A good compromise between researchers and those concerned with animal rights seems to have been worked out in Cambridge, Massachusetts, where a local ordinance to govern the care of laboratory animals was enacted.

Genetic engineering

In the **United States** controversy switched last year from the release of genetically engineered organisms to gene therapy. After surviving an arduous series of examinations and re-examinations by regulatory bodies, W. French Anderson and his colleagues at the National Institutes of Health finally received permission

Gene therapy survives red tape

to insert a bacterial gene into humans as a marker in an anti-tumour therapy.

Elsewhere in the world, governments made efforts to provide new regulations for biotechnology. In the **United Kingdom**, it became a criminal offence to release genetically manipulated organisms without first notifying the government's Health and Safety Executive.

West Germany continued to find the regulation of biotechnology way beyond its competence. Last year, it once again failed to set up clear legal guidelines for genetic engineering, despite pressure from the pharmaceutical industry and university researchers. The government did make progress in sketching the outlines of the new 'basic law' for genetic engineering but it left the difficult details.

Researchers in Cologne received permission to carry out the first release of genetically engineered organisms in West Germany. But their plan to grow 40,000 pink petunias carrying recombinant DNA was postponed until this year. Environmentalists oppose the release because it sets a precedent.

Europe put the brakes on biotechnology too last year. The European Commission announced in August a 15-month moratorium on the use of of bovine growth hormone (BGH), a peptide hormone produced using genetic engineering. BGH increases milk production in cows with minimal side-effects, say the manufacturers. The Commission said it needs more time to evaluate scientifically possible risks before approving the sale of BGH. □

Fraud and misconduct

This year surely cannot be like last with its string of US congressional subcommittee hearings on misconduct and conflict of interest in science, none of which appeared to produce useful results in proportion to the enormous time and effort they consumed. The main conclusion of the pair of hearings concerning the case of David Baltimore was surely that there was no conclusion — except perhaps that a congressional hearing is not a suitable place for politicians to try to debate immunology with a Nobel laureate.

But this year may hold some surprises. Even the Baltimore case may not yet be dead. Investigations are continuing of laboratory notebooks containing data upon which rest some of the conclusions of the disputed *Cell* paper. But the science involved is so esoteric that the subcommittee may find a forceful conclusion can never be drawn.

A clearer and simpler case of alleged fraud came from India last year. A researcher from Punjab University allegedly polluted literature on the geology of the Himalayas for over 20 years by passing off museum and other samples as fossils he had recovered on field trips.

Nuclear energy, waste and weapons

1989 was the year in which the **United States** began to face up to the colossal problems of the accumulation of waste from decades of nuclear weapon production. Under the new leadership of Admiral James D. Watkins at the Department of Energy, the gargantuan cost of cleaning up nuclear contamination has finally been counted — 30 years and $200,000 million is required, $19,000 million is needed over the next five years just to get started.

The department's plans to build a repository for high-level nuclear waste from commercial nuclear power plants at Yucca Mountain, Nevada, is also in difficulty. Completion of the project is now impossible before 2010, seven years past the original deadline. And if further study finds the Yucca Mountain site unsuitable for the waste, the problem will be back in the hands of Congress.

In the United States there have been no new orders for nuclear power plants since the Three Mile Island accident in 1979, and all orders dating back to 1974 have been cancelled. Last year, voters in Sacramento, California, became the first to shut down an operating nuclear power plant.

Another year passed for the still-unlicensed nuclear plants at Shoreham and Seabrook. Watkins has argued forcefully for both facilities but New York has decided to purchase the Shoreham plant from its owners for one dollar and then to assume the costs of shutting it down. Watkins has called this "one of the most foolish deals in the nation's history". Seabrook could be the one glimmer of good news for the nuclear industry, although so far it is a small glimmer. After the utility that owns Seabrook declared bankruptcy, the Nuclear Regulatory Commission finally agreed to find a way to license the plant.

The British nuclear power industry faces a year of reorganization. In January, most existing Magnox and advanced gas-cooled reactors will come under the control of two new divisions of the Central Electricity Generating Board (CEGB): which will eventually be converted to separate government-owned companies. Further development of **Britain's** nuclear programme is to be shelved until 1994. Plans to build three new pressurized-water reactors are on hold and the development of new reactor designs will be delayed.

West Germany's plans for nuclear power generation are becoming ever less grand. The controversial nuclear fuel reprocessing plant at Wackersdorf has been abandoned. And with the completed but unlicensed fast-breeder reactor at Kalkar unlikely ever to go on line, nothing remains of the plan to complete West Germany's nuclear fuel cycle.

Now that nuclear energy opponents have won the battle against Wackersdorf, they are likely to begin efforts to ban nuclear energy in Europe. The strong showing of Green groups in European Parliament elections in June 1989, bodes ill for nuclear programmes all over Europe.

Even in **Japan**, long the most stalwart supporter of the virtues of high technology in all its forms, the anti-nuclear power movement is growing ever stronger. The Japanese government and power industry have tried to reverse the trend through publicity campaigns but to little avail. A pump failure at one of Japan's nuclear power reactors, the Fukushima No 2 plant caused considerable public alarm. The reactor has since been out of action.

The issue is likely to come to a head this year as the government and industry hope to open part of a huge complex in Aomori Prefecture in 1991 for storing radioactive waste and for reprocessing and enriching nuclear fuel. □

From Peter Aldhous (United Kingdom), Alun Anderson (United States), Peter Coles (France), Steven Dickman (Germany), KS Jayaraman (India), David Lindley (United States), John Maddox (Soviet Union and Australia), Christine McGourty (United States), Vera Rich (East Europe), Seth Shulman (United States) and David Swinbanks (Japan).