ty of Chicago, Gray asked him to direct Argonne, which Chicago was about to take over entirely from a consortium of universities with which it shared the management of the lab for the Department of Energy. Bromley, who was at Yale at the time, recalled in an interview that Massey proved to be the right person in the right place at the right time. Virtually single-handedly, Walter changed Washington's impression of Argonne. At the time, Argonne was fraught with problems as it searched for a mission and sought to improve morale among its scientific staff. "He introduced what can only be called participatory democracy, and in turn the scientists responded with a dazzling array of ideas for the lab's research efforts," says Bromley. Gray claims that one of her great achievements was luring Massey from Brown to Chicago. "I can't say enough good about him," she declares. "He has an engaging style, a wonderful sense of humor, great clarity of intelligence, and he's a good listener to boot."

As Argonne's director, Massey was responsible in the early 1980s for one of the nation's most diverse energy R&D labs, with a staff of nearly 4000 and an annual budget of more than $250 million. He became a force in forging practical and lasting relationships involving industry, government and research universities. He was also active in civic affairs, heading the Chicago Mayor's Task Force on High Technology Development and serving on the Illinois Governor's Science Advisory Committee. He is still a trustee of the newly formed Academy for Mathematics and Science Teachers, formed to train some 17 000 Chicago public school teachers in math and science. The academy's most prominent champion is Lederman, who headed the campaign for DOE and the state to sponsor it.

Massey is already familiar with the NSF culture. From 1978 to 1984 he was a member of the National Science Board, the agency's policy-making body. In addition, he served on the physics advisory committee, the advisory committee on science and engineering education, and the committee on international programs.

The selection of Massey is interpreted in Washington as a conspicuous way of restoring NSF's small science programs, which are widely seen as having been weakened during Bloch's tenure by his support of engineering and supercomputer centers, and of strengthening the agency's pre-college and undergraduate education programs.

Those who know him characterize Massey as smart, savvy and very smooth. When the White House released its announcement about Massey's nomination, he took it all in stride. He was attending a board meeting of the First National Bank of Chicago and delayed his departure to Paris by four hours to answer phone calls from well-wishers and reporters.

"Walter's tickets are punched in all the right places," says a friend. Equally important will be Massey's style of operation in Washington. While Bloch was cocky and contentious, Massey is said to be conciliatory and charismatic. The friend notes: "Walter has no character flaws I know about and many strengths that will benefit NSF and science."

—IRWIN GOODWIN

# AT NEW KIND OF SUMMIT, GORBACHEV SEEKS GREATER R&D COLLABORATIONS

In the annals of the 17 superpower summits, dating back to President Eisenhower's meeting with General Secretary Khrushchev in 1959, it is rare to find the leaders mentioning science. The closest Khrushchev came to the subject was when he slogged around Roswell Garst's 3000 acres of cornfields near Coon City, Iowa, in 1959 and saw the tangible benefits of scientific farming. On his return to the Soviet Union he found Garst's methods hard to introduce while Trofim Lysenko's crazy notions dominated crop genetics. In 1972, Nixon and Brezhnev reached agreements to cooperate in public health, environmental protection, outer-space exploration for peaceful purposes, and high-energy physics and magnetic-fusion research. At Geneva in 1985, Reagan and Gorbachev signed general agreements on a range of fields in science, technology, education and culture, which their sherpas had hauled to the summit. But the three-day Soviet–American summit conference held in Washington and Camp David in early June was different in style and scope.

It is natural in assessing summits to add up the subjects agreed to and subtract those still in disagreement,

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**Subsummit on science:** US–USSR talks in the US Academy boardroom.

and by this arithmetic the Washington conference was only a modest success. With the exception of important new restrictions on chemical weapons and an agreement to reduce long-range nuclear weapons by a third, many of the accords signed by Bush and Gorbachev were not only conventional but even humdrum: extension of the 1973 ocean studies agreement to include joint use of research ships and open publication

of collaborative research; cooperation in the peaceful uses of atomic energy; collaboration on nuclear reactor safety, which has been a critical issue since the 1986 explosion at Chernobyl, and US assistance in training reactor operators; participation in funding a proposed $5 billion magnetic-fusion facility, known as the International Thermonuclear Experimental Reactor, or ITER, which would demonstrate the feasibility of developing nuclear fusion as a commercial power source; and expansion of cultural, scientific and student exchanges, raising the number of undergraduates involved from 500 to 1500 students from each country per year.

Still, it would be wrong to apply the customary measurements as though nothing had changed. At worst, past Soviet–American talks were confrontations; at best, they were exercises in conflict management. The Washington summit on 1–3 June, by contrast, was marked by no sign of imminent danger or inevitable confrontation. The two leaders and their teams dealt with some difficult and sensitive subjects touching the vital interests of their own countries—particularly investment opportunities, business relationships and greater scientific collaboration.

