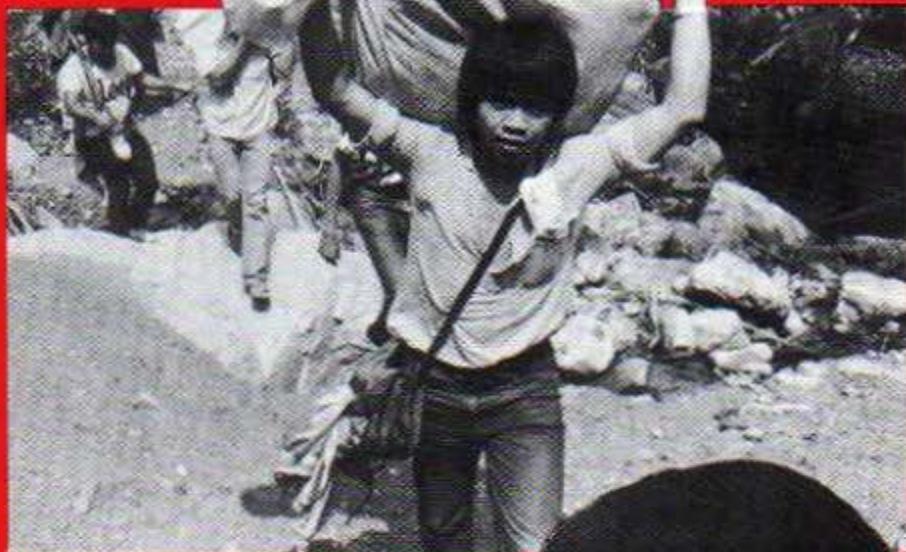


SCIENCE FOR THE PEOPLE

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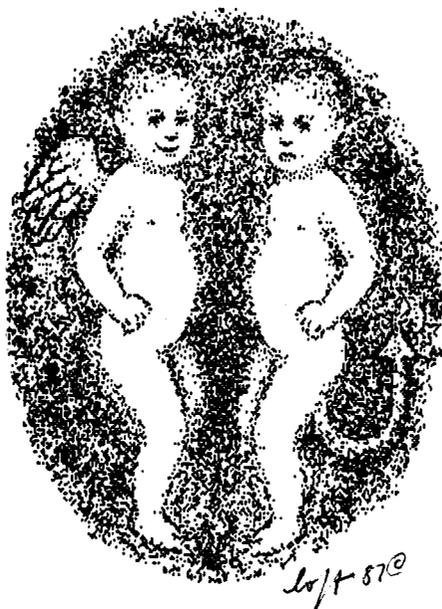
Nature, Nurture & Common Sense

Dear SftP:

In regard to your article on whether it is nature or nurture that shapes people ("The Nature-Nurture Controversy: Buried Alive," by Diane B. Paul, Sept/Oct 1987), why can't it be both? As a mother of two children and an observer of many more, I would say, based on my experience, that children clearly are born with personalities and temperaments, as surely as they are born with big or small earlobes.

However, this given personality has not stopped me from feeding them properly so they can reach their potentials, or disciplining them, or teaching them what I know. But each child needs to be approached differently. This all seems like just common sense to me. Doesn't it to you? Perhaps the problem is whether people must think dichotomously or not.

—*Esther Rome*
Somerville, Massachusetts



systems of DES sons, and is linked to a 40 percent greater risk of breast cancer in the women themselves who took it.

DES Action is the nonprofit organization that provides information to the public and health professionals about DES. Anyone wishing further information, or packets of literature, can contact DES Action USA at L.I. Jewish Medical Center, New Hyde Park, NY 11040 or at 2845 24th St., San Francisco, CA 94110.

—*Nancy Adess, Secretary to the Board*
DES Action USA

Mislabeled Medicine

Dear SftP:

In the Sept/Oct 1987 issue, David Dickson's article "Choosing Technology" cites "the pregnancy drug Bendectin" on page 6, and describes it as later being "discovered to cause vaginal cancer in the daughters of those to whom it had been prescribed."

While it is important to continue to point to the hazards of embracing new technologies without thorough investigation of their threats, it's also important to be accurate in one's reporting. Bendectin is a drug that is given during pregnancy for nausea. It has not been shown to have effects on the fetus (though women have often worried about such effects, and rightly so.)

Diethylstilbestrol (DES) is the drug Mr. Dickson has in mind: prescribed during the 1940s, '50s, '60s, and '70s throughout the world and especially in America, DES has been shown to cause cancer in some of the daughters of women who were prescribed the drug (1 in 1,000 daughters up to age 35) and pregnancy problems (tubal pregnancy, early miscarriage, and preterm delivery) in many others (up to 50 percent). Sadly, DES also has been shown to affect the reproductive

AIDS & Sex in Africa

Dear SftP:

We were very disturbed by the allegation in Fran Hosken's opinion "AIDS & Sexual Mutilation" (Nov/Dec 1987) that the "real causes of why African women are infected in such large numbers" is female genital mutilation. While it is true that sexual intercourse accompanied by epithelial trauma can facilitate infection by the AIDS virus (1), epidemiological data do not support the contention that HIV infection is most widespread in regions where, according to Hosken, the practice of genital mutilation is greatest and older men routinely purchase young brides (e.g., East, West, and Northern Africa) or where, as Hosken also asserts, anal intercourse is frequently practiced by heterosexual couples (e.g., the Sudan) (2, 3). In fact,

CONTINUED ON PAGE 2

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by Maurice Bazin

In September, at least 250 people were exposed to radioactive cesium-137 from an abandoned radiotherapy machine that was smashed open in a Brazilian junkyard. Four people died within two months, and many others are seriously ill. The sicknesses and deaths could continue for years. How could such an accident have happened?

10 AFTER THE INF TREATY

by Greg LeRoy

When Congress ratifies the INF treaty, how will the 859 "eliminated" U.S. nuclear warheads be decommissioned? They will be taken apart at the same place where they were put together: the Pantex Plant in the Texas panhandle. The legacy of deadly toxins from this nuclear arsenal will remain with us long after the missiles are gone.

13 FUEL-AIR EXPLOSIVES

by Marc Wills and Peter Orr

The Pentagon has been contracting out research on fuel-air explosives, part of the new near-nuclear "emerging technologies" generation of weapons, to professors at Montreal's McGill University. Canadian students aren't happy about this military partnership with the U.S. government.

16 REPRESSION IN MALAYSIA

by the Committee for Human Rights in Malaysia

More than 100 Malaysian citizens were jailed without charges or trials last October. Heng Leng Chee criticized the biological determinist policies of the Malaysian prime minister, and she is now serving a two-year detention as a threat to "internal security."

DEPARTMENTS

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Letters

CONTINUED FROM INSIDE COVER

the reported incidence of AIDS is lowest in Moslem Africa (3) and is highest in regions such as Central Africa, where genital mutilation is uncommon (2, 3, 4).

Even more disturbing, Hosken's hypothesis omits reference to other important risk factors now shown to contribute to the nearly 1:1, male:female ratio of AIDS in Central Africa and other underdeveloped countries, such as Haiti. For example, the combination of inadequate health services and massive urbanization carried out in the context of the past two decades of political upheaval have led to high rates of genital ulceration associated with sexually transmitted diseases (STDs), which in turn can facilitate AIDS transmission (2, 5, 6).

Likewise, inadequate funds to purchase equipment to screen each nation's blood supply (with the exception of Zimbabwe) has contributed to a more equal male:female ratio; the practice of treating pediatric malaria-induced anemia with blood transfusions has further increased the risk of AIDS among Central African children (5, 6). Additional evidence supports the view that use of unsterile needles, due to a lack of funds to buy sufficient reusable supplies and/or sterilizers, has also contributed to the spread of AIDS (5, 6).

Beyond ignoring these additional risk factors, Hosken essentially alleges that sex in Africa is almost always tantamount to rape (a racist assertion which ignores the high prevalence of non-consensual sex in the U.S.), and further perpetuates the false and ethnocentric view that the U.S. dispels the "normal" epidemiological profile for AIDS and that other patterns are deviations that must be explained. Even the U.S. AIDS profile is changing, as AIDS enters minority communities, infecting a disproportionately high number of their women and children, for reasons similar to those described above: a lack of adequate health services, coupled with high rates of STDs and an insufficient number of sterile needles for IV drug users (7, 8).

In conclusion, we find Hosken's opinion to be inaccurate, distorted by omissions, and racist. Obviously, we do not support the practice of clitoridectomy or other forms of genital mutilation, but it is possible to condemn these practices without also

blaming them, erroneously, for the spread of AIDS. Hosken's article does a disservice to all struggling for both a better world and a better science by suggesting that African culture, rather than underdevelopment, is the primary reason AIDS in Africa has spread so rapidly.

—Nancy Krieger, *Epidemiology*
Lisa Dorothy Moore, *Health Education*
School of Public Health
University of California at Berkeley

REFERENCES: 1. Institute of Medicine/National Academy of Sciences, Committee on a National Health Strategy for AIDS. *Confronting AIDS: Directions for Public Health, Health Care and Research*. Washington, D.C.: National Academy Press, 1986; 52. 2. *Ibid*, page 75. 3. Von Reyn CF, Mann JM: *Global Epidemiology*, in "AIDS—A Global Perspective" (Special Issue). *West J Med* 1987; 147: 694-701. 4. Feldman DA: *Role of African Mutilations in AIDS Discounted*. *New York Times*, Jan. 7, 1987, p. 26. 5. Institute of Medicine, op. cit., pp. 74-77. 6. Okware SI: *Towards a National AIDS-control Program in Uganda*, in "AIDS—A Global Perspective" (Special Issue). *West J Med* 1987; 147: 726-729. 7. Hopkins DR: *AIDS in Minority Populations in the United States*. *Public Health Reports* 1987; 102: 677-681. 8. Bakeman R, McCray E, Lumb JR, et al: *The Incidence of AIDS Among Blacks and Hispanics*. *J Natl Med Assoc* 1987; 79: 921-928.

Dear SftP:

I was rather surprised to read Fran Hosken's article on "AIDS & Sexual Mutilation" in your November/December 1987 issue. Female circumcisions might very well contribute to the fact that some women in some African countries are at higher risk for being infected with the AIDS virus—but I think that it is just one factor among many others.

What really offended my international sensibility, though, was the interpretation of sexual practices in Africa. I read, "Hospital records also show that sex is often closely linked to physical violence. Violent rape is reported to be very frequent..." and then later, "Data from areas where mutilation is rare indicate that other sexual customs, and especially violent sexual practices by African men..." White men—pardon me, white woman—once again putting forth her ideas on sex among the savages.

It all might have slipped my attention—but *Cosmopolitan* magazine brought out the same accusations in its January issue. Violent sex practices in Africa are blamed for the spreading of the virus. Women in the United States are "safe," especially when practicing "normal vaginal intercourse." Confronted with "information" like

this, I sometimes wonder—is it 1888 I'm living in, or 1988? Fran Hosken and *Cosmopolitan* could be from then, but a science magazine, especially one for the people, should know better what century we are in.

—Ines Rieder
Oakland, California

Editor's note: The letters regarding Fran Hosken's opinion "AIDS & Sexual Mutilation" were received too close to press deadline to allow Ms. Hosken adequate time to respond. She plans to publish a response in the next issue of SftP. The opinion published under her name was edited from a letter she sent to the *New York Times* and material on genital mutilation she wrote for *WIN News*.

Filling in the Waste Land

Dear SftP:

John Wasson and Stephanie Pollack's article on the solid waste crisis ("The Waste Land," Nov/Dec 1987) shines for its timeliness and detailed nature. But I would like to fill one hole I see in the piece.

After discussing what seem to be the three options for dealing with trash, the authors ask, "what mix of recycling, incineration, and landfilling should cities use?" It's a good question, yet by framing the choices this way, the authors pull their punches and thus divert attention from an even more fundamental question.

I have talked with hundreds of people on behalf of a statewide public interest organization which is fighting against incineration and for recycling. Among most of those who disagree with our organizational "line," there seems to be a genuine feeling that incineration may be the so-called most practical option for dealing with trash. It's hard to say how much of this belief is due to the immediate pressure they feel from lack of landfill space in their communities, and how much is due to slick public relations by the corporations who stand to profit by constructing and operating incinerators. I also detect, however, something else at work here: resentment. It's a resentment that arises from not being involved in the decision-making process.

Wasson and Pollack, by asking the question and pursuing the answers as they do, create an abstract issue out of garbage, about which rational decisions

Letters



need to be made. On the surface, this seems like a sound approach. Yet solid waste, along with its proposed solutions, is not *just* an abstract issue out there somewhere. It's something tangible that touches all of our lives—whether through the trash itself, the air and water pollution from incinerator emissions and ash, or the much-hoped-for recycling programs.

Therefore, all of us need to be involved in the choices that the garbage crisis challenges us to make. So the more appropriate question—and one that the attitudes of ordinary citizens point to—would be: how do people become more involved in making decisions about technologies that will have impact on their lives?

Solid waste is an important environmental issue. But what makes solid waste relevant to *Science for the People* is that it involves different technologies, it raises questions about who controls and benefits from those technologies, and it points to the need for increased citizen involvement in decisions about those technologies. The article does not address these factors, either implicitly or explicitly, and thus does not go beyond what any environmentalist would have to say about garbage. In short, the article fails to add to the solid waste debate the critical insights of *Science for the People*.

"The crux of the problem is convincing individuals—and government agencies—that they can no longer send their garbage out and forget about it," conclude the authors. Let me say that, instead, the crux of the problem is convincing people that

they have the right to make the decisions about what gets produced in society—and about why there is garbage in the first place.

—Joseph Regna
Medford, Massachusetts

Dear SftP:

The article "The Waste Land: Confronting America's Garbage Glut" (Nov/Dec 1987) might better have been titled "A Primer on Solid Waste Management for Local and Medium-Sized Government." It seemed as though the article not only failed to provide an all-sided summary of the solid waste dilemma, but perhaps deliberately slanted and cribbed the issue by presenting a picture of the problem that is easily fitted to convenient government options.

They write, "States and cities should consider...", "cities can try...", "Government must lead the way..." Not to seem trite or disillusioning, but the only thing government *must* do is remain responsive to its creditors.

In its effort to fit the problem to existing bureaucratic options, many crucial aspects of the solid waste dilemma are left ill-formed or merely hinted at. In the first case, the roles of supply and demand side are cutely reversed into "supply-side" consumers and "demand-side" producers, and treated as an agreed-upon redefinition of economic relations. (*Editor's note:* Regarding the economic prospects for recycling, the article referred to the potential for consumers to supply recyclable trash through participation

in recycling programs. It then falls to local governments to develop the demand for stable markets for products made from recycled materials by public and private companies.)

Our new "supply side" being composed of nothing more than atomized free radicals in the marketplace, it falls to local and medium-sized governments to regulate affairs. The new regulatory initiatives cited are marked precisely by "some combination of public education and coercion."

The result of this bias (perhaps prejudice) is to merely hint at what is probably the crux of any approach that goes beyond mere coping, that being source control. (*Editor's note:* The authors describe recycling as a combination of source reduction—"shrinking the amount of material entering the waste stream"—and separation of recyclable materials—glass, paper, metals, and biodegradable food and yard wastes—from trash.) And in pointedly walling off source control from the discussion, there is no mention whatsoever of the single worst solid waste toxin: ozone-destroying CFCs (chlorofluorocarbons) trapped in insulating plastic.

Any science for the people must try to fit the problem (the marketplace and government) to the inflexible contours of the task to be accomplished (picking up the garbage). Failing that, however, any loss of free advice for the government should not entail an equal and proportionate loss of science for the people.

—Fitz
Oakland, California

CORRECTION

On page 24 of the November/December issue of SftP (Vol. 19, No. 6), an editorial error was made in the opinion "AIDS & Sexual Mutilation" by Fran P. Hosken. The second and third sentences in the third paragraph read, "Most mutilations consist of infibulation, in which part or all of the clitoris and labia are excised. Infibulated women are left with only a small opening for the flow of menstrual blood and urine." The copy should have read, "Most mutilations consist of excision, in which most of the clitoris and labia are removed. In infibulation, women are left with only a small opening for the flow of menstrual blood and urine."

