KOREA

Influx of Industrial Funding Shifts Balance on Campus

SEOUL—Things are looking up for Yook-Hyun Kwon, an engineering professor at Seoul National University (SNU) who works on computer-integrated manufacturing. Generously supported by eight industrial grants totaling $600,000, he works with the latest computer numerically controlled machine tools and automated guided vehicles. This state-of-the-art equipment and ample funding have attracted 12 graduate students eager to learn on the latest machinery. Kwon also gets government funding, but he says it is support from industry that allows him to keep pace with the fast-growing field.

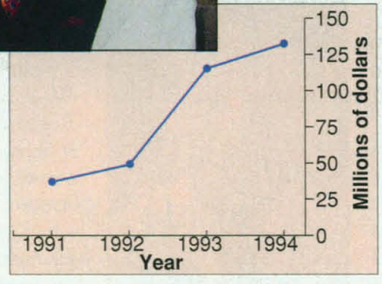
Across campus, geologist Chang-Up Bagg labors under very different conditions. He gets no industrial funding, and only $30,000 to $40,000 a year in government grants to support his work and that of his six graduate students. "Our lab needs instruments to record seismic activity, but I really can't dream of purchasing them," he says. "From time to time," he confesses, "I have paid for equipment with my own money."

While disparities across fields are common among universities in any country, they have become pronounced in Korea in the wake of rising contributions from corporations eager to bolster their own technological capabilities (see graph). Korean universities, which have been struggling to establish a research tradition on shoestring budgets and bare-bones facilities, welcome this outside support for new buildings, labs, and individual scientists. But it also poses a challenge to the balance among departments and existing academic standards.

The surge of corporate dollars reflects a big shift in attitude, helped along by a 1992 law that gives priority to university-industry cooperative projects in government R&D spending policy. "In the past, we didn't expect much to result from funds given to academia," says Young-Il Park, a manager at LG Information & Communication, a part of the giant LG business group. "But recently we've come to recognize academia as an important partner in R&D."

Park's company supports work at SNU and other major Korean universities, often based on personal ties to particular scientists. The partnerships also allow the company to spot talented young researchers it might want to hire after they graduate. The LG group is not alone. The Korean Ministry of Science and Technology (MOST) estimates that corporate support for university research nearly tripled between 1992 and 1994, reaching $133 million, and it appears to be continuing to rise.

D. NORMILE



Campus connection. The recent rise in corporate spending on academic research strengthens Korea's economy, says SNU's Joo.

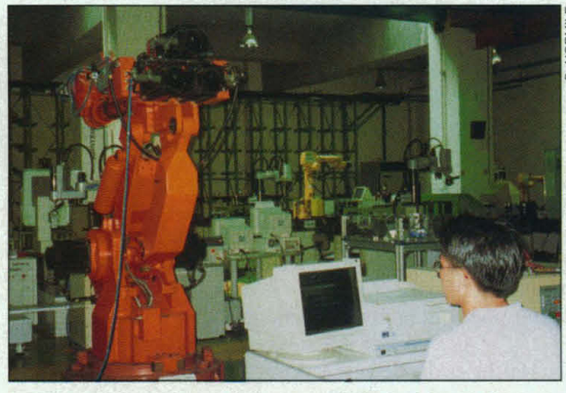
The boom is obvious on college campuses across the country. At Korea University in Seoul, for example, what just 3 years ago were playing fields and lawns have been transformed into three seven-story buildings with over 500,000 square meters of lab space. And these recently completed buildings come at no cost to the school, one of the nation's leading private universities. In return for putting up $120 million, 10 corporations are setting up their own laboratories in one of the buildings. Samsung Data Systems, for example, will use its space for software development, and Hansol Electronics is working on next-generation mobile phone technologies. The arrangement spares the companies the cost of buying their own land, a major factor on the crowded peninsula, and they gain ready access to university researchers. For its part, Korea University gets badly needed buildings—two now and a third in 30 years.

It's not just corporations that are recruiting universities in a campaign to improve industrial competitiveness. The government is also stepping up its investments in applied research. In 1994, for example, 45% of the government's overall support for academic research went to applied areas, up from 39% in 1992. The total amount of government spending has also risen sharply, from $45 million in 1992 to $145 million in 1994.

Haves and have-nots. The sudden influx of corporate money and the government's tilt toward applied research are creating rifts between well-funded departments like Kwon's and those in less favored disciplines, like Bagg's. There are also worries that younger researchers in hot fields are being pulled from the bench by the demands of managing too many projects and too many graduate students. The disparity between the "haves and have-nots [tends] to distort the entire research environment," says Young Gul Kim, a chemical engineer and director of the Research Center for Catalytic Technology at Pohang University of Science and Technology (POSTECH).

One result of the influx of funds has been a skewing of proposals toward the "hottest" fields. "These days, the field of environmental research is pretty popular, so some scientists tend to dress their proposals in environmental trappings, regardless of their actual expertise," says Sang-Koo Nam, dean of research and international affairs at Korea University. Geologist Bagg worries that the money now available for applied research is pulling the most promising young scientists away from working on more fundamental questions. If that trend persists, he says, it could weaken overall progress in the field.

Kim says the largess is also distorting traditional scientific values, putting a premium on quantity—the number of grants and grad students researchers can accumulate—over quality in both teaching and research. "If you have, let's say, a dozen students, it really takes a superhuman effort to keep track of what they are doing," he says. There is no mechanism in any Korean university, he notes, to prevent faculty members from



D. NORMILE

Rich get richer. Korean companies have lavished millions on this automation and systems research institute at Seoul National University.

overextending themselves.

