

EUROPEAN AND US PROPOSALS FOR AIDING FSU SCIENCE VIE FOR SUPPORT

Despite the admission of Russia and other states of the former Soviet Union to the International Monetary Fund at the end of April and the agreement by IMF members on a \$24 billion stabilization fund for the FSU states, the whole question of aid for the ex-Communist countries—and along with it, aid for science in those countries—remains subject to large economic uncertainties, differences of opinion and political unknowns. Various proposals for aiding Soviet science are under discussion, but at this writing it has yet to be determined which will come to life and which will prove stillborn.

Prospects for success of the IMF stabilization program are themselves highly dicey, and, if the program fails, then of course the situation in the ex-Soviet states may be written off as hopeless, and prospects for any kind of specific aid project will deteriorate. Meanwhile, the outlook for every aid proposal is complicated by lingering recession in the major industrial countries, especially Japan, Germany and the US. The German situation is further complicated by the costs of reunification, which contributed greatly to the outbreak of a public workers' strike in May. Japan is thought to be dragging its feet because of Russia's continued refusal to consider returning a group of islands in the Kurile chain seized by the USSR after World War II. And in the US the whole question of aiding the FSU states has been caught up in the Presidential primaries and will stay hostage to election-year politics, at least to an extent, until November.

The Bush Administration, faced during the winter with a neo-isolationist challenge on the right from Patrick Buchanan, was slow to act initially on FSU aid. Just as the specter of Buchanan was beginning to fade, the Administration was criticized both by former President Nixon and by the leading Democratic chal-



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A recent APS meeting of physicists from the former Soviet Union included Mikhail Voloshin (left) of the University of Minnesota and Andrei Linde (right) of Stanford.



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lenger, Bill Clinton, for not doing enough to help the FSU. The Administration soon presented itself as much more open to considering aid, and in addition to the IMF package it helped formulate a program to provide funds to FSU weapons scientists. But whether its new openness extends to the most ambitious of the proposals under discussion in Europe remains to be seen.

Baker-Genscher initiative

Articles in the May issue of *PHYSICS TODAY* by Roald Z. Sagdeev and Evgenii L. Feinberg described the critical state of science in the FSU. In fact, the crisis has been of lively concern throughout the last year among scientists and science leaders in Europe and the US, including scientists from the former USSR working abroad. Many ideas have been formulated, but a consensus has been slow to develop, not only because of uncertainties as to which proposals

will win political support but also because of real disagreements as to which approaches would be most effective and most desirable. One important disagreement concerns *who* most deserves to be helped.

The first proposal to get off the ground concerned FSU weapons scientists. In mid-February US Secretary of State James Baker announced that an internationally supported "clearinghouse" would be established to help provide new employment for weapons scientists, the basic idea being to keep the scientists out of trouble. This program has come to be known as the Baker-Genscher initiative, apparently because it originated both in the US and in Germany, where Hans Dietrich Genscher, Germany's prestigious foreign minister (who recently announced his retirement) played an important role. The US is providing \$25 million to create an office in Moscow and another \$10 million for

an office in Kiev, with the money coming from a \$400 million fund that Congress earmarked late last year for dismantling nuclear weapons in the FSU states. The European Community has pledged \$25 million toward the clearinghouse, and Japan, Sweden and Switzerland are expected to put up a similar amount.

US planning for the clearinghouse is centered in a newly created State Department office, which is headed by Robert L. Gallucci, a former co-leader of international inspection teams to Iraq. Gallucci, a senior coordinator for special projects, is attached to the deputy secretary of state's office.

The rationale for the clearinghouse is of course not to support FSU science as such but to prevent weapons scientists from selling their services to rogue nations or from pursuing projects in the FSU itself that could undermine strategic stability. The clearinghouse has been criticized both for being too limited and for rewarding scientists who went along with the Soviet system rather than those who pursued pure science or even actively opposed the Communist regime. Shortly after the announcement of the Baker-Genscher initiative, the Russian foreign minister complained during a visit to Paris that more needed to be done to address the crisis in basic science in the FSU.