BIOTECH GETS A NEW FACE

Biototechnology has always been controversial. Since the first battles over biotech research in Cambridge, firms have learned their lessons and started public relations campaigns to assuage public fears over the research. Those fears became more vocal when biotech companies began testing their products outside the laboratories. Field experiments of Frostban, a genetically altered microorganism, were sabotaged by opponents last year in California. The industry has also been plagued by lawsuits from environmentalists and Jeremy Rifkin's Foundation on Economic Trends that would force biotech companies and the government to perform environmental impact assessments.

Confronted with this public anxiety, biotech firms have hired public relations consultants to give themselves a better image, and to assure the public that everything is as safe as can be expected. They want to capitalize on the public feeling revealed by a poll done for the congressional Office of Technology Assessment last year, claiming that 62 percent of the public believed that biotechnology's benefits outweigh its risks. This same poll also showed that when public information about the risks was insufficient, a smaller percentage supported the research.

Monsanto, the giant chemical corporation, learned this the hard way. After experiments in St. Charles County, Missouri were halted by the Environmental Protection Agency and local officials, they moved their field tests to South Carolina and staged a massive public relations campaign to garner public support. As Howard Schneiderman, Monsanto's senior vice president, put it, they had to stage a "full-court press." This time, they used market researchers and dozens of staff to explain Monsanto's position to local residents. They also chose the site more carefully. South Carolina would be more receptive because it's a state whose "future depends on agricultural competitiveness." Their first environmental release experiment went off without a hitch in November.

Similarly, Crop Genetics Corporation is planning outdoor environmental release experiments in two cornfields in Queen Anne's County, Maryland. Their experiments, to release a genetically altered bacterium for use as a pesticide against the corn borer, are being well received by farmers who are devastated



by the pest and would like to stop using tons of pesticides. For months, Crop Genetics officials have been holding public meetings and briefing state and county officials. They're even thinking

about holding public demonstrations at local high schools. Crop Genetics plans to hold its first environmental release experiments this spring.

Another firm, Biotechnica International, has been working for almost a year with farmers in rural Arkansas, Wisconsin in preparation for a release of genetically altered bacteria this spring to aid in alfalfa yields.

While public relations and the depressed conditions of rural farmers have helped ease the way for more field-test releases, the proof of the pudding will be the results of those tests. These early releases were strategically planned—the first wave of new microorganisms seem to have some social or neutral use. Other genetically engineered organisms that are still in the lab have corporate and military value that will be harder to sell. Will ecocalamity and imbalance occur, as Rifkin and others have warned, or will the releases be as innocuous as industry claims? Stay tuned to find out.

—Scott Schneider

SCANDAL ROCKS EUROPEAN NUCLEAR INDUSTRY

Charges of bribery, fraud, and other malfeasance have left the European nuclear industry reeling, according to recent reports in the European press. Beginning with the disclosure of bribe-taking by West German and Belgium nuclear safety officials, the affair has mushroomed with the latest allegations that plutonium from West Germany was sold by way of Belgium to Pakistan and Libya for making bombs. The accusations have prompted the International Atomic Energy Agency (IAEA) to launch an investigation.

Hints of wrongdoing first surfaced in October 1986 when a truck carrying radioactive waste from West Germany to Belgium for processing overturned. As a result of the spill, officials learned that some of the containers held waste that was more radioactive than the accompanying documents stated. The truck was owned and operated by Transnuklear, West Germany's largest nuclear waste handling company.

The spill was cleaned up and nothing more was heard until last August, when a

German television program alleged that bribery and fraud were involved in the waste shipment. The program claimed that Norbert van de Voorde, the head of waste handling at the Belgium Nuclear Studies Center in Mol, where the shipment was bound, had accepted bribes from Transnuklear.

Another official at Mol has said that van de Voorde accepted shipments from Transnuklear that were five times more radioactive than the company's documents claimed. Transnuklear was also found to have shipped low-level processed waste from the Belgium facility to West Germany, including 321 barrels containing 200 milligrams of plutonium in the shipments.

Subsequent investigation revealed that Transnuklear's parent company, Nukem, was aware of the transgressions but did nothing about them. (Nukem manufactures nuclear fuel.) In fact, Nukem later admitted that it bribed nuclear safety officials to allow these and other shipments of waste between Germany and Belgium. Both companies have since been shut down, pending further investigation.

Meanwhile, three employees of the firms involved have committed suicide in the wake of the deepening scandal.

The worst violations involve the alleged sale of fissionable material to Pakistan. One report in the West German press claims that 600 kilograms of plutonium have been shipped to Pakistan

over the years from Nukem's partner company, Alkem. The shipments were allegedly made by Belgonuclaire, a Belgium company that helped to build Pakistan's nuclear test reactor.

Accusations seem to be proliferating faster than reactor waste, prompting environmental officials in the European Economic Community to talk about drafting laws to regulate the international transport of low-level nuclear waste. (At the moment, there are no such regulations.) Tough talk and midcourse corrections notwithstanding, public confidence in the European nuclear industry may have received a lethal blow. —Tracey Cohen

DEATH KNELL FOR SEABROOK NUKE?

After more than a decade of construction at a cost of a prodigious \$5 billion, New Hampshire's stalled Seabrook nuclear power plant may never open. You've heard that one before, you say? Well, Massachusetts Governor Michael Dukakis told reporters that a "death knell" for the plant had been sounded. And while many remain more skeptical, there is little question that recent events have significantly deepened the New Hampshire nuke's fiscal and regulatory crisis.

First came the news that Seabrook's largest owner declared bankruptcy. Plagued by its more than \$2 billion investment in a plant that has yet to be licensed, and by a 1979 court order that prohibits the company from passing along its construction-work-in-progress costs to consumers until the plant opens, the Public Service Company of New Hampshire became the first major U.S. electric utility to apply for bankruptcy protection since the Depression.

Then came two decisions from the Nuclear Regulatory Commission (NRC) that have surely not been heartening to Seabrook proponents. The first NRC decision denied the Seabrook plant a low-power license—the second of three permits the reactor needs to operate—pending a substitute for warning sirens that the utility removed in nearby Massachusetts towns. The NRC also said that it will consider whether the bankruptcy impairs the plant owners' ability to safely run the reactor. That a bankrupt company could be allowed to run a nuclear facility at all is another believe-it-or-not story.

The second NRC decision flatly

rejected the proposed evacuation system for the Shoreham nuclear reactor in New York, a plant also awaiting its license to operate after much controversy and long delays. The Shoreham case parallels Seabrook in that local government officials there also refused to participate in evacuation plans for the reactor. The latest Shoreham plan had proposed that plant employees, rather than police or fire fighters, would oversee the evacuation.

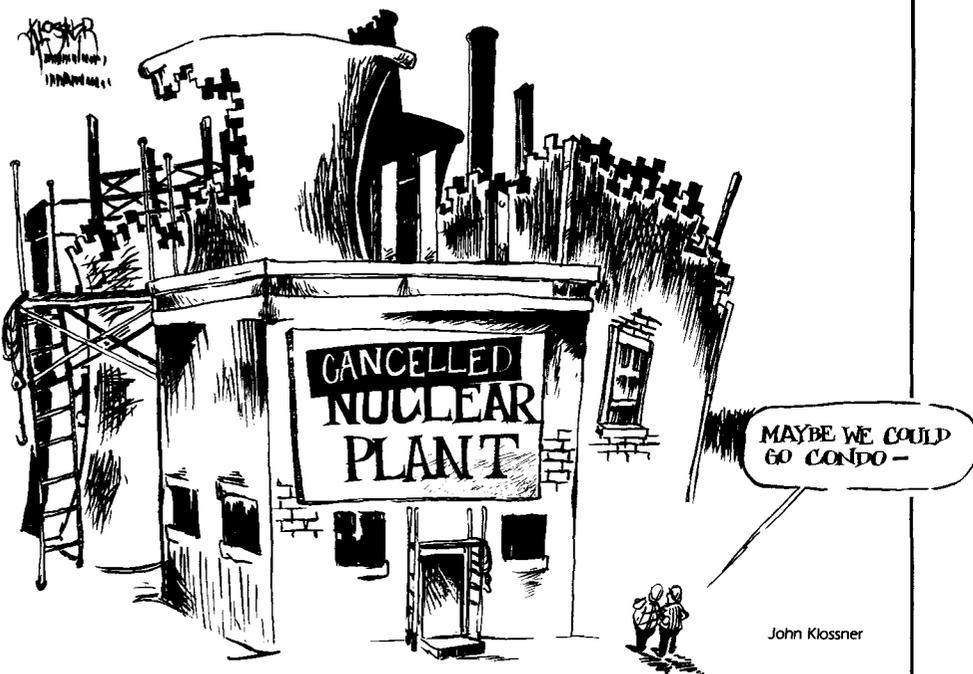
The latest events at Seabrook are seen by many observers as a natural progression in the plant's disastrous economic history, as well as yet another sign of the moribund state of nuclear power plant construction in the U.S. No new nuclear power plants have been ordered in this country for a decade, and all of those ordered since 1974 have been subsequently cancelled.

Meanwhile, as is the case with virtually all of the dozen or so nuclear plants that have been under construction in the U.S. over the past decade, Seabrook's construction costs skyrocketed a full ten-

fold, from an original estimate of \$1 billion for two plants to approximately \$5 billion for one plant. During the course of these cost escalations, Public Service Co. was forced to borrow more and more money at increasingly higher interest rates.

pay a full nine percent more than the prime rate in interest, Public Service's investment bankers could not raise the \$150 million they needed. Indeed, investors in the project seem to be the big losers. The company's common stock, which traded at about \$20 per share in the early 1980s, has plummeted to under \$3. Initial statements from the utility's management have, not surprisingly, tried to downplay the situation, noting that electric service will not be interrupted to their customers, and stressing that the bankruptcy should not affect the ultimate licensing of the plant. But critics are already challenging this view. Massachusetts Attorney General James Shannon, a longtime Seabrook critic, claims that the bankruptcy strengthens arguments he plans to make against the plant to the NRC.

"I would think the Nuclear Regulatory Commission would think twice before they would license a plant whose main owner was going through bankruptcy," says Shannon, adding "this certainly



John Klossner

fold, from an original estimate of \$1 billion for two plants to approximately \$5 billion for one plant. During the course of these cost escalations, Public Service Co. was forced to borrow more and more money at increasingly higher interest rates.

Profound lack of confidence in the Seabrook project by the investment community is evident. As of last summer, despite months of effort and an offer to

distinguishes Seabrook from every other nuclear power plant ever built."

Supporters of the Seabrook plant are rather dismal. Says utility spokesman Nicholas Ashooh, "They force us into bankruptcy because of delays, then argue a license shouldn't be issued because of the bankruptcy. It's like a child murdering his parents and then asking for mercy because he's an orphan."

—Seth Shulman

FARMWORKERS WIN LAWSUIT OVER MECHANIZATION

A 1979 lawsuit filed by the California Rural Legal Assistance program for fifteen farmworkers and the California Agrarian Action Project (now called the California Action Network) will force agricultural research to become science for the people rather than science for big business.

Schools like the University of California have long received money from the government to do agricultural research under the Hatch Act. This act, passed 100 years ago, requires federally supported research to foster consumer welfare and preserve small family farms. Many land-grant universities have instead used the funding to research techniques that help foster corporate farming, such as the mechanization of tomato harvesting that was highlighted in the lawsuit.

The tomato harvester developed at the University of California went into use in 1963, bringing American supermarket shoppers the hard and tasteless agribusiness tomatoes which many of us have grown to dislike—or boycott. Within six years, the number of harvesting jobs fell by almost two-thirds in California, from 50,000 to 18,000.

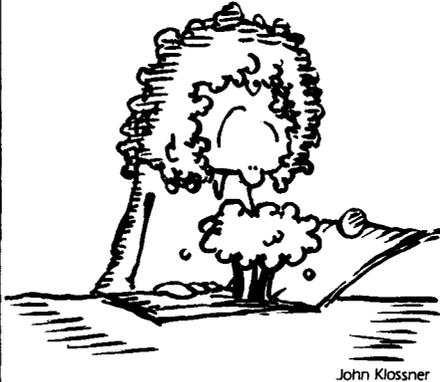
Since the machines cost over \$100,000, only the largest farmers could afford them. In ten years, the number of tomato growers fell by 85 percent, from 4,000 to only 597 in 1973. At the same time, the number of acres farmed for processed tomatoes rose from 32 acres to 363 acres per plot. The impact on consumers was a 111 percent increase in the price of tomatoes, while prices for other fruits and vegetables rose only 74 percent.

The court decision, released on November 18, 1987 by Judge Raymond Marsh of the Alameda County Superior Court, will force the University of California to comply with the principles of the Hatch Act. The court will review the university's agricultural research plan and retain jurisdiction over it for at least five years. According to UC attorney Gary Morrison, the university is appealing the ruling because "there is nothing in the Hatch Act that requires such a process." No university in its right mind would want to be caught doing science for the people!

(For more information on the history

of this struggle, see the Jan/Feb 1981 issue of SftP and an upcoming feature on how this legal victory was won in a future issue.)

—Scott Schneider



John Klossner

MILITARY PROVOST

An up-and-coming "military academic" worth watching is John M. Deutch, Provost of the Massachusetts Institute of Technology. Before he became provost in 1985, Deutch was a Department of Defense representative to the DOD/University Forum, a member of the Scowcroft Commission, and Undersecretary of Energy under President Jimmy Carter. He served on the Science Advisor's Panel on Basic Research in the Department of Defense and chaired the Defense Science Board (DSB) Task Force on Chemical Warfare and Biological Defense.

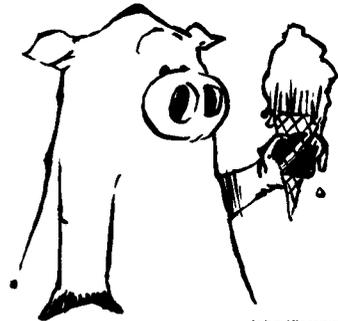
As if those credentials were not enough, he recently chaired the "Midgetman Panel" of the DSB Task Force on the Small Intercontinental Ballistic Missile, and was appointed to the boards of Draper Laboratory and Mitre Corporation.

Aside from gaining him a reputation as a man vying for a Cabinet job in Washington, Deutch's activities have prompted concern among MIT faculty members that his DOD activities may interfere with campus responsibilities. Students at MIT documented an instance where Deutch persuaded an untenured professor in the Applied Biological Sciences Department, Michael Marletta, to undertake research on tricothecene mycotoxins, a potent toxin used for biological warfare. Moreover, Deutch continued to promote this research even after the alleged Soviet use of "yellow rain" mycotoxins was discounted when the substance was shown to be bee feces.

The Science Action Coordinating Committee (SACC), a student organization promoting social awareness among MIT scientists, acquired Deutch's research contract with the Department of Defense for "Selected Advanced Technology Assessments." It revealed Deutch's participation "on the R&D planning for...a 100kW space nuclear power reactor" in 1983 and a recent interest in "Chemical Reactions in Random Media," which, in his own words, "is of relevance to combustion and explosive phenomena especially for fuel/air mixtures." (See the article on fuel-air explosive research at McGill on page 13.)

As students at McGill, Berkeley, and the University of Michigan have shown, exploring the nature of campus research and exposing dangerous activities in a responsible manner can be an extremely effective tactic for student peace groups. SACC plans to continue publicizing its investigation and encourages other campus groups with a similar interest to contact them at Room W20-401, MIT, 77 Mass. Avenue, Cambridge, MA 02139.

—Rich Cowan



John Klossner

PISTACHIO FOR PIGS

Ben & Jerry's Homemade—the Vermont ice cream company known for its socially conscious investments, employee profit-sharing plans, and rule that owners and administrators can't be paid more than five times the salary of the lowest-paid employee—now has corporate plans for recycling. Their local sewage treatment plant couldn't handle the 2,000 gallons of ice cream waste that Ben & Jerry's whips up each day. So they found a hog farm in Stowe that was willing to take their waste. Cheers to the 250 pigs slopping up the milky leftovers!

