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Science and Technology Committee

Science communication and engagement

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Report, together with formal minutes relating to the report

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Science and Technology Committee

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Summary

Despite the strong interest in science in many quarters, there is a collective need to do more to take science to those who are not currently engaged. It was encouraging to see that the competition to name the new polar research ship received 124,000 votes for 'Boaty McBoatface'.

There is a wide range of initiatives by organisations to increase public awareness of and engagement in science, including many encouraging projects aimed at children and young people which complement formal science learning. They all play a vital part in further building our 'science capital'. However, further efforts are needed to change the long-standing cultural biases that pervade science.

The BBC has made improvements to its science coverage, although there is an opportunity for it to widen its coverage beyond news and documentaries. The position is less clear in the print and other media which often have an agenda with inadequate place for opposing evidence.

There are concerns over the media's misuse of 'balance' and its sensationalism. The illegal media behaviour which prompted the Leveson inquiry, will have done nothing to improve the public's mistrust of science reporting. The Government should ensure that a robust redress mechanism is provided for when science is misreported.

The Government has a responsibility for fostering and facilitating science engagement in its policy-making. It should continue to maintain and strengthen national programmes such as Sciencewise and the National Coordinating Centre for Public Engagement. Their programmes should be routinely used across all government departments, so that public opinion is fully captured in developing government policy where science is involved.

Science, politics, finance and the law are all components in the policy-making process. When these components do not fully align, it is the Government's responsibility to ensure that trade-off decisions between what the 'science' says, what is affordable and legal, and ultimately what the public will accept, are transparent. It is not unreasonable for the Government to weight scientific evidence to a lesser or greater extent, but where they do not follow the results they must ensure that they do not dismiss or discredit legitimate scientific evidence. The public consultation process unhelpfully pitches science and other factors together which makes it difficult for a clear foundation of scientific understanding to be established without being co-opted—and misinterpreted—by the political debate. The consultation process should be adjusted so that it addresses the scientific issues separately from the political and other trade-offs. We believe this could bring significant benefits for public engagement and reduce unnecessary disputes over the essential science. Such a separation could allow researchers to more readily confine their debate contributions to the science. If they also contributed to questions on policy implementation and the political trade-offs, that would be more transparent.

We agree with the recommendation made by Lord Stern that the Research Excellence Framework (REF) should encompass a definition for 'impact' in the system's assessments that includes a closer association with policy-making. The Government has

now abandoned plans for an 'anti-lobbying' clause in government contracts and grants, which for research grants would have sent precisely the opposite message to the one needed—that there should be the widest and fullest possible science communication and engagement.

1 Introduction

What is science communication?

1. Science affects our everyday lives, not least when science influences (or should influence) how Government makes policy. Dr Karen Bultitude of University College London identified four key motivations for communicating science:

- A *utilitarian* imperative—giving people technical skills and knowledge that will be useful in their wider lives;
- An *economic* imperative—advanced societies require a technologically skilled workforce and science adds to the output of a country;
- The *cultural* imperative—science represents "shared heritage"; and
- The *democratic* imperative—science affects most major decisions in society, so it is important that the public are able to interpret basic scientific information.[1]

2. Imperial College defined science communication as:

> An umbrella term covering a wide variety of activities, including, professional communication by scientists; interactions between scientists and members of the public; the media representation of science; and the ways people use scientific knowledge in their own lives.[2]

3. The Lords Science & Technology Committee in its *Science and Society* report in 2000 recommended a move away from presumptions about the public's lack of scientific knowledge, towards an emphasis on dialogue and engagement.[3] Our predecessor Committee examined in 2013 the public's understanding of the science on climate change, including where people look for science information and how that influences climate change policy. Despite national policies to address climate change, the Committee found little evidence of coordination amongst the Government and its agencies on communicating climate change science.[4]

4. In 2012, the former Department for Business Innovation & Skills (BIS) concluded from its Science and Society Programme that "public engagement with science in general is gaining momentum but the current audience is largely already interested in science. This means that there is a collective need to do more to take science to those not currently engaged."[5] As a result, the then Science Minister, David Willetts, launched a *Charter for Science and Society* in March 2014, which included a call for science organisations to "focus on […] target new audiences, embrace diversity and inclusivity, be sensitive to audience needs and perspectives, and engage with others where they naturally congregate".[6]

1 Bultitude, K, The Why and How of Science Communication (2011)
2 Imperial College London (COM0014)
3 House of Lords Science & Technology Committee, Science and Society, Third Report, Session 1999–2000
4 House of Commons Science & Technology, Communicating Climate Science, Eight Report, Session 2013–14, HC 254
5 Department for Business, Innovation & Skills, Review of BIS Science and Society Programme, 2012–13
6 Department for Business, Innovation & Skills, UK Charter for Science and Society (March 2014)

Our inquiry

5. In our inquiry we examined the current state of science communication and engagement; how Government, scientists, the media and others facilitate public awareness of and engagement in science; and the barriers that need to be overcome. We received 121 written submissions and took oral evidence from 18 witnesses including academics working in the field of science communication as well as representatives from research organisations and the media. In addition to our call for evidence, we worked with the Parliament Outreach team in targeting a wider audience. A questionnaire was designed based on the terms of our call for evidence, which was sent to members of the public to seek their views on the portrayal, influence and importance of science. In our inquiry, we also examined the National Environment Research Council's 'Name Our Ship' campaign and took some of our oral evidence at the Natural History Museum in London. We would like to thank them, and everyone who contributed to our inquiry.

6. In Chapter 2 we examine science awareness and communication. In Chapter 3 we look at science and policy making.

2 Science awareness and communication

Public attitudes to science

7. Following the Lords Science and Technology report on *Science and Society* in 2000, BIS commissioned Ipsos MORI to survey Public Attitudes to Science. The most recent such survey, in 2014, found that public interest in science was high and rising:

> The UK public overwhelmingly think it is important to know about science. Over eight-in-ten (84%) agree that science is such a big part of our lives that we should all take an interest, and seven-in-ten (72%) agree that it is important to know about it in their daily lives.[7]

A recent Wellcome Trust 'Monitor and Culture Tracking Survey' by King's College London found that public interest in science is high, with 77% of people interested in medical research and 63% of people interested in hearing from scientists about their research.[8]

8. These surveys have also shown, however, that while the public has developed a more positive attitude towards science over the past 30 years, most people still lack a personal connection or understanding of science.[9] The Public Attitudes to Science survey, for example, found that "people still do not know much about how scientists work", and that there was "low trust in science journalism".[10]

9. Cultural perspectives can influence both how science information is disseminated and how it is absorbed, as Soapbox Science, a public outreach platform for promoting women scientists, explained:

> Political views, religious background and systems of beliefs can particularly matter when scientific consensus on a given issue is not reached: If not carefully considered, these views can alter the objective presentation of the science and alienate a proportion of the audience.
>
> It is of paramount importance that a diversity of senders gets to participate in science communication initiatives. This is by far the best way to ensure that the science communicated takes into account the variety of communities' traditions and outlooks found in the UK. By providing a diverse range of role models who get to share their passion for science with the general public, science communication initiatives have a real opportunity not only to engage more people with science, but also to ultimately help increase the cultural and socio-economic diversity within the scientific community.[11]

7 Ipsos MORI for Department for Business, Innovation & Skills, Public Attitudes to Science Survey (2014)
8 Wellcome Trust, Wellcome Trust Monitor Report Wave 3: tracking public views on science and biomedical research (April 2016)
9 International Journal of Science Education, Attitudes towards science: a review of literature and its implications (2003)
10 Ipsos MORI for Department for Business, Innovation & Skills, Public Attitudes to Science Survey (2014)
11 Soapbox Science (COM0122)