At least one Russian scientist, Sergei Kapitsa, has complained that the clearinghouse plan is demeaning to FSU scientists. Writing in the May issue of the *Bulletin of the Atomic Scientists*, Kapitsa said, "To single out a nuclear scientist from Russia—however difficult his current position—is an expression of distrust, if not a direct insult to that community." As Kapitsa sees it, Russian nuclear scientists—no less than those in other countries—are overwhelmingly people of integrity who have been motivated by patriotic and moral concerns.

Okun-Rubbia proposal

Well before agreement on the Baker-Genscher initiative was reached, a proposal for aiding fundamental science in the FSU was circulating. The proposal, which anticipates the creation of an international science foundation that would provide peer-reviewed grants directly to FSU scientists, was conceived last summer by physicists Lev Okun of the Institute for Theoretical and Experimental Physics in Moscow and Mikhail Voloshin of the University of Minnesota. In a version of the proposal dated 23 October 1991, they said: "The working and living conditions even of

world-known scientists have deteriorated below any imaginable limits of decency. This puts the existing unique scientific schools on the verge of annihilation by forcing many leading scientists to leave the country and others to seek means of survival in other activities. . . . An intellectually rich scientific culture in Russia exists today. Tomorrow it may disappear, and it may well be that no future efforts will be adequate to restore it in full. At present it is a matter of good will and political wisdom of the Western world to allocate a small fraction of its wealth to preservation of this part of the world's intellectual and cultural heritage."

Okun and Voloshin suggested the establishment of an international fund with about \$100 million to spend per year, based on the following considerations: They estimated the total number of senior people in all fields of fundamental science in the FSU at 2000–7000, and they proposed grants to principal researchers of \$20 000–\$25 000, "which approximately corresponds to grants awarded by the US-Israel Binational Science Foundation," a model for their proposed foundation. If the average estimated number of basic researchers is multiplied by the average proposed grant, the total is about \$100 million.

Okun, a former member of CERN's scientific advisory committee, took the proposal to CERN Director General Carlo Rubbia last fall. It was Rubbia's inspiration, with the help of CERN physicist Robert Klapisch, to make a direct approach to French President François Mitterrand. Rubbia no doubt had in mind the history of cooperation between French and Soviet scientists, France's historic concern for human and political rights in Russia (which predates the USSR) and Mitterrand's personal taste and talent for alluring international initiatives such as EUREKA—the European cooperative organization that funds preindustrial research.

In a letter to Mitterrand dated 26 September 1991, Rubbia drew his attention to the proposed foundation, noting prominently that Russian science is a part of Europe's common cultural heritage and indeed a part of the whole world's. "The traditions of Mendeleev, Pavlov, Lobachevsky, Kapitsa, Landau, Sakharov and so many others are continued today by brilliant schools of mathematics, physics, astronomy, chemistry, biology. Their disappearance would be a very grave loss, not only for Russia but for world science and culture."

In a reply dated 24 October, Mitter-

rand promised to have his aides study the proposal carefully, and in a press release issued by France's Ministry of Science and Technology on 27 February, research minister Hubert Curien indicated that the "Rubbia initiative" would make a useful complement to Baker-Genscher. It is now understood among European physicists that Italian and French "sherpas"—the bureaucrats who prepare the way for summits of the Group of Seven Nations, the big industrial countries—are refining a presentation of the Okun-Voloshin-Rubbia initiative for the summit that will take place in Munich in July. Mitterrand has written to the G7 leaders suggesting they discuss the initiative.

Brown proposal

It is one of the ironies of the current situation that France, which has a style of managing research by directive (rather like the old USSR's), is the strongest supporter of the Rubbia initiative, while the US—whose National Science Foundation is the very model of an agency making grants in response to applications—is perhaps the most skeptical about the idea.

George Brown, the California Democrat who heads the House Committee on Science, Space and Technology, has floated a somewhat similar proposal for a foundation, except it would be "binational" rather than international. That is, it would be a US-Russian foundation, perhaps with variants for other republics. Brown's foundation or foundations would fund research of mutual interest, especially industrially relevant R&D, and it would rely on both sides—the US and the FSU republics—for funds.

Brown has introduced a bill to establish such a foundation in the House, and Senator Al Gore, the Democrat from Kentucky, has introduced a counterpart in the Senate. But foreign aid of any kind is a questionable matter in Congress in this recessionary election year, and the White House so far has shown no enthusiasm for any proposal for an international foundation.

