THE ROYAL SOCIETY

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Science and Society

A response from the Royal Society to the House of Lords Science and Technology Select Committee inquiry

1. In April 1999, the Science and Technology Select Committee of the House of Lords appointed Sub-Committee II, chaired by Lord Jenkin of Roding, to conduct an inquiry into society's relationship with science (including engineering, technology and medicine). Of the many issues raised by this topic, the Committee expressed a desire to focus on: (a) the sources of information that shape attitudes to science, and (b) the mechanisms for facilitating the dialogue between scientists and the rest of society.

2. The Royal Society is grateful for the opportunity to contribute to the inquiry, and hopes that its written evidence will help the Committee to formulate its recommendations to the Government. This submission was prepared by a working group chaired by Professor Patrick Bateson FRS (Biological Secretary and Vice-President, Royal Society) and consisting of Sir Walter Bodmer FRS (Hertford College, Oxford), Sir John Krebs FRS (Natural Environment Research Council), Sir Martin Rees FRS (University of Cambridge), Professor Edwin Smith FRS (University of Manchester), Dr Jim Smith FRS (National Institute for Medical Research), Professor Lewis Wolpert CBE FRS (University College London), Mrs Mary Manning (Secretariat) and Mr Bob Ward (Secretariat). The evidence has been endorsed by the Council of the Royal Society.

3. This evidence covers a range of topics including: independent and credible scientific advice; methods of informing public opinion; and society, scientific uncertainty and risk. The main recommendations for consideration and further action are:
   - Further means to be found for monitoring and informing public opinion about science and technology, and particularly risk and uncertainty.
   - The Government to provide a set of criteria through which the independence of scientific advisers may be clearly established.
   - A Code of Practice to be introduced to ensure that media coverage of science is factually accurate, and the BBC and other media organisations to establish 'expert panels' to ensure access to the best available scientific advice.
   - Scientists to continue to determine the direction of basic research.

4. We understand that the Committee will be receiving evidence from COPUS, in which the Royal Society is an active partner, and this submission should be regarded as complementary to it.

Independent and credible scientific advice

5. Scientists are generally held in high regard by the public in this country. We note that a recent MORI survey found that scientists in general are trusted by nearly two-thirds of the

public, and that they are considered more truthful than the police, civil servants, business leaders, journalists or Government Ministers.

6. We are concerned, however, about a perception emanating from some quarters that a scientist's independence is compromised by any association with industry. At a time when scientists are being encouraged to forge closer links with industry, it would be unfortunate if their advice were considered less reliable when their research is sponsored by a company or, for that matter, more reliable when they have links with a lobbying organisation. Although the source of financial support may influence the opinion of an adviser, so may personal beliefs.

7. In general, scientists have a high regard for evidence, irrespective of their prejudices and sources of funding. Nevertheless, public opinion has prompted the need for transparent procedures and even stricter standards in the appointment of advisers, so care must be taken over securing unbiased guidance on scientific issues from credible sources. We should like to see the Government provide a set of criteria through which the independence of a scientific adviser may be clearly established. These might include, for instance, obtaining an assessment from other researchers about the credibility of an individual scientist to provide advice on a particular issue.

8. As in the Royal Society's previous statements, we should like to endorse the approach outlined by the Chief Scientific Adviser in his March 1997 paper, *The use of scientific advice in policy making*. This emphasised the importance of integrity in the collection and assessment of factual evidence, openness in the solicitation and interpretation of advice, honest acceptance of scientific uncertainty, and full public explanations of how advice has been applied during the development of policy. These are all essential if the public is to have confidence in the probity of scientific advice. We urge the Government to press for the adoption of this approach in European, as well as UK, policy-making.

9. We should also like to highlight the role of the Royal Society as an independent source of scientific advice, which aims to ensure that policy-makers and the public have access to the best available scientific information.

Informing public opinion

10. We understand that COPUS will comment extensively on this issue in its evidence to the Committee, so we will confine ourselves here to a few key points.

11. Although sales of popular science books have increased over the last ten years, we note that there are some controversial scientific issues, such as radioactive waste disposal, about which there are relatively few publications that are accessible to the layperson. In the absence of such sources of information, public debate about these issues appears to be influenced more by pressure groups, which have adopted a particular set of beliefs, than by scientists who attempt to promote rational arguments. We believe that this may be due, in some cases, to the failure by scientists to recognise and acknowledge public priorities and concerns.

12. Mechanisms must be devised by which these public concerns and priorities can be taken into account, and it is important for these to be understood and respected by scientists when attempting to explain scientific issues. Consensus conferences, such as those organised by the Biotechnology and Biological Sciences Research Council in 1994 on plant biotechnology and jointly by the Natural Environment Research Council and Office

of Science and Technology in May 1999 on radioactive waste, are a useful way of uncovering public concerns. To be effective, these events need to be held frequently and in different parts of the country.

