

President José Sarney and Argentine President Raul Alfonsín to nuclear facilities in each other's countries

▷ Upcoming Presidential elections in which an antinuclear left is expected to be strengthened in Brazil and a pronuclear right in Argentina

▷ Defeat in Argentina of an attempt by Alfonsín to put the National Atomic Energy Commission under stricter government control

▷ Establishment in Brazil of a Superior Council for Nuclear Energy to oversee the country's entire nuclear program.

For some years Brazil has had a dual program in which major energy facilities and technology purchased abroad have been under civilian safeguards while the military has controlled unsafeguarded facilities such as the São Paulo centrifuge plant. The formation of the Superior Council is a step toward providing unified control of the programs, and its members include physicist José Gol-

demberg, rector of São Paulo University, who is a prominent critic of Brazil's nuclear program. The military dominates the council, however.

In a loosely related development, the World Bank has been holding up a loan of \$500 million for Eletrobrás, Brazil's newly established electricity company, because the company refuses to reevaluate the wisdom of continuing with construction of the Angra-3 nuclear power plant. With inflation running near 1000% *per annum*, the World Bank takes the position that Brazil can ill afford excessively costly nuclear power.

Brazil's government recently proposed austerity measures involving abolition of the Ministry of Science and Technology and drastic cuts of junior-level university faculty and researchers. Horacio Macedo, rector of the Federal University of Rio de Janeiro, has said the new policy would be "catastrophic for research institutions." —WILLIAM SWEET

GERMANS TIGHTEN EXPORT RULES AMID SPREADING SCANDALS

Last year it was discovered that a West German company with the unfortunate name of Nukem had been systematically mislabeling international shipments of nuclear wastes containing traces of plutonium; the disclosure prompted a parliamentary investigation, which is still going on, and raised serious questions about Germany's commitment to the spirit as well as the letter of the Nonproliferation Treaty (see *PHYSICS TODAY*, August 1988, page 67). This March it was disclosed that Egypt is building a poison gas factory with assistance from a Swiss company with the unfortunate name of Krebs AG—"Cancer Incorporated." Roughly midway between these two incidents, relations between West Germany and the United States were badly bruised when *The New York Times* revealed that a German company with the wholly innocent name of Imhausen-Chemie was building a chemical weapons plant for Libya, and that the Reagan Administration had repeatedly asked the German government to investigate the situation, but without success.

The Libyan incident got an enormous amount of press and brought out the worst in a lot of people. Spokesmen for the German government issued denial after denial about the involvement of the German company, only to admit in the end that the *Times* and the Reagan Adminis-

tration were correct after all and that the Germans already had been aware of the allegations about the Libyan plant several years ago. Under sharp attack domestically, the leaders of Germany's conservative coalition government took refuge in the argument that they had no information that could be made the basis of a criminal prosecution. This did not deter the West German Chemical Industry Association from suspending Imhausen, and it did not deter Imhausen's second-in-command from a suicide attempt in mid-February. (The Nukem scandal has cost two suicides to date.)

The immediate effect of the Imhausen scandal has been to further strengthen forces in the Federal Republic that favor stricter regulation of sensitive exports, including nuclear exports. Already the German government has announced new controls on chemicals and nuclear materials, equipment and technology.

Writing this January in *Die Zeit*, Germany's most prestigious journal of opinion, Gary Milhollin said that "West German help for the Libyan chemical weapons factory . . . is only a footnote in the much more ominous story of West German nuclear exports. During the last ten years West German firms have been the main suppliers for secret nuclear programs all over the world." Milhollin, a law professor at the University of Wiscon-

sin, a nuclear licensing judge and an expert on nuclear proliferation, has himself been a principal figure in investigations that have disclosed German shipments to five of the six countries considered to be closest to having clandestine nuclear weapons capabilities: India, Pakistan, Argentina, South Africa and Israel. In India, and possibly Pakistan as well, the supplies have helped feed thermonuclear weapons projects. (In the sixth country, Brazil, Germany's provision of safeguarded enrichment technology is believed to have made it easier to develop an indigenous unsafeguarded enrichment capability.)

On 15 February, Germany's economics ministers announced four new measures to strengthen export regulation: establishment of a database at the customs administration, with compulsory registration of manufacturers and dealers in the nuclear, biological and chemical sectors; introduction of export permit requirements for certain countries of destination and certain goods, including 17 chemicals; toughening of administrative fines and punishments, and amendment of a weapons-control law to discourage direct or indirect participation by Germans in chemical or biological weapons projects overseas; and added staff for surveillance and investigative authorities.

In the estimation of Leonard Specter, the Carnegie Endowment's nuclear proliferation expert, the laws represent a considerable improvement but still leave a loophole for Germans to participate in weapons-related nuclear projects overseas. Milhollin argues that regulation of exports needs to be separated from the economics ministry, which is notoriously pro-export. Milhollin advocates setting up a separate regulatory agency or giving the foreign ministry a veto over sensitive exports.

In his piece in *Die Zeit*, Milhollin raises the question of why German governments, over a period of a decade, resolutely refused to take action on complaints from the United States and Norway about a series of very questionable nuclear transactions. Noting that the Nukem scandals exposed a morass of corruption in one segment of the business world, Milhollin wonders whether the corruption might even extend to the highest political level. Regrettably, this is not a completely implausible theory. The current Christian Democrat-Free Democrat coalition was formed in fall 1982, when the Free Democrats broke with the Social Democrats in the midst of mushrooming investigations into financial payoffs at the top levels

of the three major parties.

