of funding 12 years ago as "underinvestment in the future" and a "loss of the U.S. empire in science and technology." For more than a decade, says Price, "academic research in science and technology has been running effectively at half speed compared with the world growth rate of a 6% per annum increase in scientific and technological activity. Many of the other most developed nations of the world have followed our lead a few years later, but still, relative to the rest of the world, the United States is falling back at about 3% per annum. It is this loss in our 'scientific and technical empire' [I make an analogy with the loss of British empire which I experienced in my youth] which makes itself felt in the adverse balance of our dominant high technology international trade and thereby devalues the dollar in the world exchanges.

"In 1967, at peak, the United States was about 33% of all world science and technology across the board. The decline, due to saturation at the previously mentioned 3% per annum, has been producing a 1% fall in our share of the world's science and technology every year and we are now, so far as I can make a guesstimate, only about 25% world science. Since the United States has only about 7% of the world population, one can express these figures by saying that at peak in 1967 we had about five times the average share of world affluence or per capita GNP. It is now, in 1978, about 3½ times the average and unless heroic measures are taken we will have been reduced to only about double the world average before the year 2000 A.D."

Before taking such "heroic measures," Price thinks that a useful first step would be to "disaggregate" the basic science budget which is now combined with other items, including technology purchases and civil service science, to form a "dangerously misleading aggregation." Then he would treat the basic science budget to "moderate increases instead of decline." He sees the 11 percent boost requested for basic research in the Carter budget as helpful but not sufficient. What academic science needs, he says, is funding over perhaps a 10-year period to make up for the cuts it has suffered. To do this would require an increase of 16 percent a year in the academic science budget and, if funds were provided to compensate for a 6 percent inflation rate, Price calculates a 22 percent increase would be in order.

These would be heroic measures indeed, but Price insists that the choice is between such action or rapid decline.

Price's bid for support of basic science was not subjected to questioning by either legislators or his fellow panelists because he departed immediately after giving his testimony. Price, a versatile academic whose interests and expertise range from the development of scientific instruments to the wilder shores of science policy, was scheduled to chair a session on "Science and the Ism's of the 20th Century," set for the same hour.

Challenges to Price's views seem predictable from those who feel that improvement of U.S. performance in industrial innovation is the main problem for science policy today and that heroic increases in the basic research budget are not the way to solve it. Senate staff members say that Senator Adlai Stevenson III found Price's paper provocative, and Price's analyses have a way of getting noticed in academia, so there could be a delayed reaction.

—JOHN WALSH

Patent Policy Changes Stir Concern

Acting on recommendations that date as far back as 1971, the General Services Administration (GSA) has amended federal procurement regulations to permit universities to get a larger share of the commercial benefits of federally financed research.

The new regulations were based primarily on suggestions by a subcommittee of the Federal Council for Science and Technology that greater incentives are needed for universities to pursue commercialization of their research. The GSA regulations would provide this incentive by encouraging federal agencies to allow universities to retain possession and control of their federally financed discoveries; universities, in turn, would be encouraged to license these discoveries to private industry.

Specifically, the regulations provide for a standard agreement between federal agencies and universities, known as an Institutional Patent Agreement (IPA). "The agreements permit . . . institutions, subject to certain conditions, to retain the entire right, title, and interest in inventions made in the course of their contracts" with the federal government.

Such agreements are in common use by federal agencies now, but each may have a slightly different form. The GSA regulations require that all new IPA's, meaning any written or rewritten after the effective date of 20 March, must follow a single standard.

Moreover, the standard specified in the regulations is different from the IPA's being used now in several respects, according to several federal patent officials.

1) The new IPA can be used to cover research funded through contracts as well as grants.

2) The new IPA increases the period of exclusive control that a university can give to a licensee from 3 years after the initial marketing of a product to 5 years after the initial marketing.

3) The time that a licensee spends trying to get a federal regulatory agency to approve the product will be exempted from the time limits on exclusive marketing.

4) It permits universities to affiliate with for-profit patent management companies, which are organized to promote the licensing of university discoveries to private industry.

5) It removes the ceiling on the amount of royalties from a discovery that can be returned to the researcher who invented it, essentially allowing each university to set its own policy on the amounts.

Although this patent policy is intended to facilitate the transfer of research results from laboratory to marketplace, there is some concern on Capitol Hill that it goes too far in the direction of allowing profit-making firms to benefit from federally funded research. Also of concern is a provision that could pressure researchers to withhold publication pending patent filings. Senator Gaylord Nelson (D–Wis.), chairman of the Small Business Committee, hopes to hold hearings before the policy goes into effect next week. If that cannot be done, he intends to ask the Office of Management and Budget to delay implementation until hearings can be scheduled.—R. JEFFREY SMITH

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