## Signs and symbols

The meeting also was notable for its symbolism: the scenes of Gorbachev welcomed with military fanfare at the White House, chatting up leading members of Congress, plunging happily into street-corner crowds, tossing a "ringer" on his first try at the game of horseshoes at Bush's retreat at Camp David. More significant was the personal rapport of the two Presidents: the appearance of a frank and trusting relationship, made all the more emphatic at the hastily arranged Helsinki summit on 9 September, aglow with Bush's proclamations of a "new world order" and a "new partnership" between the US and the USSR. The phrases suggested that Bush had made a striking leap in his approach to the USSR since June, when he fumbled a question on where he would place the Soviet Union along a scale between adversary and ally. "We've moved towards a—I don't know quite how to quantify it for you," he said.

This summit featured science more conspicuously than any previous one—possibly because the superpower military issues are no longer so urgent. One indication of the new emphasis was the candid tabletalk at the National Academy of Sciences in Washington between nine Soviet scientists and economists in Gorbachev's entourage and some 40 US scientists, economists, educators, government officials and business executives, including representatives from DuPont, Martin Marietta, Monsanto and W. R. Grace. Among the participants were D. Allan Bromley, the White House science adviser, and the heads of NASA and NSF. On the Soviet side were two key members of Gorbachev's Presidential Council—Yuri A. Ossipyan, a vice president of the Soviet Academy of Science and the director of the academy's Institute for Solid State Physics, and Stanislav S. Shatalin, the economist who has attained celebrity as the author of the radical "500-day" manifesto setting out how to revolutionize the USSR's centrally planned system into something like free market capitalism.

At the US academy, Shatalin frankly acknowledged the grave troubles besetting the Soviet Union's collapsing economy. His colleagues interrupted his discourse time and again to disagree with his prescription for restoring to health an economy in agony. "The old system led us to a dead end," said Evgeniy Primakov, former director of the Soviet Institute of World Economy and International Relations and chairman of the Council of the Union of the USSR Supreme Soviet. "The old system is bankrupt." At one point, Herbert Stein, who was President Ford's chief economic adviser, warned Shatalin that the description of the proposed Soviet economic system didn't jibe at all with the way competitive market economies work in western countries.

Though most of the colloquium was devoted to the Soviet economy, Ossipyan and Evgeniy P. Velikhov, also a Soviet academy vice president as well as director of the Kurchatov Institute of Atomic Energy, gave a quick rundown of Soviet–American collaboration in space exploration, controlled nuclear fusion, isotope separation and high-temperature superconductivity. Along with Shatalin, they made a pitch for US capital investment in the USSR as well as for technical and intellectual exchanges with Western scientists and scholars. Afterward, some of the US hosts, including Frank Press, president of the US Academy, and Hans Frauenfelder of the University of Illinois, chairman of the governing board of the American Institute of Physics, were wary of quick results from attempts to revive the besieged Soviet economy with injections of scientific research.

When the Washington summit ended, Gorbachev and his entourage flew to Minneapolis–St. Paul, where the Soviets met with a Who's Who of corporate America at a reception and lunch held in Minnesota Governor Rudy Perpich's mansion. Later, during a visit to Control Data Corporation, Gorbachev was shown how the firm's Cyber 960 computers could deal with a simulated accident in a nuclear plant by providing instructions to reactor operators on how to identify a problem and correct it. After Gorbachev left, Control Data announced that the Bush Administration and the 17-nation Coordinating Committee for Multilateral Export Controls, more commonly known as COCOM, had approved the sale of six Cyber 960s, worth $32 million, to the USSR—the most advanced computers ever allowed under COCOM's customary embargo of high technology to the Warsaw Bloc. IBM then revealed that it had signed its biggest contract yet with the Soviet Union, calling for 13 000 personal computers, valued at between $15 million and $20 million, to be used in secondary schools.

Another announcement came from British publisher Robert Maxwell, who offered to put up $50 million to form the Gorbachev–Maxwell Institute of Technology in the Twin Cities, where scientists from North America, Europe and the Soviet Union would work on environmental and geophysical research and on global telecommunications. His ultimate goal is to raise $200 million for the proposed institute. Still another idea for advancing scientific exchanges was delivered by Gorbachev to Bush in a private talk at Camp David. The Soviet leader endorsed the creation of a US–USSR research university first proposed by Ossipyan and Edward D. Lozansky, a Soviet emigré physicist living in Washington. Ossipyan convinced Gorbachev that such an institution would help avert a brain drain of Soviet scientists while at the same time encourage them to collaborate with US scientists and scholars.

