

# Science's New Cold War

Increasingly, U.S. scientists are being pressured by the government — primarily the military — to cut back on scientific exchanges with the Soviet Union for both 'national security' and political reasons. Some fear that the big loser will be science itself.

By JOEL GREENBERG

It was Wednesday, last Aug. 18, when Richard Wollensak got a phone call in his office at the ITEK Corp. in Lexington, Mass. Wollensak remembers the call, from Lt. Col. Gary Walters of the Department of Defense, as the "first signal" that something unprecedented was about to happen.

Walters was "concerned" that Eastern Bloc countries would be represented at the following week's meeting in San Diego of the Society of Photo-Optical Instrumentation Engineers (SPIE), of which Wollensak was president. "He said some of the papers to be presented at the meeting were sensitive," says Wollensak, vice president of ITEK. "I didn't agree."

Walters's call was clearly more than an expression of concern. He asked Wollensak to "supply space" at the Town and Country Hotel and Convention Center, where the SPIE meeting would be held, so DOD officials could talk with authors of various papers. Wollensak complied, and when he arrived in San Diego four days later, he and other SPIE participants encountered a scene worthy of a Kafka novel:

Several DOD representatives had already secured a room and had begun summoning individual scientists. The night before, conference organizers had received a midnight telegram from the Commerce Department, warning them to comply with technology export regulations. And now, State Department personnel were circulating through the hotel, on the lookout for "international incidents," according to Wollensak.

In the inquiry room, DOD officials asked scientists two questions: "Was your work sponsored by a DOD agency?" and "Have

you secured clearance?" The tactic achieved the desired effect. "They never actually asked me to withdraw my two presentations," says one engineer from private industry. "But I was scared enough to pull both of them." Overall, scientists withdrew some 150 of their papers from the meeting.

The crackdown on SPIE stands out as perhaps the most dramatic known instance of government censorship of non-classified scientific research ever seen in the United States (SN: 9/4/82, p. 148). Moreover, what is now called "the San Diego incident" has served to uncover a confused, complex struggle between the federal government and scientists in universities and industries. The struggle centers on the freedom of U.S. scientists to report and exchange scientific and technological data with Eastern Bloc nations, primarily the Soviet Union.

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A portion of the Defense Department's \$25 billion research and development budget supports a wide range of basic research at academic institutions and in private industry. And in the past, DOD has censored individual scientific papers through its normal classification process and other screening methods, and it has even evicted Eastern Bloc scientists from several meetings. But never, it appears, had there been an action such as that in San Diego involving so many papers dealing with such apparently basic science, including holography, fiber optics, lasers and robotics. Prior to the last-minute notifications, none of the papers that were ultimately withdrawn — although all were under DOD contract — had been deemed sensitive enough in the area of weapons

development to have been classified. Just what prompted this last-hour sensitivity, according to sources familiar with the scenario, was a series of rapid-fire decisions triggered when a copy of the SPIE meeting agenda found its way unexpectedly to the top echelons of the Defense Department.

The Pentagon did not learn that four Soviet scientists were scheduled to attend last August's SPIE meeting until shortly before Walters placed his call to Wollensak. En route to the meeting, the Russian delegation was detained on a visa question by Canadian customs officials in Montreal; after several hours of detention, the scientists were allowed to proceed to San Diego. Rumors that DOD had something to do with the detention remain unconfirmed.

Indeed, it was also not until a few days before the start of the meeting that the office of Richard Perle, assistant secretary of defense for international security policy, learned that SPIE was holding an international meeting in the first place. It was through a routine report that a mid-level defense employee discovered that a lower-echelon DOD scientist was scheduled to report on a "very sensitive intelligence-related system" at the SPIE meeting. This led higher Pentagon officials to a DOD colonel who was to serve as a panel chairman at the meeting. When asked if *his* paper had yet been cleared for security, the colonel replied: "Oh, s\_\_\_\_\_!"

