HOUSE OF LORDS

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The Select Committee on Science and Technology

One-off Evidence Session with

THE GOVERNMENT CHIEF SCIENTIFIC ADVISER

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10.35 am

Witness: Professor Sir Mark Walport

USE OF THE TRANSCRIPT

This is a corrected transcript of evidence taken in public and webcast on www.parliamentlive.tv.

Members present

Earl of Selborne (Chairman)
Lord Cameron of Dillington
Lord Hennessy of Nympsfield
Lord Hunt of Chesterton
Lord Kakkar
Baroness Manningham-Buller
Duke of Montrose
Baroness Morgan of Huyton
Baroness Neville-Jones
Lord Peston

Examination of Witness

Professor Sir Mark Walport, Government Chief Scientific Adviser

Q1 The Chairman: Welcome, Sir Mark. It is a great pleasure to have you with us today. I should note that we are being broadcast by web camera. Would you introduce yourself for the record and, if you would like to make any introductory remarks, please do so.

Professor Sir Mark Walport: My name is Mark Walport. I am the Chief Scientific Adviser to Her Majesty's Government. I will not give you long introductory remarks but, to frame the job, I would divide what I do into three main areas.

First, I provide scientific advice in relation to national resilience, and so do a lot of work on the national risk assessment and how science can contribute. The second big area of work is around evidence for government policy. For example, a topic that is quite live at the moment is air quality in relation to diesel emissions. A third area I work on is emerging technologies where there are three main roles for emerging technologies as far as the Government is concerned. The first, since many of them are technological, is how we can use the data from emerging technologies to enable Government to make policy more effectively based on the evidence that they give. The second is how we can use emerging technologies for Government to deliver its services more effectively. The third area is how emerging technologies can contribute to the economy. That is a broad way of framing what I do.

My job really is to act as a transmission mechanism between the outside world of science, engineering and technology, and social science. I view the scope of the job as Wissenschaft, if you like—it is all the sciences, including the social sciences and humanities. The job is very much to find the right expertise and transmit it effectively into Government. Anyone in my role will have their own domain of research; as you know, mine is medical, but it is about finding advice more broadly and making sure it is fit for purpose for Government.

The Chairman: Thank you very much. I am going to ask Lord Hennessy if he would like to start.

Q2 Lord Hennessy of Nympsfield: I have interests to declare. I am a fellow of the British Academy, which does quite a bit of horizon scanning in various ways, and a very slim interest, in that, when the Cabinet Secretary set up the most recent new initiative, a few years ago now, I was at the first seminar and gave the historical background in so far as I knew it to horizon scanning efforts in the past. Sir Mark, could I ask you to horizon scan the horizon scanning effort?

Professor Sir Mark Walport: That is a very good question, Lord Hennessy. It was one of the pieces of work we did last year for the Cabinet Secretary's Advisory Group. We did a very specific piece of work looking both inside and outside Government at the various organisations that are doing it.

Lord Hennessy of Nympsfield: Can we have a copy of that?

Professor Sir Mark Walport: Yes, of course you can. For example, Shell does long-term horizon scanning and quite a lot of industry does it. We have a community of interest both inside and outside Government which talks together about horizon scanning, so it is an absolutely relevant question: horizon scanning the horizon scanning, and so on ad infinitum.

Lord Hennessy of Nympsfield: Do you have any cheery news about how some of the recent efforts have been feeding into policy-making? The first big one was young people's attitudes generally, which I think was made public. Has that helped policy formation at CSR time, and all the rest of it?

Professor Sir Mark Walport: That is not the example I would pick in the first instance. It provides understanding, but I do not know that I could pick out a specific example where that particular one has had a policy impact. If I pick other areas, we have been doing a Foresight project on the future of ageing, which arose from the report that Lord Filkin chaired in the House of Lords; we are collecting evidence about ageing populations, and that is feeding directly into policy workshops across Whitehall.

I am conscious of the broader point behind your question: why would Government do horizon scanning as opposed to all the other organisations that could do horizon scanning? The answer is that it has to have an impact within the work of government. One of the things that has happened as a result of John Day's original report on horizon scanning across government is that it has been much more effectively joined up. It now reports in through Sir Jeremy Haywood to Oliver Letwin and other Ministers. We are working very closely with the Economic and Domestic Affairs Secretariat to actually turn the evidence we have produced into policy questions. I think ageing is a good example. More specific examples would be connected and autonomous vehicles, where the Council for Science and Technology does some horizon scanning as well. The CST wrote a letter on autonomous and connected vehicles, and that has formed a framework for a great deal of government policy work.

Baroness Manningham-Buller: I need to understand what autonomous and connected vehicles are. I expect everybody else on the Committee understands.

Professor Sir Mark Walport: Autonomous and connected vehicles are the vehicles that you sit in, but do not actually drive yourself.

Lord Cameron of Dillington: Such as DLR.

Professor Sir Mark Walport: DLR is an example of an autonomous and connected vehicle on the railways.

Lord Hennessy of Nympsfield: Could I add one further request? As a Wissenschaft transmitter chief scientist, could we have as much as we can of your product coming to this Committee? I cannot speak for the rest of the Committee, but I would certainly value any of the product that you could put our way, so we can keep a feel of all of this as it is developing.

Professor Sir Mark Walport: I would be very pleased to do that. I can give you more examples. The work we did on financial technologies has led to the Financial Conduct Authority doing work on regulation. The work that we did on the "internet of things" resulted in the Treasury releasing £40 million of funding. Increasingly, we are very focused on the horizon scanning and the Foresight work having an impact.

Baroness Morgan of Huyton: Sir Mark, thank you for coming this morning. Building on what Lord Hennessy said, could you make a lot of the work more public on horizon scanning? I confess I have been aware of little bits of it, but not much. Regarding the public's view of who they trust, I suspect your voice will be more believable than many others. Have you considered a way of getting it out there more?

