neuroscientists, who believe "every thought, every feeling can be explained in neuronal terms."

The question of whether NIMH should go back to NIH recurs with increasing frequency these days. At the NIMH council meeting in February, it was noted that the agency's research budget began a long-term falloff in growth in 1966, the year it was split off from NIH. Frazier says he has not yet decided what would be the better course, but he clearly wants to position the agency so that it would be perceived as qualified to reenter the fold. He is considering changes to streamline the organization of the agency and "accentuate basic research." Asked if he "is going all out to prove NIMH is not 'soft,' " Frazier said, "Exactly right, that's as clear as it ever was put."—CONSTANCE HOLDEN

Europe Tries Cooperation on Military R&D

Economic and technical incentives, coupled with pressure from the United States, are forcing European governments to explore new links

Paris. Europe's defense ministers are expected to announce at a meeting in London next month their endorsement of a list of 30 research fields with important military implications that they consider ripe for collaboration. The fields range from sophisticated computer software to the use of gallium arsenide semiconductors.

The list has been compiled from proposals prepared by each of the European members of the North Atlantic Treaty Organization (NATO), as well as non-NATO member France, in close discussion with their respective defense industries. Although there is no guarantee that concrete research projects will materialize in each case, the very existence of a single list is significant, for it represents the first step toward the integration of Europe's military research efforts. Such a goal has been discussed for many years. Indeed, it has frequently been advocated by the United States as a way of increasing the overall efficiency of Europe's military capabilities without a significant increase in defense expenditures.

In the past, however, national rivalries have proved a formidable barrier, and cooperation has been restricted either to specific military technologies or to fields such as space research, where economics alone has made collaboration inescapable. But the mood is now changing. "We are currently seeing the development of a new European cohesion [in military research] that many thought would not be possible," says one member of the British delegation to NATO.

Several factors are responsible for this change. One is merely a growing realization of the cost of maintaining separate military research programs. It has been calculated, for example, that of the $75 billion currently being spent annually by NATO members on R&D, up to 25 percent represents a duplication of effort.

"The West cannot go on luxuriating in too many different types of similar weapons systems," Sir Frank Cooper, chairman of one of Britain's largest defense contractors, United Scientific Holdings, recently wrote. "We should save the research and development money. . . . More collaboration must be essential."

Adding to the pressure to economize is the fact that European governments have agreed, partly under U.S. pressure, to modernize their military forces at a time when their economies remain weak, and many are already committed to major defense expenditures.

> "The West cannot go on luxuriating in too many different types of similar weapons systems."

The British government, for example, is currently looking for substantial economies in its military budget to cover the unexpectedly high costs of the Trident missile. In France, companies such as the missile and rocket engine manufacturer Societe Européenne de Propulsion, which had previously looked almost entirely to the government for support, is having to raise long-term research funds on the international capital market.

A third factor encouraging more collaborative research is a move, again encouraged largely by the United States, toward the wide-scale introduction of what are known as "emerging technologies" into Europe's conventional weapons systems, on the argument that technological superiority has an important "multiplier effect" in balancing Warsaw Pact firepower.

Finally, as in the civilian sector with the European Commission's ESPRIT program in microelectronics, closer research collaboration is being seen as the only way in which Europe's defense industry can remain competitive with the United States—particularly as U.S. export controls threaten Europe's access to the latest American defense technologies.

A combination of these reasons has encouraged greater willingness to cooperate on military R&D projects in large and small countries alike, both arguing that a rationalization of resources and some form of division of labor is essential if their armed forces are not to be reduced to buying "off the shelf" from American contractors.

The major political initiative in this direction has come from Britain's Minister of Defence, Michael Heseltine. Domestically, Heseltine has introduced a number of steps—including most dramatically plans to sell several government research centers, such as the Royal Ordnance Factories, to the private sector—in an effort to reduce a military research budget that, at $1.6 billion, is currently almost as large as that of the rest of Europe combined.

Last November, Heseltine tried to persuade his European colleagues to follow the same strategy at a European level. At a meeting in The Hague of the Independent European Program Group (IEPG), a high-level body that operates in the general framework of NATO, Heseltine argued that all European defense ministers should explore ways in which they could harmonize research programs on the components of future weapons systems. As a first step in what Heseltine subsequently described as a "political breakthrough," defense ministers attending the meeting endorsed the search for a number of potential "cooperative technology projects."

Since last November, the search has

been carried out more enthusiastically in some countries than in others. Nevertheless, the next IEPG ministerial meeting, scheduled to take place in London in June, will have before it a list of 29 possible areas for collaboration.

"What we have in mind is a series of projects that are not totally basic research, but involve areas where there is a clearly defined generic need, such as composite materials or aspects of microelectronics," says one member of the Dutch delegation to NATO, which shares Heseltine's enthusiasm for collaborative research projects.

Many obstacles remain, both at the national and the international level, before the idea of widespread collaboration in defense research is broadly accepted. According to NATO officials, some opposition has already been encountered from military planners who will be required to define their future weapons requirements much more accurately than in the past.

