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BUT WHAT WOULD PASTEUR SAY?



The Israel Academy of Sciences and Humanities actively involves Israeli scientists in wide-ranging discussions of major issues in post-Cold War science policy. Starting with its major International Conference on Strategies for the National Support of Basic Research (October 1994), cosponsored with the C. H. Revson Foundation, the Academy has hosted a lively series of lunch and dinner meetings with such distinguished speakers as Dr. Arthur Bienenstock, Associate Director for Science at the U.S. Office of Science and Technology Policy (OSTP), Prof. Paul Singer, Chairman of the Israel Science Foundation, and Prof. Jean-Jacques Salomon, author and Director of the Centre de Science, Technologie et Societe of the Conservatoire National des Arts et Metier. The following excerpts were adapted from Prof. Salomon's December 8, 1998 presentation on Recent Trends in Science Policy, which was followed by a spirited open discussion.



AN EVENING WITH J. J. SALOMON



When discussing recent trends in contemporary science policy and science funding, the plural is really unnecessary. There is only one major overall trend: the increasing priority given to industrial research and innovation at the possible expense of curiosity-driven enquiry. This trend started earlier, but the implosion of the Communist world and the end of the bipolar nuclear arms race inevitably meant that defense R&D investments would be cut and that market-oriented research would redirect national science and technology policies. Unfortunately, to manage a technology policy in support of economic growth is much more complex than implementing the traditional, security-oriented policies of the previous four decades. The state is no longer the predominant consumer of R&D activity, and innovation involves much more than just research. It requires innovative design, production marketing, finance, and so on.

Several factors have changed the landscape. First, after the Cold War, the resources

formerly allocated to defense R&D did not flow to civilian research, but rather to other social priorities. Second, the shift from military to economic competition has promoted ever closer links between the universities and industry. Third, revolutions in new information and communication technologies, biotechnology and the materials sciences have triggered momentous changes, analogous to those provoked by the printing revolution: an intellectual, economic and social metamorphosis of civilization and culture. All contribute to knowledge-based industries, and to "dematerialization," a process in which post-industrial societies rely ever less on natural resources and ever more on intangible intellectual capital. Finally, an increasing number of

research to applied development to production to the market place. The mobilization of brains and laboratories that had been so successful during World War II should, therefore, continue indefinitely in peacetime, as in Vannevar Bush's *Science, the Endless Frontier*. This S&T-push model no longer holds true. Japan and others did quite well innovating while doing comparatively little basic research. The new American catch-phrase is "Science, the Endless Resource." But a pure "market pull" model is equally incomplete. Neither supply nor demand alone can explain everything.

Researchers assume that the state will subsidize basic research without worrying too much about short or medium-term results or precise suballocations. In contrast, industrial managers pursue short-term priorities, based on market demands, and

which we live may also be under threat. We may come to have very uniform societies, closely linked by the internet into global villages, but rather absurd ones.

I am pessimistic, although that doesn't mean that I don't act. But, in the broadest terms, the dream of the Enlightenment, that there would be a conjunction between scientific progress and social progress, is no longer obvious. In the future, material progress will not measure our ability to prevent war or growing inequalities. Pasteur's passion to serve humanity no longer seems to belong to our time. That is where I am truly pessimistic. Science remains a luxury activity of very developed countries, which have already paid the long-term price for

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issues now affect the future of the whole planet.

But, just as globalization gives an illusion of convergence without global integration, the trend towards "innovation" leads to common challenges, without creating identical opportunities to respond. National economies are becoming more interdependent, and technical knowledge is becoming the common property of a worldwide technical community; but the dominant political concept still remains that of the nation state which struggles to ensure that the production and exploitation of innovation remains largely circumscribed within its borders. The old linear model of scientific progress, which was as simplistic as it was attractive, offered an idyllic vision of discoveries proceeding smoothly from basic

keep a close watch on expenditures and returns on their investment. Other well-known "incompatibilities" between industry and university include research style, acceptability of unpredictable delays, disclosure/dissemination policies, intellectual property rights, and so on. Industrial values might undermine the basic purpose of long-term, "risky" scientific research, by treating science as just one commodity among others. Both sides will have to learn to live together, but greater industrial support might well lead to less basic research.

The autonomy of the university indeed seems under threat. The notion of spending leisure time trying to understand how the world works may become increasingly less relevant than "urgent" short-term applications. I worry seriously about this, not only in the natural sciences, but also in the social sciences. The basic possibility of criticizing the society in

this kind of thing: culture, political tensions and democratic processes, etc. Some newcomer countries will try to catch up, but only a few, mostly bigger ones, will succeed. There will be both more international competition and more collaborative research, the prime driving force being financial. The next century will not be the end of history!

Finally, what a country wants to do with science and technology is ultimately linked to what it cares about. None of the technical solutions offered by science can ever act as a substitute for such goals. That is why, whether formally or informally, Israelis cannot escape thinking, formulating and implementing decisions that will affect the future of Israel's science and technology. These decisions and their sequelae will inevitably influence the future of all sectors of Israeli society.