HOUSE OF COMMONS

Science and Technology Committee

Pre-appointment hearing: Government's preferred candidate for the Chair of the Biotechnology and Biological Sciences Research Council (BBSRC), HC 1087

Monday 2 March 2015

Ordered by the House of Commons to be published on 2 March 2015.

Watch the meeting

Members present: Andrew Miller (Chair); Dan Byles; Jim Dowd; Mr David Heath; Stephen Metcalfe

Questions 1-29

Witness: **Professor Sir Gordon Duff**, Government's preferred candidate for the Chair of the Biotechnology and Biological Sciences Research Council, gave evidence.

Q1 Chair: Sir Gordon, thank you very much for coming this afternoon. The Committee has done a number of these pre-appointment hearings over the Parliament. They are relatively informal, but we want to ask a number of fairly detailed questions. This Committee hearing is in the public domain, as you know. First, what interested you in applying for the chair of BBSRC?

Professor Duff: Thank you, Chair. The first thing I should tell you is that I have had a lifelong passion for biology and biotechnology. I started my early career going along the botany track, before being diverted towards medicine and medical research.

About a year ago, I was approached by the head-hunter, who said that this chair would become available and would I be interested in being considered. I thought about it at length and spoke to colleagues and friends. I think that this is a very important area. Given the estimate that by 2050 we will have to feed, water, shelter and keep healthy 9 billion people on a planet of limited resources, I could not imagine any area of more importance. As a grandfather, I wanted to be very sure that I did my best to leave a habitable future for our successors. It seemed to me that BBSRC, with its mission, was centrally placed to have a good contribution to that.

Q2 Chair: When the head-hunter approached you a year ago, did they give you any indication of the kind of people they were talking to? We know that they approached people other than you.

Professor Duff: Do you mean apart from me?

Chair: Yes.

Professor Duff: No, they did not.

Q3 Chair: How do you think this will be different from your time at the MHRA?

Professor Duff: In some ways, it will be quite similar. They both involve quite central activity in a science-rich and research-based area, so there will be strong similarities. The differences will be extending beyond human biology, medicine and public health into areas that are just as important, such as agriculture, food security, the progression of industrial biotechnology and the development of bio-energy in a world where, increasingly, we need to leave behind fossil fuels. It will be a broader science base for me, but I do not think that the day-to-day work will be all that different. It will still involve hearing from a lot of highly technically trained experts and trying to bring consensus where there may be none at the outset.

Q4 Stephen Metcalfe: Good afternoon. Part of your role will be to be the custodian of the council's charter. How do you think that responsibility will make you distinct from the chief executive?

Professor Duff: The council's charter is at the base of the council's strategic plan and is very much enshrined in the mission. There are three main charter objectives. The first is to promote research and training, to ensure that we have the skill base to go forward in what is supposed to be, and I believe will be, the century of biology and biotechnology. The second is to advance knowledge and technology to support the economy and to increase prosperity and the quality of life of people here in the United Kingdom and globally. As chairman, I will be focusing on those three large strategic objectives.

Q5 Stephen Metcalfe: I thought that you mentioned two. Was there a third?

Professor Duff: Yes. I was getting to it.

Stephen Metcalfe: I am sorry.

Professor Duff: It was a circuitous route; you were right to call me in. The third is to communicate our research outcomes, to disseminate the knowledge that our funding creates, and—very importantly, I think—to encourage very good dialogue with all our stakeholders, but particularly the public. In an area like biotechnology, the issue of public

understanding and stakeholder dialogue is very high. I will take a strategic view on all three objectives, but initially I may be particularly interested in seeing how well we are doing at getting our messages across and making sure that they are the correct messages.

Q6 Stephen Metcalfe: Excellent. That is one of the areas we have always had some concern around, not particularly about your role but about the fact that public engagement per se is not as good as it could be. You talked about the challenges that the world might face by 2050. It is quite important that we start that dialogue, because things will have to change if we are to meet those challenges. Can you flesh out how you will go about judging your public engagement, and then opening up new areas of public engagement that perhaps have not been explored before?

