Academic Questions: Campus and Company Partnerships

Universities are looking to industry for help in funding scientific research, but the new partnerships raise questions about the role of universities

By IVARS PETERSON

Until a few months ago, Walter Gilbert was a professor of molecular biology at Harvard University. In 1980, he had shared the Nobel Prize in chemistry for pioneering work in recombinant DNA research (SN: 10/18/80, p. 244). Meanwhile, he had become an executive with Biogen, S.A., an international research concern based in Geneva. His two roles, professor and business executive, seemed to conflict. And last summer, as Harvard tightened its guidelines for faculty business involvement, he left the university, at Harvard's request, and became Biogen's full-time chairman.

Gilbert's role change represents some of the dilemmas arising in a developing experiment in university-industry relationships. Hoping to meet their particular needs, colleges are seeking research dollars at a time of lagging government support. And industries are looking for new knowledge that leads to innovative products.

Together universities and industry are testing a variety of approaches to cooperation. Biotechnology companies court biologists by offering shares and executive positions. Some researchers form their own companies while maintaining connections with their universities. Large corporations like Monsanto, Exxon and DuPont sign multimillion-dollar research contracts with universities. Industries like the semiconductor and computer industries establish cooperative research units for funding university research projects. Some schools tailor educational programs specifically to meet business needs.

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What effect do these diverse agreements and practices have on traditional university values? A. Bartlett Giamatti, president of Yale University, said recently at the "Partners in the Research Enterprise" conference in Philadelphia, "The university exists to protect and to foster an environment conducive to free inquiry, the advancement of knowledge and the free exchange of ideas." Although the activities of industries and universities are complementary, Giamatti said, the academic imperative is to seek knowledge objectively and to share it openly and freely, while the industrial imperative is to garner a profit, which frequently creates the incentive to treat knowledge as private property.

This concern along with renewed efforts to promote efficient transfer of knowledge from laboratory to application has forced corporate and university leaders, researchers in industrial and academic laboratories, scholars and observers to examine closely the new ties being forged.

There was much less debate when universities and science underwent a fundamental transformation because of dramatic increases in government funding during World War II and with the peacetime growth of federal programs. At the Philadelphia meeting, Robert M. Rosenzweig, president-elect of the Association of American Universities, said, "We appear to have learned something. The experience with government, the knowledge that good fortune frequently carries danger in its wake, has led to an attentiveness that should encourage us about the ability of people to learn from experience."

Although industry expenditures for university research amount to only 4 percent of the research funds available to universities, the dollar value has risen steadily since the 1940s to reach $240 million in 1981. Herbert I. Fusfeld, director of the Center for Science and Technology Policy at New York University, noted, "This partnership has a long and honorable tradition, but there are several aspects of current relationships that reflect pressures on industry, which differ from the situation of, say, 20 years ago."

Whereas once the time lag between the creation of a new scientific concept and its general application was usually measured in decades, in some fields, like genetic engineering and semiconductor physics, the gap is now considerably compressed. This puts a premium on identifying and applying new scientific concepts and techniques quickly. In fact, the worth of biotechnology companies is often measured by the extent of their access to the minds of talented researchers.

A second pressure is the shortage of technical people with certain skills and interests. The future workforce, in general, will need to be better educated. Industry has long recognized and supported the educational role of universities. IBM, for example, recently allocated $50 million to support the establishment of manufacturing engineering programs at universities.

Frank Press, National Academy of Sciences president, said, "The upshot is that technological — and hence economic — progress increasingly demands an unprecedented understanding of the underlying physical and biological phenomena. The single most important contribution of the research universities to industry is their provision of highly professional men and women to undertake independent research."

However, critics worry that universities could become glorified trade schools and that education in, say, the humanities would be neglected. Giamatti reminded the audience that scientists were not the only ones who did research at universities. The interests of those working in disciplines of much less concern to industry, but equally important, had to be protected, too, he said.

Rep. Albert Gore Jr. (D-Tenn.) expressed other fears, particularly about increasing commercial investments in biotechnology at universities. He said the country's institutions were currently unprepared to address the scientific, religious, ethical and societal issues inherent in the possibilities of human genetic engineering. "It would be disastrous," Gore said, "if we

were unable to receive neutral opinions from the best minds at universities and other research institutions because they were all on the payrolls of companies that have financial stakes in the outcome of the policy debates."

