Science and Technology Committee

Oral evidence: Science communication, HC 1004

Tuesday 10 May 2016

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Watch the meeting

Members present: Nicola Blackwood (Chair); Victoria Borwick; Stella Creasy; Jim Dowd; Carol Monaghan; Graham Stringer; Matt Warman

Questions 1-61

Witnesses: **Professor Duncan Wingham**, Chief Executive, Natural Environment Research Council, **Julia Maddock**, Associate Director of Communications and Engagement, Natural Environment Research Council, and **Professor James Wilsdon**, Director of Impact and Engagement, Faculty of Social Sciences, University of Sheffield, gave evidence.

Q1 Chair: I welcome the panel to the first hearing in our science communication inquiry. We are trying to understand a bit more about public engagement with science and how we can do a better job of spreading excitement about science. We felt that Boaty McBoatface was a very good place to start. I have been sent various good recommendations of first questions to ask, lots of them involving nautical puns. The question I would like to start with is for you, Professor Wingham. Do you think that the Minister is proud of NERC's work in public communication, or do you think that he will make you walk the plank?

> ***Professor Wingham***: I would like to think that he sees this as what I would describe as an incredible success. We could make the claim that we are now probably the best-known research council in the world and, because of that, hundreds of thousands of people both in the UK and around the world not only know about us but know about the science that we have done. We know that we have attracted extraordinary attention, as have the makers of the ship, for example. In many ways, we feel that this has been an astonishingly great outcome for us. In addition, it has put a smile on everybody's face. I cannot put words in the Minister's mouth, of course, but I hope he would regard it as a very successful outcome to the activity we started on a few months ago.

Q2 Chair: What are your immediate plans to build on the awareness that has been developed through the poll? There has been a connection with a lot of groups that would not ordinarily connect with science, particularly with polar research ships. What are your plans not just to maintain those connections but to deepen them into an interest in the science, not just the name of the boat?

> ***Professor Wingham***: We came to think about this because last year we decided to bring the Discovery, one of our blue-water vessels, up the Thames to London, as a way of

materialising our science. We moored the ship alongside the Belfast. That of itself created enormous interest in London. We came to the view that our ships are enormous draws and a marvellous means of materialising, in a completely recognisable way, the science that we do. With that in mind, we came to the view that we should survey more widely public views on how to name our new vessel. We certainly wish to continue with that. Indeed, we now have plans to bring either the Discovery or the James Clark up the Mersey in October. We will try to make that coincide with the keel laying of the new ship—again, to try to bring material attention first to our ships and then to all the science that we do.

The other thing that has been very clear from the response we have had is that we have engaged—entirely through Boaty McBoatface, it is true—with a lot of young folk who otherwise would not have known about us, the Antarctic or the science that we do. We would very much like to think about how we can continue an engagement with that younger group of people. That is why, for example, we are very keen to continue the name, albeit on a smaller vessel.

Q3 Chair: We received a number of tweets in response to our announcement that we were going to have this hearing today. One, in particular, caught my eye. It was from Robin Gissing, who said, "Vote brought this vessel to my attention. I do STEM outreach to Y6 & Y8s and will be using it as a career example." Are you thinking of putting together any lesson plans and working with the teaching profession to make sure that this is a way of improving STEM teaching?

Professor Wingham: It is fair to say that the primary role of a research council in its public engagement is at a higher level, roughly speaking. As you know, the Minister has announced £1 million to beef up STEM around the whole issue of polar science, and of course for us that is a very nice outcome. We will try to feed our understanding and knowledge, to the extent that it is needed, into that activity, in order to build that kind of connection with the younger and the teaching community.

Q4 Chair: Professor Wilsdon, we ran a highly scientific Twitter poll to try to establish whether Boaty McBoatface was a PR triumph or a disaster. Of 109 respondents, 71% said that it was a triumph. What is your assessment?

Professor Wilsdon: Far be it from me to counteract the views of the public. I would agree with that. It has been a good exercise and has been very positive for NERC, as Duncan said. The eventual decision that was reached on the name was a very elegant compromise. It would have been very hard for anyone to object to it.

It is good. The question, of course, is how you build on it and recognise its place in the broader ecosystem of science communication and public engagement with science. When I first saw it, I laughed—I voted for Boaty McBoatface myself—but, great as it is, it is not a substantive topic for public engagement. If you ask a fairly superficial, low-stakes question, you will get a different type of public engagement or response from the one you would get to the more serious, substantive questions the research councils sometimes need to engage the public in.

There are many examples of that from NERC's own past. A few years ago, I was involved in work they did on geo-engineering the climate, which is one very controversial area of environmental or climate technology. We need to place this in that hierarchy, as a first-order type of communication and engagement. There are second-order types, which could include the kind of engagement with schools you are talking about. Then there are third-order, much more substantive, contested areas of public debate about the direction of science and technologies, where we are not necessarily just selling the good news but often raising the quite difficult, uncomfortable questions, choices or dilemmas that attach themselves to particular trajectories of research. A good research council or research system should do all those things. Indeed, the remit of this inquiry should cover all those things.

Q5 Chair: How do you make sure that you have a coherent system that first captures interest and imagination, as this competition has, and then retains it and makes sure that, when the more difficult questions come along, you already have that captured audience? What are the key features of such a system?

Professor Wilsdon: We have to start by acknowledging quite how far and fast we have travelled on this agenda over the last 15 or 20 years. We have come from an era 25 years ago when we talked in somewhat patronising terms about public understanding of science, through a shift towards dialogue with the public, to more of a two-way conversation that was, in large part, the result of the difficulties that were experienced around BSE, GM crops and so on. We now have an incredible, diverse, largely bottom-up environment in which science communication and engagement takes place on social media, in pubs and on YouTube, as well as in the formal media. It is fantastic. There is a richness to all of that that was unthinkable even 15 or 16 years ago, when I first became involved in science policy.

