As a public service,

THE LAUCKS FOUNDATION

from time to time calls attention to published material that might contribute toward clarification or understanding of issues affecting world peace. The accompanying reprints constitute Reprint Mailing No. 78.

(Mrs.) Eulah C. Laucks, President
Post Office Box 5012
Santa Barbara, CA. 93150-5012

November 25, 1985

The following is quoted from Calculated Chaos : Institutional Threats to Peace and Human Survival, by Butler D. Shaffer, (Alchemy Books, S.F. 1985)p.135:

"I have no doubt that the war system will come to an end someday, and that the earth will experience total and unconditional peace. The only question is whether mankind will be around to enjoy it. If the human race is to survive, we must be prepared to abandon the political, religious, and ideological divisions that have nourished the war system. Those who persist in their efforts to reconcile peace with the interests of the State in organizing and controlling people should learn that there is no such thing as a peaceful form of conflict. In the past, the political State has asked 'who will defend our nation,' or 'who will defend freedom,' or 'who will defend democracy?' But if life on this earth is to continue, we must now ask 'who will defend mankind?'"

(EXCERPT)

THOSE WHO END WAR

NOW and then someone comes along who says simple things about the prospect of nuclear war—things which interrupt and in effect silence all the talk about "arms control." This talk is largely senseless because it accomplishes nothing. The "simple things" need to be said, that is all. For example, in his Pugwash address in 1984, Hannes Alfvén, the eminent Swedish physicist, declared that scientists, whatever else they do, should tell the public the truth. This means to stop using euphemisms. As he put it,

> An important euphemism is "nuclear arms." It gives the impression that these are similar to old-fashioned arms. At the back of their minds, people may associate them with brave knights who fight in shining armor. But the criminal pressing of a button which will kill millions, if not billions of civilians including women and children, or rather torture them to death, has nothing to do with heroism. I think that "annihilation" is a more precise definition. . . . Similarly, money for developing and manufacturing annihilators should not come from defense funds, but from funds for "mass murder of civilians." . . .
>
> Planet Earth cannot accommodate both life and nuclear technology. One of us—life or nuclear technology—has to be buried forever. We have to choose.

One can hardly ask more of a scientist than a forthright statement such as this. He leaves nothing more to say, which is as it should be. If the press of the world had picked up his statement and put it on page one, all around the world, when it was made, the editors and publishers of newspapers might have had a problem of filling all the space usually devoted to "arms control," but there are, after all, other things much more worth writing about. But the talk about arms control is what they want, and what they print.

To print Alfvén would be to press their readers to moral decision, and they are not ready to do that. Neither the writers nor the readers are ready to do that. But since, if war comes, it will come whether we are ready or not, it makes equal or far more sense to propose the need for moral decision. A few men and women have already done so. Unfortunately, they are largely ignored. Yet they have their effect.

This way of thinking about the prospect of war is suggested by a book that came out a little earlier this year—*Plowing My Own Furrow*, by Howard W. Moore. It was issued by Norton, a publisher responsible for other important works. (This book is $12.95.) Moore is a man—he is still alive, at ninety-five—who at the outbreak of World War I decided he could not be a soldier. After the Conscription Act was passed in May, 1917, when Moore was twenty-eight, he decided to register. He explains:

> The question of voluntary registration for conscription was a hard one over which I pondered long. Draft evasion was much in the news; it was later estimated that over 125,000 "slackers" had failed to register. I didn't want to evade anything; I wanted to oppose war openly and take the consequences.

He turned in a protest to his draft board when he registered. At the end of the year he sent a formal deposition to his board:

> I am not a member of any religious sect or organization whose creed forbids me to participate in war, but the convictions of my own conscience as an expression of my social principles forbid me from so doing. I hold that all war is morally wrong and its prosecution a crime. I hold life as a sacred thing and cannot bring myself to join in the slaughter of my fellowmen. Moreover, I claim the same rights and considerations as are accorded under the law to members of a well-recognized religious sect or organization whose principles forbid their members to take part in war.

He did not conceal his ideas from others and he soon lost his job—a good one—with the telephone company. Then, when the draft board ordered him to report for duty, he wrote:

> In acknowledgement of the receipt of your communication ordering me to appear for military service on April 29, I wish to advise you that I shall report in compliance with the law but again wish to emphasize the fact that as a conscientious objector, I shall refuse to accept either combatant or noncombatant service.

He was sent to Camp Upton on Long Island, where he refused to put on the uniform issued him. This brought a storm of abuse, the beginning of systematic mistreatment.

> Returning to the barracks, I sat on my bunk, ignoring the whistles and shouts to line up for reveille and retreat. These ceremonies over, an officer with two sergeants appeared in the barracks. The sergeants grabbed me and threw me out of the second-story window. I landed on the cinders of the company street with the window sash around my neck.
>
> Aside from some bruises, I was unhurt and at once demanded to see the captain of the company. He was a former Episcopal minister who was teaching bomb throwing. We got into a great argument about that, and he finally shouted at me, "I won't have a man like you in my company!"
>
> The company to which he had me transferred was composed of men with venereal diseases. Petty officers constantly threatened me with infection.

