New Push for European Science Cooperation

Europe's research ministers, fearful of economic domination by Japan and the United States, may soon agree to broaden scientific collaboration

Brussels. Can the threat of economic domination by Japan and the United States succeed, where political idealism has failed, in forging the nucleus of a European science policy? This is the question that will face the science ministers of the 12 member countries of the European Economic Community (EEC) when they meet in late June to approve a new 4-year plan for joint cooperation in scientific research.

In principle, the attractions of such cooperation appear numerous. They range from the economic advantages of sharing expensive research equipment and avoiding the duplication of research programs, to the more explicitly political goal of using collaborative projects to increase the social and cultural integration of Europe.

In practice, however, many past efforts to stimulate greater cooperation through the research budget of the Commission of the European Communities in Brussels—the administrative bureaucracy of the EEC—have fallen foul of the fact that European unity is often superficial. The same tensions that pervade any sphere of international cooperation have seldom been absent from joint research projects, many of which have suffered from conflicting goals, excessive bureaucracy, and nationalistic aspirations.

Some have succeeded despite the obstacles. One of the biggest has been the Joint European Torus (JET), a tokamak which has been built with EEC funds in the United Kingdom as Europe's main facility for research in fusion energy. Although JET's construction was delayed for 2 years by competition for the site between Britain and West Germany, the research facility is now proceeding smoothly, and attention is shifting to plans for what is already referred to as the Next European Torus (NET).

Others, however, have resulted in embarrassing failures. The most recent was a major research program into the behavior of nuclear reactors in loss of coolant accidents, which was to have been carried out at the Commission's Joint Research Center at Ispra in Italy. Known as Super-SARA, the project started in 1980 but was terminated in April of this year because of a tripling of estimated costs, continued disagreement over research strategies, and the fact that similar experiments in Canada and the United States were moving rapidly ahead, making Super-SARA redundant.

Viscount Davignon

Trying to convince European leaders that if Europe is to remain economically and politically strong, it must substantially increase collaboration in high technology.

Given its mixed track record, nobody pretends that the EEC's past research programs have been an unqualified success. Indeed, despite a decision taken in 1974 to broaden research away from a previous emphasis on nuclear energy, the proportion of the Commission's budget spent on research actually fell from 2.8 percent to 2.2 percent between 1969 and 1979.

It is this situation that the Commission itself is now trying to reverse, largely through the efforts of its aggressive and outspoken commissioner for industry, energy, and science, Viscount Etienne Davignon. "The Old World is running out of steam," warns Davignon, a Belgian aristocrat who is trying to convince European leaders that the only way Europe can remain economically and politically strong is by substantially increasing collaboration in high technology—and that the EEC has a key role to play by boosting joint research in fields of science relevant to this strategy.

Davignon's proposed strategy for the EEC is contained in recommendations that he is placing before the Council of Ministers. He is suggesting a streamlining of the Commission's decision-making bureaucracy and greater opportunities for interaction with the private sector in determining research priorities. And, by adding major new joint research efforts in fields such as microelectronics and biotechnology, Davignon hopes member countries will agree to increase the share of the Commission's budget devoted to research from 2.6 to 4 percent over the next 4 years. The extra money would come from other parts of the Commission's budget, 70 percent of which is currently spent on agricultural subsidies.

Two factors lie behind Davignon's proposals. The first is political pressure on the Commission to increase its general effectiveness, as a result of which the Commission has placed at the top of its new priority list efforts to help increase the international competitiveness of European industry. For its research programs, this has meant shifting the emphasis away from problem-solving in fields such as energy, health, and environment—the principal research goals of the 1970's—towards what are now described as "pre-competitive technologies."

"We will always need to carry out science and technology in support of community policies in fields such as agriculture, trade, and protecting the environment. But in addition we must also respond to the growing need to pull our forces together to have a greater chance

of success in new technology areas," says Paolo Fasella, director general of the EEC's science, research, and development directorate.

The political thrust in favor of greater economic efficiency has coincided with a new emphasis that individual European countries are placing on "strategic research," defined as occupying a position midway between the traditional categories of fundamental and applied research. In the past, Common Market countries such as Britain have insisted that the EEC Commission only carry out applied research, on the basis the cooperation in fundamental research should be left to the scientific community through bodies such as the European Science Foundation (see box below). The new enthusiasm for strategic research, however, is blurring the previous distinctions, permitting the Commission to think more in terms of long-term research objectives and encouraging its member countries to endorse a joint approach.