Professor Sir Mark Walport: The first thing to say is we do publish it all. Everything I have talked about is publicly available, but I am very happy to distribute it further. The question of trust is interesting and of course, as Baroness O'Neill of Bengarve says, the corollary of trust is being trustworthy. The extent to which you are trusted depends on the topic you are talking about.

Baroness Morgan of Huyton: I agree with that.

Professor Sir Mark Walport: When a scientist talks about the Higgs boson, even if no one can understand a word, they are trusted to a very high degree.

Lord Hunt of Chesterton: There was another boson before that.

Professor Sir Mark Walport: Indeed, bosons in general. As soon as you start talking about neonicotinoid pesticides or GMOs, the trust can change. The messenger is then very important and it depends on who is speaking.

Q3 Lord Kakkar: I must first declare my interests as professor of surgery at University College London and Chairman of UCLPartners. Building upon the question of GMOs—and of course at the moment this Committee is involved in an inquiry into the whole question of GM insects—in your 2014 annual report you state that, "in some areas regulatory systems have become sclerotic and stifle growth". Do you consider that regulation of genetically modified insects and other GM modifications fall into that category where regulation is stifling innovation?

Professor Sir Mark Walport: I think the short answer to that is yes, but I shall give you a slightly longer answer as well, and it may take us into the next question. This is a classic example of an area where a scientific discussion has been conflated with a values discussion, and the regulation has been caught on the horns of that particular dilemma. You cannot argue that there should not be regulation of genetically modified organisms. The problem is that has then got conflated with values concerns by people who think that one should not fiddle with nature, for example, and concerns about the role of big companies in the agricultural world, and because of that I think the regulatory process has become stifled.

Lord Kakkar: You also turn to the precautionary principle in your 2014 annual report. You make a very interesting comment about the importance of having a rational response to uncertainty as distinct from risk. Would you like to expand on that in the role that regulation may be playing in stifling innovation, which is at the heart of where our economy and society need to go in the future?

Professor Sir Mark Walport: The precautionary principle in and of itself is extremely sensible. Essentially, it suggests that you should consider all of the risks and all of the benefits when you are considering the implementation of, for example, a new technology, and make a decision based on a balance of those, and, if there are major uncertainties, then it may be necessary to do more work to try to resolve them. The challenge is not the precautionary principle itself; it is how it is actually used. Increasingly, there is a sense that it is being used as a stop signal rather than a traffic light, where you look at things as red, amber or green—when it is amber then you may proceed with caution—and it is about uncovering more facts. Again, we get confused between the science and the values.

Another major issue is the confusion between a hazard and a risk. We are confronted by hazards everywhere, but a hazard only becomes a risk if the exposure to it is significant and the vulnerability is there. All too often we are seeing regulation which is based on the hazard of a substance rather than whether it poses any real risk. That is an issue of clarity of language and discussion. All of this has become clouded. We would have much better discussions about innovations if we recognised that there is the science on the one hand and all the values issues on the other. At the end of the day, it is your job as parliamentarians to help to resolve these questions. The HFEA and the mitochondrial regulations were a very good example of where the HFEA had looked at the science very carefully, it engaged in public debate and at the end of the day, because this is such a heavily value-laden area, it was decided there would be free votes in both Houses of Parliament.

Lord Kakkar: Would it be right to interpret your comments as saying that within the context of the United Kingdom we are able to deal with the precautionary principle, and understand both benefit and risk, and have the broader public debate about values, but when we come to the European level, where we have heard, particularly with regard to the question of GM insects, evidence that suggests that the precautionary principle is applied simply on the basis of risk without any assessment of benefit, there may not be the context yet in Europe to have the broader discussion about values?

Professor Sir Mark Walport: With respect, I think that may be going a little too far. I do think that when, for example, EFSA—the European Food Safety Authority—considers something it looks at both benefit and risk. The values that I have been talking about vary in different countries across Europe. For example, if you take nuclear, which is a very clear example, you see a difference between Germany and France and the UK. I do not think we have been good at resolving the fact that it is perfectly reasonable for there to be plurality of values. The question then is whose values trump whose. Maybe we have reached a sensible resolution in the context of GM crops, which is a principle of subsidiarity whereby a country can decide not to implement a crop, even if there has been a European regulatory decision saying it is okay. What has happened is that up until now the regulatory decision has been mired in the fact that not every country wants to implement GM crops. By separating that, it gives the opportunity for plural values to express themselves effectively in a European context.

Q4 Lord Cameron of Dillington: I am not quite sure to what extent your post is replicated in other European countries, but there must be senior scientists. Is there any agreement among the scientists within the EU regarding this sclerotic regulatory system, particularly on the important point of risk versus hazard that you mentioned a moment ago? Is there any movement on the continent vis-à-vis trying to get one's media communications better so that the politicians understand the difference and can get it across from science to the people taking the decisions?

Professor Sir Mark Walport: Of course, the UK system of science advice is not replicated across Europe, but in the last week the Commission has announced the composition of the scientific advisory panel to the Commission. Dame Julia Slingo is a UK member of that group and, although members are not there as national representatives, she is there, which is very good news.

Finding a uniform scientific voice is not easy either, and there are always various scientific voices. The other thing that is happening as part of the European science advice mechanism that is being implemented at Commission level is that the European academies are also being invited to apply for funding to be able to provide advice. It is quite a complicated and fragmented landscape of academies. Obviously we wish it well, but it is going to be quite complicated to get it going.

Lord Cameron of Dillington: Lord Chairman, I should have declared my interests as a farmer and chairman of the Advisory Committee of the Centre for Ecology & Hydrology, as a trustee of Rothamsted Research and also chairman of the Strategy Advisory Board of the Global Food Security Programme—as you know because you are on it.

The Chairman: I would like to follow up your answer to Lord Kakkar, but first I had better declare my own interests. I am chairman of the Foundation for Science and Technology and a fellow of the Royal Society. Sir Mark, you have referred to the very profound differences of attitude in the populations of different countries, not just in Europe but further afield as well. It follows, therefore, that there are going to be strong reactions in one or more nations. You said in your 2014 annual report that we need to share "a common understanding of the distinctions between hazard, risk and vulnerability", and you have just referred to that. Have we made any progress on this in Europe as a whole? Are we likely to get agreement as to what we mean by hazard, risk and vulnerability?

