

strains, ARC has no ready outlet but individuals have sometimes had to contend with the rather persistent advances of some of the several American companies that have been set up in advance of any British counterpart. A special relationship with a company, preferably British, would therefore suit ARC well.

For its part, BTG is believed to have board approval for starting the company and to have a managing director in mind. It has not, however, yet found a scientific director and has met with some refusals already.

One problem facing any potential scientific director is the need to ensure that the company is profitable within five years. That was also the BTG stipulation for Celltech but the problem is greater in plant breeding because the genetic manipulation of plants by modern techniques is far less advanced than is that of bacteria, which Celltech use to make products of commercial value, such as rennin.

Nevertheless the optimists believe that profits could be made within five years by concentrating initial efforts on the improvement of bacterial strains, particularly the nitrogen-fixing *Rhizobium*, which are used to inoculate crop plants and on the development of techniques of clonal and meristem propagation.

Finance for the new company is being arranged by BTG which is almost certain to provide at least one third of the money from its own, governmental coffers. The rest will be raised from private sources.

Peter Newmark

University admissions

Still squeezed

Applications from home and European Community students for undergraduate courses at British universities are likely to be six per cent up this year on last, according to figures released by the Universities Central Council on Admissions (UCCA) (see table). But admissions to courses starting in October 1982 are expected to be down on admissions in October 1981.

This is no surprise. The government has implemented its policy of limiting university places just when the number of 18 year olds in Britain is increasing. Hence, the previous policy of gearing university places to demand has been abandoned. The Department of Education and Science, in recent evidence to the House of Commons Public Accounts Committee, has thrown

light on how this policy may affect potential students. The table below shows the department's estimate of the numbers of potential students that may be deprived of a university place in the academic years 1981-82 to 1983-84.

Understandably, universities hope to make up the fees lost from home students by taking in more students from overseas. But their aim has been made more difficult since the government removed the subsidy from overseas student fees. The figures clearly show that full economic fees have deterred a high percentage of potential overseas applicants.

The number of overseas admissions, however, is not necessarily a constant proportion of applications. UCCA statistics suggest that the shortfall in acceptances of places from overseas students in October 1981 over October 1980 was only 19 per cent, compared with the 34.5 per cent shortfall in applications. But statistics compiled by the University Grants

Annual percentage change in applications for undergraduate courses at UK universities

	1980 over 1979	1981 over 1980	1982 over 1981
Home students	+3.5	+4	+6*
Overseas students	-12	-34.5	-20*

*Estimates.

Committee (UGC) suggested an even smaller shortfall in overseas admissions: only two per cent in 1981 over 1980. This apparent discrepancy seems to be explained by the fact that UGC includes admissions for more non-degree undergraduate courses than does UCCA. So it seems that overseas students are now opting for shorter, less costly courses.

Last week, the House of Commons Public Accounts Committee published the report of its findings on the administration of university grants. The committee seemed pleased with the move by the education department to reduce the amount of university income not subject to cash limits by transferring the grant paid to home students for their fees directly into the universities' purse. The universities are praised for keeping their student intake on target last October (a 4 per cent shortfall over the previous year) — but the polytechnics, and other institutions of higher education, come in for a drubbing for increasing their intake by 18.2 per cent over the previous year. The committee's report urges that the body now being set up to control higher education outside the university sector be developed quickly with full co-operation of UGC and laments the fact that steps to coordinate all aspects of

higher education had not been taken before the cuts to the universities.

The parliamentary committee also seemed satisfied by assurances that the universities are taking care not to offer new tenured appointments with no redundancy clause. The Committee of Vice-Chancellors and Principals has been looking at more flexible forms of contract.

Judy Redfearn

US research support

Question of size

Washington

In coming weeks, the US Congress will probably pass legislation that would give a major shot in the arm to small research and development firms in the United States, many of which suffer in the present economic climate, yet which are major sources of new technical inventions. The legislation is not final, however, and is subject to considerable opposition voiced by spokesmen for the universities and government-sponsored basic research.

