

## Industry/university

## Takeovers and interfaces

FOR its size, Sweden has a remarkable number of large and internationally-known science and technology-based companies, which are in the habit of investing heavily in research and development. A new habit, which characterizes the past two years, is for these companies to grow by means of takeovers or mergers. For example, ASEA, Sweden's engineering giant, has just received government approval for a merger with its Swiss counterpart, Brown Boveri, and Volvo has bought up Sockerbolaget, Sweden's only sugar company.

But perhaps the most striking merger is that between the companies obliquely referred to in a rhetorical question posed in the recent OECD review of Sweden's national science and technology policy: "Can you imagine today a biochemical laboratory without ultracentrifuges, without electrophoresis, without exclusion chromatography — in short, without Swedish contributions to the science of separation of large molecules, and without Swedish products and equipment adapted to achieve these separations?"

No prizes for guessing that the reference is to Pharmacia and LKB. A small prize if you knew that Pharmacia now



Pharmacia Group headquarters in Uppsala.

owns LKB, but a big one if you knew that a major contribution to the group profits of Pharmacia now comes from prescription sales of a chewing gum that substitutes a new form of nicotine intake for the traditional one of smoking.

The gum came with the acquisition of Leo, another Swedish pharmaceutical company — for that is Pharmacia's core business, whatever the perception of laboratory scientists. Leo, LKB and other acquisitions all came in a flurry last year, hard on the heels of an attempted takeover of Pharmacia by Fermenta, which began to go wrong when Pharmacia, among others, questioned the falsely-claimed doctorate of Fermenta's chief

executive, Refaat El-Sayed.

A temporary price, at least, is being paid for Pharmacia's acquisitiveness. Profits were unchanged for the first half of this year despite a massive increase in turnover, and management still has to smooth some of the joins. Most amused by it all are the competitors-turned-colleagues in LKB and the biotechnology division of Pharmacia. The competition had become fiercer over the years as Pharmacia, which began by producing the separation products referred to in the OECD review, and LKB, which began with the separation equipment, each tried to build up their missing halves. The unanswered question is why the complementary halves of the separation business did not get together before now, particularly when they both sprung from the same source, Uppsala University.

It was the university's Theodor Svedberg who both pioneered the use of the ultracentrifuge for protein separation and was a major influence in LKB's foundation in 1943. Many of LKB's products were based on the techniques of electrophoresis devised by Svedberg's student, Arne Tiselius.

And it was Tiselius who persuaded Pharmacia in the late 1950s that it would be worthwhile marketing a cross-linked dextran, Sephadex, for the separation of large molecules by gel filtration. Pharmacia was already selling dextran, discovered by Tiselius's student Björn Ingelman, as a blood plasma volume expander, but had found no use for cross-linked dextrans, until Jerker Porath and Per Flodin, also both students of Tiselius, stumbled upon their value in protein separation. At the time, Flodin was in Pharmacia and Porath in Tiselius's laboratory.

A long-time advocate of the marriage of Pharmacia and LKB, Porath has mixed views on their effect on university research. The individual companies, let alone their combination, are a strong draw for academics, he says, recalling the time that Pharmacia bought out his whole affinity chromatography group.

Nevertheless, he has always been a great advocate of links between science and industry, as makes sense for someone who has continued regularly to contribute new separation techniques to science. In the late 1960s, he and Tiselius formed a company to hold and licence patents arising from their work and so successful has it been that he claims to have paid more back to STU (see below) than any other private individual. The downside, says Porath, who retires from the University of Uppsala this year, was that "15 years ago I was a very suspicious person

even in my own faculty".

Times have changed, and in common with all industrialized countries, there is a new awareness on the part of Swedish scientists of the benefits of flirting with industry. Playing matchmaker is Styrelsen för Teknisk Utveckling (STU), the National Board for Technical Development, which is an agency of the Ministry of Industry.

STU, like its counterparts elsewhere, has a somewhat bewildering variety of



Jerker Porath — one of Arne Tiselius's students and formerly "suspicious" in his faculty.

ways of spending its budget, which amounted to SEK 750 million in 1985/86 (in which year a total of SEK 20,000 million was spent on R&D in Sweden). Its activities range from providing grants for pre-competitive research, in part through a Technical Research Council, to the support of technology and product development. The first of these activities accounts for 45 per cent of STU's budget, and is spent mainly on postgraduate training and major coordinated research programmes, predominantly in computers and electronics. For example, STU was influential in increasing the number of PhDs in microelectronics from 20 in 1978 to 120 a few years later.

Another 40 per cent of STU's budget supports the development and propagation of technology, mostly in cooperative programmes involving both industry and institutes of higher education. The remaining 15 per cent helps pay for product development, and is repayable for any product that is a success. "A 40 per cent success rate was achieved in one of our ten-year programmes", says Göran Friborg, who is involved in long-term planning in the director-general's office at STU, "which is too high. We should be taking greater risks, especially as venture capital is presently withdrawing from high technology".

Information technology, advanced production engineering technology, materials technology, new energy sources and biotechnology are priority areas for STU, but in the last it has suffered a setback. Stating that "what is now needed above all in Sweden is a significant effort in basic research in cell and molecular biology", the government failed to meet STU's request this year for extra funds for biotechnology and instead put them into the higher education coffers. □