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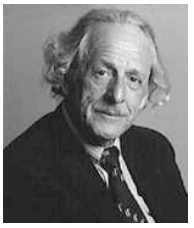

NATO's Strategy for Science

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The North Atlantic Treaty Organization (NATO) unites 16 nations in a military and political alliance for the defense of the West. But there is a lesser-known and nonmilitary third dimension to NATO—its activities to foster cooperation in civilian science, both basic and applied.

NATO's involvement in science rests on its 30-year old agreement that a strong, dynamic alliance requires a sense of community based upon a common cultural heritage, of which science and technology form an important part. It is gratifying that a defense organization like NATO extends itself to support nonmilitary basic science. NATO understands that the free world's material advance and its ability to defend itself depend at root on technical and scientific knowledge.

Setting policy and priorities for NATO's science activities is its Science Committee, which includes distinguished, internationally minded scientists representing member nations. The United States, for example, has been fortunate in having Professor I.I. Rabi (1958-80) and Dr. Edward David, Jr. (since 1980) as its representatives on the NATO Science Committee. The policies and priorities the Committee sets are enacted by the Scientific Affairs Division at NATO headquarters in Brussels. This division coordinates the NATO fellowship program, which sends researchers to study and work with colleagues in other NATO nations; it also organizes NATO seminars and workshops that bring together members of an invisible college to review the latest development in selected fields. Whether dispersing scientists or bringing them together, NATO uses scientific exchange as a large part of its strategy to promote science.

NATO's science programs are known for their diversity and high quality and as such they attract many of the best scientists in the Western world. In fact, over 250,000 scientists have participated in one or more of NATO's science programs since 1958. Now about every 35 minutes a scientist boards a plane or train to travel to a NATO-sponsored conference or to join colleagues in another country for collaborative work.

When the European Economic Community (EEC) fashioned its own program of scientific exchange, known as the "stimulation plan," I am sure its members took encouragement in the success of the

NATO program. But whereas the stimulation plan program brings together scientists from European Community member nations only, the NATO program includes researchers from both Europe and North America. It, therefore, serves as a vital conduit for European scientists seeking collaboration with North American researchers, as well as for Canadians and Americans wishing to work with their European counterparts.

This transatlantic bridge is, in particular, vital to the U.S. science community. The United States can no longer afford—if it ever could—a comfortable chauvinism about its own scientific standing relative to that of other nations. International cooperation in science is for the United States as much a matter of self-interest as it is a gesture of goodwill to colleagues abroad.

Funding from member countries for the NATO science program has been stable in recent years, with each nation increasing its contribution to match inflation's pace. The funds are well spent, both in terms of overhead and return. The Scientific Affairs Division, with a professional staff of only 8, oversees the details of exchange fellowships, collaborative research grants, and seminars and workshop, involving in all over 10,000 scientists each year. The returns to member nations in scientific knowledge are, naturally, difficult to calculate, but scientists who have participated in these programs testify that the return is high indeed.

It is therefore somewhat disturbing to note the reservations expressed by the United Kingdom in regard to the amount of its contribution. Lately, British government officials have balked at funds for international cooperation in science and technology, whether for CERN, for the EEC's Framework program or for NATO's science activities. As a member nation of NATO, the United Kingdom has a responsibility to carry its fair share. But, much more than an obligation, its contribution is an excellent investment in the health of that nation's scientific community.

And it is not only NATO member countries that benefit from this unique alliance for science. Committed to the unhindered flow of scientific information, NATO publishes proceedings of its seminars and workshops. Over 1,000 advanced texts reporting discoveries at the frontiers of science have appeared to date and are available from commercial publishers. NATO also encourages its fellowship holders to publish their research in the journal literature.

Only recently has NATO mounted an effort to describe its programs to an audience beyond the scientific community. But I suspect that even within the scientific community, there are many who are unfamiliar with the range of activities that the NATO science program supports. They are:

- Science Fellowships. NATO each year enables some 1,200 scientists to study with colleagues in other NATO countries. A NATO science fellowship provides travel funds, living expenses and tuition for de-

gree candidates. A fellowship administrator in each member nation decides how to divide fellowship funds among different classes of researchers (junior or senior level, for example); these decisions reflect national priorities.

■ Collaborative Research Grants (CRGs). About 400 grants and 150 renewals are made annually to support collaboration between researchers at laboratories in different countries. Scientists from each lab visit their colleagues abroad for periods from one to four weeks to discuss common problems and fashion joint projects.

■ Advanced Study Institutes (ASIs). These two-week seminars bring together postdoctoral-level scientists working in a specialty area. About 60 seminars are held annually. Each involves approximately 8 to 15 lecturers who update the 70 to 100 attendees on the most recent developments in their field.

■ Advanced Research Workshops (ARWs). Workshop participants, generally 30 to 50 senior-level scientists, come together for three to five days to assess the status of research in a selected field and to recommend areas of needed or potentially profitable concentration or cooperation.

■ Special Programs. Each year the NATO Science Committee singles out areas of emphasis for the CRGs, ASIs, and ARWs. The special programs now underway include: global transport mechanisms in the geosciences, selective activation of molecules, sensory systems for robotic control, cell-to-cell signals in plants and animals, and condensed systems of low dimensionality.

In addition to these core programs, NATO supports two other special efforts. The Science for Stability program develops scientific and technological resources in Greece, Turkey and Portugal, especially in areas of applied science and technology that have an economically beneficial impact. The Challenges of Modern Society program brings NATO's coordinating skills and expertise to bear on common social and environmental problems, such as pollution, aircraft noise and the need for improved emergency medical services.

Last fall, at the request of Secretary General Lord Carrington, the Scientific Affairs Division organized a symposium on nonmilitary science in the Soviet Union, which was attended by both Sovietologists and scientists. Next spring, a follow-up conference will be convened on nonmilitary science in Eastern European countries. That a defensive alliance would use its resources to promote a better understanding on any level of its adversaries is as intriguing as it is salutary.

The scientific activities of NATO are clearly diverse, but they share a high quality, an efficiency in the use of resources, both monetary and human, and a winning strategy of promoting the advancement of science through scientific exchange. ■