Proliferation Pessimism and Peter D. Feaver Emerging Nuclear Powers Scott D. Sagan

David J. Karl

To the Editors (Peter D. Feaver writes):

In his article, "Proliferation Pessimism and Emerging Nuclear Powers,"¹ David J. Karl advances a neo-optimist argument in the ongoing debate over the likely behavior of new nuclear proliferators. Karl evaluates critically the work of neo-pessimists, including my own, which was itself a critical response to paleo-optimists who argued that the proliferation of nuclear weapons would spread geopolitical stability. Karl focuses his strongest criticisms not on my version of nuclear pessimism but on that of others (notably Scott Sagan) who, like me, have argued that organizational pathologies make proliferation unsafe. I have published my own quibbles with Sagan, most of which Karl adopts, but he pushes my critique of Sagan further than I would take it and along the way makes several other claims that bear further examination.²

I make four points. First, Karl's article and a forthcoming article by another scholar³ mark the death of paleo-optimism and the emergence of a new consensus about the determinants of nuclear behavior. Second, civil-military pathologies can still undermine command and control even without generating preventive wars. Third, the fear of being a victim of a preventive war can still drive a minor proliferator to adopt unsafe operations even if the chances of a preventive war are remote. Fourth, operational dilemmas do generate something of a management paradox, whereby attempting to prevent nuclear proliferation makes proliferation more dangerous, but I think Karl misunderstands the problem and mistakenly sees a double standard among proliferation pessimists where none exists.

The New Consensus

While Karl is sharply and explicitly critical of some of the claims of new pessimists like me, Sagan, and Bruce Blair, his argument is even more striking in its implicit acceptance of our critique of paleo-optimism, specifically the variant espoused by Kenneth Waltz. Karl criticizes neo-pessimists for making the same mistakes I have accused Waltz of

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^{1.} David J. Karl, "Proliferation Pessimism and Emerging Nuclear Powers," *International Security*, Vol. 21, No. 3 (Winter 1996/97), pp. 87–119. Further references are noted with page numbers in the text.

For a fuller discussion of neo-optimism, see Peter D. Feaver, "Neo-Optimists and the Enduring Problems of Nuclear Proliferation," *Security Studies*, Vol. 6, No. 4 (Summer 1997), pp. 93–125.
Jordan Seng, "Less Is More: Command and Control Advantages of Emerging Nuclear Nations," *Security Studies*, Vol. 6, No. 4 (Summer 1997), pp. 50–92.

making: namely, drawing misleading analogies from the Cold War and relying on unsupported generalizations from a deductive model. Presumably, if it is wrong for us to do it (and below I dispute that we do), it is certainly wrong for optimists to do it.

Traditional optimism relies on two pillars: (1) the deductive logic of rational deterrence theory (RDT), which holds that nuclear deterrence is stable precisely because it would be crazy to fight a nuclear war; and (2) the Cold War experience of the superpowers, which apparently confirms RDT because no accidental, unauthorized, or deliberate nuclear war happened. The difference between neo-pessimists and paleooptimists on the relevance of the Cold War experience is subtle but important. Paleooptimists export rather blithely one behavioral outcome (the absence of war) and some convenient behaviors (relative war avoidance and the development of crisis management skills). Neo-pessimists induce from the U.S.-Soviet experience certain determinants of behavior (domestic politics, bureaucratic politics, cognitive traps, trade-offs inherent in command and control, etc.), deduce causal relationships therefrom, and then export these relationships. Thus it is not a crass export of the American experience.⁴ On the contrary, the neo-pessimist brief begins with a call to pay attention to causal relationships that drive the real-world behavior underlying observed outcomes. Just because the United States adopted certain operations does not mean others will operate in exactly the same way. Precisely such an approach allows the neo-pessimist argument to be extended and in some cases revised as new data become available, as Karl and others have sought to do.

What deserves emphasis, however, is that Karl's arguments amount to a rejection of Waltzian optimism. Waltzian optimism depends on there being only one nuclear strategic logic, and on this logic dominating all other factors that might affect nuclear behavior. Karl agrees that nuclear strategic logic is occasionally indeterminate or at least multifaceted, and he concurs that many factors determine nuclear behavior. Because of this, some forms of proliferation are worse than others. Karl, Sagan, Blair, and I all agree on that point. Only nuclear reductionists like Waltz argue otherwise.⁵

If Preventive War Is Unlikely, Do Civil Military Relations Matter?

Karl notes that I have voiced some ambivalence over the degree to which civil-military factors might determine nuclear behavior in small states (p. 98, fn. 37). On the one hand,

^{4.} In this light, Karl unfairly claims that James Blight and David Welch contradict themselves about how the smallness of new arsenals limits the generalizability of inferences from the Cuban missile crisis. See Karl, "Proliferation Pessimism and Emerging Nuclear Powers," p. 14, fn. 101. While they concede that the small emerging nuclear arsenals may avoid some (although by no means all) of the organizational pathologies afflicting complex command-and-control systems, they also lean heavily on psychological pathologies that do not depend on the size of the arsenal. Their overall conclusion is entirely consistent: on balance, nuclear optimism is unwarranted given the large number of problems new proliferators are likely to encounter. James G. Blight and David A. Welch, "The Cuban Missile Crisis and New Nuclear States," *Security Studies*, Vol. 4, No. 4 (Summer 1995), pp. 833–845.

pp. 833–845. 5. Although Waltz appears to hedge his bets by saying proliferation is good only if states adopt safe behavior, he argues that all proliferators are in fact likely to adopt safe nuclear behavior; according to this logic, all likely forms of nuclear proliferation will be good. In Scott D. Sagan and Kenneth N. Waltz, *The Spread of Nuclear Weapons: A Debate* (New York: W.W. Norton, 1995), p. 21.

I have argued that civil-military relations definitely played a major role in the evolution of U.S. nuclear command and control, and so it is important to consider them in the case of proliferating countries.⁶ On the other hand, with an explicit nod to Peter Katzenstein's findings in the area of trade policy, I have suggested that system effects might dominate domestic factors with very small states.⁷ Both propositions are plausible and, although not entirely contradictory, are nevertheless in tension. Will civil-military pathologies cause small states to adopt certain behaviors or will systemic pressures discipline states to ignore domestic pressures? This is precisely the kind of empirical question best settled by further investigations of the sort Karl and I agree is necessary.

Karl extends the argument, however, and here is where I would diverge with his analysis. Karl seems to believe that civil-military relations are important only insofar as they affect calculations of preventive war. In this, Karl follows Sagan's reasoning rather too closely and ignores other neo-pessimist arguments about how civil-military relations shape command and control. Sagan argues that civil-military pathologies will lead to a predisposition toward preventive war. Karl correctly emphasizes the significance of how many times countries under various civil-military constellations resisted the preventive-war temptation: the United States vis-à-vis the Soviet Union, both the United States and the Soviet Union vis-à-vis China,⁸ arguably China vis-à-vis India, and India vis-à-vis Pakistan. But preventive war to stop nuclear proliferation is not quite as fantastic as Karl implies. Israel engaged in something resembling a preventive covert war to stop Egypt's nuclear arsenal,⁹ and destroyed Iraq's Osiraq reactor in 1981 to accomplish the same end. The United States exploited Iraq's invasion of Kuwait to wage a preventive war against Saddam Hussein's arsenal and seriously contemplated the preventive war option with North Korea. The jury is still out with respect to how the United States will deal with Iran's nuclear ambitions. And would anyone categorically rule out a preventive strike by China should Japan or Taiwan take observable and significant steps along the proliferation path?

^{6.} Peter D. Feaver, "Command and Control in Emerging Nuclear Nations," *International Security*, Vol. 17, No. 3 (Winter 1992/93), pp. 174–178.

^{7.} Peter D. Feaver, "Proliferation Optimism and Theories of Nuclear Operations," *Security Studies*, Vol. 2, No. 3/4 (Spring/Summer 1993), pp. 172–173.

^{8.} Although here I would not draw the same rosy conclusion that Karl draws. He states: "If U.S. opposition [to a Soviet preventive strike against the Chinese nuclear program] exerted a restraining influence on Moscow in 1969, it is unclear why, as optimists confidently expect, the possibility of hostile international reaction could not staunch preventive temptations by new or old proliferators in the future." Karl, "Proliferation Pessimism and Emerging Nuclear Powers," p. 103. There was a Cold War logic driving the U.S. "defense" of China having to do with President Richard Nixon's desire to play the China card as a relatively cheap counterbalance to Soviet power. Such strategic situations might arise to check future preventive-war fever, but the 1969 case was not decided simply by fears of a terrible nuclear destruction. Accordingly, it is possible to imagine situations where relevant outsiders might not step in to thwart a preventive war.

