More commercial genetic manipulation

Harvard and Biogen establish Cambridge labs

Washington

Not to be outdone by West Coast colleagues, scientists from Harvard University and the Massachusetts Institute of Technology (MIT) are busy with their own plans for the commercial exploitation of research using recombinant DNA techniques.

The president of Harvard, Dr Derek Bok, is expected to announce shortly the university's decision to become a shareholder (although not an investor) in a company being set up to develop gene cloning techniques evolved in the university's laboratories. One candidate technique is Dr Mark Ptashne's methods of cloning human fibroblast interferon genes in *Escherichia coli*, reported in the latest issue of *Proc. natn. Acad. Sci. USA* (77, 5230; 1980).

At the same time, Biogen, the Swiss-based genetic engineering company whose board of directors includes Dr Walter Gilbert of Harvard and Dr Philip Sharp of MIT, is seeking permission to construct a \$5.5 million research and manufacturing facility in East Cambridge.

Both schemes would make it easier for senior research scientists to maintain their university positions while working as consultants for the companies. In the case of Harvard — which 2 years ago agreed to license the rights to Dr Gilbert's insulin research to Biogen — the university would be able to invest its share of the profits from the new company in further research.

Inevitably, both plans have caused controversy. Harvard faculty members have been concerned about the potential conflict of interests between the goals of the proposed company and the university's commitment to basic research; Biogen's plans were the subject of a public meeting held on Tuesday before the Cambridge Biohazard Committee to discuss whether any conditions should be placed on the company's activities.

The Harvard plan was the brain-child of Dr Mark Ptashne, professor of biochemistry and molecular biology. Initially it had been proposed that the company would, at least temporarily, rent space in the university's biology laboratories; that postgraduate students might be able to work for the company while retaining university appointments; and that finance would be largely provided by the pharmaceutical company Eli Lilly, which had earlier bid unsuccessfully for the licence to Dr Gilbert's research.

Following an intense debate over the

summer, various steps have been taken to keep the company, as one university official describes it, "very much at arm's length". For example, it has been agreed that, even if the university's involvement is approved, the company will seek separate premises.

In addition, although some Harvard scientists would be shareholders in the company and could be employed on a one-day-a-week basis as consultants — the generally accepted limit to outside commitments — direct overlap with university research staff would be minimal.

Financial support would probably come from outside sources of venture capital under a scheme being worked on by the Harvard Management Company, which manages the university's endowment.

The proposed organization of the company and its relationship to the university was discussed last week at a meeting of the faculty of arts and sciences. Although no formal decision was taken, Mr Daniel Steiner, Harvard's general counsel, said after the meeting that he saw "no overwhelming obstacles" to the plan being approved by Dr Bok, adding that the university "would not have gone as far as we have" if it had not been seriously interested in the project.

Ironically, the faculty meeting took place the day after Biogen had told the city council in Cambridge that it wished to build a research and manufacturing facility in the city. At present, Biogen's main research facilities are in Geneva; and it is rumoured that one of the reasons for

planning to build the new facility in Cambridge is the difficulty that has been experienced in obtaining Swiss work permits for US postdoctoral students.

Biogen's proposal was due to be presented on Tuesday to the Cambridge City Biohazard Committee, a subcommittee of the City Health Policy Council set up in 1976 after an intense local debate to monitor recombinant DNA research in the area.

More criticism was expected at the meeting. Ex-mayor Alfred E. Vellucci, who previously led an unsuccessful fight to ban all recombinant DNA research in Cambridge, was equally opposed to a "DNA factory" coming to Cambridge now.

Others thought that — particularly in the light of the investment fever that swept Wall Street two weeks ago over the public offer of shares in the San Francisco company Genentech — Biogen is unlikely to encounter substantial opposition.

If the Biogen facility gets the go-ahead, it is likely to be partly financed from a \$20 million equity investment which the chemical company Monsanto is to make in the company. Also, the two other major equity holders — Shering Plough and International Nickel — have increased their equity by \$8.8 million.

In a separate development, the Dow Chemical Company announced that it was making a \$5 million investment in another small Massachusetts biotechnology company, Collaborative Research, of which Dr David Baltimore is chairman.

David Dickson

Few complaints on education

Washington

US science and engineering efforts are basically on an even keel, even if there are a few selective vacancies among the crew, the officers do not understand too much about how the engines work and the passengers occasionally question the course that is being followed.

This seems to be the main message of a long-awaited report on the state of US science and engineering education, requested by President Carter in February from the National Science Foundation and the Department of Education, and published in Washington last week.

The request, largely prompted by the President's Science Advisor, Dr Frank Press, responded to certain concerns expressed about aspects of educational policy in these two fields. These include a well documented decline in performance by US school-children in science-related subjects, difficulties faced by the armed forces in retaining technically trained recruits (much talked about after the failure of the attempt to rescue the hostages from Iran) and warnings of the dire consequences of apparent Soviet educa-

tional supremacy.

But whereas in the mid-1950s the launching of the Russian Sputnik was seen as a challenge which led to a massive injection of new funds to revitalize US efforts to improve scientific and technical skills, the new report implies that there is little need for general alarm — or any major investment of resources.

This time, the emphasis is on quality rather than quantity. The report concludes that the number of science and engineering graduates is likely to be adequate for the next couple of decades, apart from possible shortages in fields such as computer science.

Two main problems are identified: first, the increasing cost of providing a good engineering education, both in terms of employing good teachers and purchasing up-to-date equipment, and, second, evidence of a spreading "scientific illiteracy" which could have serious consequences in a world of increasing technical complexity.