All of that is great, but it needs to be accompanied by more structured approaches to public dialogue on some of the trickier issues that are also part of the landscape. Again, we have a lot of good work to build on. Over the past 12 years, the Government have funded things like the Sciencewise programme, which has done a lot of interesting, often smaller scale, deliberative work to try to tap into social intelligence and public attitudes and values at a point in the research cycle where that intelligence can help to inform policy agendas and the decisions taken by funders and regulators. We need more of that kind of stuff as well. In that way, we can build up a richer system.

In terms of the timing of this inquiry, if we look at the sorts of changes that are now envisaged in the organisation of our research funding system, which will of course include NERC in the reshaping of that landscape, linked to the Nurse review and other measures in the White Paper to come, it is a good point at which to ask questions about how we organise this stuff and at what level we run engagement and think about communication and dialogue. We need to make sure that we are building that into the new systems properly as they come into existence.

Q6 Matt Warman: We have touched on the fact that you are interested in quality rather than quantity of engagement, up to a point. How many people have been engaged by this programme? How many of those are you still in contact with?

Julia Maddock: There is a range of ways in which we can measure engagement and reach. If you look at media coverage, which is very light-touch engagement, we have had reach of more than 250 million in the UK, in print and online media alone, not including the broadcast coverage or the international pieces. More than half a million people took action by visiting the website that was set up just for this purpose. The Twitter statistics show that about 23 million people were reached using our NameOurShip hashtag, whereas 214 million Twitter users—a very high proportion of Twitter users—were reached using the BoatyMcBoatface hashtag. We know that, on that light touch, we reached a large number of people with awareness.

In terms of being able to evidence that we have had longer-term engagement with those people, we have seen a growth in the number of our social media followers, for example. We also released some videos on YouTube, each of which contained a minute and half's worth of content on science and the building of the vessel at Cammell Laird. We had 60,000 people view at least a minute's worth of that content. We are looking to build as much as we can an ongoing connection to people, using Boaty and the new name of the ship, Attenborough. We have evidence that they got real science, not just fluff and excitement.

Q7 Matt Warman: How does that compare with campaigns of a similar ilk that you or others have run before?

Julia Maddock: This has been wildly more successful than most of the campaigns we have run before. We were targeting 2 million Twitter users, but we got 20-odd million with just our hashtag and 200-odd million with Boaty. In media coverage, we were looking to get a couple of good national hits. We ended up getting very broad coverage, not just in the science media but in the mainstream news media and light entertainment shows. We were on "Gogglebox", "Ant & Dec" and "Jonathan Ross"—all sorts of places where science would not normally be discussed.

Q8 Matt Warman: If you extend it to the 60,000 who have watched the videos and have obviously gone a bit deeper, how does that compare with videos you have put up before?

Julia Maddock: It is a lot more than we normally get. We normally get a few thousand.

Q9 Matt Warman: It seems unlikely that science engagement will surpass 250 million people for one issue in the next few years—certainly in the next few months. As Professor Wilsdon suggested, is this a case of, "Ask a trivial question; get a load of trivial answers"? You will never get anywhere near the majority of the people who have been engaged, so in that sense it is not really an exercise in scientific engagement; for the vast majority of people, it is simply an exercise in humour.

Julia Maddock: You are correct to say that for some people it is just about the humour and they have not really touched any of the broader content, but science engagement is a question of frequent contact with people. This made science engagement something that happened in their normal, everyday lives. It became part of pub quizzes and discussions at car-boot sales. It reached them—them being the wider public—in their own terms, rather

than in a formal sense, coming by a particular route, with someone saying, "You must do it in this way."

Q10 Matt Warman: Do you envisage NERC running another competition to name a boat?

Julia Maddock: We do not have any more ships planned just now, but I would do it again.

Q11 Matt Warman: The Australian Antarctic Division is currently running a competition to name its Australian polar research vessel. What advice would you give them?

Julia Maddock: We learned a few lessons. First, we learned to be prepared to over-achieve. We did not expect to go viral. We started out more concerned about not getting engagement. Going viral is something I will always be prepared for in future, while not necessarily expecting that I can produce on demand. There were some procedural things. Moderating the submissions before they were published was very important. Of 32,000 submissions, we eventually made 7,000 public. There was a lot of work removing duplicates or submissions that were perhaps in less good taste.

Q12 Matt Warman: In terms of capitalising on the boat itself and the submarine, will they be jammed full of all sorts of clever multimedia stuff so that we can see what Boaty and Attenborough are doing? Have you thought about how you might capitalise on it practically as well?

Julia Maddock: Yes. We will go as far as we can with that practically. We are still designing the vessel at the moment. We have had a lot of offers from people who are interested in working in new ways. If we now get a bit of quiet, we will be able to consider those in the cool light of day.

Q13 Stella Creasy: I will make full disclosure. James and I wrote papers about this in different magazines when I was the deputy director of Involve. I come at it from a slightly different perspective, which is a concern about terminology and the difference between engagement, participation and awareness. It would be really helpful to understand from you what metrics you set for all three of those categories—the difference between people being aware of Boaty McBoatface, people engaging in the competition and people participating in scientific activities and engagement as a result of that being a gateway to involvement.

Julia Maddock: What were your three categories?

Q14 Stella Creasy: Awareness, engagement and participation, because they are not all the same. One of the big concerns is always that bad involvement is worse than no involvement at all. I wonder whether you could unpick those three categories for us. You had all of those hits. Does that translate into people taking part in the competition? Where does that then lead to participation in scientific discussion, inquiry and endeavour, which is what you are trying to do?

Julia Maddock: Awareness levels are the easier thing to measure. Particularly with social media, you can measure how many people were talking about you or your topics. We got very good metrics on that. I am not sure whether you were in the room when we covered those, but we targeted 2 million people on Twitter. Social media and media coverage are very easy to reach, so we made people aware.