After a week had passed all the COs in Upton were put in one barracks, about fifty of them. Some were religious objectors, many of whom were discharged for "inadequate personality."

> The rest were radicals of one sort or another. They included a few who became my lifelong friends, Evan Thomas, Roderick Seidenberg, and Julius Eichel among them. We exchanged ideas and experiences and had lectures every night, largely autobiographical talks so that we would know each other's background and reasons for opposing the war.

These men often turned out to be distinguished citizens in the years to come. Evan Thomas, Norman's brother, became Professor of Clinical Medicine (assigned to syphilis) of the New York University College of Medicine and a visiting physician at Bellevue Hospital. Seidenberg became a distinguished architect and author (he wrote *Post-Historic Man*). All these men were segregated at Upton:

> Uniformed men were forbidden to talk with us, under threat of court martial. Nevertheless we heard ugly rumors. One concerned Ernest Gellert, brother of a well-known artist on the *Masses* magazine. For no obvious reason, he and another CO had been taken to the outskirts of the camp, where a squadron of soldiers ordered them to dig what they thought were to be their graves. They refused and were knocked unconscious. When they came to, they were made to stand in holes the soldiers had dug. If they leaned against

the sides, they were prodded with bayonets. It was winter, and water collecting in the holes froze around their feet. At the end of the day the second man was returned to his barracks. The next morning Gellert was found dead. According to the report, he had *borrowed* a rifle from his guard and shot himself, as a means of publicizing the CO problem.

Another CO, named Clody, was said to have had his jaw, nose, and frontal bone crushed by repeated blows from the butt of a rifle for refusing to clean the floor in a guardhouse cell. His face was restored to some semblance of the original by plastic surgery using a silver plate. I believe the records of the American Civil Liberties Union can verify the essential facts of these two cases.

All these men were eventually sent to the military prison at Leavenworth, Kansas, where the noncooperators were shackled to the bars of their cells and made to stand for nine hours a day. Nearly all of them had been sentenced to twenty-five years in military prison, and four of them given death sentences, later commuted to the penalty given the other men. Moore's book, and other accounts by Evan Thomas and Harold Grey tell the same story. At Leavenworth Moore learned about what was done to the Hutterite objectors from the man in the next cell, Jacob Wipf.

In the wartime drive to sell Liberty Bonds, the Hutterites in their community near Alexandria, South Dakota, refused to buy the bonds but offered to contribute to the Red Cross instead. This did not satisfy their patriotic neighbors, who rounded up the Hutterites' cattle, sold them at auction, bought Liberty bonds with the proceeds, and threw the bonds into the Hutterite church building.

Then the local draft board decided that since the Hutterites farmed communally, the women and old men could harvest the crops and the young men would be subject to the draft rather than having the usual farm exemption. Jacob Wipf, a blacksmith, and four brothers in the Hofer family were taken forcibly from their homes. Refusing to put on uniforms, they were sent to Alcatraz Prison, where they were forced to stand in the dungeon clothed only in their underwear. The dungeon hadn't been used since the Spanish-American War. Sea water seeped through its walls and stood on the floor.

An alert reporter for the Hearst papers discovered their plight, and the resulting publicity forced the government to do something; the men were transferred from Alcatraz to solitary confinement in Fort Leavenworth. The Hofer brothers contracted pneumonia, and two of them died at Leavenworth. One of the bodies was returned to the Hutterite community dressed in the uniform which the men had refused to wear.

Moore and other absolutist COs had refused to eat because the Army would not prepare their meals. When these men were asked if they were willing to work, they refused, and in consequence were sentenced to "two more weeks in solitary, shackled as before for nine hours daily."

But this time we were to receive full diet. I looked forward to my first meal in two weeks. It consisted of a plate of soupy beans, which the guard shoved under the cell gate and then deliberately spit into. If this was intended to curb my appetite, it was successful. I continued to live on breadcrusts, the *pièce de résistance* of the various garbage that was offered to us. . . .

One day Jane Addams of Hull House in Chicago, accompanied by two other ladies, one of whom I think was Emily Green Balch, author of *Approaches to the Great Settlement*, visited our wing of the prison and talked with each of the thirty manacled COs about conditions there and especially about our health. As a result of this visit we were given wooden pallets to lie on and one army blanket apiece.

Where did these men get their determination and courage? They were men from various walks of life, with different backgrounds and beliefs. Yet no one of them was willing to enter the Army and be trained to kill other men. If there is ever to be real peace in the world, it will be because there are more men like that—men who refuse to harm other human beings. Moore gives a clue:

Now, half dozing on my manacled arms, I heard the voice of Arthur Denham, a religious objector who had shared our tent at Fort Riley during my hunger strike, asking, "If you don't believe in God, what sustains you?" and I answered him again, "My own sense of moral responsibility. To accept an authority outside oneself is to deny oneself the right to make an ultimate decision. Understanding that and the consequences likely to follow is to know freedom in the deepest sense."

Freedom! Can there be any freedom under military authoritarianism? Emphatically, yes. Though brutally confident, I can still fight for the ideals in which I believe.

