Downsizing at the University of Michigan

Faced with erosion of state support, some programs are being cut or even eliminated to provide funds for growth in priority areas

Universities in many industrial states are facing budgetary woes. This article looks at the impact on the University of Michigan. A subsequent article will look at the University of Texas which, in contrast, is in a period of expansion financed in part by oil revenues.

Ann Arbor, Michigan. During the past few years, as Detroit's automakers have been frantically "downsizing" their products in an attempt to stay competitive, some downsizing of a different sort has been going on a few miles away in Ann Arbor. The University of Michigan, whose support from the state has shrunk as a result of the automobile industry's troubles, is in the throes of a painful process designed, in the words of president Harold Shapiro, to make the institution "smaller but better."

"If we are to take our commitment to quality seriously, we will have to engage in fewer activities," Shapiro said recently. Thus, the university is shedding some programs entirely and inflicting deep cuts in others in order to channel more resources into priority areas. So far, the savings have been used to raise faculty salaries, but support is also expected to increase for selected programs such as molecular genetics and some fields of engineering.

The most conspicuous casualty to date has been the Department of Geography, which has been eliminated. In June, a similar fate will befall the Institute for the Study of Mental Retardation and Related Disabilities. The Institute of Labor and Industrial Relations will be slashed by 50 percent over the next 5 years, and the schools of Art, Natural Resources, and Education face possible cuts ranging from 25 to 40 percent. Most other academic departments have been asked to trim their operating budgets by up to 10 percent.

The notion of cutting selectively rather than across the board has been endorsed by the Senate Assembly. But the process has met with some disquiet on campus. Some critics have charged that the university administration is favoring high-technology programs at the expense of those geared toward environmental and social needs. "The administration here is a carbon copy of the Administration in Washington, D.C.," says Bunyan Bryant, a professor in the School of Natural Resources. Others have argued that the procedure by which the cuts have been made has been unduly disruptive.

Few, however, have questioned the need for retrenchment. Over the past decade, state support for higher education in Michigan has declined by 11 percent in real terms, according to a survey by the *Chronicle of Higher Education*. Only in Illinois have state funds declined as steeply. As a result, Michigan, which was once one of the top four or five states in the country in terms of per capita support for higher education, now ranks 39th. Most of the reductions, moreover, have come in the past few years and they have often been made in the form of emergency rescissions with virtually no advance notice. To make matters worse, last year the state was in such a cash flow crisis that it witheld some payments to higher education for 6 months, and the university was forced to dip into its reserves. The same thing has been happening since January.

The University of Michigan, along with other higher education institutions in the state, has thus been grappling with a difficult combination of shrinking support and week-to-week uncertainty over payments. One response has been a dramatic increase in tuition fees, which have more than doubled since 1978. Michigan residents now pay more than $2,200 a year for undergraduate tuition, a level that gives the university the dubious distinction of having the highest fees of any public school in the country. Another response has been general belt-tightening and deferral of expenditures on facilities and equipment.

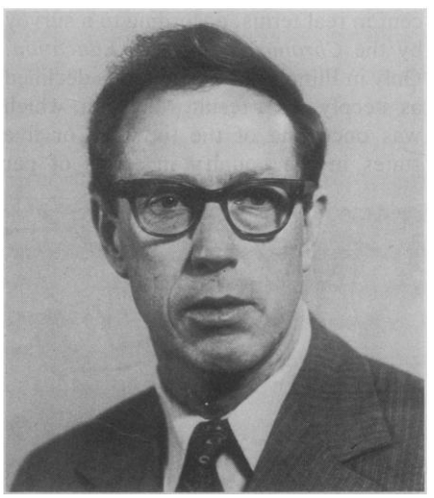
Even with these economies, however, the university is barely making ends meet. Its general fund, which is used for salaries, student aid, libraries, research support, equipment, and other operating costs, is $30 million to $60 million short of meeting current needs, according to academic vice president Billy E. Frye. Part of the shortfall is due to deferred equipment expenditures. The general fund, which now amounts to about $290 million a year, is made up of state appropriations, tuition revenue, and payments for overheads on research projects. A decade ago, state appropriations accounted for about 65 percent of the fund; this year, for the first time, they are expected to fall below 50 percent.