On levels of engagement, we can look at the actions that people took. We can look at how many people visited the website, which did not exist before the campaign and was specific to it, how many people looked at the videos, how many people came to NERC's website—our own traffic spiked—and how many people wrote to NERC. We had about 2,000 emails directly on this topic, as well as phone calls. We can look at the engagement levels there.

We do not have statistics on what I would call good evaluation of participation as a result of this. We have a lot of anecdotal data that people talked about it with their families and children, that it was a discussion point and that they have done other things as a result, but we did not set out to achieve that.

Q15 Stella Creasy: What sort of other things?

Julia Maddock: People have been talking with their friends and family about the work that NERC does more widely. We have had families write in. A dad called Darren phoned us and said that he and his children had never heard of the ship or the research council, but now they were talking about the research that is done in Antarctica because of Boaty McBoatface.

Q16 Stella Creasy: To me, that would be an example of engagement rather than participation. Matt asked whether you had plans for more media and more participation by people in what the boat is doing. I want to tease out a bit more what plans you have to use the interest you have generated in the boat and NERC to get people into science and participating in scientific endeavour. Was that part of the project that you planned, or was it just about naming the boat?

Professor Wingham: It is fair to say that at the outset our main concern was to bring focus on to the new ship and simply to ask for views on what her name should be. We wished to engage the public. What we have now is a different situation—quite marvellous success—so we are only now starting to address the longer term questions of how we can build on and sustain that level of interest. There is no question but that there is a very high level of interest. One of our reasons for wanting to retain the name on one of our vessels is that it allows us to bring a renewed focus every time we launch, for example. We can use that as a platform for the science that it will be performing at that time. I am just making these observations. This is a very short period of time over which to seek evidence of what you describe as participation.

Professor Wilsdon: The point I was making was about the different levels of participation and engagement in research agendas. As I said at the start, what NERC have done with the name processes is great and has had largely positive effects. How sustained or deep they are is hard to measure. To be realistic, a lot of the interest will probably dissipate as the

agenda moves on. There are things that NERC can do. The stuff they are going to try to do around links to schools and young people is a great idea. I really want to see our research councils, NERC included, taking seriously that layering—that spread of activities—and thinking a bit more deeply about which techniques in respect of communication and engagement are more relevant to different research agendas.

We have shifted in this debate. There was a period in the early part of the last decade, because of things like GM, when this stuff was very high on the mainstream science policy agenda. There was a very tangible sense that the way public debate had played out had proved deeply problematic in certain key areas. A lot of the urgency around that debate has drained away, and it would be a great shame if we had to wait for the next fiasco to push it back up the agenda.

In the UK, we have great experience in this area. As Stella knows from direct experience, we are viewed around the world as one of the leaders in science communication and in public engagement in science. We are spending just under £5 billion a year of taxpayers' money on research. As you look at the research system as a whole, taking seriously a strand of work that tries to engage in all the different types of communication and engagement and in more participative, deliberative dialogue is really important. To take a specific example linked to the ship, one area where you could have really substantive public dialogue is around the links between polar research, diplomatic agendas and business agendas. This is not to say that anything NERC has or has not done in that domain is right or wrong, but it is not long since you had NERC publications talking about their role in helping to de-risk some regions in terms of oil and gas exploration. Understandably, that raised issues with people who worry about climate change and the environmental agenda. That is an example of a substantive area where this stuff plays in. The research that is going on is an important part of it, but there are also deeper social, political and ethical questions that merit some form of public engagement that a research council should undertake.

Q17 Stella Creasy: What you are talking about is upstream—essentially, using that interest to start conversations with people about issues that may be contentious, and doing it in a transparent way. The challenge is that, in this instance, ultimately the decision-making ability was taken away from the public, because you intervened and said, "No, we are going to call it this," instead of keeping the original format. Do you think that impacts on the ability to get people to take part? This is a less contentious area than something like GM foods or crop developments. If we are talking about upstreaming, the concern about getting people involved is their understanding what power they have to influence what the vote does—from what the ship is called to where it goes, what research it does and how that research is used.

Professor Wilsdon: Yes. The nature of engagement in this case was fairly well understood. People realised they were voting on a name, and I do not think that most people would have expected much more than that to flow from it. If we look across the research portfolio as a whole, within an individual research council or the UK research system, absolutely, you need to identify those areas where—

Q18 Stella Creasy: But they were given the idea that they were going to vote for something, and the thing they voted for did not happen. I am talking just in terms of the participation.

Professor Wilsdon: Sure. It was always left slightly open that there would be an eventual decision taken, irrespective of the weight of public votes. They have come up with a name that is very hard for many people to object to, given that David Attenborough is a national treasure, and they have retained the Boaty McBoatface name elsewhere. For me, this particular thing is great in its own terms. I really hope that NERC will build on that in various interesting ways; I am sure that they will. I am just encouraging them, in a constructive way, to go a bit further and to think a bit harder about some of the trickier areas around which they might want to have some of the deeper modes of engagement you are talking about.

Q19 Jim Dowd: In response to the Chair's question about whether this was a public relations triumph or disaster—I will leave aside whether you should treat those two imposters just the same—was it not a victory for trivialisation more than anything else, or do you take the view that any publicity is good publicity?

Professor Wingham: I do not think this is a question of trivialisation. Although Boaty McBoatface was the tag line that took the story around the world, in much of the press and media coverage that we got, time and time again we saw very clear evidence of people reading about the boat and the science and learning much more about what we do. I myself am quite relaxed about the idea that people should have come at it in that way. I do not really see it as an either/or issue. It is one that has been of benefit all round.

Q20 Jim Dowd: You take the view that any publicity is good publicity.

Professor Wingham: I do not think that it was any publicity.

Q21 Jim Dowd: Let us move on. Were there any conditions to undertake public engagement in the Government's granting of £200 million for the research vessel? Beyond the naming—you and your colleagues have answered part of this question already—what plans do you have to continue public engagement, other than around what Boaty McBoatface is doing this week?