Another concern involves agreements between U.S. research institutions and foreign companies. The best known is the $70 million agreement between Massachusetts General Hospital (affiliated with Harvard Medical School) and Hoechst A.G., a West German chemical company, to fund a new molecular biology department at the hospital. For its funds, Hoechst will receive exclusive, worldwide patent rights on any discoveries that may be produced. Gore said, "I am concerned that we are too easily allowing our basic research expertise to be converted into foreign profits. We should think long and hard before we permit foreign corporations to 'skim the cream' from the research that the American public has supported."

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Gore suggested a national conference to set some precise guidelines to protect both universities and industry. He warned, "The federal government should not be afraid to act, when warranted, to ensure that a balance between innovation and basic research is maintained and that the public interest is not sacrificed to commercial opportunity."

His suggestions did not go down well with many of the meeting participants. Some shuddered at the thought of further government interference and felt strongly that precise guidelines could not be formulated. Giamatti earlier had emphasized, "The remarkable diversity within higher education, one source of its strengths, means that unqualified agreement can be reached only on very general statements, which do not translate readily into usable policy back home."

Fusfeld agreed. "On the university side, we not only see the sharp differences in research activity, but also note the equally great differences in philosophy as to the desired role of each particular institution," he said. Similarly, every industry and company has different financial capabilities and technical needs.

At the same time, Fusfeld said, industry is not dependent on universities for research. Industry funds about $39 billion in U.S. research and development, of which only a small portion goes to universities. The majority of cooperative research programs are actually initiated by the university. Fusfeld said, "While industry is receptive, it is clear that the university is selling, not receiving."

Press raised another important concern and planted a metaphor that propagated rapidly through the meeting when he asked, "How do we deal with the problem of 'eating the seed corn,' luring away the best students and teachers with better corporate salaries?" Again and again speakers referred to this problem and to the danger of universities losing the strengths and qualities that attracted industry in the first place.

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During the last year, a variety of university rules has emerged to protect university interests. One key principle is that the primary and overriding obligation of every faculty member is to the university. Thus, when a professor becomes a company manager, the professor's commitments ought to be reviewed, and if his or her role outside the university is substantial, the faculty member should leave the university. In the case of "consulting" relationships, many universities already stipulate a strict time limit on consulting.

Giamatti said that Yale, like a few other universities, plans to implement a more stringent policy that requires faculty to disclose outside commitments and the identity of organizations involved in their non-university work. Giamatti also suggested that universities should have a permanent forum to handle "ambiguous situations where reasonable people will have to wrestle with the application of policy guidelines to specific cases."

Derek Bok, Harvard University president, at a conference last June on "New Partnerships in Biotechnology," had similar thoughts. "There is no doubt about what the key question is. Where do the primary loyalties of the professor lie?" Bok said. "We're going to do everything we can to provide an effective program of technology transfer, but one which leaves the professor's loyalties with the academic institution."

George M. Low, president of Rensselaer Polytechnic Institute, presented another overriding principle for a successful relationship with industry: "University linkages will be successful only if they are based on educational programs of intrinsic academic value." He illustrated with an account of the RPI program in computer graphics and computer-aided design. The effort grew out of a desire to improve undergraduate engineering education. Now, while still of great academic value, the program has attracted more than 100 separate arrangements and agreements with industry.

Samuel B. Guze of Washington University in St. Louis, in discussing the university's $23.5 million biomedical research agreement with Monsanto (SN: 6/12/82, p. 391), admitted that "it is not unheard of for donors to try to influence in many ways the beneficiaries of their grants and gifts." This old problem for colleges, he said, should not frighten them away from entering research contracts and agreements. "There is nothing wrong with the university carrying out research that may result in commercially successful products, so long as such efforts do not significantly distort the university's academic goals and priorities," Guze said.

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Low's conclusion represented a strong consensus. "There is no single right or wrong in these relationships," he said. "It is a time to experiment, to address problems when they arise, to be flexible in the details of their solution, and to do this without endangering the interests of either partner."

Rosenzweig said, "There is an unprecedented amount of thought being devoted to the policy consequences of these new associations. And what is most encouraging is that individual institutions — the proper makers of policy in a society that values pluralism and that rejects the notion that there is only one road to heaven —are looking to solutions that make sense to them." To help, the Association of American Universities, together with other national groups, hopes to start an information clearinghouse that will widely distribute the experiences of institutions and businesses as they come to terms with one another.

Fusfeld concluded, "The primary requirement, therefore, is not so much increased partnership, but increased understanding of each other's role. That is the ultimate basis for a healthy strengthening of university-industry cooperation." □