COMMENT: CRITICAL POINT

Solutions to the scientific divide

Robert P Crease looks at new ways of bridging the gap between science and the public

Those who doubt the relevance of social science to physics need only have attended the recent Public Communication of Science and Technology (PCST) conference, which was held in February at CERN. The conferences began 12 years ago as a small group of people interested in the special problems of science communication. Since then they have grown in size and influence.

One sign of this influence is that the recent meeting – the sixth – was the first to be held at a laboratory. Another is that various government papers – including last year's influential House of Lords report on "science and society" – now readily accept one of the PCST's central claims, namely that the traditional "deficit" model of the public understanding of science is inadequate. According to this model, scientific "experts" have the right information needed to address an issue, the public lacks it, and any conflict between these two perspectives is because not enough information has been transferred from the former to the latter.

In his welcoming remarks, CERN's director of research Claude Detraz approached the PCST's work pragmatically. Scientific institutions such as CERN depend on public support, he noted, and it is "potentially disastrous" when their research is remote from public interests and comprehension. No doubt he was thinking about events and issues that, for one reason or another, have become lightning-rods for distrust of scientific and technological institutions – Chernobyl, Three Mile Island, BSE, genetically modified food, irradiation, cloning and so on.

Going beyond the deficit model

But the PCST's research goes far beyond simply improving the information flow from science to public. Its members also analyse how knowledge is produced within science itself, and within a culture shared by scientists and the public. "The old model was linear," said Bruce Lewenstein, a media historian at Cornell University and editor of the journal *Public Understanding of Science*.

He grabbed a piece of paper and drew a diagram of several boxes in a row, with an arrow pointing from one to the next. "[The old model] saw scientific knowledge as starting in the lab," he said, "then going out to peer review, and from there to textbooks, government reports and the media."

Lewenstein then drew an oval underneath. "We now know it's much more complicated than that. There's the lab, peer review and mass media" – he drew boxes in the oval – "but the media can shape what goes on in the lab. We have well established

Cheers! – "science bars" let the public talk science

data, for example, that articles cited in the *New York Times* are more likely to be cited in peer-reviewed literature than an article on the same topic in the same issue of the same journal not referred to in the *Times*." He then drew a line pointing back from media to lab. "We also know that some information goes directly from the lab into government reports, bypassing peer-reviewed literature," he added. "Personal interactions play an important role, as do e-mail, talks and preprints." He then drew more nodes and lines in what was now a dense web. "It's a messier model. Where we are at now is trying to get a better grasp of this process."

Lewenstein's own paper at the conference examined the role of books. Despite conventional wisdom that a key change in science during the 20th century was the installation of scientific knowledge in peer-reviewed journals, Lewenstein argued that books continue to play a key role. One path is via textbooks, which shape and orient existing fields. Lewenstein cited the physics texts of Sears and Zampansky, and Halliday and Resnick. These, he claimed, are structured round the specifically Newtonian needs of engineering students, only addressing quantum mechanics as an appendage.

But textbooks can also help create new fields, as James Watson's *Molecular Biology of the Gene* shows. Lewenstein also mentioned the function of best-selling, award-winning, or culturally influential books that have served as touchstones for controversy or debate, such as Richard Herrnstein and Charles Murray's *Bell Curve*. Books play a key role in the development of scientific knowledge, Lewenstein concluded, not only by shaping the character of scientific com-

munities but also by challenging and fostering public intellectual life.

The other 75 or so conference talks ranged widely over issues and countries. Some examined the process by which certain scientists get beknighted as "experts" by politicians or the media. Others analysed media coverage, such as the tendency of reporting to follow political rather than scientific agendas (dubbed the "Prince Charles effect" by one speaker).

Speakers discussed specific case studies and research programmes – earthquakes in Italy, images of scientists in Korea, science communication in Nepal – as well as museums, exhibitions, public relations and science-literacy campaigns. Special events were interspersed between the talks, including plays, exhibitions and a public debate.

By far the liveliest event was "Science in the Pub" – a re-enactment of a breed of topical discussions that a group of Australian science communicators stage once a month in a Sydney bar. The discussions are run like a talk show, but with the contention and fervour of a football match, thanks to free beer, prizes, jokes and a provocative host.

Held in the CERN cafeteria, the event was billed as "HEP colliding with GDP" – in other words, why should the public pay for physics? It was one of the most engaging, and amusing, discussions of the value of physics research I have ever heard, as the host kept prodding the scientists to explain their work more clearly, and challenging them to articulate technological, educational and cultural values that spring from it.

The critical point

The conference dramatized the nonlinear nature of the science-society interaction, and therefore reinforced the notion that more astute communicators are not the final solution to defusing the "potentially disastrous" situations of which Detraz spoke. As Evan Selinger, a graduate student from my university, remarked in his presentation: "The public-relations solution can only succeed in the short term. It cures symptoms of the scientific-lay divide but leaves the underlying disease – the gap between scientific and value-laden cognition – untreated."

For that gap is a lifestyle disease. Only by studying it as a lifestyle – with the methods of social science – can one hope to understand, let alone change, the dynamics.

Robert P Crease is in the Department of Philosophy, State University of New York at Stony Brook, and historian at the Brookhaven National Laboratory, US, e-mail rcrease@notes.cc.sunysb.edu