Networking: Better Than Creating New Centers?

Governments are focusing their efforts on linking researchers in existing laboratories rather than on creating major ones

Strasbourg

NOT all collaborative research programs in Europe have catchy names like Eureka, ESPRIT, or BRITE (see box on page 1113). Some of the most successful over the past few years have taken place under the umbrella of an initiative from the European Economic Community (EEC) with the off-putting title of "Stimulation Program." Others have been based on the equally unglamorous concept of "networking."

Whatever the label, the top political priority given to the idea that governments should focus their efforts on linking together scientists in existing laboratories—rather than on creating major centers or research facilities—has become perhaps the most important shift in European-level science policy in the 1980s.

The shift has occurred across the spectrum, from basic research through "precompetitive" technology to the more development-oriented projects in EUREKA. The aim is to overcome a major handicap faced by the European research community in comparison with that in the United States: professional interaction in Europe tends to remain confined to a relatively small geographical area, usually a scientist's home country.

"In the United States, people move around freely and automatically," says Michael Posner, secretary general of the European Science Foundation (ESF) in Strasbourg. "In Europe, if you go to a top-class meeting, it is most likely to be organized and attended by people from your own country, and these are the only scientists you will meet."

To help break down this isolation, organizations as diverse as the EEC and Britain's Royal Society are encouraging interaction among existing research groups by providing funds for meetings, travel costs, and joint experiments. For European governments, there is a big plus: this type of support is usually a lot cheaper than pouring money into centralized collaborative facilities. It also avoids the internation conflicts incurred by attempts to identify and focus support on isolated centers of excellence.

The new emphasis has been on the need to strengthen contact between research groups, rather than the research groups themselves. "Networks involve both nodes—that is centers of excellence—and links; we decided that we wanted to strengthen not the nodes but the links," says Hermann Fröhlich of the Deutsche Forschungsgemeinschaft in Bonn.

One of the first applications of this idea was in the EEC Commission's Stimulation Program. This was launched for an experimental 2-year period in 1983 and subsequently funded in an enhanced form for the 4 years from 1985 to 1988.

The Stimulation Program operates almost entirely by soliciting research proposals from the scientific community. It currently supports more than 350 separate research projects. Money can be provided through a procedure known as "twinning" to enable groups of scientists from different countries to form a critical mass, for example, by covering the costs of an initial meeting, helping to support joint experiments, and occasionally employing scientists to temporarily reinforce the work of the team.

"We seem to have hit on a trick that suits the circus," says Posner of the ESF.

One successful application of this approach has been a research program into the development of new high-field magnets, which now links together scientists working in 58 research institutions in the 12-member states of the EEC. "The result of this effort is that Europe now has the same level of expertise as the United States and Japan in this area, and in some cases we may even be in the lead," says project manager Irving Mitchell of the EEC Commission.

Other projects involve an effort to build an optical computer and a $2.5-million research project in adaptive intelligence. Designed to explore the possibilities of building what EEC official Charles White calls "a thinking computer," the project has been given the appropriate title of BRAIN, the convenient acronym for "basic research in adaptive intelligence and neurocomputing."

Similar efforts to encourage cooperation between research groups has become a central element in other EEC endeavors, for example, the Biotechnology Action Program. Launched with a budget of $62 million for the period 1985–1989, the program is funding 260 research contracts, each of which has been required to involve scientists from more than one EEC country. Topics covered range from plant genetics to cheesemaking.

Commission officials, who received almost 1500 applications for support from the biotechnology program, are now trying to link individual projects together into groupings that they describe as ELWWs (European Laboratories Without Walls). "Cooperation is never really spontaneous in Europe," says Dreux de Nettancourt, head of the genetics and biotechnology division. "But once scientists start working together, things tend to snowball."

In a separate initiative, the concept of networks was given political priority in a resolution passed in September 1984 by a meeting of research ministers of the 21 member countries of the Council of Europe. This emphasized the need for what it described as "thematic" cooperation between scientists, and asked the ESF to suggest how this could best be achieved by the creation of scientific networks.

The proposal was greeted with some skepticism at first by the scientific community. "When it came out of the ministers' meeting, it came with a list of 150 proposed topics; the whole thing looked very depressing," admits Sir Arnold Burgen, master of Darwin College, Cambridge, and at the time foreign secretary of Britain's Royal Society.

As the first networks got off the ground, however, the skepticism began to evaporate. "What comes back to us from the ones that are going is great enthusiasm, and the feeling that this is something which was not happening before," says Burgen, who was appointed to chair the ESF networks committee.

Eight networks have been created so far by the ESF with seed money from sources that include the EEC Commission, the Council of Europe, and various individual governments (including $130,000 from France). Topics range from a polar science network, currently undertaking feasibility studies for research projects in glaciology, Southern Ocean ecology, and the geology of polar North Atlantic margins, to a network on longitudinal studies in individual development—the first to be established—look-

ing at behavioral changes over a long time scale.