Communication with the public through the media

13. We recognise that the media play a crucial role in communicating an understanding of science to the public. The coverage of scientific issues is not as comprehensive as is desirable, and is extremely variable in quality. Some recent media reports about the perceived risks of genetically modified organisms to human health and the environment have not accurately reported the science underlying this issue and have not, in our opinion, advanced rational public debate. Such practice is regrettable, and does a disservice to both the public and science. In its report on *Scientific advisory system: Genetically modified foods*, the House of Commons Science and Technology Committee recommended the introduction of a Code of Practice to ensure that media coverage of science is factually accurate. We endorse this recommendation.

14. We believe that broadcast and print journalists have a responsibility to provide accurate and complete information when presenting scientific issues. The best way of ensuring this is by consulting credible scientists. In view of this, it is a disappointing, therefore, that the BBC abolished its scientific consultative group. We recommend to the BBC that it should reinstate this panel, or a similar group of advisers, and that its remit should cover all news and current affairs programming. We urge other media organisations to establish similar 'expert panels' so that they can be assured of access to the best available scientific advice.

15. Scientists who seek to communicate with the public through the print and broadcast media must also be fully aware of the potential impact of their statements. Some of the problems which have arisen from recent coverage of contentious scientific issues have been exacerbated by the apparent naivety shown by researchers when dealing with the media.

16. We welcome initiatives to increase access to scientific information through the internet. These should be actively publicised so that interested parties, such as the print and broadcast media, are able to exploit them. Methods must be found, however, of ensuring the quality and authoritativeness of the information provided in this way. As long as the credibility of its sources can be demonstrated, the world wide web has the advantage of allowing the public direct access to scientific information, without the distortion which sometimes occurs through other media. The Royal Society is committed to posting its major policy statements and studies on its web site.

Peer review and public confidence in science

17. The public has the right to expect that the results of research, presented through any media, reflect science of the highest quality. Peer review is a fundamental component of the quality assurance process in science. For their part, scientists must ensure that their work has been thoroughly peer-reviewed before it is made public.

18. Anonymous peer reviews encourage frankness from the referees. We accept, however, that this practice may be misperceived as an attempt to cover up sources of criticism which might not be disinterested. Reviewers report, however, to a body or editor whose

job is to assess their comments alongside the original work, and to make a decision. This body or editor assumes responsibility for the decision or judgement, and must be publicly identifiable.

Society, scientific uncertainty and risk

19. We believe that an increased effort must be made to convey to non-scientists, among both the public and policy-makers, the concept of uncertainty in areas of current scientific research. The results of research are often surprising and, indeed, few scientists would embark upon a particular line of inquiry if its outcome was already known in advance. A distinction must be drawn, however, between genuine scientific uncertainty and the confusion which may be generated by the media when portraying maverick views as being of equal worth as the consensus view of the scientific community.

20. Scientists' perceptions of the risk associated with a particular technology or natural phenomenon often do not match those held by non-scientists. Confusion may arise, for instance, between the meanings of hazard, risk and vulnerability. This should be acknowledged, and a means must be found of informing public opinion about the risks and uncertainty associated with science and technology. Openness and an explicit recognition of the limits of scientific understanding are essential to foster greater acceptance of its associated uncertainties.

The role of the public in determining the direction of scientific research

21. When considering the influence of public opinion on research, it is necessary to distinguish between basic and applied science. Basic scientific research is undertaken primarily to acquire an understanding of the natural world. Applied science draws on the knowledge gained from research to produce new materials, products, devices, processes, systems or services, or to improve those already produced. Applied science clearly should be responsive to public needs.

22. While public opinion may influence the conduct of basic research, we believe it is of the utmost importance that scientists are allowed to determine the direction of their investigations. It is the purpose of responsive mode funding to allow scientists to pursue their professional curiosity unhindered.

23. In addition to providing pure responsive mode funding, the research councils support directed or thematic programmes. Stakeholder consultation is part of the process of developing these programmes. As public interest in a scientific topic tends to wax and wane on relatively short timescales, it would be inappropriate for it to determine the amount of funding for areas of basic science where progress is gradual over long periods.

24. In some instances in which public opinion has made a constructive contribution to the way in which basic and applied science has been carried out. The use of animals in experiments is a good example of this. The high levels of public concern have helped to prompt researchers to find innovative methods of carrying out their investigations, and to recognise fully that the behaviour and physiological states of whole animals are much more appropriately analysed when the standards of welfare are high.

25. The public should be made aware of opportunities to contribute to discussions about scientific issues, and the outcome of its participation in this process. Public input is a particularly essential part of the consideration of the ethics in science, as has been demonstrated by the debate over the use of human embryos in research.

Relevant recent publications from the Royal Society

Peer review: An assessment of recent developments (December 1995)

Management of nuclear waste (February 1998)

The scientific advisory system (June 1998)

Regulation of biotechnology in the UK (February 1999)

Scientific advice on GM foods (May 1999)