



HOUSE OF LORDS

Science and Technology Committee

Corrected oral evidence: Government Chief Scientific Adviser (one-off session)

Tuesday 13 February 2024

10.15 am

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Members present: Baroness Brown of Cambridge (The Chair); Lord Drayson; Lord Lucas; Baroness Neuberger; Baroness Neville-Jones; Baroness Northover; Lord Rees of Ludlow; Lord Wei; Baroness Willis of Summertown; Baroness Young of Old Scone.

Former members also present: Lord Holmes of Richmond; Lord Winston.

Evidence Session No. 1

Heard in Public

Questions 1 - 14

Witness

I: Professor Dame Angela McLean, Government Chief Scientific Adviser.

USE OF THE TRANSCRIPT

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

Examination of witness

Professor Dame Angela McLean.

Q1 **The Chair:** It is my great pleasure to welcome Professor Angela McLean, the Government Chief Scientific Adviser, to our one-off evidence session today. Angela, you are very welcome. As you will know, this committee is a big fan of the Chief Scientific Advisers' network, so we are very much looking forward to hearing from you about how your role is going.

You have been Chief Scientific Adviser for 10 months and this is the first time we have had the pleasure of having you before the committee. It would be really interesting to hear from you how you feel things are going and what your priorities are for the role.

Professor Dame Angela McLean: Thank you very much for that kind welcome. Things are going well. It did feel like a whirlwind start. I inherited a whole set of regulation reviews, which turned out very well but were sometimes quite fiery in their creation. That was very exciting when I started. For many of us, of course, the autumn was dominated by the Covid inquiry. I have really enjoyed both of those being done with for now, from my point of view, since January.

First, I am very clear on what the job of the GCSA is: to make sure that the Prime Minister and the Cabinet have high-quality science evidence to inform the decisions that they have to make. Even in the months that I have been there, I can think of examples. I would like to share three examples of things where we feel we have made a difference.

The first of those is our input to the whole Horizon debate. It was not only us, by a long way. Almost everybody in the community was clear in their advice to the Prime Minister and other Ministers that associating with Horizon is the right thing to do for British science. We are all extremely pleased that that is how we have ended up. That is the first thing.

Secondly, we—again, along with lots of other people—did a lot of work through last year to make sure that the AI Safety Summit, which took place in November, had excellent science content. I think it did. All of us should pay tribute to the enormous amount of work that was done by DSIT and the FCDO to make sure that the summit was a success in many dimensions. As I say, our role was to make sure that there was great scientific content for it, and there was. We had proper science conversations during that international summit.

The third example I want to give comes from the Council for Science and Technology. This was a report that I happily inherited from Patrick, which delivered when I was new, about how we should use R&D in our creative industries and should not forget what a large and successful part of our economy they are. The Council for Science and Technology is a committee co-chaired by me and Lord Browne. We delivered that advice, which basically said, "Make sure there is enough R&D going on in the creative industries because this is a big part of our economy and there is massive potential to take science, technology and engineering and transform it, through the magic of the imagination of the creative industries, into fantastic products and services that can be sold and can enrich our lives in all kinds of ways". That was taken up through an announcement in the Autumn Statement that there would be a review of that kind of R&D spending.

Moving on to my priorities, I will be quite brief. There are really just four of them. Obviously, each of them is quite a big lump. The first is to make sure that we play our role internationally in what I think of as the massive science questions of our day. Of course, the biggest one is climate change. Among those, a lot of our time this year has been spent on AI; it probably always will be. I hope that we will eventually move to a situation where we are advising various well-established bodies within and across government to help us all make really good use of AI in a safe way.

My hope for the coming year is that it is going to be the year of engineering biology. Lots of us think of this as the biological century. We are nearly a quarter of the way through it. We need to crack on with using our ability to shape biological systems to what we want with what I would call an engineering mindset. That is number one.

The second one is what we call science for strategic advantage. That is really GO-Science's support to DSIT in delivering the science and technology framework; I am pretty sure that you as a committee are familiar with the science and technology framework. One of the really brilliant things that Patrick did was to persuade pretty much everybody in government that they should write the science and technology framework.

There is a lot of support for it right across government but we have to be clear that it is a massive piece of work. It is a seven-year, cross-government, long-term commitment. DSIT's job is to deliver it. We feel very strongly that our job is to make sure that we help it with that in every way we can.

The third thing on my list is a more scientific Civil Service. We may well come on to talk more about this. Right across the Civil Service, we have lots of great schemes to bring scientists in to help with our work, but we need more.

The fourth thing on my list is S&T for resilience. This is about being ready for the next emergency or disaster. My prop to remind me of that one is this horrible cigarette packet. Look at it; it is a hideous object. I bring it with me to remind me of the back-of-a-fag-packet calculations that we had to do in late February and early March 2020. Those were the days when we knew how many people had died of Covid two or three days before, but we had no idea how many people in the country were infected.