As Michigan's economy sank deeper into depression and the university's fiscal woes worsened, the administration was faced with two choices: either cut back everywhere and hope that the economy would soon pick up, or reduce the number of programs and use the savings to maintain the quality of those that remain. About 2 years ago, the administration decided to take the "smaller but

The University of Michigan

Striving to maintain quality in a frigid economic environment.

better" approach. A central consideration, says Shapiro, was that, even if Michigan's economy improves, funds for higher education are unlikely to expand by much because of competing demands for state resources. On top of that, enrollments are expected to decline in the 1980's because of a decrease in the college-age population. "If I had been convinced that this was just a short-term adjustment, then I would have chosen a different course. I don't think smaller is necessarily better, but it is our only choice for maintaining excellence," says Shapiro.



President Harold Shapiro (left): Downsizing is "our only choice for maintaining excellence." Vice President Billy Frye (right): "The perception that we are pulling out of the core of the university to move into high-technology areas is nonsense."

Thus, the university administration last year launched a 5-year effort designed to reallocate $20 million a year from existing programs to priority areas. About half the funds would come from general belt-tightening, trimming administrative costs, and similar savings, and the rest would come from truncating or closing selected programs. At the same time, the university is planning a major fund-raising drive to bring in $180 million from private sources, and it is exploring new sources of research support.

The reallocation plan has proved to be painful partly because the programs under the knife are generally well regarded. The School of Natural Resources, for example, is the oldest program of its type in the country and has a good national reputation. "We are chipping out a piece of an institution that probably ought to be retained. When we cut out a geography department here, we are not cutting out a poor department," says Richard Kennedy, vice president for state relations, and secretary of the university.

The chief architect and executor of the reallocation plan is vice president Frye. Together with the Budget Priorities Committee—a committee made up of faculty members and some students—Frye determines which programs should be singled out for major cuts or complete closure. The chosen few are then put through an elaborate review to determine just how deep the cuts will be.

The process has been likened by one critic to "a public trial." A budget priorities subcommittee conducts an initial, lengthy review and makes recommendations for both budgetary changes and structural reforms. The affected faculty is given a chance to respond, and the full priorities committee then makes a recommendation to Frye. After a public hearing, Frye makes a proposal to the Board of Regents.

The departments and programs that have already been put through this inquisition have been relatively small and their demise has not resulted in the firing of tenured faculty. (Six of the seven tenured members of the geography department were transferred to other departments and the seventh got an appointment at another university.) But the reviews of the School of Natural Resources, the School of Art, and the School of Education are proving a tougher test for the system.

The Budget Priorities Committee has recommended a 33 percent reduction for natural resources and a 25 percent cut for art. It is said to be considering a 40 percent cut for education. Frye has yet to make a final decision, but feelings are running high in the affected programs, with critics claiming that the slashes—which are likely to extend to tenured faculty—would be so deep as to be crippling. Of particular concern is what will happen to graduate students who have just embarked on Ph.D. studies. Although administration officials have given assurances that they will be able to complete their degree work, as one student in the School of Natural Resources said, "That's fine, but what happens when your supervisor leaves?"

Adding to the turmoil is the fact that the targeted schools have been under review for a year, and the uncertainty has taken a heavy toll on morale. When a final decision is made, suggests natural resources professor Bunyan Bryant, "they should give us $200,000 for a public relations job" to repair the damage to the school's reputation among would-be applicants.

Some critics have also questioned the underlying rationale for the cuts. Wilfred Kaplan, a mathematics professor, says, for example, "They chose the easiest departments to cut." But, he says, "you could just as easily argue that the weak departments are the ones that should be built up." Others have seen darker motives. At a meeting of the Michigan Student Assembly last November, Frye was accused of cutting socially oriented programs in order to build up departments of interest to the military and high-technology industry.

"The perception that we are pulling out of the core of the university to move into high-technology areas is nonsense," says Frye. He notes that the reallocation plan involves less than 10 percent of the controllable portion of the general fund, and less than half the total being reallocated will be taken from the handful of schools singled out for special review. Moreover, initially at least, most of the savings will be used to support university-wide causes such as raising faculty salaries and increasing support for graduate students.