Things progressed very rapidly from then on. By the following morning DOD had obtained a copy of the SPIE program and confiscated a dozen papers that its own people were to present in San Diego, and plans were made to attend the meet-

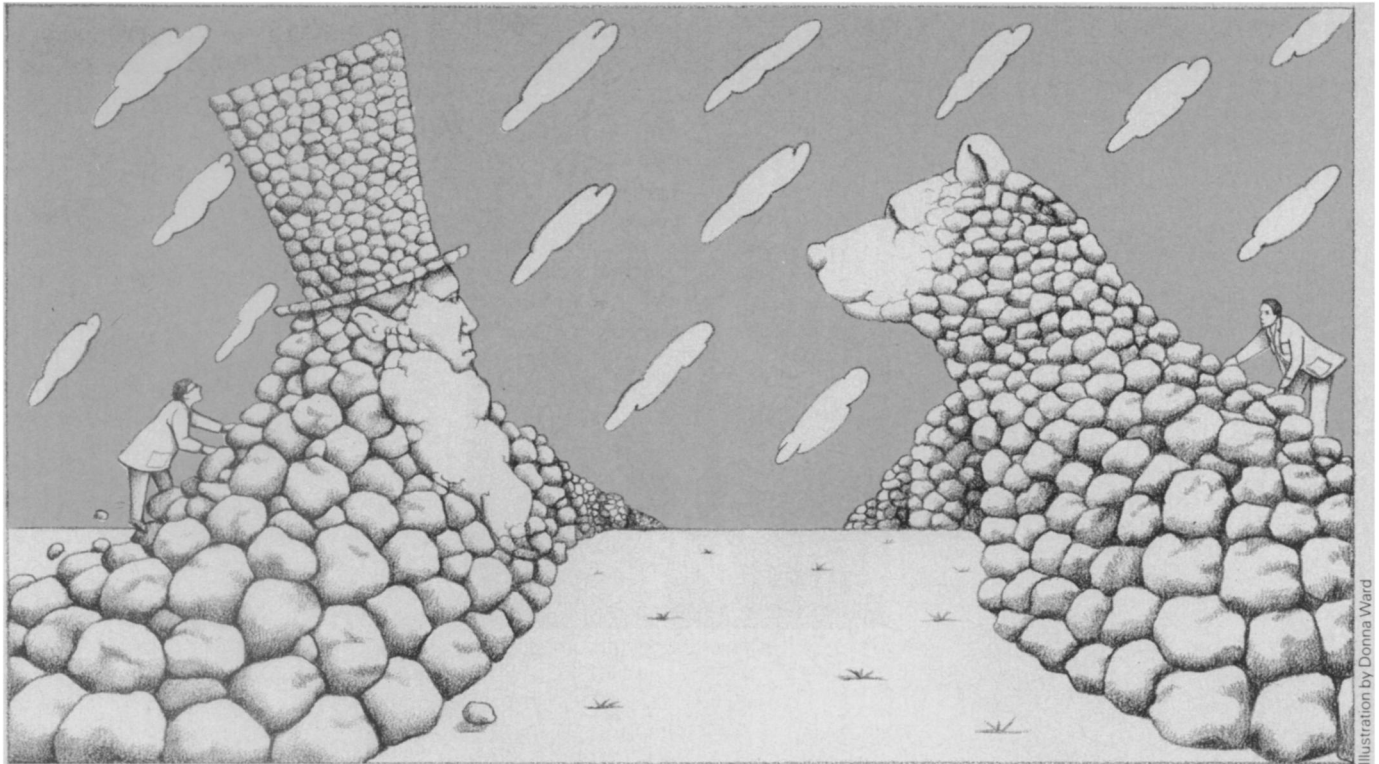


Illustration by Donna Ward

ing and question other scientists. Much of the action emanated from the office of Perle's deputy at DOD, Stephen D. Bryen. But the orders carried the personal approval of Secretary of Defense Caspar W. Weinberger.

