Lie in the Sky

How Edward Teller sold America on Star Wars

by James Fallows

This is a very good book* with a small skeleton in its closet. Let's do justice to its merits first.

William Broad, a well-known science correspondent for *The New York Times*, has covered the political, technical, and military implications of the Star Wars program almost since the day Ronald Reagan proposed it in 1983. The evangelical steam has now gone out of Star Wars, with the departure first of Reagan from the White House and then of the Soviet Union from the family of nations. But the Star Wars budget rolls on—some $4 billion will go into the program this year. That Star Wars ever came this far, Broad argues, is largely due to the efforts of one man—or maybe two, if you count Reagan himself. *Teller's War* presents a techno-political history of Star Wars through the intertwined narratives of one man and one invention.

The man is of course Edward Teller, the crazy-genius Hungarian refugee who in the late forties played a crucial role in developing the American hydrogen bomb. In the early eighties, Teller again made a crucial difference, Broad says, by legitimizing Reagan's strategic defense proposals both inside and outside the government.

On the inside, Teller was able to tell Reagan that the project the president had long dreamed of—building a perfect shield against incoming warheads, which would make nuclear weapons "impotent and obsolete"—was not just a dream but could in fact be attained. Reagan's yearning for a perfect shield was obviously not the result of his own careful, Jimmy Carter-like study of ballistic technology. It reflected what was simultaneously the best and worst about Reagan: his tendency to latch onto big, appealing ideas without getting bogged down in the details. Like many nuclear-freeze and ban-the-bomb protesters, Reagan seemed to view the doctrine of nuclear deterrence as basically immoral: Some day it was bound to break down, and at that point everyone would die. A few years before he became president, Reagan gave a speech in which he proclaimed, "For the first time ever, everything is in place for the battle of Armageddon and the second coming of Christ." A nuclear shield would provide a way out of this depressing dilemma (at least from America's perspective, although it would presumably leave the Soviet Union utterly exposed to nuclear attack), but only if it could actually be built.

It made a huge difference, therefore, to have one of the world's most famous physicists on hand to say, "Yes, Mr. President. No problem. It can be done." In fulfilling this role, Teller became the defense counterpart of the supply-side economic advisers who were telling Reagan at just the same time, "Yes, Mr. President. No problem. You can cut taxes and not cut spending, and the deficit will take care of itself." (These two camps of yes-men will have a lot to answer for in the history books.)

Outside government, in the prolonged PR battle over the feasibility of Star Wars, Teller's role was also crucial. Politicians and scientists knew that he was not politically neutral. Thirty years earlier, Teller had been the most prominent scientist to side against J. Robert Oppenheimer when Oppenheimer was accused of disloyalty. In the pre-Reagan years, Teller had given long, doom-laden speeches about the inevitable Soviet triumph—unless the West was rescued by "several miracles." In 1981, he began to say that one of the necessary miracles had occurred: the election of Ronald Reagan.

Broad says that if Teller's background had been more fully known, the press and politicians might have been even more skeptical of his biases, because at several points in the preceding decades he had exaggerated the performance and scientific merit of weapons he wanted Congress to approve. But it probably would not have made a difference. No matter how suspicious Teller's opponents might have been of his motives, it was simply impossible to debate with him on equal terms. He stood before any audience as a celebrated if controversial genius. Many critics of Star Wars, in Congress and in the press, weren't really sure of the difference between a quantum level and a quark. If Teller said that new discov-

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* *Teller's War: The Top-Secret Story Behind the Star Wars Deception*. William Broad. *Simon and Schuster, $25.*

eries really would make Star Wars feasible, people were bound to give his views weight.