In a conversation with PHYSICS TODAY in early May, White House Science Adviser D. Allan Bromley did not outright oppose the idea (and indeed he refused to comment on any of the proposals currently in contention). But he clearly implied that establishment of an international science foundation might be redundant, because Russia may be already on its way toward establishing a science foundation of its own.

Confirmation of Bromley's informa-

tion is found in a report issued in April by Britain's Royal Society. The report said that Russia already has decided to establish a Russian Fund for Basic Research on the model of the US National Science Foundation. It "will begin life under ministry auspices with a capitalization of 300–400 million rubles. Later, as it grows, it may become independent," the report said. Some 10 000–15 000 scientists with solid international reputations are expected to serve on expert councils assessing grant proposals.

But even apart from the difficult questions of whether or not Russia will be able to raise the money it has promised for the foundation and what the money will be worth when it appears, there are other serious objections to the notion that a Russian foundation would render an international foundation superfluous. In a meeting of FSU scientists held under the auspices of The American Physical Society at its April meeting in Washington, and at a meeting of individuals concerned about FSU science that was held at the National Academies of Science and Engineering in March, many individuals expressed this major concern: The science institutions and institutes of Russia and the other FSU states remain to a disturbing extent under the influence of the "old guard" that opposed *glasnost* and *perestroika* and failed to oppose the attempted putsch last year with sufficient vigor (see box, page 69); this old guard may not channel monies to the right individuals and, in any event, is not trusted by many FSU scientists to make funding decisions fairly. But fairness and a perception of fairness—as NSF's William Blanpied pointed out to *PHYSICS TODAY*—are the essential preconditions for establishment of a successful science foundation. (Blanpied heads an APS task force on FSU physics, but he is not involved in the evaluation of APS grant proposals to NSF.)

National Academy meeting

At the meeting at the National Academy in March, the participants formulated several proposals for Bromley that implicitly represent an alternative or a supplement to the Okun-Rubbia approach. They suggested first of all that the US establish a \$25 million fund specially for non-weapon scientists, matching the Baker-Genschler fund for weapons scientists. Second, they urged the White House to establish a fund of \$50–100 million to help large FSU institutes with infrastructural costs.

Because of rampant inflation in the FSU states, energy costs at a typical

Reformers Frustrated by New Academy, Moscow University Leadership

The Soviet Academy of Sciences, easily the largest science organization in the world throughout the postwar period, ceased to exist on 9 December last year. A presidential decree of 21 November had put all academy institutions on Russian soil under the control of the new Russian Academy of Sciences. In elections to the newly fused academy that were held 17–20 December, Yuri S. Osipov defeated Evgeny Velikhov for president—an upset. Aleksander F. Andreev, deputy director of the Institute for Physical Problems in Moscow, replaced Yuri A. Ossipyan as the vice president in charge of physics.

There had been some thought that the Soviet academy might survive as a central institution serving the whole Commonwealth of Independent States, but apparently its dubious behavior during the coup attempt last August sealed its fate. According to a report just released by Britain's Royal Society, "the USSR Academy and the Union of Writers were the sole learned societies which did not condemn the attempted coup as unconstitutional." In elections two years before to the newly formed Congress of People's Deputies, the academy's leadership had discredited itself by attempting to control the results, which provoked a grassroots rebellion among members (*PHYSICS TODAY*, May 1989, page 65).

On 10–12 December, a conference of scientists from academic institutions was held and a new statute for the Russian Academy was adopted. The results "fell short of the original objectives of the younger scientists," the Royal Society reported, particularly a decision that "representation from research institutions at the General Assembly should be elected not by full staff but by the more conservative scientific council of each institute."

Though the statute insists on its independence, the Russian Academy,

like its Soviet predecessor, is in fact entirely dependent on the state for funding. For the foreseeable future its budget will come from the Russian Ministry of Science, Higher Education and Technology Policy, which is headed by B. S. Saltykov.

Both Saltykov and Osipov are applied mathematicians: Saltykov worked for the Central Economics-Mathematics Institute of the Academy of Sciences, and Osipov was director of the Institute of Mathematics and Mechanics at Ekaterinburg (formerly Sverdlovsk). Osipov was associated with the USSR's military-industrial complex for many years, and according to the Royal Society, he owed his victory over Velikhov to his reputation as an effective administrator, his success in combining the Russian and Soviet academies and an assumption that "he was likely to be fully acceptable to the Russian political leadership." No doubt Osipov's origins in Ekaterinburg, Russian President Boris Yeltsin's home and original base, and his association with Yeltsin, were decisive factors in his election.