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In retrospect, the San Diego affair might be viewed as an isolated example of a "bureaucratic screwup," as some have characterized it. But from SCIENCE NEWS interviews over the last several months with scientists and government and university officials has emerged a far different picture: The SPIE incident, it appears, was an inevitable result of a major shift in the government's attitude toward science communication. The shift began to take shape under the Carter administration shortly after the Russian invasion of Afghanistan in 1979 and has escalated during the Reagan administration.

"Before that time there wasn't that kind of sensitivity to these meetings that I can recall — or any restrictions at all," says Frank Press, president of the National Academy of Sciences and science adviser to President Carter. "There was always some concern, especially among non-scientists in the government," says Press, "about the transfer of hardware and equipment to the Soviets." The invasion of Afghanistan triggered more than a U.S. agricultural embargo and Olympic boycott against the USSR. It led to a reinterpretation of two key trade regulations—the International Traffic in Arms Regulations (ITAR) and the Export Administration Regulations (EAR) (SN: 3/20/82, p. 204)—to limit the export of scientific *ideas* as well as hardware.

It is this redefinition of these trade

regulations that has been used to justify, in large part, the San Diego action and a number of other steps taken involving lesser "technological hemorrhages," as some government officials call such transfers. "But I don't think those who are concerned with these 'hemorrhages' understand that it isn't all of scientific communication that should be blamed and therefore subjected to restrictions," says Press. "One has to differentiate between clandestine and illegal sales and scientific communication — one is damaging; the other — there's no evidence that it has been damaging."

There are those who believe the most damage is being inflicted upon the scientists themselves, who are beginning to feel the effects of restrictions on their freedom to communicate with colleagues. "It's a subtle type thing," says Bernard Roth, professor of engineering at Stanford University. "I have lots of contacts and friends in Eastern Europe and the Soviet Union, and people don't write as frequently — I got fewer Christmas cards this year than usual. I don't know, but I just have a sense that there is caution all around."

What Roth and the Stanford administrators experienced last year when they invited Soviet scientist Nickolay V. Umnov to visit the campus was anything but subtle. Prior to Umnov's scheduled visit the State Department sent a letter, through NAS, setting up the terms and conditions for Stanford's management of the visit. "It included some really quite outlandish requests," says Stanford President Donald Kennedy. The State Department asked that Stanford officials prevent Umnov from having any contact with industry in Silicon Valley during his visit, and that he not be

permitted to engage in discussions of certain DOD-supported research at the university. The research was unclassified and, according to Kennedy, "had no provisions for confidentiality in the contract."

Though Stanford and the State Department subsequently negotiated mutually acceptable terms for Umnov's trip, the State Department later canceled the visit for "other reasons," according to Kennedy. "I don't know to this day what the real other reasons were," he says. "A lot of theories . . . tend toward the conspiratorial. And they may be right."

In a more recent incident, a Stanford graduate student in computer science requested unclassified information from a research index published by DOD. The Defense Department not only refused the student access to the information via its computer link with the Stanford engineering library, but promptly classified the material. The affair has become so sensitive in the last several months that the Stanford library has canceled its account with DOD's Defense Technical Information Center, severing the computer link.

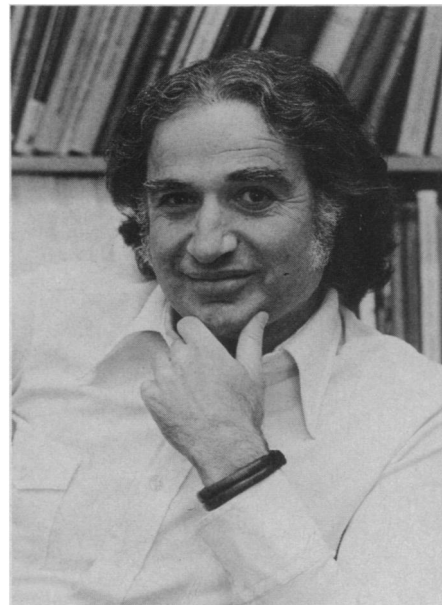
Roth and others believe that by pressuring the university to break that informational link, the federal government is signaling a crackdown on the dissemination of scientific information to foreign students who will be returning to their native countries. According to a Stanford estimate, about half of all the graduate engineering students in the United States today are foreign nationals.

