Science Steers Around Euro-Potholes

While European political and economic integration suffered setbacks in the past year, the prospects for scientific collaboration improved—thanks in part to changes in the Brussels bureaucracy

BRUSSELS AND STRASBOURG—A year ago, Michael Posner, then secretary-general of the European Science Foundation (ESF), lamented that scientists were lagging behind soap salesmen in their ability to operate globally. At that time, things looked bright for soap salesmen: The European Community (EC) was poised on the brink of removing the remaining trade barriers between its 12 member states, to make it the world's biggest single market, and was preparing to welcome a handful of other nations into the fold. European science, on the other hand, was still stubbornly organized along national lines, and the EC's efforts to foster stronger links among the continent's research labs were mired in what most scientists regarded as a near-impenetrable bureaucracy. However, in the year since Posner made that remark in *Science*'s first "Science in Europe" special issue, researchers have been doing somewhat better than soap salesmen—and a whole lot better than the politicians.

Europe's political leaders like to say that any country that hesitates with European integration could miss the train. But last year, their analogy ran off the rails. First, in June, with the European unification express barely out of the station, the Danish electorate pulled hard on the emergency cord, rejecting the Maastricht Treaty that is meant to draw the community closer together. Then last fall, a severe currency exchange crisis frustrated progress toward a common European currency. And in December, Swiss voters declined a ticket to eventual EC membership when they opted not to join the European Economic Area (EEA), a free-trade zone centered on the EC.

To many bench scientists, however, the long-term prospects for European integration have actually improved over the past year. "I am more optimistic than I was before," says molecular biologist Jeff Schell of the Max Planck Institute for Plant Breeding Research in Cologne. One reason for the change in mood is that research administrators have managed to prevent the problems with European political and economic integration from causing serious disruption in the scientific arena. Even more important, researchers are encouraged by changes at the top of the EC's $2 billion a year research programs, which could make the EC into a more powerful—and certainly more popular—force for European scientific unity. Antonio Ruberti, an Italian systems engineer, took over as the new EC research commissioner earlier this year (see box), and he's talking about cutting the bureaucracy, cooperating with other European research agencies, and perhaps shifting some administration of the EC's basic research programs out of the European Commission, the EC's much-criticized executive.

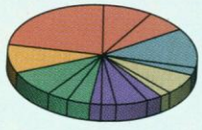
That's not to say the events of the past year haven't caused problems. In rejecting the EEA, Swiss voters also dealt a blow to their own researchers. EEA membership would have allowed Swiss scientists to compete for EC research grants in return for Switzerland contributing to the EC's research fund. But now, they're able to join EC projects only if they can get funding to do so from Swiss agencies. Heinrich Ursprung, state secretary for science, is, however, now pressing for a separate agreement to let Switzerland become a full member of the EC research club.

As for the currency exchange crisis, it could have had a devastating impact on countries such as Britain, where the pound dropped in value by about 15%. To take only one example of the potential scale of the problem, Britain was suddenly faced with a $15 million a year increase in its contribution to the European Space Agency (ESA)—peanuts in the National Aeronautics and Space Administration's terms perhaps, but nearly 6% of the entire UK space budget. In this case, though, ESA's governing council came to the rescue. It agreed to spread all currency-fluctuation-driven increases across all 13 member states, so that the impact on any one country of the sudden intra-European imbalance is "not as bad as was first feared," says Leicester University space scientist Alan Wells.

Meanwhile, the economic recession has led to continent-wide belt-tightening—forcing even that showpiece of European scientific unity, the CERN high-energy physics center in Geneva, to trim its budget by 5%. Still, particle physicists are relieved that the cuts aren't so deep as to threaten seriously CERN's next megaproject, the Large Hadron Collider. "If everybody is poorer," says CERN director-general Carlo Rubbia, "we accept that we must also be poorer."

