laboratory accommodation and equipment as well as $50 million over ten years for running costs. Both sums are indexed against inflation, while the hospital administration will be allowed to charge an overhead percentage (within the $50 million) equal to that agreed from time to time with NIH.

Under the agreement, the hospital is required to patent all inventions arising from sponsored work, but at Hoechst's expense. The company will be automatically entitled to an exclusive licence for exploitation, but the hospital will be able to take back the rights of exploitation if the company delays for more than three years: the agreement specifies that the director of the new department of molecular biology should be Dr Howard Goodman, who is already in post. One of the potentially contentious points in the agreement is that senior appointments be decided "after consultation with the company". The agreement also requires that those appointed should be "as appropriate" recommended for tenured appointments at Harvard Medical School.

On publication, the agreement requires that the company should be sent a copy of any proposed publication 30 days before this is sent off for publication, during which period the company will decide whether patentable discoveries are involved: all those employed at the department will be required to sign service agreements declaring that the hospital authorities will be notified of any possibly patentable discoveries. Collaboration with others is permitted, provided that Hoechst's exclusive patent rights are not prejudiced. Consultancy for other companies and organizations is permitted so long as there is full disclosure and discussion with the director of the department.

The agreement also defines the way in which the proceeds from patent exploitation will be shared between the inventors, their department and the hospital at large. The agreement says that royalty percentages negotiated should ordinarily be half those appropriate to commercial agreements, and that royalty income should be deductable from the annual payments to which the company is committed.

The agreement now published is very similar to the outline account of it given to the Gore committee earlier in the year, so it is not obvious why the hospital withheld it from the committee.

SERC director looks to the future

Britain must collaborate with its European neighbours if it is to have a stake in building major new research facilities in the future, according to Professor John Kingman who succeeded Sir Geoffrey Allen as chairman of the Science and Engineering Research Council (SERC) on 1 October. Precisely how big and costly a facility will be before international collaboration becomes worth while will depend on SERC's future resources and on the needs of potential collaborators. But if SERC was embarking now on some of the major facilities it agreed in the mid-1970s then international collaboration would almost certainly make sense, according to Kingman.

Indeed, the council is already looking for European partners to help with the construction of the spallation neutron source at the Rutherford Laboratory which, at an estimated cost of £15 million, is due to come on line during 1984. One possible collaborator is Germany which has considered building a similar facility of its own. But the council has also held discussions with other countries which may wish to use the facility.

SERC's difficulties over building major facilities began in the late 1970s when its budget failed to keep up with inflation, forcing it to lengthen construction times for major facilities and leading to an inefficient use of resources. Worst affected has been the nuclear structure facility at the Daresbury Laboratory which was originally due to come on line in 1978. Technical difficulties and a shortage of money at the right time have delayed its commissioning until March 1982, although the capital cost (£13.5 million at 1980 prices) has kept roughly in line with inflation. The synchrotron radiation facility also at Daresbury, which was commissioned last June eighteen months behind schedule, has suffered a similar, but less acute problem.

Despite a static budget, however, SERC has had some recent successes. Kingman is particularly impressed with the work of the council's three directorates in encouraging collaboration on engineering research between academics and industry. The council set up its fourth directorate in biotechnology last week (see this page) but Kingman is doubtful that it can afford to set up a fifth in microelectronics unless it can transfer responsibility for those in marine and polymer engineering to industry in general or the Department of Industry in particular.

One of Kingman's major problems will be how to maintain the quality of science in British universities which are suffering an unprecedented cutback in income. Although he is sceptical of government promises to maintain the real value of the science vote, he says that he is determined to maintain spending on research grants and studentships at least at its present level. That could mean convincing the Advisory Board for the Research Councils, which divides the science vote between the five research councils, that SERC should have a larger slice of the cake. It will also mean maintaining numbers in the face of overall cuts in research studentships already made by the Department of Education and Science.