Professor Sir Mark Walport: As part of the work arising from the report, I have been involved in seminars in several countries in Europe—in Germany, France and Denmark. Recently I was talking about this at the Expo Milano. At a specialist level, the distinction between risk and hazard is quite well understood, but I do not think it is that well understood in public, and indeed in political discourse, so I think more work does need to be done.

I was asked just now about science advice in Europe. One of the other interesting things that we have in the UK is the Science Media Centre, which again is an effective transmission mechanism between the world of science and the world of the media. That is an important part of the equation, because the messenger is often the media in different forms, and so how we communicate science to the media is very important. Fiona Fox has done an excellent job in leading the Science Media Centre in the UK and if you look at the quality of science reporting, it has improved, by and large.

The Chairman: We always hear from scientists, quite reasonably, that they feel that policy decisions should be made against the scientific evidence base, but, of course, as you have said in your annual report, and I think as you have hinted now, you cannot ignore cultural values, which are going to be different, or the historical context, which is going to be different. Presumably, Japan's history of being a target for the atom bomb will colour its attitude to nuclear research. Does there need to be a separate process in determining policy, where first the scientific evidence base is taken into account, and then other overlying cultural or historic or values issues are taken into account? If so, how can the two be brought together?

Professor Sir Mark Walport: I suppose the question is how and whether you can formalise the process of policy-making into protocols. I would reinforce the point that you have made. I talk about this publicly quite often because scientists are for ever saying to me that it would be so much easier if politicians understood science, and I always make the point that it would be quite good if scientists understood politicians as well. The point I make is that, essentially, policymakers look through three different lenses. They look through the lens of evidence, which is, "What do I know about X or Y?", and frequently the evidence is partial or at least contingent. The second lens that they look through is, "If I make a policy X or Y, is it implementable?", because the best policy in the world, if it is not implementable, is no good as a policy. The third lens they look through is the lens of values: political values, what does the electorate think, what are my personal values? At the end of the day, policy is an integration between all of those. The job of the scientific adviser is to communicate the evidence as clearly as possible. It is always appreciated when the policymaker is interested in the evidence, and I would say that by and large they are. However, at the end of the day, whether you can then reduce that to a protocol which is completely logical is above my pay grade.

Lord Kakkar: If I may come back to the tension between innovation and regulation. In the context of European regulation, is there a risk that if we do not solve the issues, as you have described them, regulation at a European level may start to stifle the innovation that we wish to take forward in our own country?

Professor Sir Mark Walport: There is that potential. Again, it is how innovation is viewed. All too often innovation is viewed as something that introduces risk whereas, if you look at the challenges we face, we require innovation to reduce our risk. You could look at that over many different domains.

One of the problems for regulation in general is the fact that regulators are not accountable for all the decisions they make, be they positive or negative. One of the issues—and I am caricaturing this a bit and I do not wish to be beastly to regulators—is, by and large, if a regulator lets something happen that causes harm they get into terrible trouble, but if they stop something happening that would have done good, then there are no potential consequences. Until we find mechanisms for holding regulators to account for all of their decisions, that asymmetric incentive is likely to be an issue. It is easy to say that and quite hard to find a solution.

Baroness Neville-Jones: I wanted to ask Sir Mark a supplementary to what he said about the experience on GM crops. Do you see what is in effect an opt-out system in that context as a precedent for the future? How desirable, or undesirable, would that be were it to become the way forward?

Professor Sir Mark Walport: I think it is a precedent, although, if you look at the implementation of technologies, you can see that has happened already. Energy policy would be a good example, where some countries have a lot of nuclear and others have none, so it has been happening in the past.

We have to recognise that human values are plural. There are some that we readily accept as universal, such as it is not nice to kill each other, but there are others where, genuinely, there is not a right answer, such as where people have very different religious beliefs. We have to recognise that plurality between different countries is inevitable and that will have implications for how they take up technologies.

There is then phase two, which is that there is also an element of the fear of the unknown, and once things start actually delivering benefits, then we may find there are two paces of progress and, when things really work well, then people will get over it.

Q5 Lord Peston: My task is to take us into the area of government influence on research. As background, many, many years ago when the old Social Science Research Council existed, and I chaired its economics committee, Ministers would always say to me, "You never seem to finance any research that is of any use to us". I must admit—I was a young man then—I did not have the faintest idea what they were talking about, because I thought my job was simply to look at the research protocol on the application, whether it was significant, and then to look at the quality of the research. I think those days have gone. Could you outline to us your view of how Government ought to influence research? In particular, I am bothered—wearing my academic hat—that Government often wants research in areas where research cannot be done, or at least good research cannot be done. Could you tell us your general view of that sort of issue?

Professor Sir Mark Walport: Thank you for that question. I think that Viscount Haldane got it right in 1918, and he said six things. The first, and by far and away the most important thing he said was that he thought that research and evidence was important to the development of government policy. That was his most profound observation. Secondly, he said that each government department should provide funds to answer specific policy questions—the idea of departmental R&D funds. The third thing he said was that there should be a department of government which was charged with funding what he called general research questions—so that is BIS and the research councils. Fourthly, he said—and this is the Haldane principle that everyone in the scientific community remembers and focuses on—that the choice of how and by whom that research should be conducted should be the decision of experts. Fifthly, he said—and I think this gets to your question—that the questions and topics to be tackled should be considered as a result of close collaboration between the administrative and general departments—in other words, that there needs to be discussion between government and the research community. Finally, he said that there should be a department that supports research applied to trade and industry, and of course, again, BIS has that role. I think it turns on the more general question of who asks the research question, and the endless battle between the top-down and the bottom-up, which in reality is a non-issue because it requires collaboration. Scientists set their questions based on what others have done and on discussion, and, even in the world of pure science, there is a mixture of top-down and bottom-up. It is important that government departments have the opportunity to discuss with the research councils the areas that are important because at the end of the

day this is taxpayers' money that is being disbursed. It is equally important that departments have research and development budgets to answer very specific policy-related questions.