^{9.} See Ian Black and Benny Morris, Israel's Secret Wars: A History of Israel's Intelligence Services (New York: Grove Weidenfeld, 1991), pp. 194–199; and Isser Harel, The Crisis of the German Scientists (Tel Aviv: Ma'ariv, 1982). I am indebted to Benjamin Frankel for directing my attention to this example.

My own view is that the logic of preventive war is tempting but definitely not irresistible given the tremendous costs associated with it. Preventive war is more likely if there is a catalyst that lowers the costs, as when Hussein handed the United States a casus belli, and such catalysts are probably more important than civil-military relationships. I am inclined to think that Sagan has perhaps overdrawn the civil-military pressures for preventive war. But it must be stressed that even if many or most states will resist preventive war pressures, it does not mean that civil-military relations are irrelevant. Civil-military factors affect not just the decision for war, but also the assertive or delegative nature of the command-and-control system itself. Civil-military relations, if sufficiently pathological, can also affect regime stability. Regime instability in turn is important for considerations of the security of the arsenal against loss or hostile takeover during a civil war. There is ample reason to worry about the nuclear implications of civil-military relations quite apart from the propensity of states to wage preventive wars.

Does Preventive War Matter If Splendid First Strikes Are Hard To Do?

Karl claims that "first strikes are ruled out as a practical option because of the difficulty of success" and then quotes me as agreeing with this assessment (pp. 106–107, and fn. 73). I disagree with Karl on two important points. First, while I think that preventive strikes are very difficult and thus very unlikely, I would not go so far as to say they are "ruled out as a practical option." Karl's own evidence shows that preventive strikes were seriously contemplated in most cases of proliferation, even when they were not taken. The evidence supports a probabilistic assessment that preventive strikes are unlikely, but it does not admit of an assessment that rules them out entirely, *especially not an assessment that rules out preventive war in the minor proliferator's calculations of how to design command-and-control systems.*

Second, Karl quotes me out of context. The quotation he invokes is: "Even a modest nuclear arsenal should have some existential deterrent effect on regional enemies, precisely because decapitation is so difficult."¹⁰ This quotation comes from the policy recommendation section, where I propose that we encourage proliferating states to worry more about unauthorized use than about the survivability of their arsenal. I acknowledge that there are trade-offs, but as a matter of policy I recommend that we push proliferators in the direction of developing relatively assertive rather than relatively delegative command-and-control systems. However, precisely because I made it a policy recommendation, I was also recognizing that proliferators will have incentives to worry about both concerns, including preventive war, and so may adjust their nuclear behavior in the opposite direction. In other words, Karl (and I) may be right that preventive war is very difficult and unlikely, but that does not mean that minor proliferators will simply dismiss it as not worth considering. I might prefer them to worry more about unauthorized use, but there is reason to believe they will overcompensate for preventive-war concerns. The evidence embodied in the U.S. nuclear com-

^{10.} Feaver, "Command and Control and Emerging Nuclear Nations," p. 186.

mand-and-control system indicates that while the U.S. military worried about both during the Cold War, it worried more about a knockout blow from the Soviet Union than it did about an unauthorized use by its own forces.

There are two dangers in the preventive-war scenario. One is that states may in fact launch a preventive war; Karl is probably correct in saying this danger is not as great as the alarmists claim, perhaps even less than Sagan asserts.¹¹ The other danger is that the potential victim of a preventive war will adopt unsafe command-and-control practices as a hedge against preventive war. Nuclear neo-pessimism is supported both by evidence of states preparing to launch a preventive attack and by evidence of states desperate to avoid being the victim of a preventive attack.

To defend his optimism even in light of this second danger, Karl makes two doubtful and contradictory claims. First, he states that "the lack of an extensive resource base will put the brakes on any plans to expand dramatically South Asia's nuclear programs and in the process belie fears that they are driven by technological momentum" (p. 108). Even if he is right that weaponization in South Asia will proceed more slowly than I and others expect, his causal agent, fiscal constraints, is the same one that I argue will drive states to seek cheap but risky command-and-control "solutions" to their vulnerability problems. If he is right that resource scarcity will constrain a South Asian arms race, why am I not right that resource scarcity will constrain them to seek cheap command-and-control solutions?

Karl would respond with his second counterpreventive war claim, namely, that states will adopt "innovative 'low-tech' solutions that contribute to crisis stability" (p. 109). He cites the Chinese deployment scheme, which called for many launch units relative to the size of the arsenal, units hidden in valleys and caves, and a large industrial base spread throughout in remote areas. I would argue that China's program reflects a resistance to the pressures of resource constraints more than a submission to those constraints. Karl's evidence shows that even a desperately poor state like China will spend lots of money to make preventive war an even less desirable option for its enemies, even when strategists like Karl confidently rule out preventive war as a plausible scenario.

Leaving aside the obvious contradiction between China's behavior and Karl's first claim that resource constraints will halt arms races, it is still possible that optimists are correct in discounting command-and-control worries associated with preventive war, *provided that proliferators eschew delegative command options*. Karl claims that the small size and opaque nature of the arsenals in question all facilitate assertive control. I believe that strategic pressures will drive them to more delegative postures, either in peacetime or, more dangerously, suddenly and without adequate training and preparation in the midst of a crisis. Karl cites South Africa and Pakistan as cases where no

^{11.} However, by comparing the preventive-war prospects of only regional adversaries and otherwise roughly equivalent dyads (United States–Soviet Union, Soviet Union–China, India-Pakistan), Karl grossly understates the preventive-war challenge to command and control. In fact, most minor proliferators must worry about regional competitors and the possibility of a significantly more credible first-strike attack by a superpower, especially the United States. I develop this argument in greater length in Feaver, "Neo-Optimists and the Enduring Problems of Nuclear Proliferation."

dangerous command-and-control measures have been taken. South Africa is clearly an anomalous case, both for pessimists and optimists, and is perhaps best cited as a cautionary example against placing excessive confidence in any generalizable theorizing about nuclear proliferation. I admit to being surprised that South Africa adopted a code-management system that, if reports are accurate, would cause the arsenal to fail-impotent (vice fail-deadly) if the prime minister were hit by a bus. I also admit to being surprised that South African nuclear strategy apparently called for them to detonate a demonstration weapon in the desert and then call for help from the United States. With hindsight, these measures may not be entirely unreasonable if the sole purpose of the arsenal is to preserve the minority regime (vice the state) and the sole credible threat is domestic insurrection by an oppressed majority supported by outsiders; this is, by any measure, a rare strategic environment. Optimists, however, have to be surprised that South Africa built a weapon that "could not meet the rigid safety, security, and reliability specifications then under development."12 Moreover, the fact that South Africa did give up its arsenal seems to be evidence that the South African government was not as hopeful about its arsenal as the nuclear optimists would be.

As for Pakistan, I would adopt a wait-and-see posture. Karl believes Pakistan will remain in a nonweaponized opaque status indefinitely; I think it will gradually weaponize. Pakistan probably adopted opacity in part to avoid U.S. economic sanctions. The longer the United States tolerates Pakistan's de facto nuclear power status, the less of a brake this concern will be. Regional arms control measures might delay weaponization, but I am skeptical that they will do so indefinitely. As China's power and restlessness grow, India will face more arms race pressures; Indian responses to China will increase pressure on Pakistan. Given that I am moderately pessimistic about the consequences of nuclear proliferation, I hope I am wrong in this prediction. But it is too early to rule out concern altogether.

Assisting Proliferation and the Hazards of Opacity

Karl claims that if pessimists believed our own logic, we would advocate a policy of providing assistance to fledgling arsenals; he further infers from the alleged inattention to this point a secret antinuclear bias. In fact, I have discussed the nuclear assistance problem at length,¹³ and my analysis shows that, contra Karl, it is not inconsistent to believe technological backwardness will give minor proliferators safety and security problems and yet also to believe that giving them technical assistance is not the appropriate policy response in every case.

In a similar fashion, Karl misunderstands the problems of opaque proliferation and therefore incorrectly perceives a double standard in my argument (pp. 115–116). Opaque proliferation has several dangerous consequences. First, opacity inhibits nuclear learning by operational units, reducing the likelihood of discovering unanticipated

^{12.} David Albright, "South Africa's Secret Nuclear Weapons," ISIS Report, Vol. 1, No. 4 (May 1994), p. 10, as quoted in Sagan and Waltz, *The Spread of Nuclear Weapons*, p. 120.

