SWEDEN

More Elitism, Encouraged With a Shot of Hard Cash

STOCKHOLM—Per Unckel is a man with a mission. The 45-year-old career politician, who has been Sweden's research minister since 1991, is planning the biggest shake-up of the nation's scientific enterprise in 40 years, cutting Sweden's universities loose from government control and kicking them into the competitive world of the late 20th century. His ultimate goal: A diverse, U.S.-style system with universities specializing to create world-class centers in the disciplines where they are strongest. And far from protesting these changes, the usually conservative Swedish research community seems happy to go along. The reason? Unckel has sweetened the pill by promising the "largest increase ever" for Swedish research funding—even as the government slashes other areas of public spending to tackle the burgeoning national debt.

Unckel's vision is a far cry from the academic research enterprise built up by the Social Democratic governments that have ruled Sweden for most of the past four decades. The government currently influences everything from faculty appointments to the kinds of research that individual universities pursue, and its benign sponsorship has produced a system that is the envy of much of the rest of Europe: Swedish scientists come second only to the Swiss in terms of citations per paper, and institutions such as Stockholm's Karolinska Institute (see box) are world renowned.

But this cozy arrangement is now coming under attack as the ruling center-right coalition struggles to pull the country out of its worse recession in memory. To remain internationally competitive, says Unckel, what's needed is some elitist thinking: "Higher education and research must be given extensive freedom, and the incentives to attain high standards." He talks of attracting top-flight foreign researchers to Sweden. He plans to double the number of Ph.D. candidates and has told the universities to start paying salaries to graduate students. He is cajoling the universities to "compete and challenge one another," and work more closely with industry. And he wants Swedish researchers to compete intensely for European funds as the nation gets ready to join the European Community (EC).

To achieve the promised budget increase, Unckel is siphoning $1.37 billion from the "wage earner funds" levied from industry by the Social Democrats. These funds were intended to buy shares in companies for the public (*Science*, 12 March, p. 1536), but Unckel now plans to plow them into three foundations that will distribute the spoils over the next 15 years. The largest, with some $820 million, is for industrially relevant research; an environmental science foundation, again slanted toward industrial applications, will get some $340 million; and the humanities will pick up the rest.

Why create new agencies, when Sweden already has an efficient research council system? "If I'd have wanted more of the same, I'd have put money into the old structures," says Unckel, arguing that research councils are fine for distributing project grants but are not equipped to run the large initiatives in areas like biotechnology and materials science that he has in mind. And while many academics would prefer to see the money go to the research councils, most don't want to rock the boat by complaining—particularly as the bill to release the wage earner funds for research is facing staunch opposition from the Social Democrats. "If it comes through, it will be very significant increase for research," says Carl Nordling, secretary-general of the Swedish Natural Science Research Council.

SVENSKT PRESSFOTO

Per Unckel

Researchers are similarly pleased with Unckel's conviction that the best way of improving technology transfer is to boost graduate programs and send more Ph.D.s out into industry. And his proposal to create new "centers of excellence" for research, closely linked to the universities, has also gone down well. The plan is short on detail, but the government's science policy bill, published in February, mentions the campus-based units funded by the Howard Hughes Medical Institute as a possible model.

Unckel's idea of drafting in scientists from abroad to kick the centers into life has, perhaps surprisingly, also won general support. Far from worrying about foreigners taking Swedish jobs, many scientists see an opportunity to entice the best young talent into research. "It's like a concert," says Uppsala University ion physicist Bo Sundquist. "If you have a big international star, it's an attraction." Indeed, Unckel's entrepreneurial spirit seems to be catching on: To woo leading foreign scientists, maybe we should "give them a limousine, a driver, and a nice apartment," muses Stockholm University biochemist Bertil Andersson.