We basically had to do a backwards calculation that said, "If the people who died today were infected something like three weeks ago, the doubling time is something like this and the case fatality rate is something like that, we can work out how many thousands and thousands of people out there are infected, but we do not know where they are". I never ever want to be in that situation again. Progress is being made on how we gather data for such situations.

Those are my four priorities. I feel confident that I am well supported in GO-Science to do our work—it is advisory work, remember—going out across government and helping to make sure that those things get delivered.

The Chair: I hope that the committee will indulge me because I want to follow up quickly on one of those. You will know that I chair the Adaptation Sub-Committee of the Climate Change Committee. You mentioned how important it is to ensure that the advice from organisations such as the Climate Change Committee is heard by Ministers and that you want to work with bodies such as the CCC to make sure that that happens. How do you envisage doing that?

Professor Dame Angela McLean: The way for us to do that is this: first, when they ask us to step in and lend our voice, we must do so as much as we can. I am a civil servant and there are things I can and cannot say.

Secondly, particularly for adaptation, I co-chair with the CSA from Defra something called CARIB, which is specifically about helping different government departments across Whitehall to do the work to deliver their commitments for adaptation. We do not have the commitment for net zero by 2050 that the mitigation side of the House does. There is a bit of work for us to do in whipping up a serious sense of urgency.

This is more there in terms of my own work. There is a convening role for the CSA to say, "Look, guys, we do actually have to get on with this. Here are the things that we can do to help you with that", but, at the end of the day, it is the departments that have to do that.

The Chair: Thank you. I must not take up any more of your time. I will hand over to Lord Drayson.

Q2 Lord Drayson: One major change in science policy has been the creation of the Department for Science, Innovation and Technology. The committee's report on being a science superpower recommended making the Science Minister a Cabinet-level position. Clearly, that has happened, but there is a risk that having one department—particularly a relatively small department compared to the Treasury—could keep science in a silo and make it more challenging for science to fight for budget than when it was part of a larger and more powerful department. We hear a lot about how difficult interdepartmental co-ordination on science is. How do you think it is going? How do you see the power of the science voice now compared to what it was?

Professor Dame Angela McLean: I have not brought it—it is not my bit of paper to bring—but there exists a thing called the R&D stack. "Stack" is a fancy word for "table". It is a table for R&D expenditure by year and by department, broken down within departments.

That piece of information was gathered because the Secretary of State for DSIT basically sent out the word that she was going to gather it; therefore, the other Secretaries of State went back to the departments and handed that information over. There was more information in that table about the MoD than I ever saw when I was the CSA for MoD.

That is evidence that this is working. I really take my hat off to DSIT for getting things like that done. It was its first birthday last week. It published an update to the S&T framework about everything that it has achieved. It is an impressive list.

The risk you identify is real and will always be with us. It is really important. Currently, the direction of travel is going the other way. There are more departments that really see themselves as science departments. One of the many jobs of the CSA is to make sure that their department thinks of itself as a science department.

To name-check one spectacular success, I highlight the Department for Transport. Clearly, the Department for Transport deals with deeply scientific issues. It has a fantastic CSA and some

other terrific leadership. We went there in the autumn. It was absolutely clear that we did not have to push it in all its discussions to say, "What is the science angle here? How can we use science to do a better job of delivering this piece of work?"

Please do not think that I think everything is absolutely rosy. This will always be a tension. So far, after a year, DSIT has proved that it was the right thing to do.

Lord Drayson: Can you comment on the role of the National Science and Technology Council in the context of the new science department? It is very hard for this committee to get any information on what it does, when it meets, et cetera. Can you clarify whether it still exists and whether it is still important? How does it fit in now that we have a Science Minister in the Cabinet?

Professor Dame Angela McLean: Yes, it does still exist. I believe that it is still important. We need two things from it. First, every time we have some big trade-off decision that has to be made across departments, the NSTC should be the place where that is made. We very much felt the absence of such a locus for discussion during the great Huawei debates. You can imagine that there will be many such debates where trade-offs, particularly between national security and prosperity, will arrive. That is the most obvious place where we will really need the decision-making powers.

We will also need them, of course, in spending. If you look at all the spending decisions that have been made about supporting the five critical technologies, those have come through the NSTC. In some sense, the NSTC is also a power of its own because, by announcing that something's going to get discussed at the NSTC, you can drive homework tasks across government. Yes, it still exists and, yes, it is still important.

Lord Drayson: In that case, would you welcome greater transparency and could you help champion that?

Professor Dame Angela McLean: I am happy to try to champion it. I will be sweeping water uphill there because there is a long-standing convention that Cabinet committees do not talk about the dates or content of their meetings. Before I ever went, I was sat down and told all these things very firmly. I am happy to say that we should be more open, yes.