The National Science Foundation (NSF) estimates that there are 13,000 small firms in the nation, defined as independently owned firms with 500 or fewer employees and performing research and development work. Although numerous, accounting for 85 per cent of firms involved in such work, these small companies in fact spend only 4 per cent of all industry research and development dollars. In contrast, giants such as McDonnell Douglas and IBM spend 87 per cent of US industry's investment research.

Yet there is ample evidence that most innovations come from small firms. One 1976 study showed that small firms produce 24 times as many innovations per research and development dollar as large ones, even though the small firms receive only 2 per cent of total federal support for industrial research.

Small business found a champion last year in Warren Rudman a freshman republican senator from New Hampshire. Rudman introduced a bill that would set aside one per cent of all federal research and development funds — which total some \$40,000 million — for small firms. They would compete for the money by applying to separate federal agencies for grants, awarded on a peer review basis, as seed money. If the work was fruitful, some firms would qualify for follow-on funding. In a third phase, the money would have to come from the private sector, or from other government sources if the government was interested in the company's work.

The plan was modelled on the Small Business Innovation Research Program run by NSF, and a newer, similar programme run by the Department of Defense. The NSF programme gave some \$5 million in seed money to 42 small firms in 1977. By 1981, the 11 of them that qualified for follow-on funding had

No. of home students, aged under 21, entering university (thousands)

	1980-81*	1981-82	1982-83	1983-84
UGC targets	67.3	65.2	63.1	60.9
Target to maintain 1980-81 age participation rate†	67.3	68.5	70.4	69.5

* Actual intake

† Age participation rate is the percentage of 18-21 year olds in the population entering university, which was 7.5% in 1980-81.

succeeded in raising \$41.4 million in outside capital and equity. Moreover, the programme apparently created jobs. The 11 firms had employed 261 people in 1977; by 1982 they employed 616 people. The most spectacular growth was in a genetic engineering firm, Collaborative Research of Lexington, Massachusetts, which received \$25,000 in seed money in 1977 and by 1982 had raised \$24.9 million from outside sources.

The Rudman bill made a spectacular passage through the Senate in December. Of the Senate's 100 members, 85 were co-sponsors of the bill, and it passed by a vote of 90 to 0. One modification exempted the \$10,000 million in-house federal research and development from the calculation. A second modification was an amendment introduced by Senator Harrison Schmitt limiting the amount of funds to be set aside that could be taken from federal basic research budgets. This amendment was an attempt to placate spokesmen for the basic research community and universities who attacked the bill as a raid on basic research funds. They argued that development work in most federal agencies has powerful protectors, whereas basic research does not. In the Department of Defense, for example, the contractors and armed services buying the MX missile, or Trident submarine, would keep their research and development funds from the amount set aside, so that the basic research funded by the Department of Defense would be unduly thinned.

One fear being raised by university spokesmen is that the small firms' share of the federal research and development pie will grow, at the universities' expense. The proposed one per cent sounds modest enough, but any amount would take some funds away from federal basic research at a time when such money is becoming scarce.

Some university spokesmen argue that small firms do not do basic research of high enough quality to qualify for federal funds, and that a set-side programme will allow them to adhere to this lower standard. They argue that such firms should compete with universities and other traditional research groups. Several federal agencies prohibit for-profit firms from applying for research grants, although the National Institutes of Health has now lowered this barrier.

In the coming weeks the House will have to decide which version of the legislation it will pass. The variant most palatable to university spokesmen is that proposed by Don Fuqua, chairman of the House Science and Technology Committee. This would leave oversight of the programme to the authorizing committees of Congress for each of the federal agencies involved, thus allowing them to devise individual set-aside programmes or exempt the agencies under their jurisdiction.

