

UK policy learns about risk the hard way

London. When Ian Taylor, Britain's science minister, addressed the British Association for the Advancement of Science last September, the subject he chose was the way public concern about technological risks is increasing scepticism towards science.

In his address, Taylor advocated the use of a 'Richter scale' of risks to communicate the relative severity of different types of events. His proposal reflected frustration in government circles over the public's apparent refusal to adopt a rational approach based on a scientific assessment of hazards.

But, in passing references to other elements — such as the 'dread factor' — Taylor also indicated a growing, if sometimes reluctant, acceptance of what sociologists have been telling governments for some time: that an effective approach to the public perception of risks must take into account the importance of less 'rational' factors.

Britain has learnt its lessons the hard way. At the start of last year, the government was still smarting at the failure of the Shell oil company to stand firm in the face of environmentalist protests over the dumping of the Brent Spar disused oil storage platform in the North Sea (see *Nature* 378, 376; 1995).

But the biggest blow came over bovine spongiform encephalopathy (BSE), and in particular the announcement in March by Stephen Dorrell, the health secretary, that government science advisers were no longer

ruling out a possible connection with human Creutzfeldt-Jakob disease (see page 6).

The announcement triggered a flood of ridicule of previous statements about the safety of beef for which the government paid a heavy political price. The economic costs were also enormous.

The crisis has pulled the rug from under the feet of those who argue that the views of scientific (and economic) experts are a sufficient basis for an effective approach to the political management of risk.

It has been the Treasury — which has had to pick up the bill for previous failures — that has been the prime motivating force behind efforts to develop a more effective approach. Pressure from the Treasury has led to the creation of an Interdepartmental Liaison Group on Risk Assessment, run by the Health and Safety Executive, which is aiming to develop standard government-wide techniques for handling risk.

Some individual advisory groups have already departed significantly from the previous approach of drawing primarily on 'hard' science, and are seeking to broaden the base on which their advice is established. An example is the Advisory Committee on Novel Foods and Processes, which warned the government about the potential dangers of an antibiotic marker left in genetically engineered maize grown in the United States (see *Nature* 383, 564; 1996). The com-

mittee's chairman, Derek Burke, a microbiologist and former vice-chancellor of the University of East Anglia, says the advice of his group reflected the views of some members that any increase in antibiotic resistance — however small — should be opposed.

"Experiences such as that over irradiated foods, which were approved but were rejected by consumers, have changed the way we think about our role," says Burke. "I am much more sensitive to consumer issues than I was five or six years ago."

Shell has also learnt from the lessons of the past. Since last year's retreat on Brent Spar, the company has transformed its approach and is now engaged in an extensive dialogue with environmentalist groups and others on platform disposal.

Meanwhile, some government officials are pointing to the consensus-generating strategy of the Intergovernmental Panel on Climate Change (see page 7) as a guide to the way in which contentious scientific issues should be handled.

Not everyone has welcomed the new approach. Publication of the report of a panel of advisers on Brent Spar was apparently delayed because Tim Eggar, the energy minister, was uncomfortable about its failure to condemn environmentalists' arguments outright (see *Nature* 381, 99; 1996). Right-wing think-tanks such as the Institute for Economic Affairs continue to

German resistance to genetic engineering diminishes

Munich. Genetic engineering remained high on the public agenda in Germany last year. With the Nazi abuse of genetics still fixed firmly in the German conscience, a conference marking the 50th anniversary of the Nuremberg war crimes trials attracted wide publicity and helped to keep the debate going (see *Nature* 384, 5; 1996).

At the same time, however, 1996 was a year in which opposition to genetic engineering appears to have lost some ground. Although its agricultural uses remained under suspicion, medical uses found much wider acceptance. Even the Green party admitted that, under certain circumstances,

genetic engineering could be beneficial.

An opinion poll published last summer by the Institute for Public Opinion Research in Allensbach confirmed this growing public acceptance. Only 29 per cent of about 1,000 individuals questioned said Germany should reject engineering completely because the risks were too high, compared with 40 per cent in a similar poll eight years previously.

Gerd Hobom, president of the Zentrale Kommission für Biologische Sicherheit (ZKBS), the federal office that controls licensing of all genetic experimentation, says that one important factor in boosting the acceptance of genetic engineering has been the BioRegio competition launched by Jürgen Rüttgers, the federal research minister (see *Nature* 384, 298; 1996). In preparing their entries for this competition, local governments put aside their doubts and backed collaboration between academics and local industries to develop regional biotechnology projects.

Such cooperation even took place

Red menace? Protests against genetic engineering (here in Berlin) continued to reflect public concern about its use in agriculture.

in the state of Hessen, where plans for Hoechst's production plant for genetically engineered insulin were blocked by the environment ministry for nearly a decade (see *Nature* 360, 402; 1992). Dieter Brauer, a spokesman for Hoechst, the chemicals and pharmaceutical company, says that the notorious obstacles facing such companies in Germany have virtually disappeared. One reason, he says, has been changes to the 1990 Gene Law that reduce approval times for new projects and facilities (see *Nature* 367, 210; 1994).