Howard Moore, still a farmer in Cherry Valley, New York, ends his book:

Now, at ninety-five, I have not changed my mind. I believe the present generation is witnessing the twilight of the nation-state. Unless the human species arrives at a spiritual and intellectual awareness of our interdependence and establishes a world community using the earth's resources for the benefit of all, we are headed for extinction.

Louis C. Jones says in his introduction to *Plowing My Own Furrow:*

As World War I approached this side of the Atlantic, Moore gave increasing thought to the whole question of war itself. It was more than a moral aversion to killing another man caught in the same trap he was; rather it came down to a "deep philosophical and political conviction that war was futile and its use as an instrument of national policy a confession of moral bankruptcy." The starting place for his revolt was conscription and a refusal to obey any military order. The price Moore paid over the next three years, until Thanksgiving 1920, was paid in guard houses, isolated barracks, and prisons of varied horrors. His treatment and that of other conscientious objectors is a disgraceful chapter in our military and political history and one that needs to be understood.

The confusion, puzzlement, and frustration this man created in the military authorities, to whom obedience was unquestionable, can only be imagined. Neither violence nor sweet reasonings would move him from his obdurate refusal to recognize the right of the military principle to control the nation's life.

Who are these men who have personally solved the problem of war, who know what to do and what not to do? They are men with the conviction to stand against the weight of the world, for whom the highest authority is their own sense of responsibility. What is it in a man that gives this strength, this conviction and enduring courage? If we want peace, we need to find an answer to this question. All the rest is no more than talk.

SUBSCRIPTION RATES

1 Year $10 **2 Years $18** **3 Years $25**

Students and others with low income who find it difficult to keep up with rising costs may subscribe at the rate of $7.50 for one year, and $14 for two years.

A free sample issue will be mailed on request

MANAS PUBLISHING COMPANY

P.O. Box 32112, El Sereno Station, Los Angeles, Calif. 90032

SCIENCE (Reprinted with permission. Copyright 1985 by The American Association for the Advancement of Science)
Vol. 229, pp. 1245-46/20 Sept. 1985

A Grim Portrait of the Postwar World

"Nuclear winter" may be the least of our worries, according to an international study; starvation seems more likely

A controversial theory that nuclear war will dramatically alter the earth's climate and environment has won a new endorsement from a prestigious scientific group. The group, a branch of the International Council of Scientific Unions, says that "there is substantial reason to believe" that such a war could produce a phenomenon popularly known as "nuclear winter." In addition, the group says, a major war could sufficiently disrupt agricultural productivity to create a substantial risk of mass starvation, even in countries untouched by bombs.

These are the principal conclusions of a 2-year, $600,000-study by the Scientific Committee on Problems of the Environment (SCOPE),* in which more than 300 scientists from 30 countries participated. Released on 12 September during a SCOPE meeting at the National Academy of Sciences in Washington, D.C., the 850-page study reflects the latest research on several aspects of nuclear war, according to Gilbert White, an emeritus professor of geography at the University of Colorado, who served on the steering committee. The chairman was Sir Frederick Warner of the University of Essex.

With regard to postwar climate, for example, the report suggests that temperatures in some regions of the Northern Hemisphere could indeed drop by as much as 35 degrees and that light reaching the earth's surface could be diminished by more than 90 percent, as dust and soot pour into the atmosphere.† But it discounts the relative importance of smoke from forest fires and emphasizes the necessary contribution of fossil fuel combustion in urban or industrial centers. It also highlights the seasonal nature of any adverse effects—if the war occurred in wintertime, ironically, the effect on light and temperature may be slight.

Once in the air, some of the smoke will be eliminated by precipitation. No one knows how much, but the study authors discount recent forecasts by Edward Teller, Fred Singer, and Jonathan Katz in *Nature*‡ that moisture in wood and fuels will condense and ultimately wash a lot of smoke from the atmosphere. "The significance of these quantities of water vapor for precipitation and particle scavenging is easily exaggerated because of a common misconception," they state. Specifically, they suggest that much of the moisture will not condense, and that any precipitation will occur well below the smoke layer.

Smoke that is not eliminated could start to spread to southern latitudes within 1 or 2 weeks, the report says, where it will begin to play havoc with local precipitation and, consequently, agricultural productivity. In particular, "the convectively driven monsoon circulation, which is of critical importance to subtropical ecosystems and agriculture and is the main source of water in these regions, could be essentially eliminated," the report says. What rainfall occurs will probably be at sea, or strictly along the coastline. As a result, much of the Sahel, India, Southeast Asia, China, and Japan could suffer both unusually low temperatures and a prolonged drought. El Niño, the natural warming of the ocean at the equator, might also be disturbed.

Agricultural production will be hampered not only by the adverse climate but also by "radioactive contamination, uncontrollable fires, loss of fertilizers and pesticides . . . and destruction of major ports and facilities of the global food distribution network," the report says. In some countries, mass starvation would result if a single growing season was eliminated, due to inadequate food stores and a cessation of trade. As net food importers, China and Japan are particularly vulnerable, but even nations that feed their own populace—such as Brazil or Australia—would suffer from lack of access to liquid fuels needed for food production. Many of the countries that export such commodities will be directly attacked.