Your last point, which is about tractability, is a very important question for anyone in the research endeavour, and there are undoubtedly some questions that we would all like the answers to, which are extremely tough to provide. That can particularly be the case in the context of an emergency, where there may be a lot of questions that we would like answers to, but it is no use saying, "I can give you the answer in five years, Minister". Decisions have to be made.

Lord Peston: Can I give you an example which is within the realm of current policy? The story is being floated that the NHS should stop supporting homeopathy. I have always taken the view that if homeopathy is right then the whole of chemical science is wrong.

Professor Sir Mark Walport: Indeed.

Lord Peston: And, therefore, homeopathy is totally fraudulent. Would that come into an area that you would be consulted on?

Professor Sir Mark Walport: Probably not, in the sense that is a department-specific issue and, as you know, each government department has a chief scientific adviser. In the case of the Department of Health, it is Dame Sally Davies, and she has made her opinions clearly known. Indeed, I have said before a Select Committee, and I will say it before this one, homeopathy is non-science; it is nonsense. It is one of the easier things to deal with. There is then the political lens, if you are the Secretary of State, of how you want to prioritise that amidst all the other decisions you are making. Again, that is not a decision for the scientific adviser, but, for the reasons you understand well, homeopathy is rather easy to deal with compared to some issues.

The Chairman: Lord Peston's question reminds me of the most unfair question I have ever heard asked by this Committee of a Government Chief Scientific Adviser, which I promise we will not ask of you. Sir John Beddington was asked, "What is your greatest failure?", and he answered, "The failure to get the Government to consider an evidence base in the matter of homeopathy".

Q6 Lord Hunt of Chesterton: You go through the list of the Haldane ideas and you commented on the importance, as indeed was the tradition, of very strong departmental research, and by departmental research I assume you also include government laboratories, which are now vanishing to a very small number, although the Met Office is still there. I wonder whether you have been in some sense looking at this question, where, unlike any other advanced country, we are losing many of these governmental laboratories which have a vital role in the transfer of technology—as seen in the past anyway—but now they are being substituted by these highly focused, smaller catapult structures. How are the catapult centres, which, as I understand it, are the new government research labs in a slightly different guise, going to work out?

Professor Sir Mark Walport: First, I do not believe that anyone thinks that the catapult centres are intended as substitutes for government laboratories. They have a very specific role around the translation of research into public benefit of different sorts. I do not think anyone would suggest that that is what is going on, and that is a substitution. There is the broader question though; one of the amazing privileges of being the Government Chief Scientific Adviser is seeing the scope and extent of the scientific endeavour, which of course

happens in universities and in research institutes, in some cases private research institutes, in some cases the public sector research establishments, to which you are referring, and there is the extraordinary research that goes on in industry. Seeing that amazing diversity of research is important. I do not think that one size fits all. We need all those different varieties of research organisation in order to get the most out of research for the benefit of the country.

Government R&D funding is very important. I am afraid that it is sometimes seen as a variable cost and, when cost pressures are great, there is a tendency to see if savings can be made in R&D. It is my job to argue to Government the importance of research and development but, at the end of the day, I am not personally accountable for those budgets, and I do not have a formal part in the process of setting them. I would emphasise that I agree with you that we need diversity of research and of organisations in which it is conducted.

Turning to what I said at the beginning, there are some areas of science which are critical parts of our national resilience. You will not need persuading that understanding the weather and indeed the climate are both parts of that.

Lord Hennessy of Nympsfield: Could I ask a supplementary question about the first of the three areas you talked about, your critical resilience functions, in which you are very prominent? Do you have the right, as the chiefs of staff, the heads of the intelligence world and the chairman of the Joint Intelligence Committee have, of direct access to the Prime Minister if you need to warn him clearly and quickly?

Professor Sir Mark Walport: The answer is I have never tested it in that formal sense, but I believe I do, in that I have never had any difficulty getting access when I needed it and, when there is a national emergency with a strong scientific component, I end up on COBRA. The Government Office for Science is a well-embedded part of our national response capability. Part of my job is to chair a committee with the nice acronym of SAGE—Scientific Advice Group in Emergencies—and that feeds into COBRA. That model is rather well established in national emergencies. Certainly when I am proselytising the role in other countries which do not have it, I always argue for that ability to provide advice in an emergency. I have a small secretariat which supports me on that. It works on identifying experts in advance of events so that, hopefully, if there is a major emergency we can get on the phone and identify the right people fairly quickly. We work with the Civil Contingencies Secretariat on the national risk assessment.

Another way that I sometimes describe the job is saying that Government really cares about our health, well-being, resilience and security, and all of that depends on our infrastructure, which you can divide into three categories: our built, engineered and, increasingly, our technological infrastructure; our natural infrastructure, by which I mean climate and health—so human and plant health—and the geophysical environment; and the third area is our social infrastructure. Science is important for all of those, so a lot of work is spent working with the Civil Contingencies Secretariat and, as I say, we are well-embedded there.

Baroness Neville-Jones: I would like to ask Sir Mark the following. When I was in the coalition Government, in the early stages we had some experience of needing to draw on scientific advice in the context of emergencies. There was a feeling then that SAGE was not as influential as it could and should be. Do you feel that that situation has improved?

Professor Sir Mark Walport: I have been in post for two and a half years. Essentially, SAGE has been involved in three emergencies: first, the flooding; secondly, Ebola; and thirdly, briefly, the earthquake in Nepal. I would say that we were called on effectively for all of those. We provide broader advice through the National Security Council on some areas of security science. We tend to do that not in the heat of battle but over longer time periods. I think that is much better joined up than it used to be.