Of course, there are critics. Many researchers say that Unckel's plan to convert graduate students into salaried employees could in fact scupper his plan to double the number of Ph.D. students by the end of the decade. Everyone agrees that it's a good idea to pay young scientists a steady wage. But universities will now have to pay employers' tax for their Ph.D. students, and Unckel has not so far provided full compensation, leaving graduate programs facing a cash shortfall of 10%, or more.

Other researchers complain that Unckel should do more to tackle the disinterest that many Swedish companies show toward research; and some fear that the government's current zeal for science stems from unrealistic expectations. "[They] seem to think that you can research yourself out of a crisis," says physical chemist Bengt Nordén of Chalmers Technical University in Gothenburg, and a member of the government's science advisory committee.

Nevertheless, Sweden's universities could be in for dramatic change over the next few years. Unckel wants faculty committees to begin operating more like research councils, applying tough evaluation to make sure that the best researchers get the lion's share of the multimillion-dollar block grants that the universities get each year for research. Faculties are also being pushed to merge the traditional small departments—often centered on a single professor—that hinder a multidisciplinary approach.

Most striking of all, two leading universities—Chalmers in Gothenburg, and Stockholm's Royal Institute of Technology—may step out of the state sector and relaunch themselves as private foundations to avoid having to deal with government red tape. Even with the greater freedom that Unckel promises, state universities will still need parliamentary approval for new buildings, complains mathematical physicist Olle Brander, dean of the Chalmers technical faculty. And a private university, he says, could create badly needed U.S. style assistant professorships—which aren't allowed under the Swedish state system. But many of the Chalmers faculty are skeptical, and even Brander concedes that it will be hard to raise enough money to become geniunely independent of the government.

Any ambitions to make Chalmers into a Swedish Stanford will, in any case, be squashed if the Social Democrats win the next election—which must take place within a year and a half, and could well be sooner, as

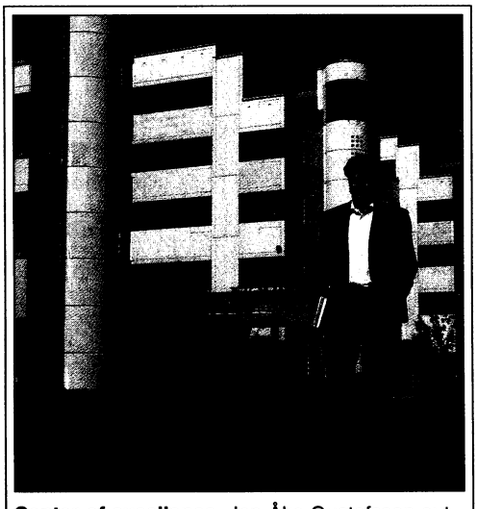
A Lot More Than a Nobel Heritage

Every fall, the biomedical research community's attention turns to the Karolinska Institute in Stockholm—as the world waits to learn who has won the Nobel Prize for physiology or medicine. But suggest to professors at this unique, free-standing medical school that their institute owes its reputation to the tradition of staging medicine's version of the Oscars, and you'll get an indignant response. "Our tradition is to avoid tradition," says neurobiologist Lars Olson. "We've been able to stay on top by doing new things."

Olson is referring to the consistently innovative research that has won the Karolinska its reputation as Europe's premier center in his discipline. But institute president Bengt Samuelsson notes that the Karolinska can also innovate in response to a changing political environment: It has pre-empted many of the government's current ideas to reform Sweden's universities (see main story). Next month, its archaic structure under which some 1300 researchers are divided into 150 tiny departments will be scrapped—creating 30 multidisciplinary units, chaired by department heads given real power to decide which projects should get the most bench space. And echoing the government's call for elitism, Samuelsson is setting up committees of senior faculty members that will act like "mini-research councils," rewarding groups doing the highest quality work with an extra-generous slice of the Karolinska's $42 million a year central research budget. The aim is to free resources that are "locked into petrified organisms," says virologist Erling Norrby, dean of the medical faculty.