The report goes so far as to suggest that starvation could be the primary cause of death after a nuclear war. "This vulnerability is . . . not currently a part of the understanding of nuclear war," it says. "Not only are the major combatant countries in danger, but virtually the entire human population is being held hostage to the large-scale use of nuclear weapons."

On a more positive note, the report indicates that a major conflict probably will not cause the extinction of mankind, as some suggested when the "nuclear winter" phenomenon first came to light. "That a person or group in a combatant country might find a way to escape the effects of radiation, societal disruptions, climatic alterations, and the host of other potential disruptions, and still continue to survive seems possible, even in devastated areas," the report says. "That billions of people could do so" is considered unlikely.

The authors also note that a large proportion of the world's population will not die of cold; that the earth's climate will eventually return to normal; and that, contrary to wide belief, global fallout is "comparatively not of major concern" as a cause of death, particularly in the Southern Hemisphere. Radiological doses there will probably be 5 percent of the Northern Hemisphere dose.

Finally, the authors explicitly caution that their study should be seen as "a point of departure rather than a completed investigation," and suggest that a permanent committee be formed to keep tabs on the latest research and issue periodic reports. They also support continued exchanges on the topic between scientists and military planners, and between biologists and physical scientists. Numerous uncertainties, relating to smoke generation and global weather effects, as well as the distribution of food and agricultural recovery, remain to be addressed, although some may never be solved.—R. JEFFREY SMITH

---

*_The Environmental Consequences of Nuclear War_ is available in two volumes from John A. Wiley & Sons in New York.
†This is the amount estimated for "northern midlatitude continental interiors" after a summertime conflict in which 12,600 bombs had been detonated, generating roughly 150 million tons of smoke.
‡ 23 August 1984 and 4 October 1984.

20 SEPTEMBER 1985

NOTEBOOK

Music for crows

By Lewis H. Lapham

(Reprinted from HARPER'S Magazine October 1985. With permission of the author)

Money is a kind of poetry.
—Wallace Stevens

When listening to a politician talk about public money, I think of my great-aunt Evelyn, who, at the age of sixty-three, took up a career as an opera singer. Every afternoon between the hours of three and six—wandering through the halls of a house in which the servants fled the sound of her approach—she sang, loudly and in a false soprano voice, selected arias from the works of Wagner and Puccini. When her teacher pronounced her the equal of Tebaldi she hired Town Hall for her debut. The performance was well attended. My great-aunt had taken the precaution of informing her many friends, relatives, and dependents that anybody marked absent from the occasion would be deemed ineligible for a place in her will.

The concert lasted for nearly three hours, without intermission. Holding herself firmly erect in front of the grand piano (she was a large woman, not given to frivolity or theatrical expression), my great-aunt sang her entire repertoire. Every now and then she made an inexplicably sudden and imperious gesture with the palm frond that served as her only prop. On the dying of the last, unhappy note the audience rose to its feet in a storm of tumultuous applause. Cries of "Brava!" echoed through the hall. The accompanist bowed deeply and kissed the diva's hand. A destitute nephew came forward bearing roses for which he had pawned his watch. A daughter-in-law was heard to remark that never before had she understood the importance of Gluck.

The scene comes to mind during President Reagan's press conferences, or while reading accounts of the congressional effort to impose order on the chaos of the federal budget. I listen to the politicians make speeches, and I think of my great-aunt Evelyn singing in German. The more unintelligible their remarks, the more likely their good faith will be accepted at par value. To make the mistake of being too clearly understood (i.e., of allowing the public to see them feeding on the public treasury like crows on a newly seeded field) would result in the loss of their allowances.

For any readers still in doubt about the comic brilliance of their performance, I have collected a few program notes:

1. The United States is bankrupt. The national debt exceeds $1 trillion, and unless the government debases the currency, it has as little hope of repaying its loans as do the governments of Brazil, Mexico, Argentina, and Peru.

2. Nobody can afford to say that the United States is bankrupt. All the other moneyed nations of the world, among them Japan, Saudi Arabia, France, and West Germany, hold substantial reserves of American dollars. If the United States were declared bankrupt, the assets of the moneyed nations would vanish as surely and as silently as the morning dew.

The fear of this possibility stifles the impulse to laughter and allows the opera company in Washington to mount whatever productions engage its fancy. Like the audience at my great-aunt's concert, the national media must keep up the facade of applause. So must the nation's creditors.

James Baker, the secretary of the treasury, could appear on television in medieval armor, and the *Wall Street Journal* would find a reason to welcome his return from Valhalla. If President Reagan arrived from California one Thursday morning in a helmet mounted with reindeer horns, Tip O'Neill and a chorus of knights would sing a hymn of praise to his triumph over Fafner.

3. Given an honest mechanism for the regulation of international finance, the United States, like any other former colony reduced to penury and agriculture, would be obliged to submit its accounts to the auditors from the World Bank and the IMF. The premise sets up the situation of an *opéra bouffe*—the President and his companions cast in the roles of spendthrift despots being instructed in the virtues of thrift. The bearers of bad news (a trio of Africans in Moor-

ish costume) explain (*recitativo*) that if the United States wishes to continue to borrow money at favorable rates, then it must abandon its pretensions to military splendor. Caspar Weinberger, sullen in full-dress uniform, sings an aria (*andante cantabile*) about the rust on his sword.