Q7 Baroness Morgan of Huyton: I ought to declare an interest as a member of the College Council of King's College London. Can I go back to the R&D budgets at the department level, which you referred to? When we look back at the figures at a departmental level there have already been quite significant cuts in a lot of departments—not in BIS, but, when you look at the detail of BIS, a lot of that is on the Space Agency. Clearly the CSR is going on at the moment. To what extent have you, personally, been involved in conversations across departments with the departmental chief scientific advisers about the shape of the CSR? To what extent do you think there is a tipping point beyond which the cuts start to damage the fabric of the work that is happening at a departmental level? In simple terms, why do we need R&D department budgets? As a member of the Committee, I would find it useful to understand your thinking on that, partly in order to be able to persuade other people of the importance. It is a given, but I do not think it is fully understood. People understand the research councils very well. They understand departmental science in times of emergency, but there is less understanding about the continuing work.

Professor Sir Mark Walport: Let me give you a very current example, which is NOx emissions from diesel cars. It is quite important that the UK is able to position itself effectively in terms of setting the regulations for the manufacture of car engines. The Department for Transport needs expertise in diesel engines, how they work, and the gases that they emit. That is not necessarily the ability to do the research directly. There is a critical question of being an expert customer. If you do not have the expertise within a government department, then you do not know what questions to ask. Take Defra, where there are difficult issues about bovine tuberculosis, neonicotinoid pesticides and this question of risk and hazard, without the ability in some cases to commission research and development to answer very specific questions. Going back to Lord Peston's question, the research councils are probably not the first vehicle for that, although they can certainly help. One of the things that I would observe is that there are better and better links between the research councils and government departments.

I was asked to do a piece of work on the R&D capability of Defra and, as a result, a partnership has been set up that links together the plant and animal health community much more effectively. You can look across almost every government department and see questions which require research in order for them to make the best policy, and, in some cases, it is best if they commission that research themselves.

Baroness Morgan of Huyton: I am not asking you to spill the beans, but to what extent have you personally been asked for advice or fed in advice to the current CSR?

Professor Sir Mark Walport: I have had many conversations, particularly with chief scientists in individual government departments, who are in the most direct position. My views would be well known across government. At the end of the day, this one is definitely above my pay grade.

The Chairman: Sir Mark, you will remember that we did a previous report on the departmental chief scientific advisers.

Professor Sir Mark Walport: Yes.

The Chairman: Could you tell us whether the meetings that were held under Sir John Beddington's time continue on a regular basis?

Professor Sir Mark Walport: Yes, they do. We have an informal meeting on Wednesday mornings at 7.45 am, and then about once a month we have a meeting, at a slightly more civilised time of day, when the research councils sometimes come as well.

The Chairman: Are there any gaps in that gathering? Are there any departments that you would like to see represented, but are not?

Professor Sir Mark Walport: Not every department has a chief scientific adviser. We have made a number of very good appointments over the last year, including a very good new chief scientist in the Department for Transport. There is a new chief scientist in DfID after Chris Whitty's distinguished tenure. We have a relatively new chief scientist in DECC, John Loughhead. There are some examples of internally appointed chief scientists where they work very well indeed. But not every department has a chief scientist.

The Chairman: Is the Treasury represented on the committee?

Professor Sir Mark Walport: Yes, it is. It does not have an external chief scientist, but Susan Acland-Hood, who is a senior official in the department, acts as the liaison to the chief scientific advisers' network, and I would say that works very well.

Baroness Manningham-Buller: I declare an interest as chair of the Wellcome Trust and also—relevant to my question—until six months ago, I was chair of the Council of Imperial College. Finishing the question on chief scientific advisers, do you also meet the regional ones—the Scottish and the Welsh ones—as well? Do they come to your meetings?

Professor Sir Mark Walport: Yes, they do, although obviously not every week, because it is quite a distance. I speak regularly, particularly with Julie Williams, who is the chief scientist in Wales. At the moment, the position in Scotland is vacant. There was an appointment process, but no appointment was made. At present, Northern Ireland does not have a chief scientist, although I was in Belfast a couple of weeks ago talking to the Northern Ireland Assembly about the question of a chief scientist there.

Baroness Manningham-Buller: Do they have an appetite for one there?

Professor Sir Mark Walport: You would need to ask them that. They were certainly interested in hearing about it. Time will tell.

Baroness Manningham-Buller: That is not the substance of my question. I have two related questions, one on localism and the northern Powerhouse, and the second on institutes. You and I were closely involved—I was at Imperial as well—in the establishment of the Francis Crick Institute. We now have the Alan Turing Institute, there is the possibility of the Sir Henry Royce Institute and institutes, in theory, in the northern powerhouse and potentially elsewhere. Could you give us some observations on the value of institutes that stand alone from universities in most cases? How do you see this panning out? In particular, I am concerned about the sustainability of some of these institutes. I would be interested in your views on the degree to which these are attractive political proposals as opposed to being

substantially needed. Then I would like to come on to localism, which you may want to cover in your answer. Thank you.

Professor Sir Mark Walport: Thank you for that. The first thing I would say is any institute that really does stand alone is unlikely to be a very good institute. All of those institutes you have talked about have extremely strong academic links. I will not rehearse the Sir Francis Crick Institute because you—and I suspect everyone else—know the history well. The Turing Institute has a partnership of five universities behind it and is engaging very actively with other universities as well. An opening event was held there last week. These are not either/or. We need a mixed economy. Ideally, institutes should do things which cannot be done simply within universities. The Sanger Institute would be a good example. The sequencing of the human genome and the very large-scale genome science could not have been done easily in a university setting; it was much better done in an institute environment, which actually ran it as a factory with machines 24/7generating that. The question is whether there is an opportunity to develop a critical mass in an institute to do something that would not simply be done in a university.