—information from *Environment* magazine

JUNKYARD RADIATION RELEASE

Brazil's Victims of Enforced Ignorance

BY MAURICE BAZIN

There was no "accident" or "chance" involved this past September when some 250 persons became irradiated by direct contact with a powder form of cesium-137 in Goiania, a major city in the open landscape of the rich central plateau of Brazil, near the capital city of Brasilia. The willful neglect of scientific education for the general public, in spite of an increasingly technological economy, lies at the root of this fatal event.

Unemployed youths stole the cesium source from an abandoned radiotherapy clinic, where such apparatus should have been under the surveillance of federal authorities. But even after the deaths of four of the victims, no one had been arrested for either theft or administrative negligence. The only people held prisoners were the radiation-burnt victims. They were initially kept *incomunicados*, without food or change of clothing, for three days in tents inside the city's football stadium, labeled as "contaminated." They did feel contaminated, and hid their faces when photographers aimed their camera lenses at them through the stadium's chicken-wire fence.

On September 13, 1987, Wagner Mota,

Maurice Bazin, a physics professor at the Pontificia Universidade Catolica in Rio de Janeiro, Brazil, is a founding member of Science for the People.

Roberto dos Santos Alves, and Kardek Sebastiao do Santos entered a former radiotherapy clinic that was about to be demolished. They found an abandoned cancer radiation therapy machine there, and took the base of the machine to Mota's house. The youths came back on September 19 for the head of the machine, which contained the radioactive cesium-137. Having no scientific education, the radiation symbol on the machine meant nothing to them.

The youths tried to take the machine apart, but were unsuccessful. They brought the radioactive head of the machine to a scrap metal dealer, who broke it open with a sledge hammer. Devair Ferreira, the scrap dealer, smashed the cylinder containing the cesium-137, releasing the sparkling radioactive blue salt which enchanted those who saw it. Ferreira's daughter rubbed the radioactive powder over her body. Others took some of the cesium-137 to show friends and family, because it glowed in the dark.

Seventeen members of Ferreira's family were seriously contaminated, and his wife and daughter were the first to die from radiation sickness in late October. Nineteen victims were hospitalized, fifty others were placed under medical observation, and about 30,000 residents of Goiania were monitored for symptoms of radiation sickness. Of those monitored, 243 were diagnosed as being affected.

Along with the home of Wagner Mota and the Ferreriras' junkyard, 25 homes and a local health clinic where parts of the machine were taken for examination have been contaminated and evacuated. The Setor Aeroporto section of Goiania was quarantined for radiation cleanup by Brazilian authorities. Some scientists say that it could take more than a year to decontaminate the area.

How could such an accident have happened? Much of the blame lies with the quality of Brazilian education. A recent study about levels of education in Brazil, performed at the Laboratory for Computational Sciences in Rio de Janeiro, predicts that by the year 2000, 35 million Brazilians will still be illiterate out of a population of 185 million.

In Brazil, scientific education is a reserved sphere, accessible only to the sons and daughters of the richer city dwellers. To the general public, thirty percent of whom are officially illiterate today, the basic facts of technology remain as mysterious as the basic facts of life. In the case of nuclear matters, which is associated with the source of most radiation, the added air of military secrecy has the same effect as the hush-hush on sexual education.

Persons irradiated in Goiania were

BELOW: Antinuclear protesters demonstrate over radiation exposure in Goiania.



treated as social pariahs, just like single women who become pregnant. In both cases, the society as a whole inflicts ignorance and oppression upon the individual victims, who suffer accordingly. Basic physical and biological facts about subjects like sexuality and radiation are never disseminated among the population at large. Consciousness raising among the poor is not part of the elite's responsibility.

Social ignorance was the real criminal in Goiania. How else could a scrap metal merchant—who knows enough about the commercial value of lead to buy the shield of a radiotherapy instrument from a jobless youth-turned-hungry-thief—invite his whole family and friends to see the Christmas tree effect of the scintillating powder he found in a capsule buried in the shield? How else could his cousin plan to make a ring out of one of the bluish, luminous crystallized pellets? How else could his daughter eat a sandwich with her hands covered by the blue powder she passed over her forearms to shine like a carnival star?

Contrary to the well-intentioned trickle-down approach to development, which imagines an automatic diffusion of knowledge from the elite to the plebian, in Brazil we witness how basic ignorance seeps up through the social ladder into technical professions. For example, when a member of the scrap merchant's family went to his local pharmacy to show his blistered hands, the attendant passed a cream over his skin and sent him away.

The same inability to identify the radiation burns or investigate their origin was demonstrated by the staffs of state and municipal hospitals, through which several of the irradiation victims passed in the first week after exposure. The diagnosis for the man who broke open the capsule was "contact dermatitis by primary irritant." Five more days passed until the wife of the scrap dealer convinced a public health technician that the diarrhea and vomiting which her whole family suffered must have something to do with the steel cylinder which she deposited on the man's desk. He then looked for a physicist, who called a geologist who had a scintillation counter.

The cylinder was shown to be highly radioactive, and the National Commission for Nuclear Energy—the CNEN—was informed. At this point, technocratic officialdom started bombarding the media with scientific-sounding jargon which, once again, left the Goiania community confounded in its lack of understanding. So-called specialists described the patients as "radiothermally affected" and presenting "ingestive symptoms." Medical bulletins took on the cold objectivity of "hematological reports," from which no common person could evaluate the state of health of the survivors.

Meanwhile, the CNEN released special information about the use of lead caskets (according to a hurriedly translated West

German technical document) for handling "radioactive corpses which have to be treated as radioactive waste." Within two months, four persons had indeed died and were buried in lead coffins encased in 25-centimeter-thick concrete tombs, amidst protests by 300 local residents who were alarmed at the prospect of having "sources of radiation" in their cemetery.

Those who treated the victims covered with radioactive cesium salt were the young CNEN technicians, sent hurriedly from Rio de Janeiro without any logistical or material support. For several days, they washed down the contaminated victims with soap and water, without any gloves or special clothing to protect themselves. The complete unpreparedness of the CNEN testifies to the lack of interest in radiation protection and control on the part of the top bureaucrats who parade Brazil's entry into the nuclear age at international conferences. They provided no remote-controlled equipment to remove contaminated earth. Those who had to handle pneumatic hammers and bag the contaminated cement pieces of irradiated property were the young technicians themselves.

And then it rained. The radioactive cesium chloride (as soluble in water as its chemical sibling sodium chloride, our common table salt) seeped into the ground of the courtyard where the scrap dealer had broken open the cesium capsule. Several nearby wells were slightly contaminated. Mango trees had to be felled, as their fruit appeared to concentrate cesium and made Geiger counters tick away at impermissible levels.

While the technicians discovered that the highest radioactivity level was now more than forty centimeters underground, newspaper headlines read: "Radioactivity is now decreasing in the contaminated areas." Irresponsibility, joined by scientific ignorance, lounged in the newsrooms. One consequence was that Goiania turned into a city where one million individuals anxiously observed themselves for any sign of headaches or nausea.

When the technicians finally received imported protective yellow suits, they were stopped constantly on the streets by people demanding to have a radiation detector passed over them. At the technicians' hotel, which became the headquarters for the radiation cleanup, the service personnel refused to wash their clothes.

But radioactivity was indeed escaping through the normal channels of commerce. A truckload of toilet paper, freshly manufactured from recycled newspapers that were collected by the irradiated scrap dealer, was detected as being radioactive by a carload of CNEN technicians who happened to pass the truck as it was heading out of the city. The most sophisticated gamma radiation detectors, which were flown in helicopters over the city to locate the foci of radioactivity, only

contributed to the panic and generated rumors about "radiation in the air."

Fear of radiation filled many medical workers who might have helped the victims. In one hospital, half the staff asked for sick leave or simply did not show up for work, to avoid coming into contact with "contaminated" patients.

In a country whose economy is in havoc with a fifteen percent monthly inflation rate, doctors in Goiania were on strike for better pay at the time of the accident. They reappeared only to accompany the president of Brazil, wearing surgical masks, when he visited the less-irradiated victims a safe four weeks after the accident. In a botched-up attempt to reassure the population, President Jose Sarney declared, "Would you imagine that a president of the Republic, without a vice president, would come here if there were real danger?" Thus, if it were dangerous at all, he would have safely stayed away, providing the justification to abandon their posts for all those who believed that there was real danger.

The only sector of society which withstood desertions after the accident was the military. Military personnel obeyed orders, irrespective of whether they thought they were safe or in danger of radiation exposure. They dutifully recovered the pieces of irradiated shield, ran the bulldozers, and poured concrete around the remnants of the capsule of radioactive material. The ten worst-burnt victims were taken by Air Force planes to the Navy's hospital in Rio de Janeiro, thus inaugurating its wing for radiation victims. There, the uniformed staff stayed on duty.

In this way, the military functions as a role model for society. In the midst of chaos, confusion, and the frenzy of fear caused by ignorance, authoritarian solutions easily show the virtue of their "efficiency," thus opening the way for "strong" political regimes.

A month before the accident in Goiania, the president of the Republic had announced that Brazil "dominated the uranium cycle," having succeeded in concentrating its fissile isotope to 1.2 percent from the natural concentration of 0.7 percent, on a laboratory scale. Besides this modest gain in concentration, the announcement served to appease the military hierarchy who were upset by earlier leaks about the secretly funded "parallel nuclear program" and the existence of very deep holes drilled for testing unspecified explosives in a remote mountainous area.

But I'd prefer to hope that the future of Brazil will be in the hands of the 25 young CNEN technicians who, when they finally got back to Rio, wrote up a document criticizing the state of unpreparedness of their agency and the irresponsibility of its administrators. Upon reading their own radiation detection badges after their return, these technicians learned that they



Photo/Oxam America

had received radiation doses well beyond the "highest permissible dose" as defined by occupational safety standards.

Brazil is a Third World illustration of C.P. Snow's concept of the gap between two cultures—as well as between two classes. In Brazil, the 10 percent of the population who have access to the technological culture and enjoy 47 percent of the national income do not communicate with the 50 percent of the population who receive 13 percent of the national income and belong to what the educator Paulo Freire calls "the culture of silence."

Writing from Rio de Janeiro, with the inevitable view upon a colorful *favela* (a hill-climbing slum), one does realize that nuclear safety in the Third World does not depend upon updating regulations from the International Atomic Energy Agency. They are never enforced—not even applied. In Brazil, some laws are known "not to stick." Antibiotics and valium, for instance, are still available over the counter in every drugstore.

It is the social distribution of power and knowledge, for most, that constitutes the background for all problems. The radiation release and deaths at Goiania are the result of keeping science out of popular culture. There are simply no channels for most people to learn about science and technology from the ground up. In schools, science teaching fails because it is purely formal. Laboratory rooms, when existent, remain closed, "inaccessible and mysterious," as Pablo Neruda described them in his autobiography.

For adults, television brings gee-whiz superscientists' theatrics via programs like the nationwide Sunday night series "Fantastico," or broadcasts of dubbed "Believe It or Not" episodes from the United States. Thus, those who live by scavenging abandoned scraps of the Brazilian technological society have no capacity for self protection, because they have no information about the risks and mechanics of technology. Being poor, they are on their own, just like the thousands of victims of the Bhopal accident, who suffered and died in India from the toxic gas release at Union Carbide's pesticide plant.

The radiation release in Goiania fueled a public debate about developing commercial and military sources of radiation—via nuclear energy plants and nuclear-powered submarines—sought by President Sarney. By the year 2000, Brazil's former military government had planned to have eight nuclear power plants on line. According to the transitional government in power at the time of the Goiania accident, only two plants will be built, and the multibillion-dollar contract signed over ten years ago with West Germany has now become part of the foreign debt whose payments have been suspended.

Concrete is still being poured to secure the foundations of the two nuclear plants, hugged together next to an operative 1.6mW pressurized water reactor sold by the U.S. The reactors are being built on a beach next to the tourist city of Angra dos Reis, fifty miles from Rio de Janeiro. They are sited on geologically brittle ground, already known as "rotten stone" to the Tupi Indians.

Following the end of military rule in 1985 and the nuclear accident at the Soviets' Chernobyl plant in 1986, the newly elected mayor of Angra dos Reis called on the National Commission for Nuclear Energy (CNEN) to release the

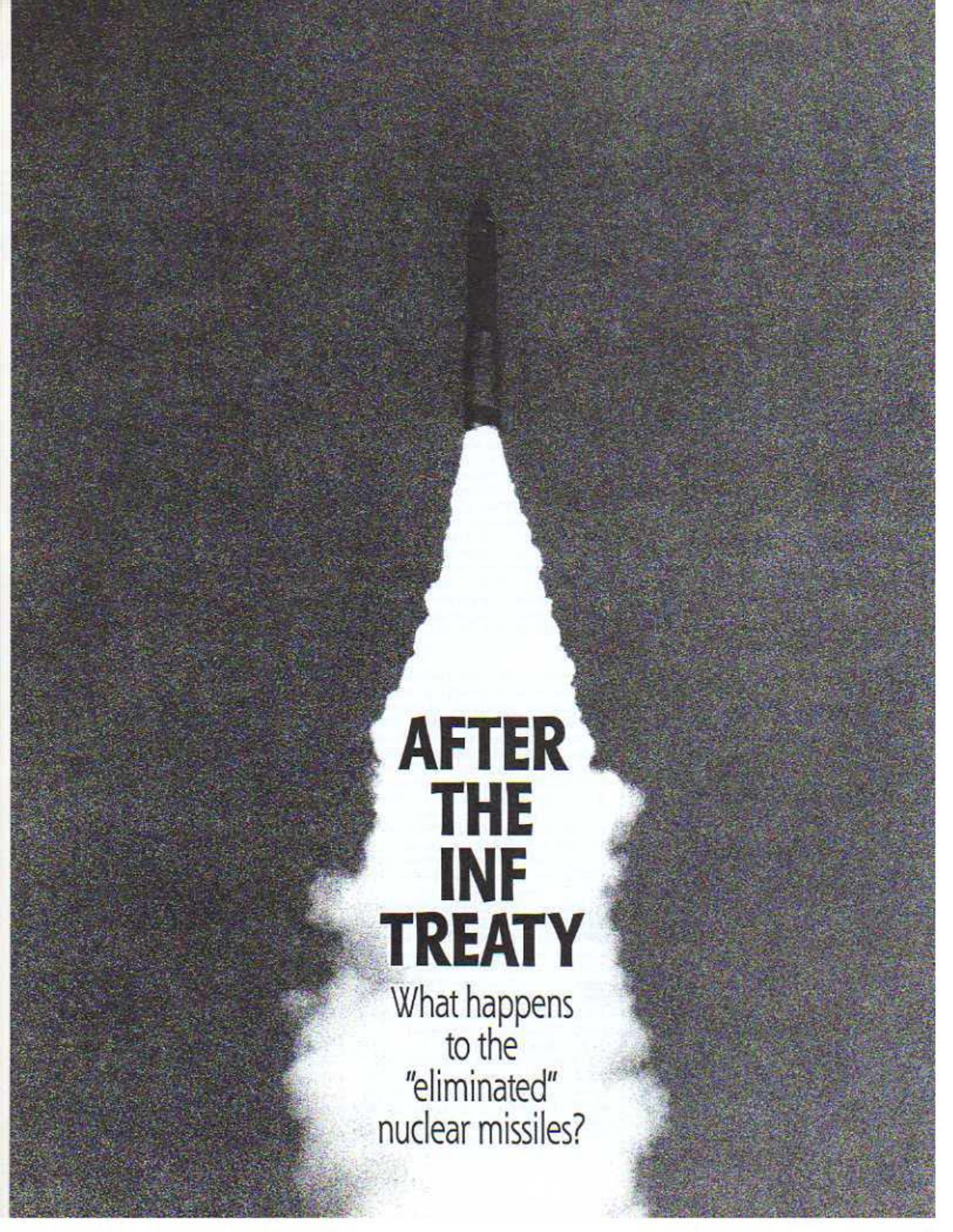
emergency plan for evacuation of the 50,000 inhabitants in case of an accident at the reactors. The plan, which had been kept secret as a matter of national security, was written by a military general. It recommended the use of dirt roads passing over hills and half-destroyed bridges, which were impassable during the rainy season. The coastal highway was deemed useless as an evacuation route because it is frequently blocked by avalanches of the "rotten stones." The plan did little to elicit confidence in CNEN's ability to protect and evacuate residents in the event of a nuclear accident.