4. The pox of the national debt reflects the inability of a democracy to make choices. Like the deficit, now running to approximately $200 billion a year, the debt stands as bleak testimony to the fraudulence of the nation's politics. Few politicians have the courage to refuse payment of the ransoms demanded by the interests that maintain them in office. None of them can distinguish between luxury and necessity—for the good and American reason that one man's luxury (the tobacco subsidy, say, or the interior electronic decoration of a Trident submarine) is another man's necessity, and who but a despised elitist can choose between them.

The politicians recommend austerity on the part of other interests in other rooms. Their vows of patronage remain as sacred as their oaths to Wotan.

5. Under the rules of political economy prevailing in a state that insists on the higher fiction of egalitarianism, everybody is entitled to everything. If freedom is defined as the freedom to buy, money must become an infinitely expanding resource, like God, or sunlight, or greeting card sentiment. If there isn't enough of it, the fault lies with the agents of an evil power—with the Russians or the Democrats or the Japanese, with the plutocrats or the grasping poor, with Scarpia or the Grand Inquisitor. The fault is never found in one's own vanity, ignorance, or greed.

6. As the country descends further into the maelstrom of debt, the presence of economists becomes increasingly imperative on all public and ceremonial occasions. They serve as shills for the wisdom in office—as directors of corporations, as seers resident in the White House, as oracles publishing prophecies in the newspapers. It is their business to mumble prayers and redistribute the blame. In most circumstances it makes as much sense to take seriously the predictions of Paul Volcker or the editors of *Forbes* as it does to rely on the financial acumen of J.R. Ewing, Henry Kissinger, or Blake Carrington.

7. The apparent prosperity associated with the President's economic policies has been paid for with other people's money. Foreign investment in the United States finances the American deficit, and the federal government last year paid the alien holders of its notes $19.6 billion in interest. Within five years the interest payments could amount to $100 billion, which might prompt the company in Washington to stage socialist pageants in which the heroes of the people carry flags, repudiate our debts, and denounce the wickedness of the international banking conspiracy.

8. If the present dilemma were to be resolved in a peaceful or benign manner, it would be necessary not only to distinguish between luxury and necessity but also to keep in mind the distinctions (suggested in 1927 by Ezra Pound) between transient, durable, and permanent goods. Transient goods include fresh vegetables, F-16's, rock concerts, legal fees, tennis lessons, pornography, and MX missiles. Durable goods include well-constructed buildings and roads, decent education, intelligent farming, and afforestation. Permanent goods include scientific discoveries and works of art.

Having assigned the rest of the world the task of providing durable and permanent goods, the American economy derives its wealth from the sale of perishable commodities (wheat, television images, ammunition) and the manufacture of transient luxury. American mothers who nurture dreams of avarice on behalf of their sons no longer tell exemplary tales of industrialists, surgeons, merchants, and ship captains. They speak instead of actors, ball players, dress designers, *maîtres d'hôtel*.

Few people bother to define real capital as the capacity to do real work, or real credit as the reserve of energy and industriousness available to the mind of the nation.

9. The whole of the United States in 1985 bears a disquieting resemblance to the antebellum South. The land-owning classes in Virginia and the Carolinas conceived of themselves as cavalier gentry who could afford to disdain the base mechanics of commerce and trade. They consigned the management of their economy to foreign agents from whom they borrowed money and bought luxury goods—Parisian silk, English carriages, Yankee machinery.

Believing that they could live forever on the verandas of chivalrous romance, they withdrew to their estates and plantations, indulged their fantasies of military glory, and recited to one another heroic passages from the novels of Sir Walter Scott. President Reagan comforts himself with the sentiments of Louis L'Amour. The members of the Washington opera troupe know as little about the economic basis of their privilege as the ladies in Charleston knew about the baling of cotton.

10. The rescue from insolvency and sloth also presupposes the asking of questions about the function of government, the purposes of taxation, and the uses of money. By what right does the state borrow instead of lend? In whose interest does the government manipulate the value of the currency? How does it come to pass that among all of mankind's wonderful inventions (art, science, law, religion, family, and medicine), men reserve to money the supreme privilege and the highest place? In the American scheme of things, why is the usurer (i.e., the financial magnates on the covers of *Business Week*) thought to possess the rank of a duke and the loveliness of a child?

Because none of these questions can be asked—they would be discounted as eccentric and un-American—the company in Washington continues to sing *Parsifal*.

11. The United States was conceived in bankruptcy, and the country never has managed to cure its financial illness except by means of depression or war. There is no reason to believe that over the span of 200 years the Americans have discovered any other remedy. ■

(Reprinted from The Vancouver Sunday Province, July 7, 1985, with permission)
Vancouver, B.C.

Start on Star Wars program without us

We had a U.S. general in town the other day, inviting us Canadians to participate in the Star Wars space program. This may have made some of us swoon with excitement, but so far Joe Clark has kept his head; or whatever it is he uses to make decisions on foreign affairs.

