

Nobody, writes Bliss, had ever seen Banting quite so angry. Upon hearing the news on the morning of 26 October, he rushed to the university, ready to renounce the award and tell Macleod exactly where to go. "Oh, he was furious," recalled an eyewitness. "He could have torn the whole building down."

Restrained by a colleague and counseled by a father figure who talked of obligations to Canada and science, Banting calmed down and announced the same day that he would share the cash and the credit with Best.

Nothing is known of Macleod's immediate reaction. A week or so after the announcement, he telegraphed Collip and asked him to share the prize money. On 7 November Macleod gave a brief statement to the press: "It would be invidious and quite unnecessary to try to dissect or divide up the work on insulin . . . it is teamwork that did it."

Was Macleod guilty of basking in the

glory of his subordinates? Given his early statement to Gooderham and his subsequent reappraisal, one might conclude this was the case. Bliss does not. He argues that the true "discovery" of insulin did not take place during those early experiments, but only after purified extract had been successfully tested on humans. "Banting and Best alone did not discover insulin," writes Bliss toward the end of the book. "Their work . . . began the process that led directly and without significant interruption to success at Toronto. But it was a multi-stage or multi-step process, to which Collip, Macleod, and perhaps others made vital contributions." Bliss especially rails at Banting's Great Idea, the duct ligation, which was not only wrong-headed, but "played no essential part in the discovery." Indeed, Banting's hypothesis may have been wrong (the ligation probably did not stop all the external secretions of the pancreas), but it led, as

Bliss notes earlier in the book, to essential further work, including the discovery by Banting and Best that the difficult ligation could be forgone in favor of extracting insulin directly from the whole pancreas.

Macleod's dalliance with the truth was unnecessary, according to Bliss. "Given what happened in Toronto in 1921-22 and given the fact that the Nobel Prize could not have been awarded to insulin's four discoverers, it is hard to see how the Nobel Prize committee could have made a better recommendation than Banting and Macleod." Perhaps not all readers will agree with this conclusion, and the conventional wisdom may continue to hold sway despite the scholarly researches of Bliss. The beauty of the book is that it tells the story in such a way as to leave room for the reader to make up his own mind on the question of who discovered the secret of insulin.

—WILLIAM J. BROAD

Stanford Doctors Try Consulting Inc.

The Department of Medicine has turned itself into a consulting collective to raise money for research by junior faculty

Faced with declining federal research budgets, universities across the country have turned hopefully to industry for support. A few, including Harvard and Washington University, have hit the jackpot with multimillion-dollar deals,* but less spectacular arrangements also have their place in the scheme of things in the growing academic-industrial complex. A case in point is a novel device by which the Department of Medicine at Stanford has, in effect, turned itself into a consulting collective to raise money to support the research of junior faculty.

About a year and half ago, the Institute of Biological and Clinical Investigation was officially established as a kind of consulting firm-cum-granting agency within the department. Its purpose is to link the department to industry while precluding conflict of interest or the rise of wealthy scientist-superstars. So far, two industrial sponsors—Syntex and Hewlett-Packard—have joined the Institute, each with pledges of \$250,000 a year for 3 years, and half a dozen young faculty members have received grants from the Institute. According to Kenneth L. Melmon, who as chairman of medi-

The Academic-Industrial Complex

This is the fifth in a series of occasional articles about the emerging relationships between industry and universities.

cine also heads the Institute, a Japanese company, Sumitomo, may sign up soon if negotiations are successful.

As Institute sponsors, Syntex and Hewlett-Packard have purchased a right to a fixed amount of consulting time from the department's senior faculty, who have agreed to respond "in a priority manner" to their requests for advice. Already, Melmon reports, department scientists, acting through the Institute, have held five major and two minor conferences with Syntex researchers on topics ranging from rheumatoid arthritis to interferon. The program with Hewlett-Packard, which is concentrated exclusively in the cardiovascular area, is just getting started.

Creation of the Institute, which was Melmon's brainchild, was preceded by nearly 2 years of groundwork, as industry, Stanford administrators, and members of the department were persuaded it

could serve a useful purpose. "Each for their own different reasons was dubious of the plan," he says. It wasn't easy. Melmon noted that industry's relations with faculty usually involved only selected individuals who were asked to help with very highly defined problems, "usually related to the fine tuning of a product that had already been discovered. We reasoned that it was rare for industry to analyze carefully the developing edges of biology in relation to the industry's particular product lines and scientific strength." He figured that the combined talents of the 80-member Department of Medicine would be an attractive lure to forward-looking companies. "We thought that if we could develop a long-term, very responsible research strategy and joint planning of activity, confidence between the two parties would develop and, more important, that fundamental university-based research projects with no obvious product-connection might eventually be funded by industry," he says. What he found, he recalls, was that a number of people in industry just thought he was looking for a "handout" and that, in many cases, the research directors of several companies saw his proposition as

*Science, 11 June, p. 1200, and 18 June, p. 1295.

a threat to their own institutional power base. Preliminary discussions with several firms went nowhere, and it is interesting that in the end it was two Palo Alto-based companies with a long history of Stanford ties that came through. In order to win the approval of the department, meetings were held to debate the pros and cons of any department-wide relationship with industry.