Evidently the election of Osipov represents a compromise between eager young reformers and the old guard, which remains a force to be reckoned with. The persistence of the old guard is evident also in the succession at Moscow State University, probably the most important institution of higher learning in Russia. The former rector, Anatoly Logunov, was notorious for many years because of his anti-Semitism, his opposition to relativity theory and his hostility to political reform. An emigré scientist at an APS meeting in April said Logunov had been conducting a war with equal vigor against both Einstein and Yeltsin. But the emigré indicated that Logunov's successor, Victor Sadovnichiy, was little or no improvement and maybe worse. Sadovnichiy was selected by a committee Logunov hand-picked.

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institute often exceed combined salaries of scientific personnel, as Sagdeev pointed out at the APS meeting of FSU scientists in April. Several participants in the APS meeting proposed partnerships between US or European institutions and FSU institutions as a means of addressing infrastructural costs.

But there also are those who rather strongly oppose infrastructural sup-

port in all forms. Joseph Birman of the City College of New York, who has been active for many years in human rights causes and who has been to the USSR many times, is one such person. "I don't support our giving money to large units," Birman told *PHYSICS TODAY*. "I believe we cannot keep the lights or heat on in the winter. If the Russian, Ukrainian or Kazakh governments cannot provide that very

basic level of support, our funds will be in my view wasted."

Indeed, not everybody agrees that FSU science is worthy of support, even in principle. Among the Soviet emigré scientists in the US, there are those who feel Soviet scientists were a privileged elite who generally went along with official policy—and who are now acting like crybabies because they are losing their privileges.

One potentially troublesome aspect of the recommendations made at the NAS meeting concerns the proposed source of funds: The participants suggested diverting funds for non-weapons scientists from Congress's \$400 million fund for weapons scientists, a procedure that would seem to be of doubtful legality. But Bromley pointed out to PHYSICS TODAY that many Soviet scientists who were doing military-oriented work of a somewhat fundamental character were funded by the old USSR Academy of Sciences. Because of this gray area, Bromley implied, it might not be so inappropriate to use some of Congress's \$400 million for non-weapons scientists.

Every proposal for aiding FSU science is open to the objection that it may discourage rather than encourage needed adjustments in the economies of the former Soviet states. It may be that large numbers of scientists need to be transferred from large institutions of the former Soviet Academy of Sciences to universities and to industry—the same kind of adjustment that the German government has encouraged in its newly incorporated Eastern states. It may be, too, that some large institutes of the former academy should be shut down outright.

NSF, APS and EPS initiatives

The onward rush of events in the FSU states is a factor that loomed especially large for participants in the APS and US academies meetings. Many pointed out that proposals geared to long-term structural problems are of little interest because they will be irrelevant by the time they are implemented, and because the crisis of FSU science is now.

Acting out of those considerations, NSF has reminded grantees that principal investigators are entitled to reprogram 5% of their grants to FSU scientists, provided of course the funds will be used in a way that is relevant to the grant. NSF also has announced it is prepared to make supplementary grants of up to \$10 000 to US scientists involved in collaborations with FSU scientists, for infrastructural support. And NSF

has announced its willingness to consider proposals for specific programs to help FSU science, though as Blaupied points out, funds are short and the funding cycles are awkward. (To date this year, NSF has awarded about \$1 million to FSU scientists.)

In April the APS council authorized the society to apply to NSF for a three-part grant: to support young FSU physicists; to support physics infrastructure by funding international schools, workshops and seminars in the FSU; and to provide sets of *Physical Review*, *Physical Review Letters* and *Reviews of Modern Physics* to the FSU, supplementing a program of journal donations APS already has initiated.

The American Institute of Physics and AIP member societies besides APS, notably the American Astronomical Society, also have launched journal donation programs and programs of small grants (see PHYSICS TODAY, May, page 56, and April, page 82). Birman has suggested establishing a program for FSU scientists similar to the China Scholars Program, which brought senior Chinese to the US after the Cultural Revolution, to bridge an adjustment period.

