FREE RADICALS

When we think about the government's relationship to the sciences, we usually think in terms of money. The government's financial support is crucial to scientific research, both fundamental and directed toward key national needs. The government also supports science in less direct but pivotal ways, such as funding scientific education and creating tax and other policies that encourage innovation.

The mantra within the scientific community is that government needs to come up with more money; in a field with limitless horizons, the urge to press on is natural. But, while the potential for discovery may be boundless, the government's supply of money isn't. In the United States, for example, the federal budget isn't a zero sum game, but it's definitely a give-and-take arena. Many other constituencies are out there, clamoring for their share and perhaps some of ours, too, to solve a host of social, economic, and political problems.

Science and technology get money partly because we have a great track record of providing value in return. Beyond all doubt, the scientific enterprise has contributed to economic growth and our standard of living. Studies have pounded home the point that half of all economic growth, and the creation of whole new industries and millions of desirable jobs, can be traced back to the laboratory bench or the engineering test stand. But there are other measures of success, too, such as how well we help the government itself to meet its major challenges and obligations.

A recent study by the Brookings Institution casts an indirect light on the latter subject. The study analyzed the more than 500 major laws passed by the United States Congress in roughly the last half-century and distilled them into the federal government's 50 most significant problem-solving endeavors in that time span. A survey of 450 American history and government professors then ranked these endeavors based on their importance, difficulty, and impact. An article by Paul Light of Brookings in the January 2001 issue of GOVERNMENT EXECUTIVE (www.brook.edu/gs/cps/50ge/50ge_hp.htm) summarized the results. (Although the study was for the United States, the broader conclusions probably apply elsewhere, too.)

Making such lists has been popular during the transition from one century to the next. In recent years, the "100 Best Movies" and similar lists of books and music fueled a lot of cocktail party debate. If we stretch the analogy a bit, we might call the Brookings list "Government's 50 Greatest Hits." My first impulse was to see how we did on the Hit Parade; that is, how many of the 50 achievements were related to — in fact, depended upon — advances in science and technology. Were we the Beatles, or just touring small stages as some one-hit wonder?

Happily, we were solidly on the charts. Promotion of scientific and technological research is itself one of the government's key endeavors, and it shows up as number 13 on the list. It's difficult to make a clean cut, but others in the top 50 that depend directly on the fruits of science and engineering included reducing disease (ranked no. 4), ensuring safe food and drinking water (no. 6), improving water quality (no. 11), improving air quality (no. 15), enhancing workplace safety (no. 16), strengthening national defense (no. 17), enhancing consumer protection (no. 20), promoting space exploration (no. 25), and enhancing the nation's health care infrastructure (no. 28). Science and technology also contributed to strengthening the nation's highway system and airways systems (nos. 7 and 33, respectively), reducing exposure to hazardous waste (no. 27), and improving mass transportation (no. 47).

By my count, then, roughly one-quarter of the most significant accomplishments of the federal government over the last half-century depended directly upon scientific and technological advances. The relationship is symbiotic, of course, because many of these initiatives came with money that was needed to get the job done. We can be proud of science's impact on the grand themes of government; we should also remember that several huge, commercially successful technologies, mainly the province of the private sector, don't even show up explicitly on this list. Among the latter, one would certainly include microelectronics, to which ECS members contribute so much.

As an aside, one observation that leaps out from the list is how much of the government's technical agenda relates to health and safety. Of the items above, numbers 4, 6, 11, 15, 20, 27, and 28 have strong health compo-

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nents. Perhaps, then, we shouldn't be too surprised at the explosion of funding in biomedical and health care research in the last several years. That research can be mapped directly onto what are obviously some very high government priorities.

A group of 450 scientists might have come up with a different Top 50, but the fact that it was compiled and ranked by non-scientists, is precisely what makes it so interesting. We have a chance to see how we fit onto the charts according to people who are experts at assessing such things, and to the extent that their assessment was both objective and comprehensive, now we know. I admit that some of the endeavors and their rankings surprised me. It's unlikely that I would have put "rebuilding Europe after World War II" first, and I don't think I would have thought to put support for veterans' readjustment and training twelfth. But I'm not an historian. I'm happy to leave such questions to them and pleased that their Hit Parade shows that we're playing the right tunes. ■