Star whores

The invention whose history Broad tells in this book is the x-ray laser, a very different device from what most laymen would infer from the name. Its active ingredient, so to speak, is a nuclear bomb; the laser beam is merely a side effect of the nuclear explosion. (Broad says that laymen weren't the only ones confused on this point; when Caspar Weinberger was on his way to Capitol Hill to tell Congress that the x-ray laser was indispensable, he kept asking a technical expert, "But it isn't a bomb, is it?") Strapped next to the bomb is a bundle of very thin metal tubes, each several feet long. The bomb goes off. In the fleeting instants before its heat and shock waves vaporize the whole assemblage, radiation from the explosion is expressed as a focused x-ray beam channeled through the tubes. If all the engineering details have been worked out correctly, this beam can, in principle, travel across long distances and blast holes in enemy satellites or missiles. With the proper aiming system, it could shoot down enemy missiles before they got anywhere near their targets in the United States.

Teller spent much of the eighties asking for money for this project because, as he insisted over and over, tests showed that it would work. But by the end of the eighties, Broad says, it had become obvious to everyone that the x-ray laser would not work within the foreseeable future. By implication, it became obvious (and Broad dug out the documents to prove it) that Teller had deliberately misled Reagan, Weinberger, and the world about the feasibility of the x-ray laser.

Broad is very good at presenting complex technical matters clearly, and also at putting his material together as a narrative. The two main dramatic elements of the story—Teller's struggle to sell Star Wars and the scientific struggle to make a workable x-ray laser—complement each other throughout the book.

The scientific problems were, in a loose sense, comparable to those involved in perfecting a solar-powered car. The underlying scientific principle—which was obviously much more complex in the case of the x-ray laser—had been established. Brilliant and quirky young researchers, most of whom had come to the Lawrence Livermore laboratories under Teller's patronage, had determined that some amount of x-ray laser response could be produced under the right conditions. (To spell out the solar car comparison: Scientists long ago concluded that sunlight would produce some electric power from photovoltaic cells. The challenge is to get enough power to run the car at a reasonable speed for a reasonable price.) The challenge for the x-ray laser also concerned "enough-ness"—whether the beams would be strong enough to destroy their targets, controllable enough to be aimed, and reliable enough to bet the nation's future on.

One big barrier on this road from "some" to "enough" was the nuclear testing system itself. Every time the scientists wanted to test a new hypothesis about x-ray lasers, or even check out a new engineering idea, they had to set off an atomic explosion. This they did in the underground test chambers outside Las Vegas, but the process was cumbersome and expensive. Researchers would dig a tunnel several thousand feet into the ground, put a bomb with its attached laser-generating rods at the bottom, lower some sensing equipment next to the bomb, run wires up from the sensors to the surface, fill in the hole—and then BOOM! Up at the surface, they would measure the few readings the sensors could send out before the equipment was obliterated. Then it was many months and many millions of dollars until the next test could be run.

At the same time, the Star Wars planners had to conceive of a "pop-up" system that would get the laser-producing bombs into orbit as soon as a Soviet attack was detected. The x-ray lasers could not patrol permanently in orbit, because then they could, in theory, be wiped out by the Soviets as part of a surprise attack. The "pop-up" process would require very sophisticated sensing, launching, and aiming systems—and virtually unlimited amounts of money. In pushing his x-ray laser plans, Teller had to work against the limits of the "Nitze Criterion." This was a rule of thumb, devised by the venerable arms expert Paul Nitze, which held that before the United States invested in a strategic defense system, we had to be sure that the system would be cheaper than the extra weapons it would take the Soviets to overwhelm it. That is, defense had to be inherently cheaper than offense. Otherwise, a costly system would just push the Soviets to add more warheads, leaving everyone worse off.

There was yet another complication for x-ray lasers. If they didn't work at all, they would obviously be useless. But if they worked too well—if it were too easy for the Soviets to figure out how to use them—then they would ultimately be useless too. X-ray laser beams can travel indefinitely through the vacuum of space, but they weaken quickly when traveling through the earth's atmosphere. This means that the lasers are inherently better at shooting up, from the atmosphere toward targets in space, than they are at shooting down, from space to targets that are still in

the atmosphere. (On the way up, the resistance is greatest when the beam is strongest and most focused, and the farther the beam goes the less resistance it meets. On the way down, the resistance gets worse and worse.) This physical fact meant that, if both sides developed x-ray lasers, the advantage would swing to the one planning the surprise attack. In order to succeed, it would have only to shoot up and disable the other's defensive equipment in space. The defender would have to shoot down, through the increasingly dense atmosphere, to intercept missiles on the rise.