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Concern over technology leakage to foreign countries has prevailed in the past almost solely in industrial settings — and rightfully so, according to an NAS report



Press: Not all flow is a "hemorrhage"



Roth: Fewer Christmas cards this year

on scientific communication and national security (SN: 10/9/82, p. 229). In the report, the NAS panel found industrial leakage through legal sales as well as through espionage is "substantial and serious" and includes a "significant portion" that is damaging to national security.

But as the federal government has clamped down — through ITAR, EAR and other means — on the international flow of technology through industrial espionage, intelligence and defense officials warn of "a clear trend toward a greater Soviet effort" to gain information from U.S. universities and open scientific meetings, such as SPIE.

This warning is trumpeted in portions of a previously classified report by the U.S. intelligence community on Soviet Acquisition of Western Technology. "Visiting Soviet and East European technical and student delegations to the United States generally consist of expert scientists, many of whom are connected with classified work in their home countries," says the report, parts of which were released in April 1982. "The Soviets correctly view the United States and several other Western countries as a continuing source of important and openly available scientific and technical information, which they take every opportunity to obtain access to."

The report further contends that some of these documents had previously been classified and were automatically downgraded to unclassified after a stipulated period of time. "When collected on a massive scale and centrally processed by the Soviets," the report states, "this information becomes significant because it is collectively used by Soviet weapons designers and weapons countermeasure ex-

perts." Intelligence officials contend that the Soviet intelligence services — the KGB and the GRU — are responsible for about 70 percent of the USSR's science and technology acquisitions, through both espionage activities and the "vacuum cleaning" of information from journals and open meetings.

The NAS panel, in its report, expresses far less concern, concluding that open scientific communication at meetings and among academic institutions "has been of little consequence to U.S. security." It recommends "no restrictions of any kind" involving universities unless the research falls into a "gray area" that might lead directly to short-term, military applications by the Soviets.

Wolfgang K. H. Panofsky, an NAS panel member and director of the Stanford Linear Accelerator Center (SLAC), says that "trying to impede the presence of foreign nationals at international meetings or distribution of journals are exercises in futility anyway. . . . One conclusion by our panel was that the cryptography example set by the previous administration simply was not transferrable to any other field," Panofsky says. In the late 1970s, pressure from the National Security Agency and Admiral Bobby Inman, then deputy director of the Central Intelligence Agency, led to a voluntary, self-policing system among university researchers in cryptography; the effort is aimed at avoiding information leakage to the Soviets.

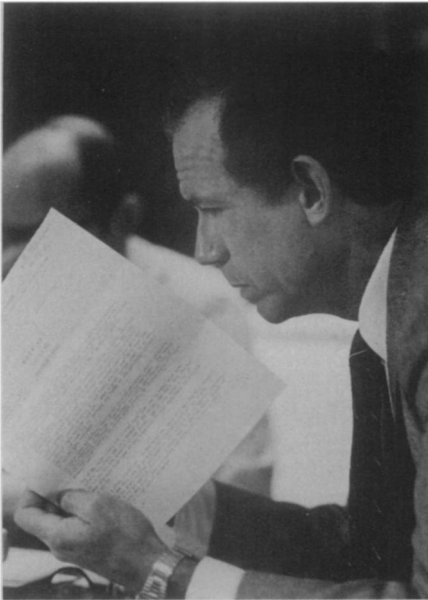
Inman emphasizes he is not equating *all* university-related research with cryptography. "I come down strongly, where basic research is concerned, that one should not try to impose constraints," he

says. "The academic [as opposed to industry- and espionage-related] part of the leakage is the smallest part by far at this point in time. But those of us who looked at the problem think it is likely to grow over the years."