Professor Duff: Currently, I believe, several methods are being used to engage the public, from quite small meetings with selected attenders, or open to the public, all the way through to the electronic media, especially those that are used most by the young. That is all going on.

BBSRC, as far as my reading tells me, has had a pretty good record in the area. Since its founding in 1994, it has had 14 very large events to get across to the taxpayer—the stakeholder—what the real issues are with things like stem cells and other emerging technologies that will affect them directly. One of them, of course, is the whole area of synthetic biology, where the BBSRC did a particularly good job in creating four centres, each of which ran a series of seminars, and some very good questions were raised. There are not necessarily any easy answers to those questions, but we need to understand that new technology can be both exciting and very frightening, and I think the public have a slight mistrust of technology when it goes into commercial use on a large scale.

To answer your question, I would first review what we have done—review its effectiveness and see whether we have any product from the investments that we have made in the area—and then look at other ways in which we could improve, using the media and certainly face-to-face dialogue in fora across the country. I would look for and take advice from communication experts on how to get messages across in a way that is both understandable and acceptable to all sectors of the population.

Q7 Stephen Metcalfe: Yes, the "all sectors of the population" is the biggest challenge. It is easy to engage with those who want to engage; it is more difficult to engage with those who may not know that they need to engage to understand the way in which the world around them is changing. That will probably be the biggest challenge, and would require some innovation to reach out from your usual circle or sphere of influence. Is that a description that you recognise?

Professor Duff: I recognise the description exactly, but I do not think that it is completely outside my usual sphere of influence, because in the field of medicines regulation we fairly frequently have to explain complex and rather frightening issues to a general public.

One example is the clinical trial of a new antibody in which each one of the recipients, who were all healthy young men, fell very ill; the outcome might well have been worse, but explaining that in a way that did not stop the development of the biotherapeutics in that trial was quite a challenge.

One of the areas where I think I have strength is recognising my own weaknesses, so I would not dream of devising a communication plan myself without taking expert advice. There is another point attached to that. I mean expert advice not just from the field of communications but from the social scientists who understand far better than I do what is at the base of human behaviours and what, if anything, could change them. I had an example of that when we were dealing with the H1N1 pandemic flu in 2009-10. The social scientists on the committee were absolutely correct that the messages going out needed to be different, and we needed to understand how you change behaviours. I learned from that that there are people who are better qualified than I am to advise in these areas.

Q8 Chair: Finishing up on that point, I take it that, nevertheless, you see that you would have a hugely important leadership role in those controversial areas. I agree that we need behavioural scientists to help us to get across some of the complex messages, but your role would be one of leadership. For example, on some of the issues we have dealt with recently, on mitochondrial donation or GM foods, where there is controversy in the general public but the science is very clear, we need very strong, determined leadership, don't we?

Professor Duff: I agree entirely. I hope that I did not give the impression that I would delegate leading from the front row. I certainly would not. What I was trying to get across is that I would do it after being informed by experts on the best way of doing it.

Q9 Mr Heath: My colleagues have been testing you on the dialogue with the general public, but the highly specialised academic sphere, which you epitomise with your career, also needs a very successful and productive dialogue with BBSRC. From your experience, are there particular areas in which the organisation could better support the research community in what it is attempting to do?

Professor Duff: The connections between BBSRC, all the other research councils and Research Councils UK are critical to this, but that is not where it stops; obviously, the university sector and, very importantly, the industrial sector need to be consulted. The main aim is to take the harvest of biology that we are now reaping from decades of prior investment and to make sure that we can translate it as effectively and efficiently as possible into economic benefit, societal benefits and better quality of life for everyone. So there is a huge need, in my view, to keep those dialogues going and to look for interdisciplinary areas where we could accelerate the development in useful directions. I know that a group of the chairmen of research councils meets, and that is the first place for making sure that we all understand what each research council area does that could be of benefit to a greater goal and a more holistic view of national and international needs.

Q10 Mr Heath: Have your previous communications and exchanges with BBSRC been positive ones from the point of view of your own research background?

Professor Duff: I have always had very good communication from BBSRC, including in the run-up to today's hearing, but earlier in my career as well. The BBSRC interface with universities is good and strong. The interface with developers of biotechnology is also quite strong, but I suspect that it could be taken on and advanced a bit.

