U.S.–West European Cooperation in Science Seems to Be Declining

Is the two-way scientific traffic between the United States and Western Europe slackening? The evidence is incomplete and inconclusive, but the question is causing concern on both sides of the Atlantic and is being studied with unprecedented interest.

One thesis is that the science and technology agreements between the United States and the Soviet Union and other socialist countries are diverting attention and federal funds from cooperative activities between American scientists and their counterparts in Western Europe and Japan. However, most observers familiar with international scientific affairs dismiss this view as simplistic. They point out that formal government-to-government agreements have never been as important in U.S.–West European scientific cooperation as the web of informal, freestyle relationships formed over the years by scientists. While these ties remain strong, there appears to be a consensus, particularly among scientists engaged in basic research, that the post–World War II entente between American and Western European science is threatened.

The plateauing of science budgets both here and in Europe has had negative impact on international science activities and the general impression is that the cutbacks have affected younger scientists most heavily, with depressing implications for future cooperation. The situation has been regarded as serious enough to prompt efforts to get a statistical grip on the problem by the U.S. National Academy of Sciences here, the Royal Society in Britain, and by several federal agencies.

Data on the matter are frustratingly deficient. Record-keeping by science agencies has been designed primarily to account for money rather than to provide grist for analyses of who went where and when. More important, much of the relevant activity has been carried out with funds provided through regular "domestic" science programs. For example, much foreign travel by American scientists has been funded through their research grants and many foreign scientists have worked in the United States on stipends provided by such grants. Thus, information on the specifically international programs—and the funding agencies have not been very good at retrieving even that—can illuminate only part of the federal picture. And support from private sources and foreign governments is even harder to trace.

Despite the murkiness of the data, there is no disagreement that the last decade has brought major changes. During the 1950's and early 1960's, American assistance was crucial to rebuilding Western European science. The help was most conspicuous in the faster moving disciplines such as molecular biology and high energy physics. American postdoctoral fellows on U.S. money were a familiar and welcome phenomenon at the main-line European labs. The biologists flocked to Cambridge, Paris, Geneva, Copenhagen, and Naples, for example, and the physicists to the European high energy physics research center (CERN) at Geneva. For bright young European researchers, American laboratories were a kind of obligatory scientific finishing school.

By the middle 1960's there was less largess for research. Balance of payments problems for the United States led to some tightening up, but the rein on R & D budgets in the later 1960's was the key cause of retrenchment. There were other contributing factors, however, notable among them the disengagement of the military services from their roles as patrons of basic research after the Mansfield Amendment directed the service to concentrate on the sponsorship of applied research.

By this time, European dependence on the United States, both scientifically and financially had, of course, been sharply reduced. Scientifically, the Europeans had largely attained self-sufficiency, and European governments were able to provide sound support for research. There was also an understandable stress on the "Europeanization" of science, which found expression in organizations like CERN and the European Molecular Biology Organization. At the end of the 1960's, a substantial number of young American scientists were working in European labs on European money.

The 1970's brought further changes. Science budgets in Europe tightened as a result of the post–oil crisis European recession, and it is said to be more difficult now for Americans to go to Europe or Europeans to come here on European money.

The state of the academic job market in the United States has made young Americans reluctant to leave this country for a year or two in Europe because of what they see as forbidding reentry problems.

There are exceptions to these gloomy generalizations. West Germany, for example, is offering support to fairly large numbers of foreigners, including Americans, through the Humboldt Foundation and by other means. In certain "hot" fields like solid-state physics, Americans are apparently able to find attractive temporary research posts in Europe and then expect to land safely back home. The exceptions, however, seem to be fairly few and far between.