In broad terms, the new program for the years 1984 to 1987 which the Council of Ministers is being asked to endorse at a meeting on 28 June is aimed at allocating scientific and technical resources to meet seven separate goals: promoting agricultural competitiveness; promoting industrial competitiveness; improving

ESF: Modest Plans, Modest Achievements

Strasbourg. Perhaps no other initiative better illustrates the harsh realities faced by any effort to integrate European science policy than the European Science Foundation (ESF), set up in the early 1970's with the intention of performing the same functions for the European Economic Community as the U.S. National Academy of Sciences performs for the U.S. government through the National Research Council.

The first plans for such an organization, hatched at the top of the EEC in the late 1960's by then Commissioners Ralf Dahrendorf and Altiero Spinelli, were ambitious. Drafted as an integral part of a politically and culturally united Europe, they envisaged an international research council with an initial endowment of perhaps $1 billion which would provide sufficient income to launch a series of major research programs.

The reality has been very different. "Some were wildly optimistic; others were practical and concrete," explains an official in the ESF's modest offices in Strasbourg, close to the border between France and Germany. The foundation was set up in 1974—and has remained—as primarily a meeting place for the research councils and scientific academies of Europe. It currently has 49 member organizations from 19 countries; these contribute individually toward its current budget of a little over $1 million a year, enough to support a full-time staff of 12 but not to sponsor any ambitious programs of its own (though it sees its task as being to prompt member organizations to do so).

The EEC provides funds for specific projects, but its own research budget remains two orders of magnitude larger, and even its use of the ESF as a channel for independent scientific advice has not been as great as initially hoped.

The ESF seems resigned to its more limited role. "I do not think that the ESF should be much larger; it could double in size, but not much more," says its current president Herbert Curien, chairman of France's Centre National d'Etudes Spatiales. "Our ambition is still to be kind of counterpart to the NAS, but we cannot hope to approach the Academy's size.

"You must remember that Europe is not the United States of Europe, and it is difficult to say that we really represent Europe. We do try, however, to represent science in Europe more or less independently of the political positions of our governments. We try to find a common denominator between the positions of our members."

Despite its relatively modest budget, the ESF has been far from inactive. Its activities since it was formally created in 1974 have ranged from an advanced postgraduate training and research program in the brain and behavioral sciences (which the ESF, having supported for 5 years, is now trying to place in another home to free up resources for other projects) to a report on the current state of the planetary sciences in Europe, described by Curien as an attempt to do for the European Space Agency what the NAS does for the National Aeronautics and Space Administration.

Perhaps ESF's single greatest success has been in catalyzing interest in a European Synchroton Radiation Facility. After the foundation had financed initial studies which demonstrated both the scientific need and the potential political support for such a facility, the project is now proceeding independently under an ad hoc committee of representatives from the various European nations interested in helping to build it.

This committee now faces the thorny task of deciding where the facility should be sited, with rival offers from Denmark, Germany, France, and Italy—as well as the trilateral consortium which currently runs the Institute Laue–Langevin in Grenoble. Curien admits that national rivalries can make disputes such as those over siting even more contentious than comparable arguments in the United States. Another ESF official points out that the United States has at least had the advantages of "one territory, one language and one currency."

Curien continues to argue, however, that true multilateral cooperation remains an important political goal. "It is much easier to start bilaterally or trilaterally, and then afterwards admit the collaboration of others; but if I were a Swiss, a Belgian or a Swede, it would mean that I might never be in at the beginning of an important decision. We must at least occasionally try to have decisions made multilaterally; it is important that everyone in Europe feels that they participate."

ESF representatives met recently in Washington with counterparts at the NAS to discuss the possibilities for U.S.-European collaboration in planetary research. Curien hopes that the Williamsburg economic summit meeting will provide a political impetus for closer collaboration in this and other fields; and that this, in turn, may bring Europe's scientific community closer together.

"The road leading to a scientific Europe is neither straight nor flat," Curien wrote in the ESF's last annual report. "Above all, it should be noted that, as in any other area, the European concept is not inherently spontaneous; it has to be promoted."—D.D.

the management of raw materials; improving the management of energy resources; reinforcing aid to Third World countries; improving living and working conditions in member countries; and, finally, improving the effectiveness of the community's own scientific and technological potential.

"We are proposing a completely different approach than before, basing our strategy on broad policy objectives rather than on problem-solving," says Louis Villecourt, head of the EEC's science policy office. "Research must be seen as an instrument for helping to achieve the overall economic and political objectives of the Commission, and not merely confined to sectoral problems."

