1994: Science enters the post-Cold War era

The past year has seen continuing transition on the global stage. The storming of the Russian Parliament in October indicated that, whatever the future of the former communist countries of Eastern Europe, a return to the rigid East–West confrontations of the Cold War is unlikely. The successful termination of negotiations on the General Agreement on Trade and Tariffs has established the codes of conduct under which the global wars of the immediate future — those over access to markets — will be fought.

In the following pages, our correspondents around the world report on the impact these trends are already having on the way research is conducted. The most obvious, namely the reduced need for heavy spending on military research, is perhaps the least significant. There has been little evidence that funds freed in this way are being directly transferred to civilian research; indeed it would be surprising to see the so-called 'peace dividend' surface in this simplistic way.

More significant has been the need to fill the role previously played by government support of military research in maintaining the health of the science base, particularly in countries such as the United States and the former Soviet Union. It is this, together with a shift in concern from military to economic security, that has helped to determine the new world scientific order emerging in countries of both East and West, North and South.

What are the main characteristics of this new order? First, that governments both conservative (as in Britain, France and Germany) and liberal (as in the United States, Canada and Australia) feel a new responsibility to back research policies designed to boost 'strategic' civilian technologies given the market's inability to address issues of national security.

Second, that in a world where the ability to prosper depends on the quality of technical skills as judged by the market-place, the criteria used to evaluate research projects are increasingly those accepted by the international scientific community, rather than those that meet local self-interest. Hence the growing willingness of countries such as Japan, France and Italy, previously suspicious of the judgement of outsiders, to open their research systems to external review.

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Point of no return: Muscovites watch the attack on the Russian parliament.

Third, scientific projects whose motivation lay partly in national prestige — itself a valuable currency during the Cold War — have lost much of their lustre. The Superconducting Super Collider (SSC) in the United States is one such casualty. A similar fate could soon meet NASA's planned 'international' space station, while France is under pressure to reduce funding for large projects in fields such as space and nuclear energy. Science as a political spectacle has lost its bite.

As the reports below indicate, the post-Cold War era has brought new promises for science, including a renewed political commitment (valuable when the welfare state is under attack) and a determination to address shortcomings in science and engineering education. But it has also brought new threats, from the marginalization of research whose potential contribution to wealth or well-being cannot be demonstrated, to the shrivelling of support for research teams (for example in the former communist states or in the newly industrialized nations) ill-equipped to survive the harsh winds of international competition.

Scientists may have less to fear than they did at the beginning of 1993; the promise of renewed economic growth can only be good news for those whose funding prospects depend directly on the health of the economy that supports them. But, with research budgets being frozen virtually everywhere, and pressure increasing to evaluate all research projects in terms of competitive advantage, 1994 does not yet promise much cause for celebration. □

US looks cautiously to Clinton for leadership into new territory

Washington. The opening year of President Bill Clinton's administration cut both ways for science. The scientific community was able to applaud the appointment of a string of its respected members to posts in the administration. But many also saw the closure of the Superconducting Super Collider (SSC) as an ominous turning point in Washington's approach to science funding.

This year will see how far these hopes — and fears — are justified. In particular, it will demonstrate the impact of what was perhaps 1993's most profound development in science policy, namely the creation of a National Science and Technology Council. This 'science cabinet' will be chaired by Clinton himself, and will oversee the federal government's entire $76-billion research budget.

The appointments of Harold Varmus, the Nobel prize-winning molecular biologist, as director of the National Institutes of Health (NIH), and of the respected physicist Neal Lane to head the National Science Foundation (NSF), reassured the scientific community that the case for basic research would be strongly argued in top political circles.

Such support is likely to become increasingly necessary in a political climate that requires every dollar spent on research to be fully justified in terms of some social outcome, whether it is greater industrial competitiveness or a lower infant mortality rate.

No such justification was forthcoming for the ill-fated SSC. Policy makers are looking to the new council to provide a clear direction for science, to replace the fog in which the Texan atom smasher was lost. Varmus, for one, describes it as "very useful and potentially very important"; Bruce Alberts, president of the National Academy of Sciences, says the council will work if Clinton wants it to do so.

The will is certainly there. At a recent White House reception for Nobel laureates, Clinton and his wife Hillary seemed to impress their guests. Varmus says they were "informed and enthusiastic" on science policy matters, and predicts the president will chair the council with gusto.

Guided by Jack Gibbons, the president's science advisor, the administration appears to have accepted the importance of fundamental science. But Congress is likely to continue to press strongly for research that meets "strategic" goals. And the first to come in for close scrutiny will be the NSF.

In a few weeks, Lane is due to appear before the Senate appropriations subcommittee chaired by Barbara Mikulski (Democrat, Maryland) to explain how he plans to make sure that 60 per cent of NSF's work ▶

is 'strategic'. Lane — and the rest of the science community — will either have to convince Congress that much basic research can comfortably wear that label or accept that research directions will have to be changed.