So, I'll take the liberty of telling the general that we may be a bit late, and that maybe the Americans should start without us.

Up to now, the Canadian space program to intercept incoming Soviet nuclear missiles has been pretty well limited to putting a catcher's mitt on the Canadian-built arm of the U.S. space shuttle. (Some of our defence experts think it should be a hockey goalie's mitt, to provide against icing-up in space. Personally, I doubt that the gloved arm can be made long enough to catch as many Russian missiles as needed to keep them off the scoreboard.)

Members of Canada's Aerospace Industries Association advise us that we don't need to think up our own ways of stopping a Soviet missile attack, in order to benefit from the Star Wars program. Fat contracts are waiting, they say, from the Pentagon, complete with blueprints on how to build components of Star Wars using only a screwdriver.

All that Ottawa has to do is send in the coupon that says yes, Canada wants to be part of Star Wars and possibly win a trip for 25 million to Kingdom Come.

To make this time-limited offer even more attractive, the aerospace company executives say that the contracts will create jobs for Canadians. This is the same argument that logging companies use when they seek clearance to chop down an irreplaceable forest. The job-creation carrot is seen as the most benign incentive short of a large, glowing hand appearing in the sky, thumbs up.

The end of civilization, the destruction of the planet, these are offset by the promise of our being fully employed when vaporized.

If these evangelists of employment had been around at the time of Christ, they would have endorsed crucifixion as creating jobs in the nail industry.

However, the Americans' hard sell for Star Wars does not seem to have aroused much enthusiasm, even among Canada's unemployed. Perhaps most of them realize that the technology is somewhat beyond the capability of the kid who flunked Physics 11. I certainly don't envisage an opening for me, with my unfortunate talent for breaking mirrors. Imagine how I'd feel, cracking a mirror a mile in diameter! Talk about your seven years' bad luck!

This ignorance is cited by the aerospace association's president as a good reason for the average Canadian to have no opinion of Canada's participation in Star Wars: "... a bit like asking the Grade 6 class what they think of some complicated surgical procedure."

Well, as spokesman for the Grade 6 class that is this column's readership base, I suggest that one doesn't have to stand in front of a laser beam in order to have a hole in one's head. The aperture is visible, even from this distance, in the Pentagon's think tank. Else the U.S. generals would know that in the entire history of man's ingenious effort, he has yet to contrive a military defence that was not promptly overcome by new weapons of offence.

I was brought up to believe in the invincibility of the Maginot Line. It took the German panzer units only a few days to make M. Maginot look like Gonzo the Great.

In matters of military defence, any sense of security must be automatically deemed to be false. Why then should Canadians invest their trust in the Star Wars proposition, when it's cheaper to buy a three-dollar bill?

(Printed with permission from F.A.S. Public Interest Report, Vol.38, No.6.
Journal of the Federation of American Scientists (FAS))
June 1985

FAS-BAS RETREAT MAY 12, 1985—JOINT COMMUNIQUE

REDUCING THE DANGER OF NUCLEAR WAR: WHAT SCIENTISTS AND CITIZENS HAVE DONE AND CAN DO

Within a few months of the destruction of Hiroshima and Nagasaki by nuclear bombs in August 1945, two groups of the American scientists who had participated in the development of those weapons founded independent organizations dedicated to reducing the danger that such weapons would ever be used again. One of these organizations, the *Bulletin of the Atomic Scientists*, established offices near the University of Chicago site where Enrico Fermi and his associates had achieved the first self-sustaining chain reaction; the aim of the *Bulletin* was to communicate information and informed opinion about military and civilian uses of nuclear energy to an audience not restriced to specialists in these matters. The other organization, the Federation of Atomic Scientists (soon to become the Federation of American Scientists), had its headquarters in Washington, DC as befitted its primary mission of decision-maker education and lobbying. Its first campaign—to secure defeat of a bill that would have left postwar control of nuclear energy in military rather than civilian hands—was a success; this auspicious beginning was duly reported in an early edition of the *Bulletin*.

On May 10-12, 1985, surviving founders of the Federation of American Scientists and the *Bulletin of the Atomic Scientists* met at Airlie House, Virginia, to celebrate the fortieth anniversary of these two organizations with other scientists and citizens who have joined and continued their efforts over the intervening decades. The participants included members of the Board of directors and Board of Editors of the *Bulletin* and Sponsors and members of the elected Council of the Federation. It was an occasion for review of the successes and failures of forty years of working to reduce the nuclear danger, and for discussion of the challenges that face us in 1985 and the years ahead.

Already in 1945, the atomic scientists of conscience who founded the FAS and the *Bulletin* had agreed on three crucial conclusions about nuclear weapons; there is no "secret" (meaning that the capability to build such weapons soon would spread); there is no defense (some penetration of any defense is inevitable, but none is tolerable); and, given the first two conclusions, international cooperation to control these weapons is essential. The advent in the early 1950s of fusion weapons a thousand times more powerful than the original fission bombs only strengthened these conclusions. Nothing has happened since to weaken them.