Science and engineering departments will, however, benefit from the reallocation. Frye lists as a high priority improvements in research equipment, whose deteriorating state at Michigan he calls "part of a national scandal." The engineering school is also likely to be given the go-ahead to hire some faculty. According to dean of engineering James Duderstadt, as a result of enrollment increases in the 1970's, the engineering school is understaffed by a factor of 2.

These potential increases in support for science and engineering involve expenditures that have been put off for years, and university officials thus insist that they should not be viewed as indicating a shift to high technology.

Fears of a change of direction were not assuaged, however, when the regents approved the establishment of a new Center for Robotics and Integrated Man-

ufacturing shortly after voting to eliminate the geography department. Similarly, last November, they gave the go-ahead for a Center for Molecular Genetics on the very day they approved the closure of the Institute for the Study of Mental Retardation and Related Diseases. Although there is no direct link between the birth of these new centers and the demise of the older programs—indeed, the centers will get most of their support from outside the general fund—the juxtaposition of the events reinforced a comment by Frye that "at the same time that we are looking forward to new and expanding activity in some areas we must be prepared to plan for shrinkage or closure in others."

Aside from being areas of growth in an otherwise constrained budget, the robotics and genetics centers are noteworthy because they mesh with two major state-supported high-technology initiatives. In an attempt to provide a catalyst for the growth of high-technology industry in Michigan, then-Governor William Millikan last year approved the establishment of a $100-million Industrial Technology Institute. The institute, whose creation was recommended by a task force consisting of academics, businessmen, and government officials, will receive $17.5 million from the state, and the remainder will come from private foundations.

Although the institute will be independent from the university and will do mostly in-house research under contract, it will be built on the edge of the Ann Arbor campus, and some faculty members are likely to have joint appointments there. The institute's acting director, for example, is a university computer science professor who has taken a leave of absence to help get the operation under way.

The robotics center will be the university's chief point of contact with the new institute. Initial funding for the center came from the state, the National Science Foundation, and private industry, but last year the center won a fierce competition with Stanford, Carnegie-Mellon, and Massachusetts Institute of Technology for a $3.4-million contract from the Air Force. This now provides core support for the center. The award proved to be controversial, however, because it came in the midst of a growing debate on campus about the university's involvement with defense research. Although a small fraction of the total, Department of Defense–sponsored research at Michigan has been rising in recent years. The campus debate culminated in a 40 to 15 vote by the Senate Assembly on 21 March calling on university departments to establish a mechanism that would bar research "a substantial purpose of which is to destroy or permanently incapacitate human beings."

The Center for Molecular Genetics has been less controversial. An interdepartmental unit that involves some 40 researchers in 14 departments, it was established to channel more resources into molecular biology and foster more interaction among geneticists on campus. Part of the rationale for creating the center, according to a proposal drafted for the regents, is that Michigan has lost

NAE Elects New Members

The National Academy of Engineering has elected 49 new members and 5 new foreign associates. This brings the total U.S. membership to 1142, with 102 foreign associates. The new members are:

Norman R. Augustine, president, operations, Martin Marietta Denver Aerospace; **Richart T. Baum,** partner, Jaros, Baum & Bolles; **Arden L. Bement, Jr.,** vice president of technical resources, TRW, Inc.; **John G. Bollinger,** dean of engineering, University of Wisconsin, Madison; **John L. Cleasby,** professor of civil engineering, Iowa State University of Science and Technology; **Harry W. Coover,** vice president, Eastman Chemicals Division, Tennessee Eastman Co.; **L. Eric Cross,** professor of electrical engineering, Pennsylvania State University, University Park; **W. Edwards Deming,** consultant in statistical studies, Washington, D.C.; **Thomas B. Drew,** professor emeritus, Massachusetts Institute of Technology; **Charles A. Eckert,** head of chemical engineering, University of Illinois, Urbana; **G. David Forney, Jr.,** vice president, information systems group, Motorola, Inc.; **Richard H. Gallagher,** dean of engineering, University of Arizona; **Harry C. Gatos,** professor of electronic materials and molecular engineering, Massachusetts Institute of Technology; **Ralph S. Gens,** consulting electrical engineer, Portland, Oregon; **Serge Gratch,** director, chemical sciences laboratory, Ford Motor Co.; **Wilfred M. Hall,** chairman of the board, C. T. Main Corp.; **Alfred J. Hendron, Jr.,** professor of civil engineering, University of Illinois, Urbana; **Raymond J. Hodge,** partner, Tippetts-Abbett-McCarthy-Stratton; **David A. Hodges,** professor of electrical engineering and computer sciences, University of California, Berkeley; **Richard R. Hough,** retired executive vice president, American Telephone & Telegraph Co.; **John W. Hutchinson,** professor of applied mechanics, Harvard University.

