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# THE PORCUPINE THEORY OF NUCLEAR PROLIFERATION: SHORTENING THE QUILLS

by

LOUIS RENE BERES

Among the community of international relations scholars, strategic theorists, and atomic scientists, nuclear proliferation has always had a surprising number of supporters. Today, some members of this community continue to favor the spread of nuclear weapons on the assumption that it would produce security by expanding the number of states with credible deterrent postures. This view of nuclear proliferation is often referred to as the "porcupine theory" because it suggests that a state with a modest nuclear weapons arsenal possesses the capability to "walk like a porcupine through the forests of international affairs: no threat to its neighbors, too prickly for predators to swallow."<sup>1</sup>

Such thinking has been with us for a long time. Winston Churchill surely had a sort of "porcupine" metaphor in mind when he made the following statement before Commons on 3 November 1953:

When I was a schoolboy I was not good at arithmetic but I have since heard it said that certain mathematical quantities, when they pass through infinity, change their signs from plus to minus—or the other way round. It may be that this rule may have a novel application and that when the advance of destructive weapons enables everyone to kill everybody else nobody will want to kill anyone at all.<sup>2</sup>

In the same vein, a number of prominent scholars have been associated with "porcupine" thinking since the inception of the Atomic Age. A pioneering essay by Arthur Lee Burns in 1957 hinted that, in the absence of sudden technological breakthroughs, the spread of nuclear forces could actually be stabilizing.<sup>3</sup> In that same year, Morton Kaplan described conditions under which a world system comprised entirely of nuclear powers would be exceptionally stable. According to Kaplan, a system in which all states are in possession of weapons of such character that "any actor is capable of destroying any other actor that attacks it even though it cannot prevent its own destruction" (a "unit-veto" system) can be stabilized "if all actors are prepared to resist threats and to retaliate in case of attack."<sup>4</sup>

In 1963, F. H. Hinsley wrote that nuclear weapons "constitute for the first time a true deterrent, one that will never have to be relied upon so long as it exists—and this is likely to be forever." Supremely confident of the virtues of a *pax atomica*, Hinsley regarded the possession of nuclear weapons as "absolute" and differences in nuclear strength between states as insignificant.<sup>5</sup>

Throughout the 1960's, General Pierre M. Gallois of the French Air Force wrote widely on the subject of nuclear strategy, always in advocacy of "porcupine" reasoning. Although his preeminent rationale was the

encouragement of an independent French nuclear deterrent, the celebrated *force de frappe*, Gallois also defended nuclear proliferation in general. The principal lines of his argument suggest that any nuclear state, "regardless of size or power," can be secure against aggression as long as it is capable of wreaking unacceptably damaging retaliation. According to Gallois, "If every nuclear power held weapons truly invulnerable to the blows of the other, the resort to force by the one to the detriment of the other would be impossible." Therefore:

Because the risks of nuclear war cannot be compared with the benefits that might be obtained from armed conflict, because it is impossible to endure the shock and to continue with an organized military effort (and therefore, impossible to envisage an armed encounter), it is necessary to make nuclear deterrence the foundation of defense policy.<sup>6</sup>

Perhaps the most enduring "porcupine" (albeit one whose sensitivity to the problems of proliferation has led more to undue optimism than to full-fledged advocacy) has been Richard N. Rosecrance. Writing in 1963, Rosecrance stated:

Undoubtedly the concern over the dissemination of nuclear weapons among a large number of states in the next generation has been overdone. The 'Nth Country Problem' may not turn out to be a major 'problem.'

A year later, an edited collection of essays dealing with the probabilities and effects of nuclear proliferation pointed toward the basic conclusion that these effects might be less destabilizing than is generally supposed.<sup>8</sup> A UCLA security studies monograph in 1966 recognized that the stabilizing impact of nuclear proliferation could be reversed if the pace of diffusion were suddenly accelerated,<sup>9</sup> but a subsequent publication by Rosecrance, speaking of the years up to 1969, once again underscored "the conservatizing impact of nuclear acquisition."<sup>10</sup> Here, too, the author argued:

If each threat of minor war makes the two greatest states redouble their efforts in tandem to prevent major war, it is even conceivable that nuclear dispersion could have a net beneficial impact.<sup>11</sup>

Recently, advocacy of nuclear proliferation has been championed by R. Robert Sandoval, staff member at the Los Alamos Scientific Laboratory of the University of California, who writes that nuclear spread might not be all to the bad since it could render territorial aggression "an obsolete human endeavor."<sup>12</sup>

**T**hese views of nuclear proliferation are extraordinarily misconceived. Nuclear weapon states are not porcupines, and the international system is not a forest. Such metaphorical representations tend to obfuscate rather than illuminate the complex dynamics of international security and nuclear deterrence. The porcupine theory reveals a basic misunderstanding of the deadly logic associated with a nuclear threat system. Should such a misunderstanding begin to take hold among policymakers throughout the world, the consequences for peace and security could be unimaginably catastrophic.

The crux of this misunderstanding is a wholly erroneous presumption, namely, that the tremendous destructive power that accompanies a nuclear weapons capability necessarily endows a state with a credible deterrent posture and with safety from attack. Here following are several points that should give pause to those who would accept the presumption that nuclear proliferation can lead to peace and security for all.