"Like the man in the Molière play who found he had been speaking prose all his life, 'networking' is really what the ESF has always been doing," says ESF secretary general Posner, formerly secretary of Britain's Social Science Research Council. "But it is going remarkably well—we seem to have hit on a trick which suits the circus—even though it was very difficult to predict that it would turn out this way."

European scientists generally have warmed to the networking approach. For one thing, topics are selected by the scientists themselves. "We were given the money with no strings attached, which means that . . . we are free for the first time to take risks," says Posner.

But there can also be problems. One danger, according to some Commission officials, is that of exclusivity; while a network may be helpful to those who belong to it, it may place at a disadvantage those scientists, particularly from the poorer regions of Europe, who are not considered appropriately qualified to become full members.

Related to this is the question of openness. For the scientific network, this is less of a problem; but for those organized around technological research projects (for example, ESPRIT or the magnet program) elaborate legal procedures are required to specify who will have access to and control over the new knowledge generated.

Some argue that the relative absence of centralized strategic thinking could turn out to be a major weakness. "The problem with EUREKA, for example, is that it lacks selectivity and concentration, and thus cannot set strategic goals at a time when funds for European R&D are still very limited," says Glyn Ford, a member of the energy, research, and technology committee of the European Parliament.

Finally, even though they are generally lower than for other forms of collaboration, the costs of creating working links between scientists in different European countries is still considerable, with hotel and transportation charges significantly higher than in the United States.

Most of ESF's networks budget, for example, is used up by the traveling expenses of participants. "The most effective thing that governments could do to encourage more cooperation between scientists would be to reduce airfares in Europe," says Stephen Cox of Britain's Royal Society. Unfortunately, this is one area over which research ministers have no control. ■

DAVID DICKSON

America's Seductive Charms

For all the attempts to foster closer ties among European labs, scientists in Europe still seem more eager to seek collaboration across the Atlantic. "America is the hub of the European research community, about which its [scientific] disciplines rotate like planets around a sun," concludes a recent attitude survey of European scientists prepared for the Commission of the European Communities in Brussels.

In eight of the nine member states of the European Economic Community (EEC) covered by the survey—the odd man out was the Netherlands—scientists said they had closer ties with the United States than with any other European nation. Moreover, most said that given the opportunity, they would prefer to publish their work in U.S. rather than European journals.

This penchant for transatlantic collaboration is often cited as a hindrance to closer collaboration within Europe itself. The report, which was prepared under the auspices of the European Science Foundation (ESF), does note a positive factor, however. It describes the U.S. experiences of European scientists as a "cross-cultural force," which both helps to bind them together and makes them favorably disposed to international cooperation more generally.

Almost 40% of those contacted in the survey said they were collaborating or had collaborated with U.S. scientists. Perhaps surprisingly, French scientists reported the highest level of transatlantic collaboration; 48% said they had ties with U.S. colleagues. In contrast, only about one-quarter of French researchers have cooperated with scientists in each of West Germany and Britain, France's two principal scientific neighbors.

More than half the scientists who said they had received training abroad—who themselves made up one-third of those surveyed—did so in the United States. "It is not essential to have studied in the Unites States, but it is practically so," says Guy Ourrisson, professor of chemistry at the University of Strasbourg and director of the Institute for the Chemistry of Natural Substances of France's National Center for Scientific Research (CNRS).

The closest contact occured in the two decades after World War II, when many science administrators saw U.S. training for research workers as one of the quickest ways to rebuild Europe's scientific infrastructure. "This created a pattern of cooperation with the United States which has been good," says Pierre Aigrain, a former French science minister who is currently chief technical adviser to the electronics company Thomson. "What was bad was that it developed at the expense of cooperation between neighboring countries."

The number who train in the United States now seems to be trailing off, as does the number of scientists who permanently leave Europe to pursue their research career in the United States. A recent report from Britain's Royal Society, for example, found less of a "brain drain" problem than some had claimed. It found the overall number leaving the United Kingdom—less than 2% a year—to be "not large."

The report states, however, that the continued emigration of qualified scientists, particularly to the United States, represents a net loss of research talent "with long-term deleterious consequences." It also points out that some of the most talented scientists have emigrated. For example, the number of U.K.-born scientists resident in the United States at the time of their election to the Royal Society tripled between the periods 1960–1962 and 1984–1986.

The strong magnetism of the United States, therefore, remains a powerful card for those proposing more mobility in Europe as a necessary countermeasure. "Research funding agencies have certainly got the impression that European scientists tend to meet each other frequently in the U.S., and do not meet often enough in Europe," says one German science administrator.

The sentiment is echoed by officials with the CNRS in Paris, who point out that France, in common with other Western European countries, has been steadily increasing its support for bilateral exchanges within Europe over the past few years to compensate for this tendency. "Ironically we have in the past been doing more in Europe to facilitate travel to the U.S. than we have in Europe itself," says one French scientist. ■ **D.D.**