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## The Best of Times, The Worst of Times

Science has never had higher gross funding, but at the same time the gap between what science needs and what has been appropriated has never been greater. That funding gap, together with the headlines clamoring for infrastructure changes, has created a mood of pessimism among some scientists that must be reversed.

The steady growth of science and the zero-sum budget of the nation have created most of the problems that exist today. In the past, when our economy was expanding buoyantly, and the budget for science was growing at roughly the same rate, sloppiness in procedures or priorities among scientific disciplines could be ignored. Those days are certainly past, but the situation is not yet cause for panic, provided that scientists and government are willing to do some hard work and some hard thinking.

First, the infrastructure problems must be resolved in a way that has faculty and administrators, private and public institutions working together instead of warring with each other. The machinery to handle problems of fraud is now in place, with minor disagreements between those who think the bureaucracy has become overly burdensome and those who think it is still not adequate. The overhead problem is not resolved, but there is evidence that it is now getting the kind of intensive attention that it should have had long ago. Nevertheless, these problems pale in significance compared to the overall funding problem. Because there are enormous pressures on all budgets, science can continue to advance only if scientists can demonstrate that (i) its growth is essential to society as a whole and (ii) the scientific community is placing its priorities in proper order. To do this will require some new approaches among scientists and between Congress and the scientific community.

Within each discipline, the “little science” community is quite good at allocating funds. Biologists are good at setting priorities in biology, chemists in chemistry, astronomers in astronomy, and so on. When it comes to evaluating the funding of physics versus chemistry, or biology versus space science, or big projects versus small ones, there are no formal mechanisms. Even if the scientific community developed them, there is no indication that Congress or the President would be likely to delegate to an outside group the responsibility for deciding whether research on AIDS is more important than a new shuttle, or a new superconductor more important than tests for environmental pollutants.

If Congress intends to reserve final priority-setting for science to itself, it must establish better mechanisms to learn about new programs that science can provide for the good of the country. If the purpose of a project such as the space station is mainly to bolster “the prestige of the nation,” its funding need not be debated on scientific grounds, but then it should not be counted as “support for science.” If a new science project is proposed or major increases in current programs are advocated, there should be some central science committee (possibly a joint House-Senate committee) to evaluate relative scientific priority. This would be an opportunity for scientists to present bold new programs, such as a massive basic research effort on environmental protection, without waiting for an agency or department to initiate the process. The scientific community might create devices for an initial screen on proposals such as the astronomers have done recently. Then Congress could establish priorities among disciplines after each group put its best foot forward.

Last year a congressional committee admonished some individuals at the National Institutes of Health “to get your act together” in a way that suggested that hearing all sides of a controversy somehow made the case less persuasive. That is exactly the wrong message; the group that does the decision-making must hear both sides of a controversy. Congress should invite critics, advocates, and the President’s science adviser to critique proposals. Scientists must be willing to speak up or they will hear that a massive increase in funding for a space station is support for science when very few scientists agree that it is.

If this nation is to maintain its standard of living in an increasingly competitive world, and if the threatening problems of environmental damage, overpopulation, crime, and energy shortages are to be avoided for the world as a whole, an increase in the total amount of science and in the productivity of science are essential. Scientists should not be ashamed to ask for more money for science, but they must be prepared to justify its value to society. Moreover, they cannot afford to have wasteful projects sold in the name of science because these will preempt other more valuable uses of scarce resources.

—DANIEL E. KOSHLAND, JR.

# Science

## The best of times, the worst of times

DE Koshland Jr

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