CNEN's director, Rex Nazareth, was attending an international conference of the International Atomic Energy Agency in Vienna at the time of the radiation release in Goiania. He first appeared on television after his return to announce that "this accident is comparable in gravity to that of the atomic plant at Chernobyl." A few days later, he called the situation "reassuring," adding that "the lamentable episode of Goiania should not affect Brazil's national program in nuclear technology."

Indeed, under the euphemism of a "parallel program," \$400 million were being spent from a secret account in Nazareth's name. He insisted that the main value of the confidential program lies in the national character of the technologies being developed, citing a figure of "only four percent on imports." It is, however, quite difficult to verify what these technologies are, and whether they contribute to national development since, in Nazareth's words, "the uses of the funds are secret if not the money."

This seemingly haphazard "program" for entering the nuclear club comes under the aegis of CNEN, which is also responsible for the control of all radioactive materials and apparatus, including medical equipment like the dismantled radiotherapy machine in Goiania. There is no independent radiation control agency in Brazil. The only institute for radioprotection and dosimetry is located within the CNEN. The same CNEN technicians who determined the level of natural radioactivity in the secret holes drilled by the Army for future testing of nuclear devices also measured the absence of radiation on Aeroflot planes coming from Europe at the time of the Chernobyl accident and aimed Geiger counters at the victims of the cesium-137 exposure in Goiania.

The larger the cultural vacuum left by the ignorance forced upon the majority of a society, the easier it is for mediocrity and irresponsibility to reign among the elite. To the privileged ones who have scientific knowledge, one may ask: Who are Brazilian scientists teaching today? What are they teaching? And what are the fundamental responsibilities of science and technology in Brazilian society which have not been taken on?



**AFTER
THE
INF
TREATY**

What happens
to the
"eliminated"
nuclear missiles?

When President Reagan and General Secretary Gorbachev met in Washington recently, signing an agreement to eliminate some short and medium-range nuclear missiles, it seemed as though 2,611 weapons were simply erased from the worldwide arsenal. Unfortunately, "eliminating" these missiles is a bit more involved. Apparently, the unarmed missiles are going to be launched into the ocean, blown up underground, or made into museum pieces. And as for the actual explosive devices—the so-called nuclear warheads—we are told that they are scheduled for routine "disassembly."

The process of decommissioning nuclear warheads, however, is not as simple, tidy, and safe as the majority of Americans have been led to believe. It involves the careful disassembly, separation, transportation, and storage of highly toxic and radioactive materials that remain dangerous even when incapable of exploding. For U.S. weapons, every one of these operations occurs at a single location in Texas that has served as the graveyard for America's obsolete nuclear weapons for over thirty years.

The 859 American missiles covered under the Reagan/Gorbachev agreement will be taken apart in North Texas, 17 miles outside of Amarillo. There, among flat farming lands, is a cluster of 288 buildings on 16,267 acres called the Pantex Plant. Disassembly is not their only business, however; Pantex is also the final assembly point for all of this country's nuclear weapons.

So, with the Summit accord ratified by Congress, the U.S. Army will begin to send the warheads from Pershing 1a, Pershing II, and Ground Launched Ballistic Missiles to the panhandle by truck and rail. Missiles stationed in Europe may enter the port of Houston by boat, where they can be met by special white unmarked tractor-trailer trucks that will pass through Houston city streets and Harris County highways.

Once at Pantex, the warheads will be disassembled inside heavily reinforced concrete "igloos." Then, as explained in a 1982 Department of Energy (DOE) report on nuclear warhead disassembly, "the conventional high explosive components are separated from the nuclear components."

This is not as simple as it may sound, because nuclear warheads are tightly woven layers of many dangerous materials: highly toxic metals, such as beryllium; highly toxic chemicals, like barium nitrate, which is also suspected of causing cancer; and

Greg LeRoy is the director of a nonprofit public interest group in Houston. His book about the environmental impact of the Pantex Plant will be published later this year. An article he wrote about university and industry research centers funded by the military appeared in the January/February 1988 issue of SftP.

finally, there are radioactive ingredients—plutonium, uranium, deuterium, and tritium.

The policy at Pantex is to put portions of a nuclear warhead into vats of potent solvents (like toluene) which dissolve the materials of lesser value, leaving the "nuclear components" capable of recovery. The solvents, and a leftover sludge of bomb materials, however, have now become doubly dangerous, a hot soup that is both highly toxic and radioactive.

How is this soup disposed of? For over twenty years, along with billions of gallons of other "liquid effluents," it was pumped down wells into two underground basins called "reservoir playas" (each about a mile in diameter) that are now almost completely filled with toxic chemicals and metals, uranium, and other radionuclides, including plutonium. "The quantities of hazardous substances," admits a DOE report from last year, "that may remain in the environment at these locations are unknown."

What is known is that one of these underground basins borders "the water wells that supply the city of Amarillo with drinking water," and that the entire Pantex Plant is perched atop the largest and most prolific underground fresh-water supply in America—the Ogalalla aquifer. In July of last year, Public Search, a nonprofit public interest group, asked the DOE whether the Ogalalla aquifer had been breached by these immense underground ponds of toxic and radioactive waste.

"Well, that's still up in the air," Joe Estrada, a DOE engineer in charge of the environmental program at Pantex, explained in a recorded interview. "There's no way we can say."

While the plant continues to expurge contaminated waste water into underground basins, an attempt has been made to reduce the total volume of liquid waste produced. Since the 1970s, Pantex has placed the soup of solvents and sludge outside in an open tank where it was "allowed to evaporate" into the atmosphere. The residue—as much as one-quarter of a million pounds per year—has been regularly "open burned" at one of eighteen outdoor sites.

"Because of the relatively large quantities involved and the types of emissions that result," a 1986 DOE report decided that solvent evaporation and burning "are believed to create the greatest potential for air pollution or adverse health effects." Human exposure to this smoke, another report suggests, "could result in respiratory tract irritation to exposed individuals."

Hundreds of people live close to the Pantex boundaries, and the area's largest primary/secondary school is only seven miles northeast of the plant.

As if this were not enough, all residues from an estimated ten to twenty nuclear weapons accidents "have been stored at the

Pantex Plant since 1966." Over 36,000 pounds of uranium have been dispersed into the open air through "test fires," and significant quantities of high- and low-level waste may be buried at numerous locations in cardboard boxes or other temporary containers. Under the Freedom of Information Act, for example, it was discovered that highly toxic plutonium (with a half-life of 24,000 years) had been buried in metal drums designed to last only twenty years.

These are just a few examples of hazardous waste sites and procedures that even the Energy Department believes require "additional evaluation." Remedial action has not become a "priority" because the Superfund, the federal program for cleaning up the nation's most severely polluted areas, has identified six other DOE military nuclear sites as being in even worse shape than Pantex. These are the Hanford Nuclear Reservation in Washington state, Oak Ridge National Labs in Tennessee, Rocky Flats in Colorado, the Savannah River Plant in South Carolina, the Idaho Laboratory, and the Nevada Test Site. (For more information on this, see "Pollution and the Pentagon" in the May/June 1987 issue of SftP.)

At Hanford, where military reactors have produced weapons-grade plutonium and uranium for nuclear warheads, tens of millions of gallons of the most dangerous radioactive wastes have been injected directly into the local aquifer, and over 300 additional sites have been heavily polluted with wastes that were simply thrown into trenches or allowed to leak onto the grounds. The director of waste management for the DOE plant, Jerry White, told *Science* magazine that it will cost \$100 billion to reclaim Hanford lands. That's about one-seventh of the entire U.S. federal budget, or ten times the total annual DOE funding.

With some 280 nuclear facilities which employ 115,000 people, the DOE may have become, as a 1986 U.S. General Accounting Office report describes, "potentially one of the more dangerous industrial operations in the world."

The point is not that America's nuclear weapons industry is especially careless—the Soviets, with even less public scrutiny, probably pollute the environment at least as recklessly as the U.S. military. The issue is that all nuclear weapons plants create massive amounts of deadly materials that will stay with us for thousands of years, remain harmful to human life, and remain exorbitantly expensive (if not impossible) to clean up.

A group of respected scientists and statesmen recently wrote a letter asking both superpowers to close down all of their military reactors. Gerard C. Smith, chief negotiator for the SALT I Treaty; Paul Warnke, former head of the Arms Control and Disarmament Agency; Jerome Wiesner,

president emeritus of MIT; and William Colby, former director of the CIA, among others, believe that only by stopping production of plutonium and enriched uranium can both nations reduce their nuclear arsenals and prevent the assembly of new weapons.

Even more people are convinced that now is the time for a Comprehensive Test Ban Treaty to be signed and ratified as well. Since it is difficult to design new weapons if these designs cannot be tested, a CTB agreement to stop the testing of all

nuclear weapons would naturally motivate our leaders to begin the real work—treaties outlawing new weapons, and major reductions in present stockpiles.

The greatest irony is that our own nuclear weapons facilities, allegedly built to manufacture weapons to *protect* us against the threat posed by Soviet missiles, are now seriously threatening us ourselves. As of 1980, the nuclear weapons and power industries had bequeathed to the American people about 3 billion cubic feet of uranium mill tailings, 10 million cubic

feet of highly dangerous high-level waste, over 122,000 cubic feet of spent commercial reactor fuel, 24 million cubic feet of transuranic waste, 494 million cubic feet of contaminated soil, and 236 million cubic feet of what is now classified as low-level radioactive waste.

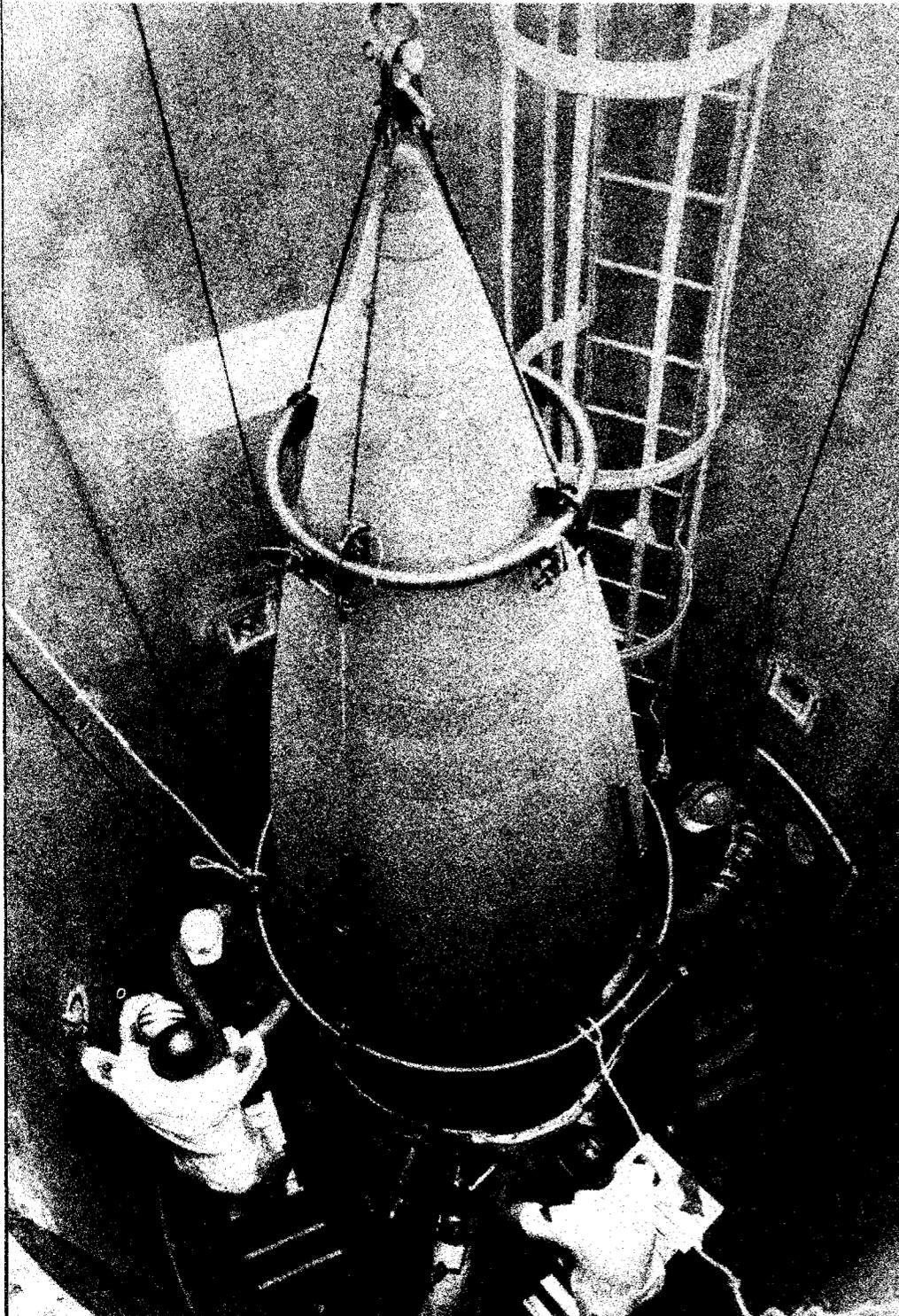
The Department of Energy argues that a secure long-term “repository” can be made by drilling caverns in subterranean salt formations to store these dangerous materials for thousands of years. This does not seem likely. *The New York Times* reported recently that the DOE prototype in Carlsbad, New Mexico, designed to hold plutonium-contaminated wastes from the manufacture of nuclear bombs, already has water leaks, and may have to be closed even before it is officially opened.

The solution, as both scientists and laypeople have begun to realize, is to cut back on the quantities of toxins produced and to close the legal loopholes which allow the Department of Energy to treat dangerous wastes like bathwater.

Two major loopholes now exist. First, no DOE plant needs to apply for an Environmental Protection Agency National Pollutant Discharge System permit if their discharges do not reach surface waters outside their boundaries. Second, although the EPA does have rules for toxic waste disposal, it is the Nuclear Regulatory Commission that governs radioactive waste. At nuclear armament plants these two sets of rules simultaneously apply since the same waste is often both radioactive and toxic. But NRC and EPA regulations are often contradictory and therefore unenforceable.

For these reasons, it is important that we not be filled with a false confidence from the signing of a recent Summit accord. The fact that both superpowers are now willing to allow each other on-site inspections must be applauded—although, in real terms, the world has been made a more dangerous place during the last eight years. Over 8,000 new American nuclear warheads were added during the Reagan tenure; the INF treaty will delete less than one-quarter of them. Meanwhile, the budget for nuclear weapons activities has more than doubled, from less than \$3 billion in 1980 to a request for over \$8 billion in fiscal year 1988.

The Reagan/Gorbachev treaty was a small first step in the right direction, and the U.S. Congress should move swiftly to ratify the treaty. But we must remember that in actuality the treaty alone does little to eliminate the ever-present threat of a hundred thousand Hiroshimas. Nor does the treaty address our own increasingly lethal legacy of research, testing, production, assembly, repair, modifications, deployment, disassembly, and storage of nuclear weapons. Both of these huge and ominous areas still urgently need our attention. 



Photo/U.S. Air Force

FUEL-AIR EXPLOSIVES

BY MARC WILLS AND
PETER ORR

Cloaked in the garb of scholarly prestige, academic freedom, and objective scientific inquiry, Canadian academic research is seldom challenged about its political implications. In recent years, however, a current of minority dissent which harks back to the Vietnam era has been developing.

At the height of the Vietnam War, McGill University political science professor Sam Noumoff acquired a printout from the Pentagon listing U.S. military-sponsored research projects on Canadian campuses. Assisted by a team of students from various Montreal universities, Noumoff produced *How to Make a Killing* in 1971. In addition to detailing ongoing military research on Canadian campuses, his monograph presented an analysis of the specific role of Canadian research in the U.S. war against Vietnam.

How to Make a Killing found no publisher, but it was imitated at other Canadian universities. Passed from hand to hand, the monograph helped to radicalize McGill student protest in the early 1970s.