In deciding whether to go with the x-ray laser, therefore, the government had to resolve several questions: whether it would work at all, how much it would cost if it did work, and how long the Soviets would take to develop their own version. By the end of the decade, the first question had been resolved negatively and the other two rendered moot (as Broad demonstrates in his clear and engrossing way). The x-ray laser would not work, at least not within a reasonable time and at reasonable cost.

But—and this is the main political point of Broad's book—that decision took more time and much, much more money than it should have, mainly because of Teller. On the basis of extensive interviews, declassified documents, and official reports, Broad substantiates the charge he makes on the book's first page, that Teller deliberately overstated how well the x-ray laser was doing:

> Over the protests of colleagues, Teller misled the highest officials of the United States government on a critical issue of national security, paving the way for a multibillion-dollar deception in which a dream of peace concealed the most dangerous military program of all time.

This program was "most dangerous," Broad argues, because the Soviets were so terrified of it. They, like Reagan, basically believed that it would work. If it seemed likely to succeed, and if they had not developed an offsetting x-ray laser of their own, then they might feel naked and exposed, and be tempted to act preemptively to defend themselves. The "most dangerous" claim seems a little pumped up, especially since Broad spends the rest of the book arguing that the pop-up x-ray laser never had a chance of succeeding. The Soviets might be chronically fearful of American technology, but presumably they would know enough about the project to realize it was nowhere near deployment. Still, Broad has no trouble proving that it was a bad idea.

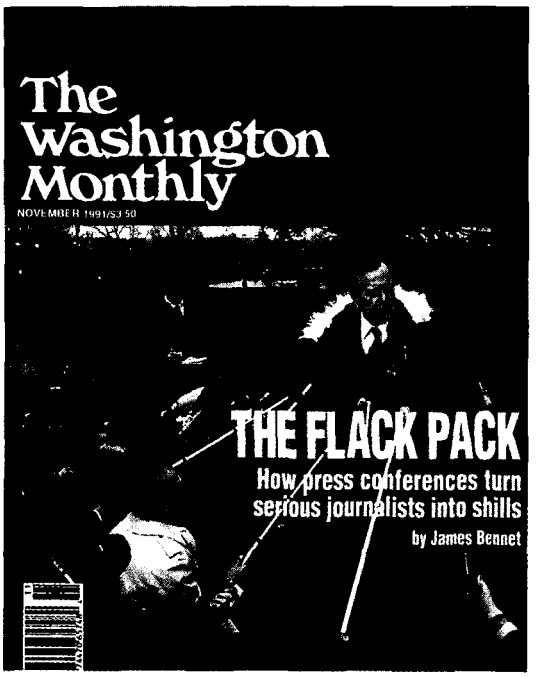
Teller wanted to be what the public thought he was: the solitary hero. So when he became powerful and famous enough to set his own terms, he removed himself from exactly the peer criticism he needed to accomplish his best work.

Broad explains not only the technology behind these struggles, but the politics and sociology as well. There is an endless background theme of bureaucratic rivalry, especially between Teller's Livermore labs and Los Alamos, which was fighting for the same research money and was skeptical of the x-ray laser from the start. The book includes a wonderful vignette of Los Alamos scientists whooping with glee when they run an independent test of the x-ray laser and find that it is much weaker than Teller has been claiming. (In one test, the laser beam was only one tenth as bright as Teller's team had been expecting. "It was like the owner of a new car suddenly discovering that his engine produced 10 horsepower instead of the 100 advertised by the dealer.") There is ethical tension: Some of Teller's subordinates discover that he is cooking the information before presenting it to Reagan and the public, and they must consider whether to risk their careers by revealing the truth. There is the sociology of science, including a description of the funding network that is used to pick out promising young scientists and lure them to Livermore.