George R. Jasny, vice president, Union Carbide Corp. Nuclear Division; **Charles C. Ladd,** professor of civil engineering, Massachusetts Institute of Technology; **J. Halcombe Laning,** head of manufacturing automation and computation, C. S. Draper Laboratory, Inc.; **Raymond C. Loehr,** professor of engineering, Cornell University; **Joseph C. Logue,** manager of Josephson technology, Thomas J. Watson Research Center, IBM Corp.; **Alan L. McWhorter,** head, solid state division, M.I.T. Lincoln Laboratory; **Harry O. Monson,** senior mechanical engineer, Argonne National Laboratory; **Morris Muskat,** retired technical adviser to the executive group, Gulf Oil Corp.; **Norman A. Nadel,** president, MacLean Grove & Co., Inc.; **William Nierenberg,** director, Scripps Institution of Oceanography; **Ralph L. Palmer,** IBM Fellow, IBM Corp.; **Dalton H. Pritchard,** fellow of the technical staff, David Sarnoff Research Center, RCA Laboratories; **Lawrence R. Rabiner,** supervisor, acoustics research department, Bell Laboratories; **Brian H. Rowe,** senior vice president, Aircraft Engine Business Group, General Electric Co.; **Mario G. Salvadori,** partner, Weidlinger Associates, Consulting Engineers; **Harris M. Schurmeier,** associate director, utilitarian programs, Jet Propulsion Laboratory, California Institute of Technology; **Charles V. Shank,** head of quantum physics and electronics, Bell Laboratories; **Maurice E. Shank,** director, engineering-technical, commercial products division, Pratt & Whitney Aircraft Group, United Technologies Corp.; **George E. Smith,** head, metal oxide semiconductor device department, Bell Laboratories; **Kenneth A. Smith,** professor of chemical engineering, Massachusetts Institute of Technology; **Fred Sterzer,** director, Microwave Technology Center, RCA Laboratories.

William D. Stevens, retired chairman of the board, Foster Wheeler Corp.; **Derald A. Stuart,** vice president and general manager, missile systems division, Lockheed Missiles & Space Co., Inc.; **Nickolas J. Themelis,** professor of mineral engineering, Columbia University; **Charles W. Tobias,** professor of chemical engineering, University of California, Berkeley; **John F. Welch, Jr.,** chairman and chief executive officer, General Electric Co.; **Willis S. White, Jr.,** chairman and chief executive officer, American Electric Power Co., Inc.; **Paul Zia,** professor and department head, North Carolina State University, Raleigh.

The foreign associates are: **Giuseppe Gabrielli,** retired technical director, Fiat Aeronautical Division, and retired professor of aircraft design, Polytechnic Institute of Turin, Italy; **Cyril Hilsum,** chief scientific officer, Royal Signals and Radar Establishment, Worcestershire, United Kingdom; **Fritz Leonhardt,** retired professor, Institute for Concrete Structures, Stuttgart University, West Germany; **Robin B. Nicholson,** chief scientist, central policy review staff, Cabinet Office, Whitehall, London, United Kingdom; **Ewald Wicke,** professor emeritus, University of Munster, Westphalia, West Germany.

some good faculty members in recent years and is "in danger of losing its best junior and middle-level researchers in recombinant DNA and hybridoma-based investigation."

The center will have at its disposal $750,000 over the next 5 years from a special endowment. In addition, according to acting director Dale Oxender, up to $250,000 may be available from the university's general fund. Initially, the money will be used to supplement the stipends of graduate students and postdoctoral fellows and to hire two junior faculty members. Eventually, two senior investigators will also be hired.

Like the robotics center, the genetics unit has a state-funded counterpart, the Molecular Biology Institute. Established in Lansing, close to Michigan State University, it will perform contract research and, like the Industrial Technology Institute, it will work closely with the universities. The two institutes are part of Michigan's pitch to attract high-technology industry into the state.