While concern about the U.S.–Western European connection has apparently been the subject of desultory discussion among scientists for several years, the first initiative at a formal assessment of the situation seems to have come from the National Academy of Science's Board of International Scientific Exchanges. The board, set up 3 years ago under the aegis of the academy's foreign office, was headed by David Pines of the University of Illinois, a member of NAS who has a reputation as a fervid internationalist in science affairs. The board, soon after it was established, asked one of its members, Dorothy S. Zinberg, a sociologist at Harvard, to look into the problem. That effort was interrupted when the board was dissolved—like most Academy operations, the board was expected to sustain itself with outside support, and this was not forthcoming. Zinberg has been asked to revive the study effort and is following two specific lines of inquiry. She is surveying scientists who appear on National Research Council records as having recently received their doctorates. She is also surveying Academy members on their travel patterns. This should provide limited but firm data on groups of junior and senior scientists; Zinberg has also traveled recently in Europe and hopes to be able to report on the evolving situation. The British Royal Society, apparently stimulated by contacts with the Academy here, is undertaking its study of the state of cooperation between Britain and the United States and other countries.

The issue of cooperative scientific activities generally has a place on presidential science adviser Frank Press' list of priorities. Press's interest has spurred a study of these activities, focusing on the bilateral science and technology agreements the United States has concluded with the socialists and with less devel-

oped countries as well as with Western European countries, Japan, and other industrialized countries. The study is based in the State Department's Office of Oceans and International Environmental and Scientific Affairs (OES). Again no returns are in.

The National Science Foundation's new 24-member advisory council, formed to advise the director and his staff on general problems of interest to NSF, has assigned a task force to look into the issue. The task force seems to be taking the tack that it is less profitable to sift over unsatisfactory data than to consider what should be done in the future.

What trend data are available point mostly in one direction—down. But the available data are partial in the sense that they generally offer limited information on a single program rather than a broad view of the big picture. The National Institutes of Health (NIH), through its division of computer research and technology, seems to be taking a lead over other agencies in mining masses of data for meaningful details.

NIH figures, for example, show that in 1966 there was a total of 300 Americans abroad on regular NIH postdoctoral fellowships, 128 of them in the United Kingdom, 39 in Sweden, and 17 in France. By 1976, the total was down to 65 with 32 in the U.K., 12 in Sweden, and none that year in France.

Perhaps the clearest comparative data obtainable are on the North Atlantic Treaty Organization (NATO) fellowships. These fellowships all go to scientists, engineers, and other technical professionals. Most of the recipients are young scientists in the early phases of their careers. In 1963, some 1000 of these fellowships were awarded; the number dropped to 850 in 1965 and then fell further, stabilizing at about 650 in recent years. The fellowships are funded by contributions from NATO member countries and distributed according to a formula which gives the United States about 12 to 15 percent of the fellowships—or 50 to 60 fellows a year—although the U.S. antes up more than 20 percent of the funds. An interesting statistic is the one showing the percentage of NATO fellows studying in the United States which has remained steady at slightly under 50 percent. Since these fellows are all Europeans, it seems to undercut the theory that Europeans increasingly prefer to study in other European countries.

The Fulbright-Hays academic exchange program has provided funds for thousands of students and faculty members to go abroad over the years, but the statistics do not separate out the scientists, and hence the figures do not help much to clarify the question of how the exchange of European and American scientists is going. The U.S. budget for the Fulbright-Hays program has only recently returned to the $65 million level of the late 1960's when it was cut sharply in a wave of Vietnam war economizing. Inflation, however, has taken its toll so that despite the recovery in funding the number of fellowships is down sharply from the 1960's. Program officials estimate that about 250 Europeans have come to the United States this year under the ex-

Briefing

Confusion Breaks Out Over Gene Splice Law

The long-awaited legislation on recombinant DNA research has suffered further delays in both House and Senate. Congress may now be unable to report out a bill until its session next year.

Reasons for the setback include the low priority assigned to the bills by legislators, the chemistry of personal relations and committee rivalries on Capitol Hill, the development of new perspectives on the hazards of the research, and lobbying by scientists.