The version most likely to pass, however, is a bill put forward by John J. LaFalce, which is modelled on the original

Rudman bill but is even friendlier to small business. The LaFalce version would make the money set aside not one, but three per cent of all federal research and development, and does not exempt federal in-house research from the calculation. The LaFalce version would make \$1,200 million available to the small firms in the first year — contrasting with the more cautious Rudman bill, which phases in the programme, reaching the \$300 million level in the third year. But in view of the opposition to the set-asides that has surfaced elsewhere in the House, it seems likely that the LaFalce forces would be satisfied with a final version limiting the set-aside to one per cent, having a three-year phase in period, and a feature limiting the "raid" on basic research.

Deborah Shapley

Polish Academy of Sciences

Slow progress

Poland's new legislation on the Academy of Sciences will ensure parity of funding for the institutes of the academy and the research institutes of the production ministries, according to Warsaw radio. A main concern of Polish scientists has been the lack of separate budgets for the various institutes funded on the principle of dividing research into "problems" funded nationally. The new bill, which is under discussion by the Council of Ministers (Cabinet), thus seeks to redress one of the major grievances of the academy scientists expressed at last September's National Congress of Solidarity in Gdansk. It therefore forms part of a current tacit policy on the part of the ruling Military Council for National Salvation (WRON) to grant various "social" demands from the Solidarity programme while keeping open the question of the future of the independent trade union movement.

Much, however, remains uncertain, and nothing has been announced so far about one of the most contentious issues — the status of the Secretary of the academy. At present, the incumbent of this post holds quasi-ministerial rank, and is responsible in the first instance to the prime minister, not to his fellow academicians. During "renewal", as part of the nationwide drive towards "self-governance", there were strenuous moves (headed by the academy lobby within Solidarity) to change this anomalous state of affairs and ensure greater autonomy for the academy, thus ending the long-standing friction between the members and scientific employees of the academy on the one hand, and the academy bureaucrats on the other.

There has also been no news since the military council took power of many other proposed reforms, despite their apparent innocuousness. For example, it was proposed that the academy should decide, on purely academic grounds, whether or

Call from arms

Washington

At its annual meeting in Washington the National Academy of Sciences (NAS) made one of its rare ventures into public policy pronouncements. The assembled members adopted a resolution calling on the President and Congress and their counterparts in the Soviet Union "to intensify efforts to achieve an equitable and verifiable agreement" limiting strategic arms, and to "reduce significantly the number of nuclear weapons and delivery systems". The resolution further urged them to reduce the risk of accidental war, to inhibit proliferation of nuclear weapons, and to "continue and observe" all arms control agreements including Salt II, signed by the United States and the Soviet Union in 1979 but not ratified by Senate. Finally NAS urges the avoidance of "military doctrines that treat nuclear explosives as ordinary weapons of war".

The NAS resolution makes no mention of the "nuclear freeze" urged by other groups around the country. It was passed almost unanimously, with a few abstentions and one dissenting vote. Proposer for the resolution was Marvin Goldberger, president of California Institute of Technology and chairman of the academy's Committee on International Security and Arms Control. The resolution was sent to the President via his science adviser, George A. Keyworth II.

Deborah Shapley

not its members should be able to travel abroad. At present, non-scientific criteria still play a major role in such decisions. The emergency regulations on foreign travel for scientists stress that the would-be traveller must be given a thorough political vetting.

Not surprisingly, this can pose problems for academy scientists. A case in point is that of Artur Swiergiel, a young physiologist who, since last October, has been researching at the Babraham Institute of Animal Physiology in Cambridge.

Mr Swiergiel had a six-month scholarship under an agreement between the British Council and the Polish Academy of Sciences. Last November, realizing that he would need extra time for his experiments, Mr Swiergiel applied for an extension. On 31 March, he received a telegram from Professor Maciej Zurkowski, director of the academy's Institute of Animal Breeding and Genetics, confirming the extension. Three weeks later, a second telegram arrived, stating that Professor Zurkowski had been informed by "the academy" that the extension had been refused. No explanation was given — but Mr Swiergiel had formerly served on the Warsaw regional executive of Solidarity.

Vera Rich