Boaty McBoatface

10. An illustration of how engaged the public can be in science matters, and a case study of how to engage with a wide audience, was provided by the initiative by the Natural Environment Research Council in 2016 to name its new polar research ship.[12] The most popular suggestion was 'Boaty McBoatFace', which received 11 times as many votes as the name subsequently selected by ministers ('Sir David Attenborough').[13]

11. The Science Media Centre highlighted at the time that:

> The entire nation have been discussing a polar research ship. And they've all heard of NERC. How many other scientific research councils could they name?[14]

Media coverage of our evidence session in April 2016 with NERC prompted numerous tweets and emails, including for example:

> As a member of the public I wanted to write to let you know that I approve of the way the NERC have handled the situation […] The process raised the attention of the organisation; certainly I had never heard of NERC before. I have also never been motivated to write to a select committee before, so their PR actions can show that as a positive benefit as well.[15]

> Please keep the public engaged. Humour is often the best way to keep that going. For example, I detested the name at first, but it has grown on me and I quite like it now.[16]

> Give the public something more serious to engage with and they'll engage with it more seriously.[17]

> The vote brought this vessel to my attention. I do STEM outreach to Y6 & Y8s and will be using it as a career example.[18]

> Well it got my kids asking about research vessels, never would have happened without McBoatface![19]

12. In May 2016, science minister Jo Johnson MP announced that the ship would be named *RRS Sir David Attenborough*, with one of its remotely operated submarines *Boaty McBoatFace*.[20] He had previously been reported as saying that the Government wanted a name [for the ship] that "lasts longer than a social media news-cycle and reflects the

12 Natural Environment Research Council, Name Our Ship (March 2016)
13 Boaty McBoatFace' 124,109 votes, Poppy-Mai' (a 16-month-old girl cancer sufferer) 39,886 votes, 'Henry Worsley' (explorer who died in January 2016 while attempting to complete the first solo and unaided crossing of the Antarctic) 15,774 votes, 'David Attenborough' (wildlife broadcaster) 11,023 votes.
14 The Guardian, Boaty McBoatface may not be the name of new polar research vessel (18 April 2016)
15 Victoria Blyth by email [not published]
16 Neil Doherty, by email [not published]
17 @scienceogram
18 @RobinGissing
19 @Davidson7470
20 Department for Business, Innovation & Skills, UK's £200 million polar research ship named in honour of Sir David Attenborough (6 May 2016)

serious nature of the science it will be doing".[21] While the Government's selection is understandable, it may end up curtailing public engagement in future similar events. As one of our contributors observed:

> What happened to public engagement? The public were engaged, and now overridden.[22]

Engagement with young people

13. Education in Science, Technology, Engineering and Mathematics (STEM) plays a vital role in equipping young people with the knowledge and skills needed to participate in and contribute to society. Many have expressed concerns over many years about a persistent STEM skills gap. We highlighted in our *Digital Skills Crisis* report last year that "the Government needs to focus on other areas beyond gender - looking at other diverse backgrounds such as disability, ethnicity and disadvantaged socio-economic groups - so that children and young people can have a wide range of role models to inspire them to study and pursue careers in STEM".[23] Following from this, we are currently undertaking a separate inquiry into the *STEM skills gap*.[24] Particular fields are predicted to have, or are already experiencing, significant STEM skills gaps that will negatively affect the economy.[25] The Government's recent Industrial Strategy Green Paper represents the latest in a succession of government initiatives over more than a decade to tackle this problem.[26] The 2017 Spring Budget made a commitment to invest in improving technical education, raising the status of technical education.[27]

14. In our inquiry we looked at whether science communication, rather than reform of institutions or curricula, has a role to play in addressing to the STEM gap. King's College London's ASPIRES programme has sought to identify the influences in 10–14 years olds' career choices.[28] [29] The study found parent-child relationships played a particularly important role in shaping attitudes towards STEM subjects, but also a widespread association of science and scientists with being 'brainy', which put some off.[30] Imperial College London have recommended greater diversity in popular and media representations of those 'who do science' to help overcome that barrier.[31]

15. Recognising the value of parent-child relationships, particularly mothers, in shaping attitudes towards STEM subjects, the ASPIRES project found that the most important

21 The Independent, D-Day looms for 'Boaty McBoatface' with decision due 'very soon' (5 May 2016)
22 @GrantDenkinson
23 House of Commons Science & Technology Committee, Digital Skills Crisis, Second Report, Session 2016–17, HC 270
24 House of Commons Science & Technology Committee, Closing the STEM skills gap (launched 29 November 2016)
25 UK Commission for Employment and Skills, The Labour Market Story: Skills for the future - Briefing paper (July 2014)
26 Department for Business, Energy & Industrial Strategy, Building our Industrial Strategy - Green Paper (January 2017)
27 HM Treasury, Spring Budget 2017 (8 March 2017)
28 Professor Louise Archer and Dr Julie Moote (COM0009)
29 The ASPIRES project has since transferred to University College London.
30 King's College London, ASPIRES Young people's science and career aspirations, age 10–14 (November 2014)
31 Imperial College London (COM0071)

sources of influence of children's aspirations at year 8 are family members or close family friends who have a science related job or have a high interest in science.[32] King's College London defined this as 'science capital' and is seen as:

> A 'holdall', or bag, containing all the science-related knowledge, attitudes, experiences and resources that you acquire through life. It includes what science you know, how you think about science (your attitudes and dispositions), who you know (e.g. if your parents are very interested in science) and what sort of everyday engagement you have with science.[33]

16. The dimensions of science capital include scientific literacy; science-related activities, values and dispositions; knowledge about the transferability of science; science media consumption; participation in out-of-school learning contexts; family science skills; knowledge and qualifications, knowing people in science-related roles and talking about science in everyday life.[34] Research by Enterprising Science showed that the more 'science capital' (paragraph 15) a young person has, the more likely they are to study science post–16.[35] However, the ASPIRES survey showed that 27% of all 11–17 year olds have low science capital, and more than that level from disadvantaged schools and communities.[36]

17. Informal STEM educational events and programmes have a role in inspiring students, often through hands-on activities that can add value to their school experiences. We received many positive and encouraging submissions from national and local science museums, nature clubs and festivals, all of which are doing invaluable work, not least in complementing formal STEM learning in schools.[37] In recent years, events such as the Cheltenham Science Festival, the Big Bang Fair, the opening of the At-Bristol Science Centre and the Life Science Centre in Newcastle upon Tyne, amongst others, as well as the increased visibility of science communicators have significantly raised the profile of public engagement with science. Dr Matthew Hickman from the Wellcome Trust told us:

> There is an interesting question about what that role [of informal science learning] is, and whether it is simply to deliver the curriculum in a different setting […] or whether there is a more affective element to it, about normalising the science, putting it into context and putting a bit more flesh on the bone. Science in school can too often be a body of facts that is to be memorised and regurgitated specifically for an exam, rather than a more holistic view of it.[38]

32 King's College London, ASPIRES Young people's science and career aspirations, age 10–14 - King's College London (November 2013)
33 King's College and the Science Museum, Science capital - Enterprise Science
34 King's College London and the Science Museum, Enterprising Science
35 Ibid
36 King's College London, ASPIRES Young people's science and career aspirations, age 10–14 - King's College London (November 2013)
37 Aberdeen Science Centre (COM0008), Cambridge Science Centre (COM0024), The Eden Project (COM0025), Jordell Bank Discovery (COM0026), Science Museum Group (COM0028), Catalysts Science Discovery Centre and Museum (COM 0031), Dynamic Earth (COM0044), At-Bristol Science Centre (COM0047), Glasgow Science Centre (COM0049), Dundee Science Centre (COM0050), Plymouth Marine Laboratory (COM0051), Explorer Dome (COM0081), British Science Association (COM0085), Botanic Gardens Conservation International (COM0089)
38 Q124

We recently considered proposals from the science community and the wider public as part of *My Science Inquiry*, suggesting areas for scrutiny[39] Professor Becky Parker drew our attention to the work of the Institute for Research in Schools, which facilitates school children undertaking science research themselves.[40]