The most interesting part of this chronicle is Broad's analysis of why Teller, undoubtedly a brilliant man, became so intellectually dishonest. Teller's opponents in the Star Wars fight usually attributed his views to simple political bias, but Broad says there was a much deeper root in Teller's intellectual style.

Teller—like Einstein, Oppenheimer, or other great physicists—was perceived by the general public as a lone genius. But Broad says that he was one of the many scientists who depend on collaborators to criti-

Common Sense



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cize, test, and react to their ideas. Teller was wonderfully creative and spewed out a nonstop stream of new ideas. But, Broad says, "His career was one long demonstration of the fact that his scientific gifts worked only in a social context":

> As with most science romantics, the vast majority of Teller's ideas were wrong. There is nothing terribly surprising about this. On the contrary, scientists far and wide recognize that being correct just five percent of the time in the field of theorizing can produce a dazzling career, if the insights are important. And Teller's often were.

Early in his career, Teller either wanted or couldn't avoid second-guessing by his colleagues. His scientific peers were capable of discarding the cockeyed majority of his ideas and working out the details of the few that indicated brilliant possibilities. But Teller was apparently vain about his reliance on collaborators. He wanted to be what the public thought he was: the solitary hero. When he became powerful and famous enough to set his own terms, he removed himself from exactly the peer criticism he needed to accomplish his best work. By the time of the x-ray laser, his ideas were "tested" mainly by an ignoramus president and a crew of scientists his grandchildren's age. The Livermore scientists were talented but had no franchise to challenge Teller, their patron, head on. Teller made himself comfortable with this arrangement, Broad argues, but discredited himself permanently.

Debate and switch

So far, so good. If the only thing you knew about Broad was that he had written this book, or that he'd won the Pulitzer prize for his science reporting, your sole reaction would be, well done. But there is a complication.

In 1985, Broad published a book called *Star Warriors*. To say that its subject is similar to that of *Teller's War* would be quite an understatement. The main characters, human and technological, are virtually identical. The same bright young scientists are wrestling with the same moral dilemmas and scientific mysteries. The same Edward Teller and his chief acolyte, Lowell Wood, are exhorting the youngsters in their same cluttered cubicles. Many of the same anecdotes and establishing details are used to bring the characters to life.

The main difference is like that in a Rashomon tale: the different moral shading given to the same set of events. *Star Warriors* was much more a descriptive than an analytic account, because Broad had the opportunity to spend a week at the Livermore labs. In structure, the book was like a long newspaper feature piece, with minute-by-minute accounts of how the characters talked and what they ate, used as a vehicle for general discussion of Star Wars, nuclear strategy, and the frontiers of physical research. The prevailing tone of the account was, if not exactly naive, innocent and upbeat. Such engaging and smart young men! Such promising new technologies! Broad wrote of x-ray lasers at the time:

> As the bomb at the core of an x-ray battle station exploded, multiple beams would flash out to strike multiple targets before the entire station consumed itself in a ball of nuclear fire. That is the vision. But many of the young scientists say their creations will actually bring about an era of unprecedented peace, because the world will know that the threat of nuclear attack from space has forever been laid to rest.

My complaint about Broad is not that he has changed his mind. On the contrary, it is much to his credit that he's stuck with the subject for so many years and that he is willing now to present a different view from what he understood several years ago. The problem is that he hasn't been completely forthcoming about what he has done. (My main conclusion about life is that nine tenths of its embarrassment and ten tenths of its mental strain come from the attempt to hide inconvenient facts. Bill Clinton understood the Gary Hart side of this principle when he and his wife held their famous meeting with reporters last year to disclose that their marriage had not been "perfect." But he didn't understand the Vietnam corollary: that one year ago, or 15, he should have said, "I was against the Vietnam war, and here are the things I'm proud of about my behavior, and here is what I feel bad about." Douglas Ginsburg lost his chance for the Supreme Court because he'd smoked marijuana. Learning from his example, Al Gore, Bruce Babbitt, and others preemptively disclosed that they'd done the same, so there was nothing left to be "revealed" in a campaign. Because of Clinton's experience, the next non-veteran who runs for president will presumably get his explanation out early.)