It is the latter problem which provokes some of the strongest language in the report, with the claim that there is a

"desperate need" for curricula for students who are not interested in professional scientific and engineering courses, and that "the current trend toward virtual scientific and technological illiteracy, unless reversed, means that important national decisions involving science and technology will be made increasingly on the basis of ignorance and misunderstanding".

The evidence used to support this contention — headlined in the US press coverage of the report — is scarce. However, various background studies are quoted. These reveal, for example, that in 1976–77 about 48 per cent of grade 9–12 students were enrolled in at least one science class. This compares with more than 59 per cent in 1960–61, the crest of the post-Sputnik science education boom.

Among the proposals aimed at tackling the growing gap between the two cultures is the setting up of a President's Council on Excellence in Science and Technology Education, to act as a possible vehicle for presidential statements about the need to raise science and mathematical requirements for all secondary school students. Other suggestions include a federal inter-agency coordinating committee of public understanding of science and technology, various regional conferences to help state and local administrators to discuss with teachers and educationalists ways of improving the quality and attractiveness of science courses, and various measures to increase awareness of the need to prepare for career opportunities in science and technology.

On the question of whether the current supply of science and engineering graduates is sufficient, the report is reassuring. In terms of scientists, a background "staff analysis" says that the present supply is adequate to satisfy demand except in a few sub-fields of physical and biological science, and that in 1990 the aggregate number of new science graduates at all degree levels should exceed the number able to find jobs in the broad fields in which they are trained.

In engineering, the picture is less optimistic. The same analysis indicates that there are current shortages of trained computer professionals and most types of engineers at all degree levels, and it says that for computer professionals in particular a shortage at all degree levels is likely to persist beyond 1990.

The general conclusion, however, is that the numbers of new engineering baccalaureates should be adequate to satisfy demand for the services, with neither a rapidly increasing defence budget nor a major programme in synthetic fuels creating significant additional demands.

Where the report does pinpoint a cause for concern is in the supply of engineering teachers and equipment. In the first case, it suggests that increased support for university-based research projects, and possibly salary increases for researchers

approved by separate federal agencies, could reduce the rewards gap between industrial and academic careers.

In the second case, officials from the Office of Science and Technology Policy point out that the upgrading of university equipment is a principal objective of the extra \$600 million in basic science support which President Carter pledged in his economic revitalization package announced in August.

The report's proposals are now being debated inside the White House to find those which, at a time of general budget austerity, can still be squeezed into the budget request for the fiscal year 1982. In a covering letter to the report, Dr Frank Press says that the Administration intends "to enhance the capabilities of our science and engineering programs for education and research".

However, following a report which throws lukewarm water on some of the more extreme claims and fears that have been expressed over the past year — nothing very dramatic is expected.

David Dickson

UK higher education

Commons take stock

British universities have at last found some friends in the House of Commons, to judge from the report (published earlier this week) of the inquiry by the Education, Science and Arts Committee into the funding and organization of higher education. Specifically, the committee sternly rejects the implications of the question raised by the Secretary of State for Education and Science, Mr Mark Carlisle, that the pattern of university courses should be tailored to the forecast needs of skilled manpower in the United Kingdom.

The committee has also sided with the universities in its urging that steps should be taken to encourage more potential students to go on to higher education, thus denying Mr Carlisle's statement that the present participation rate reflects market forces and should not be "artificially boosted". The question of participation rates is crucial for the universities, faced as they are with the prospect of a declining demand for university places for demographic reasons.

On the administration of institutions of higher education other than the universities (polytechnics, technical colleges and the like), the committee does not go the whole hog with radical opinion and recommend a committee analogous to the University Grants committee for channelling funds in their direction. Rather, it advocates a committee to be responsible for planning and advice in the non-university sector, saying that the local connections that have grown up between local authorities and the institutions which they maintain are valuable.

The committee links its opinion on the participation rate with the financial

problems of higher education. It describes as "disappointing" Mr Carlisle's explanation of what is meant by "level funding" — the procedure by which the universities' budgets for the two coming years will "not be very different in real terms" from that for the present academic year. The committee says that the policy of "level funding" leaves no room for potential increases in the age participation rate, and that the government should instead devise a formula relating expenditure to student numbers.

The committee's approach to Mr Carlisle's delphic hope that there would be a "subject balance in broad terms in relation to the future of highly qualified manpower" was first to take advice on its meaning from his officials. For its pains, it won the supposed clarification that the objective was to translate "the very specific requirements of the market-place into very broad subject areas, grouping them in, for example, the technologies, the sciences and the arts subjects . . . to try to work out from such messages as can be derived . . . a subject profile which could be a guiding principle for the institutions of higher education".

While aspects of this opinion were echoed by others among the committee's witnesses, the committee says it found no agreement on what might be called the national need, and no workable suggestions as to how the task might be accomplished were put forward. The committee therefore recommends that the universities should indeed listen to such "messages" as they can hear, but that the suggestion that they should then attempt to work out "principles for higher education" should be rejected as impracticable.

The committee also asks that the University Grants Committee should be made more independent of the Department of Education and Science, perhaps by recruiting its own officials, not borrowing them from the department. It applauds the setting up of the Merrison committee, intended to look into the joint support of the University Grants Committee and the research councils for university research, and approves of the consideration now being given to the concentration of resources in those establishments where research is most vigorous.

For the rest, the committee gives its blessing to the department's present investigation of student loans, asks for a better definition of the problems of different fees for home and overseas students and suggests that the concept of tenure should be re-examined. The committee is judicious on the last point. It acknowledges that tenure is an important ingredient of academic freedom, but asks that it should not stand in the way of change. One solution, the committee suggests, would be for academics displaced from unwanted departments to be offered "fair redundancy".