The proposed new budget figures reflect this change in strategy. As late as 1979, almost 70 percent of the Community's joint research funds were spent on energy—and most of this on nuclear fusion and fission research—compared to as little as 6 percent on subjects directly related to industry's needs. Of the figures now being suggested for the period 1984 to 1987, energy's share would be reduced to 47 percent, while improving industrial competitiveness—in particular support for research into new technologies such as microelectronics and biotechnology—would absorb 28 percent of the new budget.

The overall increase in the proposed budget, which the Commission is suggesting should be virtually doubled to $3.9 billion over the 4-year period, is likely to be a source of controversy with member states (particularly those opposed to a compensatory reduction in the agricultural budget).

Less opposition, however, is expected to the two key political changes in the proposals that Davignon is putting forward. The first concerns the way that research decisions are made inside the EEC. Partly as a result of distrust of international bureaucracies, member states have in the past insisted that even relatively minor decisions be made at the diplomatic level of the Council of Ministers. But this is a requirement which Commission officials complain only adds to the general problems of managing multilateral research projects.

The lack of a flexible management structure, for example, has been partly blamed for the failure of Super-SARA. Keen to avoid similar problems in future, Davignon is now proposing that, once broad research priorities have been agreed on by the Council of Ministers, responsibility for the operation of individual programs be delegated to a newly created Higher Policy Committee for Science and Technology, made up of official representatives from each of the 12 member states of the EEC.

The second element of Davignon's strategy is to encourage far greater involvement by the private sector in determining the Community's priorities for supporting strategic research. The most obvious example of this so far is ESPRIT—the European Strategic Research Program on Information Technology—which Davignon hopes could eventually become Europe's answer to similar programs already under way in Japan and the United States.

Although individual European countries are already developing their own research programs in response to the Japanese and U.S. challenges, Davignon argues that "national strategies cannot address the root of the problem," namely that "all technology options must be pursued and developed." ESPRIT has therefore been conceived as a long-term program of research into five key areas of information technology: advanced microelectronics, advanced information processing, software technology, office automation, and computer-integrated flexible manufacturing.

One of the principles of ESPRIT is that all funding of research should be shared equally with the private sector. Already over 12 major European electronics manufacturers have signed up to contribute half of the $23 million needed to cover the first preparatory year of joint research. If successful, the ultimate goal is a 5-year, $1-billion research program modeled closely on Japan's strategy.

A similar initiative is now being planned for biotechnology. "If biotechnology policy develops in an independent way in the different countries, then you have no possibility of having a common agricultural or industrial policy," says Riccardo Petrella, head of a team known as "forecasting and assessment in the field of science and technology" whose surveys of future industrial developments helped lay the basis for both ESPRIT and the biotechnology initiatives. "The more that there is a divergence in science and technology policies, the more this will push you into having a divergence in your industrial policy."

The success of both ESPRIT and whatever initiatives are eventually agreed for biotechnology will therefore depend largely on the extent to which European companies can be persuaded to bury their national differences and work on a common response to challenges from Japan and the United States. Not everyone is convinced that this can be done. Recently, for example, Philips turned down a proposal to merge with the French company Thomson-Brandt, preferring instead to enter an agreement as European agents for the U.S. giant AT&T. In biotechnology, too, it is not obvious why a European company should collaborate with domestic scientists rather than those in the United States (as Hoechst demonstrated in its recent agreement with the Massachusetts General Hospital).

Some, however, claim that whatever the appeal of collaboration with the United States, the price can be high in terms of lost commercial independence. Herbert Curien, for example, chairman of France's Center National d'Etudes Spatiales (and currently president of the European Science Foundation), points out that this was one of the main reasons behind France's decision in the early 1970's to push for European collaboration in the development of the launcher Ariane. "It is a question of business," says Curien. "If we do not have a launcher in Europe to launch our own satellites, then we will never get any business from outside."

Davignon is now hoping that the formula successfully applied to space research can be adapted to the other newly emerging technologies that are expected to form the basis of global commerce in the coming decades. In his more ambitious moments, he talks of creating a European equivalent of Japan's powerful Ministry of International Trade and Industry.

Previous efforts in the 1960's to forge a single European electronics and telecommunications industry—and with it a unified European science policy—foundered on the rocks of nationalism. But after the traumas of the 1970's, political enthusiasm for such a strategy seems to be building up again. The Council of Minister's meeting will determine how far and how fast Davignon will be permitted to move.—**DAVID DICKSON**

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