One research organization that isn't getting poorer, however, is the European Commission. The EC's annual science budget is slated to grow over the next 5 years by some 45%. Although that's a smaller increase than was anticipated a year ago, it is still one of the fastest growing research budgets in Europe. But it isn't just the money that is attracting enthusiasm from researchers. They are delighted by Ruberti's willingness to reform the commission's bureaucracy. For years, scientists have complained about the labyrinthine complexity of EC grant application forms, and the fact

The European Community's Research Budget, 1992–94



	($ million*)	
I. Enabling technologies		
1. Information technologies		**$3019**
Information technologies	$1838	
Communications technologies	$665	
Development of telematic systems in areas of general interest	$516	
2. Industrial and materials technologies		**$1208**
Industrial and materials technologies	$1018	
Measurement and testing	$191	
II. Management of natural resources		
3. Environment		**$704**
Environment	$563	
Marine science and technology	$142	
4. Life sciences and technologies		**$1008**
Biotechnology	$223	
Agricultural and agro-industrial research	$452	
Biomedical and health research	$181	
Life sciences and technologies for developing countries	$151	
5. Energy		**$1276**
Non-nuclear energy	$320	
Nuclear fission safety	$274	
Controlled nuclear fusion	$682	
III. Management of intellectual resources		
6. Human capital and mobility		**$704**
*Converted at $1.2 = 1ECU		**Total $7920**

SOURCE: EUROPEAN COMMISSION

A New Breeze Blows Through Brussels

BRUSSELS—This time last year, the officials who administer the European Community's (EC) science budget were obviously frustrated. Not only were they overwhelmed with the task of managing a rapidly growing budget and new responsibilities, but their efforts were denigrated by large sections of the scientific community (see accompanying story).

Since January, however, those same administrators have been walking around the offices of the European Commission, the EC's executive in Brussels, with a spring in their step. The reason: That's when Filippo Pandolfi was replaced as EC research commissioner by his compatriot Antonio Ruberti, a systems engineer. Ruberti earned the respect of Italian researchers during a 5-year stint as their science minister, and he has already impressed many in Brussels with his managerial skills.

EUROPEAN COMMISSION

Antonio Ruberti

A short, amiable 66-year-old, Ruberti may not seem like a power broker. But Italian scientists who know him well say his low-key image belies a formidable political ability, honed during his decade-long tenure as rector of Rome's La Sapienza University. "Those were very difficult years," says physicist Carlo Rizzuto of the University of Genoa. In 1976, when Ruberti took over, the university's administration was paralyzed and Red Brigade terrorists were active on campus. Ruberti kicked La Sapienza's bureaucracy into life, and cleverly marginalized the extremists responsible for the violence. He also pulled off some impressive feats after entering government—notably in raising the profile of science by creating a new ministry responsible for both research and university policy. And, while the Italian system for supporting research is still far from perfect, Ruberti strived to introduce more rigorous evaluation of projects.

Now, researchers hope that he can encore by reforming the EC's research activities perhaps by allowing other agencies, more experienced in managing science, to run some of its programs. Ruberti says he wants to make the commission more scientist-friendly. "We must have deeper relationships with the scientific community," he told *Science*. As a step in that direction, one of his first moves was to recruit three advisers from the top rank of the scientific community: Molecular biologist François Gros of the Pasteur Institute, CERN director-general Carlo Rubbia, and chemist Ilya Prigogine of the Free University of Brussels.

Ruberti oversees a diverse set of programs. Although research in information technology and telecommunications was recently shifted into the industry commissioner's patch (see next page), Ruberti gained education policy. This moves the center of his responsibility more toward basic science, but Ruberti's aides warn against expecting a major shift of emphasis: His portfolio is still dominated by large industrial programs in areas like materials science, and the tough economic climate is breeding strong support among the EC's member governments for applied programs. "Our goal will be to see that basic science is not forgotten," says Gros.

The recession will also curb growth in Ruberti's budget. Last year, Pandolfi asked for $12.1 billion—a huge increase—for the next 5-year EC research budget, slated to run from 1994. Ruberti has now prepared a more modest request for $10.8 billion, stressing the need for the European Commission to maximize its impact by collaborating with other research agencies. Indeed, he wants the EC to become the focal point for the development of a coherent European science policy. "European research is still very fragmented...and characterized by national research policies," he says.