The 1980s marked a return to benign neglect in the scrutiny of military-sponsored laboratory activity in Canada. In 1980, the *Montreal Gazette* and the *Burlington Free Press* reported that a McGill engineering professor and entrepreneur named Gerald Boell was part-owner of a Stinger-type missile factory that straddled the Quebec-Vermont border by virtue of a special joint dispensation from the U.S. and Canadian governments. The special arrangement allowed Boell's company, Space Research Corporation, to circumvent Canada's embargo on arms shipments to South Africa. Boell's expertise in missile guidance was perfected in McGill's labs. But these disclosures elicited little interest from the McGill student body.

In September 1984, two student journalists from the *McGill Daily* discovered a contract between mechanical engineering

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McGill Researches Near- Nuclear Weapons

professors and the Canadian Department of National Defense. From a computer printout itemizing research grant awards, reporters Albert Nerenberg and Mark Smith became curious about \$209,000 given to R. Knystautus for "A Study to Assess the Effects of Fuel-Air Explosives" and a much smaller award to the same professor for "Development and Propagation of Detonation in Fuel-Air Vapour Clouds."

At the office of the vice president for research, Gordon MacLachlan, the reporters asked to see a copy of Contract 03Su97702-0-2691. A secretary obliged them. "We couldn't believe our luck," Nerenberg later recalled. The contract was based on a proposal Knystautus had submitted jointly with fellow McGill engineering professor J.H.S. Lee in 1980. The proposal called for the McGill Shock Wave Physics group to carry out a series of tests to determine "initiation requirements" and "composition limits of detonability" of gases floating freely in oxygen.

"From a practical point of view, one is interested in the potential destruction that can be caused by a fuel-air explosive. This depends critically on the size of the fuel-air cloud that is within the detonable limits," said Knystautus and Lee in their research proposal. In other words, the experiments would discover what size cloud of gas would yield maximum "destructive potential."

The McGill fuel-air explosive (FAE) research, complemented by experiments at the Defense Research Establishment in Suffield, Alberta, is Canada's contribution to the development of second-generation fuel-air explosives.

The first generation of fuel-air explosives came to world attention in the last days of the Vietnam War. In the spring of 1975, *Le Monde* and the *London Times* reported that American planes were testing a new type of cluster bomb (CBU-55) that sucked oxygen from the air for a radius of up to 250 yards. The *London Times* carried reports of "hundreds and perhaps thousands of corpses" near Bien Hoa, Cambodia. "Dead troops had their mouths wide open and had died clutching their throats as though gasping for breath."

The *McGill Daily* journalists discovered that Dr. Lee was a veteran of FAE-related

research. From 1972 through 1981, his McGill salary was supplemented by \$536,000 in U.S. Air Force grants for work on "Fundamental Mechanisms of Diverging Detonation Waves and Combustion Dynamics of Detonation Lasers." During those years of FAE-related research, former U.S. president Jimmy Carter had banned the export of fuel-air explosives in 1977, and the Stockholm International Peace Research Institute called for a ban on FAEs as "inhumane and indiscriminate weapons" in 1979.

Faced with public exposure, the engineering professors sought refuge in arguments of scientific neutrality. "I don't deal with social implications. Who sponsors research is immaterial," Lee told the *McGill Daily*. Knystautus compared fuel-air explosives to the discovery of fire. "Now we can cook, but we can also napalm people into shrivels," he said.

Exposure of the FAE research came too late for a campaign waged by an antimilitarist McGill group called Project Ploughshares. Ploughshares members had repeatedly, without success, tried to learn details of military research at McGill through the Access and Privacy Act (Canada's watered-down equivalent of the U.S. Freedom of Information Act).

Handicapped by a lack of specific information, Project Ploughshares initiated a Student Council-sponsored referendum on campus military research in the spring of 1984. Management and engineering students turned out *en masse* to vote for continued acceptance of military funding. Only 20 percent of the students voted, and the majority opted to keep military-funded research on campus.

In October 1986, renewal of the FAE contract came before the university's Board of Governors. Lee and Knystautus were seeking \$151,000 for "study of the formation of detonation by turbulent mixing, and transition from deflagration to detonation." David Shulze, a graduate student representative on the board, accused Gordon MacLachlan, the vice principal of research, of authorizing an unethical use of university facilities. Shulze and MacLachlan played a slow tennis match with official correspondence for several months.

"Refinement of means to destroy human life and property on a massive scale, and with great suffering, is an advancement of learning of a most dubious kind," wrote Shulze. Fuel-air explosives research would help Canada "to defend itself against an aggressor who might use such techniques against us," replied MacLachlan. (A Defense Department spokesman contacted by the *McGill Daily* used almost exactly the same phrase.)

In February 1987, Shulze, tired of the game with MacLachlan and with an undergraduate representative on the Board of Governors, formed the Ad Hoc Committee for Responsible Research. The

committee issued a document calling for an end to the FAE project as well as tighter university regulations on research. The committee's manifesto was immediately endorsed by the Student Council and a group of professors known as McGill Employees for Nuclear Disarmament. The Canadian Coalition for Nuclear Responsibility also supported the committee. However, the university administration was not impressed.

The *McGill Daily* raised the pressure with a feature story that February under the headline "Setting the World on Fire." Drawing on data from *Jane's Weapons Systems*, the article described fuel-air explosives as part of NATO's emerging system of "near nukes."

"Weapons are usually described as falling into two categories—conventional and nuclear," the *Daily* reported. "But the difference between the two classifications is shrinking. In a lab on the second floor of MacDonald Engineering, two McGill professors are helping to close the gap."

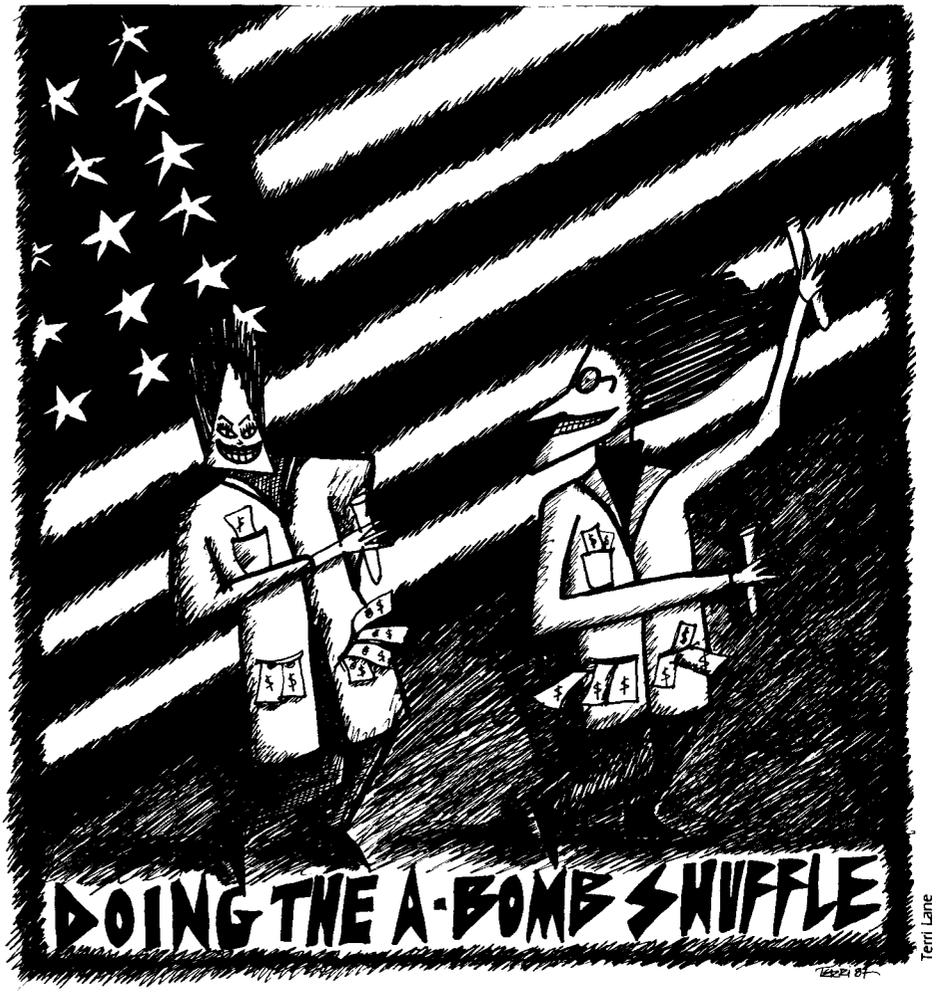
Shulze's ad hoc committee had also been reading *Jane's*. In press releases and submissions to the Board of Governors, a passage from a 1987 *Jane's* publication was cited: "FAEs are also known as compression wave or volume-detonating weapons. On

humans the impact of a compression wave's destructive force is truly gruesome. People at the fringe of the explosion suffer burst tympanic membranes and crushed inner ear organs, severe concussions, pneumothorax, ruptured internal organs and blindness; those near the ignition point are obliterated."

On March 2, 1987, the executive of the Board of Governors announced that the board had been advised that there was "no reason to change the original decision" approving the FAE contract. The following day, a small group calling itself Little Red Wagon occupied the office of the vice principal for research. Gordon MacLachlan threatened them with expulsion if they did not leave his office. The five demonstrators remained.

The Little Red Wagon occupation gained immediate national media attention. The Canadian Broadcasting Corporation's most widely heard news program, "As It Happens," gave top billing to an interview with the students in the vice principal's office.

McGill's Board of Governors had dealt with a lot of occupations in the 1960s. They made no move against these demonstrators while the media were around. On Sunday night, the sixth day of



the occupation, the administration called in the police and had the demonstrators thrown out.

Little Red Wagon's action caught the Ad Hoc Committee for Responsible Research by surprise. A scheduled press conference on March 4 announcing a petition campaign against FAE research became anticlimactic. Members of the ad hoc committee, Shulze in particular, saw the occupation as a preemptive strike. The ad hoc committee's carefully laid plan had been deliberately upstaged. In terms of reaching an audience, the Little Red Wagon group succeeded where the ad hoc committee failed, but their statements to the media had been littered with factual errors and often digressed into sectarian irrelevancies.

On March 16, the ad hoc committee presented the Board of Governors with a petition carrying more than 1000 signatures protesting FAE research, while 200 placard-waving students demonstrated loudly three floors below. The committee's petition demanded a general review of McGill's policy on research awards. MacLachlan flatly refused, but Principal David Johnston was conciliatory. At Johnston's suggestion, the board set up a committee to review the regulations on awards, which seemed to be a minor victory.

Once the term ended, however, the governors returned to business as usual. A leaked confidential memo dated May 1987 showed that the board's executive had not only retroactively approved the fuel-air explosive contract renewal under contention, but also authorized a third FAE contract worth \$226,000. The May memo also revealed board approval for a \$216,000 grant from the U.S. Army to chemistry professor A. Eisenberg to investigate "Physical Properties and Structure of Ion-Containing Polymers."

The Ad Hoc Committee for Responsible Research began the summer break trying to decipher the meaning of Eisenberg's project. Like most political dissenters on Canadian campuses, they drew their ranks primarily from the social sciences. As outsiders to the world of hard science, they were often bewildered by its jargon. This language barrier accounts in part for sometimes tentative and restrained criticism of weapons-system research.

Throughout 1986 and 1987, the McGill ad hoc committee emphasized the gruesome, unethical nature of fuel-air explosives. The role of second-generation FAEs (and FAE research) in the U.S. global military design was ignored in the committee's literature. Symptomatic of this retreat from the geopolitical dimensions of the research was a perennial confusion of Lee and Knystautus's second-generation FAE research with descriptions of FAEs of Vietnam vintage.

The new FAE weapons will be part of the "emerging technologies" ("E.T.")

CONTINUED ON PAGE 27

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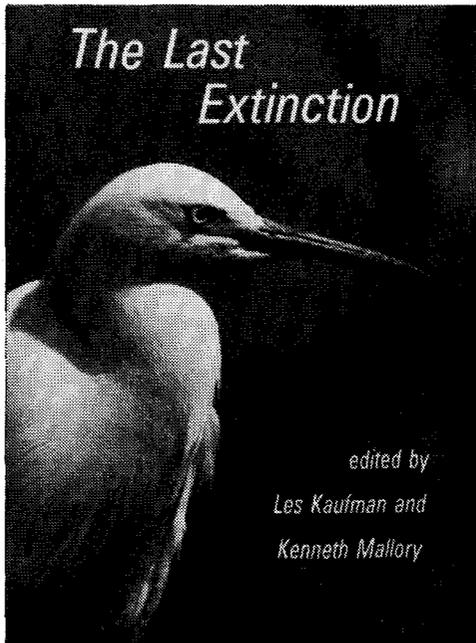
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REPRESSION IN MALAYSIA

Biological Determinist Jails Opponents

BY MEMBERS OF THE COMMITTEE FOR HUMAN RIGHTS IN MALAYSIA

At 3:00 AM on October 27, 1987, Heng Leng Chee was arrested by the Special Branch police at her home in Petaling Jaya, Malaysia. It appears that Heng Leng, a graduate of Wellesley College and the Harvard School of Public Health, may have been detained because she coedited the book *Designer Genes: I.Q., Ideology & Biology*, a book critical of the sociobiological theories favored by Malaysian Prime Minister Datuk Seri Mahathir Mohamed in his social and economic programs. She also works with the Institute of Social Analysis—a group singled out for government repression—the Women's Development Collective, and has protested the detention of church and community leaders who were arrested in Singapore for their disagreements with that government.

On Christmas Day, 1987, the Malaysian government issued a two-year detention order to Heng Leng Chee. The order included no mention of *Designer Genes*, but made vague reference to "internal security." The detention order may be renewed indefinitely.

Since October 27, over 150 Malaysian citizens have been arrested and detained without charges by their government. They are a diverse group including environmentalists, politicians, consumer advocates, scholars, trade unionists, and religious workers. The only common thread linking the detainees is some form of criticism of the administration of Prime Minister Mahathir.

The law under which the arrests have been made is called the Internal Security Act (ISA). It permits the indefinite "preventive detention" of anyone deemed by the government to be "likely to act in

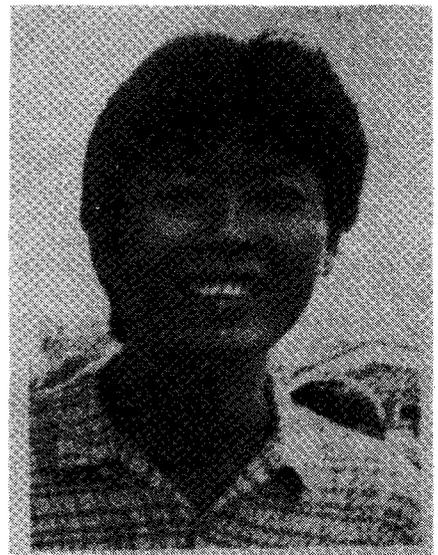
any manner prejudicial to the security of Malaysia." Although no charges were made against the detainees, Heng Leng's link to *Designer Genes* could have provided the justification for her detention under the ISA.

Designer Genes is a book of essays written mostly by American biologists and social theorists, including Leon J. Kamin, Richard C. Lewontin, Stephen Jay Gould, and Noam Chomsky. The book refutes arguments for genetic differences in intelligence and abilities among different peoples. The two leading essays, coauthored by Heng Leng, illustrate how the leaders of Singapore and Malaysia have utilized such unproven genetic arguments to further their own interests.

It may seem bizarre that Heng Leng is in solitary confinement today as a threat to national security due to her outspoken scientific beliefs. A brief review of the peculiar situation in Malaysia, however, will help to clarify how her detention occurred.

Race has always been an emotional and political issue in ethnically diverse Malaysia. The population is comprised of roughly 50 percent Malays, 37 percent Chinese, 9 percent Indians, and the rest native tribal peoples and other groups. When Britain granted independence to Malaysia in 1957, the Malays were recognized as the indigenous ethnic group and granted political power in an officially Islamic state. In exchange for primacy, the Malays granted citizenship to the Chinese and Indians who had, for the most part, immigrated under British rule.