So far efforts by the European Physical Society have been largely confined to gathering information on physicists, physics institutions and problems associated with journal subscriptions and library collections, especially in Eastern Europe and the westernmost or "outer rim" FSU states—the Baltics, Belarus and Ukraine. EPS has been leery of confronting problems on the scale that Russia presents and also has been respectful of misgivings found among Eastern European and outer-rim scientists about dependency on the Russians. Therefore, as an EPS report put it, the society "will only embark on an aid program towards Russia together with APS, as the sheer size of Russia is larger than the US."

As this issue goes to press, APS and EPS leaders and officers will be meeting in Budapest to discuss possible joint programs. And despite a reluctance to "point fingers" in the FSU states—to take responsibility for specifying who is competent or incompetent, whose behavior was morally dubious or beyond reproach—the European physics communities are expected to generally support the Okun-Rubbia initiative. Indeed, EPS has been developing databases that could be of considerable use in implementing an international foundation.

French and British programs

Britain's Royal Society is providing

its journals free to selected institutions in the FSU and has launched a program of "Kapitsa fellowships," which bring FSU scientists to the UK for up to three months. But the French claim priority in establishing visitor programs that provide FSU scientists with contacts in the West and at the same time yield enough savings from hard-currency fellowships to make life as a whole much more manageable.

In November 1990 two agreements were signed that were specifically designed to help preserve the Soviet schools of physics and mathematical physics, known worldwide for an approach that stresses intuition and a lively interplay between mathematics and theoretical physics: These agreements provide for visits to France of six months' duration, and one was between the Landau Institute in Moscow and the physics department of the Ecole Normale Supérieure in Paris; the other was between the Laboratory of Theoretical Physics of the University of Paris, the mathematics department of the University of Orsay and the Steklov Mathematics Institute in St. Petersburg. According to André Neveu, deputy to Daniel Thoulouze, the scientific director for physics and mathematics of the Centre Nationale de la Recherche Scientifique, the first teams of 8–10 Soviet physicists arrived in February 1991.

Neveu says that the French "are now going to set up, starting this fall, long-term recurrent visitors' contracts to stabilize, in a French-Russian orbit, some of those who do not want to take a permanent full-time position in the West, but who wish to keep their country scientifically alive, taking students, teaching courses while in Russia; we also invite for shorter visits some of the best graduate students while their advisers are in France. This will be extended to experimental physics."

Besides that, Neveu says, hundreds of Russian scientists from all fields come to France each year for visits of various lengths, invited by universities and research institutions. Funds mostly come from postdoctoral and senior fellowships funded by the Ministry of Research.

Gravity of situation

About the urgency of the situation in the FSU there is little disagreement among FSU scientists and other, perhaps less biased or less emotionally engaged, observers. Elements of the crisis were aptly described in the January issue of *La Recherche* by Michèle Leduc of the Ecole Normale Supérieure, a CNRS research direc-

tor: "I arrived [in Russia] very soon after the putsch of 19 August and rather expected to find a climate of the order of 'May 1968 in France' [a time of political euphoria]. In fact the enthusiasm about anticipated political changes is almost exclusively a thing among the very young. . . . Man or woman, institute director or technician, everyone has to leave for a long time every day to do shopping errands. . . . There is only one single central library in St. Petersburg where subscriptions to foreign journals have not been interrupted because of hard currency shortages. People come from far and wide, and one has to wait several hours to consult a copy of *Physical Review*!"

From this account and many others it is evident that there is a rather sharp generational cleavage in the FSU states. Under the circumstances the possibility either of reaction—or of much more radical revolution—cannot be dismissed.

Other nightmarish scenarios also are conceivable and even plausible. Commenting on a recent decision by Finland to spend \$3 billion for combat jets from McDonnell-Douglas, a Soviet expert with the Carnegie Foundation said, "If something goes very wrong [in the FSU], one of the things that could happen is not the emergence of a right-wing central government but the development of a local warlord situation."