The most important factor, says Brauer, is a change in attitude — largely due to the economic recession and a relatively high level of unemployment. Nevertheless, resistance to the agricultural uses of genetic engineering remains firmly entrenched. Last year it was revealed that almost all field trials of genetically-manipulated crops in Germany had been either totally or partially destroyed by protesters (see *Nature* 380, 94; 1996). And Germans remain stubbornly opposed to genetically modified foods.

Unlike countries such as the United Kingdom, Germany has no formal mechanism for integrating public perception of risks into political decision-making. Further-

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Blood scandal and *E. coli* raise questions in Japan

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All at sea? Brent Spar pointed up differences over policy based on 'hard' science alone.

argue that government policy on topics such as climate change should be based only on proven scientific 'fact'.

But others, such as Brian Wynne, an expert on risk at the University of Lancaster, argue that attempts to require standard risk management techniques across all sectors of government can ignore important differences in the social and political contexts in which risks arise. If the BSE crisis and other events of 1996 have revealed how not to do things, 1997 will be watched closely to see how widely the lessons have been learnt.

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more, problems tend to be addressed in a traditional consensus-seeking manner, whereby agreement is sought through discussions and compromise. Attempts to use this approach with genetic engineering have met little success.

One example is an exercise in 'participatory risk assessment' on the genetic engineering of plants carried out from 1991 to 1993 and involving 50 individuals from environmental groups, industry, regulatory authorities and the scientific community. The meetings were organized by Wolfgang van den Daele, a sociologist at Berlin's Science Centre for Social Research.

But groups critical of genetic engineering withdrew before the last meeting because they were unhappy with the direction of the discussions, which meant that no consensus conclusions could be agreed. The talks had been leading to the conclusion that the central issue of the controversy was the political one of democratic control of new technologies rather than real risks. Critics did not want to see their objections on safety grounds being reduced to a political goal.

The failure of the consensus approach has put strain on attempts to bring public participation into risk-related decision-

making. Indeed, at a meeting in Bavaria early last year organized by Dechema, a group that supports the chemical industries, many supporters of genetic engineering argued that, with the 1990 regulations in place, they no longer needed to take account of the views of critics.

In 1993, the Bundestag, the German parliament, asked its technological assessment group, TAB (Büro für Technikfolgen-Abschätzung), to commission a full risk assessment of genetic technologies. TAB officials say that they are surprised that parliament has not called for a similar study on genetically-engineered foods, given the fierce level of public debate on the topic.

Last month, on its own initiative, it therefore commissioned a small study, coordinated by Gert Spelberg of the consumers' organization, Verbraucher Initiative.

Spelberg says that, perhaps as a result of van den Daele's exercise, the consumers' voice is now being heard. He points out that Germany led the controversial move to require detailed labelling of foods containing genetically modified products in European Union legislation that will come into effect this year (see *Nature* 384, 301; 1996).

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his arrest on charges of wilful negligence resulting in death (see *Nature* 383, 6; 1996).

More bad light was thrown on medical science by the role of other scientists on the ministry's advisory committee. For example, it was reported that Yuichi Shiokawa, who headed the AIDS advisory committee after Abe, had rejected recognition of one of Abe's patients as Japan's first haemophilic AIDS victim in 1983. Two years later, he proposed a homosexual patient from his own hospital as Japan's first AIDS patient despite minimal evidence.

Exposure of the ways in which such decisions were made has led to an increase in the public's distrust of science. But the public still sees Abe and Shiokawa as exceptions. In contrast, others used the activities of these two to argue that there are serious defects in Japan's whole medical system.

The public row over the contaminated blood scandal was closely followed by the food poisoning of thousands of children by the O157 strain of *E. coli*. In this case, the public turned with concern to the government, scientists and the medical world for guidance and solutions. But no clear-cut answers emerged.

Preliminary DNA analysis suggested many possible sources of infection. But the public demanded more precise explanation. And Kan came under pressure to provide one. His ministry — using only circumstantial evidence — announced that radish sprouts (*kaiware daikon*) in school lunches were the likely source of *E. coli* contamination (see *Nature* 382, 567; 1996).

The announcement brought radish farmers throughout Japan close to the brink of financial ruin. But it was never established that the radish sprouts were indeed a source of the mass infection. And Kan was subsequently forced to eat radish sprouts in public to restore confidence.

To many, the blood scandal and the *E. coli* food poisoning have underlined a basic lack of understanding among the Japanese public of the limitations of science. Some feel that the experience of the Kobe earthquake disaster of 1995 — which the experts failed to predict — should have altered this attitude. But the Japanese still look to science for black-and-white answers.

Some popular politicians such as Kan are making moves towards greater public involvement in decision-making on issues such as health and nuclear power.

But many Japanese scientists feel that, as long as public awareness and understanding of science remains limited, such moves are unlikely on their own to lead to better management of science-related risks.

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