Competitiveness for stability

The US National Academy of Sciences, which has proposed a new framework based on international status for making decisions about the support of research, should follow through with a real-life study.

THE one thing that is certain in the United States these days, besides death and the new (but confusing) taxes in President Bill Clinton's economic programme, is the dismal state of morale among researchers in nearly all branches of science. Pressed to get grants in an increasingly competitive environment, even the best and the brightest feel beleaguered — and with justification. Uncertain about whether their research will be funded from year to year, they find that anxiety defeats concentration and creativity.

That this is the present state of affairs, despite the fact that the US government spends some \$70 billion a year on research and development in federal, industrial and university laboratories, is not in doubt. The problem is that there is no obvious solution.

Into this terrible dilemma comes the National Academy of Sciences and its recently issued report on *National Goals for a New Era*, which picks up on the current fashion of justifying research in terms of international competitiveness. The Committee on Science, Engineering, and Public Policy (COSEPUP), which represents the academy proper, the National Academy of Engineering and the Institute of Medicine, made the bold and interesting suggestion that decisions about funding science should be based on the recommendations of committees whose job would be to decide where the United States stands in any given field *vis-à-vis* its competitors in other countries.

In this scheme, which would include at least one "foreign" scientist on every evaluation committee, the United States would decide that it must be the world leader in certain fields but that it could do adequately in others by merely being among the world leaders. Criteria would depend largely on the perceived contribution science might make to national security (largely defined in economic terms in this post-Cold-War era). However, points could also be earned if a particular area of science "so captures the imagination that it is of broad interest to society". Astronomy and, alas, manned space flight come to mind.

Several factors influenced the COSEPUP authors, who worked under the chairmanship of Phillip A. Griffiths, director of the Institute for Advanced Study at Princeton. First is the arguable premise that "the ongoing changes in science, technology, and society have [adversely] affected the relationship between scientists and the general public, including the public's representatives in Congress".

That relationship, born in the 1940s after

science "won the war" is epitomized in a report written in 1945 by Vannevar Bush, director of the Office of Scientific Research and Development. Called *Science — The Endless Frontier*, the Bush report is credited with establishing the federal government in Washington as a principal sponsor of research and science education. For instance, the National Science Foundation, with its proclivity for basic research, was a product of the Bush report.

Indeed, *The Endless Frontier* is often cited by those who have not read it recently (or at all) as the scientific equivalent of the Ten Commandments: it proclaims the federal government's duty to support basic research. In fact, Bush, who strongly endorsed unfettered scientific inquiry, cast his argument in coldly political terms, stating among other things that "more and better scientific research is one essential to the achievement of our goal of full employment". Another argument rested on the notion that the United States could no longer depend on Europe as a major source of scientific capital and would have to create its own. It all sounds very contemporary.

What about the compact between government and society, which is widely rumoured to be falling apart? The academy recites the evidence: some members of the public are dissatisfied with the quality of education at research universities (as they ought to be); environmental problems are blamed on science (sometimes but not always fairly); and biomedical research is being held accountable for the high cost of medical care, when in fact it should get credit for improving the health of the nation.

Whatever element of truth there is to these and other signs of lack of reverence, it does not follow that the public is anti-science. Citizens who support a \$70-billion research and development budget cannot be said to be Luddites. Nor does it follow that panels of experts evaluating research on the basis of international competitiveness can solve the insecurity that is justifiably felt throughout the scientific establishment — among young and old alike.

The academy offers its "New Era" report in the spirit of bringing a rational decision-making framework to a system that is bound up by the various peer-review systems of federal agencies, the many committees and subcommittees of Congress, the powerful lobbying of special interest groups and the much maligned phenomenon of "pork barrel" politics, which is the only way universities can claim federal funds for new scientific

laboratories in the present environment.

As Clinton's recent painful and public encounter with Congress over his economic package ought to make plain, there is no possibility of turning the present Congress into a compliant body that will do for science whatever science says — no matter what the framework.

But, more important, the root of the problem is neither the public nor the government. It is the sheer size of the scientific enterprise. There are more scientists, with more good ideas, than there is money. Science spending cannot go up forever without consuming the US Treasury.

To their credit, the academy authors appear to understand this. Their plan envisages a redistribution of money rather than an increase in the pot. And their real motive, which is to protect science and bring stability to the enterprise, is laudable, even though it may be little more than an exercise in wishful thinking. But one fundamental barrier to the international competitiveness framework is that there is, at present, no responsive audience.

Unlike *Science — The Endless Frontier*, which was written at the request of President Franklin D. Roosevelt at a time of national unity and post-war optimism, *National Goals for a New Era* was written not in response to a presidential request but on the academy's own initiative. The academy should therefore carry its idea one step further and actually do what it proposes. A pilot study of a real scientific problem might well demonstrate the feasibility or impracticality of the competitiveness framework.

Throughout its report, the academy emphasizes that its roster of scientific panels could make decisions not only about what to fund but also about what not to fund. And that, of course, is what the report is implicitly all about, although the authors infuriatingly refuse to make any real-life judgements. They do, however, cite the Human Genome Project, the Superconducting Super Collider, NASA's mission to Planet Earth and other big science projects as projects that could be rationally evaluated according to the new framework.

If the academy actually came up with specific examples of areas in which the United States must be first, areas in which it need be only among the first, and areas in which funds could be cut, it would at the very least make a contribution to the funding debate that, unlike its new report, would be sure to get everyone's attention. It is worth the political risk.

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