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Scientific Instrumentation

Prior to 1965, owing to generous support, university research laboratories were well equipped. But with the growing pressure on available funds that began at that time, a pattern of postponing equipment purchases emerged. By 1970, a problem was widely recognized: university scientists were working with obsolescent equipment.

A National Research Council report commissioned by the National Science Board in the early 1970's gave the cost of updating the laboratories as $200 million at that time. With the inflation of the ensuing decade, compounded by the growing complexity and sophistication of instrumentation, that figure has grown to a conservatively estimated $1 billion.

At a recent meeting of an ad hoc Working Group on Scientific Instrumentation convened by the National Research Council, one participant observed: "The problem of instrumentation in our research universities has implications for the whole country. . . . [W]e are educating a generation of scientists who, when they leave the university, suffer the disadvantages that many people from less developed countries feel when they come to work in a technologically advanced country. This hurts us in a broad range of our activities, both in the defense establishment and in our industrial establishment." He went on to point out that existing scientific and engineering manpower in the universities has outstripped the dollars available for equipment.

But it would not be realistic to try to solve the problem solely by a large infusion of federal funds. The Working Group therefore turned its attention to ways of promoting more effective use of existing resources. A number of leaders of corporate research laboratories participating in the group outlined their procedures for ensuring a balance between manpower and capital expenditures. This stimulated a reassessment by academic participants of institutional arrangements that promote similar rational planning in the academic environment, such as organizing experimental scientists in closely allied areas into research groups with block funding.

The Working Group recommended that several tutorial workshops be organized on a regional level under the auspices of the National Research Council. These workshops would have two objectives: (i) to achieve a more balanced emphasis on provision of modern research instrumentation by revising the policies, mechanisms, and procedures of research support, management, and financing, and (ii) to reduce the current deficit of modern research equipment. Efforts in this direction will be more productive if the research-producing system shows determination to use its resources more effectively. The work of the Interagency Task Force on Instrumentation led by the National Science Foundation, highlighted by the $30-million initiative from the Department of Defense, was enthusiastically supported. Nevertheless, whatever improvements are accomplished in the management of research, there will still be a substantial backlog of need that can only be addressed by the federal government.

The overall purpose of the workshops, then, would be to inform the university community (researchers, administrators, and trustees) of new approaches to providing and using instrumentation. An exchange of practical experience would be sought, with the hope that the universities could respond to the problem with new initiatives and practices. The regional workshops would form the basis for preparing a policy statement and a call to action that could provide some stability for a decade or longer.

Our country's scientific enterprise is a unique combination of individuals from universities, industrial research laboratories, and government research laboratories. The meeting adjourned with a clear sense that discussions among these three elements of the U.S. scientific enterprise could work to the mutual benefit of all three sectors in the solution of this fundamental problem in experimental science.—WILLIAM A. FOWLER *and* DONALD C. SHAPERO, *Office of Physical Sciences, National Research Council, Washington, D.C. 20418*