Broad briefly mentions the existence of the previous book in the current one, and his footnote section contains numerous "reference" notes to *Star Warriors* as the source of anecdotes recycled here. But Broad makes no serious attempt to disclose how much his perspective has changed, and at one point he even tries to conceal the difference. He refers to *Star Warriors* in a way that makes it sound as if it, too, had taken a wholly skeptical view of the x-ray laser project. He says that Lowell Wood, the Teller protégé who was a relentless cheerleader for the pro-

ject, had hoped that *Star Warriors* would be a "glowing account." But, Broad now claims, *Star Warriors* "depicted him as a headstrong visionary making extravagant claims and his subordinates as far more candid about the x-ray laser's weaknesses." This, to put it mildly, is not the main impression I took from the book.

This attempt at repositioning is unworthy of the otherwise extremely admirable job Broad has done. It is also unnecessary—just like Bill Clinton's claims, before his letter to Colonel Holmes was released, that a lucky number in the lottery was all that had kept him out of Vietnam. Clinton could have said from the beginning what he said in his letter, and Broad could have added a few sentences, in the preface or epilogue to his book, explaining the journey he'd made in his effort to learn the truth. Future editions might include lines like these:

I've been interested in this story for a long time, and several years ago I wrote about these same characters and many of the same projects in a book called Star Warriors. *Since then, I have learned much more about the subject. What I have learned has made me change my mind about some things and to reach conclusions about other questions that were unresolved or unresolvable before. In order to tell this new story correctly, I have had to go over a lot of material that I have used before, this time with a different slant and perspective. Journalism is a continuing and inherently imperfect effort to make sense of the news of our time. My previous effort represented the best information available to me at that time. The story is now much closer to its conclusion, and in this book I present what I believe to be its true shape.* □

Company *Time*

It thought it was a cultural icon. But it's been a business all along.

by James Ledbetter

As if scripted by publicists for Richard Clurman's book*, the board of Time Warner in late February ousted its co-CEO, Nicholas J. Nicholas in what was widely described as a "coup." The awkward two-chief arrangement that had existed since the companies' 1989 merger finally gave way, and Warner mogul Steve Ross, even as he seemed to be dying of prostate cancer, had won again. By the time Nicholas left the company, he and Ross were no longer even speaking—a feud born, reportedly, of the vastly divergent styles that are described in Clurman's book.

In a gesture of excess that has come to characterize the company, Nicholas will receive somewhere between $24 and $45 million for the privilege of being booted out of the company. That decision prompted a lawsuit from four shareholders who claim, not at all unreasonably, that the payment "would constitute a gift and a waste of Time Warner's assets." A quote from Clurman, whose book details many such greedfests, became mandatory in everybody's account of the Nicholas debacle.

This was only the most recent example of publishing hype that Simon and Schuster couldn't possibly buy. The excerpt in January's *Vanity Fair* profiling Ross, for all its discussion of his mob-tinged past and obscene $100 million annual compensation, contained very little that hadn't already been published. But it managed to catch the tsunami of resentment rising against American executive perks, prompting tongues to clack in the microcosmos where such things matter—so much so that New York City Council president Andrew Stein was compelled to write a letter to *Vanity Fair* saying Clurman had done Ross wrong. Stein defended Ross as "a unique human being, a great New Yorker, and a visionary business leader," and thanked him for continuing to employ 7,000 people in the city where Stein hopes soon to be mayor. That *Time* had, just weeks before, laid off hundreds of employees and that Time Warner has a monopoly on cable television services in New York City were clearly less important to Stein than the fact that Ross had recently co-chaired a $5,000-a-plate Stein fundraiser that helped him circumvent public campaign financing laws.

James Ledbetter is a media critic for The Village Voice.

To the End of Time: The Seduction and Conquest of a Media Empire. Richard Clurman. *Simon and Schuster, $23.*