One of the challenges is that, although our universities are large, in the grand scale of things they are not that large. If you look at the cluster of universities around Boston, for example, they are on a gigantic scale compared to UK universities. There is something about providing environments in which academics from different universities can work together effectively. There is also something about having institutes. When industry came to a seminar in Downing Street around the discussion of the creation of what turned out to be the Sir Henry Royce Institute, they made the strong point that they wanted a single place with which they could interface—a sort of gearbox, if you like. In each case, it is about asking the question. It comes back to Lord Hunt's question, which is would you simply put the Met Office into a university? The Met Office does something that would not be easily replicated in a university department. There are things that the DSTL does that could not be easily replicated. The answer is not to be ideological about it, but to recognise that we need a diversity of scientific environments, and look at each one on a case-by-case basis. We have to recognise that some of the traditional disciplinary silos are no longer appropriate for 21st-century science. Institutes can be a way of breaking that down, but institute structures can also be created within universities. That is an important aspect as well. In the case of each of those, the case was looked at quite carefully. As I say, I do not think this is a battle between institute and university. Historically, the UK has been very, very heavily weighted towards research being done in universities. It is much less the case in Germany, for example. What we need is an intelligent balance between the two.

Baroness Manningham-Buller: In Germany, the emphasis on the institutes has damaged the universities.

Professor Sir Mark Walport: Whether it has damaged them, or they have never developed to the extent that they would have done if there had not been that embedded university question, I think that is right. I do not sense at the moment that our British universities are being damaged by what is going on in the institutes**.**

Baroness Manningham-Buller: I think you are saying that announcing the creation of a new institute, which is quite appealing politically, is only done when there is a clear and definable need and judgment taken that this cannot be done in a university.

Professor Sir Mark Walport: Yes. For example, the Turing Institute originated in advice in a letter to the Prime Minister from the Council for Science and Technology, on which a group of vice-chancellors was sitting. These things do not come out of thin air.

Lord Hunt of Chesterton: Is it not an intrinsic problem? I was in a university department with lots of contracts. It is hopeless maintaining software over donkey's years in a university department. You have to have a company or a government lab, so I set up a company. The point is it is not an ad hoc decision, it is an intrinsic point. If you have any scientific response that exists for a long time you have to have a separate organisation.

Professor Sir Mark Walport: I agree with you, Lord Hunt.

Lord Hunt of Chesterton: I was not sure that Baroness Manningham-Buller did.

Q8 Baroness Manningham-Buller: I stand corrected, Lord Hunt. Can we move on to the localism point? In other forums I have heard you speak about the very strong wish of this Government to ensure that some of this is spread and not all focused in the south-east. Can you talk through the scientific implications of the northern powerhouse? How would scientific advice feed into that?

Professor Sir Mark Walport: The first thing is—and you will recognise this from your association with the Wellcome Trust, as did I—that there is excellent science and engineering technology and social sciences throughout the country, so it is not all focused in a very small number of institutions. It is very important to build on that strength, wherever it is. It would be an unfortunate effect if, as it were, a pure Darwinian process resulted in an overconcentration of all our research in a very small number of places. The question is, how do you build on, and support, the excellence in different parts of the country?

One of the things that the BIS Secretary of State launched last week, the science and innovation audits, is quite a good way of working to identify the strengths where they are in the country. As a precursor—it was not part of the process—Gareth Davies, the director-general of BIS and I had an event in Exeter last week. It is important for the centre to get out to different parts of the country and talk to people and find out what their strengths are and where they see their opportunities. The concept of the science and innovation audits is very much to act as a catalyst, and that is an important role for government in science, helping people to do things they would not do otherwise. That is something that the Wellcome Trust has done, and continues to do—to act as a catalyst to enable the community to do things that they might not do spontaneously. These science and innovation audits will be a process where the centre will go to different parts of the country and work to identify what the key areas of strength are.

Baroness Manningham-Buller: What do you expect might happen once they have done that?

Professor Sir Mark Walport: The question then is, how is government funding allocated when it becomes available? I do not think you would find anyone who would argue against excellence being the primary criterion on which funding is allocated. I go back to the point I made at the beginning—it is important to recognise that there is excellence in many different parts of the country, and to make sure that the mechanisms in place do not all result in the funding being distributed in a rather narrow part of the country.

Baroness Manningham-Buller: Thank you very much.

Q9 Baroness Neville-Jones: I declare my interest as a member of the Engineering and Physical Sciences Research Council. Sir Mark, you make a powerful case for the notion of institutes. You have put forward various points, including one that I think is very important, which is the interdisciplinary nature of quite a lot of the scientific endeavour that needs to take place and the need to draw it together. Industries need to be able to focus on a concrete point they can go to. Capital has been provided for these various new institutes—quite right, too—but there is some anxiety about day-to-day running costs and funding. The scientific budgets are not getting bigger overall; on the contrary. There is some worry about robbing Peter to pay Paul. Are you confident you will be able to ensure there is adequate, sustained funding for day-to-day activity which does not deprive other parts of the system of moneys that they need?

Professor Sir Mark Walport: I want to make two points. First, I do not want to be characterised as someone who supports institutes at the expense of universities. I have never been in that position.

Baroness Neville-Jones: No, and I did not do that.

Professor Sir Mark Walport: We need a balanced economy. We need both; it is not one or the other.

Your second point was most memorably encapsulated by Lord Selborne's predecessor as chairman of this Committee who referred to "batteries not included" when he talked about the structure.

Baroness Neville-Jones: This is the "batteries not included" question.

Professor Sir Mark Walport: That phrase continues to resonate across the funding landscape.

I should also make it clear that I do not have a formal role with respect to the science budget in BIS and the research councils. I work closely with Gareth Davies, but it is not part of my formal responsibilities.

Baroness Neville-Jones: I do hope you make the point.

Professor Sir Mark Walport: I am always making the case that if you fund capital and you do not fund the revenue then you are not using your capital to the best effect.

Q10 Baroness Neville-Jones: Sir Mark, I wonder if I can draw you on the subject of the scientific advice in BIS. We are all aware of the way in which one of the jobs was split after the departure of Sir John O'Reilly. We have learned that DBIS is about to reinstate a single individual. Have you had an input into the decision-making process? How do you view this? We do not know anything about the job spec. Will this be a scientist or a Civil Service appointment?

