22 May 1981, Volume 212, Number 4497 **SCIENCE**

Research Equipment Acquisition

Instrumentation defines the cutting edge of experimental and observational science. Scientists invent their own tools of discovery, quickly incorporating new phenomena into new instrumentation with which to press forward the search. Concurrently, the new analytical principles are reversed to provide new tools for design and process control. Thus yesterday's scanning electron microscope becomes tomorrow's electron beam mask generator for integrated circuits. The dynamics of the concurrent advances in scientific instrumentation and industrial technology lies at the heart of the American success story in both arenas.

Unhappily, this process is no longer as healthy in the United States as it once was. Instrumentation leadership has migrated abroad in one class of instruments after another. The obsolescence of research equipment in our universities threatens the rapid progress of science itself. Few engineering schools provide their students access to the equipment they should be expected to master in industry. Technical progress in materials science and engineering now requires access to a large number of sophisticated instruments, costing $100,000 and up. Scientists have had to learn to share expensive instruments and to set priorities for major facilities within their fields.

The National Science Board has for several years sought to give priority to critical equipment and facilities. Unfortunately, a $100-million addition to the National Science Foundation budget for research and instructional equipment came at a time when the pressures to bring government expenses under control have forced it out of the revised budget for fiscal year 1982.

The pattern of periodic national equipment crisis must be broken. Universities must find more responsive and flexible means of allocating their limited research funds between salary and equipment costs. They need new sources of capital to supplement federal appropriations. The instrument industry needs to be given incentive to innovate with daring new instrumentation ideas, knowing that they will be rapidly tried out by demanding and expert researchers.

One way to help achieve this would be to make the Administration's investment tax credit for equipment used in research clearly available to companies offering leased equipment to nonprofit institutions. This would stimulate the leasing of scientific instrumentation to the research community. Universities might be able to capture some of the financial benefit and make equipment acquisition decisions in response to current needs with lower initial cost and without permanent commitments. New instrumentation ideas would be more readily tested in the marketplace. Older instruments would find their way out of the university research laboratory into less demanding environments.

None of this will work, however, unless the university community takes a different point of view toward equipment acquisition. Many universities purchase instrumentation as though the cost of capital were zero. Motives for purchasing equipment for permanent use by a small group are rational enough—a hedge against discontinuities in research support, administrative simplicity, and the opportunity to modify the equipment without concurrence from others. But a shift to leasing obviates the government's need to appropriate all of the capital investment up front, diminishes the role of the government contract monitor in equipment selection, and could reduce acquisition time from years to weeks.

Congress must provide sufficient funds to keep our science competitive, and the scientific community needs to look to its instrumentation acquisition strategy in the light of the changing economic environment. For if we cannot keep the U.S. instrumentation industry and the experimental scientists who depend on its capabilities in dynamic good health, not only science but economic progress will suffer.—LEWIS M. BRANSCOMB, *Chief Scientist, International Business Machines Corporation, Armonk, New York 10504, and Chairman, National Science Board*