A NATIONAL SYMPOSIUM ON THE MEDICAL CONSEQUENCES OF NUCLEAR WEAPONS AND NUCLEAR WAR

For two days, on February 9 and 10, 600 physicians, students, and other concerned citizens sat in awe as the nation's leading experts on nuclear weapons and war described the most likely end of the human race. Organized by PSR and sponsored by the Harvard and Tufts Medical Schools, the symposium was called *The Medical Consequences of Nuclear Weapons and Nuclear War.*

The meeting had four parts: Nuclear Weapons Production; Short and Intermediate Term Effects of a Nuclear War; Long Term Effects; and Political Considerations. Introducing the program was Howard H. Hiatt, M.D., Dean of the Harvard School of Public Health. In a quiet delivery he summarized the anticipated medical consequences of a nuclear attack on a typical American city. Citing from a report on the topic written twenty years ago for the *New England Journal of Medicine,* he said that in a city the size of Boston 2.2 million would die in the short term. The majority of physicians and nurses would be dead. Acutely ill survivors would have a doctor:patient ratio of one to 1700. Virtually no facilities would be available to handle the multiple cases of burns, lacerations, infections, fractures, and hemorrhages. The only viable solution for a medical problem of that magnitude, he stated, was prevention. It was this concept that served as the major theme of the conference. Without a trace of rhetoric he asked the question, "Will this be our last epidemic?"

Herbert L. Abrams, M.D., Radiologist-in-Chief at the Peter Bent Brigham Hospital addressed the critical question of whether medicine is ever linked to politics. "Since time in memoriam," was his answer. "We have failed to control technology and man." Germ and chemical warfare have been outlawed, but nuclear weapons have not.

The proliferation of such weapons was the theme of Dr. George Rathjens, Deputy US Special Representative for Non-Proliferation Matters, US Department of State. He pointed out the vital link between nuclear power plants and the capacity to fashion nuclear weapons. There are two pathways from nuclear reactors to nuclear weapons. The first is by reprocessing spent fuel to extract plutonium. The second is by enriching uranium 235 in a small plant. He reported that the technology for such work is getting simpler. The U.S. and West Germany have exported the technology to Brazil and India, both of whom are now thought to have nuclear weapons capacity.

Carl Johnson, M.D., the Director of Health in Jefferson County, Colorado, discussed some of the medical consequences of weapons manufacture. A 1957 fire destroyed part of the Rocky Flats weapons facility in Colorado. From 1971 to 1977 dosimeters on the eastern boundary of the facility registered the world's highest levels of plutonium in the environment. In a subsequent analysis of Colorado cancer and leukemia data Dr. Johnson showed a correlation between plutonium exposure and increased risk of developing these diseases. In areas of peak plutonium exposure, leukemia death rates doubled, and carcinoma of the testis, where plutonium is known to concentrate, rose from an expected incidence of 18 to an observed incidence of 40 cases.

Dr. Arthur Tamplin warned that the issue of nuclear waste is a growing problem. By the year 2000, uranium tailings in the U.S. will emit 400,000 curies of radon gas a year, which, when delivered to a population of 300 million, could result in 400,000 cases of cancer, and a presumedly comparable increase in the number of genetic defects. He sharply criticized the Department of Energy's WIPP Project, which is a proposal to dispose nuclear wastes below ground in Carlsbad, New Mexico. He pointed out that the DOE has apparently selected the site first, and then gone about the task of tailoring site selection criteria to fit the location. A similar situation occurred when a site chosen in Kansas was rejected only when an independent test by the Kansas Geological Survey showed that the intended site was filled with holes, and leaked 150,000 gallons of water immediately on infusion.

The afternoon session began with Dr. Bernard Lown, the Harvard cardiologist. He observed that a billion dollars a day are spent around the world for armaments, yet for a medical problem like cardiac death, which kills a person a minute, the U.S. only spends $10 per victim. He reminded us of the remark of John F. Kennedy, that "mankind will either put an end to war, or war will put an end to man."