Q3 **Baroness Young of Old Scone:** Just to touch briefly on that question before I move on, how often does it meet?

Professor Dame Angela McLean: Again, I am not supposed to say. I can tell you that it has met three times since I have been in post.

Baroness Young of Old Scone: Of course, the big thing that we have had is the science and technology framework. It would be good to hear from you how you feel the implementation is going and whether departments have completed delivery plans. Do they have any interim deadlines and numbers in them that we could use to judge whether we are moving towards being a science superpower?

Professor Dame Angela McLean: First, let us remember that this was a seven-year plan when it was published in 2023. It is too early to ask, "Are we nearly there yet?"

However, there are plans. There is the S&T framework as published in February or March 2023; that is the nice, short 19-pager that is a completely terrific document. How far have we got with that? For a start, if you remember, task one was to identify critical technologies. Those were identified. We have five critical technologies. Each one of them has an SRO. Those people are all in DSIT. They also have, helping them, a board that is mostly deputy CSAs.

Deputy CSAs are really important people. They tend to be directors. They are what I would call real civil servants. For example, when I was in MoD, my deputy was a total lifer. He knew MoD science and technology like the back of his hand because that had been his working life.

There are the SROs in DSIT and lots of support across government departments for them. For four out of the five critical technologies, there is an announced spending plan. For example, there is £2.5 billion over two years for quantum. Really great progress has been made on many of the 10 big things in the S&T framework.

It has been easier for some than others. The Treasury is responsible for making sure that there is more funding for S&T companies. That is a Treasury responsibility and it has made a lot of progress on that this year. Hats off to it for doing that. As we all know, it is much easier to do something if you can do it inside your bit of government.

For the things that are cross-Whitehall, as I say, the work on the critical technologies is going really well. In GO-Science, we are right in the middle of convening a series of discussions with the

CSAs and the relevant bits of DSIT about, fundamentally, who is doing what in each of the critical technologies.

Imagine a short seminar where we get a bunch of people together and say, "What are your interests in engineering biology?" Defence turns up and says, "Fundamentally, you can split it into two. It is about either making some truly incredible material that is otherwise not available or producing something that we need tons of, such as fuel, much more cheaply and in a much less damaging way". MoD says that. Defra says, "For us, having a properly circular economy is the major issue".

We are making a real advance in what I would call the convening part of the work of DSIT and GO-Science. Let us remember that our fantasy is for DSIT to become the Cabinet Office for science. How do we help it do that? My view is that DSIT's superpower is to be the convener. I will do everything I can to help it with that; that is going well.

We published an update to the S&T framework on Friday, which has lots of examples of things that are going well. There are metrics and dashboards. DSIT does the implementation of the S&T framework. I would ask it how its metrics and dashboards are going to get the exact chapter and verse on everything.

There is an interesting question, which will come up in a minute, about how to keep track of how you are getting on in a seven-year plan. The dashboard is clearly going to have to be updated as we go along, is it not?

Baroness Young of Old Scone: I am hearing that quite a lot of the oomph in this is in DSIT and that the deputy CSAs are important, but is there enough commitment at the heart of other government departments rather than just in the science capability of other government departments?

Professor Dame Angela McLean: On CSAs, my goodness, yes—completely. On Sunday night, on the CSAs' chatty function—let us not name any products—the chat was, "Guess what the decorations on these fairy cakes are?" It was the five critical technologies. We live and breathe this stuff.

The CSAs are important people in their departments. They know that. We spend quite a lot of time together talking about how to make sure that CSAs are present and have a voice at the decision-making points in their department that are really important from the point of view of science; in our heads, that is about the delivery of the S&T framework.

The real strength of the S&T framework is that, when CSAs talk together about delivering science, it is not some vague thing. We are not saying, "Let's all be a bit more science-y". It is, "How do we deliver the 10 strands of the S&T framework that we worked out together that we need to do if we are going to be a science superpower?"

The answer is, yes, I think so. This is mainly coming through the CSAs at the moment. Part of the job for this coming year will be to make sure that we go back around all the departments and remind them of the S&T framework. That is something I will do jointly with the National Technology Adviser, Dave Smith, whose role is completely inside DSIT. We are in DSIT but we are a bit separate because we try to keep some independence. Dave is very firmly right in DSIT. He is there all day, every day, in a way that is working very well.

Q4 Lord Rees of Ludlow: You have not said much about how UKRI fits into this. That has its councils and its overall board. They have to be aligned with these priorities. I wonder how you argue for that.

Professor Dame Angela McLean: My feeling is that the chief executive of UKRI is very aligned with the S&T framework. She and I speak about it frequently. You have probably heard her stump speech about the S&T framework; many of us have. I am not worried about that at all.

DSIT, UKRI, GO-Science and the CSAs are all completely up to speed on and behind the S&T framework. More broadly, we have to make sure that the Permanent Secretaries know all about it. I am not so sure about our partners in industry. We have not done a good enough job of taking ourselves around the sector bodies to talk about the framework and our partners overseas.