^{13.} Peter D. Feaver and Emerson M.S. Niou, "Managing Nuclear Proliferation: Condemn, Strike, or Assist," International Studies Quarterly, Vol. 40, No. 2 (June 1996), pp. 209–234.

flaws in time to fix them, and so increasing the likelihood that if the proliferator ever had to mobilize in a crisis, it would confront problems under the very conditions of time urgency that optimists and pessimists alike agree can be destabilizing. Second, while Karl asserts that opacity will lead to tighter central control, it seems more likely that opacity inhibits nuclear learning by central command authorities, so that they may have grave misconceptions about what their nuclear arsenal can and cannot do, and about what kind of risks and failure modes are associated therewith; opaque proliferators are apt to learn these things at the worst possible times, and perhaps only after taking misguided provocative steps based on these misconceptions. Third, opacity inhibits a broader public strategic discourse that would increase public scrutiny of these issues and allow for a thorough examination of command-and-control problems. Now I have said before that none of these dangers matters much if the opaque proliferator never weaponizes.¹⁴ If the proliferator never assembles the weapon, even as enemy air strikes knock out key military installations and as its regime is toppled by enemy troops pouring across the border, then the opaque proliferator really does not encounter many nuclear operational dilemmas. If the deterrent is only existential and never is weaponized further, it does not pose many of the command-and-control problems I have discussed.

I seriously doubt, however, that the arsenal could stay in such a minimally weaponized condition indefinitely. The empirical record is clear that most states do not act as if they believe in existential deterrence, regardless of whether optimists like Karl do. It is possible (and most preferred) that the state goes backward, giving up its nuclear program as apparently have Argentina, Brazil, South Africa, and the Soviet arsenal successor states. If the state feels enough need for nuclear weapons so as to maintain an existential capability, however, I think it is even more likely it will continue along the nuclear weaponization path. The conventional wisdom holds that Pakistan, whose nuclear behavior Karl cites approvingly elsewhere in his article, felt it necessary to begin crossing weaponization thresholds during the 1990 Kashmir crisis. Karl claims they did not assemble any nuclear weapons, citing an anonymous private interview with knowledgeable government officials. It is difficult to rebut private interviews, so I will suspend judgment on the particular case until more evidence comes forth. We can leave this particular incident as a competing prediction: I would be surprised by evidence that shows that Pakistan never increased nuclear readiness, just as Karl should be surprised by evidence that shows they did. As for the larger point that opacity means never having to weaponize, Karl's optimism seems unreasonable. The Soviet Union, Great Britain, France, China, Israel, and South Africa all found it necessary to weaponize what started out as an existential deterrent capability.¹⁵ Only India appears to have hewn to the existential deterrent path unswervingly. It is more likely that opacity really

^{14.} Feaver, "Proliferation Optimism and Theories of Nuclear Operations," p. 176.

^{15.} Curiously, Karl cites China in his discussion of nuclear opacity. China's nuclear arsenal and doctrine may have some ambiguity about it, but it hardly qualifies as an opaque proliferator. China has fully weaponized and developed a complex, integrated nuclear force posture. For a stronger, but still problematic, critique of my opacity argument, see Seng, "Command and Control Advantages of Emerging Nuclear Nations."

involves what I would call "delayed weaponization," with the weaponization coming at a dangerous point in a crisis.

What of Karl's challenge? Would I prefer thorough weaponization and publicly detailed strategies in advance of any crisis? If command-and-control concerns were the only troubling factor in nuclear proliferation, and if vigorous public scrutiny and discourse accompanied the lifting of the shroud of opacity, then I would welcome it. As I have argued elsewhere, however, there are reasons for opposing proliferation as a matter of policy, regardless of whether one is an optimist or pessimist in the command-and-control debate—and not for any antinuclear bias, as Karl darkly suggests. Under every condition, nuclear proliferation complicates the ability of the United States to project power abroad and in many cases may embolden other states to resist U.S. efforts to impose its will. From the parochial viewpoint of an adviser to U.S. policy-makers, if opacity preserves a meaningful chance that the proliferator will give up its arsenal altogether, one should prefer opacity; if the chances of converting the country to nuclear abstinence are vanishingly small, then one should prefer open weaponization and full public scrutiny.

The basic point is that nuclear opacity facilitates nuclear ignorance, so any commandand-control benefits that Karl imputes to nuclear opacity must be weighed against the risks associated with ignorance. My reading of the Cold War record shows that secrecy nurtured some pathologies in the relatively open U.S. and Soviet arsenals. By extension, one would expect even more pathologies in more closed strategic communities. I simply do not find persuasive what I presume would be Karl's response: that there is so much less to know with a small arsenal that there is really nothing to get wrong.

Regardless of these disagreements, Karl and I concur on one fundamental point. The empirical basis of the debate so far has been too thin to support categorical statements on either side. Because this is a debate about the future as much as the past, further research into the past nuclear behavior of new proliferators and further experience with emerging proliferators is needed before one side can declare victory.¹⁶ Given the consequences, I hope to find out that I was needlessly pessimistic.

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16. I lay out a series of competing hypotheses to guide this empirical research in Feaver, "Neo-Optimists and the Enduring Problems of Nuclear Proliferation."

To the Editors (Scott D. Sagan writes):

David J. Karl's article "Proliferation Pessimism and Emerging Nuclear Powers" issues an important challenge: to understand the consequences of nuclear proliferation, it is essential to clarify the historical record concerning nuclear weapons operations and strategic decisions in proliferator states.¹ For too long, too many scholars studying proliferation—following the tradition set by most scholars of the U.S.-Soviet nuclear rivalry—have presented purely deductive arguments based on the logic of rational deterrence theory, and eschewed the kind of historical research that is necessary to test theoretical arguments about the strategic effects of nuclear weapons. To the degree that scholars now carefully follow Karl's advice "to go beyond rote arguments over whether proliferation is good or bad and undertake empirical investigations into the actual behavior of new nuclear powers" (p. 119), they will surely produce both improved explanations of our nuclear past and better predictions about the nuclear future.

Although Karl's call for more thorough empirical study is valuable, his central critique of "the new proliferation pessimists" (his label for Bruce G. Blair, Peter D. Feaver, and me) is seriously flawed.² These three authors differ on many details of theory and policy, but share a common perspective that develops and utilizes organization theory—instead of rational deterrence theory—to provide insights into the strategic consequences of nuclear weapons. Our research on the history of U.S. and Soviet military operations, in peacetime and in crises, led to pessimistic conclusions about whether any nuclear command-and-control organization can be perfectly reliable, which in turn led us to make pessimistic predictions about the effects of further proliferation. Karl accepts the validity of our arguments that the crisis and peacetime nuclear operations the United States and the Soviet Union practiced were far more dangerous than previously known. He claims, however, that in our writings on proliferation, Blair, Feaver, and I have "acquired the myopia of what might be called 'superpower-centrism'" (p. 117) because we argue that "these kinds of problems are likely to emerge, sometimes quietly and sometimes with a vengeance, in new nuclear

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^{1.} David. J. Karl, "Proliferation Pessimism and Emerging Nuclear Powers," *International Security*, Vol. 21, No. 3 (Winter 1996/97), pp. 87–119. Subsequent citations to this article are in parentheses in the text.

^{2.} The works he concentrates on are Bruce G. Blair, *The Logic of Accidental Nuclear War* (Washington, D.C.: Brookings Institution, 1993); Peter D. Feaver, *Guarding the Guardians: Civilian Control of Nuclear Weapons in the United States* (Ithaca, N.Y.: Cornell University Press, 1992); Peter D. Feaver, "Command and Control in Emerging Nuclear Nations," *International Security*, Vol. 17, No. 3 (Winter 1992/93), pp. 160–187; Scott D. Sagan, *The Limits of Safety: Organizations, Accidents, and Nuclear Weapons* (Princeton, N.J.: Princeton University Press); and Scott D. Sagan, "More Will Be Worse" and "Sagan Responds to Waltz" in Scott D. Sagan and Kenneth N. Waltz, *The Spread of Nuclear Weapons: A Debate* (New York: W.W. Norton, 1995).

nations."³ In contrast, Karl optimistically maintains that "for a complex set of disparate reasons, the nuclear behaviors of China, India, and Pakistan are not congruent with expectations derived from the U.S.-Soviet experience" (ibid.).