## Auguries and arguments

On 4 June, Gorbachev met with more businessmen in San Francisco, then addressed a capacity crowd of faculty and students in Stanford's 1700-seat Memorial Auditorium. Gorbachev's speech was a major policy statement on political and scientific relationships. "Let us think about the future," he declared. "Our two nations have enough reasons to be partners in building it, in shaping new security structures in Europe and in the Asian Pacific regions, and also in the making of a truly global economy and the creation of a new civilization. I am under no illusions regarding the pos-

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**Greetings:** Ossipyan embraces Frauenfelder (left) as Press watches.

sibilities of a faster convergence of our two societies.... They probably will never be alike. There is no need for that....

"In our cooperation to build a better future, I will take as a point of departure the fact that the cold war is now behind us. Let us not wrangle over who won it.... There can be no winners in a cold war, just as in nuclear war.... Our two countries, who know the burden of the arms race during the cold war, know that particularly well.... Each of our two countries bears its share of responsibility for the fact that the postwar period ... took on the character of an exhausting and dangerous confrontation. It is now ... quite logical to say that it is our common responsibility to make sure that the mechanisms of East–West military confrontation are dismantled as soon as possible."

Gorbachev noted that although science "played a major role in the arms race," scientists were among "the first to speak out authoritatively against this folly and to look for a way out." In this, he continued, "we have to give credit to the joint efforts of Soviet and American scientists." And in those efforts, he said, Stanford scientists "made a very substantial contribution. I am referring to the development of the basic principles of such concepts as international security and strategic stability.... The scientists of our two countries ... approached this work as a scientific project and put aside the political and military ambitions which had long stood in the way of a solution."

He then named four Stanford faculty members who, he said, "have very high academic reputations and believe in the need for peace and the triumph of reason and justice." The four professors, whose names were given to Gorbachev by Ossipyan and Velikhov, are Wolfgang K. H. Panofsky, director emeritus of SLAC and a founding member of Stanford's Center for International Security and Arms Control; Sidney D. Drell, deputy director of SLAC and former codirector of the center; William Perry, codirector of the center; and David Holloway, professor of political science and chairman of the Program in International Relations. Panofsky and Drell were away from the campus during Gorbachev's visit, but Holloway and Perry, who were in the audience, expressed surprise and delight at being mentioned.

Gorbachev also took the occasion to cite the Soviet scientists who on their own and in collaboration with the Stanford group have sought to reduce the nuclear threat—notably Primakov and Shatalin, the economists, and Ossipyan, Velikhov and Roald Z. Sagdeev, who holds a joint appointment as director emeritus of the Soviet Institute of Space Research and professor of physics at the University of Maryland. "They and others have been doing much to build bridges of trust between our two countries," he stated. "I take advantage of this opportunity to thank them all warmly, and I hope that you will join with me in this."

He praised Stanford scientists for initiating contacts with officials in defense industries of both the US and USSR, with the goal of weapons builddown. "New steps in disarmament require major restrictions on the development of advanced weapons systems. Soviet and American scientists will have a lot of work to do in this area, too, in order to identify the borderline between permissible modernization and a qualitative arms race." It so happens that Perry is directing a new cooperative study with the Soviets on ways of converting the defense industries in both countries to the development and production of commercial products—a transformation that Gorbachev argues is devoutly to be wished to satisfy pent-up demands in the Soviet Union for consumer goods.

## Praise for physicists

Gorbachev then turned to other fields of US–USSR scientific cooperation. "I have heard that Stanford scientists would like to cooperate closely with their Soviet colleagues on the problem of the environment. This, too, is an area of vital importance for world development." He spoke about the contribution of Stanford physicists to Soviet–American efforts in high-temperature superconductivity and named Malcolm Beasley and Theodore Geballe for organizing an international conference on the subject on the Palo Alto campus the previous summer, which was attended by some 30 Soviet condensed matter and solid-state physicists. Beasley later recalled in a telephone interview that when Gorbachev mentioned his name "I was numbed. It's certainly not standard practice for a head of state to thank individual scientists."

Just before Gorbachev's address, Ossipyan met briefly with Beasley and other Stanford physicists, including Walter Harrison, Conyers Herring, Aharon Kapitulnik, Blas Cabrera, Steven Chu, Alexander Fetter and Douglas Osheroff, along with three physicists from SLAC and four graduate students. Ossipyan spoke of a "new atmosphere" in scientific relations between the two countries.

Gorbachev, too, concluded his speech by wishing success to Stanford's students and scientists in making sure that people "live a better life in great freedom." Afterwards, George Shultz, who was Secretary of State in the Reagan years, presented Gorbachev a 1921 poster from the collection of Russian Revolution memorabilia in the Hoover Institution on campus. The poster showed students in a classroom and carried a line by Aleksandr Pushkin: "Long live the Sun! Let the darkness go away!" In handing the poster to Gorbachev, Shultz said: "We share this belief in the power of knowledge to enlighten our lives."

—IRWIN GOODWIN ■