I have no worries about UKRI. It is firmly on board. Ottoline would never claim to have written anything but I expect you could find a lot of people in UKRI who would tell you that, actually, they wrote the S&T framework—as did we all.

Q5 Baroness Northover: One of the major areas that you flagged was AI. This question is about that and the expectation that government will want to use AI far more, especially with the public finances being squeezed, because of the claims that it can save money as well as solve problems.

We know that there can be lots of problems with that. A major challenge that we are now seeing is with the Post Office's Horizon system—a different Horizon—where there were all sorts of

problems because of too much trust in computers. In the light of this being a high priority—clearly, it must be—what regulations and safeguards are you looking at before AI is comprehensively used in government? Do you see the need for a watchdog here?

In terms of assessing how AI is used, there will be a challenge in terms of the skills that are required within government. Those skills are in wide demand right across the economy. How are the Government going to be able to recruit people with the right expertise on the salaries that they can put forward? How would that potential challenge in staffing be overcome? You can start by answering the general question about the role of AI.

Professor Dame Angela McLean: It is important that we learn both at speed and wisely—that is the challenge; we have to do it fast and we have to do it well—to use AI in our everyday work as civil servants and more widely right across the public sector. It is not just a Civil Service issue.

There are various ways to do that. One is to get on with it and share experience of how to do that well. I have a meeting—I cannot remember whether it is later this week or next week—with a former academic colleague of mine who is driving this in UKHSA. Basically, we are going to do a work in progress and ask, “What have you done? What works? Has anything ever made you feel a bit queasy because you ended up having shown something to a chatbot that you suddenly thought afterwards you should not have?” Practically and sensibly, we are going to crack on, like many of us do in our private lives. That is one thing.

There is an engine for AI adoption in Downing Street. I do not know whether you know 10DS. There is a really good set of people there working on questions about how to safely adopt the most modern kinds of AI, such as generative AI. You will have seen in the papers the stuff about the red box chatbot. Instead of going home and trying not to fall asleep while you read your red box, you sit and chat with this chatbot. Presumably, it still takes a long time.

It is a really fascinating project that is under pilot in various ministries, although it is not under pilot with me. I was just thinking that, when I go home, I am going to ring up and say, “I ought to be in one of your pilot things”, because I could sit on the sofa and chat with my red box. That sounds great. I do not have a red box, of course, but I do have a box. Every department that you speak to would say, “Yes, we are trying to use very modern AI with our paperwork”.

If the National Statistician were here, he would say—I will now parrot him—“Don’t forget that all of us have great advances we

could make with very straightforward data analytics". Ian would use the phrase "reproducible pipelines". We all know the problem with data analytics. If you come back three weeks later, you can reproduce the same set of data. If two different people address the same question, there is some chance that they might get the same answer. It is that sort of thing. It does not sound like AI but it is about the proper use of data to make sure that we run the business of government wisely and efficiently. There is lots to do.

Baroness Northover: Do you link in closely with that unit in the Cabinet Office?

Professor Dame Angela McLean: Yes, I would claim that—closely enough that I feel I could ring it up this afternoon and say, "Hold on a minute. Why am I not in one of your pilots?" As with many things, we worked closely together during Covid. Those relationships endure and are very constructive.

In terms of skills, we can sometimes make the case that we have to pay something close to market rate. The AI Safety Institute has much wider freedoms on pay because we know that there is an unbelievably tiny pool of people to draw from. That is one way to do it.

A much more widespread way to do it will be training our own people to use AI products. You do not need a PhD in statistics or computer science to be a wise and creative user of AI products. There are various kinds of training. First, we can train the people who are already in post. We have quite a lot of apprenticeship opportunities and we make good use of internships; we get people from industry and academia to spend six months in government to see what it is like in government, share some of their skills with us, explain to us where we are doing it all wrong and, in particular, help us to see forward to have some sense of what is coming next.

Baroness Northover: What is required in terms of the safeguards and the potential watchdog?

Professor Dame Angela McLean: What do we have? I am trying to find the name. We have a set of guidelines. It is a whopping great thing here: *Generative AI Framework for HMG*. It came out quite recently. It is a set of instructions to all of us about how to be sensible and careful in how we use generative AI, particularly with government papers.

It is sort of what you would expect: do not use secret papers as input to public models—that sort of thing. Rule number one will be, "You are responsible for what comes out of this use of generative

AI, so you'd better check that it is right". That is very interesting. We were using it the other day to generate minutes for a meeting. It claimed that stakeholders had made some point, as though all the stakeholders had risen up and made a point, but one person who always makes the same flipping point had made that point. We all recognise this scenario. We had a bit of a giggle about this. We thought, "When we make that joke about that person always making that point, that is from the years of experience we have of working together". We know who has which bee in their bonnet. At the moment, Copilot certainly does not have that.