I believe that scientists within industry have an awful lot to contribute to the overall development of industrial biotechnology, obviously, but also to the basic sciences that underpin it. Those areas tend to be siloed across the patch, and there are not many opportunities to bring everyone together. I was lucky in a previous role to interface quite a bit with the British BioIndustry Association, the Association of the British Pharmaceutical Industry and the British Generic Manufacturers Association, so I developed a feel for the different needs and viewpoints of industry. I see industry as central to our progress.

Q11 Mr Heath: I am going to ask you a question that I hope you will not consider to be a bouncer—an unfair question. I note that you stepped down as chair of the MHRA because you did not feel that you had enough time to devote to it, presumably because of your role at St Hilda's. Is there now such a utopian state of grace south of Magdalen Bridge that things have changed and you now have time to devote to this new role?

Professor Duff: It is a very good question. MHRA was a half-time job on paper, but actually took up rather more than half of my time. The time demand of this chair is not of that magnitude. The main direction of travel of BBSRC is highly compatible with the academic strategic plan of the college I work in. It has a very high focus on interdisciplinarity, research and inclusivity, which would be the main strategic goals of the college. They are highly complementary to what I see as the strategic directions of BBSRC. Rather than saying that it is one or the other, I think that they are quite complementary, and there could be good synergies.

Q12 Dan Byles: It strikes me that BBSRC has a very strong track record, looking backwards, so you are inheriting an organisation that is in pretty good shape. Looking forward, what do you see as the main scientific and political challenges? We are in a challenging environment for many organisations these days.

Professor Duff: I have mentioned the word quite a lot; there are several things, but the first is interdisciplinarity. Some large problems can be solved only with an interdisciplinary, a multidisciplinary or a transdisciplinary approach, but, first and foremost, you need strength in the disciplines; if you do not have that, they cannot support interdisciplinarity. You have to be excellent at the core—the basic, fundamental disciplines that the BBSRC funds—but also strong at the periphery, at the interface with

other areas, looking for the important questions that can be answered only in that way. That is one of the development routes that I would like to see in the future.

Support for the bio-economy is key. We need to have the maximum impact there and to have the societal benefits, sooner rather than later. There is not the luxury of waiting to see what happens—we have to make the future happen in a way that is inhabitable for everyone. I regard the BBSRC as an investor in science. Any good investor needs to watch how their portfolio is performing and be prepared to rebalance it as events change, so I would look for increased agility in that sense as well.

Of course, we are talking about taxpayers' money, so we must continue to improve our internal efficiency, which is pretty good at the moment. Only 3.7% of the BBSRC's budget is spent on admin, which is, you will understand, quite good for a large organisation.

Dan Byles: It's amazing, yes.

Professor Duff: But I feel that there may still be savings to be made. I would want to take a view right across microbial, plant, animal and human science, all the way through to large industrial biotechnology and to bio-energy, to look for ways of supporting the UK national economy.

Q13 Dan Byles: Do you see any potential conflict between the need to commercialise the science, to which you referred, cementing it in the real world, and the need for blue-sky science thinking? Do you see that creating any sort of tension?

Professor Duff: There is a tension, and historically it has been detrimental. Things are improving. When I was an undergraduate, either people were academics or they went into industry. I do not think that is quite the case now, but I would like to see even less of a distinction. Science is science. Applying science is a part of that continuum. In the field of medicine I have been in, a lot of the huge advances came in the 1980s and '90s, through biotechnology companies. That immediately let everyone know that scientists in those companies were at the top of the field; they were at the leading edge, and that did a lot to rebalance the fairly odd cultural thing that academics are pure and the others are not.

Q14 Dan Byles: Absolutely. The most recent strategic plan is "The age of bioscience". From what you have read of it and your understanding of it, are you satisfied that it is up to dealing with the challenges going forward?

Professor Duff: I think it is, but, as I said, frequent review, agility and responsiveness at a strategic level will increasingly be needed as the rate of change increases. The council's vision for leading the United Kingdom's bioscience is leading it towards the promotion of innovation, with the realisation of benefits for society very much in the picture—right there in the main statement. We need to maintain our traditional excellence in creating the skills and research needed in these areas.