In this venture, Ruberti expects to encounter some difficulties at the national level. Research officials in Euro-skeptical countries like Britain, in fact, are already complaining about "the tail wagging the dog"—given that the EC's science budget is only 4% of the total government spending on civilian research across its member states. But Ruberti isn't too concerned by such comments. "I'm an optimist by nature," he says. Which explains his laid-back attitude to the problems facing European political integration: "It's not necessarily the pains of childbirth that determine how healthy the baby will be."

–P.A.

that they often don't get to hear about a call for proposals until perilously close to the deadline. "You have to have some kind of inside knowledge," says Nigel Spurr, a geneticist with the Imperial Cancer Research Fund who coordinates an EC-funded consortium working on a linkage map of the human genome.

Ruberti may find his reformist ideas welcomed even within the commission itself. Many officials admit that as the EC's research budget has grown, they've found it difficult to cope with their increased duties—a fact made abundantly clear last year when a program designed to help researchers from eastern Europe, largely through fellowships to work in EC countries, degenerated into farce. Just three commission staff were assigned to handle some 12,000 grant requests, and, "They had east Europeans turning up with suitcases and the universities didn't know they were coming," says Alf Game, who represents the British research councils in Brussels.

Commission officials have been chastened by that experience. "There is a growing realization that they cannot fulfill their new responsibilities," says Wolfgang Hasenclever, secretary-general of Germany's Max Planck Society. As a result, there's now serious discussion about farming out the peer review of grant proposals, and other aspects of the management of some EC programs, to bodies more experienced in running research.

One radical idea, being pushed by Germany's two main research agencies—the Max Planck Society, and the Deutsches Forschungsgemeinschaft—is for the Strasbourg-based ESF to help administer the basic research contained within the EC's programs. The ESF, an association of 54 research councils and academies from 20 countries that already coordinates some $5.5 million a year worth of pan-European collaborative research, is currently undergoing a reappraisal to define its future role. But many of its member agencies are uneasy about ESF becoming too closely involved with EC research, as they want it to remain independent.

Instead of the EC's basic research programs being transferred en masse to ESF, it's more likely that the management of some specific programs will be handed out to a range of different agencies. One candidate is a new grouping called Euro Recherche, set up by the French Centre National de la Recherche Scientifique, the Max Planck Society, and Spain's National Research Council with the specific goal of helping to manage European projects (*Science*, 30 April, p.743).

Another possibility is that the management of some projects will be handed over to the scientists themselves. Already, a consortium of leading plant biology labs, led by Cologne's Schell, has convinced the commission to let them run a $20 million, 3-year program in agricultural molecular biology that's expected to involve more than 100

research groups. And if that is a sign of the future, it would please the many researchers who are wary of a centralist approach to European integration. "We don't want to create Europe in Brussels....We don't want to create Europe in Strasbourg," says Nobel Prize–winning chemist Jean-Marie Lehn of Strasbourg's Louis Pasteur University.

It's too early to say yet just what form the decentralization of the EC's programs will take. Indeed, with the Max Planck Society backing a role for both the ESF and Euro Recherche, it's evident that the major players are keeping their options wide open. But even if the European Commission eventually decides to relinquish very few of its programs, reforms within the commission are still on the agenda. Ruberti is now talking about simplifying the EC's grant application forms and adopting regular deadlines for proposals.

Some centralized decision-making is unavoidable, of course, particularly in the planning stages of EC programs. But again, Ruberti is expected to bring a more open approach to framing the EC's research strategy. A longstanding complaint of national research agencies has been that their views aren't taken into account when EC programs are put together. But with Ruberti talking openly about the need to collaborate with national bodies, that may now change. Indeed, Peter Fricker, the new secretary-general of the ESF, sees a possible role for his organization in representing the views of national agencies during the planning of EC programs—whether or not it gets involved in their day-to-day management.

Many of the ESF's member organizations agree that this might work, but they're working on several fronts to ensure that they don't get left out of the European science policy debate. In January, the heads of most of the major research agencies from the EC member states met in Bonn to discuss the Europeanization of science—and they plan to hold another summit in London in October. If the ESF doesn't provide an effective voice in Brussels for the national agencies, promises Mark Richmond, chairman of the UK Science and Engineering Research Council, the national bodies will create an alternative.