A deep uncertainty about the future, together with the anti-Semitism that surfaced with *glasnost*, has of course been an important motive prompting some FSU scientists to seek work abroad. How serious is the danger of a brain drain? The situation at the leading physics institutes appears from many reports to be quite varied, and FSU scientists seem to disagree among themselves about the acuteness of the threat and about the kind of attitude one should adopt. Several eminent FSU scientists—among them Vitaly Ginzburg in a recent visit to *PHYSICS TODAY*—have voiced a degree of unease about individuals leaving permanently and about foreign programs that encourage scientists to leave permanently. Ginzburg particularly favors programs that enable researchers—especially young researchers—to pay short visits of up to a few months to foreign institutions.

The New York Academy of Sciences and the Committee of Concerned Scientists launched a project four years ago to place emigré scientists in the US, which has helped about 50 individuals find jobs so far. Yet even some of the people who are promi-

nently associated with the project do not necessarily approve of FSU scientists taking permanent jobs in the US.

Sagdeev, both publicly and privately, has tended to minimize dangers associated with brain drain, including the rogue weapons scientist. By his estimate, there may be only two or three dozen FSU physicists who have accepted permanent jobs in the US. However, Voloshin pointed out at a press conference after the APS meeting of FSU scientists that the emigration of just a few leading scientists was enough to seriously retard science in Nazi Germany.

At least superficially, the current crisis is reminiscent of the situation in Weimar Germany in the 1920s, which prompted the formation of an emergency committee to aid German science. For example, the Rockefeller Foundation made a major grant for establishment of a physics institute in Berlin in the 1920s and remained true to its commitment after the Nazis took power, only to see the institute incorporated into the Nazi war machine in the 1940s.

David Hamburg, current president of the Carnegie Foundation, has made forceful presentations of the Weimar analogy in recent talks—with the clear intention of warning against the dangers of failing to provide adequate aid to FSU science. Yet there are those, including Bromley, who reject

that analogy with equal force: "I don't think that's a fair comparison at all," he told *PHYSICS TODAY*. "The situations are totally different."

Rationales for aid

Individuals concerned about FSU science have formulated a variety of arguments as to why it is in the interest of foreign countries and foreign societies to help. Several such arguments were articulated in the articles in the May issue of *PHYSICS TODAY*, and another is made in a letter by Andrei Linde of Stanford University in this issue (see page 13).

Asked which arguments he personally finds most persuasive and which he finds most effective in the counsels of government, Bromley said there are two: "First, Soviet science has been an integral part of world science and technology, and continued contributions are to be expected. Second, in contrast to most other societies, scientists and technologists had a privileged position in the USSR, and they can help provide stability today."

Not least among the ironies in the current situation is the argument proffered by Bromley, Voloshin and others that FSU physicists—precisely because they contributed so mightily to the critique of the Soviet state and to its unraveling—are crucially situated today to lend stability to the newly emerging order. —WILLIAM SWEET

AIP CONCLUDES AGREEMENTS WITH FSU TRANSLATION JOURNAL EDITORS

For many years the translation into English of 20 Soviet physics journals has been one of the most important services performed for the physics community by the American Institute of Physics—and it has been an important source of AIP revenue as well. In what now seems an almost enviably simple and straightforward arrangement, AIP translated, published and distributed the journals under a single comprehensive contract with a central Soviet publishing agency.

Even before last year's coup attempt, the breakup of the USSR and the founding of the Commonwealth of Independent States, it was apparent that the journal translation program would have to be reorganized. Pursuant to Gorbachev's policy of *perestroika*, the founders of each Soviet journal were authorized to enter into contracts with foreign organizations. At the same time, because of *glasnost*, Soviet scientists began to publish in foreign journals—a desirable development, of course, but one that threat-

ened to lead to a decline in the quality of the Soviet journals.

With the onset of the economic crisis in the former Soviet states, the journals also have been confronted with dire financial problems, limited access to hard currency, shortages of materials and so on. Under the circumstances AIP has sought both to be of assistance and to consolidate new relationships with the journals and their editors. Last November AIP sponsored a meeting in New York of the editors from the former Soviet Union, their translation-editor counterparts in the US, and AIP staff, where problems of mutual interest were thrashed out. During the meeting it was announced that AIP would provide the FSU journal editors with complimentary subscriptions to journals published by AIP, The American Physical Society and other member societies (*PHYSICS TODAY*, April, page 82, and February, page 90). AIP executive director and CEO Kenneth W. Ford and publishing director Dar-