Professor Wingham: I am sorry. The conditions—

Q22 Jim Dowd: Did the Government put any conditions on the grant of £200 million for the research vessel to engage with the public?

Professor Wingham: No. The business case for the vessel was primarily around the science need and on a value-for-money case. It was not justified at all in terms of public engagement.

Q23 Jim Dowd: What else are you going to do—if, indeed, you are going to do anything else—to continue public engagement with its work?

Julia Maddock: The royal charter NERC operates under places an obligation on us to do public engagement work. It was always our intention that, as part of the ship activity, we

would have a communications and engagement plan to reach out to wider audiences. The success of this stage having been somewhat livelier than we expected, we will probably look at those plans again. In addition to working with BIS on the polar exploration programme, we will look at launching our own new public engagement strategy this year. It has three strands. One is around inspiring and informing the public about the science that we do, one is about engaging them in discussion and debate on contemporary issues and one is on dialogue about the decisions and funding routes that we take in NERC.

Q24 Jim Dowd: Fine. NERC itself has strict instructions for those to whom it grants funds to undertake public engagement. How is that engagement monitored and how is its success measured, or not?

Professor Wingham: Just to follow up on Julia's remarks, towards the end of last year the NERC council had a discussion as to whether we were sufficiently strategic in our approach to public engagement—in particular, to pick up something that James was saying, about whether we are as effective as we could be in informing discussions around the somewhat trickier areas of environmental science. It is easy to list them straight off—fracking or neonicotinoids, for example. Our view was that we were not doing enough in a strategic kind of way. In particular, we were probably relying too much on pathways to impact, in which quite often public engagement features as an activity, and we were too reliant on what I might describe as a large number of small investments.

Julia remarked on the need for us to generate a public engagement strategy. I would add that NERC council agreed in March to create a specific funding line of some £500,000 a year in order to inform more seriously what I might describe as contested areas, in particular, of environmental science and to do so in a more strategic way. Many of the investments that we have been making—this is true of the science as much as it is true of the public engagement element, which is a general requirement on the organisations to which we give funding—are of themselves very small. Primarily we rely on what I might describe as our primary auditing functions to ensure that the organisations we grant to are using the money in an appropriate way. At the strategic level, NERC has decided that essentially it has to up its game. It is not so much a question of the total expenditure. All our institutes also have significant public engagement activity. As a council, we felt that we needed to take a more strategic approach to it.

Q25 Jim Dowd: In the proposals of any particular applicant for grant funding, are their intentions for public engagement in the project taken into account before you decide on the allocation of funding?

Professor Wingham: In our ordinary grant lines—the competitive grant lines—the funding decisions themselves are made on scientific grounds. If the science view is that they should be funded, we then seek a proper pathways to impacts case. It is a condition of being awarded the money, but it is not a criterion in the scientific evaluation of who gets it. Depending on the subject matter of the grant, the public engagement element may be larger or smaller. It depends on the extent to which the specific science lends itself to public engagement.

Q26 Jim Dowd: The primary consideration is the scientific merit or potential of the project.

Professor Wingham: Yes—for our competitive science funding.

Q27 Jim Dowd: There is then a secondary consideration as to how that can be best communicated to the public in the way their money is being used.

Professor Wingham: Yes.

Q28 Jim Dowd: Do you have a strategy or plan for fostering public engagement with science and sharing best practice in doing that among your institutes—or is it just as and when?

Professor Wingham: In the terms that you are describing, the honest answer would probably be no. That is why we decided, first, to give that specific funding intention and, secondly, to create a specific strategy associated with it. Having said that, I would not want to downplay the very significant activities that happen in our institutes around public engagement. For example, they all run open days, which are often very effective, at least in their locality, in bringing their activities to people's attention. However, we are aware of the need to look at this in a more top-down and strategic way.

Q29 Jim Dowd: Finally, I have a question that is not related to any of the ones that I have previously asked. Have I misunderstood it, or does there seem to be a disproportionate amount of effort put into the Antarctic rather than the Arctic?

Professor Wingham: Very clearly, there is a wider UK interest in maintaining the level of activity in the Antarctic. That issue got difficult some years ago, primarily because the inflationary cost of maintaining the bases was being placed on the remainder of the NERC science budget. In the end, the resolution of that question was to introduce partition for Antarctic logistics and infrastructure. It has been good to see that work very effectively in the spending review process, so that the inflationary element of the Antarctic bases—and there is some—has not been tensioned across the rest of the environmental science budget.

On the other hand, if one takes a look at the amount we are spending on science in the north and south, as opposed to maintaining the logistics capability, the answer is that it is about 50:50. We have maintained for some years, and have recently renewed, levels of strategic funding in the Arctic, because we recognise that there is very considerable change going on there, and, straightforwardly, the Arctic is closer to us than the Antarctic. In science budgetary terms, I would say that it is about 50:50.

Q30 Graham Stringer: I wasn't going to ask this question, but in your answer about engaging the public you mentioned neonicotinoids. I guess that at the moment all MPs are swamped with emails from people concerned about the impact of neonicotinoids on bees and other pollinators. It seems to me that the emails we are getting, stimulated by 38 Degrees and Friends of the Earth, are a long way from the science as we know it. What have you done to engage people with that science?

Professor Wingham: One of our institutes, the Centre for Ecology and Hydrology, has embarked on quite extensive work to try to produce more objective scientific information. That is being done with a public engagement strategy in place. To go back to James's remark and the remarks I was making earlier, I think NERC has not been as effective as it ought to have been, and could be, at putting in place funding mechanisms to inform the public on these issues. In the past, NERC has tended to focus its public engagement activities on the interest and wonder of the natural world. We have a journal called *Planet Earth* that has been run very effectively for many years. We have had other engagements—James mentioned the one on geo-engineering, which was quite effective—but generally speaking we can do better, precisely to try to address your question.