Supporters of science in Congress are sanguine about the outcome. "My feeling is that there's going to be no lessening of funding for basic research, but probably a little more guidance on which areas are critical for the nation — as we did before with defence-related science," says George Brown, chairman of the House Science, Space and Technology Committee.

Keen listeners: Hillary and Bill Clinton impressed scientific guests at a recent White House reception.

But if funding for civil science is to grow — and 1993 has seen healthy budget increases at least at the NSF and the National Institute of Standards and Technology (NIST), the administration's chosen workhorse for technology transfer — defence research must continue to contract: there is nowhere else for the money to come from.

The ending of the Cold War would seem to point in this direction. Indeed, efforts are being made to ensure that concern for economic security delivers the same pay-off to the scientific community as did the previous concern for military security.

But the shift cannot be guaranteed, particularly with the recent nomination as Secretary of Defense of Admiral Bobby Inman, who has already expressed his independence from the administration in remarkably forthright terms, and is seen as the dark horse in the new "science cabinet". Inman has previously shown strong interest in research and high technology. A successful rearguard action by him to shore up the vast defence research budget could wreak havoc with Clinton's plans for expansion elsewhere.

More immediate concerns are likely to dominate the science policy agenda in the coming months. Proposals for health care reform will become sufficiently concrete to influence the future path of biomedical research. And NASA's proposed "international" space station will fly a dangerous (and possibly fatal) mission into Congress.

But the space station's destiny will be of more concern to the aerospace industry than to most scientists. The latter are likely to be more worried about a slow — and Hollywood-assisted — erosion of their public image. The dedicated, white-coated researcher, labouring to save the planet from poverty and disease, risks being supplanted in the public mind by a money-grabbing, plagiarizing con-artist.

This phenomenon has some way to go. A recent opinion poll showed the National Academy of Sciences to be the most credible of all American institutions, well ahead of the military in second place — and with six times the level of public confidence enjoyed by either Congress or the media.

But top scientists have been alerting their peers to the risk of losing this reputation. Alberts and Lane have been among those urging scientists to get out to schools, offices and factories and win the public's appreciation. Outside Washington, that is the priority for 1994. **Colin Macilwain**

Italy draws order out of chaos

Munich. Last month, Italy's Ministry of Research and Universities announced plans to scrap the country's much-criticized system of distributing research funds through small committees, and to introduce for the first time a formal peer-review process for almost all government-funded research.

This is the latest move by the ministry to develop tighter control over the quality of the research that it funds and align its procedures for allocating research funds more closely with those of other Western nations.

The new system will be introduced gradually beginning in 1994, when three per cent of all research grants will be allocated after peer review. It will be followed by a scheme under which research projects receive international evaluation at defined intervals.

At the same time, discussions have begun between the ministry and Italian industry to identify long-term strategic research needs. The ministry has already decided to launch a strategic programme on robotics, once its budget for next year has been agreed. Also under consideration are programmes in environmental technologies, informatics and nanotechnology.

Much of the credit for bringing order into a reputedly chaotic ministry must go to the new minister of research, Umberto Colombo, who has been in office only since May. But he is not a politician, and therefore may be replaced after next spring's elections. If so, there are many in Italy who hope that the reforms he has started will be respected by his successor. **Alison Abbott**

Japan: Recession threatens shift to basic research

Tokyo. While most countries around the world — including its immediate neighbours, South Korea and Taiwan — are promoting research aimed at developing new technologies, and cutting back on basic science, Japan, the pioneer of this strategy, is heading in the opposite direction.

But as the economic recession continues to bite and international competition becomes more fierce, Japan may find that it too comes under pressure to follow the worldwide trend in order to restore its economic growth. This will be a critical year for deciding which path it will follow in future.

Since the beginning of the 1980s, government and industry in Japan have both accepted that they should support basic research, reacting in part to criticism from the West, and particularly the United States, of the country's perceived tendency to live off the fruits of Western science.

In the latter half of the decade, some of this talk was translated into action. Companies flush with cash began setting up basic research laboratories at home and overseas, the latter often in close association with Western universities.

Similarly, government agencies such as the Ministry of International Trade and Industry (MITI) launched a number of projects aimed at supporting basic research. A typical example is the International Human Frontier Science Program (HFSP), established in 1989 by MITI and the Science and Technology Agency (STA) to support international research on the brain and biological functions, with the bulk of the funding coming from Japan.

Public pronouncements and actions by the government still support this push for basic research. Last year, for example, the Ministry of Education, Science and Culture continued its drive for large increases in the budget for university research grants — still very small compared with some Western countries — with the aim of almost doubling the budget in a few years.

Similarly in October, MITI, in collaboration with industry, began a large project on long-term research on nanotechnology. Several US semiconductor manufacturers have joined the project because, they claim, it is difficult in the current economic climate to win support for such research from their own companies or government.

In line with this trend, a number of government-funded research organizations have carried out reforms and introduced external reviews to strengthen their ability in basic research. First off the mark was Tokyo University, which, after persuading the government to increase funding for buildings and graduate research, brought in a team of ▶