versity people to their laboratories, the study concluded: "The most important reason, cited by nearly 90 percent of the laboratories, is to update the skills and generally increase the competence of the laboratory's professional staff—'to stay competitive,' as one laboratory director phrased it." The second-ranking reason, cited by 60 percent of the laboratories, was that "education and training programs are viewed as a recruitment aid." Finally, about one-third of the laboratories expressed the belief that close ties with universities were desirable because they produced beneficial, though often long-range, effects contributing to scientific and technical knowledge, education, and institutional development.

The study noted many instances where universities and federal laboratories have pooled efforts and resources for special purposes. Thus, it points out that, in 1966, NASA's Ames Research Center and Stanford University produced a summer course on the methods of teaching systems engineering. Taught jointly by Ames and Stanford personnel, it drew an enrollment of faculty members from universities throughout the country.

But the study also noted, somewhat cryptically, that "there is a noticeable tendency on the part of some universities to withdraw from cooperative educational endeavors with Federal laboratories, affecting both after-hours educational programs and the university's regular advanced degree programs. Some universities that in the past cooperated in setting up extensive after-hours programs, are currently reluctant to extend them or to participate in similar new programs with other laboratories. In at least one case a university is withdrawing completely from an extensive program of many years standing, thus precipitating a crisis at the affected Federal laboratory." No details are offered on this particular case.

The study noted that "strong" laboratory directors often find ways to circumvent "unrealistic" directives that impede cooperative programs with universities, but that half the laboratories studied cited difficulties with manpower ceilings, approximately one-fourth reported that funds "were insufficient for an optimal educational activity," and about a third complained of delays and difficulties in getting approvals from headquarters.

The FCST recommendations state, "As a matter of policy, federal organizations should take the initiative, where feasible and suitably related to the agency mission," in promoting joint research and training activities with universities. They call for various steps to encourage federal employees to engage in study and research at universities; in line with this, it is recommended that increased use be made of the Government Employees' Training Act, and that federal laboratory directors be given greater authority, as well as funds, for conducting training programs for their staff. Also, the FCST calls for legislation that would permit establishment of a government-wide program of visiting appointments, in universities and federal laboratories, without financial loss or fringe-benefit complications for the persons involved. Noting that the need for meeting development deadlines often eats up travel funds that are supposed to be available also for basic researchers in mission-oriented laboratories, the study urged the Office of Science and Technology (OST) to "promote fuller understanding by top administrative officials as to the vital necessity of maintaining scientific interchange through attending professional meetings. . . ." And the report recommends that OST and the American Council on Education examine the reasons why some universities are reluctant to engage in collaborative programs with federal research centers.

It is difficult to fault any of the recommendations, but perhaps a comment is in order regarding the process that led to their formation. As is typically the case with pronunciamentos that emanate from the labyrinthine regions of the White House science advisory complex, the FCST study, which is probably of no small import for American science and technology, was cooked up without any public notice that it was in the works. (A draft copy of the report was made available to *Science* by a source outside the FCST.) It is not inconceivable that representatives from universities might have had

Hindsight Study Adds Kind Words for Basic Research

The final draft of Project Hindsight, the Defense Department's study of the scientific and technological origins of modern weapons systems. includes a lengthy defense of the "less measurable" benefits of basic research, according to an official in DOD's Office of Research and Technology.

The final report emphasizes the training value of basic research for practitioners of applied and developmental research and points out that basic research often takes several years to show up in technology.

On the other hand, Hindsight has not altered its conclusions, stated in the interim report (*Science*, 18 Nov. 1966), about the role of research in DOD programs.

The interim report included judgments that: (i) contributions from basic undirected research to military needs have—since 1945—been small; (ii) utilization of research findings has been accelerated when the practitioner has been working in areas related to military technology; and (iii) production of timely knowledge is achieved best when DOD funds and manages its own programs.

Although Hindsight's final draft was completed in October, DOD reported that "due to higher priorities" the project has not been thoroughly reviewed, and that it will not be released until middle or late spring.

Begun in 1962, Project Hindsight was conducted by a team of scientists and engineers under the direction of Colonel Raymond S. Isenson, an engineer with long experience in technological planning for the Army. His staff undertook the study in order to identify the contributions of science and technology embodied in 20 major weapons systems. Each contribution was termed an "event," and efforts were then made to identify the contributors, cost, source of funds, motivation, and pathway to eventual incorporation into the weapons system.—F.C.