Citing "high emotions" among scientists opposing the legislation, Senator Edward Kennedy (D–Mass.) last month withdrew the bill drawn up by his health subcommittee. But the withdrawal possibly had less to do with high emotions than with the low vote count for Kennedy's bill—only 20 senators would have voted for it, according to one estimate. A rival bill sponsored by Senator Gaylord Nelson (D–Wis.) had attracted a certain number of supporters. They, together with a larger number who were just against the Kennedy bill or Kennedy, sufficed to imperil the bill's passage.

The state of legislation on recombinant DNA is now somewhat perplexing. Kennedy has come up with a new bill that would simply extend the existing NIH rules to industry for the time being. Meanwhile he plans to set up a study commission, funded from private sources, to look again at what kind of legislation is needed. Members of the commission are to be chosen by the president of the Institute of Medicine, and two others, from nominees submitted by scientists and public interest groups.

Kennedy's new approach is regarded with scorn by supporters of the House bill, who say that his new bill will "accomplish nothing" and that, as for the study commission, the subject has already been "studied into the ground." But the House bill, drawn up by Congressman Paul Rogers (D–Fla.) and his health subcommittee, still has some hurdles to cross. Harley Staggers (D–W. Va.), the committee chairman to whom the Rogers subcommittee reports, has voiced certain minor criticisms. Also another House group, the committee on science and technology, wants an input to the bill.

With Congress at sixes and sevens, the Administration—which asked for the legislation in the first place—is now reconsidering its position. The Office of Science and Technology is conducting a review, which will reportedly include a new look at whether adequate regulatory control could be achieved under existing statutes, without any special legislation. This was the course urged on the National Institutes of Health as early as February 1976 by Peter Hutt, former general counsel of the Food and Drug Administration. His advice was not taken, at first because the NIH thought that a voluntary control mechanism would prove acceptable, and then because the particular statutes Hutt suggested as the basis for federal control were deemed inadequate.

The future course of events in Congress is hard to predict, but one possibility is that Kennedy's second bill, when properly redrafted, will turn out to be quite similar to the Rogers' bill, on which Senator Nelson's bill is also modeled. Thus the Rogers' bill may provide the framework for compromise, if Congress can get its act together.

More Flowers, Less Cabbage

"The Academy of Sciences is an Academy of Sciences, not an academy of cabbage." Not the height of oratory, perhaps, but the statement, made in 1975 by then Vice-Premier Teng Hsiao-ping, heralded the resurrection of Chinese science after its long prostration to peasant values during the Cultural Revolution.

Derided as "stinking intellectuals," scientists were then discouraged from doing basic research. Whole research institutes were disbanded, specialist training

change, some 40 to 50 percent of them scientists. About the same number of Americans have gone to Western European countries, but a much smaller percentage of the American scholars tend to be scientists.

While most evidence points to a decline, there is some testimony on the other side. OES did a quick survey of its European scientific attachés who reported little serious anxiety about contacts with U.S. science in the countries to which they were assigned. Officials of the science office of the French embassy in Washington said that the meeting last spring between the Franco-American commission which oversees the U.S.–France bilateral science and technology agreements had not been suffused by a sense of crisis. They note, as do some U.S. government officials, that more attention is being given to applied science and technology than to basic science by governments these days and that this may account for anxiety among basic scientists.

It is among university basic researchers that concern does seem highest. A generation of American scientists gained part of their formative professional experience in collaborating with Europeans and have a natural attachment to European colleagues and European places and life-styles. During the era of "the affluent professors" in the 1960's the European trip was a virtually unquestioned fringe benefit for the academic scientist. As the science budget grew tighter, money to attend international conferences grew harder to come by, the justifications required for travel on research grants became more rigorous, and supplementary money to make a sabbatical abroad more comfortable proved harder to find.

Because so much travel and work abroad was funded with money which was never itemized in any budget, the erosion of that funding and the consequent loss of flexibility was, so to speak, invisible. Now, although so many scientists are convinced of the importance of maintaining close ties with their European colleagues, the decline of such contacts is hard to document and their value almost impossible to quantify.