Intelligence and defense officials publicly agree that scientific censorship should be used prudently, only in cases where security is clearly threatened. However, numerous sources attest to a sharp conflict within the federal government, particularly the Department of Defense. "I think the real problem here is that there are in fact different philosophies in DOD," says Stanford's Kennedy, former head of the Food and Drug Administration. "It is complicated developing a coherent position in any government agency because there are different people with different objectives and different beliefs."

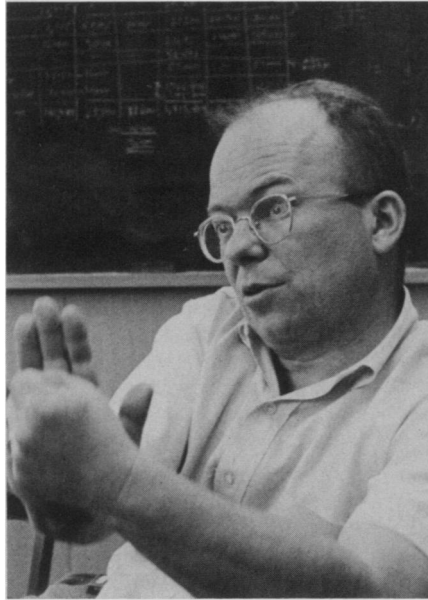
Still, Kennedy says, "I think there are more people in influential policy positions in this administration than there were in the last who believe that the interdiction of technology transfer is an important policy objective. I think that position in general," he says, "is apt to be accompanied by a more aggressive military and defense posture, which is more characteristic of this administration than the last."

It was this posture that inspired Kennedy and four other university presidents — from the University of California at Berkeley, the California Institute of Technology, the Massachusetts Institute of Technology and Cornell University — to send a letter to three Cabinet members two years ago. In the letter, the presidents expressed concern over what they saw as the beginnings of constraints upon access of foreign nationals to unclassified mate-



Stanford Univ.

Kennedy: Academicians won't be spooks



Stanford Univ.

Panofsky: Exercise in futility



CIA

Inman: Scientists must share burden

rials on college campuses. The letter led to the establishment of a joint University-Department of Defense forum, which is still studying the question of science and technology transfer at universities.

"Our first worries came when Carter was still president," says David Saxon, president of UC-Berkeley and a member of the DOD-University forum. "So it's not something I associate with Reagan at all or with particular staff people." Since the post-Afghanistan sanctions by the United States, Saxon says he has feared that scientists and the government "might be heading for a major, unfortunate kind of confrontation." The San Diego incident, he says, "is an example of the thing I feared."

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At the root of the problem are two basic questions: Is it desirable, or even possible, to block the flow of certain scientific ideas? If so, which ideas, and how?

In addressing the second question, the NAS report indicates that possibly restrictive "gray area" basic research could include, in addition to cryptography, work on Very High Speed Integrated Circuits. "How you manufacture such circuits—the production techniques — might fall under the 'gray areas,'" says Press. Exactly how such topics would be restricted is not made clear in the report, but Press stresses that the process would have to be voluntary. "The ultimate right of publication [must] still rest with the researcher," he says. "Without that, many universities would refuse to participate and the government would lose a valuable resource. This process would set up a 'creative tension' in research where the concept of open university and scientific communication is preserved, but it would also give

the government a vehicle to protect its interests."

Such creative tension is not only necessary but desirable, says Inman, now president of Microelectronics and Computer Technology Corp. "You want defense to take a position . . . of protecting our national security," he says. "And you would expect scientists to automatically take an attitude of being very cautious of any kind of restraints. I get chided heavily by some of the academics who say, 'Don't put the burden on us to prove our case.' Well, I think they share some of the burden [to show why some research should not be restricted] just as Defense has a burden to make the case as to why to impose restrictions."