18. Surveys have found that significant numbers attend informal events: 20% of people went to a science museum—often free—in the last year, 33% a history museum, 36% a zoo or aquarium and 41% a nature reserve.[41] Dr Simon Singh and Professor Richard Wiseman cautioned, however, that "the value of science festivals with high ticket prices is very limited: It is hard to see how the money being invested is cost-effective in terms of reaching new audiences."[42] Professor Louise Archer from King's College London told us that young people across a wide age-range showed "very high levels of interest [in science]", and that "it is not that students do not find science interesting: the wealth of very engaging media […] around science is partly to do with that.[43]

19. Professor Archer nevertheless highlighted a problem in the stereotypes of science communicators:

> It is fairly clear from our [ASPIRES] evidence that there are still widespread stereotypes around who is a scientist. […] Young people and their parents are very much aware of people like Brian Cox as scientists. […] There is still the idea that whether he is geeky or more trendy, or used to be in a band and has cool hair, scientists are still very brainy and are generally white, male and middle class. There is still more that could be done to challenge that.[44]

20. Part of the problem, the Institute of Physics told us, was that "many students, depending on their background, consistently receive a number of negative messages which reinforce their decision to not pursue science". They concluded that "a long term strategy of engagement with young people, rather than one-off events is needed to challenge perceptions and convince more students that they are welcome in the world of science".[45]

21. **There are many diverse initiatives being taken forward to increase public awareness in and engagement in science, including many encouraging projects aimed at young people which complement science learning in formal education. They all play a vital part in topping up our 'science capital'. In Government too, the campaign to name the new polar exploration ship showed that there is a great appetite for public involvement. The Government had to find an elegant solution by using the most popular name—'Boaty McBoatface'—for the ship's remotely operated submarines rather than the ship itself.**

39 House of Commons Science & Technology Committee, Future Programme: 'My Science Inquiry', Ninth Report, Session 2016–17, HC 859

40 The Institute for Research in Schools (MSI0045); My Science Inquiry evidence session Qq35–39

41 Wellcome Trust, Wellcome Trust Monitor Report Wave 3: tracking public views on science and biomedical research (April 2016)

42 Dr Simon Singh and Professor Richard Wiseman (COM0048)

43 Q87

44 Q89

45 Institute of Physics (COM0087)

Role of the media

22. Since 2000, the Department for Business, Energy and Industrial Strategy (previously BIS) has commissioned Ipsos MORI to undertake a regular Public Attitudes to Science survey. The 2014 survey, the most recent, found that "the UK public are as enthusiastic about science as they have ever been". It found that 59% of people listed television as one of their two most regular sources of information on science (with 42% specifying TV news programmes), 23% newspapers, and 15% online newspapers or news websites.[46]

23. However, the survey also highlighted public mistrust in the media's science coverage. Only 28% of respondents thought that the statement 'Journalists check the reliability of scientific research findings before they write about them' was always or mostly true, and 71% believed that the media sensationalises science.[47] Jerome Davies identified three problems arising from the media's coverage of science, which can contribute to a "potentially dangerous distrust of science":

> Very few journalists are scientists. So the people interpreting the science generally don't have the tools required to understand it. This is frequently highlighted by the media's inability to use statistics correctly.
>
> Media outlets, mainly in print and online, have their own agenda. Media outlets wilfully distort scientific findings to support their own agenda.
>
> Media require sensationalism and science is seldom sensational. This can lead to distortion of scientific results as a sensational result will be reported widely, but boring results that contradict it won't receive the same attention.[48]

24. The BBC Trust commissioned an independent review of the impartiality and accuracy of BBC science coverage in 2011 by Professor Steve Jones from University College London.[49] He found that BBC content was generally of a high quality and was exemplary in its precision and clarity, but he also highlighted some shortcomings. These included a lack of contact and cooperation between science programme-makers across BBC divisions; an over reliance on a narrow range of external information sources; and concern about the application of 'due impartiality' in its science coverage.[50] An internal review of progress in 2014 concluded that the 2011 concerns about the "over-rigid application of editorial guidelines on impartiality in relation to science coverage […] still resonates today".[51]

25. In our inquiry, David Shukman, Science Editor of BBC News, described the state of progress since then:

> It is improving, with exceptions […] After the review, the BBC News ran a series of courses that everybody in news had to do. As its heart, the key thing was to explain scientific method, to help people understand the

46 Ipsos MORI for Department for Business, Innovation & Skills, Public Attitudes to Science Survey (2014)
47 Ibid
48 Jerome Davies (COM0013)
49 BBC Trust, BBC Trust review of impartiality and accuracy of the BBC's coverage of science (July 2011)
50 Ibid
51 BBC Trust, Trust conclusions on the Executive Report on Science Impartiality Review Actions (July 2014)

> difference between what looks like science and really is science, and to be able to form judgements about the due weight that should be allocated in covering a topic. That has filtered through—no question.[52]

26. Beyond news coverage, drama programmes can change science perceptions and popularity, as seen by the 'CSI effect' where forensic science programmes have led to an increase in university forensic science students.[53] David Shukman and Deborah Cohen, Head of BBC radio science, acknowledged however that beyond news reporting and documentaries they had little influence over the commissioning of science content in drama programmes. David Shukman told us:

> I cannot claim to have any role in that [pushing science role models into non-science programming], apart from being encouraging whenever I get the chance. In news, I have a personal crusade to try to get young women scientists on air, whenever possible.[54]

Deborah Cohen similarly recognised that "it is very hard for us to influence everybody making programmes for the BBC".[55]

False balance and sensationalism

27. An early case study of sensational science reporting, though one where the science community as well as the media performed poorly, was the alleged link between the measles, mumps and rubella (MMR) triple vaccine and autism. *The Lancet* published Dr Andrew Wakefield's study in 1998 which he claimed suggested a link[56] and the media criticised the Government for not acting on it.[57] Between 1998 and 2003, the immunisation rate fell from 88% to 80%, and was much lower in London and other urban areas.[58] In 2004, the Medical Research Council found that there was no evidence linking MMR to autism.[59] Many witnesses in our inquiry complained that the media chose to look at the dangers of the MMR vaccine rather than its benefits. Wakefield's article on MMR was an example of misconduct in research;[60] a subject we are examining in our separate ongoing *Research Integrity* inquiry.

28. Our predecessor Committee's 2014 report, *Communicating Climate Science*, found sensational media reporting in a different field. They found that it was driven by an "appetite for a scare story" and the "desire to overstate claims made by one individual". They criticised the inaccuracy of reporting in some newspapers, which they described as "inherently biased", and highlighted that those newspapers "relied on their readership to distinguish between factual news reporting and commentary by columnists, and absolved

52 Q78
53 The Economist, The CSI Effect (22 April 2010); The Guardian, The Grisly Truth of CSI degrees (15 October 2009)
54 Q64
55 Q65
56 Wakefield A.J, Murch S.H., Anthony A., et al, Ileal-lymphoid-nodular hyperplasia, non-specific colitis, and pervasive developmental disorder in children, The Lancet RETRACTED (28 February 1998)
57 In 2001, further sensationalised media reporting followed the Prime Minister not publicly confirming if his son had been vaccinated (The Guardian, Tony Blair should have gone public over Leo's MMR jab - Sir Liam Donaldson, (2 June 2013))
58 House of Commons Library, Measles and MMR statistics (updated 10 February 2009)
59 The Independent, Comprehensive MMR study finds no link with Autism (9 September 2004)
60 British Medical Journal, Wakefield's article linking MMR vaccine and autism was fraudulent, 12: c7452 (6 January 2011)

themselves of any responsibility for the content of opinion columns".[61] Sir Mark Walport, the Government Chief Scientific Adviser, observed recently that "the climate debate is an example of where people have claimed to be experts who are not".[62]