Racial tension arising in the 1960s was thought to result from the disproportionate control of wealth and commerce by the Chinese, and the lower economic status of the largely rural Malays. After racial violence erupted in 1969, the government instituted the New Economic Policy



Tan Ka Kheng

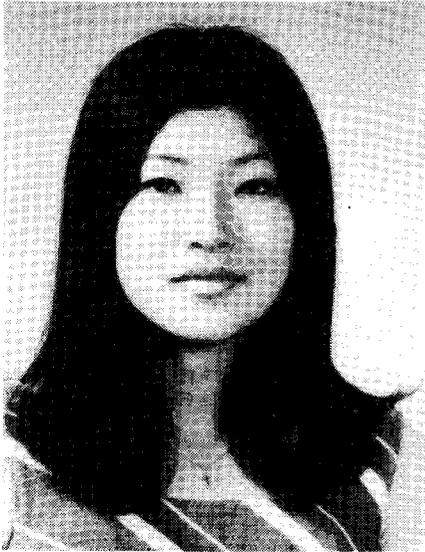
(NEP) and imposed two years of martial law.

The NEP, whose 20-year duration expires in 1990, attempted to redress the disparity of wealth through a program of open discrimination in favor of the dominant Malays. It is a kind of affirmative action plan, providing special privileges to Malays in business, employment, education, and housing. Designed to create a middle class of Malays, the NEP now falters because it cannot provide a strong economy to support its new middle class. Malaysian exports—including crude oil, timber, tin, palm oil, rubber, and gas—have been falling in price. Efforts to exploit and develop these natural resources have met with resistance from environmentalists and native peoples.

Although there is a compelling case for some affirmative action program on the basis of equity, Prime Minister Mahathir has gone beyond the issue of fairness and has attempted to justify special privileges for the Malays based on genetic theories of race and heredity. The following passage from *Designer Genes* explains Mahathir's beliefs as expounded in his book *The Malay Dilemma*:

"Mahathir believes that the absence of a tough environment in the Malay peninsula to 'naturally select' for more aggressive qualities among its inhabitants gave rise to 'weak' and 'easygoing' traits. These characteristics are heritable, he believes, and have come to distinguish the 'Malay race' from other races and accounts for their economic backwardness. Moreover, he believes that the inheritance of these weak traits has been aggravated by widespread inbreeding among Malays.

"He contrasts this with the situation of the ethnic Chinese who, according to him, are a vigorous race trained and naturally selected by difficult living conditions in China as well as cultural sanctions that



Cecilia Ng

forbid inbreeding. However, Mahathir elaborates, not all Malays have been thus condemned by their history, there being urban Malays who have intermarried with other ethnic groups."

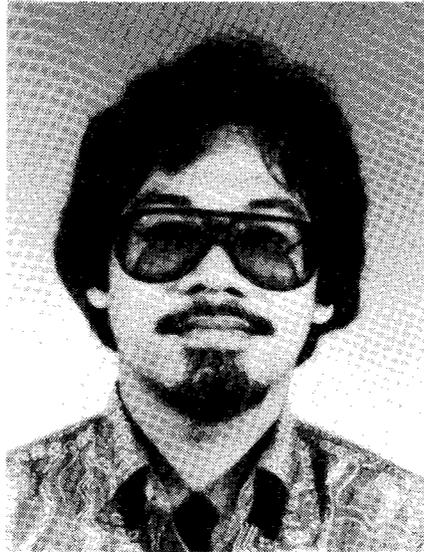
It is perhaps not coincidental that Mahathir himself is an urban Malay of mixed parentage.

Mahathir has also applied racial stereotyping in his analysis of racial conflicts in the West: "The Jews, for example, are not merely hooked-nosed but understand money intuitively... Jewish stinginess and financial wizardry gained them the commercial control of Europe and provoked anti-semitism which waxed and waned throughout Europe through the ages." (*The Malay Dilemma*, page 84)

It appears that Mahathir justifies the necessity of a program to help Malays compete, such as the NEP, based on the purported genetic characteristics of the Malay and Chinese peoples in Malaysia. In fact, the NEP has succeeded only in benefitting an elite of urban Malays. (Mahathir would probably explain this tendency biologically.)

In *Designer Genes*, Heng Leng Chee responded to this official racism by observing: "In invoking biology to explain the existence of social inequalities, and hence the need for differential social policies, Mahathir and Lee (Singapore's Prime Minister Lee Kuan Yew) are in distinguished company, both past and present. Although the grounds for such supposedly scientific assumptions have time and again been shown to be shaky, nonetheless efforts to reduce social phenomena to biological cause and effect persist. We need to go beyond debunking the false science upon which such assumptions lie to examine the social and historical roles they play in legitimizing the *status quo*."

While Heng Leng's arrest has been



Nashir Hashim

related to race, she has actually *fought* racism by questioning the scientific basis of Mahathir's hereditarian assumptions. It is thus ironic that Mahathir defends the recent arrests as necessary to prevent racial violence, charging that dissidents have "magnified racial issues" for political advantage.

In reality, the underlying reason for the mass arrests is that the prime minister's personal authority is being threatened. There is a pending legal suit by members of his own party to invalidate the results of the last elections. If the suit succeeds, Mahathir could lose his position as prime minister. There are also charges of corruption within his party.

Evidently the issue is power, not race. Many of those who also have been detained had nothing to do with creating racial tension. They include:

NASHIR HASHIM (age 40): chairman of the Institute of Social Analysis (INSAN) and coauthor of "Mahathir's (Genetic) Dilemma," an article in *Designer Genes*. He is a nutritionist who graduated from Cornell University and an activist in labor issues.

TAN KA KHENG (age 35): university lecturer in environmental engineering and vice president of the Environmental Protection Society of Malaysia, who campaigned against radioactive waste dumping.

CECILIA NG (age 37): graduate of Swarthmore College and the Harvard School of Education. She is a university lecturer who's active in opposing violence against women and other women's issues, and served as secretary of INSAN.

HARRISON NGAU (age 29): regional head officer of Sahabat Alam Malaysia (Friends of the Earth Malaysia) and supporter of an antilogging campaign in



Heng Leng Chee

The absence of a tough environment to "naturally select" for more aggressive qualities gave rise to "weak" and "easygoing" traits which are heritable in the "Malay race" and account for their economic backwardness.

Borneo to preserve the rainforests and livelihoods of indigenous peoples.

The government has dealt with Nashir Hashim, Ta Ka Kheng, and Cecilia Ng by issuing two-year detention orders for them. Harrison Ngau was released with a restraining order limiting his freedom of speech and prohibiting him from leaving his house from 8:00 PM until 6:00 AM. At press time, 35 individuals are still in detention.

In January, former Massachusetts congressman Robert Drinan and Harvard School of Public Health professor Paul Wise went on a fact-finding mission to investigate human rights violations in the arrests and detentions of social critics in Malaysia. They met with representatives from the U.S. Embassy in Malaysia, who accepted the government's premise that social critics were "threats to national security" who fomented racial tensions in Malaysia. However, U.S. Embassy representatives saw the detentions and

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shutdown of three newspapers as an overkill, and criticized the lack of due process or public trials for those detained.

In a two-hour meeting with Malaysian government representatives that Paul Wise described as "blunt and constructive," officials explained the crackdown as a preventive measure against racial unrest. They described the social, environmental, religious, and political leaders detained as representatives of what they called the "new subversion."

Dr. Wise spoke with government officials on behalf of Physicians for Human Rights. They discussed the cases of Harvard graduates Heng Leng Chee and Cecilia Ng. Wise said that the government's dossier on Heng Leng had no evidence of criminal wrongdoing, but it mentioned that she took courses with "left-leaning professors" at Harvard and "tutorials whose goal was to improve the lot of the poor." Malaysian students who study abroad—there are over 24,000 in the U.S. alone—now have their suspicions confirmed. They are being watched for any dissent against the government expressed while they are out of Malaysia.

While Dr. Wise was not officially representing Harvard on his visit to Malaysia, he presented government officials with a letter protesting the detention of the Harvard graduates that was signed by Harvard's president, Derek Bok, and the dean of the Harvard School of Public Health. Wise believes that international pressure, particularly from individuals and institutions in countries where detainees have educational or other ties, will help to win their release.

Malaysians who have spoken out against injustice deserve praise, not persecution. In attempting to improve the social and natural environment of their country, these people have become victims of Mahathir's drive to preserve his rule by quashing all criticisms, however constructive. This trend toward authoritarian rule, marked by eugenic principles, undermines the few avenues of democracy that remain in Malaysia.

Letters of support have proven to be effective in pressuring other governments to release political prisoners. Please write to one of the individuals listed below, inquiring as to the charges against Heng Leng Chee and the other Internal Security Act detainees. Express your concern for their treatment in prison and request their immediate unconditional release or their right to a prompt and open trial. Inquiries to your government representatives as to action they are taking will also help. Contact Prime Minister Datuk Seri Mahathir Mohamad, Prime Minister's Department, Jalan Dato Onn, Kuala Lumpur 11-01, Malaysia. Letters should also be sent to His Excellency Albert S. Talalla, Embassy of Malaysia, 2401 Massachusetts Avenue, NW, Washington, DC 20008.

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PEOPLE'S SCIENCE AND TECHNOLOGY

In the Philippines

BY LEANDRO J. TY

The imposition of martial law in the Philippines by the Marcos regime spawned widescale impoverishment, deprivation, and political repression, victimizing the vast majority of our people. Even the science and technology community, considered to be one of the most apathetic and apolitical sectors of our society, was not exempted from such realities.

In the field of education, the Philippines has more than 50 universities and over 500 colleges, with almost a million students in higher education. Yet it has no viable program for graduate studies in science and technology, except for a few schools not readily accessible to most citizens. Instead of teaching basic science, Philippine education is geared toward vocational technical training to supply labor for multinationals. The Philippines, according to the World Intellectual Property Organization, ranks first in inventions that respond to practically every basic need, but these have been left to stagnate and waste away in the back alleys of government priorities.

For many years, Philippine science and technology have known only such development as suits the requirements of transnational corporations. Government policies on science and technology hinge on the idea that "technology transfer" is one of the catalysts of economic development. For the Marcos regime, transnationals were believed to be the most effective vehicle for the transfer of technology from advanced and industrialized countries to underdeveloped countries. Thus, he actively sought their entry into our country.

However, to seek development from transnational corporations is to seek nondevelopment, and to be stone-blind to the plunder by U.S. imperialism of the Philippines' economy and natural

Leandro J. Ty is the chairman of Scientists, Technologists and Engineers for the People (STEP-Leyte).



Photo/Grassroots International

wealth. Today, we still import machinery and technology, thus reducing our engineers and scientists to mere operators, maintainers, and equipment repairmen. Thus the Philippines has remained "primitive" technologically, with its backwardness dating to nineteenth century industrial technology.

The Green Revolution program of the early days of martial law and contemporary agricultural development projects utilize technologies peddled by transnationals to aggravate peasants' bondage to the soil. High-yielding varieties of rice and other crops require massive agricultural inputs, such as fertilizers and pesticides, turning these into another profit-making bonanza for transnationals and their local counterparts. The Bataan nuclear power plant built by Westinghouse, the most expensive government project and the most widely protested by our people, is a legacy from the Marcos regime that also falls into this transnational profit-making scheme.

On the other hand, salaries remain low for our scientists and engineers. Researchers and inventors are beset by a lack of funds, discrimination, unemployment, and underemployment. Many have joined the brain drain and the lure of Middle East jobs.

The National Science and Technology Authority was established to promote

science and technology, but it ended up merely tracing the path of the defunct National Science Development Board. It promotes noble objectives that are lip service, at most. Only fifteen percent of the total science and technology allocations are appropriated for basic research, while the research and development priorities are tied up with foreign interests and do not answer the need for our economic growth and technological development.

The problems besetting the science and technology sector are not caused solely by the fallen Marcos regime. We are a semi-feudal society that prevents modernization in agriculture, and a semi-colonial society that hinders national industrialization and the development of our own technology. Directions and policies in science and technology necessarily mirror the economic and political framework of Philippine society. Fettered by feudalism and imperialism, our country has remained poor and underdeveloped, a mere supplier of raw materials and an importer of goods and technology. Under such conditions, it is futile to expect technological innovation and scientific research to emerge and flourish.

In view of the present situation and the problems facing the science and technology sector, there is a need to unite and take up tasks that lay ahead. It is vital and timely that Scientists, Technologists and

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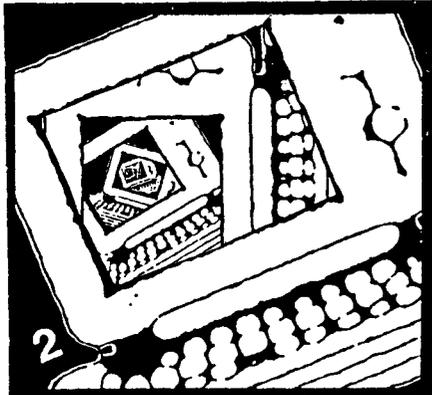
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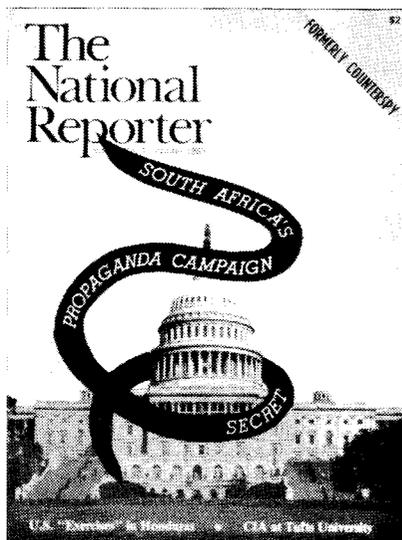
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Engineers for the People (STEP) is organized to undertake the following program of action:

We must unite and organize scientists, engineers and technologists for a science and technology that genuinely serves the interests of the broadest base of Filipino people. We should launch a massive educational campaign on issues concerning the science and technology community. We hope to coordinate activities between members of the scientific community and Filipino inventors on issues that may serve as a basis for alliances. We plan to organize new chapters of STEP whenever possible.

STEP will launch an intensified campaign to promote indigenous technologies. To do that, we need to establish a core group that will plan, gather materials, and prepare kits on indigenous technology for dissemination among the Filipino people. We must also establish networks and links with different schools (especially vocational and science programs) and other community organizations that can promote indigenous technology.

We must launch a nationwide campaign to redirect the thrust of government policy and appropriations to develop a nationalist-oriented research and development policy. We will appeal to the Aquino government to recognize the vital role of science and technology in national development. STEP will organize forums to gather, analyze, and review existing government policies on research and development, and prepare recommendations to redirect government policies. We must also lobby representatives of the government body that formulates science and technology policies for nationalist-oriented research and development.

STEP is in the process of establishing formal links with local and international scientific organizations based on the principles of cooperation, equality, and respect. We are also uniting with sectoral and multi-sector organizations on issues of national concern. We are particularly interested in the area of integrated upland farm management, because these farmers are more marginalized and because efforts in this area will lessen the damage to our forests by *kaingeneros* (slash-and-burn upland farmers).

The number-one constraint to the realization of these projects is funds. We would welcome, however, any form of assistance to our program. For information, contact Leandro Ty, c/o ILAW Resource Center, P.O. Box 23, Tacloban City, Philippines.



REPRODUCTIVE REPRESSION

West German Police Raid Activists



Katherine Berney

BY GENA COREA

The West German equivalent of the FBI, the Bundeskriminalamt, staged 33 simultaneous raids, many of them against feminists, throughout the Federal Republic of Germany on December 18, 1987 at 4:30 p.m. Hundreds of heavily armed police (200 in Essen alone) burst into the workplaces of activists. Fifteen to thirty in a group, they swept into homes in Cologne, Dortmund, and Dusseldorf. In Essen, Duisburg, Bochum, and Hamburg, the raids were directed overwhelmingly against feminist critics of genetic and reproductive technology,

*Gena Corea writes about genetic engineering and reproductive health. Her book *The Mother Machine* was published by Harper and Row in 1985.*

according to Prozessgruppe Hamburg, a watchdog group.