In this response to Karl, I present the evidence that is missing from his article concerning whether new proliferator states are likely to meet the three basic requirements of nuclear stability: avoiding preventive war, building survivable second-strike forces, and preventing accidental and unauthorized nuclear weapons use. I acknowledge from the start that it is exceedingly difficult to obtain accurate and thorough information on a subject like nuclear weapons operations, both because relevant evidence is often highly classified and because government officials and military organizations have strong interests in presenting their actions in the best possible light. For example, it was only after thirty years (and the passage of the U.S. Freedom of Information Act) that scholars learned about the most serious false-warning incidents and nuclear safety violations that occurred during the Cuban missile crisis. In light of that difficulty, I am not entirely surprised that Karl did not find evidence to support the pessimists' predictions about proliferation. In this response, however, I seek to demonstrate that if scholars dig deeper into the data, and look under the rocks of the self-interested statements of government actors, they will find disturbing evidence that more strongly supports the pessimists' fears about nuclear proliferation than it does the more sanguine predictions of proliferation optimists such as David Karl, Kenneth Waltz, Devin Hagerty, and John Mearsheimer.⁴

Preventing Preventive War

In *The Spread of Nuclear Weapons*, I theorized that military officers are biased in favor of preventive war because their training and self-selection into the profession leads them to believe that war is inevitable in the long term, because their professional focus on narrow operational war objectives makes them less sensitive to broader domestic or diplomatic constraints against preventive attacks, and because organizational incentives exist that promote offensive doctrines and decisive operations. I provided examples of preventive-war biases inside the U.S. military in the 1950s and the Soviet military in 1969, and therefore expressed special concerns about future cases in which civilian control of the military cannot be assured. In contrast, Karl states that it is "unwarranted" to assume that such biases exist, and claims that the history of the Indo-Pakistani rivalry and the Sino-Soviet crisis of 1969 "undermines pessimistic concerns about the danger of preventive war" (pp. 99, 117).

With respect to South Asia, Karl claims that "the absence of preventive-war thinking among Indian national security elites is striking in comparison to the attitudes of their

^{3.} Sagan, "Sagan Responds to Waltz," p. 136.

^{4.} See Kenneth N. Waltz, "More May Be Better," and "Waltz Responds to Sagan," in Sagan and Waltz, *The Spread of Nuclear Weapons*; Devin T. Hagerty, "Nuclear Deterrence in South Asia: The 1990 Indo-Pakistani Crisis," *International Security*, Vol. 20, No. 3 (Winter 1995/96), pp. 79–114; and John J. Mearsheimer, "The Case for a Ukrainian Nuclear Deterrent," *Foreign Affairs*, Vol. 72, No. 3 (Summer 1993), pp. 50–66.

U.S. counterparts during the early Cold War" (p. 100). But here Karl ignores evidence that in 1981 the Indian air force conducted a study of preventive-attack options against Pakistan's Kahuta nuclear facility and that senior aides to Prime Minister Indira Gandhi recommended such a strike in 1984.⁵ Even more important, Karl fails to discuss the preventive-war thinking that apparently lay behind the 1986–87 Brasstacks crisis. This crisis began in late 1986 when the Indian military initiated a massive military exercise in Rajasthan, involving an estimated 250,000 troops and 1,500 tanks, including the issuance of live ammunition to troops, and concluding with a simulated "counteroffensive" attack, including Indian air force strikes, into Pakistan. The Pakistani military forces and conducted exercises along the border, which led to Indian military countermovements closer to the border and an operational Indian air force alert. The resulting crisis produced a flurry of diplomatic activity and was resolved only after direct intervention by the highest civilian authorities, including emergency telephone conversations between the prime ministers of India and Pakistan.⁶

As Kanti Bajpai and his colleagues note in their detailed study of the Brasstacks crisis, numerous Indian military officers followed preventive-war logic in 1986, believing that "Pakistan would never cease its hostility toward India," and that therefore "Pakistan's decades-long animus against India should be decisively crushed" before Islamabad had the bomb.⁷ The most plausible explanation for the crisis is that India's chief of the army staff, General Krishnaswami Sundarji, shared these preventive-war ideas.⁸ He therefore designed the Brasstacks exercise in hopes of provoking a Pakistani military response,

^{5.} Evidence on the 1981 preventive-attack study appears in W.P.S. Sidhu, "The Development of an Indian Nuclear Doctrine Since 1980," Ph.D. dissertation, Cambridge University, 1997, p. 331. In 1984 it was reported that the Central Intelligence Agency informed members of the Senate Select Committee on Intelligence that "it had learned from a sensitive intelligence source that Mrs. Gandhi received recommendations this year from some senior aides that India attack the Kahuta plant to make sure that the enrichment process was not used for the development of weapons." Philip Taubman, "Worsening India-Pakistan Ties Worry U.S.," *New York Times*, September 15, 1984, p. 2. Indian officials denied that such recommendations were made; Pakistani officials, however, reportedly moved some nuclear facilities underground in response to the threat. See William K. Stevens, "India Worried by U.S. Links to Pakistanis," *New York Times*, October 21, 1984, section 1, p. 7; and Don Oberdorfer, "Pakistan Concerned about Attack on Atomic Plants," *Washington Post*, October 12, 1984, p. A28.

^{6.} The descriptions of Indian and Pakistani military operations during the crisis are based on Kanti P. Bajpai, P.R. Chari, Pervais Iqbal Cheema, Stephen P. Cohen, and Sumit Ganguly, *Brasstacks and Beyond: Perception and Management of Crisis in South Asia* (Urbana: Program in Arms Control, Disarmament, and International Security, University of Illinois, June 1995), pp. 15–20, 29–34; Dilip Bobb and Inderjit Badhwar, "Back from the Edge," *India Today*, February 28, 1987, pp. 24–25; and Inderjit Badhwar and Dilip Bobb, "Game of Brinksmanship," *India Today*, February 15, 1987, pp. 8–14.

pp. 8-14. 7. Bajpai et al., *Brasstacks and Beyond*, p. 15. See also Sidhu, "The Development of an Indian Nuclear Doctrine Since 1980," passim.

^{8.} As was the case with preventive-war proponents inside the U.S. military in the 1950s, military officers advocating preventive war in new state proliferators today are unlikely to present their arguments openly in unclassified forums. In his limited unclassified writings about nuclear weapons from before the Brasstacks incident, for example, Sundarji argues that India must weaponize its nuclear capability quickly and does maintain that a small Indian nuclear arsenal could "suc-

which could then provide India with an excuse to implement existing contingency plans to go on the offensive against Pakistan and to take out the nuclear program in a preventive strike.⁹ This possibility would help explain, for example, why the Indian military did not offer full notification of the exercise to the Pakistanis and failed to use their special hot line to explain their operations when Pakistan requested information during the crisis.¹⁰ That civilian leaders in India were forced to intervene to prevent inadvertent escalation of the crisis does not contradict my theory. If the Indian army, tightly controlled by civilians in a democracy, could nevertheless trigger such a serious crisis, the episode adds more evidence to support my argument that pessimistic predictions about preventive war are warranted in future cases (such as Pakistan against India in future crises, or Pakistan against Iran in ten years' time, or North Korea against South Korea, or the People's Republic of China against Taiwan if the Taipei government begins to develop the bomb) in which strict civilian control cannot be assured.

The history of the 1969 crisis between China and Russia also supports a pessimist's argument, with an interesting twist. In *The Spread of Nuclear Weapons*, I noted that senior officers in the Soviet military argued in favor of preventive attack during the Sino-Soviet border clashes in 1969, but that the Politburo did not approve the attack in part because of wider concerns, including the demonstrated U.S. opposition to such a strike. Karl does not dispute that the Soviet military offered preventive-war arguments during the crisis;¹¹ however, he does argue that my suggestion that U.S. threats may have helped deter a Soviet attack on China "is more in line with the logic of proliferation optimists" because "if U.S. opposition exerted a restraining influence on Moscow in 1969, it is unclear why, as optimists confidently expect, the possibility of hostile inter-

cessfully deter Pakistan." He also argues, however, that "a few crude nuclear weapons by Pakistan" are threatening to India and warns that once Pakistan develops a small arsenal, India "with a conventional edge...is unlikely to exploit it." See Krishnaswami Sundarji, "Strategy in the Age of Nuclear Deterrence," unpublished manuscript, June 21, 1984, pp. 6, 55–56. (I thank Stephen P. Cohen for providing me with a copy of this manuscript.) In 1986 Sundarji told a reporter that "we will limit damage both psychological and physical" in any nuclear conflict and that "I am convinced that not only will the security of the nation be properly safeguarded, but our armed forces will not be made to fight in a disadvantageous situation." Both comments could be interpreted as euphemisms for counterforce and preventive attacks. See "The Thinking Man's General," *India Today*, February 15, 1986, p. 42.