29. In our current inquiry, Imperial College highlighted a continuing problem of misapplied 'balance' in the media's science reporting:

> Both the under-use of balance and a polarising use of balance are symptoms of a failure of news reports to interrogate claims about scientific issues […] News coverage builds an image of science as either an unassailable truth or a matter of opinion […] At the other extreme, where science is presented as a matter of opinion, science is denied its ability to provide a baseline of uncontested knowledge supported by reliable data.[63]

Similarly, University of Oxford told us:

> The tendency to give air time to opposing views in order to provide 'balance' creates the impression of an equal rift in scientific thinking, as opposed to coverage conveying the (significant) majority view.[64]

30. The Academy of Medical Sciences recently reported the findings of its seminar on *Communicating evidence in the media*. It emphasised that accurate and balanced media reporting was a responsibility shared between reporters and researchers, and identified some practical measures that each side could take to bring improvements.[65]

The pressures of the embargo and open access

31. Even without having sections of the media with an agenda to ignore particular areas of scientific consensus, the media's challenge in scrutinising science developments is often made more difficult by the reporting embargo process. An embargoed science publication is typically shared with the media in advance of its publication date to gives journalists time to prepare their own coverage. The embargo system should reduce inaccuracies in news reporting, but AlphaGalileo Ltd, a news management company, explained the drawbacks it sometimes had:

> News embargoes are a frequent problem. The primary purpose of news embargoes in research is to provide time for the media to research the story in more detail than provided by the release; assimilate the paper on which the release is based, discuss the news with other researchers; and hence deliver a balanced or if appropriate, a critical story. We receive embargoes of a few hours, and embargoed releases, where the paper on which the release is based, is not accessible to the media by the peer-reviewed journal until

61 House of Commons Science & Technology, Communicating Climate Science, Eight Report, Session 2013–14, HC 254

62 Oral evidence taken on 25 January 2017, HC (2016–17) 949, Q69

63 Imperial College (COM0014)

64 University of Oxford (COM0043)

65 Academy of Medical Sciences, Perspectives on 'Communicating evidence in the media - A report of a roundtable meeting held by the Academy of Medical Sciences and the Science Media Centre on 8 April 2016 as part of the Academy's wider workstream on 'How can we all best use evidence to judge the potential benefits and harms of medicines? (July 2016)

> after the embargo has lifted. Both of these practices reduce the ability of the media to do its job properly. In these cases, it appears that the embargo is being used as news management by peer-reviewed journals.[66]

Imperial College London recommended that:

> Some of the drawbacks of the embargo system could be addressed if press releases and the journal papers on which they are based were required to be publicly available and linked from online news reports as part of the embargo contract.[67]

32. Some have argued that making science publications more readily available, to the public as well as the media, would also facilitate better science communication more generally. The Higher Education Funding Council for England have stipulated that research must be 'open access' in order to qualify for its funding.[68] A growth in the number of open access journals has been driven by author publication fees, rather than relying on traditional subscriptions which have often limited their readership to other scientists. Our witnesses nevertheless highlighted that open access would not on its own make science writing more accessible to a public audience. Dr Stephen Webster from the Science Communication Unit at Imperial College told us:

> You can liberate your publishing milieu and make it quicker and more open, with open access for everybody, but if [the] research culture is still very much locked into pressure to publish, fear about promotion and worry about grants, you can be as open as you like, but it will not improve science communication.[69]

Mark Lorch, Professor of Science Communication at University of Hull, emphasised that language remained a barrier:

> Much of the material published in open access journals […] is no more accessible by a lay audience than when it was behind pay walls. Scientific publications are too often written in dry jargon filled prose which makes them incomprehensible by a lay person.[70]

Press regulation

33. In recent years there has been significant debate about the behaviour of the press, in the wake of the phone hacking scandal and newspapers paying police officers for confidential information. Lord Justice Leveson's inquiry examined "the culture, practices and ethics of the press" and the regulatory regime for media misconduct.[71] The Science Media Centre gave evidence on poor and misleading science reporting to the Leveson Inquiry, including on 'false balance' (paragraph 27).[72] The Leveson Report, in 2012 nevertheless concluded

66 AlphaGalileo (COM0003)
67 Imperial College (COM0014)
68 Higher Education Funding Council for England, Policy for open access in the post-2014 Research Excellence Framework - Higher Education Funding Council for England (updated July 2015)
69 Q126
70 March Lorch (COM0094), submitting in a personal capacity
71 Journalism.co.uk, Phone hacking inquiry: first hearing announced (2 September 2011)
72 Leveson Inquiry, Science Media Centre evidence, (24 January 2012)

overall that: "The evidence received by the Inquiry suggested that science reporting had improved in recent years, and that the majority of science reporting was responsible and accurate."[73]

34. The Leveson inquiry process presented an opportunity to address misreporting of the sort which affects society as a whole (not just individuals), including the way science is sometimes misreported. The Leveson Report recommended a new—yet to be enacted—independent statutory body, to replace the Press Complaints Commission. The new body, with voluntary membership, would have a range of sanctions available to it, including fines and directing the prominence of corrections in subsequent publications. Leveson requested the Science Media Centre to produce best practice guidelines for science journalism which he subsequently welcomed, stating that any new regulator should take them into consideration.[74] His report concluded that the new code must take into account "the interests of the public, including […] protecting public health and safety and preventing the public from being seriously misled".[75]

35. **There are encouraging signs of continuing improvement in the BBC's already excellent science coverage. The position is less encouraging in the print and other media, which often have an agenda which allows inadequate place for opposing evidence. The phone-hacking scandal and the subsequent Leveson inquiry, though about illegal media behaviour, will have done nothing to improve the previous mistrust of their science reporting. *The Government should ensure that a robust redress mechanism is provided for when science is misreported.***

73 Lord Justice Leveson, An Inquiry Into the Culture, Practices and Ethics of the Press (Volume 1) (November 2012), p690

74 Lord Justice Leveson, An Inquiry Into the Culture, Practices and Ethics of the Press (Volume 1) (November 2012)

75 Ibid

3 Science and policy-making

36. Early development of science communication efforts were based on a 'knowledge deficit model'; the idea that public scepticism towards science was due to a lack of knowledge or understanding, and that this could be rectified by spreading more and better information.[76] Many criticised that deficit model because it ignored individuals' specific characteristics and cultural contexts that influence their understanding of science.[77] Researchers have since developed a contextual framework theory for how scientific messages are absorbed in a way that is influenced by people's attitudes and social environment.[78] In short, science communicators must understand their specific audience to be effective in engaging them.

37. The University of Oxford emphasised that "publics constituted by shared concerns", such as patients with a particular disease or communities affected by particular environmental risks, were "knowledgeable publics whose first-hand understandings, evidence and experiences have a valuable contribution to make to informing and improving the quality of research as well as its policy and societal impact.[79]

38. Professor James Wilsdon from the University of Sheffield believed that there had been great progress in recent decades on how people were engaged in science:

> 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 […] 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.[80]
>
> We have reached a point where the diversity, volume and intensity of conversations between researchers and the public […] is one of the standout strengths of UK science.[81]

39. Research by the Wellcome Trust reported "positive and encouraging signals" of an increase in the "extent, support and quality of public engagement by researchers over the past decade" with a majority of researchers considering public engagement to be as important as other aspects of their job.[82] The Wellcome Trust also noted, however, that pressure on researchers' time and a lack of formal structures to reward public engagement as barriers to undertaking this work.[83]

76 Sturges P., Allumn N., Science in society: Re-Evaluating the Deficit Model of Public Attitudes, Sage Publications (2004)
77 Brossard D., Shanahan J., Do they know what they read? Building a scientific literacy measurement instrument based on science media coverage, Sage publications, Vol. 28, Issue 1 (2006)
78 Sturges P., Allumn N., Science in society: Re-Evaluating the Deficit Model of Public Attitudes, ResearchGate
79 University of Oxford (COM0043)
80 Q5
81 The Guardian, Let's keep talking: why public dialogue on science technology matters more than ever - Guardian (March 2015)
82 Wellcome Trust, Factors Affecting Public Engagement by Research, (4 April 2016)
83 Wellcome Trust, Factors Affecting Public Engagement by Research, (4 April 2016)