It is not just the issue of, "Is it hallucinating?" There are also issues of emphasis. You know as well as I do that the writing of minutes and the reporting of discussions in a committee is quite a subtle business. You are not going to get that from one of these at the moment, but you might get a reasonable first draft. That is where we are at. Do we think the first draft is useful?

Baroness Northover: To come back to the watchdog question, how do we protect those who might find that, using a particular model, the computer says no when it should have said yes?

Professor Dame Angela McLean: You raise a very important issue. Issues about bias and the right to an explanation are ubiquitous, particularly across AI, and have been for years and years. It is not special to generative AI. That is not something where I have sat down and thought to myself, "Yes, we really need a watchdog", but I would welcome further discussion about that. It is an interesting idea, particularly on this issue of a right to an explanation.

Q6 **Baroness Young of Old Scone:** I have one very last quick point on AI regulation. The Government have said that they are not going to set up the framework for regulating the use of AI in the country, not just within government, because it is too early to say and they want to see what emerges. Is that a bit risky?

Professor Dame Angela McLean: I think it is the right decision at the minute. The domain-specific expertise of our regulators lies in the domain-specific regulatory bodies, so at the moment the plan is to keep the regulation there and to regulate the application. I would side with them and say that that is the right way to go for now, but I would also side with you and say that it needs to be watched carefully.

Q7 **Baroness Neuberger:** You have already dealt to some extent with paying more for people who are AI experts, and indeed with skilling up people who are not necessarily experts in AI. Can we go to

science more generally? Both you and your predecessor have advocated having more scientists and scientific capability within the Civil Service. Could you give us some sort of update on that? In particular, are there targets for scientists in the fast stream, and what are they?

Professor Dame Angela McLean: Yes. The Cabinet Office, which runs the fast stream, has a target of 50% of fast-streamers to be scientists. I am particularly interested in what is called SEFS, the science and engineering fast stream, which is one part of it. I think of them as mine, so to speak. They are all scientists. We had 113 SEFS participants in 2023 compared with 18 in 2015. SEFS is growing well.

We view them as a fantastic cohort of people. They are just wonderful. That is not the only way for scientists to come into government. Scientists come into government from lots of routes. GO-Science has its own scheme whereby people come for a year after graduation and can then move on to other roles in government, which most of them do. There are about 15 people a year in our own scheme. It is really nice. My section always has 15 to 20 new graduates in it. That makes me feel a bit at home. It is a bit like being back at university.

How are we getting on otherwise? What we really need—it is in discussion—is what I would call a mid-career fast stream. We need something for people who have worked as scientists. They could come from lots of places. They could come from our own government labs. Those people are deep in their science and have a bit more knowledge of the Civil Service than most academics would. They could also come from academia and, where we can, from business. We should have a way into the Civil Service for people who worked for 10 to 15 years as scientists.

The step at the moment for that is showing lots of people what it is like through six-month internships. Interestingly, my understanding is that the six-month internships we have for academics specifically prohibit people from staying.

Baroness Neuberger: Do you have any idea why that is?

Professor Dame Angela McLean: It is because they are afraid that it is all way too interesting.

Baroness Neuberger: That is ridiculous.

Professor Dame Angela McLean: It does not matter. I have talked to people about that and they say, “Is six months really going to be material?” I think not. There might have to be some

sort of six-month firewall. If they come in for six months and really like it, they have to go back to their academic job for six months before they can apply and compete for Civil Service roles.

The Civil Service is a funny old place. I love it, but getting a job in the Civil Service is not straightforward for an outsider. That is the next step. I am very interested in this. I cannot do it myself. I would never win a Civil Service competition, but I could find people who would help me. We need to find a set of people who will coach and give practice in how you win a job in a Civil Service competition. I do not know whether you have ever seen a Civil Service job application. It is very specific.

There is also a flipside to this. We probably need to earmark some roles in the Civil Service as, "This a job really has to be done by a scientist".

Baroness Neuberger: At the moment, that is not done.

Professor Dame Angela McLean: There are a few. It is done rather informally. Even for the ones where we all think, "This is clearly a scientist's job", there is no formal thing on there that says, "Yes, this is going to be a scientist". That would help. It would send a clear signal to more junior scientists throughout the Civil Service that this is a very respected and valued set of special skills that not everybody has.

Those are the two things that are in my mind at the moment. I view those as things that we could do in preparation for a mid-career fast stream. The last thing we want is a ton of people with science expertise applying for Civil Service jobs and not getting them.

Baroness Neuberger: That sends out the wrong message.

Professor Dame Angela McLean: It sends a terrible message.

Q8 **Baroness Neuberger:** What about pay? You said something about AI, but what about everybody else?

