EMBL: "Small Science" on a European Scale

The European Molecular Biology Laboratory is still trying to establish a clear identity for itself

Heidelberg

In the mid-1960s, when Europe's molecular biologists were lobbying their governments for the creation of a central laboratory comparable to CERN, the particle physics center near Geneva, several prominent researchers promised that if the facility were established they would move there with their research teams. This would have guaranteed the laboratory a place among the world's leading research centers.

Most of the promises were not kept. The European Molecular Biology Laboratory (EMBL) eventually came into operation in Heidelberg in 1977. But apart from its first director general, Sir John Kendrew, Europe's top molecular biologists preferred, in general, to stay in their national laboratories, such as France's Institut Pasteur and the Molecular Biology Laboratory of Britain's Medical Research Council in Cambridge.

The problem of establishing a clear identity continues to face EMBL as it attempts to become the focal point for European collaboration in molecular biology. Since its creation (under the auspices of the European Molecular Biology Organization) in 1974, the laboratory has steadily established a growing reputation both for the quality of its scientific and technical output and for its value as a training ground for young research workers.

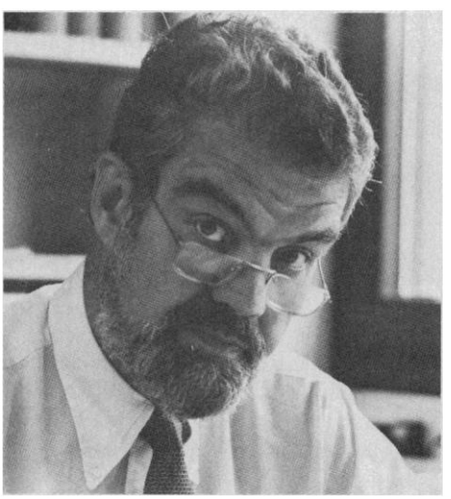
But molecular biology, unlike high energy physics, has not turned out to require the dedicated use of enormous facilities. Indeed, with the development of recombinant DNA techniques, much of the research has remained "small science." There has, therefore, been no comparable pressure for countries with well-established molecular biology communities to make a major funding shift from national to international research facilities.

"It seems that the more successful a country becomes, both economically and in its molecular biology, the less we see the direct interaction that occurred before," says EMBL director general Lennart Philipson. He adds that the idea that the discipline would need experimental facilities comparable to CERN was "perhaps a little naïve at the time." But he also says that if large projects come along—for example relating to human genome sequencing—there will be a strong need for a European facility.

EMBL's bills are paid by the 14 European states belonging to the EMBL Council, the most recent recruits being Norway and Spain. Its annual budget is about $27 million, and it currently has a staff—including both internal and external fellows—of 456. About 50 of these work at its two outstations, one at the Deutsches Elektronen Synchrotron (DESY) in Hamburg and the other at the Institut Laue-Langevin (ILL) in Grenoble.

Shortly after the arrival of Philipson from the University of Uppsala, Sweden, in 1982, a new scientific program was agreed upon to boost the laboratory's reputation as a center of excellence. Enhancing what Philipson describes as EMBL's "scientific credibility" has meant:

- Concentrating its research efforts on a limited number of selected topics in structural biology, cell biology, and differentiation;
- Emphasizing that the instrumentation program must be science-led, rather than—as in the past—concentrating primarily on developing instruments based on physical techniques, such as detector systems for x-rays and electron microscopes.
- Expanding the program of advanced training courses—including the proposed establishment of a predoctoral training program leading to a doctorate degree—and postgraduate fellowships.



Lennart Philipson. *"The more successful a country becomes . . . the less we see the direct interaction."*

One of the latest developments has been the creation of a new research program in bioinformatics. This is intended to bring together research in computing science, structural biology, and molecular genetics—for example, to study protein folding.

"In the long run, we are trying to build a 'useful' department of theoretical biology, in the sense that it will very much satisfy the needs of molecular biology," says program coordinator Chris Sander.

Construction will begin shortly on a new building to house the bioinformatics program. This will be one-third financed by EMBL itself, one-third by the state of Baden-Württemberg, and one-third by the European Economic Community.

EMBL is keen that its data-handling facilities should play a key role in building up European collaboration in the human genome sequencing project. It has already helped to set up a series of meetings with European, U.S., and Japanese scientists aimed at harmonizing the way sequence data are collected and stored.

According to Philipson, however, an offer by EMBL to coordinate European data-gathering for the human genome project has received a lukewarm response. Many of the individual research groups likely to be involved said they would prefer to operate more independently.

This tension between EMBL and national research efforts remains central to debates over the laboratory's budget. Britain, for example, has recently been refusing a 2% increase in its contribution to cover the bioinformatics program. This is partly the reflection of a lingering feeling that, although EMBL's science has in general been of high quality, better value might be obtained by putting the same money into national laboratories—a suggestion that Britain's Medical Research Council has contested, however.

Philipson says that this debate inevitably arises when funding for national and international research projects comes out of the same budget. He now insists that, if a new country wants to join, its financial contribution "must come directly from the government, and not be otherwise available to the scientific community."