40. The Royal Society highlighted that the Ipsos MORI surveys of public attitudes to science had showed that:

> There is a suggestion that people feel less able to engage with the process—there is an increase in the number of people who feel that they have no option but to trust those governing science (from 60% in 1988 to 67% in 2014).[84]

At the same time, the surveys found "an overwhelming desire for regulators, government and scientists to engage in dialogue with the public: seven-in-ten (69%) think that scientists should listen more to what ordinary people think."[85]

41. Effective science communication between researchers and the public is important. But so too is engagement between Government and a public which ultimately pays for much of our institutional research and which is affected by policy-making founded on that research.[86]

Government and dialogue

42. Government has a pivotal role in making that communication happen. As Research Councils UK put it:

> The Government has a key leadership role in setting high-level strategy and championing the importance of effective public engagement and high quality science communication—ensuring it understands the research system, the importance of the independence of researchers and the basis of public trust in this.[87]

43. Following the Government's 2004 *Science and Innovation Investment Framework*, it founded Sciencewise programme to fund public dialogue projects to investigate public attitudes relevant to particular policy decisions.[88] After the Council for Science and Technology (CST) recommended in 2005 that public dialogue should form a routine part of policy decisions involving science and technology,[89] the Government established and funded Sciencewise as a permanent expert 'national centre for public dialogue' to "support policy makers to commission and use excellent public dialogue as an integral part of policy-making".[90] It has since managed dialogue projects, commissioned by government departments or agencies, on synthetic biology, shale gas and oil, mitochondrial replacement, stratified medicine and geo-engineering.[91]

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84 The Royal Society (COM0036)

85 Ipsos MORI for Department for Business, Innovation & Skills, Public Attitudes to Science Survey (2014)

86 National Coordinating Centre for Public Engagement have defined 'public engagement' (What is public engagement - National Co-ordinating Centre for Public Engagement) and sought to identify factors producing it (Why engage? - National Co-ordinating Centre for Public Engagement)

87 Research Councils UK (COM0045)

88 HM Treasury, Science and Innovation Investment Framework 2004 – 2014 (12 July 2004)

89 Council for Science and Technology, Policy through dialogue: informing policies on science and technology (March 2005)

90 Sciencewise - Expert Resource Centre. An earlier House of Lords Science & Technology Committee report in 2000, Science and Society, had called for more meaningful engagement between scientists, policy makers and the public (Science and Society - House of Lords Science and Technology Committee - Third Report (February 2000))

91 Sciencewise - Expert Resource Centre, Dialogue Projects

44. Sciencewise has identified key characteristics of good 'public dialogue', including engaging with the public "at a stage in a decision-making process where the policy can be affected",[92] and described 'public dialogue' approaches including 'Citizen juries', 'Citizen summits' and 'Citizen advisory groups'.[93] Sir Roland Jackson, chair of Sciencewise, said that it had "increased recognition among science policy-makers that members of the public can have useful insights that the experts may not have thought about. Dialogue provides a valuable reality-check on what's at stake in a given policy."[94] An evaluation of the organisation in 2015 by one of its partner bodies concluded that half of its dialogues had "influenced the development of new decision-making processes, most commonly through the recognition of how public dialogue or public engagement can help remove policy barriers", and that 35% of its dialogues "appeared to have directly fed into policy decisions".[95]

45. Sciencewise was a central plank of one of four key areas ('Making informed science policy decisions') in the Government's 2012 policy on the *Public understanding of science and engineering*.[96] Our predecessor Committee expressed its support for Sciencewise in 2015 and for its continued funding.[97] The Government did not at that time commit to permanent funding of Sciencewise because spending programmes were to be reconsidered in subsequent Spending Reviews.[98] In our current inquiry, with Sciencewise's current budget coming to an end in March 2016, Jo Johnson told us in November 2016:

> It was brought back in-house in 2016. There is an intention to re-let the contract shortly, so that they can continue the good work, but for the time being, it has been undertaken in-house in the Department of Business, Energy and Industrial Strategy.[99]

46. Despite Government initiatives such as Sciencewise and establishing the National Centre for Public Engagement (paragraph 43), witnesses had concerns about restrictions on government scientists' communications. The Science Media Centre complained that:

> Scientists who work at research institutes or agencies owned by government departments are not always free to share their expertise with the media and are subject to restrictions. These scientists are publicly funded and work on subjects of public interest, including vaccines, bees and pesticides, badgers and TB, tree diseases, e-cigarettes, Ebola, GM, etc. They do undertake media work, but only with the express permission from the government press office and under very tight controls.[100]

92 Sciencewise - Expert Resource Centre, What is public dialogue?
93 Ibid
94 Sciencewise - Expert Resource Centre, Interview with Sir Roland Jackson
95 Ricardo Energy & Environment (COM0065)
96 Department for Business, Innovation & Skills, 2010 – 2015 Government policy: public understanding of science and engineering (updated 8 May 2015)
97 House of Commons Science & Technology Committee, Advanced genetic techniques for crop improvement: regulation, risk and precaution, Fifth Report of Session 2014–15, HC 328
98 Ibid
99 Q292
100 Science Media Centre (COM0070)

47. Professor Sir Mark Walport, the Government Chief Scientific Adviser, did not share such concerns:

> Government scientists […] are subject to the Civil Service Code and it is very important that we have the trust of the policy makers we work with. You need to look at this through three different lenses. First, many Government scientists are engaged in […] routine, usually quite applied research, and they publish their research in the normal way. It is quite uncontentious and they communicate with the public the results of their research. There is a second category of work where Government scientists are communicating and involved in policy decisions and policy advice. In that context, they are covered by the provisions of the Freedom of Information Act that allow for a safe space in relation to policy discussions and advice to Government. That work would typically not be published and would not take the form of academic publications anyway. […] Then there is the third area, which is in the heat of an emergency. There I think the risk is that one does not want too much of a running commentary from all sorts of different voices. We are very clear that in the context of SAGE - the Scientific Advisory Group for Emergencies - when we have external experts we encourage them to communicate, but not to use confidential information that they have acquired during the context of the national emergency. […] You want people to be able to communicate but not to be managing an emergency through a megaphone.[101]

48. We have previously examined the role of science advice in emergencies, including how government communicates information on the science to the public in our 2016 report, *Science in Emergencies: UK lessons from Ebola*.[102] We are currently examining science advice in chemical, biological, radiological or nuclear (CBRN) incidents or emergencies in a separate ongoing inquiry.[103]

49. The public funding system for research has changed in recent years to encourage researchers to undertake public engagement. Public engagement is included in the 'impact' assessment of the Research Excellence Framework (REF), which decides the block grant element of universities' research funding. We have previously highlighted the strength of the 'dual support' research funding system, of which such grants are a part, and the need to preserve this system once UK Research & Innovation is set up.[104] A consultation on the REF in 2014 found that the 'impact' factor "has created more demand and interest from academics to help and support to develop good public engagement, many of whom were previously unaware or uninterested", but also that "it has encouraged an instrumental attitude from some—doing public engagement for 'selfish' reasons rather than to achieve genuine mutual benefit".[105]

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101 Q265

102 House of Commons Science & Technology Committee, Science in emergencies: UK lessons from Ebola, Second Report, Session 2015–16, HC 469

103 House of Commons Science & Technology Committee, Science in emergencies: chemical, biological, radiological or nuclear incidents inquiry (launched 5 April 2016)