Professor Dame Angela McLean: I need to do some more work on this. I understand that, because of individual pay negotiations, we in the SCS will always struggle with industry. We get people from industry because there are people who will say, "I have enough money, thank you. I want to do a different thing that I'm really interested in doing". I cannot see how we can do anything other than rely on that. For academics, my understanding is that the grades just below SCS are reasonably competitive with academic salaries for fairly junior academics. I am thinking of

someone who has done a PhD and several years of post-doc. That is where we should aim.

I completely agree about pay. When I say that we should have a more scientific Civil Service, the number one thing that I would like to do is build a pay framework for scientists. The GSE profession is working on that with Treasury.

Baroness Neuberger: That would be great.

Professor Dame Angela McLean: I agree. It will be difficult, but we will go all out on that.

Q9 **Lord Winston:** Dame Angela, you noted this as the biological century. Certainly, one issue is genetic modification, which comes very strongly into this in all sorts of ways. I wonder whether the passage of the so-called precision breeding Bill, for example, which looked at the release of organisms, both animal and plants, into the environment, was dealt with in an adequately scientific way. I felt that some of the scientific advice given was pretty definite and with no doubt at all about the risks.

Given that this was Defra and therefore a major scientific department, I wonder whether you feel that that kind of advice could be improved or whether it was adequate and perhaps my impression is wrong.

Professor Dame Angela McLean: That is a very specific question, which I do not have a very specific answer to. Rather than sit here and flannel, I will say so. My sense was, "Hurrah, there's less of this foolishness about the dangers of GM". If you think that there are things that have been overstated there, I would be very interested to hear about them. I will go away and look at that.

Lord Winston: That would be great. The Minister had no scientific background at all. I admired the way he took it through. He was clearly listening to scientists who were very certain about the risks of mutation being negligible. I felt that that was a bit unwise.

Professor Dame Angela McLean: I hear you. I do not have a sensible answer. I will go away and ask.

The Chair: Thank you. We are always delighted, as you know, to receive any further input after one of these events. It would be great to have your input on that one.

Q10 **Lord Rees of Ludlow:** I would like to ask a bit more about how the community of departmental chief scientists gets together and co-operates where necessary. To take a particular example, this is

necessary in preparedness for extreme risks. We know that Covid was primarily medical, but it cascaded into supply chains, the education system and all the rest. Everyone agrees that we were underprepared for it. The Government responded positively to a special inquiry two years ago that highlighted the need for preparedness and even exercises to ensure that the chain of command was set up.

Could you say a word about how you see the role of the chief scientists in ensuring cross-departmental interaction in this preparatory work?

Professor Dame Angela McLean: I am very confident about the fact that the government chief scientific advisers know each other and even quite like each other. We are all strangers in a strange land. Some of us are career civil servants, but most of us are not career civil servants and we are trying to make a difference in the Civil Service. I think that binds us together. We meet every week. We still have a meeting every Wednesday. One of the topics that we discuss is preparedness and resilience.

Somewhere along the line—this was before I was GCSA—a rather good thing called situation centre was built inside the Cabinet Office. The CSAs take an interest in that and will continue to support that. The support that we could give would be to help them join up, “If this bad thing happened, what would the policy question be?” with, “What data or processed data would we therefore need to take to decision-makers?”

At the moment, the thinking goes, “When a disaster happens and the question gets asked, we’ll whip out the right dataset, which will answer the question”. Sometimes that is right. If it solves the question, that is brilliant. However, there is sometimes simply no raw dataset that answers the question. The answer to the question will sometimes require some science. The CSAs will be very helpful there. We are building a strong relationship with that part of the Cabinet Office.

Lord Rees of Ludlow: It needs to lead to planning who is in charge of what. To take one example, the dangerous-seeming dam in Derbyshire, it was not clear whether the chief constable could force people to evacuate or not. That is a very local example. One needs to have buy-in from the government departments to decide what the chain of command is between local versus central. That is just an example of how the chief scientists can be the catalyst for getting this addressed across departments.

Professor Dame Angela McLean: Yes. I view the Chief Scientific Advisers’ Network as my superpower, and I view asking the right

question as its superpower. One of the questions that has arisen with the Chief Scientific Advisers' Network is that we need total clarity on which decisions get made in central government and which decisions are made locally. If that is not completely clear to us, I suspect it might not be completely clear to other people.

We can help by saying, "Please come along and explain to us". We did an exercise fairly recently in which precisely that scenario arose. We pretended that we had been convened one afternoon and that a whole ton of things had happened locally all morning. Most of the CSAs are not resilience forum veterans. Most of us did not really have any idea what would have happened on that morning.

We are aiming to get somebody to come along and explain this. They are not called local resilience forums anymore. They have been renamed. What are they? How do they work? How do they get their science advice? They will have had local science advice. At what stage does central government, and hence us, get involved? What is the handover?