EMBL's major achievement? "I do not think that any European country could have set up a differentiation program as focused and as novel as we have been able to do here, certainly not within 3 years," says Philipson.

The laboratory has demonstrated a flexibility that would have been impossible at the national level, he says.

And the major barrier to future growth? "We do not have a good spirit of European collaboration, in the sense that the creation of a strong and aggressive approach to establishing a European effort in molecular biology, as opposed to a collection of national efforts, does not appear to be of enormous importance to member countries." ■ DAVID DICKSON

Defense Research: Promises, Promises

The pressures for cooperation on defense R&D are growing stronger, but so far competition has been the order of the day

NOWHERE are the pressures both for and against closer European collaboration felt more intensely than in defense research.

On the one hand—as the United States frequently points out to its European allies within the North Atlantic Treaty Organization (NATO)—increased collaboration would go far toward raising the overall effectiveness of European defense spending. Duplication of research would be reduced and the weapons procurement policies of NATO member states would be better coordinated.

Set against this, however, is the fierce competition among European weapons manufacturers, particularly for foreign markets in the United States and the Third World. This fuels a desire to protect sales, and thus reduce international cooperation, in domestic markets as a springboard for exports. There is also the political argument that an adequate "defense industrial base" should be preserved for security reasons.

Competition, rather than cooperation, has so far ruled European defense research efforts. Recently, however, there have been various signs that this may be changing. Economic pressures on defense budgets, combined with a growing awareness of the need for a convergence in defense policies, are providing European politicians with a greater incentive for requiring their defense industries to collaborate on R&D projects.

Last spring, for example, when Britain's defense minister, George Younger, announced that he was planning a long-term reduction in the proportion of the nation's R&D budget devoted to military research, he made it clear that part of the saving was to be achieved through increased international collaboration.

Similarly, André Giraud, his French counterpart, has surprised the nation's armaments manufacturers with the enthusiasm with which he has been pushing proposals for greater collaboration with European neighbors—including an agreement to exchange "background information" with the United Kingdom on the two countries' nuclear deterrents.

The most vocal case for greater research collaboration has come from the 13-nation Independent European Program Group (IEPG), which is made up of the European members of NATO, and was established to help ensure a genuine "two-way street" in military technology between the United States and other members of the alliance.

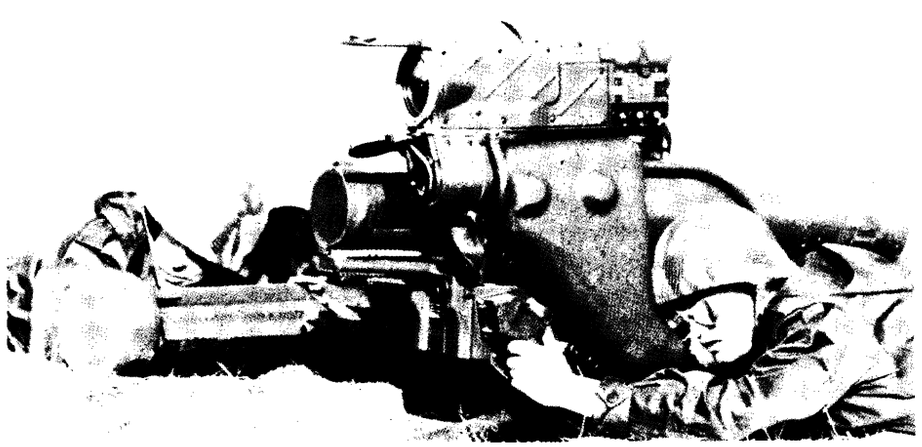
Earlier this year, for example, IEPG published a report prepared by a group under Henk Vredeling, a former Dutch minister of defense, proposing the creation of a joint military R&D fund starting at $100 million a year and eventually rising to $500 million.

Lord Carrington, NATO's current secretary general, has suggested going even further, with the creation of a "European agency for military research," which could coordinate initial work on all new weapons systems. According to Carrington, French President François Mitterrand has said he would be prepared to support the idea if Carrington can win approval from other NATO countries.

Pressures for closer collaboration continue to run up against the opposition of national armaments manufacturers, however. They worry that any attempt to rationalize military research on a European basis would reduce the amount of money they receive from the public purse, and they have warned that the result would be a rise in unemployment.

"We have achieved a lot of cooperation for civilian purposes, but are far behind when it comes to cooperation in military developments," says a member of the science advisory board to France's Ministry of Defense. "Perhaps we need a little more modesty from the industries working for defense; if you come to meetings saying that you have the best ideas, the best materials, and so on, then it can be difficult to persuade others to accept your point of view."

The problems were recently highlighted by tense negotiations over R&D plans for a new European Fighter Aircraft. After the French company Dassault-Bréguet made it clear that it was only prepared to cooperate with other European companies if it were



Franco-German missile. *The Milan 2 antitank missile is a product of a joint venture between French and German companies.*