104 House of Commons Science & Technology Committee, The Science Budget, First Report, Session 2015–16, HC 340; House of Commons Science & Technology Committee, Setting up UK Research and Innovation, Eight Report, Session 2016–17, HC 671

105 National Coordinating Centre for Public Engagement, After the REF - Taking Stock: Summary of feedback (21 may 2014)

50. Lord Stern's recent 2016 review on the REF system recommended a wider definition of 'impact' in the assessments, but also that they include a closer association with policy-making:

> Guidance on the REF should make it clear that 'impact' case studies should not be narrowly interpreted, need not solely focus on socio-economic impacts but should also include impact on government policy, on public engagement and understanding, on cultural life, on academic impacts outside the field, and impacts on teaching.[106]

51. Dr Simon Singh and Professor Richard Wiseman thought it "naive to think that the majority of scientists have the skillset or motivation to be great communicators: Science communication is hard, and it requires scientists who will take it seriously by dedicating time and effort over a sustained period."[107] AsSIST-UK, Science in Public and Public Communication of Science and Technology, on the other hand, wanted science communication and public engagement embedded in the new research structures more generally:

> The REF's focus on impact has given a boost to this agenda, but a broader set of impact definitions would help more engagement activities 'count', when they sometimes struggle to demonstrate REF-able transformations to policy to practice.[108]

The Royal Society told us similarly that:

> A key principle of the UK's research landscape should be openness which engenders public trust, increases transparency and supports the widest possible dissemination and honest discussion of research outputs. The future REF should have consideration for the culture it can create.[109]

52. **The Government has the primary responsibility for fostering and facilitating science engagement in its policy-making. *It should maintain and strengthen national programmes such as Sciencewise and the National Coordinating Centre for Public Engagement. Their programmes should be routinely used across all government departments, so that public opinion is fully captured in developing government policy where science is involved.***

53. **We agree with the Stern review's recommendation that the Research Excellence Framework encompasses a definition of 'impact' in the system's assessments that includes a closer association with policy-making.**

106 Lord Nicholas Stern for Department of Business, Energy & Industrial Strategy, Building on success and learning from experience - an independent review of the Research Excellence Framework (July 2016)
107 Dr Simon Singh and Professor Richard Wiseman (COM0048)
108 As-SIST UK, Science in Public, Public Communication of Science and Technology (COM0030)
109 The Royal Society (COM0036)

Government policy-making and consultations

54. The 2014 Public Attitudes to Science survey highlighted a need for regulators, government and scientists to engage in dialogue with the public: "75% of respondents thought that the Government should act in line with public concerns about science with 88% expressing views that regulators need to communicate more with the public".[110]

55. Government departments regularly undertake public consultation on specific policies, distinct from public dialogue, by engaging people typically in the later stages of policy-making. The Cabinet Office's *Consultation Principles* were updated in 2016, allowing departments to use a range of consultation timescales rather than a previous default of 12 weeks, particularly where extensive engagement has occurred before.[111] The Royal Academy of Engineering was concerned that:

> Short consultation periods, of as little as four weeks, are now more common than previously and can seriously affect the range and quality of responses […] Longer consultation periods of up to 12 weeks, as previous standard practice, allow for more effective expert responses to be sought and compiled.
>
> There is increasing concern […] that Government, where it consults, appears to do so reactively […] rather than proactively […] Consultation also appears to focus on areas where there may have been less significant public interest and less contention.[112]

56. Consultations are widely seen as an important tool to understand the views of relevant stakeholders and an effective means of providing evidence which influences policy making.[113] Some of our witnesses complained that consultation respondents were often drawn from a small pool of organisations with a particular interest in the area rather than from people likely to be affected by the policy[114]—overlooking what the University of Oxford called "publics constituted by shared concerns" (paragraph 37).

57. Professor Robert Evans from Cardiff University's Centre for the Study on Knowledge, Expertise and Science provided some interesting insights in how policy-making consultation might be improved, by reflecting research on the 'Expertise and experience' approach to public engagement. This required an acknowledgement that 'expertise' came from those closely involved in the scientific research of the field in question but also from those experiencing the consequences of that area. He explained that:

> Meaningful public participation in technological decision-making requires that the questions put to citizens match their ability to answer them. […] The 'political' elements of technological decision-making must be kept separate from the 'technical' elements. In this context, the 'technical' element concerns establishing what the relevant expert community believes is known with certainty (e.g. it is now highly likely that human activity is causing climate change) whilst the 'political' element concerns how to act

110 Ipsos MORI for Department for Business, Innovation & Skills, Public Attitudes to Science Survey (2014)
111 Cabinet Office, Consultation Principles: guidance (14 January 2016)
112 Royal Academy of Engineering (COM0093)
113 Ibid
114 Ibid

> as a result of this knowledge (e.g. what is the appropriate balance between adaptation and mitigation). […] Although political decisions should be informed by the best available expert advice, […] policy-makers must retain the right to discount expert advice and choose a different alternative.[115]

From this, Professor Evans drew some recommendations for Government engagement and policy-making:

> Government bodies should distinguish carefully between processes that seek to gain expert advice, encourage public engagement and measure popular opinion. All three are perfectly legitimate objectives but require different methods and serve different purposes. […] Where expert advice is needed then it is important to distinguish between the 'technical' and 'political' elements of the policy problem as expert advice is only needed to resolve technical concerns; political issues require political solutions. […] Policy-makers must not misrepresent the expert advice they have received. In other words, policy-makers are free to reject the consensus view of experts but, if they do, citizens must know that this is what has happened.[116]

58. Government witnesses acknowledged the separate imperatives of science and politics, and how these sometimes needed trade-offs. Jo Johnson told us:

> We are given significant assistance by the Government Chief Scientific Adviser in understanding where the balance of scientific opinion lies on any question. Then it is up to us as Ministers in the Department to weigh up those important scientific interests against other factors that always come into play—deliverability and particular policy recommendations within fiscal constraints, affordability generally and how the public will react to decisions that might flow from the scientific evidence.[117]

Sir Mark Walport had a similar perspective on where "science meets values":

> Policy makers have to look through three lenses. The first lens is, "What do I know about X or Y?"—the science evidence lens. The second lens is whether a policy is deliverable. […] The third lens is the lens of values—political, personal and social values and the values of the electorate. Policy-making, ultimately, is an integral of all three of those things, and science is a more or less important part of it, depending on what it is. If it is whether you can fly an aeroplane through an ash cloud coming out of Eyjafjallajökull, the science is likely to trump the rest. When it comes to mitochondrial disease and possible preventive strategies for that, there is a classical area where science meets values.[118]

115 Professor Robert Evans (COM0039)
116 Professor Robert Evans (COM0039)
117 Q275
118 Q275

He gave the further example of the regulatory control of khat, where the Home Secretary did not follow the advice of the Advisory Committee on the Misuse of Drugs that there were only minimal health implications, due to "other issues, such as the broader societal impacts […] -an example of the broader lens of the policy-maker".[119]

59. When we asked Sir Mark if there might be an argument for having different kinds of consultations with experts in the field and with the public, for each of those policy-makers' 'lenses', he replied "Yes, a horses-for-courses approach might be advisable."[120]

60. **Science and politics (as well as finance and legal considerations) are at the heart of Government policy-making. When they do not fully align, it is the Government's responsibility to ensure trade-off decisions between what the science says, what is affordable and legal, and ultimately what the public will accept are transparent. The Government's policy-making public consultation process often unhelpfully pitches science and those other factors together, so that a clear foundation of scientific understanding is not established without being co-opted—and misinterpreted—by the political debate. It is not unreasonable for the Government to weight scientific evidence to a lesser or greater extent, but where they do not follow the evidence directly, they must ensure that they do not dismiss or discredit legitimate scientific evidence.**