Q31 Graham Stringer: But are you actually doing anything? This is a major policy issue on which decisions have been made at European level and are being made at UK level. It feels like the GM debate, where Frankenstein foods win the arguments against the solid science. What are you actually doing?

Professor Wingham: We are asking ourselves what things we should put in place to inform the public debate, bearing in mind that we would not do this ourselves but would give funding to others to achieve it. At the same time, research council activity has somehow to fall short of telling people what the answers are. It is not our role to determine policy; it is our role to fund things that inform policy. There are various ways in which one may approach something like that. One could create a specific unit of people with a specific remit to provide—

Q32 Graham Stringer: Are you actually doing anything at the moment? I know that there are different ways in which one could approach it, but how are you getting the science that is done out there to people at the moment? How are you answering the question that you ask yourself? Your job is to present the facts to policy makers so that they can make decisions. How are you doing that on this issue?

Julia Maddock: In terms of engaging the public with those facts, as Duncan said, we have a way to go and we are not really doing it at the moment. What we have been doing is engaging policy makers and, via communications channels, media. We have had media briefings on the science of neonicotinoids and the experiments that are conducted to determine whether and how they are affecting bees and other pollinators. As well as working with the media audiences, we worked with representatives of the House of Commons Library to make sure that they had accurate briefing information. Duncan mentioned the Centre for Ecology and Hydrology. It has just published a new book, which it is distributing free to farmers and other landowners, on bees and pollinators and how to maintain safe habitats for them. We are working with those groups to get the evidence out there. On the public side, it is part of our ambition to change and to do more.

Q33 Graham Stringer: That is clear. Can I move back to the ships? Why was a new ship needed, as opposed to upgrading the existing ships in the fleet?

Professor Wingham: The existing ships are ageing. If we kept them, we would be looking at an increasing maintenance cost. That was fairly apparent some years ago, so we looked

at the question of whether it was better value for money to continue with a two-ship operation, given the age and the increasing maintenance costs, or to move to a new single ship with both science and cargo capability. We looked at that in a net present value methodology and came to the conclusion that a new single ship was the best way forward over the next 25 years, in terms of providing both the science and the cargo capability that we need to maintain our science and our bases in the north and the south.

Q34 Graham Stringer: Do I understand from that that one or more of the current fleet will be scrapped?

Professor Wingham: Whether it will be scrapped or not is—

Q35 Graham Stringer: It will not be doing the work that it was doing before.

Professor Wingham: Yes, that is the aim, from 2019.

Q36 Graham Stringer: What science research will the new ship be able to do that either could not be done before or was not being done before?

Professor Wingham: In the first instance, its aim is to sustain the science that we do. Clearly, there are very large-scale changes going on in the Antarctic ice sheet, driven by marine processes. It is not necessary for me to emphasise the rate of change in the Arctic and to observe that the mechanisms of propagation of climate change are as important in the ocean as they are in the atmosphere. In addition, ocean acidification is likely in the first instance to affect the polar oceans more rapidly and to greater depth than the tropical oceans. The need to maintain our capability to do science in the polar oceans has got stronger over the years, if anything, rather than weaker.

In the first instance, we are looking at being able to sustain our science and its quality. The UK is a big player in both the oceans and at the poles—both sides.

Q37 Graham Stringer: I am sorry to interrupt you, but where are we in the pecking order internationally in terms of polar science?

Professor Wingham: If one looks simply at quality, we can make a fair pitch to be in first place. Of course, we cannot compete with the US on volume.

Q38 Graham Stringer: Where would we be if we did the pecking order in terms of quantity?

Professor Wingham: In terms of volume?

Graham Stringer: Yes.

Professor Wingham: I do not know off the top of my head. We could provide you with the data, but my guess would be fifth, possibly, in terms of volume. For example, the German polar effort is very substantially larger than ours, just to illustrate the point.

Q39 Graham Stringer: What would we have to do to move up the pecking order to be second or first?

Professor Wingham: I guess the answer to that is fairly obvious.

Q40 Graham Stringer: It is. I am looking for a figure.

Professor Wingham: Roughly, the cost of our polar activities in total may be in the order of £60 million a year, all told. That is for the infrastructure, as well as the science that we fund on top. You would probably have to double that. I am the chief executive of NERC, so I am not going to argue that strongly, because of course we have to tension that kind of decision across the rest of our portfolio.

Q41 Graham Stringer: This is my last question. How many boats will there be in the fleet in 10 years' time, and who will they be owned by?

Professor Wingham: In my view, that is a very interesting question. I do not know about 10, but certainly if one looks 20 years into the future, I do not think we will have the same degree of reliance on ships as the main platform to explore the oceans. That is different from having no reliance, but we are going to move in a big way to automated submersibles in order to explore the ocean. We can already see that.

NERC, particularly its National Oceanography Centre, is something of a world leader in this area. We now have the biggest fleet of automated submersibles in Europe—including all military capability—and we are investing in that. We have just taken another decision to continue to invest capital in the growth of range, depth and measurement capability. At present, we have three scientific vessels, with a fourth one for cargo. We will close to three. I would be surprised if in 15 years' time we have much more than one. Ships have been the workhorses of exploring the oceans for hundreds of years, but there are many challenges in the oceans, particularly the deep oceans, that they cannot address. We need greater depth, greater range and greater ability to survey large areas.

Q42 Graham Stringer: Who will own that ship?

Professor Wingham: If they are scientific ships, my view is that ownership will have to remain in the public sector. It is very hard for me to see anybody else wanting the risk on a ship, which is very substantial. As we move to smaller, more varied ways of exploring in the ocean, one can foresee a different kind of arrangement. With the costs coming down, a much wider group of people may be interested in exploring the ocean. Given that we are talking 15 years away, it is a bit difficult to see, but the direction of travel is very clear.