Professor Sir Mark Walport: There are two separate questions there, if I may. The first question is how directors-general are chosen and identified in BIS. I do not have a role with respect to that.

The second question is that John O'Reilly's successor as the director-general of knowledge and innovation—now director-general of business and science—is Gareth Davies, who is not a scientist, and I would say that I have an excellent working relationship with him. That was part of the discussions when he took on the job. I would reinforce that it is the quality of the

person as much as their qualifications that will determine how effectively they do the job. My observation is that he does the job very well indeed.

Baroness Neville-Jones: I have to say that I do think qualifications matter. The quality of person is one thing, and you cannot substitute for it, but I do think that qualifications are important.

Professor Sir Mark Walport: That is perfectly true, but the job is a managerial job. The research councils are led by distinguished scientists. There is a chief scientific adviser in BIS in the form of Tim Dafforn. There is plenty of specialised science, but how you hold it all together requires managerial and leadership skills at least as much as it requires specialist scientific skills.

Lord Hunt of Chesterton: I have worked with Schlumberger, a German company, and the top managers are engineers in all those countries. Are you saying there is no British engineer who could be in charge? This is unbelievable.

Professor Sir Mark Walport: No, no, that is not what I am saying at all. I could not agree with you more that engineers are absolutely excellent at delivering and running things. They are not the only people who are capable of doing it.

Lord Hunt of Chesterton: What is the most senior engineering job in government?

Professor Sir Mark Walport: At the moment, probably the most senior engineer would be John Loughhead, who is the chief scientist at the Department of Energy and Climate Change. John is a very distinguished engineer. There are plenty of engineers around government departments, particularly the Department for Transport and the Department of Energy and Climate Change.

Lord Hunt of Chesterton: My real question was we have had horizon scanning, but we have not had picking winners. I know you like reading interesting books. There is a book written by André Lebeau, the former head of the French space agency and Météo-France. There was a multilateral rocket project—Blue Streak—and France said, "We are going to have our French rocket". He described how he manoeuvred and, bingo, they ended up with Ariane and the rest were practically nowhere. I was in Paris in the late 1980s when there was a question of whether Dassault Rafale was going to join our fighter. The French Government said, "No, we're going to have our own". What did we see last week when Mr Modi came? Dassault Rafale won. It is picking winners at a very high level. We do not seem to be doing that.

Professor Sir Mark Walport: There are certain phrases that are uncomfortable in discourse. They are the equivalent of poisonous polypeptides. "Picking winners" has a rather unpleasant resonance; a bit like "green shoots". The critical issue is that Government have to make choices. The key question for all of us is how you best effectively make choices.

Lord Hunt of Chesterton: Will the new structure move in that direction?

Professor Sir Mark Walport: As you know, Sir Paul Nurse is doing a review at the moment. We will need to wait on his report and the Government's view of it.

Q11 Duke of Montrose: Most of the international science is co-ordinated through UN agencies. You mentioned that there is a new European agency which is going to try and co-ordinate some science. Do you feel that the current system is fit for purpose?

Professor Sir Mark Walport: It all depends. One needs to look at international science through a series of different lenses, if you will indulge me for a minute. The first lens, which is important, is the business of doing science well and increasingly scientists recognise that if they are to do the best science they need to collaborate internationally. That works well. The UK is good at it. A high fraction of our papers are authored as part of international collaborations and are well cited.

The second issue for international science is taking on the grand challenges. Antimicrobial resistance would be one. Climate change would be another, as would questions of food security. Those are areas where the scientific community can play an important role in collaboration, but where government can really help. You could look at the leadership of, first, Sally Davies, Chief Medical Officer, but, secondly, the role of the Prime Minister and the Government in promoting antimicrobial resistance as an important international grand challenge, which is now recognised.

There is a third area of international science, which is how we build capacity in the developing world, for example, and the UK has a rather proud record and the work of DfID and funding agencies has been important.

There are then the big bits of scientific infrastructure. The Large Hadron Collider and the Square Kilometre Array would be good examples of that**.** Those are all areas where international collaboration is absolutely critical and tends to be done through science ministries.

There are some areas of location-specific science. If you want to study the aurora borealis, you are best to do that at the Poles. If you want to study oceans or malaria, there are some places where you have to do it.

The next area is science in ungoverned spaces. That is a very important area where science is beginning to work in areas that are of increasing interest to sovereign Governments. The deep oceans were very much the space of science because they were more inaccessible than the moon. Space was very much the domain of scientists; much less so the Arctic and the Antarctic. Interestingly, we have created a human infrastructure, which is cyberspace, where science and engineering technology is absolutely important, as indeed are the social sciences. Sovereign Governments have not quite worked out how to deal with that yet. There is science that goes on in a series of spaces that are increasingly of sovereign interest, but are not under strict single sovereign domains.

Then there is how we promote our national capability internationally, so that is science for diplomacy. I think the UK is quite good at that. I am not sure whether I have really answered your question. Could we have done better in the case of the WHO and the Ebola response? I think everyone would say the answer to that is yes, including the WHO.

Duke of Montrose: Could I declare that I am a farmer and president of the National Sheep Association? Do you get much co-operation from the like of the Chinese, who always seem to me to be off on a different tangent on science than a lot of our more co-ordinated science?

Professor Sir Mark Walport: The scientific links between the UK and China are very strong and have been extremely important diplomatically. The Royal Society had access to China in the 1960s in a way that other parts of the UK did not have. It remains the case today that when Sir Paul Nurse, president of the Royal Society, goes to China, he gets a very high-level

reception. The scientific collaborations are very strong. The Newton Fund, which is a £75 million a year fund, created by the Government for international collaborative work—it is ODA money—is forging very strong links between Chinese science and the UK. We should view science as an important tool for our diplomatic efforts.