^{9.} The preventive-war interpretation of Sundarji's motives was also raised by Stephen Cohen, one of the authors of the Brasstacks study. See Sunil Dasgupta, "Operation Brasstacks," *Bulletin of the Atomic Scientists*, Vol. 52, No. 1 (January/February 1996), p. 57. The other major explanation that has been offered for the Brasstacks crisis is that it was purely accidental, caused by Pakistan's misinterpretation of the Indian army's military exercise. This alternative explanation would, however, conform with the third concern raised by proliferation pessimists: the risk of accidental war. 10. Bajpai et al., *Brasstacks and Beyond*, pp. 20, 29–30.

^{11.} Karl does state that "if strong U.S. opposition to Soviet military actions was a large factor in staying Moscow's hand, it is odd that neither Nixon nor Kissinger in their memoirs gives mention of this or takes credit for it" (p. 103, fn. 58). Nixon and Kissinger did, however, later discuss U.S. signals to the Soviets—including, in Nixon's case, hints about nuclear weapons threats—during the 1969 crisis. See Nixon's recollections in Roger Rosenblatt, "What the President Saw," *Time*, Vol. 126, No. 4, July 29, 1985, p. 53; and Henry A. Kissinger, *Diplomacy* (New York: Simon and Schuster, 1994), pp. 723–724.

national reaction could not staunch preventive temptations by new or old proliferators in the future" (p. 103).

Because nuclear weapons are so destructive, nuclear threats by third parties can in theory deter a preventive attack by one nuclear state against an emerging proliferator state. I see no reason to predict, however, that such nuclear threats will in fact be forthcoming in all future cases of proliferation concern. Moreover, the organizational theories I presented would suggest that such third-party nuclear threats, if they include operational alerting activities, would raise the risks of nuclear accidents and accidental war. Evidence concerning the 1969 case supports this point. On October 12, 1969, Strategic Air Command (SAC) B-52 crews were ordered to initiate an airborne alert in an apparent effort to add credibility to the U.S. threat to intervene in a Sino-Soviet conflict. SAC B-52 bombers, loaded with thermonuclear weapons, flew over the Arctic until the end of October on a specially designed "show of force" alert option, aptly titled "GIANT LANCE."¹² We still know little about whether this nuclear alert strongly influenced the Soviet decision not to attack China, although there is some evidence that political authorities in Moscow were informed of the highly unusual U.S. military activities.¹³ We do now know, however, that the SAC alert increased the danger of a nuclear weapons accident: one of the bomber wings involved in the thermonuclear airborne alert euphemistically reported afterward that "several B-52s were required to orbit in close proximity with other aircraft, an air traffic situation that was considered unsafe."14 In short, the evidence supports a pessimistic appraisal, suggesting that if nuclear powers try to deter preventive attacks against emerging nuclear states by alerting their nuclear forces, the risk of accidents will increase.

Organizational Problems That Compromise Survivability

In *The Spread of Nuclear Weapons*, I argued that the new proliferator states might not deploy nuclear weapons in survivable basing modes because the parochial interests that military organizations have in following their traditions can lead them to reject new kinds of weapons-delivery systems and deployment operations, and because organizational routines often produce "signatures" to enemy intelligence agencies that inadvertently reveal secret information and the location of otherwise "hidden" military forces. I provided many nuclear and nonnuclear examples of such inadvertent military vulnerabilities: delays in the development of survivable U.S. and Chinese nuclear forces, the failure to keep secret the Soviet missile deployment in Cuba, the Egyptian air force's vulnerability to Israeli attacks in 1967, Britain's ability to locate virtually all

^{12.} History of the 92d Strategic Aerospace Wing (Heavy), 14 September-31 December 1969 (declassified under the U.S. Freedom of Information Act), p. 42. This document is available at the National Security Archives in Washington, D.C.

^{13.} Most details about this event are still classified. For a discussion of alternative explanations for the nuclear operation and the evidence about Soviet knowledge of the alert, see Blair, *Logic of Accidental Nuclear War*, pp. 180, 339, fns. 15, 16. That the SAC bomber alert included the "show of force" airborne alert option leads me to conclude that it was most likely ordered in response to the Soviet threats against China.

^{14.} History of the 92d Strategic Aerospace Wing, p. 44.

of Nazi Germany's V-1 rockets in 1943, and North Korea's unsuccessful effort to hide its nuclear weapons program in the early 1990s. Karl, however, disputes whether such organizationally driven survivability problems have occurred or will emerge in the case of China or the Indo-Pakistani rivalry.

With respect to the Chinese case, I argued that military organizations did not innovate on their own and wrote that "only in 1975, after Mao Zedong approved a weapons institute report recommending that advanced deception measures be used to make China's medium-range ballistic missiles less vulnerable to Soviet attacks, were successful camouflage and cave-basing deployment methods developed."15 As my citations made clear, this was a reference to the Chinese deployment of the DF-4 missile inside hidden caves and tunnels, with prepared launchpads nearby to minimize vulnerability (what the Chinese called a strategy of "shooting a firecracker outside the front door").¹⁶ In contrast, Karl claims that China had no missile survivability problem in the late 1960s or 1970s, stating that "although Western sources reported, at the time of the Sino-Soviet border conflict, that China lacked an operational ballistic missile capability, a limited number of medium-range missiles were actually deployed in such a slow and camouflaged manner that they escaped detection by U.S. intelligence systems until about 1969" (p. 109). The only source he cites for this claim, however, is an undocumented statement in Harvey W. Nelsen's The Chinese Military System that refers to the DF-2A and DF-3 ballistic missiles that were deployed in 1966 and 1967, but which required so much time to be transported to their preassigned launchpads, and to erect, fuel, and align the guidance systems once on the pad, that Chinese authorities and Western analysts considered them to be highly vulnerable to a Soviet conventional or nuclear attack.¹⁷ (That is precisely why the Chinese developed the new basing mode for the DF-4 missile.) In addition, Karl asserts, "in the time period that Sagan claims that military parochialism was abetting a dangerous vulnerability of Chinese strategic forces to Soviet attack, the U.S. Joint Chiefs of Staff [JCS] were favorably commenting on the deterrence capability of these same forces, given their effective although relatively unsophisticated deployment schemes" (p. 109). The citation Karl offers is to a 1977 JCS report, which comments on *future*, not then existing, Chinese missile forces and which obviously came after the crucial 1975 Chinese decision to deploy the DF-4 missile in a less vulnerable manner to increase its survivability against attack.¹⁸

^{15.} Sagan, "More Will Be Worse," p. 72.

^{16.} See John Wilson Lewis and Hua Di, "China's Ballistic Missile Programs: Technologies, Strategies, Goals," International Security, Vol. 17, No. 2 (Fall 1992), pp. 22–24.

^{17.} See Harvey W. Nelsen, The Chinese Military System: An Organizational Study of the Chinese People's Liberation Army, 2d ed. (Boulder, Colo.: Westview, 1981), p. 71. On the vulnerability of the DF-2 and DF-3, see Lewis and Di, "China's Ballistic Missile Programs," pp. 22–23; and Harlan W. Jencks, "Defending China in 1982," Current History, Vol. 81, No. 476 (September 1982), p. 247. 18. Karl's citation is to the fiscal year (FY) 1978 JCS Posture Statement that states: "Shortcomings,

^{18.} Karl's citation is to the fiscal year (FY) 1978 JCS Posture Statement that states: "Shortcomings, while significant, will not prevent them [the Chinese] from developing a formidable arsenal. An effective deterrent, however, does not always require the highest level of sophistication. A variety of credible strategic systems deployed in different, and when possible, changeable locations will serve as well." General George S. Brown, *United States Military Posture for FY 1978* (Washington, D.C.: U.S. Government Printing Office [U.S. GPO], 1977), p. 106. It was not until the FY 1982 Military Posture report, after the DF-4 was deployed, that the JCS would unequivocally state that