Q43 Carol Monaghan: At the start of this meeting, I put out a tweet saying that we were discussing science engagement. I had a response from Semta, which says, "Would be great if interest in #BoatyMcBoatface meant a new generation of curious minds turning on to #science." You have already mentioned public engagement, and you have had a question regarding lesson plans for teachers. I am wondering specifically about children, possibly of

secondary age, who are looking at subject choices. What can be done with them? Rather than just put out the competition on the boat and leave it at that, what can we do off the back of it further to engage those children?

Julia Maddock: The BIS polar exploration programme is still being scoped, so there is a lot of opportunity in that. In addition, we have had contact from a lot of people who are interested in producing high-quality children's books and other ways of engaging young people. As part of our ongoing strategy, we are trying to humanise a lot of public engagement with science and to explain in careers terms just how many ways into science there are and why it is open to everybody. One of my aspirations is to increase the understanding of people who are in science of the role they have as a model for others. To refer to last year's ASPIRES report and the concept of science capital, if young people are able to connect to somebody they know or understand in terms of science, they are much more likely to engage with it further.

Q44 Carol Monaghan: Is there the possibility of a specific person being allocated to a school to work with young people, so that there is a direct contact? You talk about having somebody they know. Surely we have enough scientists to enable us to have that direct contact.

Julia Maddock: I believe that we will look at that in the polar exploration programme. The delivery partner for that is likely to be STEM Learning, which is taking over the STEM ambassador scheme. That sort of activity is something we would look at.

Q45 Carol Monaghan: Professor Wilsdon, you mentioned Sciencewise. Until quite recently, BIS funded Sciencewise to increase public dialogue on science policy decision making. What benefits and expertise did that bring? What has been lost by the lack of funding?

Professor Wilsdon: The cycle of Sciencewise came to an end with the end of the last spending review. I understand that the form it will take in the next period is still under discussion, so it is not over, although I am sure that there are discussions ongoing in BIS and elsewhere about how it has operated most effectively.

The good thing about Sciencewise was that over a sustained period we had a lot of experimentation in different ways of doing this stuff. Gradually we built up an accumulated body of expertise, knowledge and experience of ways of doing dialogue and participation more effectively. A lot of what Sciencewise did, and, hopefully, will continue to do, is fairly small scale in terms of the number of people engaged. We are not talking about the vast hordes who voted on the name of the ship. It is a different sort of engagement. You are trying to pull a different sort of social intelligence into the decision process.

This goes a bit to Graham Stringer's question about neonicotinoids. When you are in the heat of a controversy about GM crops, bees, badgers or fracking—whatever it might be—and you as MPs are being bombarded every hour with emails generated by all sorts of different websites, it is a very difficult point at which to have the kind of thoughtful dialogue we are talking about, although of course there are things that the science

community can and should do to help to communicate the underlying evidence in those difficult debates. If you look at the research system, you are talking about building in the capacity to look ahead, to think, to anticipate and to engage the public in ongoing discussion about possible directions and implications of a whole host of things we are investing in as a nation, across different scientific and technological domains. It seems to me that that is a very proper element of a good, functioning, healthy and democratic science and innovation system. I hope that that gets due emphasis in discussions that are now under way around reform of the research system.

Another concrete example is the vote on mitochondrial transfer that you had here 18 months to two years ago. There were lots of activities that went on in the lead-up to that, including things that the MRC and the Wellcome Trust did. Earlier on, Sciencewise had run a whole host of more in-depth deliberative processes. They involved around 3,000 people in a series of workshops and meetings to tease out what was at stake in the debate—what people were worried about and what ethical issues concerned them. When we got to the point that there was going to be a vote here and the question was being discussed in the mainstream media, it was possible to point to that work, not as a representative exercise—it is not a vote—but as something that gives a depth of understanding of the texture and nature of public concern. It also improves the overall legitimacy of the decisions that are being made, whether they be policy or regulatory decisions in respect of reproductive technologies or, earlier on—upstream in this process—the funding decisions that the councils are making. I hope that Sciencewise is maintained and that the role of that kind of dialogue is re-emphasised in the reorganised research council system that is coming.

Q46 Carol Monaghan: Do you see that it will affect the research councils' ability to engage properly if the funding is not renewed?

Professor Wilsdon: It would be a great shame if it were not renewed in some way, shape or form, and I believe that the intention is that it will be. I very much welcome the kinds of things that Duncan said about the plans that NERC has to develop a more strategic approach to its public engagement activities. All the councils should be doing that. At a time when new metastructures are being created, through the Nurse review, at Research UK level, with plans to bring a lot of generic communications and other functions up to that level, there is also a need to think a bit more strategically across the piece about how we do public dialogue in the research system.

There is a related debate about the impact agenda, as it is played out in the research excellence framework, which Lord Stern is currently reviewing. There are things that could be done there to think about the incentive structures we have in place for researchers, scientists and academics to do public engagement, to do it well and to be properly recognised and rewarded for that in their academic careers. If those structures are wrong—however well meaning the strategies are—people will not do this stuff, because they are under pressure to do many other things. We need to think about it at that strategic level, to try to make sure that proper thought goes into structures and budgets and the policies around public dialogue.

Q47 Carol Monaghan: Stella has already asked questions about the different levels of public engagement. To what extent do you feel that the Government incorporate real depth of public dialogue, rather than simple engagement exercises, into their policy decision making? That is a question for the panel generally.

Professor Wingham: I am not sure that the question as you have posed it is one that the head of a research council should answer, if I take the view that we are not Government. If one places the question in the scientific domain, it is a fair question in some ways. Let me illustrate that. We are considering what we as a council should be funding to inform ourselves generally and scientifically about what the environmental impact of fracking might be. Doing that would require us to take measurements and to have people moving around the environment in areas where people are at least considering the possibility of doing fracking. We would absolutely want to engage—indeed, we are already doing so in some respects—with local authorities, parish councils and individual people about their concerns very early on in such a process, perhaps to address those concerns scientifically and to give them the feeling that part of our activity is on their behalf. There are certainly areas, particularly on contested issues, where we could do more than we have done in the past. For example, I thought that the recent BBSRC activity around GM crops and the earlier geo-engineering activity were reasonably well handled. We could do more to get that kind of public dialogue into our process.