Q12 Lord Hunt of Chesterton: I should declare my interests as having had one of the Newton projects and I am a fellow of the Royal Society. The formal co-ordination of a UK presence in connection with many of these UN agencies is through the Foreign Office. It used to be called the UN department; it is now called something else, a co-ordination department. What is the role of the chief scientist in ensuring this co-ordination works?

Professor Sir Mark Walport: It is actually the Department of Health that works most closely with the WHO and Dame Sally Davies sits on the WHO executive board.

Lord Hunt of Chesterton: So it is devolved to departments?

Professor Sir Mark Walport: It is linked to departments where it is appropriate to do so. You know better than me the IPCC process, and the links there are with DECC rather than the Foreign Office. The Foreign Office plays a key role and, as you know, Sir David King advises the Foreign Secretary on matters of climate. There are bespoke mechanisms depending on the area of science, to some extent, and the IPCC would be one of the most extreme examples of that.

I visited the Joint Research Centre at the European Commission recently. That plays an important role in providing evidence for the European Commission. The geometry of this is quite complicated.

Q13 The Chairman: Do you have any concerns about recruitment, training and support for scientists in public sector research establishments? For example, we know that over a time BBSRC has moved its research institutes into different governance. The Natural Environment Research Council has been looking at this for some time. Do these developments cause you any concern, or do you welcome these changes of governance?

Professor Sir Mark Walport: I always start from the premise that form should follow function. The most critical thing is to be clear what is the strategy and the mission of those lots of different organisations that are embedded in that question. There are several governance models that can satisfy the functional requirements. At the end of the day, good people can make bad structures work quite well and bad people can wreck the best of structures. The critical question for all these organisations is about the quality of the leadership and their governance. In some senses, you need to look at each of these in detail to work out what the most appropriate governance structure is. There is no doubt that we could get more from collaboration, in general. The whole is sometimes less than the sum of the parts and the challenge for all of us is to make the whole greater than the sum of the parts. It goes to Baroness Manningham-Buller's question about institutes. That is how sometimes you create a whole that is greater than the sum of rather fragmented parts.

In relation to jobs, the Prospect union recently has done quite a big survey of their members working in R&D to get their perspectives of the work. There is a nice four-sided summary which I can provide for you. When it looks at dimensions of job satisfaction and segregates the respondents as to whether they are public bodies—so PSREs typically, civil servants, and private sector—perhaps not surprisingly, it found that the pay satisfaction is somewhat less

in the Civil Service than in the private sector, but many of the other aspects of job satisfaction are rather high for both PSREs and government.

The Chairman: Lord Hunt, did you want to come back on that?

Lord Hunt of Chesterton: You are the chief scientific adviser?

Professor Sir Mark Walport: Yes.

Lord Hunt of Chesterton: Not the chief scientist?

Professor Sir Mark Walport: Correct.

Lord Hunt of Chesterton: We do not have a chief scientist. When I was head of the Met Office, we had a chief scientist—it was not my idea, it was somebody else's good idea—and that person's job was to do the technical advising. You made a comment that scientists may not be tremendous managers. My belief is that we do very little. Many of the scientists are trained as very specialist people. What used to be called the Civil Service College, or whatever it is called now—

Lord Hennessy of Nympsfield: It has gone.

Lord Hunt of Chesterton: Exactly. There is no training. Many of them do not read newspapers. We need to do something.

Baroness Manningham-Buller: Lord Hunt, can I interrupt to say that one of the things the Wellcome Trust has funded is courses on leadership for leading scientists? These are highly popular; I spoke to one yesterday. The person at the end of the table was behind the start of them. There is an attempt by somebody to make a change.

Professor Sir Mark Walport: To pick up on that point, part of my job is as head of the science and engineering profession in government. It just so happened that yesterday afternoon we spent two hours with the individual heads of science and engineering in individual parts of government. Jonathan Lyle was there from DSTL, Alan Pratt from the Home Office—I could string out a whole list—and we spent two hours talking about precisely these questions of professional development where, as you probably know, Lord Hennessy, the whole of CSL is being refreshed at the moment. Prospect has done some work in this area well. There was a uniform perception that, first, the science engineers in government do seek out professional development—there is a hunger for it. Secondly, there is a strong recognition that we need to provide that serious professional development; put it this way, there is a great deal of opportunity to improve the offering.

The Chairman: A last contribution from Lord Hennessy.

Lord Hennessy of Nympsfield: I am one of those who regrets the passing of the National School of Government. It is very significant that the Ministry of Defence has kept its training up through the Defence Academy of the United Kingdom, the Foreign Office has just created a Diplomatic Academy, but the whole of the Home Civil Service has this amazingly patchy provision and the contract is up, as you say, for renegotiation. Do you think it would be desirable to have some kind of national school of government in which the S&T training could be there for the professional science and technology people as part of its remit, while those who are coming up the old generalist route—to go back to an earlier discussion we were having—should at least have a working feel for S&T matters; there should not be this ancient CP Snow two cultures.

Professor Sir Mark Walport: I could not agree more. We were both involved in paying tribute to Lisa Jardine a few weeks ago.

Lord Hennessy of Nympsfield: We were.

Professor Sir Mark Walport: She was rather passionate about that. Without going into the structure, because there are many structures that could potentially solve the problem, I do agree most strongly with you that we need to take a much broader approach to the education and training of not just civil servants but society at large, where this early balkanisation between the sciences and the humanities is something we need to break down. It is a bit distressing that Snow gave his Rede Lecture in 1959 and the topic has come up again and again. It is probably not within my job description and potentially above my pay grade. This is one of the major challenges that we face. It comes back to the good customer function: how can you be a good customer for technical questions of science and engineering if you have no background at all? It is important that, as it were, we educate the scientists in the humanities and educate the humanities in the sciences as well.

The Chairman: Sir Mark, we have run out of time. We have kept you longer than we said we would. The Committee is most grateful to you for the very full way you have answered our questions. We have covered a lot of ground. You very kindly said you would send further information on horizon scanning, which would be very helpful. In the normal way, a transcript will be sent for minor corrections to the record. Thank you very much for joining us today.