I know that three grand challenge themes have been taken up. Agriculture and food security are key; with global warming and a rising population, they cannot not be important. There is also large industrial biotechnology and bio-energy. We need to move away from fossil fuels and to find the best ways of doing that. We need to consider bio-energy sources that would not compete with arable land and food production. We may need to be cleverer at finding ways of using the by-products of food production as energy sources.

Then there are biosciences for health. Fortunately, all of us are living longer, but the penalty for that is that most of us will acquire long-term conditions. We are all aware that our national health service is quite stretched. It is going to be very difficult to solve the health problems of the nation; it is much better to take a long-term view to prevent health problems in the first place, and biotechnology and biological sciences can give us insights there. There are parts of Sheffield where, between postcodes, there is a very significant difference in the longevity of men and women, especially men. What is it about the environment that writes on your DNA? These areas are beginning to be tractable. Taking a technological approach, we can begin to understand why that happens. Those sorts of questions are key—stopping people getting ill and giving them a better quality of life, as well as a better length of life. I adhere to them as important and would argue with anyone on that.

We must enable innovations through finding new ways of working and doing things. Everyone in this room will be aware that one of the big opportunities, which is also a very difficult challenge, is the quantity of data that we can now generate. Right across the science field, we can generate huge quantities of data, far more than the human brain can ever analyse, understand or, certainly, visualise. This is happening in biology at a rate. I speak to bioinformaticians who give me a very good feeling that new people are coming into these areas and being trained appropriately, so we ought to have the skill base to deal with them. In some of my previous roles, I came across a lack of adequately trained number scientists as a real impediment to progress. I think that is changing. Within BBSRC, we should take a very active part in making sure that it does change.

Q15 Dan Byles: Is it part of the big data agenda, in a sense?

Professor Duff: Big data, and visualising the data. You cannot understand huge quantities of data; you have to have a way of showing somebody what they look like. There are real challenges there—in biology, too.

Q16 Dan Byles: Absolutely. In terms of your personal experience, what will be most useful to you in contributing to the forward look of BBSRC's strategy?

Professor Duff: Having engaged in research for a very long time. I broke my medical training to do a PhD. It was not a clinical PhD; it was very much a biological PhD. I went on to work in fairly fundamental sciences, in the world of immunology and molecular

immunology, and then took up a role in Sheffield, which was one of the earliest chairs of molecular medicine. Once you start thinking in terms of molecular genetics, DNA and other macromolecules, the knowledge that you gain is fairly transferable to other fields of biology. It is not totally so, but it is not too difficult a transition to make. I think that my fairly broad scientific understanding is an advantage.

Having been a research dean in a big Russell group university was helpful, too, because I learned how you balance competing interests and competing claims for the best investment. After that, I have had a career where I have been fortunate enough to chair groups that were absolutely full of the best in the nation. I have learned from each one of them how you get to a consensus. It is very difficult to go forward without a consensus, and there are ways of doing it. I think that I have learned some of the skills. I looked very carefully through the person specification in the official advertisement, and I thought that I could probably argue a positive case on each of the criteria.

Q17 Stephen Metcalfe: Earlier, you talked about stakeholders and communicating with them. One of the key stakeholders is Government. Can you tell us what experience you have of interacting with Government at a senior level, and perhaps give an example or two?

Professor Duff: I have had statutory appointments for quite a long time—about 20 years—starting with work on the Commission on Human Medicines, which was called the Committee on Safety of Medicines in those days. I became the chairman of its biological sub-committee, at a time when biological medicines were first coming on to the market and no one really had any knowledge of how safe they would be in the immediate and the long term. In those days, I would report, through the chair of the CHM, to the Secretary of State. When I became the chair myself, I would report to the Secretary of State.

I then became the chairman of the NIBSC—the National Institute for Biological Standards and Control—at South Mimms. It is a remarkable place—a jewel in the crown of British science. Not many people know about it, but I will tell you. It supplies over 95% of the world's requirements in biological standards needed for vaccine development and the development of biological medicines.