61. ***We recommend the Science Minister and the Government Chief Scientific Adviser should discuss with the Cabinet Office, and the Treasury as the sponsor of the policy evaluation 'Green Book', the scope for the consultation process to address the scientific issues separately from the political and other trade-off. This could, we believe, bring benefits for public engagement and reduce unnecessary disputes over the essential science. Such a separation in the consultation process could allow researchers, if they wished, to more readily confine their debate contributions to the science. If they also contributed to questions of policy implementation and the political trade-offs involved that would be more transparent.***

The 'anti-lobbying' clause

62. In February 2016, the Cabinet Office announced its intention to introduce a new clause in such agreements from May 2016 that would prevent grants being used to "support activity intended to influence or attempt to influence Parliament, Government or political parties, or attempting to influence […] legislative or regulatory action".[121] The Science Media Centre thought that the anti-lobbying clause would have "sent negative messages to the scientific community about the Government's commitment to openness".[122]

63. We wrote to the then Business Secretary in March 2016 to voice the concerns of the science and research community that the proposal could have had unintended effects and would "create a barrier to evidence-based policy-making."[123] In April 2016, the Government announced a "pause" to "give further consideration to the wording of the clause and its effect".[124] Jo Johnson told us in November 2016 that the academic

119 Q275
120 Q277
121 Cabinet Office, Government announces new clause to be inserted into grant agreements (6 February 2016)
122 Science Media Centre (COM0070)
123 Correspondence from the Chair to Rt. Hon. Sajid Javid MP, Secretary of State for Business, Innovation and Skills relating to Government grant conditions and anti-lobbying (15 March 2016)
124 Cabinet Office, Update on a new clause to be inserted into grant agreements (27 April 2016)

community had raised concerns that the proposals would have limited their ability "to communicate effectively the findings of their research to Government".[125] In December 2016 new 'standards' to manage grants were announced in place of the proposed clause.[126] Sir Mark Walport, the head of the Government Office for Science (GO-Science), told us in January 2017 that "both we and the Science Minister listened to the scientific community and fed the concerns through to the Cabinet Office; they were listened to and we got a good outcome".[127]

64. **We welcome the Government's decision not to proceed with its plans to introduce an 'anti-lobbying' clause in government grants and contracts. If implemented, it would have contradicted the thrust of the reforms of the REF research funding system which are aimed at giving greater weight to 'public engagement' (paragraph 49). It would have sent precisely the opposite message to the one needed—that there should be the widest and fullest possible science communication and engagement.**

125 Q263

126 Correspondence from the Rt. Hon. Sajid Javid MP, Secretary of State for Business, Innovation and Skills relating to the anti-lobbying clause in government grant agreements (10 May 2016)

127 Oral evidence taken on 25 January 2017, HC (2016–17) 949, Q68

Conclusions and recommendations

Science awareness and communication

1. There are many diverse initiatives being taken forward to increase public awareness in and engagement in science, including many encouraging projects aimed at young people which complement science learning in formal education. They all play a vital part in topping up our 'science capital'. In Government too, the campaign to name the new polar exploration ship showed that there is a great appetite for public involvement. The Government had to find an elegant solution by using the most popular name—'Boaty McBoatface'—for the ship's remotely operated submarines rather than the ship itself. (Paragraph 21)

2. There are encouraging signs of continuing improvement in the BBC's already excellent science coverage. The position is less encouraging in the print and other media, which often have an agenda which allows inadequate place for opposing evidence. The phone-hacking scandal and the subsequent Leveson inquiry, though about illegal media behaviour, will have done nothing to improve the previous mistrust of their science reporting. *The Government should ensure that a robust redress mechanism is provided for when science is misreported*. (Paragraph 35)

Science and policy-making

3. The Government has the primary responsibility for fostering and facilitating science engagement in its policy-making. *It should maintain and strengthen national programmes such as Sciencewise and the National Coordinating Centre for Public Engagement. Their programmes should be routinely used across all government departments, so that public opinion is fully captured in developing government policy where science is involved*. (Paragraph 52)

4. We agree with the Stern review's recommendation that the Research Excellence Framework encompasses a definition of 'impact' in the system's assessments that includes a closer association with policy-making. (Paragraph 53)

5. Science and politics (as well as finance and legal considerations) are at the heart of Government policy-making. When they do not fully align, it is the Government's responsibility to ensure trade-off decisions between what the science says, what is affordable and legal, and ultimately what the public will accept are transparent. The Government's policy-making public consultation process often unhelpfully pitches science and those other factors together, so that a clear foundation of scientific understanding is not established without being co-opted—and misinterpreted—by the political debate. It is not unreasonable for the Government to weight scientific evidence to a lesser or greater extent, but where they do not follow the evidence directly, they must ensure that they do not dismiss or discredit legitimate scientific evidence. (Paragraph 60)

6. *We recommend the Science Minister and the Government Chief Scientific Adviser should discuss with the Cabinet Office, and the Treasury as the sponsor of the policy evaluation 'Green Book', the scope for the consultation process to address the scientific*

issues separately from the political and other trade-off. This could, we believe, bring benefits for public engagement and reduce unnecessary disputes over the essential science. Such a separation in the consultation process could allow researchers, if they wished, to more readily confine their debate contributions to the science. If they also contributed to questions of policy implementation and the political trade-offs involved that would be more transparent. (Paragraph 61)

7. We welcome the Government's decision not to proceed with its plans to introduce an 'anti-lobbying' clause in government grants and contracts. If implemented, it would have contradicted the thrust of the reforms of the REF research funding system which are aimed at giving greater weight to 'public engagement' (paragraph 49). It would have sent precisely the opposite message to the one needed—that there should be the widest and fullest possible science communication and engagement. (Paragraph 64)

Formal Minutes

Wednesday 15 March 2017

Members present:

Stephen Metcalfe, in the Chair

Victoria Borwick	Gareth Snell
Jim Dowd	Graham Stringer
Chris Green	Derek Thomas
Dr Tania Mathias	Matt Warman
Carol Monaghan	

Draft Report (*Science communication and engagement*), proposed by the Chair, brought up and read.

Ordered, That the draft Report be read a second time, paragraph by paragraph.

Paragraphs 1 to 64 read and agreed to.

Summary agreed to.

Resolved, That the Report be the Eleventh Report of the Committee to the House.

Ordered, That the Chair make the Report to the House.

Ordered, That embargoed copies of the Report be made available, in accordance with the provisions of Standing Order No. 134.

[Adjourned till Thursday 16 March at 11.30 am

Witnesses

The following witnesses gave evidence. Transcripts can be viewed on the inquiry publications page of the Committee's website.

Tuesday 10 May 2016	*Question number*
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	Q1–61

Tuesday 14 June 2016 (at the Natural History Museum)	
David Shukman, Science Editor, BBC News, **Deborah Cohen**, Head of Radio Science, BBC, and **Fiona Fox**, Chief Executive, Science Media Centre	Q62–86
Professor Louise Archer, Professor of Sociology of Education and Chair of the Centre for Research in Education in Science, Technology and Mathematics, King's College London, **Imran Khan**, Chief Executive, British Science Association, and **Katherine Mathieson**, Director of Programmes, British Science Association	Q87–104
Dr Matthew Hickman, Programme Manager, Informal Science Learning, Wellcome Trust, and **Dr Stephen Webster**, Director, Science Communication Unit, Imperial College London	Q105–128

Wednesday 7 September 2016	
Dr Seirian Sumner, co-founder, Soapbox Science, Reader in Social Evolution, University of Bristol, **Dr Nathalie Pettorelli**, Co-founder, Soapbox Science, Research Fellow, Institute of Zoology, Zoological Society of London, **Dr Penny Fidler**, Chief Executive, UK Association for Science and Discovery Centres, and **Tracey Brown**, Director, Sense about Science	Q129–183
Paul Manners, Director, National Coordinating Centre for Public Engagement; and **Matt Goode**, Director of Communications and Public Engagement, Research Councils UK	Q184–218

Wednesday 16 November 2016	
Dr Melanie Smallman, Department of Science and Technology Studies, University College London, and **Professor Robert Evans**, School of Social Sciences, Cardiff University	Q219–258
Jo Johnson MP, Minister of State for Universities, Science, Research and Innovation, Department for Business, Energy and Industrial Strategy, and **Professor Sir Mark Walport**, Government Chief Scientific Adviser, Government Office for Science	Q259–299

Published written evidence

The following written evidence was received and can be viewed on the inquiry publications page of the Committee's website.