Second, there is much skepticism from within industry toward any government-based attempts to stimulate international research projects, based on a fear that any decision to avoid duplicative efforts could also have the effect of requiring companies to withdraw from some highly competitive, and often highly lucrative, fields of defense technology.

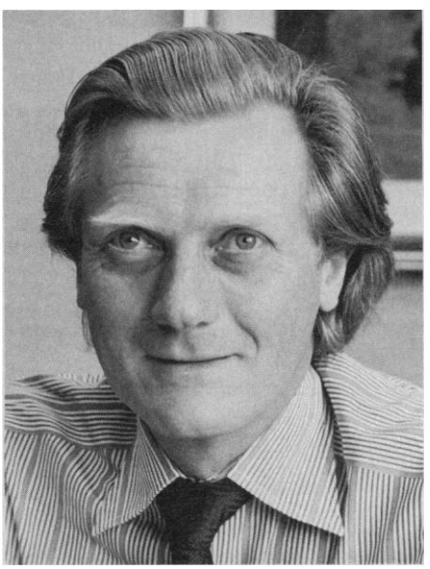
"The fact of the matter is that if the market pull is there, then companies will collaborate anyway," says David Gardner, director of the Electronic Engineering Association in London, a trade group of British electronics companies. "A research or feasibility study is really just the precursor to a new product; and if the market is not there, then industry will not be interested."

Industrialists point as evidence of their skepticism to the deep rift emerging between Britain and France over the detailed management of plans to construct a five-nation European Fighter Aircraft, a project already agreed in principle by defense ministers whose research and development stage alone is likely to cost over $1 billion. It has already become embroiled in bitter controversy over who should be given technical and design leadership.

Finally, as in the United States, there exists deep concern in many European circles about the wisdom of growing military dependence on high technology. "The problem is that we are likely to embark on a series of incredibly expensive projects, and 5 years down the road we are going to find that we cannot afford them," says Mary Kaldor of Britain's Sussex University, a leading member of the European Campaign for Nuclear Disarmament.

Similarly, in West Germany the growing collaboration with other European nations across a range of military technologies has recently become the target of several opposition groups, including both the Social Democrat Party and The Greens, which claim that it could become a covert channel for German military ambitions.

Europe's political leaders, however, have few doubts about their commitments to strengthening both their domestic defense industries and the technological base of their contribution to NATO. Repeated threats from the U.S. Congress, that it will withdraw American troops from Europe if Europe does not do more in its own defense, have helped.



Michael Heseltine

Britain's defense minister scored a "political breakthrough" in Europe.

The main political question is which institution should be given the major responsibility for achieving this. Britain, with the implicit backing of the United States, clearly favors the IEPG, which consists of the European member states of NATO except Iceland, but with the addition of France.

Last year the group identified three major technological projects—a new battle tank, a medium-range surface-to-air missile, and future transport aircraft—in which ministers subsequently committed themselves to future collaboration. Next month's meeting hopes to achieve similar support for its list of research areas.

To some, however, the ad hoc structure of the IEPG translates into a lack of political status. This, in particular, is a major complaint of the French government and a principal reason for its recent efforts to revitalize the Western European Union (WEU), a body created 30 years ago out of the ashes of efforts to establish a European Defense Community. The WEU has been relatively moribund until a ministerial-level meeting held in Rome last year.

The members of the WEU are the six original members of the European Economic Community (EEC)—France, West Germany, Belgium, Italy, Holland, and Luxembourg—and Great Britain, keen to keep a handle on French/German military links.

WEU officials, pointing to their higher political visibility (and indeed almost proudly to recent U.S. criticism of the organization's formal independence from NATO), have frequently suggested linking up with IEPG's efforts to promote joint military R&D projects. So far, however, these approaches have been resisted, largely because of fears from IEPG that the collaboration could become rapidly bogged down in excessive bureaucracy and political wrangling.

The latest actor to arrive on the scene is the Brussels-based European Commission. Last month, the new president of the commission, former French Finance Minister Jacques Delors, proposed that defense-related research—especially European collaboration in the U.S. Strategic Defense Initiative research program—might form part of a significantly expanded joint European R&D effort, building on the apparent success of ESPRIT and similar projects in telecommunications and industrial technology.

Such a move would represent a radical departure for the EEC, which has so far steered clear of all defense and security issues. Nevertheless, Delors told a press conference in Brussels recently, "If the Europeans are going to take part in the technological aspects of this program in a fragmented way, it will not have such positive results as if they act together."

The variety of political channels now offering themselves, as well as traditional rivalries and distrust between European nations (particularly Britain and France) and continuing opposition from a number of different communities, all mean that a clear program of joint military research projects will be easier to plan on paper than to put into practice.

However, defense officials in both London and Paris claim that, despite the many barriers, there is a growing convergence of views leading in this direction. And that, as one British official puts it, "it was natural that this would happen sooner or later; and at the moment, enthusiasm seems to be going from strength to strength."—**DAVID DICKSON**