But there are less sordid, albeit equally troubling, explanations for Germany's posture. Since 1969, when West Germany agreed to sign the Nonproliferation Treaty, it has been the unstated policy of every German government to acquire every sophisticated nuclear technology possible. The unstated assumption is that a country of Germany's weight must be in a position to acquire nuclear weapons quickly, should the need unexpectedly arise. Would Germany wish to know less about weapons-relevant technology than Argentina? Would

participation in sensitive projects overseas not assure Germany the knowledge and experience it wishes to have in reserve?

However such questions are answered, one way or another the depth of Germany's commitment to the NPT is at stake here. It is an issue that could turn out to play a role in next year's national election campaign, in which the Socialists and the Greens—invigorated by their newly formed local coalition governments in West Berlin and Frankfurt—can be expected to talk tough.

—WILLIAM SWEET

NAVY AND ARMY INITIATE ASAT PROGRAMS, WITH TEST BAN LIFTED

Because of the affinities between anti-satellite and missile defense technologies, forces opposing Star Wars have made it their business since the mid-1980s to block testing of ASAT systems. Specifically, from 1985 to 1988 a Congressional coalition barred testing in space of the Air Force's fighter-launched rocket interceptor (see *PHYSICS TODAY*, November 1984, page 99). Late last year, when the Air Force withdrew its request for further funding for the F-15 ASAT program, it seemed to be a significant victory for the coalition.

But apparently the cancellation of the F-15 program led to a certain complacency among ASAT opponents on the Capitol Hill, causing them to overplay their hand. Representative George Brown, the Democrat from California who has been a chief sponsor of legislation barring ASAT tests, tried at the end of last year to get the House to adopt a permanent ban on testing of the F-15 ASAT. This provided ASAT proponents an occasion to reopen the testing issue and swing votes; the result is that the test ban has been lifted. This shift in the balance of power to the forces favoring Star Wars represents a political sea change, and it clears the way for the Pentagon to start testing sensitive missile-defense elements as ASAT systems.

The Army has asked for \$100 million in the 1990-91 budget to spend on free-electron laser ASAT work; the Air force wants to spend \$62.8 million on excimer and oxygen-iodine ASAT lasers; and the Navy—causing eyebrows to rise—would like to have \$218.9 million to spend on rocket-launched ASAT interceptors based on the Exoatmospheric Reentry-Vehicle Interceptor Subsystem, or ERIS, de-

veloped by Lockheed Corp for the Strategic Defense Initiative.

"A lot of people might be wondering what interest the Navy, of all services, has in ASATs," observed David C. Morrison, national security correspondent for the *National Journal*, one of the two leading weeklies covering government in Washington. One explanation, Morrison wrote, is that the USSR has been putting its naval reconnaissance satellites into higher orbits, beyond the reach of the Air Force's F-15-launched ASAT. Another explanation, a writer pointed out in a recent issue of the *Bulletin of the Atomic Scientists*, is that the Navy is especially well placed to attack Soviet reconnaissance satellites, many of which are in elliptical polar orbits that bring them to their lowest points when they pass over the South Pacific. The broadest explanation, given to this magazine five years ago by Herbert York, has to do with the Navy's increasing reliance on satellites for the command and control of naval operations. Because of the military's ever-growing dependence on satellites for reconnaissance, command and control, York thought that trying to permanently ban ASATs might be "like trying to eliminate submarines."

The new ASAT programs requested by the services would not have been affected by the F-15 test ban, and the only ASAT test that is likely to occur in 1989 will involve using the Mid-Infrared Advanced Chemical Laser, or MIRACL at White Sands against a target in space. ASAT testing of ERIS—the system the Reagan administration wanted to deploy as the first tier of a missile defense system—is expected to begin next year.

—WILLIAM SWEET

PHYSICISTS PROTEST TREATMENT BY PRC OF FANG LIZHI

Two years ago, following student demonstrations calling for democratization of the People's Republic, the country's party leader was ousted, the leadership of the Chinese Academy of Sciences was replaced, and astrophysicist Fang Lizhi was dismissed as vice president of the University of Science and Technology in Hefei together with the university's president (see *PHYSICS TODAY*, June 1988, page 67). Fang, already a national hero among Chinese students inside and outside the PRC, increasingly is an internationally known figure as well.

Last December, when the Texas Symposium on Relativistic Astrophysics was held in Dallas, Fang was not permitted to attend, and he also had to decline five invitations to visit US universities. Fang had suggested holding the 1992 Texas Symposium in the PRC, promising he would be able to obtain visas for all participants; but given his inability to obtain a visa for himself for the Dallas meeting, his invitation had to be declined. Ivor Robinson of the University of Texas wrote a letter to China's ambassador protesting Fang's treatment. That letter went unanswered, as did a similar letter to Deng Xiaoping from Val Fitch, 1988 president of The American Physical Society. Fitch appealed to Deng's "well-known deep interest in science" and called Fang as "one of the world's leading authorities in high-energy astrophysics."

More recently, during President Bush's brief visit to China, Fang was excluded from another Texas event—a barbecue dinner that Bush hosted in Beijing. According to reports that appeared on the front pages of newspapers all over the world the next day, Fang tried for four hours to gain entry to the barbecue.

Not long before Bush's visit to China, Fang issued appeals on behalf of Wei Jingsheng, an electrician at the Beijing zoo who was arrested in 1979 and sentenced to 15 years in prison. Wei, adopted by Amnesty International as its principal prisoner of conscience in the PRC, was the author of a famous essay, "The Fifth Modernization," in which he advocated a radical democratization of China. Fang himself has retreated somewhat from demands for establishment of a multiparty system and is advocating, for the time being, respect for human rights and for freedom of thought, press and speech.

—WILLIAM SWEET ■