You identify a mystery that we have also come across. We are planning to get someone to come to a brown bag breakfast and explain this to us, so that the next time we exercise it we have all got it like that.

Lord Rees of Ludlow: There has to be a decision about who is in charge of what, and there have to be guidelines. To take another example, many people feel that the guidelines on reactions to radiation releases are overly stringent and will cause far more backlash. That is just one example where some local person might overreact. We have to have clear guidelines, which are approved by the scientists, to ensure that local people can do the right thing and neither underreact nor overreact.

Professor Dame Angela McLean: I agree. We all know and regret that quite often more people are hurt during evacuations than would have been hurt by whatever the actual hazard is. Evacuating people is not a free good. It comes with its own dangers.

- Q11 **Lord Wei:** One key goal of your predecessor, as set out now in the science and technology framework, was using government procurement to support innovation. The committee felt that this was potentially very powerful, but was concerned about how it could be implemented when there is an overriding concern about value for money and risk aversion in procurement, especially given all that has happened around Covid. How is this strand being

developed? Who is taking charge of this? Who is persuading departments that it is a good idea.

Professor Dame Angela McLean: Strand six belongs to the Cabinet Office. In terms of legislation, the important news is Royal Assent to the Procurement Act 2023. That aims to address many of the issues that you identify. How do you make a high-risk procurement decision in the knowledge that, if it does not work, you might get hauled up in front of some unfriendly committee and told to account for yourself?

I have quite an encouraging list of recent pieces of government procurement that I think we can say do support innovation and smaller companies. I will tell you some of them and then you will say to me, "That is a drop in the ocean", and we could have a discussion about it. These are the ones that I think of. First, there is the Moderna deal. In return for promising to buy an awful lot of vaccines against respiratory infections, Moderna is going to site some of its research and development here in the UK.

The second one is the national security strategic investment fund. I do not know whether you have field trips, but if you do it is just around the corner. I thoroughly recommend it. I know about it; I spent a week shadowing there.

The NSSIF is in the process of procuring something called Red 6. I happen to know about it because it made a pitch during my one-week secondment. Red 6 is basically a defence and security procurement arm that does augmented reality for pilot training. I had not understood that if you are trying to train a fighter pilot, you not only have to have the fighter pilot up there in an airplane but all the things he is pretending to fight. If you have an augmented reality headset, you do not need all the things he is pretending to fight because they just appear on his headset, and you can do a lot more training.

I am sure you are aware that there is a backlog in training RAF pilots. Not only can you do that training without having to pretend to be the baddies, but you can keep track of what happens and build yourself a dataset of that when you send a young fighter pilot to train how to run a dog fight. I do not know whether that is what you call them anymore. This is a really interesting piece of innovation. The NSSIF is helping to procure it for our RAF.

The third one that I wanted to talk about is a portfolio one about quantum companies, and a portfolio is clearly where we need to get to. This is about little quantum companies that can help to address public sector problems. I will not talk about all six, but I

will mention two of them. The first is Quantinuum, which is a London company that was one of the winners in the quantum catalyst fund. It works on actinide chemistry. The other, which most people have seen, looks like a bike helmet and uses quantum sensing to do brain imaging. Let me name-check the company. It is called Cerca Magnetics and it is based in Nottingham.

We have a growing list of people who are taking these risks with procurement. How do we scale it? I will ask that question before you do, because that troubles me too. We are at least getting to have something, so we can ask, "How do we scale it?"

Lord Wei: Do we need to mandate a minimum percentage to encourage that scaling up?

Professor Dame Angela McLean: The original S&T framework very clearly says that if there is going to be a minimum, it should be departmental. My understanding is that it is a topic of debate with the SRO for this strand. It is only fair for me to leave that there for now.

It is more about the culture. I do not know. I could have gone across defence and scraped up dozens of examples about which I could have said, "Yes, this is procurement to support innovation", because there is a lot of innovation. That would have done nothing to deal with the cultural issue. When I was in defence, I bought a quantum computer. I still slightly worry about whether I am going to get hauled up and told off for buying a quantum computer if it does not work terribly well.

I am in the very happy situation that I am not a lifetime civil servant. I can go off and do something else if they tell me that I did bad. There is always that issue at the back of your mind. My quantum computer was not a wise element in a great portfolio of things, which is what we would like people to do, but I reckon it was a good bet because I needed what were then my scientists to get used to using a quantum computer, with all its foibles.

Lord Wei: Is there anything we can do to encourage that risk-taking culture? I am thinking especially about cross-government working. I am always passionate about trying to get bi-directional charging in electric vehicles procured, but the number of departments that you have to go through, on top of just the buying, is a lot of work for a busy civil servant, is it not?