To make his own case on the matter, Inman confesses that "I unburdened myself" at last year's meeting of the American Association for the Advancement of Science when he emphatically suggested that scientists begin policing themselves before the federal government begins to do it for them (SN: 1/16/82, p. 35). Inman says his remarks, which touched off a wave of protests from scientists, were calculated to inspire "the academics to try to examine the problems themselves rather than wait to be confronted with regulations and then react."

The academy report, Inman and others say, is a healthy sign that scientists have begun to control their own destinies. At the same time, Inman adds, the report "has been helpful in taking some of the steam out of the approach of those . . . who would clamp down as a way to solve the problem." The report is currently being reviewed by a caucus of government agencies under the direction of the White

House's Office of Science and Technology Policy; the review ultimately will lead to a presidential decision about the future of governmental policy regarding science communication. "The White House is taking it very seriously," Press says, "which is all we can ask for."

The far harder question to address is whether the dissemination of scientific ideas is or should be controllable in the first place. DOD's Gary Walters says: "What we are trying to do is be reasonable people and ensure that we do not stifle scientific and technical communications among those who ought to be having such communications; and at the same time preclude the fruits of such free discussions flowing to the Soviets."

There are those who argue that this is an impossible goal — a fact, they say, that was amply demonstrated by the incident in San Diego. Saxon and others note that research journals and open meeting proceedings will sooner or later give the Soviets access to ideas in any case. Already, according to Wollensak, 36 papers that DOD blocked from presentation in San Diego have since been approved for inclusion in the printed proceedings of the meeting. "It's hard enough to control the transfer of material objects," Saxon says. "It is extraordinarily difficult to control the transfer of ideas."

Stanford's Kennedy, who co-chairs the DOD-University forum, says, "I don't think there is anything here [at Stanford], that couldn't be gained by a Soviet scientist equally well in other ways, such as by reading the open literature. What we're objecting to is the application of a set of regulations clearly not intended for ideas, but rather for products and processes," he

says. "You can't ask universities to do something they damn don't know how to do at all, which is to be spooks."

As of now, the future of scientific and technology transfer remains clouded. There has been an apparent calming of tensions following last August's San Diego incident and the subsequent publication of the NAS report. Still, there are those in both the scientific and defense communities who see this period as a lull between storms. Can one be assured that another "San Diego" will not occur? "No, not at all," says Panofsky of SLAC. "The recommendations of the NAS report will not necessarily be implemented by any branch of the government."

Press's position on the future of U.S.-

Soviet scientific exchange may be slightly more sensitive than others', since the NAS council — in protest of the Russian government's treatment of dissident physicist Andrei D. Sakharov—continues to enforce a two-year-old moratorium on U.S.-Soviet cooperation. "The Soviet Union is a very powerful scientific and technological nation, and it may not be in our interests to cut off communication with them," Press says. "Also, if we don't have scientific communication, then we lose whatever leverage we have to speak to the Soviets, let alone pressure them, on the human rights issue. On the other hand is the matter of conscience..."

To others, conscience has little to do with the question. "Looking back as a his-

torian," says Inman, "I think protectionism has almost always cost us far greater than it has benefited. So, instinctively I am skeptical of trying to impose limitations on foreign presence."

However, a DOD official who asked not to be named says: "The relative lack of amenability to each other's [the U.S. and USSR] presence on this globe drives one to build a military capability that the other has to rush to counter. You cannot say that scientific exchanges are going to drive us and the Soviet Union in the direction of friendship and harmony. It ain't going to happen."

Concludes Press: "I really don't know how the future will go. The country's going to have to make a decision about this." □

## The View from Russia: Is A 'Fair Shake' Possible? —

Scientific cooperation between the United States and the Soviet Union is at its lowest level in recent years. From the U.S. point of view, much of the motivation for this cutback is political, a reaction to the Russian invasion of Afghanistan in 1979 and alleged human rights violations; the National Academy of Sciences continues to enforce its moratorium on scientific exchange begun two years ago in protest of the treatment of Soviet physicist Andrei D. Sakharov. Apart from these considerations is the feeling among some U.S. government officials and a number of scientists as well that such exchanges have been conducted on a one-way street — to Moscow. Because the United States is ahead of the USSR in most areas of science and technology, it is argued, only the Russians can benefit from a "cooperative effort"; moreover, it is asserted, in those areas where the Soviets *could* contribute to U.S. knowledge, they refuse.