With respect to South Asia, Karl is not worried about second-strike survivability because he claims that "for an array of reasons, India and Pakistan seem content to rely on a non-weaponized type of nuclear deterrence" (p. 108). This statement, however, mistakes the current status of nuclear weapons construction and deployment in South Asia for a permanent state of affairs. This should not be assumed. Perhaps some individuals in India and Pakistan are "content" with "non-weaponized deterrence," but others are clearly not: both governments are keeping the testing and modernization option open by refusing to sign the Comprehensive Test Ban Treaty (CTBT); many military leaders, defense scientists, and Bharatiya Janata Party officials in India favor nuclear testing and the development of smaller nuclear warheads for deployment on missiles; Pakistani officials have stated repeatedly that they will conduct nuclear tests in response to any Indian test, and significant portions of the Indian and Pakistani public favor nuclear testing.¹⁹

Finally, Karl claims that in South Asia "unless counterforce attacks are executed with improbable accuracy and effectiveness-all the more improbable in view of the rudimentary intelligence capabilities possessed by new proliferators—they are impossible using the sparse arsenal that emerging states are likely to deploy against each other" (pp. 104-105). What matters of course is what Indian and Pakistani decision makers think about counterforce strikes: their recent efforts to develop advanced conventional counterforce capabilities (such as the Indian purchase of U.S. Paveway II laser-guidance bomb kits) hardly suggest that they believe such attacks are impossible.²⁰ Moreover, Karl's statement about "rudimentary intelligence capabilities" underestimates the likelihood that Indian and Pakistani agencies could determine the "secret" locations of otherwise survivable military forces, an absolutely critical issue with small or opaque nuclear arsenals. The history of the 1971 war between India and Pakistan demonstrates that both states' intelligence agencies were able to intercept critical classified messages sent by and to the other side: for example, the Pakistanis learned immediately when the Indian army commander issued operational orders to prepare for military intervention against East Pakistan; and before the war Indian intelligence agencies acquired a copy of the critical message from Beijing to Rawalpindi informing the Pakistanis that China would not intervene militarily in any Indo-Pakistani war.²¹ Perhaps most dramatically, on December 12, 1971, the Indians intercepted a radio message scheduling a

[&]quot;survivability of some portion of the [Chinese] ballistic missile force is virtually guaranteed." See General David C. Jones, *United States Military Posture for FY 1982* (Washington, D.C.: U.S. GPO, 1981), p. 108.

See George Perkovich, "India's Nuclear Weapons Debate: Unlocking the Door to the CTBT," Arms Control Today, Vol. 26, No. 4 (May–June 1996), pp. 11–16; Francine R. Frankel, "Indo-U.S. Relations: The Future Is Now," Washington Quarterly, Vol. 19, No. 4 (Autumn 1996), pp. 143–146; Andrew Koch, "Nuclear Testing in South Asia and the CTBT," Non-Proliferation Review, Vol. 3, No. 3 (Spring–Summer 1996), pp. 98–104; and Zia Mian and A.H. Nayyar, "A Time of Testing?" Bulletin of Atomic Scientists (July–August 1996), pp. 35–40. For a sanguine prediction, see Amitabh Mattoo, "India's Nuclear Status Quo," Survival, Vol. 38, No. 3 (Autumn 1996), pp. 41–57.
See Eric Arnett, "Conventional Arms Transfers and Nuclear Stability in South Asia," in Arnett, OK. 2015.

^{20.} See Eric Arnett, "Conventional Arms Transfers and Nuclear Stability in South Asia," in Arnett, ed., Nuclear Weapons and Arms Control in South Asia after the Comprehensive Test Ban Treaty, SIPRI (Oxford, U.K.: Oxford University Press, forthcoming 1997).

^{21.} Richard Sisson and Leo E. Rose, War and Secession: Pakistan, India, and the Creation of Bangladesh (Berkeley: University of California Press, 1990), pp. 199, 225 (see also p. 309, fn. 45).

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meeting of high-level Pakistani officials at Government House in Dacca, which led to an immediate air force attack on the building in the middle of the meeting.²² In short, Karl's statement that "first strikes are ruled out as a practical option because of the difficulty of success" (pp. 106–107) is an overconfident assertion, not a statement of fact based on thorough evidence of the proliferator states' current beliefs or past behavior.

Proliferation and Accidental War

With respect to the danger of nuclear accidents and accidental war in new proliferator states, Karl and I agree on a fundamental point: if a nuclear state does not put together the components of its nuclear weapons in peacetime, does not deploy warheads into the field along with their delivery vehicles, does not adopt a launch-on-warning posture, and does not delegate the authority (or capability) to use nuclear weapons to military commanders, then the risk of weapons accidents and accidental war will be significantly lessened. I do not agree with Karl's claims, however, that new nuclear states, once they deploy weapons, are unlikely to adopt a launch-on-warning posture or to delegate authority to avoid "decapitation attacks" (pp. 109, 113). First, I know of no solid evidence-and Karl offers none-concerning whether proliferator states that recently developed "weaponized" arsenals also developed launch-on-warning options or plans. Second, the limited evidence currently available on whether new proliferators predelegate use authority to their militaries is mixed. On the one hand, Karl correctly notes that the available evidence suggests that the South Africans adopted a highly assertive nuclear control system, without emergency predelegated authority given to military commanders.²³ On the other hand, I would cite the case of Iraq: the evidence the United Nations Special Commission on Iraq (UNSCOM) gathered suggests that Saddam Hussein, despite his long-standing distrust of his own military, nevertheless delegated the authority to use Iraq's biological weapons (which included botulinum toxin, anthrax, and aflatoxin agents) to commanders of SCUD missile units during the Persian Gulf War, to be used "in the event that Baghdad was hit by nuclear weapons."²⁴ Although such it might well be designed to enhance deterrence (although in this case it apparently did not, because neither the United States nor Israel knew about the

^{22.} Asoka Raina, Inside RAW: The Story of India's Secret Service (New Delhi: Vikas Publishing House, 1981), pp. 60–61.

^{23.} This strategic behavior is less puzzling, however, if one argues that the South African acquisition of nuclear weapons was driven by domestic factors, rather than by security threats. See Scott D. Sagan, "Why Do States Build Nuclear Weapons?: Three Models in Search of a Bomb," *International Security*, Vol. 21, No. 3 (Winter 1996/97), pp. 69–71.

^{24.} Report of the Secretary-General on the Status of the Implementation of the Special Commission's Plan for the Ongoing Monitoring and Verification of Iraq's Compliance with Relevant Parts of Section C of Security Council Resolution 687 (New York: United Nations, October 11, 1995). Iraqi statements about predelegation could be fabrications, of course, and the UNSCOM report offers no firm evidence that predelegation occurred. At least one UNSCOM commission, however, has argued that predelegation of launch authority was in fact implemented. See A.M. Rosenthal, "Saddam Moves Along," New York Times, September 6, 1996), p. A27.

policy), it also invariably increases the risks of an accidental war based on unauthorized use or a false warning of attack.²⁵

Finally, Karl concludes his discussion of the risks of nuclear accidents with an argument that is both ad hominem and inaccurate. He writes that "an implicit antinuclear bias" has led me and other pessimists to "overlook a simple remedy to the risks of inadvertence or accident": a policy of "providing assistance to fledgling nuclear arsenals" (p. 114). He asserts "that they have chosen not to advocate this method of resolving their particular fears about proliferation points up an underlying normative assumption that skews their entire analysis" (pp. 114–115). For one scholar to claim that another scholar has biases that skew his analysis is a very serious charge, and one that should be based on strong evidence. In this case, however, Karl overlooked the fact that I have advocated a form of precisely this remedy: providing technical assistance to other states to prevent nuclear accidents, while restricting technology that could encourage them to deploy their nuclear forces in advanced states of alert readiness.²⁶

The Continuing Search for Theory and Evidence

I hope that Karl's article will further stimulate international scholars to examine the details of the historical record concerning the effects of nuclear weapons on the behavior of states. Such careful historical research will be essential for evaluating the theories of nuclear proliferation optimists and pessimists alike. Clearly much work still needs to be done in this field. The emerging evidence I present in this response, however, leads me to remain highly skeptical about optimistic predictions that future proliferators will be able to maintain stable nuclear deterrence in many regions of the globe.

—Scott D. Sagan Stanford, Calif.

^{25.} There is at least one documented case of a false warning of nuclear attack during the Gulf War. According to the *Gulf War Air Power Survey*, when the United States attacked the Iraqi ammunition supply dump near Basra on January 28, 1991, the resulting cloud reached 25,000 feet, and both the Soviets and the Israelis initially estimated that a nuclear weapon had just detonated. *Gulf War Air Power Survey*, Vol. 2 (Washington, D.C.: U.S. GPO, 1993), p. 281. (I thank William Arkin for suggesting this example to me.)