J. Carson Mark, former Director of the Theoretical Physics Division at Los Alamos, described the physics of damage caused by burns, blasts, and nuclear radiation. Most trenchant were his comments about the proposal for the MX Missile system, which is a plan to shuttle nuclear warheads about Utah and Nevada to protect them from attack. By increasing the number of empty stations to twenty times the number of filled ones, the MX would be invulnerable to the Soviet arsenal *as limited by SALT II.* But the MX itself places SALT II in jeopardy and, moreover, even if SALT II passes it will expire before the MX is completed. Therefore, Dr. Mark suggested, "you just increase the number of incoming missiles twenty times and hit every place the gopher sticks his head out of the hole."

Missile placements constitute so-called "hard" targets; cities are clearly "soft," or vulnerable. H. Jack Geiger, M.D., spoke to the issue of civilian defense. He pointed out that a single megaton bomb would cause a fire with a twenty mile radius. The only survivors of the fire bombing of Dresden were people who *left* their shelters. The rest died from suffocation. These facts did not even take into account deaths from blast and radiation, nor from the rupture of the social fabric itself, the loss of which would destroy any meaning to the concept of medical care. To pretend there is a defense is to mislead, he warned. In passing he noted that it was 18 years since he and others wrote *The Fallen Sky,* a classic series of papers on the topic, and then proferred this belief: "I don't think we will have another 18 years."

Dr. Robert J. Lifton, the Pulitzer Prize winning author and psychiatrist, described the psychological effects of the nuclear attacks on Hiroshima and Nagasaki. Even with programs of rescue and rehabilitation, survivors of those attacks continue to carry the taint of death, through a legacy of leukemias, cancers, and social ostracism. Their social fabric has not been rebuilt.

Salvador E. Luria, Nobel laureate and Director of the MIT Center for Cancer Research, introduced the section on the Long Term Effects of Nuclear War. Bernard Feld, Editor-in-Chief of the *Bulletin of the Atomic Scientists,* recounted a history of the nuclear arms race. He ended on the ominous note that America's announced strategic policy no longer pays homage to deterrence (the threat of inflicting unacceptable damage if attacked) and instead condones "counterforce" (the threat of striking an opponent's military targets so as to disarm them and prevent retaliation). He warned that if the U.S. deploys the mobile MX missile it would eventually spur such an increase in fire-power on both sides that even a "limited" strategic war, with no targeting of civilian populations, would result in lethal doses of radioactive fallout for everyone on earth.

Fallout is more than a theoretical danger. So reported Dr. John Gardner from the University of Utah. He presented epidemiological data linking childhood leukemias to atmospheric fallout that occurred from atomic bomb tests in Nevada in the 1950's. Although 18 cases were expected in his population sample, 32 cases were found. These data were reported in the New England Journal of Medicine last year.

The largest body of data on the subject of radiation effects on people may be from the Radiation Effects Research Foundation in Hiroshima. Dr. Stuart Finch, the Foundation's former Director of Research, covered this vast subject. Following an epidemic of leukemias, there has been a slow but steady rise in the occurrence of other cancers. In addition a variety of genetic studies are in progress.

The projected effects of a nuclear exchange today dwarf by orders of magnitude the observed past effects in Japan. Henry Kendall, Professor of Physics at MIT, and Chairman of the Board of the Union of Concerned Scientists, underscored that point with computer-like precision. He outlined several "scenarios" of nuclear wars that are thought possible, depending on the targets chosen to attack. A strike against a nation's industrial centers would have one effect, a strike against its key services, such as oil refineries, another. But the probability that such attacks would be limited to selected targets seemed remote, so that one scenario forecast first a strike against weapons, followed by a counterstrike against industries, leading to a decimation of the population centers.

One paradigm was a single megaton attack on 71 of the top 119 U.S. industrial centers. 60 to 65% of the nation's manufacturing would halt, including 97 to 98% of the key industries, and 80 to 90% of our food processing capabilities. At 30 days post-attack, up to 90% of Americans would be dead. Radioactive contamination would be compounded by the release of isotopes from nuclear power plants. Widespread disruptions in the biosphere would increase ultra-violet light, skin cancers, snowblindness, crop failures about the globe, and an infestation of roaches, which are radioresistant up to 400,000 rads. Recovery would turn into a race to command survival stocks amidst a culture of chaos. In short, recovery would not be possible. With this single attack paradigm we face nothing less than an end to civilization.

