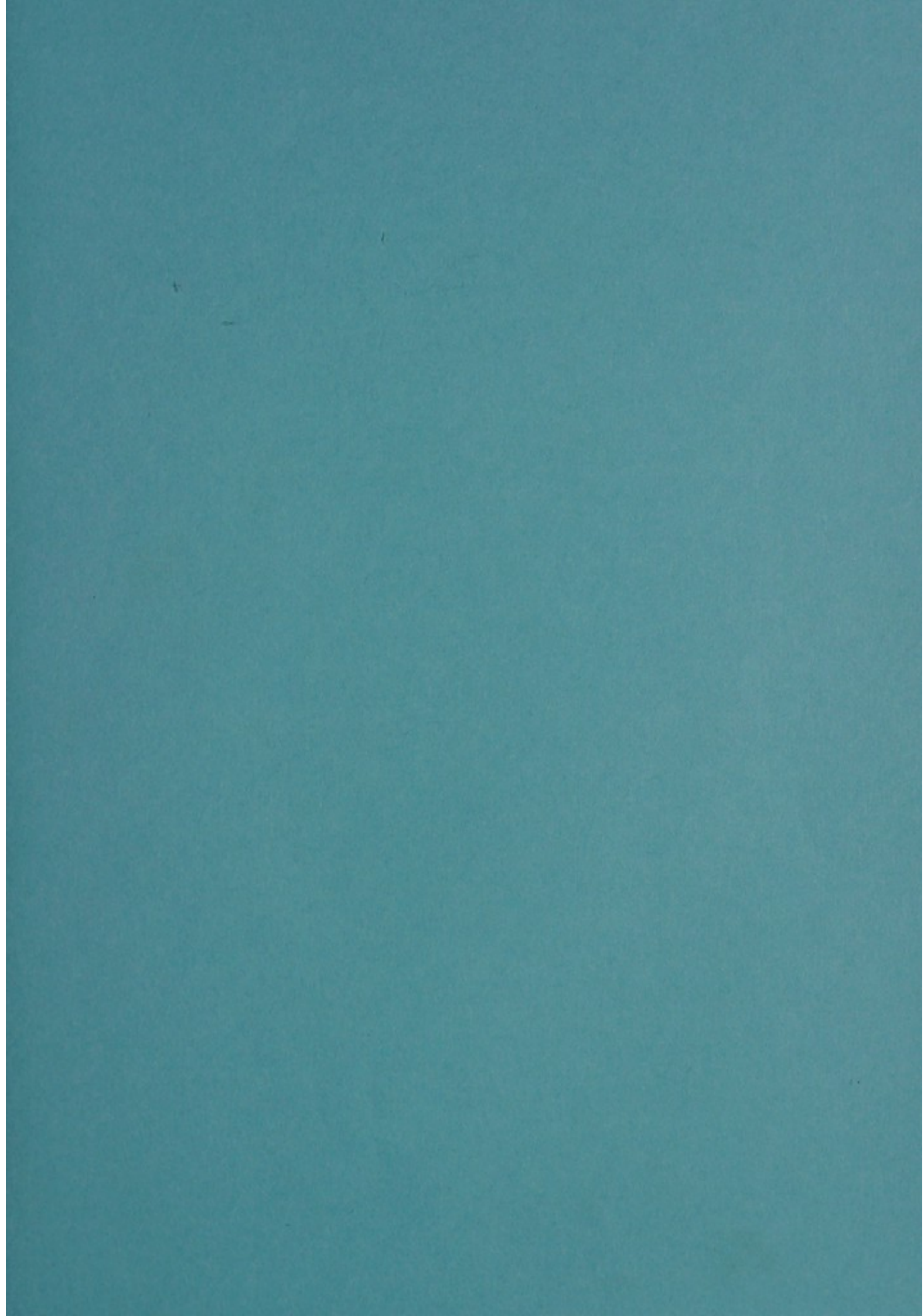
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