Professor Dame Angela McLean: Yes, definitely. There are cultural issues for us to confront. Let us use my quantum computer example. Suppose it never works. I am sure it will, but suppose it

is just no use at all. What questions should I be asked? I should not be asked, "Why did you buy a quantum computer that does not work?" I should be asked, "What were the trade-offs? When you bought this quantum computer, what did you want it to do? What did you do to try to figure out whether that was a reasonable way to spend a couple of million pounds? Did you make some sensible calculation or even think through what the payback would be if it did work?" We did that, by the way.

We are reasonably sure that this is a coming technology. We are reasonably sure that it will be very important for defence. We have a set of people already in role who we want to get used to that kind of technology. The question to ask people is not, "Did it work or not?", but "Was this a fair punt?" You had better have a documented explanation of why you thought it was a fair punt.

Q12 Baroness Willis of Summertown: I would like to ask a question about Horizon Europe. It is fantastic that we have rejoined it, and everyone is breathing a massive sigh of relief. Thank you for what you did on that. I sit on one of the advanced panels and have been seeing the grants coming through. Individual academics have still been putting in those research grants. We do not need to catch up on that part. The most alarming thing I have seen is how many people have been kicked off international collaborative grants. Their names have often been removed. I have even seen the wording, "Please don't include anyone from the UK, because we're not sure we're going to get funding".

How do we rebuild those international relationships? In Paul Nurse's review, he said that the Government should take action where broader policy objectives on immigration, ODA and education hinder wider objectives. For me, many of those things do not necessarily sit within GO-Science. Are you on top of that? How can you advise in those different departments?

Professor Dame Angela McLean: I do not know whether you know, but the relevant commissioner was here yesterday launching, with the Secretary of State for DSIT, the excellent news that we are back associated with Horizon. They are in Manchester today encouraging applications from here to there.

You are describing a piece of work with, I would have thought, our fellow academics. That is the way to go, certainly for scientists. We should encourage our European friends and former collaborators to let us back in again. We are confident that they did want us back in. We had so much support from the European academics during the negotiation that I do not view that as a problem. They clearly had cold feet, like lots of our scientists do, not because it was

obvious that something was going to go wrong but because it was not obvious that it would all go right.

I agree with you that there is a job of work to do with other Horizon members, particularly in the big collaborations. I do not currently have a plan to do that. That would sit naturally with DSIT. I would be very happy to contribute.

I am just trying to think what I would do if I were a French scientist who was part of some nice collaboration that was motoring along and then a Brit knocked on my door to say, "Can I come back in again?" I am thinking out loud here. The job is to brigade those people, to support them and perhaps just to give them a little shove. It is slightly unnerving to have to go back to your old friends and say, "Can I play with you?"

I agree with you, but I do not necessarily think that me going to Europe saying, "Please involve our scientists", is the right thing. With DSIT and UKRI maybe I should tell our scientists that we are worried that it might be a problem for them and ask them what we can do to help them to have those conversations. I would have this conversation research scientist to research scientist.

Q13 Lord Lucas: In the course of the digital markets Bill, which has just been going through the Lords, I have become aware that a very low proportion of standards-essential patents are now UK patents. Over the years, I keep being told that we are not sending top-quality delegations to standards-setting processes, which is leading to us becoming disregarded in the process of taking new developments forward. Is this something that we can do something about?

Professor Dame Angela McLean: You raise a profoundly important issue. We were talking about this in our telecoms-critical technology discussion. It is not just that we do not do it; it is that some other countries do it very assertively, shall we say.

We should talk to UKRI about making sure that that activity is firmly recognised in career progression for academics. We then need to access the companies that do this. I was told that, when there was one big telecoms company, it could put in the resource to have people doing this. Now that there is a diaspora of much smaller and more diverse companies, that is an enormous ask; you are asking one person in a company that might have half a dozen expert employees to spend time on this.

We should perhaps be doing something to support this, because we are losing that very important bit of scientific influence. I recognise the issue and I can see a clear way to address it for academics. It

is a more difficult problem in small companies. With the big companies, we could ring them up and ask, "Why are you not sending people anymore?" We could use the various ways of leaning that we have. The real problem is in the little companies, which is where so much of the absolutely cutting-edge expertise lies.

Q14 **Lord Holmes of Richmond:** Thank you for your time today. I was very interested in all your comments about AI. This is a bit of a hobby horse for me. What potential distributed ledger technology deployments are you looking at across government and beyond?

Professor Dame Angela McLean: I have no example to give you about distributed ledger technology that I am looking at. I am afraid I will have to take that one away, because I do not have one.

Lord Holmes of Richmond: That is no problem. I am very happy to hear from you in writing.

Professor Dame Angela McLean: Thank you.

The Chair: Thank you very much. That has been really interesting. We very much appreciate your time. As you know, a transcript of the session will be sent to you for minor corrections shortly afterwards. the session. You very kindly said that you would send us some further information in response to Lord Winston's question and, indeed, in response to Lord Holmes' slight curveball at the end there. We will look forward to seeing that when you have had a chance to put it together. Thank you very much.