The targeted critics have written and spoken on such issues as in vitro fertilization, amniocentesis, sex predetermination, and genetic engineering. They have actively opposed surrogate motherhood. Many worked together in a massive coalition to stop U.S. businessman Noel Keane's attempt to open a branch of his surrogacy company, United Family International, in Frankfurt. (Keane's New York branch arranged Mary Beth Whitehead's surrogacy contract.) Their campaign to stop the marketing of American women to European men for breeding purposes ended successfully on January 6, when a West German court ordered Keane's business closed, three months after it had opened.

These West German groups have

given strong support to Mary Beth Whitehead and other so-called surrogates seeking to keep their children. They have supported the efforts of a U.S. group, the National Coalition Against Surrogacy (NCAS), to ban surrogacy in the United States. In turn, the NCAS has provided support for the West German campaign.

Two well-known and widely respected women were detained and are now in prison: Ulla Penselin, active in two groups in Hamburg—Women Against Genetic Engineering and another group critical of population control policies—and Ingrid Strobl, a journalist for eight years with the national feminist magazine, *Emma*. Strobl is accused of participating in a violent action protesting the exploitation of Third World women in the sex tourism industry. Both women have been charged under the Paragraph

129a of the terrorism act.

What were the grounds for the police raids? In many cases, the women were not given any. But the day after the raids, newspapers reported that the police conducted the searches to ascertain whether any of the raided individuals were members of terrorist organizations. The police were operating under the law's Paragraph 129a, "Support or Membership in a Terrorist Organization." Specifically, they claimed to be looking for a group called Revolutionären Zellen (Revolutionary Cells), and its feminist wing, Rote Zora (Red Zora).

In West Germany today, the sheer criticism of controversial social issues is enough to bring gangs of armed terrorist-hunting police to your door, West German feminists point out. The government uses the terrorism act to harass political activists. Social criticism continues to be criminalized, according to Linda Bullard of the Green Party and a member of the Feminist International Network of Resistance to Reproductive and Genetic Engineering.

In a telephone interview from Essen, physician Beate Zimmerman, a victim of the raids, said: "I opened the door of my office and—bluum!—they came in like a herd of animals, about fifteen of them. They ran into every room and stood there with their guns drawn. I said, 'What are you doing here? There is nothing here.' There were two patients sitting and trembling. Nothing else."

Zimmerman is one of the six women (two physicians and four social workers) who founded the Gene Archive in 1982, which houses material on all aspects of genetic engineering—scientific, legal, and political. Information in the archive covers the development of genetic engineering in agriculture, medicine, and the production of pharmaceuticals.

Women from the archive conduct research on the issues of reproductive and genetic engineering and write for the new magazine *E-coli-bri: Material Against Population Control and Genetic Technology*. They are regularly invited to speak at trade unions, churches, and educational institutions.

"We are working quite openly," Zimmerman said. "Everybody can come and use the archive. In the last year, we've done a lot of work with the women's church groups that are beginning to deal with this question." Trade unions, political parties, students, and teachers also use the archive.

Zimmerman and her colleagues have also helped organize and participated in

the many conferences on reproductive and genetic engineering that have been held throughout West Germany since 1985.

"Last October, we organized the most recent meeting of the movement Women Against Genetic and Reproductive Engineering," Zimmerman said. "It was then, for the first time, we realized that the police were watching us. They put us under surveillance and followed us in their cars. We realized then that they had even had one of our friends questioned in New York. The FBI had been there to ask him about one of us. It seems that the FBI was cooperating with the German police."

The Gene Archive is located next to Zimmerman's medical practice, in the same building. Before conducting the raid, the police cordoned off the street. "I think that the archive was their main interest," Zimmerman said. "Most of the police were in the archives looking at every single paper, every picture. They took photographs all over, of everything we had on the wall, even the map of the world. It was really ridiculous."

In the nationwide raids, officials from the Bundeskriminalamt and local police confiscated materials from the archives and from private apartments and homes. They seized drafts of the women's speeches, material prepared for seminars, names and addresses of those attending seminars, published work, videos, tapes of radio programs, scientific articles, postcards, brochures, and private address books.

"From the archives, they took with them mainly materials about prenatal diagnosis and genetic counseling," according to Zimmerman. Last summer, she said, women's groups in West Germany conducted an information campaign on these practices, distributing material on the streets and entering hospitals and genetic counseling centers to talk with people there.

"The police were mostly interested in that and in one packet of material about developments in the pharmaceutical industry in genetic areas, and about the involvement of institutions and universities in this industrial development," she claimed.

At the police station, Zimmerman said, the women had to take their clothes off. "They wrote down my scars," she said. "They would put down, for example, 'One scar on the bottom, one on the back, another on the belly.' Every part of my body had a number and they described it. It's a criminological technique." She

laughed, "It's ridiculous!"

German feminists have developed a strong critique of the use of reproductive and genetic technology as a weapon of social control and of the roles of these technologies in the world marketing strategies of multinational corporations.

Since 1985, debates about reproductive and genetic engineering have moved well beyond the feminist movement into society at large. Trade unions, church groups, and political parties have become engaged in a critical discussion of these issues.

Last November, a group of Protestant women issued strong statements against reproductive and genetic engineering for the Kirchentag (National Association of Protestant Churches). They have organized many seminars and conferences on this issue.

Catholic women's groups have organized at least three different seminars and workshops on reproductive and genetic engineering. They also issued two resolutions—one in 1986 and another in 1987—criticizing these technologies. And last January, the Hausfrauen Bund (Housewives' League) met to discuss these issues in Bonn.

There have also been direct actions against labs involved in genetic engineering research. In 1985 and 1986, the militant group Rote Zora attacked the facilities of the Gene Center in Heidelberg, the Max-Planck Institute for Reproductive Research in Cologne, and the Human Genetics Institute of the University of Muenster.

The police raids appear to be an attempt to stop the widespread anti-genetic technology movement in Germany by linking legal organizations with more militant ones, said Maria Mies, author of *Patriarchy and Accumulation on a World Scale* and professor of sociology at the Fachhochschule in Cologne, in a telephone interview from her home.

"No concrete accusation or crime was being investigated," she pointed out. "This means that women doing Aufklärungssarbeit, that is, researching reproductive or genetic engineering, or talking about it or giving seminars, are already doing enough to provide a pretext for the Attorney General to launch such a police action."

Mies, an organizer of the world's first massive feminist conference against reproductive and genetic technology—the historic 1985 conference in Bonn—said of the police action: "We think it is an

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TEACHING FOR A HIGH-TECH FUTURE

A Bill of Rights for the Use of Technology



John Klossner

BY GUS BAGAKIS

For good reasons, many public school teachers have misgivings about the drive to bring computers and other high-tech devices into their classrooms. Recognizing that our concerns are shared by other educators, we have put together a 12-hour workshop (two six-hour

Gus Bagakis is a teacher from Oakland, California.

segments one week apart) designed to help public school teachers pushed to introduce high-tech in their classrooms. The discussions in *Science for the People* about responding to new technologies have been very useful in helping us clarify our thoughts on this subject.

Instead of designing a "computer literacy" workshop where we would train teachers to use "computers for education," we decided to devise a workshop that would regard technology

as a social-political force that teachers must understand. The goal of the workshop was to help teachers show their students how to take responsibility for the way they wanted technology to impact them. We felt that we could not passively acquiesce to the dictates of "experts."

In the workshop, we drafted a working document titled the "Bill of Rights for the Use of Technology in Education," which set forth our demands and concerns. This activity was followed by a lively discussion over the dilemma that fellow-teacher Christa McAuliffe, who was killed last January in the space shuttle Challenger explosion, faced: do we become tools of status quo politicians and the military-industrial complex or do we speak up for a "people's technology?" This discussion was inspired by Herbert Kohl's article "Space Lessons" in *The Nation* on Feb. 15, 1987.

For the purposes of this workshop, we proposed three definitions of technology. We felt that it was important to concern ourselves with definitions because we agree with I. A. Richards that a definition can be understood as a verbal strategy designed to help achieve an objective. Thus we should not ask whether a definition is true or real, but ask what it allows us to see. The following is a summation of our attempts at a suitable definition of technology:

- *Neutral-passive:* Technology is organized knowledge that can be used for many practical purposes. Here technology is seen as value-free, and we should passively accept it. This is the predominant view today. Such a view supports the status quo and makes the teacher a trainer.

- *Analytical-passive:* Technology is a system of rationalized control over large groups of people, events, and machines

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The Open Secret

Torture and the Medical Profession in Chile

By Eric Stover

Committee on Scientific Freedom and Responsibility
American Association for the Advancement of Science
Washington, D.C., 1987

REVIEWED BY JOSEPH REGNA

That members of the medical profession participate in state-sponsored torture is a fact which should not shock those who recall the Nazi doctors of Hitler's Germany. The AAAS's Committee on Scientific Freedom and Responsibility found that physician-assisted torture is apparently routine in the four countries it recently investigated: Uruguay, South Africa, the Philippines, and Chile. That's the bad news. The good news is that the medical profession is not monolithic in its participation in torture.

The Open Secret: Torture and the Medical Profession in Chile is the latest of the committee's reports on medicine and the prevention of torture. It details the activities of physicians who assisted in or witnessed torture, as well as those doctors who risked careers, freedom, and life to oppose torture and political repression in Chile. The report provides a chilling lesson about the extent to which medical professionals who fear their own loss of status will collude with forces of evil.

By establishing the historical context of health care in Chile from the 1950s to the 1970s, author Eric Stover explains how physicians became involved with acts of state terror. Chile legislated a national health service in 1952, sponsored

Joseph Regna is a physician who works on public health, peace, and environmental issues in the Boston area.

by the president of the Chilean Medical Association (CMA), physician Salvador Allende. The national health service coexisted with private sector practice and allowed physicians most of the authority in medical policy. But after Allende became president of the Popular Unity government in September 1970, CMA support for government health care policies waned.

Particularly troublesome to the CMA were Allende's health reforms which attempted to democratize Chile's top-down health care system. In August 1971, Allende issued a decree that altered the power relationships within the Community Health Councils that had been established under the previous administration of Eduardo Frei. Under Allende's policy, health worker unions and community organizations gained increased authority to formulate and implement council policies. This new policy resulted in a loss of authority and status for physicians on the councils. In essence, their decreased status meant that physicians could no longer create health policies which were most beneficial to their interests.

Chilean doctors and the CMA had come to expect a great deal of control over health care policies, decisions, and budgets. The radical change that Allende's policies implied was something that organized medicine in Chile would not swallow. At the same time, inflation was soaring, salaries were dropping, and medical supplies were in short supply. Through statements, policies, and actions—the most notorious of which was the nationwide physicians' strike—the CMA resisted the Popular Unity government and assisted in creating the climate which climaxed in Allende's assassination and the military coup of September 11, 1973.

The CMA immediately cooperated with the dictatorship of General Augusto Pinochet, most visibly by denying rights and privileges to physicians who were perceived to be in disagreement with the military government. Throughout Chile, CMA officials and chapters held a "review process" in which they named physicians thought to resist the military or have leftist sympathies. With CMA support, the military ordered hospital directors to classify medical workers into one of three categories: those above political reproach and necessary in their positions, potential militants, or those deemed politically unreliable who should be dismissed.

In effect, the CMA purged the medical profession's ranks of anyone who did not

pledge allegiance to the dictatorship. When asked to intervene in the disappearance, detention, torture, and murder of Chilean physicians by the military, the CMA's leaders refused to speak out against this violence until 1981. From this level of cooperation between organized medicine and the military junta, it was only a small step for individual members of the profession to become personally involved in acts of state terror.

In its report, the AAAS Committee on Scientific Freedom and Responsibility lists seven ways that Chilean physicians have participated in torture:

1. Evaluating the victim's capacity to withstand torture.
2. Supervising torture through the provision of medical treatment if complications occur.
3. Providing professional knowledge and skills to torturers.
4. Falsifying or deliberately omitting medical information when issuing health certificates or autopsy reports.
5. Providing medical assistance within the torture system without either denouncing torture or resigning from such work.
6. Administering torture by directly participating in it.
7. Remaining silent in spite of the knowledge that abuses have taken place.

The committee couples testimony from victims with research into health care records and documents to support its statements. Ironically, much of what the AAAS investigators were able to learn has come from the CMA itself. But the irony is only superficial, for, in addition to recounting the Chilean medical profession's involvement in torture and complicity with a repressive regime, the report also tells the story of the startling political transformation of medical professionals who once supported or tolerated the military junta.

The AAAS committee discovered that the Chilean Medical Association of 1987 is vastly different from the association of 1973. Why this change? Part of the reason certainly has to do with the collapse of health care under the 14-year-old military government, affecting not only patient care, but doctors' earnings as well. The continuing repression, arrest, imprisonment—and torture—of physicians themselves also account for the CMA's political shift to opposition. Many medical professionals who attend torture victims have been ordered to do so and fear for their own freedom.

Review

Whatever the cause of the shift, Chile's medical profession has evolved to a point where it now stands in opposition to military rule. The process began when formerly imprisoned physicians, led by thoracic surgeon Pedro Castillo, not only spoke out against the dictatorship, but also offered medical care to victims of torture. Dismissed as chair of the Department of Surgery at the University of Chile in Santiago in 1975 as part of the purges, Castillo founded the nongovernmental National Commission Against Torture in 1981.

Later that year, the CMA held its first elections since 1972. Released from jail, Castillo and other physicians calling for peaceful protest against the government's health policies and investigation of physicians who participate in torture were elected to the CMA's general council.

With the return of elections and a change of leadership, the CMA finally released a strongly worded statement against torture in November 1983, explaining that the association "would not be turned into a haven and bastion for

people who transgress professional ethics." In May 1985, CMA issued a set of guidelines which explicitly instructed physicians not to attend to patients under the various conditions and situations associated with torture. A year later, in 1986, the CMA acknowledged publicly its open secret through a paper, "The Participation of Physicians in Torture," the complete text of which is included in the AAAS report.

It is not known whether physician involvement in torture has disappeared or even diminished in Chile. But since the release of its report, the CMA and its membership continue to oppose the policies of Pinochet's military regime. In addition to denouncing the repression of physicians and caring for torture victims, Chilean physicians now actively support human rights organizations and are calling for a return to representative government.

The association itself has investigated twenty physicians alleged to have participated in torture. So far, six of these have been suspended or expelled from the CMA—although that does not prevent

these doctors from continuing their involvement with torture, let alone their practice of medicine. Chilean physicians opposed to medical involvement in torture have suffered reprisals ranging from firing to arrest and torture. Prominent physicians and former supporters of the dictatorship have been victims, as well as longtime dissidents.

The Universal Declaration of Human Rights (which was sponsored and signed by Chile) declares: "No one shall be subjected to torture or to cruel, inhuman or degrading treatment or punishment." How could physicians who have made a professional commitment to nurture life participate in what this declaration, their professional ethics, and common-sense humanitarian morality so explicitly condemn?

The open secret may not be simply that doctors engage in torture. Through this report, we see what may happen to a profession that sets personal economic and status interests above the ethics of nurturing human life, and how immoral actions are institutionalized under military rule.