COM numbers are generated by the evidence processing system and so may not be complete.

1 Aberdeen Science Centre (formally Satrosphere) (COM0008)

2 Academy of Medical Sciences (COM0016)

3 Agricultural Biotechnology Council (COM0084)

4 Airbus Defence & Space UK Ltd (COM0100)

5 Alice Roberts (COM0035)

6 AlphaGalileo Ltd (COM0003)

7 Alzheimer's Research UK (COM0066)

8 Association of British Science Writers (COM0124)

9 Association of the British Pharmaceutical Industry (COM0037)

10 At-Bristol Science Centre (COM0047)

11 BIG (COM0010)

12 Botanic Gardens Conservation International (COM0089)

13 British Pharmacological Society (COM0021)

14 British Science Association (COM0085)

15 Cambridge Science Centre (COM0024)

16 Cardiff University (COM0067)

17 Catalyst Science Discovery Centre and Museum (COM0031)

18 Chartered Institute of Public Relations (COM0105)

19 Connie St Louis (COM0130)

20 Dan Waddell (COM0118)

21 Department for Business, Innovation & Skills (BIS) (COM0083)

22 Dr Simon Singh and Professor Richard Wiseman (COM0048)

23 Dr David Bhella (COM0055)

24 Dr David Whitehouse (COM0115)

25 Dr James Redfern, School of Healthcare Science, Manchester Metropolitan University, and Dr Sam Illingworth and Professor Joanna Verran, School of Research, Enterprise and Innovation, Manchester Metropolitan University (COM0106)

26 Dr Jane Gregory (COM0079)

27 Dr Kenneth Evans (COM0116)

28 Dr Kris De Meyer (COM0082)

29 Dr Len Fisher (COM0023)

30 Dr Nik Sultana, Dr Jatinder Singh and Professor Jon Crowcroft (COM0015)

31 Dr Pallavi Banerjee (COM0101)

32 Dr Tamsin Edwards (COM0129)

33 Dundee Science Centre (COM0050)
34 Dynamic Earth (COM0044)
35 electivecesarean.com (COM0119)
36 Emeritus Professor James Hartley (COM0099)
37 EngineeringUK (COM0046)
38 Explorer Dome (COM0081)
39 Field Studies Council (COM0019)
40 Genomics England (COM0088)
41 Glasgow Science Centre (COM0049)
42 GM Freeze (COM0033)
43 Grantham Research Institute on Climate Change and the Environment, LSE (COM0059)
44 Hannah Graham (COM0114)
45 Hilary Ashton (COM0109)
46 Holger Kessler (COM0098)
47 Imperial College London (COM0071)
48 Institute for Research in Schools (COM0097)
49 Institute of Physics (COM0087)
50 International Centre for Life (COM0017)
51 Jerome Davies (COM0013)
52 Jodrell Bank Discovery Centre, The University of Manchester (COM0026)
53 Joint submission from AsSIST-UK; Science in Public; Public Communication of Science and Technology Network (PCST) (COM0030)
54 Kathryn Ingham (COM0069)
55 Kenneth Monjero, Science Fun Kenya (COM0004)
56 Margaret Bevan (COM0108)
57 Media Woman (COM0012)
58 Met Office (COM0054)
59 Microbiology Society (COM0041)
60 Miss Tessa Burrington (COM0123)
61 Mr Jeremy Stevenson (COM0107)
62 Mr Paul O'Connor (COM0111)
63 Mr Roderick Pond (COM0006)
64 MRC/CSO Social and Public Health Sciences Unit, University of Glasgow (COM0102)
65 Mrs Jean Martin (COM0112)
66 Ms Declan Baharini (COM0110)
67 Ms Sarah Hurson (COM0117)
68 National Coordinating Centre for Public Engagement (COM0061)
69 National Forum for Public Engagement in STEM (COM0060)

70 National Institutes of Bioscience (NIB) (COM0032)

71 National Nuclear Laboratory (COM0058)

72 National Schools' Observatory (COM0018)

73 Nuffield Council on Bioethics (COM0057)

74 People's Knowledge, Centre for Agroecology, Water and Resilience, Coventry University (COM0056)

75 Plymouth Marine Laboratory (COM0051)

76 Professor Andreas Prokop and Dr Sam Illingworth (COM0001)

77 Professor Andy Miah (COM0042)

78 Professor Louise Archer (COM0009)

79 Professor Mark Lorch (COM0094)

80 Professor Martin Bauer (COM0104)

81 Professor Michael Merrifield (COM0002)

82 Professor Robert Evans (COM0039)

83 Professor Wendy Purcell (COM0120)

84 Pupils 2 Parliament (COM0072)

85 Research Councils UK (COM0045)

86 retired academic scientist Philip Bradfield (COM0113)

87 Ricardo Energy & Environment (COM0065)

88 Ros Herman (COM0128)

89 Royal Academy of Engineering (COM0093)

90 Royal Astronomical Society (COM0022)

91 Royal Society of Biology (COM0073)

92 Royal Society of Chemistry (COM0092)

93 Royal Statistical Society (COM0068)

94 Sarah Burns (COM0096)

95 Science Communication Unit, Imperial College London (COM0014)

96 Science made simple (COM0074)

97 Science Media Centre (COM0070) and (COM0121)

98 Science Museum Group (COM0028)

99 Sense about Science (COM0095)

100 Soapbox Science (COM0122)

101 Society for Applied Microbiology (COM0091)

102 Spindle Fibre Films (COM0005)

103 Stephen Foote (COM0131)

104 Techniquest (COM0075)

105 Techniquest Glyndŵr (COM0133)

106 The Academy of Social Sciences and its Campaign for Social Science (COM0080)

107 The British Academy (COM0062)

108 The Eden Project (COM0025)

109 The Gatsby Charitable Foundation (COM0064)

110 The McPin Foundation (COM0063)

111 The Royal Institution (COM0020)

112 The Royal Society (COM0036)

113 The Royal Society of Edinburgh (COM0038)

114 The University of Aberdeen (COM0053)

115 The University of Oxford (COM0043)

116 UCL, Department of Science and Technology Studies (COM0027)

117 UK Association for Science and Discovery Centres (ASDC) (COM0090)

118 University of Cambridge (COM0103)

119 University of Southampton (COM0040)

120 W5 (COM0078)

121 Wellcome Trust (COM0077)

List of Reports from the Committee during the current Parliament

All publications from the Committee are available on the publications page of the Committee's website.

The reference number of the Government's response to each Report is printed in brackets after the HC printing number.

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Second Report	Digital skills crisis	HC 270 (HC 936)
Third Report	Satellites and space	HC 160 (HC 830)
Fourth Report	Forensic Science Strategy	HC 501 (HC 845)
Fifth Report	Robotics and artificial intelligence	HC 145 (HC 896)
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Seventh Report	Leaving the EU: implications and opportunities for science and research	HC 502 (HC 1015)
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Second Special Report	Current and future uses of biometric data and technologies: Government Response to the Committee's Sixth Report of Session 2014–15	HC 455
Third Special Report	Advanced genetic techniques for crop improvement: regulation, risk and precaution: Government Response to the Committee's Fifth Report of Session 2014–15	HC 519
Fourth Special Report	The science budget: Government Response to the Committee's First Report of Session 2015–16	HC 729
Fifth Special Report	The big data dilemma: Government Response to the Committee's Fourth Report of Session 2015–16	HC 992