Q48 Matt Warman: We have strayed a little way from Boaty, so could we get things back on an even keel? It seems to me that now you have an amazing brand. Boaty is more than just the ship and the submarine. Have you thought about whether this is more than the ship, and about how you will capitalise on the long-term process that we are going to see? Obviously the ship will be around for a long time. Partly, have you thought about what it is going to do, and, partly, what is the next thing that we are going to hear from Boaty practically?

Professor Wingham: As I said before, we are just starting to think seriously about the exact answer to your question, because we have been busy with the here and now.

Q49 Matt Warman: It has been all hands on deck.

Professor Wingham: To some extent, yes. It seems to me that your question is the obvious one. It is why we wanted not only to keep our reputation for having a sense of humour but to keep the name alive and associated with a thing. There are many ways we can reuse that. The submarines themselves will have many adventures. On one occasion, we lost one and had to organise a rescue, using an oil remote-operated vehicle to hook it out, because it got a bit confused about where it was. With modern technology, there are many ways of making a video stream and thinking about how we can go on using the name.

Straight off the top of my head, I do not think that we quite got to the bottom of some of the IPR issues around the name. To go back to the question about schools, interacting directly with schools is not a primary function of research councils, but if we can work with the money that the Minister announced recently, in particular, we may be able to use the vote very effectively. As you may have seen, just last weekend there was an excellent "Horizon" programme on the poles, which are always attractive to people. There are many ways we can think about how to continue that engagement.

On the issue of whether or not this is trivial, it has put in many people's minds the existence of an object called NERC, which I do not think they knew about before, and, to some extent, its role. That will not go away quickly; it will be around in their memories. If we can continue to engage with that, as some of those youngsters get older, to broaden people's interest, we will have achieved a long-term success from what right now is a short-term success.

Q50 Victoria Borwick: I want to take that on, because we are passionate about making the most of it and building forward. Professor Wilsdon, you are editor of *The Guardian*'s science policy blog.

Professor Wilsdon: Yes.

Q51 Victoria Borwick: What do you think about how science is reported? Do you think it is accurate? Do you think it is impartial? Do you think it is exciting? Let us have the benefit of your experience on that.

Professor Wilsdon: Sure. Obviously I do not speak for *The Guardian* corporately. The fact that *The Guardian* has so many researchers, scientists and academics—I am a social scientist—blogging for it is in part a reflection of the very diverse science communication ecosystem that we now inhabit, which is a very good thing. It has certainly been a way through which that organisation and a number of other big media organisations have been able to increase the depth and range of their science coverage. Overall in the UK, we have incredibly dynamic and high-quality science media. By and large, it has grown in quality—

Q52 Victoria Borwick: Give us a bit of background. The public will presume that things are accurate, checked and researched. Do you think it is an accurate and impartial way of finding out what things are going on? Tell us how you feel that it imparts the information to the public.

Professor Wilsdon: In this day and age, the range of sources through which people access information is much more plural than it was. You still have very high-quality science coverage through the BBC and, indeed, the other main television channels. Our print media are very strong. Your counterparts in the House of Lords were unhappy about some of the climate coverage in *The Times* over recent months and years, but by and large the science correspondents and science experts in our leading media organisations have continued to do a very good job. If you compare the UK's science media scene with that of comparator countries, it performs very strongly.

Q53 Victoria Borwick: In the sense that it is impartial or scientifically related.

Professor Wilsdon: Yes. By and large, there is an effort on the part of media organisations and individual journalists to get to the facts of the story and present them clearly. The range and richness of different media channels is probably unrivalled, in terms of the size of the country relative to the science media scene. I do not see media coverage of science

as the most problematic part of the science communication landscape. Obviously there is always more that can be done. There are specific issues that pertain to things like climate change and its discussion in the media, but by and large it is positive. Organisations such as the Science Media Centre—I think they are here, at the back of the room—have played a very positive role in bringing experts together very quickly to provide an informed, evidence-based, authoritative voice on key developments in science or in scientific controversies as they arise.

Q54 Victoria Borwick: This morning the Chair led a group at the Royal Society. We talked about quite a lot of technical points, but we also came on to the Government's responsibility to communicate policy relevant to scientific issues to the public and how that could be done. At the moment, the conversation is about this vote and how we can take it forward, which is very exciting, but inevitably—as you touched on earlier—there is a whole range of quite important things. In a very competitive debate in Parliament, do you discuss the personal crises in life or the importance of science and what it can do? What do you think the Government's responsibility is in communicating policy-led scientific issues to the public? What are the ways of doing that?

Professor Wilsdon: This brings us back to what mechanisms are in place within the broader science system to ensure that that kind of activity happens. We have talked about Sciencewise, which is one practical example. Over recent years, there has been the National Co-ordinating Centre for Public Engagement, and individual universities have been selected as beacons of public engagement. Those are all different Government schemes. Then there are the things that the research councils individually and collectively have done in this area. All of that is underpinned by Government support and public funding. Taken in totality, there is a good amount of activity going on.

Then you have the role of the Government chief scientific adviser, Sir Mark Walport, and his counterparts in different Departments. He has a particular responsibility as a spokesperson for the collective enterprise of science. A similar role pertains to the president of the Royal Society. As well as those leaders, you have media figures for science like Brian Cox and Alice Roberts. They are all important parts of the system. To go back to my earlier point, it would be good to see a bit more ambition and leadership of this agenda at Government level, which perhaps we have not seen.