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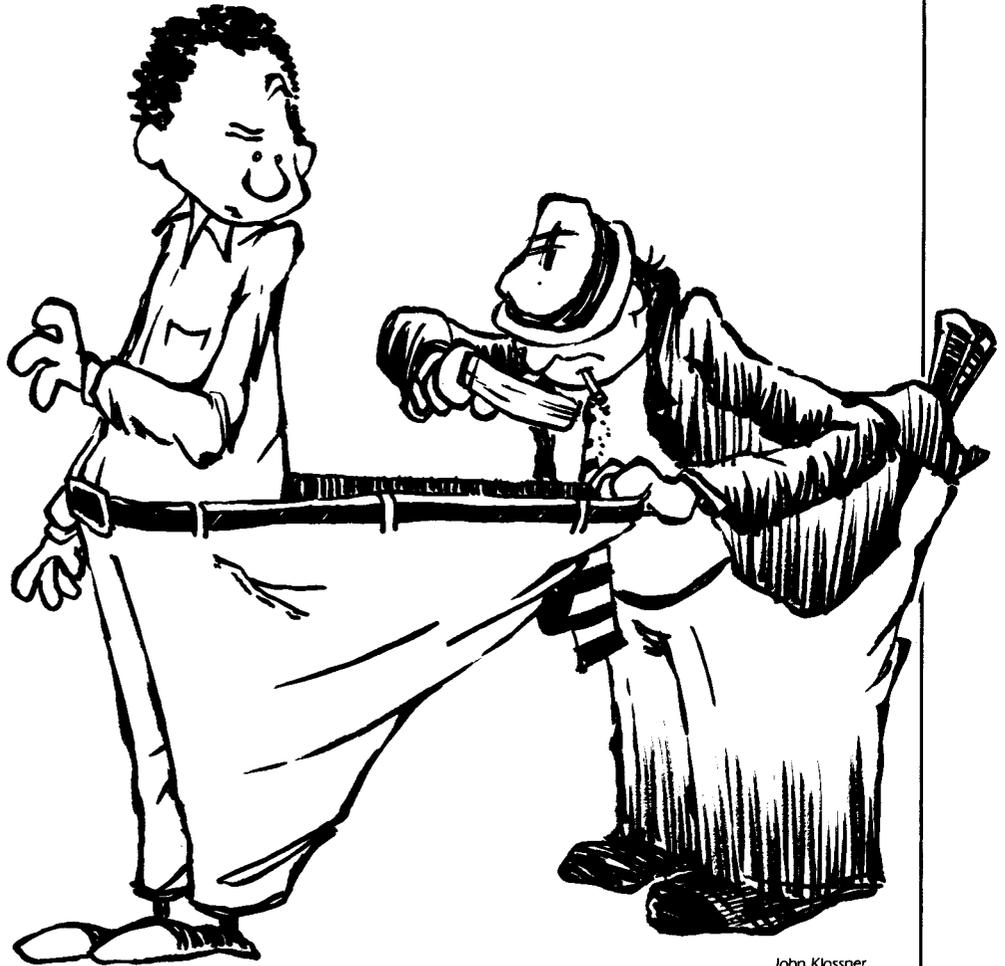
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THE STRANGE CASE OF MISSING MASS



John Klossner

BY STEVE NADIS

Editor's Note: *We at Science for the People* like to take a broad view of science. While public policy is often constrained by the dictates of four-year political cycles, issues of cosmology require attention for billions of years. Environmentalists often pride themselves on a so-called global perspective, but some matters require us to look beyond Spaceship Earth, and even beyond the confines of our own galaxy. Of all the issues confronting us, none is more urgent than the problem of missing mass: in other words, is there sufficient mass to halt the expansion of the universe? To answer this question, we called on Steve Nadis, top investigator for the Continental Detective Agency.

I was busy rearranging my sock drawer when the Old Man called me into his office. "Where's it going down?" I asked.

"The Harvard School of Cosmetology," he said.

I dragged my fat body onto the Red

Line, getting off at Harvard Square. By the time I reached the school it was too late—a riot had broken out. An old duffer was at the podium, trying to calm everybody down.

These were the facts: owing to a rash of fad diet schemes, the problem of "missing mass" had reached epic proportions. At the center of the crisis was TV flab-show host Richard Simmons, whose "Deal-a-Meal" scam had caused a quarter of a million people to lose up to 100 pounds each. You don't have to be a cosmetologist to realize that adds up to a lot of missing mass.

The question nobody wanted to face up to was where all that lard had gone and who had pinched the missing inches. Physical fitness scientists had long since debunked the myth of conservation of mass. Einstein himself showed that mass and energy were really just birds of a feather. So either I was a hop-head taking a flyer on the Purina Express, or there

Steve Nadis, aka the Continental Op, is a science writer but never loses his sense of humor.

was a lot of extra energy floating around, doing God-knows-what to innocent women and children. This is precisely the question I put to the duffer, the eminent C.W. Hemholtz, M.D., Ph.D., Sc.D., Q.E.D., ipso facto.

"Yes, we used to believe in mass-energy equivalence," he said. "But remember, Einstein was working in a different era, long before the advent of high-fiber diets and sugar-free Kool Aid."

All of a sudden it came back to me, words I hadn't heard since my last impersonation of a couch potato: "One bowl of All-Bran has less calories than ten bowls of Product 19." Of course. If the quacks in Battle Creek mistakenly upped the fiber ante, we could eat until the cows came home and still lose weight. "Doc, give it to me straight," I said. "What's the bottom line?"

"The implications are truly cosmic," he explained. If we didn't finger the mass soon, it could mean the difference between an "open" and "closed" universe. The gravitational field would weaken, meaning that stars, galaxies, taco

stands—*everything*—would continue to fly further and further apart until we all froze to death. “Miami will soon be colder than Guadalajara on the Fourth of July... *not counting windchill factor*,” he added, as I flew out.

It sounded like an open and closed case. The prime suspect was an old bunco artist from Glasgow, alias Maxwell’s Demon. Years ago, I’d sent him up for a long stretch for violating the Second Law of Thermodynamics. Now he was back on the streets, hitting the usual flim-flam circuit. But time was running out. I had a lot of questions, but few answers: Can gravity be linked to the three other fundamental forces? Were GUTs the long-sought TOE (Theory of Everything)? Or was Superstring Theory the answer? If so, how do you chase a two-bit punk across ten dimensions without getting jet lag?

The only thing we knew for sure was that the corpses were piling up fast. Dr. Pritikin was dead. Dr. Tarnower was dead. Adelle Davis was dead. And, if you believed the rumors, Simmons himself had been bumped off and replaced by a wind-up toy. If I didn’t act soon, every dietician from here to Kalamazoo would be floating down the Chatahoochee before you could solve the Schrodinger equation.

I sent my stringer Dick Foley to track down the Demon, while I headed to Elsie’s to track down some lunch. If I’d learned one thing during my 20-odd years with the agency, it was this: never chase a weight lifter on an empty stomach. I had just finished my Fresser’s Special when a shadow descended on my potato knish. Who do I see but Foley’s cheerful mug staring me in the face. “He’s over at Charlie’s,” Foley blurted.

I knew that dive. Every jailbird in town turned up there sooner or later. “Relax,” I tell the kid. “I’ll get to the Demon and the universe’s missing mass.” But first things first. I still had a knish and egg cream waiting on me.

The other thing I learned during my 20-odd years with the agency was that it never pays to eat and run. If I get indigestion, I get mean, and when I get mean, I pay less-than-usual attention to the dictates of refinement and gentility. That would upset my mother. So I took my time traversing the two blocks over to Eliot Street.

Charlie’s had the usual crowd of lowlife and other downwardly mobiles. This time, I only had to roll two out of the way to get through the door. Must have been a slow afternoon.

True to form, the Demon was

watching the Celts duke it out with the Sixers. “OK, Demon,” I said, “where’d you stash the mass?”

“Where’s the beef?” he replied. “So what if a few happy housewives lost a few inches around the tummy?”

“That’s a sham, and you know it. Even if some waistlines are shrinking—and I say *if*—the universe as a whole is expanding. It’s called the Second Law, in case you’ve forgotten.”

“Never heard of it,” he said, throwing a pitcher of Lite beer in my face.

“Demon, don’t tell me you’re into this diet stuff, too.”

“Who drinks it?” he yelled, smashing the pitcher over my head. I had the feeling this small talk wasn’t getting us anywhere. Deep down, I’m just a short, jolly fat man. Demon is a big, strapping fellow. So where’s the percentage? None, unless I could find his soft spot.

I took my hand from my pocket calculator and moved it toward him. By the time it got there, the hand was a fist. I buried the fist in the middle of his belly. That felt pretty good, so I hit it again. And again. Every time I hit it, it got a little bit softer. I hit it often.

A couple more rounds of patty-cake and he collapsed on the floor like a pool of plum pudding with Nutrasweet. “Wait,” he cried, “I can explain!”

“Don’t plead entropy, Demon. I’ve heard it before.”

I took the Demon downtown for a little chat. After a few minutes under the big lights, he was talking his head off. When he started in about his childhood, the Old Man suggested that the poor dear could use a cryogenic beauty rest. I knew just the place.

Sure enough, the missing mass was where he said it was—wrapped in Weightwatchers cookbooks in a warehouse on Commercial Street, right next to Bay State Lobster. I had Foley and company pack the blubber in crates and cart it back to the School of Cosmetology. Hemholtz was ecstatic. “I’ll nominate you to the National Academy, my friend,” he crowed.

“Save it, Doc. I’d rather hold out for those MacArthur boys. Genius like mine doesn’t fall off trees.”

I dragged my hulk to the rent-controlled flat on Hampshire Street. With the missing mass returned, it looked like the universe was closed, at least for another night. To play it safe, I reviewed my old *Quantum Gravity* text and scarfed a package of Oreos, washing them down with a quart of warm buttermilk. I gave myself a few minutes to digest. Then I got back to the sock drawer. 

EXPLOSIVES

CONTINUED FROM PAGE 15

conventional arsenal that will provide near-nuclear capabilities. An article in *Science for the People* by Derek Rasmussen (see “E.T. Go Home” in the March/April 1985 issue) described the second generation of FAE weapons as follows: “These are among the most potent of the revolutionary new explosives and warhead technologies. FAEs dispense a cloud of highly volatile fuel which, when ignited, can produce atmospheric overpressures similar to those developed by nuclear weapons. A near miss can sink an aircraft carrier or level entire city blocks.”

Canada is a non-nuclear nation, spending about \$10 billion annually to buy and develop conventional weapons and maintain its military forces. But the Conservative Party electoral landslides in 1984 signaled a shift in Canadian defense policy. In June 1987, a long-awaited Parliamentary White Paper projected defense spending to be \$200 billion over the next fifteen years. Sources in the Ottawa bureaucracy say the Canadian military establishment will use the “window of opportunity” of the Conservative government to push for substantially more than \$200 billion.

Under the Conservatives, military research at Canadian universities has skyrocketed. From 1985 through 1986, the Department of National Defense awarded over 100 contracts to 28 Canadian colleges. In 1986, DND handed out \$10 million to Canadian university researchers, an increase of 45 percent over the previous year.

Sources in Ottawa believe there is direct collaboration between the Pentagon and the Canadian Department of National Defense, a collaboration which bypasses the Canadian Cabinet. The implications of this sharing of information have yet to be explored by campus peace activists.

Is a program of Canadian research on weapons systems like fuel-air explosives symptomatic of a continuing integration of Canadian resources into the U.S. military system? Or does DND funding of research into near-nuclear weapons signal a new direction, associated with the Canadian Defense Department’s ambition to create Canada’s own military-industrial complex?

By sharing information, opponents of military research throughout North America may be able to map an international pattern of research. This work would uncover the strategic significance of specific research projects. If the present trend in Canadian university research is the first stage in the transformation of Canada from a non-nuclear to a near-nuclear power, its strategic implications go well beyond the campus. 

INTERNATIONAL CONTINUED FROM PAGE 22

effort to criminalize and intimidate the whole protest movement of women against reproductive and genetic engineering and to frighten others away from participating in order to prevent the movement from spreading even more widely."

In a report called "Political Security News" published July 24, 1986, the physicians' journal *Die Neue Arztliche* warned against the critics of reproductive and genetic technology, stating that today they are practicing "verbal radicalism," but that this might turn into an active radicalism.

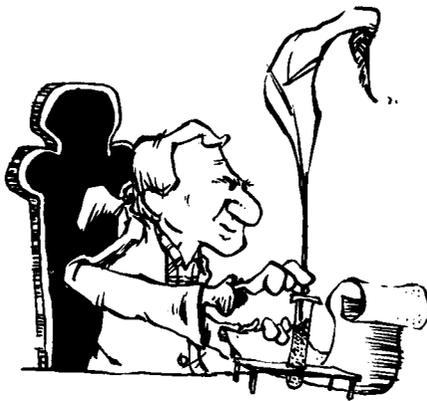
"Many organizations in Germany discuss the benefits and risks of genetic and reproductive technologies," Zimmerman said. "But in the feminist movement, as well as here at our archives, we see no benefits. We have to warn about the risks. In this sense, we are radical. We stand clearly against reproductive and genetic engineering. We think they are trying to criminalize this position and say, 'If you are radical about this, then that's a verbal radicalism which is very near to becoming an active terrorism.'"

According to Prozessgruppe Hamburg, the 1986 international Human Genetics Congress in Berlin (for which eight Berlin women's groups organized a simultaneous five-day "Anti-Genetics Congress") took place under police watch. And when women's groups met to work on the issues of reproductive and genetic engineering in Marburg, the Bundeskriminalamt warned the Human Genetics Institute and the facilities conducting genetic technology research of the meeting.

In a statement issued after the police raids, feminist critics of reproductive and genetic engineering wrote: "These police raids serve to frighten, shut up, or criminalize those who work critically against reproductive and genetic engineering. A nationwide discussion is turned into a nationwide criminal network!" According to Maria Mies, there are plans for another conference against reproductive and genetic engineering "to demonstrate that we are continuing our work."

International protests are being directed against the police raids and continued detainment of activists, including Ulla Penselin and Ingrid Strobl, who are being held in jail until they're brought to trial by the government. Supporters are asked to write letters protesting the police actions to Frau Professor Rita Sussmuth, Ministerium fur Familie, Gesundheit, Frauen und Jugend, 5300 Bonn, Federal Republic of Germany.

GRASSROOTS CONTINUED FROM PAGE 23



by small groups of technically skilled people (primarily white men). Here technology is viewed as a social and historical invention that promotes a particular perspective—that of the ruling elite. But because of its present complexity, the enlightened critic is left powerless to change the system, albeit with some capacity to affect technology in minor ways. Holding to this definition forces teachers into the role of critical passivity, hardly a model for active informed citizens. Teachers are then reduced to training students to be cynical social critics who are unhappy with the status quo but powerless to do much about it.

• *Liberating-active:* Technology is a complex, consciously directed group of social activities involving a wide range of skills, exemplified by scientific research, managerial experts, and practical and inventive abilities, which is controlled by an informed populace that actively debates and negotiates its implementation. This view recognizes that the analytical-passive definition needs an activist-democratic element.

As Lewis Mumford wrote, "from late neolithic times in the Near East, right down to our day, two technologies have recurrently existed side by side: one authoritarian, the other democratic, the first system-centered, immensely powerful, but inherently unstable, the other human-centered, relatively weak, but resourceful and durable." As advocates of activist, democratically implemented, human-centered technology, teachers must employ a philosophy of education that develops active, democratic students whose task is to transform society, through public discussions and debates, into an ecologically humane community.

The implications of these three definitions were the focus of lively discussions based on the experience of the workshop participants (all skilled public school teachers) and instructors. As a consequence of the workshop, there was

an unleashing of enthusiasm and deliberation which demonstrated that, given proper support and respect, public school teachers display those qualities of intelligence and concern similar to Gramsci's "organic intellectual." And teachers, as "organic intellectuals," are an important untapped resource with great potential for fostering progressive social change.

The following "Bill of Rights for the Use of Technology in Education" applies to the educational community, which includes students, teachers, counselors, administrators, staff, and parents. It was written by participants at the Teaching for a High-Tech Future Workshop at Dominican College in May 1987.

1. We have the right to become technologically literate, including the right to become educated in the following areas:

- a. Basic technological skills
- b. Awareness of the relationship between morality and technology
- c. Awareness of the impact of technology on society in the past, present, and future.

2. We have the right to determine through a democratic process if, when, how, and why technology is used in education. This requires an ongoing needs assessment, discussion, and evaluation procedure.

3. We have the right to a technological education that is humanistic: that facilitates cooperation, not competition; that encourages the empowerment of individuals and groups, and not passivity; and that is promoted as only a part of the learning process which emphasizes human interaction, communication, and decision making.

4. We have the right to equal access and equal opportunity to technological education. All school districts, all schools within every district, and all students within a given school will have an equal opportunity to technological education.

5. We have the right to learn from teachers who are well trained in technological education and who understand the limitations and strengths of the given technology.

6. We have the right to control the use of technology in order to maintain and/or create jobs.

7. We have the right to time, compensation, and ongoing support to ensure that these rights become a reality.



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