Stewardship of the Nobel does have its advantages, however. "We always have lots of scientists coming through here," says Samuelsson—himself a laureate in 1982 for his pioneering work on prostaglandin biochemistry. Who, after all, would pass up an opportunity to come and talk to the people who hold sway over biomedicine's most glittering prize? But judging the Nobel is hard work: If you are one of the 15 Karolinska professors on the Nobel committee, "you leave for your summer vacation with a suitcase full of reprints," says committee secretary Nils Ringertz.

Certainly, no one can accuse the Karolinska of standing still. Construction workers are now midway through renovating the imposing 1940s red-brick lab blocks that make up most of the main campus in the Solna region of north Stockholm. And the last decade has witnessed an explosion of growth at the Huddinge campus, south of the city—courtesy of the local council, which has pumped money into the Huddinge site as part of a wider investment program designed to prevent the city's poor southern suburbs degenerating into a Swedish version of south central Los Angeles.



Center of excellence. Jan-Åke Gustafsson outside the Karolinska's modern southern outpost.

The driving force behind this development is steroid hormone receptor biochemist Jan-Åke Gustafsson, director of three research centers at Huddinge set up under the Karolinska umbrella, but paid for largely by the city council. The 100-person Center for Biotechnology opened in 1985 and has since been joined by similar initiatives in structural biochemistry and in nutrition and toxicology. Gustafsson says the idea was for all three to serve as "centers of excellence" in their respective fields—just like the campus-based research centers that science minister Per Unckel now wants to see established all over Sweden. Indeed, the Huddinge site is virtually a blueprint for many of Unckel's policies. As the minister is now urging, Gustafsson set out to attract top foreign scientists: An early recruit to the biotech center was the respected Finnish molecular virologist Henrik Garoff, brought in from the European Molecular Biology Laboratory in Heidelberg. And the gleaming building, called Novum, that houses the three centers is a model of academic-industrial partnership: It also hosts two regular Karolinska departments, a small spin-off drug company and a pain control research group from the Swedish drug company Astra.

Gustafsson's entrepeneurial style isn't to the taste of all of his colleagues, however. And the millions of dollars spent on the spacious modern labs at Huddinge have galled some researchers forced to endure cramped conditions at Solna—still the Karolinska's undisputed research powerhouse. Gustafsson dismisses the rivalry between the two sites as "playful tension," but others see dangers from this north-south friction. With Sweden's universities being encouraged to compete more strongly for funding, failure to present a united front could prove costly, warns Håkan Eriksson, one of Unckel's close advisers and a reproductive endocrinologist at the Karolinska Hospital.

So far, at least, Eriksson's prophesy shows no sign of coming true, as the Karolinska is slated to receive a full one-third of the government's investment in new university buildings over the next 3 years. There is no suggestion that standards are slipping, either: The only Swedes among the 100 most cited researchers of the 1980s—neuroscientists Tomas Hökfelt and Jan Lundberg—are both at the Karolinska. But Norrby agrees that there's no room for complacency. Aiming to be the best medical school in a small country like Sweden is not good enough, he says: "We want to compete with Harvard and with Yale."

–P.A.

the present government does not command an overall parliamentary majority. The Social Democrats have already said that they would not allow private universities to receive government funds. No one, however, expects the next government to reverse the general trend toward elitism. "[T]his will be a policy for the future," says neuroscientist Tadeusz Wieloch of Lund University.

Researchers elsewhere in Europe should get a taste of the Swedes' tough new competitive edge any day now. Although they have all the usual reservations about the Brussels bureaucracy, most Swedish scientists back their government's decision to join the EC—as they know that labs lying at Europe's northern fringes cannot rely on their location to ensure rich collaboration with their counterparts to the south. As part of the move toward EC membership, Sweden is about to become a full partner in the EC's research programs. Unckel, for one, confidently expects his scientists to win back in EC grants all of the money that Sweden is being asked to pay into the programs—and half as much again.

–Peter Aldhous