

Indian science

Foreign software giants pounce

New Delhi

INDIA now has a new kind of brain drain to worry about. Added to the old problem of the loss of highly qualified scientists to posts abroad is an "internal haemorrhage" to foreign high-technology companies that are coming to India to take advantage of the low salaries.

Liberal policies on collaborations allow drugs and electronics companies to switch some labour-intensive development work, such as software engineering, to India, where salaries are a third to a fifth of those in the West. The major losers are the national laboratories and universities, which see some of their brightest scientists going to the new arrivals.

Texas Instruments of Dallas, Texas, has already recruited 25 top Indian software engineers for its wholly owned subsidiary at Bangalore, India's Silicon Valley. Texas Instruments will use the programs developed to design very large-scale integrated (VLSI) chips. The programs will be exported via satellite to Dallas using the company's own Earth station at Bangalore. On labour costs alone, Texas Instruments expects quickly to recoup its \$6 million investment.

Following hard on the heels of Texas Instruments is Peat, Marwick and Mitchell, the world's largest accountancy firm, which is planning to set up an even bigger facility near New Delhi to prepare software for its worldwide computer operations. And the US company Citibank has set up a subsidiary near Bombay Airport to produce software for Citibank's internal use and for sale world-wide.

Last year, California's Fortune Systems signed a deal to buy software developed by Kirkoskar Computer Services in Bangalore for worldwide distribution. Other electronics companies such as Digital Equipment Corporation and

Hewlett-Packard have hired Hinditron of Bombay to develop new programs.

The Japanese are also cashing in on cheap labour: last year PSI Systems was established in Bangalore to develop software for Japanese companies. The Indian Department of Electronics, which approved these collaborations, is happy that the software deals are earning foreign exchange while keeping the best brains at home and gainfully employed.

But it is not just the software engineers who are in demand. The Swedish pharmaceuticals company Astra has set up a subsidiary in India to carry out basic research on drugs for tropical diseases. The company will be able to use actual pathogens (instead of test strains) and to conduct animal trials in India at one-twentieth of the cost in Sweden. More important, the subsidiary can test the finished drug on Indians before Astra markets it in the developing world. Astra's subsidiary in Bangalore has taken the cream of Indian biochemists, including the chief biotechnologist of the Indian Institute of Science. The Astra project was strongly opposed by the Council of Scientific and Industrial Research (CSIR) in that it drained Indian talent for the development of drugs "that will ultimately be sold to us". The Department of Biotechnology, however, considers it an "excellent model" of collaboration.

Astra's successful entry has encouraged other drug multinationals. Pharmacia and Hoechst are already setting up research centres in India. At least six other drug companies have submitted similar proposals to the Indian government. Critics say the invasion by foreign subsidiaries is a form of technological colonization, and that they are taking away India's best brains to fight its own companies.

K.S. Jayaraman

Hungarian science

Travel broadens the budget

Budapest

HUNGARY'S new system of grants for basic research comes into operation this month. An injection of 4,000 million forints (£66 million) for the period to 1990 makes Hungary one of the few countries in the world, and the only one in the socialist bloc, to be increasing its investment in pure research. But the sums involved are relatively modest even by Hungarian standards (a senior university professor earns about 15,000 forints a month basic) and it is not yet clear how much of the available funds will be in "hard currency".

The new fund comprises 2,000 million forints for instruments and equipment, to be shared out among research institutions and universities, and 2,000 million forints to be distributed for projects carried out by individual scientists or teams. Project grants have been decided by two special committees of the Academy of Sciences (for the natural sciences and for the social sciences and humanities).

The need for the grants was explained last year by the General Secretary of the Academy of Science, Dr Lenart Pal, who admitted that without a rapid injection of cash Hungarian science would lose its ability to make major advances at the international level.

The lack of money for pure research has had several results. More scientists have taken on contract work for industry and agriculture. And, because hard currency is in short supply, scientists have to apply, often months in advance, for special permission to purchase standard reagents from Western countries, while many major items cannot be bought at all.

Foreign travel is fast becoming a mainstay of Hungarian science. This too costs hard currency — but far less than providing facilities in Hungary, and much can be accomplished by exchanges with foreign laboratories. But this can mean that researchers have to plan experiments for their next trip abroad and spend their time in Hungary writing up their previous trip. This promotes international cooperation, but is not particularly beneficial to young researchers.

Finally, there is the problem of keeping abreast of world literature. So far, most Hungarian institutions are managing to keep up their hard currency subscriptions, though constantly rising subscription rates mean that every year one or two of the less frequently used titles have to be dropped.

The new research grants are not intended as an advance for Hungarian pure research — rather as a holding operation to stop, or at least retard, a downhill slide.

Vera Rich

Small step forward for ice minus bacteria

Washington

ADVANCED Genetic Sciences fights on. The California biotechnology company, fined earlier this year for improper testing of its ice-minus bacteria, has announced Environmental Protection Agency (EPA) approval of its second round of test results. This frees the company to find a site for field trials but does not revoke the suspension of its experimental use permit, imposed in March, which cannot be lifted until the new site is evaluated. Delay has dogged ice-minus experiments since Advanced Genetic Sciences first obtained the go-ahead in November 1985. Tests of the *Pseudomonas* bacteria, which protect plants against frost damage by thwarting

ice nucleation, have been the subject of federal lawsuits and congressional subcommittee hearings (*Nature* 320, 2; 1986). Similar tests proposed by the University of California have weathered environmental impact assessments and a temporary restraining order. But the university's recent pledge to re-examine safety issues will postpone its experiments until at least next spring.

Local opposition and EPA requirements forced Advanced Genetic Sciences to abandon its site in Monterey County. But a company representative said that since last week's announcement, they had received many calls from residents of other areas offering test sites.

Karen Wright