In all those cases, I reported to Ministers of State or to the Secretary of State. I then chaired, at the request of the Secretary of State, the investigation into what had gone wrong with the monoclonal antibody clinical trial in London, where there was a very near tragedy, and there was quite a lot of interaction with Government then. I could go on.

Q18 Stephen Metcalfe: Your credentials show that you are experienced. Thank you for that. One of the key interactions that the BBSRC is likely to have in the coming months is with the next spending review. What do you imagine your involvement with those negotiations would be?

Professor Duff: I will start from the position that biology and biotechnology are poised to underpin an economic transformation in the UK, and investment in them is essential if we

as a country are to remain at the forefront of this revolution—it really is a revolution. Some of the key areas that we must continue to fund are agri-technology, synthetic biology, industrial biotech and bio-energy.

The BBSRC—I have asked about this—keeps its approach to planning for the spending review as an ongoing mechanism. It uses stakeholder engagement and takes a lot of feedback in order to build the case. I would build the case for maintenance of science funding in this area and for autonomy of the BBSRC, arising from the triennial review that reported in April 2014, when all seven research councils were found to be fit for purpose. BBSRC can maintain the strong disciplines that we will need to get the highly productive interdisciplinarity. I would make a strong case for independence and for the maintenance of funding. I would take a forward position there.

Q19 Stephen Metcalfe: You would expect to be actively involved in those negotiations, using your experience.

Professor Duff: Yes.

Q20 Stephen Metcalfe: There is recognition across Government that we want to maintain our spending. We have seen some increases in capital spending. How will we make sure that we see an increase in the resource allocation—the day-to-day spending? How are you going to fight for that?

Professor Duff: First, I would make sure that the balance in the way we are using the resource is appropriate—appropriate for now, with things changing rapidly. I would generate the arguments that we cannot take forward a bio-economic revolution without the skill base and the research base that the resource funds. Those are very tied in together.

Q21 Stephen Metcalfe: Is the BBSRC poised and ready to make that argument, possibly within a matter of only a few weeks, depending on the outcome of the election? There is bound to be a period of flux.

Professor Duff: I do not want to speak for the BBSRC—I am just a candidate—but I believe that the arguments are well developed and well-rehearsed, and they could be made in a short period of time.

Q22 Stephen Metcalfe: And because of the timing of all this, you would be well placed to involve yourself in that discussion, even though it may be only shortly after you are appointed.

Professor Duff: I would hope so.

Q23 Mr Heath: The relationship with Government is extremely important, but one would hope that Ministers are at least partially informed interlocutors. A lot of BBSRC research takes place within a legislative framework framed by Parliament, rather than Government, given that a lot of these are ethical issues where the party managers have been loath to impose. It would be difficult to underestimate the ignorance of some people in the House on matters of this type. To what extent would you see your role as informing Members of Parliament—of both Houses—as to the implications, benefits and potential disbenefits of the work that you are undertaking?

Professor Duff: I would see it within the spectrum for all of the stakeholders—what our long-term aims are, why we have those long-terms aims and what we believe they will deliver to the country. I would understand that the communication of complex subjects is not to be taken lightly. It can be very difficult to explain highly technical things even to an informed audience, and all but impossible to a mixed audience. Our messages and the way we communicate would need to be tailored specifically to the audience, assuming no large degree of prior understanding of the problems. Scientists are not very good at this, because what seems second nature to a research scientist is probably very hard for someone else to get their head around, if I may use that kind of analogy.

There is a lot of work to be done, not just with parliamentarians and Government but with the general public across the board. We need to get good at giving simple messages, and putting them in the right way. If we go back to GM crops, I think that the messages were poorly put out and we had a reverse, from which we are still suffering, because of public anxiety. At the time, not enough explanation was put forward about how this is a way of feeding the world and improving the production of nutritious food for people. It is very easy to hijack the whole thing as some sort of unnatural genetic practice. We must think about what we are aiming to do, how we are aiming to do it and how you explain. You explain by starting with what the end purpose is. You can then say by what mechanisms you hope to get there. Earlier you asked me about public apprehension about science. It is easy for scientists to disregard that, but it is very real and very important. A lot of the anxiety is both genuine and scientifically correct. There are things we cannot know the answers to. Therefore, you have to take an approach that is somewhat precautionary.