^{26. &}quot;The large risk of nuclear accidents in these countries suggests that the United States may want to share information on such subjects as electronic locking-devices, weapons-safety design improvements, and personnel reliability programs. To the degree that the United States can share technology that only improves weapons safety and security, but does not enhance readiness to use the forces, such efforts would be helpful. A broad policy to make the weapons of new nuclear nations safer could be highly counterproductive, however, if it led them to believe that they could safely operate large nuclear arsenals on high states of alert." Sagan, "More Will Be Worse," in Sagan and Waltz, *The Spread of Nuclear Weapons*, p. 90. See also Scott D. Sagan and Benjamin A. Valentino, *Nuclear Weapons Safety after the Cold War: Technical and Organizational Opportunities for Improvement*, A Report of a NATO Advanced Research Workshop (Stanford, Calif.: Center for International Security and Arms Control, 1994).

The Author Replies:

I welcome the opportunity to address Peter Feaver's and Scott Sagan's criticisms of my article, "Proliferation Pessimism and Emerging Nuclear Powers."¹ Space limitations preclude me from addressing all but the most significant criticisms they make individually and collectively. But before turning to this task, I wish to clarify briefly my own position in the proliferation debate.

I consider myself a critic of pessimism rather than a hard-and-fast defender of optimism (on this score, Feaver seems to have a better understanding of my views than Sagan). Elsewhere I have criticized at length elementary tenets of Waltzian optimism, arguing that under certain circumstances the spread of nuclear weapons may actually promote, via the stability-instability paradox, the outbreak of crisis situations.² Looking at South Asia in particular, I found that none of the main schools of proliferation thinking offers a fully satisfying account of the Indo-Pakistani nuclear rivalry in toto, although each furnishes a good explanation for specific facets of the empirical record.

The purpose of my article is not to rescue Waltzian optimism from its many detractors, but rather to challenge some of the basic assumptions embedded in what I term the "new pessimism." I agree with pessimists that no blithe guarantees can be proffered about the absolute reliability and safety of nuclear deterrence. Far from making such a guarantee, I wrote that "pessimists are correct to point out that the exigencies of crisis can transform the character of nuclear operations, increasing the possibilities of accidents and inadvertence within force postures.... And few would suggest that emerging nuclear powers are a priori exempt from this condition" (p. 113). Moreover, I noted the need for a coherent nonproliferation policy (p. 114). Nevertheless, my critics and I part company on such issues as how we should gauge the probability of accidents and inadvertence in emerging nuclear arsenals, how we should weigh the concomitant trade-offs between deterrence stability and crisis stability, and what policy measures the developed nuclear powers (particularly the United States) should adopt in response. Having done outstanding service in bringing the Cold War's dangerous nuclear practices to light, pessimists assume that new nuclear powers will inevitably conduct themselves in like manner—and with a much higher likelihood of catastrophe because of the technological deficiencies they face. Given the important differences in context between the superpowers and emerging nuclear states, I believe that pessimists have overstated the risk potential intrinsic to minor nuclear powers, and I demonstrate in my article how organization theory (particularly the "normal accidents" paradigm Sagan relies on) leads to this conclusion.

David J. Karl received his doctorate in International Relations from the University of Southern California in August 1996.

^{1.} David J. Karl, "Proliferation Pessimism and Emerging Nuclear Powers," *International Security*, Vol. 21, No. 3 (Winter 1996/97), pp. 87–119. Further references are noted with page numbers in the text.

^{2.} See David J. Karl, "Does Nuclear Proliferation Really Matter? A Comparative Examination of Nuclear Rivalries in Asia," Ph.D. dissertation, University of Southern California, 1996.

I now turn to the main points raised in Feaver's and Sagan's rejoinders. They criticize my views on the danger of preventive attacks and first strikes, the likelihood of accidents, and nonweaponization.

Preventive Wars and First-Strike Scenarios

Much of my article presented a critique of the deductive foundations of Sagan's arguments. According to him, I believe that it is wrong to assume that military biases in favor of preventive war exist. This is not true. Actually, what I wrote is that it is unwarranted to presume that the armed services of proliferators will necessarily tend toward offensive action and preventive war, and I cited recent research showing that military organizations do not inherently prefer offensive doctrines as well as Feaver's own criticisms of Sagan's argument on this point. I admitted that preventive-war thinking was a staple of Cold War history and noted how it continues to echo in the post-Cold War period. I also mentioned, contrary to Sagan's claim, that India might have contemplated military action against Pakistan's Kahuta nuclear plant in the early 1980s (p. 98).

Do the possible origins of the Brasstacks crisis prove me wrong, as Sagan argues? Interpretations of the crisis vary, and I have explored them in detail elsewhere.³ It is true that General Krishnaswami Sundarji, India's chief of army staff in the late 1980s, was an officer with an unusually hawkish outlook. Under his direction, the Indian army developed a new "dissuasion" doctrine that stressed retaliatory threats to deter adversaries from undertaking hostile acts, and the huge Brasstacks military exercise was probably designed as a massive show of force intended to discourage Pakistan from continuing its aid to Sikh militants in the border state of Punjab.⁴ Even if Sundarji harbored dark hopes that the maneuvers would somehow provoke Pakistan to war, it is uncertain what he did, or could have done, to engineer this outcome. As the authors of the Brasstacks study that Sagan cites make clear, preventive-war sentiments were not universally shared within the Indian armed forces. "The suspicion that India had larger objectives in conducting Exercise Brasstacks," these authors write, "needs to be seen against this backdrop of conflicting beliefs."5

One should also note that Sundarji's possible hopes were based on the calculation that Pakistan did not yet possess a nuclear arsenal.⁶ In opposition to Sagan, I am impressed by the absence of preventive-war thinking in India once New Delhi could

^{3.} Karl, Ph.D. dissertation, chap. 4.

^{4.} Šumit Ganguly, "India and Pakistan: Getting Down to Brass Tacks," The World & I (May 1987),

p. 102. 5. Kanti P. Bajpai, P.R. Chari, Pervais Iqbal Cheema, Stephen P. Cohen, and Šumit Ganguly, Brasstacks and Beyond: Perception and Management of Crisis in South Asia (Urbana: Program in Arms Control, Disarmament, and International Security, University of Illinois, June 1995), p. 15. These authors also maintain that the concept of holding a massive military exercise emanated from Prime Minister Rajiv Gandhi, who was fascinated with the thought of staging the largest maneuvers ever held in South Asia (ibid.).

^{6.} Ibid., pp. 22, 57; and Stephen Cohen's comments as noted in Sunil Dasgupta, "Operation Brasstacks," Bulletin of the Atomic Scientists, Vol. 52, No. 1 (January/February 1996), p. 57.

reasonably believe that Islamabad possessed a nuclear arsenal of some sort (as in the 1990 Kashmir crisis), and by the significant pattern of nuclear cooperation that has arisen between the two countries in spite of their acute strategic rivalry.

It is also refreshing that Sagan does not resort to the clichés about the proclivity of the Pakistani military for preventive war that he recited in an earlier work.⁷ In his rejoinder, he merely argues that if preventive thinking could come to the fore in democratic India, where the military is tightly controlled by civilians, then it is all the more likely that the politically autonomous Pakistani military will act preventively against India in a future crisis. Perhaps. But if this is true, why did Islamabad not act this way in the Kashmir crisis? On this issue, Sagan does not contest my point that Islamabad's behavior in 1990 does not tally well with pessimistic expectations.