Q55 Victoria Borwick: Of the communication or of the science?

Professor Wilsdon: Of the importance of communicating science and undertaking dialogue around science. No one would expect Jo Johnson to conduct the detail of a science communication exercise on polar research, neonicotinoids or anything else, but clearly political leadership of the agenda is important. To find the last really significant attempt to capture this stuff in a major policy document, you have to go right back to the 10-year framework produced by the Treasury under Gordon Brown in 2004, which had a very substantial discussion of science and society, off the back of GM and all the associated debates. I encourage the Committee—

Q56 Victoria Borwick: Following on from that, do you think that sometimes the media sensationalise science?

Professor Wilsdon: Of course there are examples of debates that get sensationalised, but the other thing we have now is a very good rapid response mechanism in those circumstances. That is enabled partly by social media. To take a specific example, Baroness Greenfield has been known at times to make statements about the internet and its effect on the brain development of children in ways that are not very substantiated by the science. When those kinds of statements are made, you get a very rapid and vociferous response from the science community, expressed through social media, blogging and articles in newspapers saying, "This is overstepping the mark. It's way off beam from where the science actually lies." There is a speed with which inaccurate information is corrected. Of course, that does not remove ideological debate in areas where there are other things going on, like climate; there is a lot more going on in the climate debate than just the science. However, in this country at least, by and large things are not that bad.

Victoria Borwick: That is very helpful.

Chair: Stella has the last question.

Q57 Stella Creasy: I want to follow up on that. I understand what you are saying about social media. Obviously a lot of our knowledge about how to engage people in scientific discussions and policy making—including your own work on GM foods and the Frankenstein foods debate—is from an era when we did not have quite as much social media engagement. We can look at trends in public confidence in institutions to tell them the truth. More practically, I am sure that all of us have had emails from people about chemtrails. We have talked a lot about participation, engagement and how we get more people involved, at a time when people's trust and confidence in traditional public institutions and their ability to communicate trusted information is being questioned and when there has never been more information out there. How do we square that circle?

There are lots of debates and difficult issues coming towards us, whether around bees, fracking or the science of renewable energy. Knowing what the science is is only the start of people thinking, "You're telling me this, but what is your agenda?" For me, chemtrails are a particularly good example. There have been public statements about what they are, but I already get people saying, "Yes, but the Government would say that." In a different and evolving environment, with lots of information but lots of scepticism, where is the future for science engagement?

Professor Wilsdon: You are quite right. These are bigger shifts in the broader cultural, communication and democratic landscape than are covered purely by science. For scientific institutions, the only response to those dynamics is one of greater openness and transparency, and honesty about areas of uncertainty, about dilemmas, where they exist, and about the fact that we as scientists and researchers do not have all the answers in some of these domains. We have to do our best to communicate the evidence, where it exists, but also to be honest about dilemmas. In that way, when you come to a particular issue where there is a controversy or a conspiracy theory, there will be an established, existing body of confidence and trust in scientific institutions. Taking the surveys that are done, we

should remember that trust overall in scientists, particularly publicly funded scientists, is very high—far higher than trust in many other sectors.

Q58 Stella Creasy: Could we anchor it in the conversations about Boaty McBoatface? *[Laughter.]* Matt Warman started it. You do not necessarily have a controversy about what they are doing per se, but it is an opportunity to have a conversation about what science can and cannot tell you—what risks it can and cannot reveal, what your confidence ratios are and all the unknowns we might need to have conversations about. What would be your advice for going forward on this project?

Professor Wilsdon: The scale of public interest in this has, quite reasonably, taken NERC somewhat by surprise. It will take them a bit of time to work out how to make the most of it. As we have heard here, and I would agree, it would be crazy not to try to build on it through engagement with schools and young people and in some ongoing media work. I hope that, as we have heard from colleagues at NERC, they will use this as the trigger for a revisiting of the research council's broader public engagement strategy, encompassing the different levels of communication, dialogue and participation that you described earlier.

Q59 Stella Creasy: Do you think that Boaty McBoatface can solve the problem of chemtrails?

Professor Wilsdon: Chemtrails are tricky. I was director of policy at the Royal Society—

Q60 Chair: Let us not get too deeply into chemtrails, if that is okay.

Professor Wilsdon: When I was at the Royal Society, we did a big study on geo-engineering. You get a lot of the chemtrails discussion in and around that debate. It is a difficult one.

Professor Wingham: We are all—I will continue to be—children of the Enlightenment; if one can get people early and demonstrate to them the seriousness and purpose of how science goes about doing its business, there is a chance that we will continue to be. Contrails are a question that seems to attract a rather diverse set of people, but if we can continue to demonstrate to youngsters what science can do and the integrity and seriousness with which it is done, maybe we can continue to trust it.

Q61 Chair: I thank the panel for the time they have taken today. Given that this is a science communication inquiry, I am very glad that we had a chance to talk about the science as well as the communication. I was very pleased that we got to talk a little about the importance of polar research at the moment and the role that Sir David Attenborough will play in making sure that the UK retains its No. 1 spot in terms of quality. We can have a discussion about getting up to No. 1 in terms of volume at a later date.

What my colleague has called the Boaty brand has fallen into your lap as a gift, really. I do not think that we will be the only people who will look to NERC to set an example of how to capture that extraordinary level of awareness and how to leverage it, not just as a long-term

interest in science but also as much deeper participation when we as a nation have to make what we know will be some really challenging and difficult ethical decisions. Without putting too much pressure on you, I note that all eyes are on you. We are watching with bated breath.

I am very concerned to hear that you lost one of your submersibles. The Committee will be absolutely dismayed if you lose Boaty and we will have you back before us before you can say "Boaty McBoatface".

Professor Wingham: Maybe. All we would have is son of Boaty.

Jim Dowd: Have you thought of recruiting a Captain Pugwash? *[Laughter.]*

Chair: That brings this session to an end.