Q24 Chair: I was thinking back historically to the time when GM foods first became a *Daily Mail* headline. Just now you were critical of how things were put across. Do you think that under your leadership the BBSRC would approach things differently today, either because of the power of hindsight or because you would take a different approach from some of your predecessors?

Professor Duff: I would not underestimate the power of hindsight and learning lessons. It is quite important. At the time, I went to lots of public meetings where there was a clear distinction between the use of genetic modification for health purposes and the use of genetic modification for food purposes. The first was very acceptable and the second was not. Maybe nowadays it is better to think of synthetic biology as a continuum that can do

lots of things for everyone, while understanding the anxiety that it may all be hijacked by a small group of people, that it may not be containable and that it may in fact increase economic injustices and the difference between the rich and the poor. All those things ought to be part of the initial thinking about how you get a message across in this area. It is not straightforward. I certainly would not want to give the impression that I have all the answers.

Q25 Dan Byles: The findings of the triennial review were published in April 2014. How do you see its conclusions impacting on the work of BBSRC?

Professor Duff: First, the council was found fit for purpose. There is a general feeling that interdisciplinarity is not being well recognised, well husbanded and perhaps not even well funded. I have already mentioned that that is an area I would be keen to examine. Coming up, we have Sir Paul Nurse's review. There are 11 questions that are relevant to the research councils. They are all very good questions and they all need to be answered satisfactorily. I believe that the ethos is not to let things get too far away from us. It is important all the time to be on top of the strategy, where it is going and what the aim is—what we want to produce and what success will look like.

Q26 Dan Byles: Do you have any concerns about the Nurse review coming so soon after the triennial review?

Professor Duff: Not concerns—I welcome the Nurse review. I think that the BBSRC would welcome the opportunity to get its messages across to the audience of Sir Paul Nurse's review, so I do not have concerns about that happening. At a logistical or operational level, I am sure that BBSRC would certainly want to contribute. I suppose the question is whether the next triennial review should be slightly more light touch, given that we have had the one that reported in April last year and we will have Sir Paul Nurse's findings in the summer of this year. There may well be some strategic things to be done in light of those findings.

Q27 Dan Byles: Do you think that there is a danger that you could end up being distracted from your core business by review fatigue—or rather, that one must ensure that does not happen?

Professor Duff: The onus is to ensure that it does not happen, but to welcome the review and to co-operate fully and enthusiastically with it. We are in a time that is quite extraordinary, given the rate of advance of science—not just strictly biological science, but other sciences that can get together with biology and make transformative changes to society. It has been said many times that biology will be in the 21st century what physics and electronics were in the 20th. I believe that avidly.

Q28 Dan Byles: Do you have in your mind an ideal outcome from the Nurse review, looking at the questions that it is asking?

Professor Duff: Ideally, I would like the research councils to retain their independence. There may be areas of back-office function that could usefully be united, but not the accounting officer role. I would justify that by saying that you need that independence to ensure the strengths of the disciplines, before you can take an interdisciplinary approach to things. That I would welcome. I would also welcome the beginning of a discussion about how we identify the best ways of using the different tools that we have available to solve some of the huge problems that have been identified.

Q29 Dan Byles: The 3.7% figure that you gave in answer to my earlier question is quite interesting. In some ways, that is a challenge, because it means that there is not a great deal of slack in your administrative area. Should you be called upon to make significant savings going forward, there is a danger that they might have to start coming out of the science, rather than the admin. You are already quite lean, aren't you?

Professor Duff: It is a lean outfit. I said before that I will be very committed to making a persuasive case that we cannot afford to reduce science funding generally and—in this specific case—biotechnology and biological science funding. I understand that science is the art of the probable and research is the art of the soluble, but politics is the art of the possible. It is quite difficult to align those three, but I am not unfamiliar with the need to make a very strong case for what you believe in, while at the same time understanding that policy is policy.

Chair: Sir Gordon, thank you very much for your time this afternoon. It has been very helpful.