Although Feaver and I are in basic agreement that Sagan overdraws the propensity of states to wage preventive wars, he contends that civil-military relations are still an important determinant of whether proliferant arsenals evolve in an assertive or delegative direction. His point is well taken, but I never claimed that civil-military issues are an irrelevant topic for proliferation scholarship.⁸ Nor did I maintain that proliferators will not worry about the possibilities of being the victim of a disarming attack. My point in the passage (pp. 106–107) that Feaver objects to is that force-vulnerability problems are not as significant a bane for crisis stability as pessimists believe, since the resource limitations faced by proliferators make it doubtful whether arsenals will evolve quickly or dramatically. Again, perhaps Feaver is correct that these same constraints may drive states to seek cheap but unsafe command-and-control "solutions" to their vulnerability concerns. On the other hand, an important reason why the superpowers adopted dangerous practices in response to the possibility of knockout blows is that both U.S. and Soviet capabilities were expanding dramatically—something that resource-strapped states cannot afford.⁹

^{7.} Sagan, "More Will Be Worse," in Scott D. Sagan and Kenneth N. Waltz, *The Spread of Nuclear Weapons: A Debate* (New York: W.W. Norton, 1995), pp. 62–63. For criticism of pessimists' views on this point, see Peter R. Lavoy, "The Strategic Consequences of Nuclear Proliferation," *Security Studies*, Vol. 4, No. 4 (Summer 1995), p. 721, fn. 80; and Devin T. Hagerty, "Correspondence: Nuclear Deterrence and the 1990 Indo-Pakistani Crisis," *International Security*, Vol. 21, No. 1 (Summer 1996), p. 184.

^{8.} Feaver posits that the existence of a casus belli is probably an even more important factor for preventive attacks than civil-military arrangements. Yet the 1969 Sino-Soviet border conflict and the 1990 Indo-Pakistani Kashmir crisis stand as salient examples of states refraining from preventive strikes against the nuclear forces of weaker rivals despite the existence of ample casus belli.

^{9.} There is contradiction in the pessimists' brief on this issue. Sagan emphasizes that organization biases are likely to cause nuclear states to be indifferent to vulnerability problems, while Feaver maintains that they will be sensitive enough to overcompensate for them. I point out (p. 109) that vulnerability concerns prompted China to adopt both "low-tech" force posture solutions and a massive program to disperse its industrial infrastructure—evidence that does not support Sagan's contention. Moreover, Feaver does not argue that these concerns prompted Beijing to institute unsafe nuclear practices, such as the delegation of use authority. For an argument, contra Sagan's, that military organizations may become obsessed with, rather than inattentive to, vulnerability concerns, see John Arquilla, *Dubious Battles* (Washington, D.C.: Crane Russak, 1992), chap. 5.

Even if, as Sagan believes, the acquisition of advanced conventional counterforce weapons indicates that militaries are receptive to the possibility of counterforce nuclear strikes, the lack of the wherewithal to convert desire into hard capability makes it very unlikely that states will gamble on the effectiveness of weapons that are relatively unsophisticated and few in number.¹⁰ As I note in my article (p. 105, fn. 66), the Indian army is reportedly concerned that the effectiveness of the Prithvi tactical ballistic missile is constrained by its rudimentary guidance system and the inability of the country's communications infrastructure to transmit targeting data.

Accidents May Happen, But How Likely Are They?

I do not deny the possibility of accidental and inadvertent war between new nuclear powers, although I think it is more remote than pessimists believe. My reading of the "normal accidents" paradigm used by Sagan leads me to a conclusion quite different from his: emerging nuclear states, given their resource shortcomings, will be unable to develop command-and-control systems that are as susceptible to catastrophic malfunction as superpower arsenals were. I see this as a blessing in disguise for crisis stability, although Sagan holds otherwise. He is also quite incorrect to maintain that I assert that weaponized proliferators are unlikely to delegate launch authority in order to avoid "decapitation" attacks. Actually, I made a much different claim: constraints on force development, by keeping the number of weapons limited, militate for a tight exercise of arsenal control.

Sagan takes umbrage at my suggestion that subjective value commitments have, at times, crept into the pessimists' brief. But consider the odd manner in which he discusses policy options for managing proliferation.¹¹ After listing a number of such measures, he vitiates their value by arguing that they actually are not worth the bother: both emerging nuclear states and the U.S. government are unlikely to be interested in them because of organizational biases. He then proceeds to compromise his entire argument by noting that these measures are, in any case, unnecessary because the dangers that inhere in nonweaponized nuclear arsenals really are not so great after all.

Nonweaponization: Way Station or Way of Life?

A pessimist will retort that my comments on accidental and inadvertent conflict are persuasive only up to the point that nascent nuclear states begin to deploy operational weapons. Sagan and Feaver insist that I underrate the likelihood that India and Pakistan will shed their opaque shrouds and continue along the weaponization path. Sagan is correct that there is no shortage of Indians who advocate a more open and robust nuclear posture, and he points to New Delhi's recent refusal to sign the Comprehensive Test Ban Treaty (CTBT) as a foreboding omen. India handled the CTBT issue clumsily

^{10.} Feaver agrees with me on the enormous difficulties that nuclear powers face in attempting to destroy rival arsenals.

^{11.} Sagan, "More Will Be Worse," pp. 90-91.

(although the multilateral negotiations unwisely backed the country into a corner by requiring the Indians to sign the treaty before it can come into force), but the de jure discrimination codified in the treaty is something no government in New Delhi could openly accept without serious loss of political standing-especially as the demand for New Delhi's participation was made in the run-up to hotly contested national elections. Although there is no consensus in India on the need to develop an operational nuclear arsenal, there is strong agreement that the nation should not forswear the right to do so unless every other country does the same. But it is important to note that this uncompromising position is rooted in prickly nationalism rather than unbridled nuclear ambition. The Indian government is keen to emphasize that its CTBT stance does not signify an intention to build a nuclear force. Moreover, there is no indication that its nuclear weapons program will be significantly expanded in the future, even if the hawkish Bharatiya Janata Party (BJP, or Indian People's Party) comes to power, a scenario that cannot be ruled out in the next few years. Despite its strong pro-nuclear stance, the BJP soft-pedaled its position once it briefly assumed control of the Indian government last summer. Nor is any other major political party likely to take India further down the nuclear road. Although opinion is set against unilateral relinquishing of the country's de facto nuclear capability, a recent survey revealed that the nuclear issue is not in itself of great political salience. Much more importance is attached by the nation's elites to economic development and combating the growing problems of communal strife and domestic terrorism.¹²

For now, despite pessimistic expectations to the contrary, India and Pakistan have opted for nuclear opacity. I do not know why neither moved toward overt nuclearization, but I suspect that the lack of material resources is an important part of the explanation. Feaver predicts that India will face growing weaponization pressures as Chinese power increases, yet New Delhi recently shelved the Agni intermediate-range missile that offered its only possibility for striking strategic targets in China. Moreover, even if New Delhi and Islamabad decide to field operational weapons, resource constraints will hinder how quickly and dramatically they can do so, thus mitigating crisis-staility dangers.¹³

It may be that opacity in South Asia is not a permanent state of affairs. But so far pessimism has not had much predictive value when it comes to this part of the world. Given the intensity of the Indo-Pakistani rivalry, pessimists need to better account for why opacity has held for so long under conditions where they would have least

^{12.} David Cortright and Amitabh Mattoo, eds., *India and the Bomb: Public Opinion and Nuclear Options* (Notre Dame, Ind.: University of Notre Dame Press, 1996). Moreover, it is in the economic self-interest of India's growing middle class—particularly the urban merchant groups who form the core of the BJP's support—that their country not become ostracized internationally, which would happen if its nuclear program accelerated. In fact, the Indian finance ministry has estimated that the economic backlash from a nuclear test would cost India at least one percentage point in annual gross domestic product growth. See Jonathan Karp and Nigel Holloway, "Zero Yield," *Far Eastern Economic Review*, August 29, 1996, p. 15.

^{13.} Even officials within India's nuclear establishment seem to realize that it would take at least two decades for New Delhi to build a second-strike capability against China. Amitabh Mattoo, "India's Nuclear Status Quo," *Survival*, Vol. 38, No. 3 (Autumn 1996), p. 51.

expected it. Feaver argues that Pakistan has adopted opacity in part to avoid U.S. economic sanctions. Yet Islamabad has been subject to U.S. military and economic sanctions for the last seven years, and this has nonetheless not led to an expansion of its arsenal.¹⁴

Conclusion

The coming years should pose a field test for contending views in the proliferation debate. Feaver's and Sagan's historical accounts of Cold War nuclear behavior provide a yardstick by which to measure the kind of empirical research necessary to advance proliferation scholarship. The task before us is to continue to search diligently for data that bear on the worth of the assumptions underlying our analyses and to revise them accordingly as discordant evidence emerges. I look forward to Feaver and Sagan joining me in this important work.

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^{14.} Despite my calling China an "established nuclear power" (p. 106), Feaver accuses me of mistaking it for an opaque proliferator. In my discussion on the advantages of nuclear opacity, I merely argue that pessimists fail to appreciate the military benefits deriving from a deliberate policy of doctrinal ambiguity, which China chose to adopt and which proliferators, by definition, practice.