The dangers foreseen by the original atomic scientists as they tried in 1945 to anticipate the problems ahead were also three in number: the chance that a nuclear war actually would occur; the possibility of proliferation of nuclear weapons to a large number of nations; and the danger of a nuclear arms race leading to very large arsenals in the possession of the major powers. With respect to the first two dangers, the four decades since 1945 have been kinder than many feared. There has been no nuclear war, thanks to restraint by national leaders (helped along, we like to think, by some success of scientists' efforts to communicate to decision makers and publics the dangers of these weapons) and thanks in part, we suspect, to good luck. And proliferation of nuclear weapons to additional countries has been slower than it might have been: instead of dozens of nuclear-weapons states in 1985, as some predicted, only six countries are known to have tested nuclear weapons and no more than two or three others are likely to possess small numbers of them untested; the 1968 Non-Proliferation Treaty has been an important help.

The nuclear arms race between the United States and the Soviet Union, however, has proven to be much *worse* than anyone supposed in 1945. Where pessimists of that time foresaw hundreds of nuclear weapons on each side, there are today tens of thousands; and no one could have foreseen the perverse diversity of types of nuclear explosives and delivery systems that four decades of weapons research and development have now produced. With a few exceptions—most importantly the Partial Test Ban Treaty of 1963 and the ABM Treaty of 1972—the attempt to control the nuclear arms race has been a gigantic failure.

In 1985, the prospect of the continuation and expansion of this historical failure to contain the superpower arms race has some particularly troublesome dimensions. First, ongoing and impending deployments, by both sides, of offensive counterforce weapons (those with characteristics suited to pre-emptive attacks on the retaliatory capability of the adversary) build fear and mistrust, erode the margins of invulnerability on which crisis stability depends, and promote an action-reaction spiral in which the arsenals grow without limit. Second, pursuit of "star wars" strategic defenses toward the testing stage theatens not only to generate an expensive new competition in space weapons but also to provoke unconstrained build-ups of land-based and sea-based offensive nuclear forces to counter the prospective defenses; moving to the *deployment* of such (inevitably leaky) defenses, moreover, would decrease crisis stability because a leaky defense is more effective against the retaliation of a wounded adversary than against a powerful first strike. Finally, the continuing failure of the superpowers to stop and reverse their own nuclear arms race is adding to the incentives for other nuclear powers to expand their arsenals and undermining the Non-Proliferation Treaty.

The scientists and citizens meeting at Airlie House for the 40th anniversary of the FAS and the Bulletin came with a variety of concerns and priorities, but we were able to agree on many of the ingredients of a program for doing better at reducing the nuclear danger in the years ahead. A ban on all testing of space weapons would preserve the possibility of averting an arms race in that arena and the reactions to it in others. A ban on flight tests of new ballistic missiles would terminate counterproductive trends in the main class of offensive counterforce weapons. Continued adherence to SALT II limits would provide a needed lid on strategic nuclear forces overall, as well as a framework for starting the process of reductions. A comprehensive ban on the testing of nuclear explosives (CTB) would help dispose of the illusion that nuclear weapons have some use other than deterrence (for which those that already exist are more than adequate) and would reinforce the nonproliferation regime. Pursuing less threatening postures for conventional forces would reduce the risk of conventional as well as nuclear war. And restoring and expanding US-Soviet collaboration in such areas of mutual interest as new energy technologies, environmental science, and peaceful uses of space would make at least a modest contribution toward reducing the confrontational character of the relationship.

We emphasize, finally, that the nuclear danger is a political problem more than a technical one. It should be no surprise, then, that the main arms-control accomplishments of the last forty years—the partial Test Ban and the ABM treaty—were achieved in periods when an aroused and informed public helped pressure political leaders into action. If we are to do better in the years ahead, the intense public concern of the early eighties must be sustained and translated into persistent pressure for comprehensive results. Settling for too little must be avoided, and that will require a deeper understanding of the issues than ever before by publics and decision makers alike, more ingenious proposals, and a higher level of intelligent debate. The Federation of American Scientists and the *Bulletin of the Atomic Scientists* each will continue to work to help create those conditions.

(Printed with permission from Nucleus, Fall 1985
Copyright 1985 by Union of Concerned Scientists, 26 Church St., Cambridge MA 02238)

PROBING STAR WARS' COMPUTER QUAGMIRE

Of the several technological breakthroughs required to create a working Star Wars defense, one of the most remarkable must come in computer programming. Many computer professionals, in fact, believe that it will prove impossible to write software to track and identify many thousands of fast-moving objects in space, and then send defensive weapons to their marks —flawlessly and within seconds. One doubter is David L. Parnas, a professor of computer science at the University of Victoria in British Columbia. Parnas, a US citizen, recently resigned from the Pentagon's advisory Panel on Computing in Support of Battle Management, whose job is to frame the computing tasks confronting the Star Wars project. With his resignation, Parnas submitted eight short papers outlining the computing obstacles that, he believes, make a Star Wars defense unworkable (see box).*

All software, Parnas notes, is to some extent unreliable, and bugs are routinely worked out during use—yet the Star Wars system cannot be tested under realistic conditions and must perform without a hitch if called upon. The immensity of the program needed—the Pentagon has estimated it at 100 million lines of code—creates special problems. Despite attempts to develop new programming techniques more appropriate for mammoth projects, working programmers continue to use the conventional "think-like-a-computer" approach; unfortunately, this sequential method is unreliable for large, intricate programs. Finally, Parnas believes that the new technologies sometimes held up as cures for these software ills—such as artificial intelligence, automatic programming (the use of computers to program other computers), and program verification (the use of mathematical proofs to establish that the program will work)—do not in fact promise reliable software for Star Wars.