Judy Redfearn

UK biotechnology

Still striving

The British Science and Engineering Research Council (SERC) last week launched a new directorate to foster collaboration in biotechnology between academics and industry and to forestall any brain drain of British biotechnologists to greener pastures abroad. The new biotechnology directorate is partly a response to a major study, chaired by Dr Alfred Spinks, which recommended nearly two years ago that Britain must act swiftly if it is not to lose out on the commercial development of biotechnology. Contrary to appearances, however, SERC has not been tardy in its response, according to Dr Geoffrey Potter, who will lead the new directorate. SERC's specialist panel on biotechnology spent the past year working out precisely what to do.

The biotechnology directorate will perform a function similar to the existing SERC directorates in polymer and marine engineering except that it will report to both the science board and the engineering board, reflecting the broad spectrum of research that biotechnology encompasses. One of its most difficult tasks, according to Dr Potter, will be to motivate process engineers, notoriously more reluctant than microbiologists to seize opportunities in biotechnology.

The directorate's funds will only be modest, £1 million this year rising to £2.4 million by 1984–85. The extra money will come from the Advisory Board for the Research Councils and from economies in SERC's other activities.

Most of the money will be spent on fostering collaboration through schemes already used by SERC to get industry involved in research in universities. These include the teaching company scheme and Cooperative Awards in Science and Engineering (CASE), both of which support postgraduate students on research projects relevant to collaborating companies, and the cooperative grant scheme whereby SERC and collaborating companies chip in to the cost of research projects in university laboratories.

SERC is particularly keen to encourage collaboration on fermentation, enzyme and immobilized cell technology, separation and concentration technology, product processing and recombinant DNA research. The directorate is to work closely with the Department of Industry which may take over funding of projects approaching the development stage, and with the Agricultural Research Council and Medical Research Council, both of which also support biotechnology.

One of the directorate's aims, according to Dr Potter, is to create sufficient jobs to dissuade British biotechnologists from taking posts in industry and universities abroad and even to persuade those who have already left to return. Dr Potter's concern about a possible brain drain is

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shared by the members of a Royal Society working party, chaired by Professor W.D.P. Stewart, which will shortly publish a report on biotechnology and education.

The working party estimates that over the next ten years Britain will need 1,000 extra graduates and 4,000 technicians trained in biotechnology. It does not, however, favour new undergraduate courses specifically in biotechnology; training should insted be based on existing undergraduate courses in biology and chemical engineering followed by more specialized postgraduate courses.

The working party also supports a recommendation originally made in the Spinks report that the University Grants Committee should create 20 new lectureships in selected universities. That request, together with many of the Spinks recommendations, received short shrift from the government, which said in a White Paper earlier this year that the development of biotechnology in Britain should depend on market forces rather than government intervention. **Judy Redfearn**

Hungarian protests

The use of psychiatric methods to treat political dissent has reappeared in Hungary for the first time in more than a decade, with the confinement in a Budapest mental hospital of Dr Tibor Pakh, a 57-year-old lawyer and activist from 1956. Dr Pakh's hospitalization evoked a sharp letter of protest from more than 50 Hungarian intellectuals and scholars.

Since the rise of Solidarity, Dr Path has issued a number of open letters supporting the Polish liberalization and censuring the Hungarian authorities for echoing Moscow's condemnations of it.

On 4 October 1981, Dr Pakh attempted to travel to Poland. He was stopped at the Hungarian frontier, his passport and personal papers were confiscated, and he was forced to return to Budapest. On 6 October, when his protest to the Procurator General's office failed to obtain satisfaction, he began a protest fast in the University Church in Budapest. Three days later, he was forcibly conveyed to hospital, and given intravenous feeding and heavy doses of psychotropic drugs including haloperidol, one of the drugs used in similar cases in the Soviet Union.