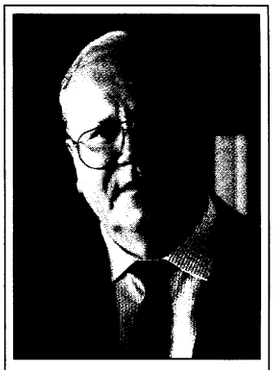
It could be some time before a stable new order crystallizes from the current melting pot of ideas. But researchers are confident that whatever system emerges will be an improvement on what's gone before. Indeed, even now that the Danes have accepted the Maastricht Treaty at the second time of asking, scientists are more concerned about the difficulties afflicting European political integration than about obstacles on the road to scientific unity. Says Franco Pacini, director of the Arcetri Astrophysical Observatory in Florence: "I wish that the political community would be as united in Europe as the scientific community."

–Peter Aldhous

INDUSTRIAL RESEARCH

A Mixed Report Card for Critical Technology Projects

BRUSSELS—In March and April, thousands of researchers were working around the clock all over Europe in a feverish effort to secure extra funding for their labs. "I would phone up [other researchers] in the middle of the night to chat because I knew they would be there," says Tim Caspell of Acorn, a small British computer company. The objective of this late-night frenzy: beating the deadline for applications to the European Community's (EC) largest research program, Esprit.



Martin Bangemann

Esprit, which covers information technology, is the oldest in a slew of international industrial research efforts launched during the 1980s on which Europe's governments now spend an estimated $3 billion a year. A large proportion of these programs are run by the European Commission, the EC's executive in Brussels, and the money it doles out, which is matched by private industry, supports collaborative research projects focused on technologies deemed critical to Europe's ability to compete with the United States and Japan. Sound familiar? Perhaps that is because similar efforts are now being ballyhooed in the United States, where they are a central feature of the Clinton Administration's R&D policies.

Clinton's advisers would do well to take a hard look at Europe's experience in the 9 years since Esprit was launched. The Europeans themselves have recently begun to take stock of what their investment has achieved, and the projects are getting a mixed report card. According to several recent studies, the research itself has been good and the programs have fostered a new spirit of cooperation among European companies and between industry and academia, but the programs' strategy needs a rethink to couple research more closely to the marketplace. That message is likely to get a sympathetic hearing from Martin Bangemann, the EC commissioner for industry, who has long been touting a more vigorous industrial policy for Europe. It is not the kind of message that laissez-faire economists in the United States will like to hear, however.

Pooling efforts. Europe's technology research programs trace their roots to the early 1980s, when it became obvious that European high-tech industry was falling behind that of the United States and Japan. The EC was forbidden by its mandate simply to subsidize industry, so it took the tack of encouraging companies to become more competitive in world markets by pooling their research efforts. This was done by sponsoring "precompetitive" collaborative research: aimed not toward producing a particular product, but the underlying technologies required. Another aim was to draft in the expertise of academic researchers. In Europe, where most universities are state-funded, industry-academia links were not strong. In the new programs, project consortia were encouraged to draw university and government research groups into their fold.

Esprit was launched along these lines in February 1984 and has served as the model for a suite of other programs: RACE, which covers communications technology; BRITE/EURAM, covering materials and manufacturing technology; TELEMATICS, covering data-exchange techniques in areas such as government, health care, and distance learning; and many others (see diagram on next page).

The fashion for Europe-wide collaborations became infectious. In 1985, another research program, called Eureka, sprang up outside the EC. Eureka has a much more decentralized, bottom-up approach, says Kim Ruberg, the program's spokesperson, and it complements the EC's efforts by concentrating more on product R&D. With a staff of just 15 at its central office in Brussels, it acts as a marriage broker, putting research groups into contact with suitable partners in other member countries. The project partners then seek funds direct from their own governments; on average, about one-third of Eureka research funds come from the governments of its 20 member countries or from the EC. Its biggest project is JESSI, a $4.6 billion, 8-year effort to develop techniques for producing future processors and memory chips.

As the late-night proposal-writing indicates, Europe's high-tech programs are a major magnet for researchers. Esprit, for example, is always oversubscribed. The last call for proposals in 1991 drew 1300 applications; only 300 received funding. Compared to the