If the audience had any preconceptions before this point, it had become clear that prevention, as Howard Hiatt had seen, could be our only rational alternative. Rear Admiral Gene La Rocque, Director of the Center for Defense Information, provided the symposium with insights into the military view of the problem. The U.S. is *planning* for a nuclear war. We have nuclearized our conventional forces. Seventy percent of our naval combatants carry nuclear weapons, and the Navy's officers are prepared to use them. Detailing a situation dramatically at odds with cries that the U.S. "is *behind* the Soviet Union" in nuclear weapons, Admiral La Rocque affirmed that the U.S. has led the U.S.S.R. in every nuclear system by three to five years. Worse, in the next ten years the MX and Trident systems will add 20,000 more hydrogen weapons to the armamentarium. He was critical of President Carter for increasing spending on nuclear weapons by 70%, and for refusing even to talk to Chairman Brezhnev about an offer to reduce Russian troops in Europe.

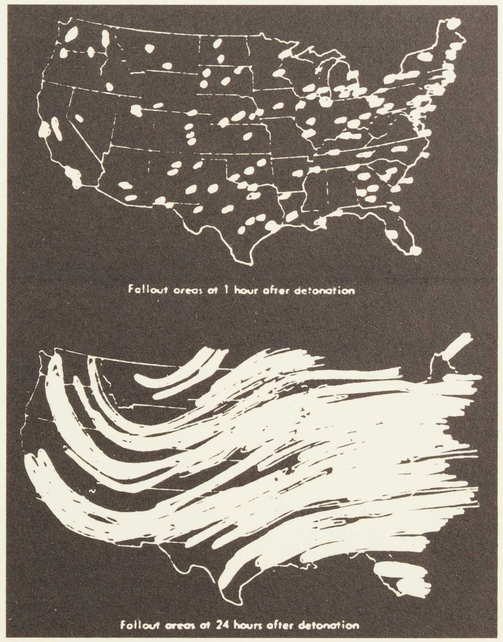
Dr. George Kistiakowsky followed. He is no stranger to Presidents, having served in the administrations of Eisenhower, Kennedy, and Johnson. He was equally harsh on President Carter, whom he scored for "dragging his feet for a year" on the SALT II Treaty. In a complex world the U.S. has had a childishly simply foreign policy: to threaten nuclear war as a major political instrument. The Soviet invasion of Afghanistan he sees as a victory for the hawks in the Kremlin, and for the military contractors here at home. Until the SALT delays and the deployment of U.S. missiles in Europe this past year, the Soviet hawks had been held in check by hopes of detente. "Many years will be needed to repair the damage Jimmy Carter and Brezhnev have done to the world," he said.

Professor Kistiakowsky's recommendations were straightforward: the U.S. should stop testing nuclear weapons; we should stop building them; we should take all nuclear weapons out of Europe; and we should announce to the world that we will not use nuclear weapons **first.**

In obvious admiration for the past Presidential advisor, Admiral La Rocque said of Kistiakowsky as he sat down, "You were a giant among the greats."

Summarizing the world's prospects for peace was Dr. Betty Lall, the U.S. Representative to the United National Panel of Experts on International Disarmament. She agreed with the foregoing presentations of increasing nuclear danger, but injected a clear note of optimism, "because there is so little that we've done so far, and there's a lot we *can* do." She pointed out that since 1945 the total results of nuclear treaties signed by the U.S. were the Partial Test Ban Treaty and the first SALT agreement, achieving virtually no disarmament.

She proposed a number of key steps towards world security: a treaty on non-intervention by one nation in the affairs of another; diplomatic intervention by world powers at the level of the United Nations to stop large scale violations before they progress to a flashpoint; the solving of regional troubles regionally with commissions and without the superpowers; more work on SALT II; improved public understanding of the issues through accurate information; and a mass movement to stop the arms race.



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