

arms control. The strategic stage von Hippel saw in 1985 did not just accidentally appear.

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■ **The article by** Frank von Hippel about the last decades of the Cold War illustrates how first-person retellings can be incomplete and ultimately inaccurate attempts at history.

I see three problems with the account. First, von Hippel prioritizes the danger of nuclear weapons over the threat posed by the Soviet political-economic system. The influence of the four Soviet experts he cites was valuable, but we are fortunate that their advocacy did not short-circuit the achievement of Cold War victory, for both the West and the East. Second, von Hippel sometimes fails to look beyond the "trees" of those men to see the forbidding forest of Soviet Communism. Third, he does not give credit to the administrations of Ronald Reagan and George H. W. Bush or to the failure of post-Cold War promises by Bush, Mikhail Gorbachev, and Boris Yeltsin to eliminate, for example, Russian nuclear-armed short-range missiles.

In addition, I offer some examples of apparent incompleteness:

Perhaps von Hippel, with Harold Feiveson, set the record straight on the Pershing II and MX missiles (PHYSICS TODAY, January 1983, page 36). However, he neglects to note that the Pershing II was a response to the Soviets' fearsome SS-20 intermediate-range ballistic missile—records show NATO's "dual-track" strategy to counter the threat and negotiate reductions—and that the elimination of all such missiles can be credited to Reagan's "zero option" for total removal. With regard to the MX, the evidence is that Reagan retained it as a bargaining chip to attempt to negotiate reductions or removal of the 10-warhead SS-18s.

Similarly, von Hippel comments on the US refusal to halt nuclear testing during the Reagan administration, but he fails to provide the full context of the SS-18 deployment; testing of new US warheads was partly in response to that missile.

Von Hippel's discussion of seismic detection of nuclear testing is also incomplete; he mentions only the detection of a half-kiloton chemical explosion at Semipalatinsk. However, what is too frequently ignored is that remote seismic sensing alone, without accompanying onsite inspections, will never

fully verify a zero-yield test ban in the face of determined seismic-evasion techniques.

There are some serious shortcomings in von Hippel's personalized account of ballistic-missile-defense issues. Although he mentions the Krasnoyarsk radar, he does not emphasize that it was a willful, knowing violation of the antiballistic missile treaty. In that context, a lack of US confidence might seem the more understandable motivation in subsequent dealings with the Soviet Union. Von Hippel writes, "The following year, the Soviet government offered to dismantle it." Perhaps one should be grateful that the Soviets offered to walk back from a purposeful treaty violation.

The article's "gotcha" surrounding the Sary Shagan laser facility is beside the point. Indeed, it was a point von Hippel himself made: The Soviets did have a missile defense program, and at some point, a combination of funding shortages and technical deficiency, likely coupled with doubts about feasibility, conspired to shift Soviet efforts toward arms control measures to inhibit US R&D. That the Soviets would shift their focus in that way is completely understandable and reasonable, but von Hippel fails to acknowledge that and paints US pursuits as somehow less peaceable.

Ronald Reagan clearly saw missile defense as a moral response to the threat of nuclear weapons. However, at the Reykjavik summit, Gorbachev rejected Reagan's offer of disarmament in favor of his own need to end the Strategic Defense Initiative. One can argue that Gorbachev could not trust Reagan on disarmament, but it seems reasonable to argue conversely that to Reagan, missile defense without nuclear missiles was a prudent hedge.

In von Hippel's worthy pursuit to remind readers of four good men on the Soviet side, his tone does a disservice to the people in the Reagan and Bush administrations who did the heavy lifting of ending the Cold War.

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■ **The perspectives** Frank von Hippel gives on the end of the Cold War are illuminating, but I was surprised to learn (page 45) of an experiment conducted to detect "gamma rays from a warhead by means of a liquid-nitrogen-cooled high-purity germanium scintillation counter." As is common knowledge in radiation detection and nuclear phys-

ics, high-purity germanium (HPGe) detectors are not scintillators, they are semiconductors. If one examines von Hippel's reference 10, it's clear the confusion may have arisen because, in addition to the use of both HPGe and lithium-drifted Ge, thallium-doped sodium iodide scintillators were also employed for gamma-ray detection. However, the principal analyses were based on measurements made with the Ge semiconductor detectors.

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■ **Von Hippel replies:** As Alex DeVolpi states, many more physicists than I could mention worked in the US and Europe to try to unwind the extraordinarily dangerous nuclear confrontation created by the Cold War. And the task sometimes required considerable courage. The McCarthy period in the 1950s was notable in that connection. For those interested in learning more about that period, I recommend Jessica Wang's book *American Science in an Age of Anxiety: Scientists, Anticommunism, and the Cold War* (University of North Carolina Press, 1999), which is based in part on 23 partially declassified volumes of files from the Federal Bureau of Investigation's probes of the Federation of American Scientists. For a good overview of the history of the global anti-nuclear weapons movement, see Lawrence Wittner's book, *Confronting the Bomb* (Stanford University Press, 2009).

James Benford is correct that the Soviet Union had a major program in ballistic missile defense. However, although the Reagan administration's Department of Defense refused to believe it, the program had pretty much ended by the time we visited the Sary Shagan ballistic missile defense R&D test site in 1989. A number of histories have been written about the program and Mikhail Gorbachev's role in ending it with advice from Evgeny Velikhov. One of those histories, in the book *The Dead Hand: The Untold Story of the Cold War Arms Race and Its Dangerous Legacy* (Doubleday, 2009), by former Washington Post Moscow bureau chief David Hoffman, is based in part on Soviet Central Committee files. According to Hoffman, the 1987 Polius launch did not contain an actual laser but rather a mockup, and the effort to put the mockup into orbit failed. That apparently was the end of the Soviet program on space-based lasers.

Gregory Benford (James's brother) argues that the Reagan administration's