That is why some scientists and government administrators familiar with the data problem feel that efforts to chart the decline will ultimately be fruitless and favor making the case for new support for U.S.–Western European cooperation by laying out the opportunities offered.

Some Americans suggest that the rather disappointing progress made achieving productive collaborative efforts under the U.S.–Soviet science and technology agreements simply proves the value of the informal, personal arrangements which have made U.S.–Western European relationships prosper.

They argue that the United States has more than ever to gain from such cooperation, since European scientists in many disciplines will bring more to the partnership than they take away. The problem of American advocates of a revitalization of cooperation will be to gain attention for the question so that they can try to prove that the benefits are worth the costs.—JOHN WALSH

Briefing

was frowned on as elitist, and foreign scientific journals fell victim to rampant xenophobia.

Now all that is changed. "We are relatively backward in natural science and must learn what is advanced from foreign countries," says an editorial in Peking's official newspapers marking National Day, 1 October 1977. A circular from the Central Committee issued a few days earlier warns that "It is criminal to suppress free academic discussion. We must encourage the habit of daring to think, to speak, and to act."

The resuscitation of the scientific enterprise in China has not been gained lightly. The fortunes of the Academy of Sciences, which virtually is science in China, have risen and fallen in close parallel with the political vicissitudes of Mao's last years. Leaders such as Teng, Premier Chou En-lai, and Mao's wife, Chiang Ching, were directly involved in the fray over science policy. The Academy of Sciences became so politicized as to possess its own internal "gang of four," known as the "small gang of four." The academy is still a highly political organization, but its vice-president, Fang Yi, now sits on the Central Committee, the highest policy-making group in China.

Some of the events in the rehabilitation of science in China are described in the September issue of the *Bulletin of the Atomic Scientists* by John Gardner, a political scientist at the University of Manchester, England. One important step, according to Gardner, was a visit to Peking in 1972 by Nobel physicist C. N. Yang of the State University of New York at Stony Brook. Yang urged his Peking colleagues to pay more attention to basic theory, advice that was apparently praised by Mao and Premier Chou.

Chou's attempt to reemphasize basic research was thwarted by Yao Wen-yuan, the "gang of four" member responsible for party propaganda. Chou tried again three years later, in 1975, when two of his old associates were appointed to key positions, Teng to Vice-Premier and Chou Jung-hsin to Minister of Education.

Chou Jung-hsin, himself a member of the academy, tried to raise classroom standards and restore the role of theory. But both he and Teng became the targets of a wall-poster campaign on campuses mounted by the ultra-leftists. The two Chous died in early 1976, and Teng was deposed in April as a "capitalist roader." Ideological dogmatism was restored. The "gang of four" is accused of having ignored scientific predictions of the disastrous Tangshan earthquake of summer 1976. It purged the academy, expelling some members and spying on others with bugging devices.

Now the pendulum has swung again. Chiang is out, Teng is back, and science is in.

B-1 Raises Head from Grave

The B-1, the Air Force's $100 million-a-copy strategic bomber, has taken a long time dying. Canceled by President Carter on 30 June, the bomber was abandoned in the House on 8 September by only the narrowest of margins—a 202 to 199 vote. The bomber's chief foes, the National Campaign to Stop the B-1 Bomber, thereupon closed up shop. In a final message to supporters, the campaign's organizers declared, "We are closing our account with $50 to spare; we spent $55,000 in 2 years. That's enough to buy one B-1 spare tire, we figure."

But through an unforeseen legislative legerdemain, the plane's supporters in the House have resurrected it for one last kick of the bucket. On 28 September the House appropriations committee voted by 34 to 21 to have Carter build six prototypes instead of the four he has said are enough to provide for a continuing research effort. The extra two copies, costing the taxpayer $426 million, would allow Rockwell, the contractor, to stretch out the laying off of its B-1 work force.

For procedural reasons, the action of the House appropriations committee is hard to reverse, but the congressional leadership will attempt a counterstrategy.

—Nicholas Wade