"We developed scenarios hypothesizing distortion of subject interests that could pervade an entire department or even create 'secondary citizenship' for people not involved with industry," says Melmon, recalling the early discussions that took place just as the biotechnology gold rush was at its height. "We considered the eventuality of a decline in pure research as scientists evinced more and more interest in consulting. We postulated the depletion of leadership for future generations of basic researchers. The hazards seemed endless." But after all was said, the department voted in favor of the Institute and all faculty members but one volunteered to consult if asked. (One faculty member had existing corporate ties that presented potential conflicts, but this problem has since been resolved.)

Given the climate of the times, the academic soul-searching was probably inevitable, though in retrospect it seems to some excessive. In any event, with its present structure, which includes a prohibition on any one faculty member consulting on Institute business for more than 8 days a year, which is only 15 percent of the total consulting time Stanford permits, it appears not to have become a dominant or distorting influence. (Melmon says that in addition to the contribution to the Institute, companies pay consultants \$500 a day or half the usual fee.) "In and of itself the Institute hasn't caused anybody to do things a lot differently," says Thomas Merigan, who serves on the committee that reviews grant applications.

Merigan, who organized a 1-day interferon conference with Syntex scientists and who also has a separate research contract with the company, places emphasis on the Institute as an instrument for raising funds for junior researchers. Junior faculty who have been in the Department of Medicine 3 years or fewer are eligible to apply to the Institute for support but are excluded from any role in its consulting business. "The seed money we can offer these people is awfully helpful." Given the current difficulties in getting grants, even the ablest young researchers may spend time going from one National Institutes of Health



Kenneth L. Melmon

The Institute was his brainchild

institute to another, for instance, before finding support, Merigan observes. With Institute funds, the department can support its own until other funding comes along. According to Melmon, the process of applying for grants to the Institute, which awards them on a peer review basis, has its own clarifying effect. "To our surprise, we've found ourselves turning down proposals from our own faculty about half the time or sending them back to be rewritten," he reports. "That's been very sobering."

The reasons that Syntex and Hewlett-Packard officials give for teaming up with the Department of Medicine reflect industry's current interest in purchasing a "window on science." John Fried, vice president for research at Syntex, declines to list Stanford scientists with whom his company is working or to discuss in any but the most general terms the work that has taken place under the auspices of the Institute. He does say, however, that the discussions Syntex scientists have had with Stanford faculty on rheumatoid arthritis, calcium blockers, congestive heart failure, and interferon "have been very, very, helpful." Says Fried, "We've incorporated some of their ideas and we're very pleased. We plan to continue our participation."

Dean Morton, executive vice president at Hewlett-Packard, noting that the company's association with Stanford dates back to the 1960's, says, "Our gift to the Institute is in recognition of the increased need for corporate support. And it gives us an inside look, a chance to gain special access to the knowledge and creativity of the department." Hewlett-Packard is anticipating what Morton calls "regular development meetings" with Stanford cardiologists that could lead eventually to more highly specific research programs. One factor that had to be taken into account in the company's negotiations with Melmon, Morton

acknowledges, was any competition with Syntex. Given Hewlett-Packard's interest in cardiovascular diagnostic and monitoring equipment and Syntex's focus on drugs, no problem exists, but clearly potential conflicts among sponsors is a consideration in negotiating with Institute sponsors.

When Melmon first began thinking about the Institute, he envisioned contributions from a host of companies and a pool of resources substantially larger than what there is now. However, 2 years' experience has led the department to the conclusion that small is beautiful. "We have come to realize that we can only work with a small number of companies without distorting our academic programs," Melmon says. "We are already close to that limit."

Melmon, who clearly is the Institute's strongest advocate, thinks the effort has been worthwhile not only for the direct income it has generated but for indirect revenue-producing effects as well. He says that private gifts from the community to the Department of Medicine totaled \$140,000 last year; he attributes this in part to good community relations that developed as a result of discussions about establishing the Institute.

Another novel arrangement that evolved in the course of establishing the Institute is a new program to bring young physicians and Ph.D.'s from Southeast Asia for training in the Department of Medicine. Initial funds for the program were provided by the Ishiyama Foundation of Palo Alto, which contributed \$500,000. Another \$500,000 has been raised from bankers and private businessmen in Hong Kong, and negotiations with the Kuok Foundation of Malaysia may lead to additional contributions. The program, which was initiated by Thomas A. Raffin, will begin operation in July 1983, when three Chinese from the University of Hong Kong become its first fellows. According to Melmon, "We considered this as a project that might generate income and be wholly consistent with our academic program. It makes sense to be training citizens of other countries where academic investments are increasing and where no economic squeeze has become apparent."

Altogether, the income associated with the Institute accounts for about 10 percent of the department's annual research budget—by no means enough to make up for federal funding, but sufficient to ease the situation somewhat. As Merigan says, "The important thing is to take steps to counteract the trend of diminishing support."

—BARBARA J. CULLITON