Physicists must learn to love the public

Most physicists now realize the importance of "the public understanding of science", but as **Martin Durrani** finds out, it is just as vital for scientists to understand the public

When the Royal Society published its landmark report entitled *The Public Understanding of Science* in 1985, it was a defining moment in the relationship between scientists and the public in the UK. The report argued that science is crucial to the economic, political and cultural life of an advanced industrial society, but concluded that the public – puzzlingly – does not appreciate this fact and that many people are seemingly ignorant of the role of science.

The society proposed a number of ways of boosting the public's understanding and awareness of science, including greater coverage of science in the media and reforms to the education system. The report also led to the birth of something of a cottage industry of hands-on exhibitions, public lectures, laboratory open days and other public-understanding initiatives. Even the UK's research councils are now required to promote the public understanding of science.

But the views enshrined in the Royal Society report are now challenged by many sociologists of science. "They're misguided," says Harry Collins of Cardiff University. "They're based on the idea that you can get the public to agree with scientists on the consensus view of various scientific issues simply by giving them the facts. But you won't get everyone to love science just by teaching them more science."

The problem is that most public-understanding initiatives tend to present science in an unrealistic fashion, with scientists as infallible creatures on the path to certain truth. Science is depicted as a coherent body of knowledge with no uncertain edges – even when most scientists will admit that this is rarely the case. Indeed, some sciences like weather forecasting and fuzzy logic are, at their roots, unpredictable.

"Portraying science in this unrealistic way just creates unrealistic expectations that fuel 'anti-scientific' reactions when those expectations are not met," explains Collins. "If scientists are just trying to glorify science like that, then it's the wrong sort of thing to be doing. The glorification of science is actually going to harm science in the long term by raising expectations of what science can do to unrealistic levels."

So if scientists must not simply provide the public with "the right technical information", then what should they do? "What I think the public needs to know is 'the scientific method'," says Bruce Lewenstein in the department of communication at Cornell University in the US. "By that I don't mean the idealized method of hypotheses and

Helping hand – scientists must work with the public

testing, but rather the real messiness of how we come to have reliable knowledge of the natural world."

"I'm not a relativist," continues Lewenstein, "but it is clear that issues of funding shape the questions we ask about nature, that problems of interpretation and rhetoric shape the answers we accept about the meaning of investigations, and that communication is a fundamental part of how raw data get turned into intelligible knowledge."

Lewenstein, who is editor of the journal *Public Understanding of Science*, believes that if the public had a better understanding of these contingencies in scientific knowledge, they could make informed choices about scientific issues. "The public would then understand why scientists cannot provide 'the' answer to various questions," he explains.

So what can scientists do at a practical level? "Scientists need to be candid about what is and isn't known," says John Durant, professor in the public understanding of science at Imperial College London. "I'm not saying they should just present science as a series of equally valid views, but they should place more emphasis on uncertainty, where it exists. They should remember that while scientific knowledge is reliable, it is not always certain and complete."

Durant also warns that if scientists fail to acknowledge the public's concerns about scientific issues, public policy can move too far ahead of public opinion. "The result, as we have seen with the hostile reaction to genetically modified foods, can be disastrous," he says. "But if scientists and policy-makers can understand the public better, the public will in turn place more trust in scientists and have greater confidence in their findings."

One way of tapping into the public mood

is through "consensus conferences", in which informed members of the public examine controversial issues and feed their views to policy-makers. Indeed, David Edge, a sociologist at Edinburgh University, believes that such mechanisms should be an integral part of the political process. "The only effective way of improving the public's attitude to science is to have a more open, flexible and constructive discourse, and not to polarize the debate between experts and laypeople," he says. "Only by having more such democratic fora will scientists maintain their trust and status with the public. If the public accepts consensus conferences as serious attempts to influence policy, people will see the point of learning about science so that they can participate. Changes in the public's understanding of science will then follow."

However, Edge thinks it is a mistake to blame the public's attitude to science on the media, who are only reflecting public opinion. Steve Connor, science editor of *The Independent*, explains. "Newspapers aren't public-relations outfits for science. Our role is not to further the cause of science, but to explain it, and if necessary to point out where there is bad science – even if it's embarrassing for the scientists involved. Public understanding is a laudable aim, but if there's any naivety on the part of scientists it's the idea that science is always good."

Arnold Wolfendale, president of the European Physical Society, agrees that it is unwise to blame the media. "Scientists should just take more chances and accept the way the media works. If they find their research is being sensationalized or inaccurately reported, then hard luck – just grin and bear it." Indeed, Wolfendale, who chaired a committee set up in 1995 to look at these issues, has recently written a code of practice to help physicists deal with the media and the public. It advises scientists to stress the fact that they do not know everything and to emphasize that there are many problems left to solve.

Back in Cardiff, Harry Collins thinks the answer lies with the way science is taught. "You only have to look at most physics textbooks and you'll see crucial experiments being described as if they collapsed 50 years of confusion in one go. Science just doesn't work like that. We need the history of physics to be taught more sensibly. We need more public education into how science works in practice, so that people aren't surprised when they see scientists disagree – and indeed that they expect uncertainty in the scientific process."