The group of intellectuals who signed the protest letter maintained a constant stream of visitors to the hospital, demanding to see Dr Pakh and also forwarded their protest to Solidarity, who published it in their uncensored bulletin *Niezaleznosc*. The protesters apparently made their point, and on 26 October, Dr Pakh was released, ostensibly on "readjustment leave". **Vera Rich**

Interferon

Gamma winners

Molecular biologists at the Californian biotechnology company of Genentech have won the race to clone a sequence of DNA corresponding to γ interferon, the least understood member of the family of proteins which may yet find a place in the therapy of cancer and viral diseases. At the same time Molloy Laboratories, a subsidiary of Revlon, have been contracted by the US National Cancer Institute (NCI) to purify sufficient γ interferon from natural sources for initial clinical trials.

The Genentech results, briefly presented by Dr David Goeddel at the Second Annual International Congress for Interferon Research in San Francisco, not only establish the sequence of γ interferon but also show that bacteria, yeast or mammalian cells are able to produce γ interferon when supplied with the corresponding sequence of DNA.

The starting material for both Genentech and Molloy was human lymphocytes, prime producers of γ interferon. From them Genentech isolated a mixture of messenger RNA molecules, produced the complementary DNA molecules, and transplanted them into cells of the bacterium *Escherichia coli*. Bacteria were then isolated which were producing the antiviral activity of interferon but with the instability towards acid that distinguishes γ interferon from the α and β varieties. Finally the DNA responsible for that activity was sequenced and shown to be about the same length as that of α interferons but with an unrelated sequence.

Human lymphocytes are also the starting material for the γ interferon that Molloy, in return for $270,000 from the NCI, are to produce by traditional methods of purification from normal white blood cells obtained as a by-product of blood transfusion. Their aim is to produce five billion units of γ interferon, enough for up to 1,000 human doses, by the end of September 1982.

It is a matter of speculation whether the Genentech and Molloy materials will be equivalent. A lot depends on whether there is a single γ interferon or whether, like α interferon, it is a family of related molecules. Genentech has no evidence of more than one species but if they do exist they are likely soon to be discovered either by the Genentech scientists or by those whom they beat to the first sequence, including Dr Charles Weissmann on behalf of Biogen, Dr Jan Vilcek of New York University Medical Center and Dr Leroy Hood of the Californian Institute of Technology.

The hope of all concerned is that γ interferon will be of greater value than its stablemates in the therapy of cancer. The hope stems from the fact that antitumour effects of interferon are thought to work through the immune system and that γ interferon is produced by and has effects on cells of that system. Reasonably large clinical trials of α and β interferon against cancer and viral diseases are currently under way using material purified from cells. It will be some time before their value is clear and even longer before it is known if γ inteferon is more effective. **Peter Newmark**

Royal Botanical Gardens

Look to the margins

This week sees a new man in charge of the Royal Botanical Gardens at Kew in London — Professor Arthur Bell, a biochemist, formerly head of the department of plant sciences at King's College. And it could mean a very different approach for an institution with a 140-year history of traditional botany behind it.

The Royal Botanical Gardens today include Kew together with a 600-acre estate at Wakehurst Place in Sussex, and are run as a department of the Ministry of Agriculture, Fisheries and Food with a scientific staff of almost 500. The emphasis is still very much on the traditional pursuits

Bell in situ *at Kew*

of collecting wild plant species (Kew boasts the world's largest herbarium) and taxonomy. Kew's new director, however, brings with him an enthusiasm for plant breeding not seen there before. And Professor Bell has a clear goal in view — to change the pattern of agriculture in the Third World.

At present just thirty plant species provide eighty per cent of the world's food supply. Many of these basic food crops are now grown in arid conditions far removed from those in which their free-growing ancestors used to thrive. Professor Bell's contention is that there are many indigenous crops used only as animal fodder, or unpalatable because of the presence of toxins, which would give better yields than today's food crops if suitable variants were selected. Therefore much of Kew's effort will centre on isolating variants of these so-called "marginal" crops which do not produce toxins, but which still grow well in arid climates. In this way perhaps Kew will again become the important source of new crops that it once was. **Charles Wenz**

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