

## The Sad State of Current Research Instruments

Ever since the 1980 U.S. Presidential election, there has been a greater than usual national debate on the subject of what constitutes the most appropriate level of federal spending for national defense. In particular, those who have advocated budgetary increases have emphasized the need for committing major expenditures for new and up-to-date military "hardware." Ships, tanks, and planes all are very expensive, but they enable a smaller army to achieve military superiority over a much larger force that is inferiorly equipped. In short, more "firepower" requires less "manpower" to achieve the same military capability.

We do not pretend to have any expertise in the area of national defense; therefore, we will not venture any opinion as to the relative merits of our military establishment's need for the added funds it has been requesting for major armaments. However, we do see a striking parallel here to the hardware needed to successfully wage another type of "battle."

The "battle" in this case is research, and the "hardware" is laboratory instruments—modern, up-to-date equipment that is capable of increasing the performance and "firepower" of the laboratory scientist just as surely and as dramatically as the advanced technology weaponry will for military personnel.

Consequently, the state of usefulness of laboratory research equipment in the nation's university research and development centers is a critical factor in considering how effectively and how efficiently these centers are able to fulfill their primary mission.

The National Science Foundation (NSF) felt that this critical question was one that needed to be addressed and answered. As a result, it surveyed the state of academic research equipment during calendar year 1982 in three selected fields—computer sciences, physical sciences, and engineering. As a second stage, data are now being collected for the agricultural, biological, environmental, and medical sciences. There is little reason to expect that the pattern found for these latter areas will differ significantly from the pattern found in the original three test areas. Hence, it warrants our attention and consideration.

The NSF issued its initial report in the April 18, 1984, issue of its publication "Science Resource Studies Highlights" (NSF document 84-312). The report title bluntly and concisely summarized the bottom line of the agency's study: "One-fourth of Academic Research Equipment Classified Obsolete."

The study report describes the considerations given to methodology, purchase price, age, funding patterns, utilization, and equipment adequacy. In particular, the study was limited to "research instrument systems costing from \$10,000 to \$1,000,000." In this manner, very simple and expendable equipment was eliminated, as well as ultra-costly items that are not really representative and could distort the overall data.

Selected excerpts from the highlights of the report provide considerable information and insight as to the status of the subject. A number of the key points that we found of special significance are as follows:

- *University researchers classified about one-fourth of the 22,300 items in their 1982 research equipment inventories as obsolete and no longer in research use.*

- *Of all academic research equipment listed in the 1982 inventories, only 16% was characterized as "state-of-the-art."*
- *About one-half of department chairpersons reported existing equipment to be "insufficient."*
- *More than 90% of the departmental chairpersons reported that the lack of equipment inhibited the conduct of critical research.*
- *One-half of all academic research instrument systems in use in 1982 were purchased within the previous 5 years, but 31 percent were more than 10 years old.*
- *Two-thirds of all academic research instrument systems in use during 1982 were acquired partly or entirely with federal funds.*
- *Each instrument system in use in 1982 was used by a median of seven researchers.*

Undoubtedly, many of our readers—and especially those in academic research centers—will find little, if any, of this surprising. It simply confirms what they have felt all along.

But the important point is that it *does confirm* what previously had been only claims and conjecture. Solid data is in hand to support those past critical assessments.

Now given this situation, what, if anything, can or should be done about it?

We have read other recent reports released by pertinent government agencies that have been at least equally critical—or more so—of the condition of the nation's interstate highway system, of its major bridges, of its dams, and even the national air traffic control system. Considering that hundreds and even thousands of lives may be at substantial risk due to those faulty, antiquated, or overtaxed systems, many citizens would argue that they require federal funding priority over new research instruments.

Furthermore, as noted above, one of the NSF survey findings is that two-thirds of instrument systems currently in use were already partially or totally funded by the federal government.

It would seem, therefore, that universities should look, and will need to look, to the private sector for increased support in this area. But the philanthropy of industry also has limits, and fairness to the consuming public as well as to company stockholders dictates that only so much money can be given away no matter how worthy the cause.

But what about "quid pro quo" arrangements? For example, the company that needs a nuclear magnetic resonance study conducted might donate such an instrument to a university with the explicit understanding that the university will conduct the study without additional funding support, except perhaps for incidentals. The equipment could then be used at spare time during the period of the study, and full-time thereafter, for whatever other research applications the university staff might find it appropriate.

The point is that the quality of our academic research laboratories is deteriorating badly, and the situation will continue to grow worse unless some concerted efforts and innovative actions are soon initiated.

—EDWARD G. FELDMANN  
American Pharmaceutical Association  
2215 Constitution Avenue, N.W.  
Washington, DC 20037