So far, the university's financial woes do not seem to have seriously damaged its prestige. According to the recent ratings of graduate schools published by the National Academy of Sciences, Michigan ranks in the top five universities in social and behavioral sciences and in the top 20 in most other disciplines. The next year or two are likely to be critical, however.

One key element will be the success of the fund-raising campaign. About half the proceeds will be used for endowment to support faculty positions and student aid. The remainder will be used for some long-overdue construction projects such as a new chemistry building, a recital hall, and some health research facilities. (A $260-million university hospital is already under construction with state and private funds.)

Perhaps more critical is what happens at the state level. The newly elected governor, James Blanchard, has proposed yet another cut in appropriations for higher education. More important, however, he has also steered through the legislature a proposal to raise state income taxes in an attempt to bring the budget deficit under control. University officials are fully behind the proposal, and they regard its passage as essential to bring some stability to funding for higher education. Further erosion of support would pose severe problems, says vice president Kennedy. "I don't think we have damaged the core of the institution yet," he says, "but if we continue on this path we will not be the University of Michigan." —COLIN NORMAN

National Science Board Okays Theory Center

The National Science Board has approved continuation of the Institute for Theoretical Physics for a second 5 years of operation. The institute, which is located at the University of California's Santa Barbara campus, began as a 5-year experiment in the fall of 1979 (*Science*, 11 March, p. 1207). Science board approval of the renewal proposal means that the National Science Foundation can issue a new grant that is to commence in 1984. The institute's annual expenditures have been just over $1 million and are not expected to increase greatly.

Walter Kohn, the institute's director, says he is pleased with the decision, especially because the science board voted to continue the center a full year and a half before the first grant expires. Planning the institute's study programs begins 3 years in advance. The science board's decision now to stay the course means "we can maintain our momentum," says Kohn. There had been some concern that doubts within the physics community as to the effectiveness of a centralized theory center with a large proportion of short- to medium-term visitors, which were expressed at the time of the institute's establishment, might resurface and adversely influence the board.

With approval in hand, three other items of the institute's business can proceed. The first is the search for a new director to replace Kohn, who has said he will step down when the institute reaches its fifth birthday. One of the issues to be resolved is whether the next director should come from the Santa Barbara faculty or, as some institute staff prefer, from outside the campus. A prestigious theorist netted in a nationwide search would be a big asset but might also be difficult to lure to Santa Barbara for a long period without the promise of a tenured faculty position.

Access to computers has been a minor frustration for institute scientists. With its continuation assured, the institute can now firm up its previously tentative order for its own mid-sized computer. For tasks requiring number crunching, the institute has completed arrangements to use one of the Los Alamos National Laboratory supercomputers. And negotiations are beginning that may lead to a powerful scientific computer being installed at the institute by the end of this year.

Finally, one provision of the new grant will allow the institute to add a new permanent staff person to go with the three, in addition to Kohn, already hired. A search, probably for an elementary particle physics theorist, will begin promptly, says Kohn.

—ARTHUR L. ROBINSON

Soviets Reject Test Ban Changes

The Soviet Union has spurned an offer from the United States to discuss modifications to the Threshold Test Ban Treaty. The agreement, which was signed by Richard Nixon and Leonid Brezhnev in 1974, is supposed to limit the yield of underground nuclear weapons explosions to 150 kilotons, thereby curbing the development of multimegaton bombs. The treaty has yet to be ratified by the Senate.

In February, the Reagan Administration said that the Soviets might be cheating and that new measures were needed to verify Soviet compliance (*Science*, 18 February, p. 819). Specifically, it proposed to dispatch a team of scientists to Soviet test sites for direct measurement of each blast above 75 kilotons. The Soviets could reciprocate and send their experts to Nevada.

After deliberating for a month, the Soviets said they were unwilling to discuss any changes. "We are very disappointed in the Soviet response," said Alan Romberg, a State Department spokesman. "If they continue to refuse to discuss our concerns, we would be forced to question how genuine their commitment is to effective limitations on nuclear testing."

A number of U.S. scientists have challenged the Administration's allegations of Soviet cheating, claiming instead that U.S. estimates of Soviet test yields are incorrect. Others have said that cheating—if it occurs—is minor and of little strategic significance. A growing number of congressmen