But others dismiss such fears, saying that Korean scientists are making good use of the new opportunities. Seung-Ki Joo, an associate professor of materials science and engineering at SNU, is managing 10 private and government grants with the help of 20 Ph.D. students and three secretaries. Joo, who was trained at Stanford University, thinks there are a number of checks and balances that keep professors from overextending themselves. Promising students avoid professors who neglect their grad students, and government grants are subject to a yearly review.

More importantly, Joo thinks that it is appropriate for Korea to concentrate its limited resources in those areas that can build up the economy. "Basic science is important, of course, but we cannot spend on basic science right now," he says. That view is shared by many in government. "As far as the promotion of basic research is concerned, the role of the government in Korea can't be the same as that in developed countries," says Kyung-Chul Chang, director-general of research planning and coordination for MOST. The current emphasis, he says, should be on helping boost the level of technology within Korean companies.

One way to lessen the gap between the haves in the hot research areas and the have-nots in basic research and the humanities is to increase the percentage of each grant that the university takes for overhead and spread this money around. SNU plans to boost its current rate from between 10% and 15% to 20% within 3 years, says Hiwon Yoon, SNU associate dean of research affairs, and eventually to 30%. POSTECH is taking a similar tack and using the pooled money to support basic research and provide seed money to new professors in all disciplines, says Jeon-Young Lee, POSTECH's dean of research.

Most universities don't have centrally managed systems to oversee research moneys, however, so they have no way to redistribute funds. "Research as a legitimate university activity is a relatively recent event in Korea," says POSTECH's Kim. "We're still very new in this kind of game." SNU's Lee agrees: "These problems will be overcome, but it will take time."

Meanwhile, construction continues. SNU has joined the trend of inviting private companies to set up labs within the university grounds. Bulldozers and backhoes are now stirring up dirt and spewing diesel fumes as they level out a corner of the campus for a new university industrial park. Only after the dust settles will it be possible to tell whether this flurry of construction is also changing the face of basic science in Korea.

–Chang-Yop Kim and Dennis Normile

Chang-Yop Kim is a science reporter for Joon-Ang Daily News *in Seoul.*

MEDICAL GENETICS

NIH, Hopkins Team Up on Genotyping

Scientists hoping to pinpoint genes involved in complex diseases from arthritis to autism have a new facility to turn to for high-powered help. Earlier this week, the National Institutes of Health (NIH) and Johns Hopkins University unveiled a center in Baltimore devoted to genotyping, the painstaking process of searching for culprit genes in families afflicted with inherited diseases.

While a handful of disorders are due to errors in a single gene, most inherited diseases arise from an interplay between several genes and environmental factors. The Center for Inherited Disease Research (CIDR) was created to help speed the search for these genes and to "empower clinicians and epidemiologists who may not have access to genotyping facilities," says the National Center for Human Genome Research's Robert Nussbaum, who conceived CIDR.

The center is to open this spring, as reported earlier by *Science* (18 October 1996, p. 331). It will be equipped with the latest gel-electrophoresis technology and statistical expertise for locating DNA sequences thought to be associated with particular diseases. In this procedure, "you're looking to identify variation between individuals at specific sites in the genome," says Robert Karp, an NIH geneticist who is part of a non-CIDR genotyping study on alcoholism.

What makes CIDR unusual is that it will include several disciplines needed for high-quality genotyping and be accessible to all researchers. Only a handful of projects will be chosen, however, in a two-stage process. Researchers will submit proposals to a panel of peers, which will recommend action to a governing board made up of directors of the eight NIH institutes that fund the center.

The competition is expected to be intense, as CIDR will have a capacity at the outset to genotype about 2 million markers per year—equivalent to several research projects—and will perhaps reach 4 million markers in a few years. Complex diseases, such as juvenile diabetes and multiple sclerosis, require up to 1 million genotypes. CIDR has received inquiries—but no proposals—from groups interested in disorders ranging from breast cancer to speech pathology.

NIH will provide core funding of $21.8 million over 5 years. Groups supported by participating institutes will pay $1.00 per genotype, while others will pay $3.50—a rate comparable to that charged by industry shops, Nussbaum says. But the rates "aren't set in stone," he adds, as advances could reduce the cost. Indeed, CIDR will devote resources to testing new technologies, such as chip-based and mass spectrometer–based genotyping.

–Richard Stone

SCIENCE POLICY

Ex-Rep. Walker Joins Lobbying Firm

WASHINGTON, D.C.—Robert Walker, the former chair of the House Science Committee, stepped through a well-worn revolving door on 6 January: He was named president of the Wexler Group, a prominent Washington lobbying firm. Walker retired from Congress after 2 decades in the House of Representatives, where he rose to become a leading advocate of basic science and critic of applied research.

SAM KITTNER

Potomac fever? Walker will stay in Washington.

After the 54-year-old Republican lawmaker announced his decision to retire last year, many of his colleagues and staff members predicted he would return to rural Lancaster County in Pennsylvania at the urging of his wife. But instead he started a post-Congress career at Wexler's downtown Washington office, a few blocks from the White House. Anne Wexler, a former Carter Administration official who is the group's chair and chief executive officer, in a statement praised Walker's leadership skills and said he will provide clients with "unparalleled insight and strategic counsel." The firm handles a spectrum of clients, both liberal and conservative. Walker will provide "general leadership and guidance," says one Wexler manager, adding, "He won't have one particular focus."

Representative James Sensenbrenner (R–WI) took over from Walker as Science Committee chair when lawmakers convened the 105th Congress on 7 January for a 3-day session. One of Sensenbrenner's first actions—which is not likely until after Congress returns in early February—will be to name the chairs of the panel's subcommittees.

–Andrew Lawler