NAS President Frank Press is among those scientists who believe that today's scientific "cold war" is hurting both countries. "If the quality of the Soviet and the American participation [in exchanges] does not improve, then the cooperation that exists will collapse," Press says. "Neither side is going to get enough out of it to justify the hassle. If we work with the Soviets in exchange programs where both countries are nearly equal, then we get a fair shake."

Press says that "there are a sufficient number of fields where the Soviets operate at world level capability . . . that we really would be damaging ourselves by not having these kinds of contacts." The fields, Press says, where the Soviets are on at least equal footing with the rest of the world include: high energy physics, magnetohydrodynamic transformation of energy (which uses ionized gases in magnetic fields), theoretical physics, astrophysics, materials for fusion (including lasers),

condensed matter physics and cosmology.

In interviews with SCIENCE NEWS, via Telex wire, several Soviet scientists in the USSR answered a number of questions surrounding the current climate of scientific exchange between the two countries. The following are excerpts from those interviews:

"True, we Soviet scientists, just as our American colleagues, can do without contacts and joint programs," says Oleg Nefedov, corresponding member of the Soviet Academy of Sciences and deputy director of the academy's Institute of Organic Chemistry. "But I am convinced that this would have an adverse effect on the development of chemical science in both countries. Political differences must not influence fruitful cooperation between Soviet and American scientists who well realize the common problems that face them.

"Several problems," Nefedov continues, "such as theoretical and experimental research into the mechanisms of organic and metalloorganic compounds, a study of new types of chemical bonds and a search for renewable sources of raw materials and energy are of mutual interest for scientists in both countries."

As examples of cooperation, Nefedov cites his two visits to the United States and the work of Ronald Caple of the University of Minnesota, who "staged experiments in Moscow to learn new Soviet methods of work with cationoid reagents." In addition, he notes the exchange visit of Soviet scientists Alexander Maltsev to Rice University.

Alexander Sheindlin, director of the Institute of High Temperatures, notes that after the Soviets had made a "major breakthrough" in MHD they undertook a cooperative program with the United States that included work in MHD. "Although the Soviet Union was way ahead of the United States in this field," says Sheindlin, the cooperative research pro-

gram "was mutually beneficial and based on wide exchange of information and equipment and joint experimental and theoretical research."

In reference to the NAS-sanctioned moratorium, Sheindlin says, "The Soviet side regretted the ending of cooperation, although the American decision did no technological and scientific harm to us." Russia remains in the lead in MHD transformation, he says. "This is an indisputable fact, since the Soviet Union has now begun to build the world's first big industrial MHD electric power station with a capacity of 500,000 kilowatts."

Valery Shumakov, director of the Moscow Institute of Transplantation of Organs and Tissues, says that his group is now collaborating with a team of American surgeons, led by Michael DeBakey of Houston, "over the problem of creating an artificial heart that would work for many years." (DeBakey's office at Baylor College of Medicine confirmed the collaboration.) A meeting of Soviet and U.S. heart specialists is scheduled for September at Samarkand in Soviet Central Asia, he says. "In the final analysis, it does not matter much who is first to find a solution to a problem," says Shumakov. "What is more important is that thousands of heart patients in both countries would benefit by this."

In an unattributed statement forwarded through the Novosti Press Agency, the Soviets dispute the contention that "scientific and technological cooperation benefits the Soviet Union alone. . . . Exchange between the Soviet Union and the United States has nothing to do with philanthropy. Suffice it to recall that the Soviet Union made all its major discoveries of world importance in science and engineering at a time when the West imposed total technological blockade of the USSR. Today, too, in many fields of science and engineering, the Soviet Union is ahead of other industrialized nations." —Joel Greenberg