WHY THE SDI SOFTWARE SYSTEM WILL BE UNTRUSTWORTHY

David Lorge Parnas

I. Introduction

In March 1983, the President called for an intensive and comprehensive effort to define a long-term research program with the ultimate goal of eliminating the threat posed by nuclear ballistic missiles. He asks us, as members of the scientific community, to provide the means of rendering these nuclear weapons impotent and obsolete. To accomplish this goal we would need a software system so well developed that we could have extremely high confidence that the system would work correctly when called upon. In the sequel I will present some of the characteristics of the required battle management software and then discuss their implications on the feasibility of achieving that confidence.

II. Characteristics of the proposed Battle Management Software System

1) The system will be required to identify, track, and direct weapons towards targets whose ballistic characteristics cannot be known with certainty before the moment of battle. It must distinguish these targets from decoys whose characteristics are also unknown.

2) The computing will be done by a network of computers connected to sensors, weapons, and each other, by channels whose behavior, at the time the system is invoked, cannot be predicted because of possible countermeasures by an attacker. The actual subset of system components that will be available at the time that the system is put into service, and throughout the period of service, cannot be predicted for the same reason.

3) It will be impossible to test the system under realistic conditions prior to its actual use.

4) The service period of the system will be so short that there will be little possibility of human intervention and no possibility of debugging and modification of the program during that period of service.

5) Like many other military programs, there are absolute real-time deadlines for the computation. The computation will consist primarily of periodic processes but the number of those processes that will be required, and the computational requirements of each process, cannot be predicted in advance because they depend on target characteristics. The resources available for computation cannot be predicted in advance. We cannot even predict the "worst case" with any confidence.

6) The weapon system will include a large variety of sensors and weapons, most of which will themselves require a large and complex software system. The suite of weapons and sensors is likely to grow during development and after deployment. The characteristics of weapons and sensors are not yet known and are likely to remain fluid for many years after deployment. The result is that the overall battle management software system will have to integrate a software system significantly larger than has ever been attempted before. The components of that system will be subject to independent modification.

III. Implications of these problem characteristics

Each of these characteristics has clear implications on the feasibility of

continued

building battle management software that will meet the President's requirements.

1) Fire control software cannot be written without making assumptions about the characteristics of enemy weapons and targets. This information is used in determining the recognition algorithms, the sampling periods, and the noise-filtering techniques. If the system is developed without knowledge of these characteristics, or with the knowledge that the enemy can change some of them on the day of battle, there are likely to be subtle but fatal errors in the software.

2) Although there has been some real progress in the area of "fail-soft" computer software, I have seen no success except in situations where (a) the likely failures can be predicted on the basis of past history, (b) the component failures are unlikely and are statistically independent, (c) the system has excess capacity, (d) the real-time deadlines, if any, are soft, i.e. they can be missed without long term effects. None of these are true for the required battle management software.

3) No large scale software system has ever been installed without extensive testing under realistic conditions. For example, in operational software for military aircraft, even minor modifications require extensive ground testing followed by flight testing in which battle conditions can be closely approximated. Even with these tests, bugs can and do show up in battle conditions. The inability to test a strategic defense system under field conditions before we actually need it, will mean that no knowledgeable person would have much faith in the system.

4) It is not unusual for software modifications to be made in the field. Programmers are transported by helicopter to Navy ships; debugging notes can be found on the walls of trucks carrying computers that were used in Vietnam. It is only through such modifications that software becomes reliable. Such oppor[illegible]ill not be available in the 3[illegible]war to be fought by a strat[illegible]se battle management syste[illegible]

5) Programs of t[illegible] must meet hard real-time dead[illegible]liably. In theory, this can be done either by scheduling at runtime or by pre-runtime scheduling. In practice, efficiency and predictability require some pre-runtime scheduling. Schedules for the worst case load are often built into the program. Unless one can work out worst case real-time schedules in advance, one can have no confidence that the system will meet its deadlines when its service is required.

6) All of our experience indicates that the difficulties in building software increase with the size of the system, with the number of independently modifiable subsystems, and the number of interfaces that must be defined. Problems worsen when the interfaces may change. The consequent modifications increase the complexity of the software and the difficulty of making a change correctly.

IV. Conclusion

All of the cost estimates indicate that this will be the most massive software project ever attempted. The system has numerous technical characteristics that will make it more difficult than previous systems, independent of size. Because of the extreme demands on the system and our inability to test it, we will never be able to believe, with any confidence, that we have succeeded. Nuclear weapons will remain a potent threat.

LAUCKS FOUNDATION, INC.
POST OFFICE BOX 5012
SANTA BARBARA, CA., 93150-5012

FIRST CLASS MAIL

MARY LAUCKS
3815 42nd AVE. N.E.
SEATTLE, WA. 98105