► *The persuasiveness of a nuclear retaliatory threat rests not only on perceptions of explosive power, but also on perceptions of the willingness or resolve to carry out the threat.* Such willingness may or may not be present. It is not automatically implied by the high levels of destruction associated with nuclear explosions.

In a world of many nuclear powers, prospective aggressor states might have strong doubts about the credibility of nuclear

retaliatory threats. After all, the resort to nuclear retaliation against a nuclear-armed aggressor would very likely be self-destructive. Once the threshold from conventional warfare to nuclear warfare had been crossed, a "no holds barred" situation might well ensue, giving rise to conditions in which the "defending" state would have to be destroyed in order to be "saved."

This view is supported by the experience of a recent NATO war game played on German territory. Interestingly named "Carte Blanche," the game had results conservatively estimated at 1.7 million Germans killed and 3.5 million wounded during a "very limited" tactical nuclear war lasting only two days.<sup>13</sup> When one considers that fewer Germans were killed and wounded during the entire six years of World War II, it is easy to understand why rational nuclear powers might entertain the gravest reservations about making good on a threat to retaliate.

► *Even if many nuclear powers were actually willing to make good on their threats to resort to nuclear retaliation, instances might arise in which prospective aggressor states would fail to perceive this willingness.* Here, nuclear deterrence could fail even though every nuclear power had actually committed itself to threat fulfillment.

► *The persuasiveness of a nuclear retaliatory threat requires secure nuclear retaliatory forces.* Yet, while they are a *sine qua non* of credible nuclear deterrence postures, such forces cannot be assured—especially among newer members of the "Nuclear Club." It follows that the prospect of preemptive strikes would increase dramatically in a proliferated nuclear milieu, as would the implementation of "hair trigger" strategies for protection against preemption. Both of these consequences of nuclear proliferation would, of course, be radically destabilizing. Simply *having* nuclear weapons would be no assurance of security for new members of the club, and it could very well engender increasing insecurity.

► *Even if nuclear powers in a proliferated world system were able to maintain genuinely secure nuclear retaliatory forces, prospective*

*aggressor states—through miscalculation or errors in information—might not perceive the secure state of their victims' counter-strike capability.* Here, nuclear deterrence could fail despite the fact that all nuclear powers had actually been successful in securing their nuclear retaliatory forces.

► *Even if all nuclear powers in a proliferated world were able to maintain secure nuclear retaliatory forces which were recognized as such throughout the system of states, the effort required for such maintenance would generate a relentless systemwide arms race.* The disadvantages of a burdensome arms race, especially for the lesser powers, are obvious.

► *As the number of nuclear states increases, the odds for accidental nuclear war become prohibitive.* This is so not only because of the geometrical increase of existing risks, but also because such risks are certain to be intensified in a proliferated world where nuclear hardware, though deadly, is still primitive. For example, new nuclear powers would most likely employ fewer and less-reliable redundant safeguards against inadvertent firings than are now employed by the United States and the Soviet Union. Further, the command and control procedures, being less sophisticated than those of the large nuclear powers, could render suspect the systems' safety.

What kinds of redundant safeguards and

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command and control procedures are we talking about? Today, American nuclear forces are safeguarded from inadvertent firings by a considerable array of features built into both the chain of command and into the weapons themselves. Where they pertain to the chain of command, these features are distinguished by the so-called "Two Man Concept" whereby no single individual has the capability to fire nuclear weapons; by a control system whereby each individual with a nuclear weapons responsibility has been formally certified under the Human Reliability Program;<sup>14</sup> and by the use of secure, split-handled codes. Where they pertain to the weapons themselves, these features emphasize a variety of coded locking devices, which prevent firing in the absence of special signals issued by higher command, and environmental sensing devices, which prevent unwanted detonations through the operation of force-sensitive switches.<sup>15</sup>

While this system of redundant safeguards is certainly not foolproof, it does provide an indispensable element of protection. Since it is unlikely that future members of the nuclear club could implement a similarly sophisticated system, at least in the early years, the prospect of nuclear proliferation portends an unacceptably high risk of accidental nuclear war.

► *The prospect of mechanical or human malfunction in the operation of nuclear weapon systems raises the spectre of catastrophic accidents which do not give rise to nuclear war, but which may still produce an enormously destructive nuclear yield.* For example, bombers can crash; their nuclear payloads can be accidentally dropped or intentionally jettisoned; the nuclear bombs or missiles which they carry can be burned in a fire on the ground. The effect of nuclear proliferation would be to increase the probability of such accidents.

Should anyone doubt the severity of this problem, he should consider the American record of nuclear weapon accidents, at least as far as that record is known. According to the US Department of Defense:

There has been a total of 33 accidents involving US nuclear weapons throughout the period that the US has had these weapons. Because of the inherent safety features, the control features, the administrative procedures designed into US nuclear weapon systems and the precautions taken during operations with these weapons, there has never been a case where a nuclear detonation has occurred in a nuclear weapon accident. During the last 10 years, due in part to the Department of Defense's comprehensive program to improve nuclear weapon safety, only five accidents have occurred with the most recent being in 1968. . . . Of the five accidents occurring in the last 10 years, two accidents, involving B-52 aircraft, resulted in the dispersal of fissile material. These accidents were at Palomares, Spain in 1966 and in Thule, Greenland in January 1968. Cleanup operations were undertaken at both locations and the areas were completely decontaminated.<sup>16</sup>

If we can believe the Center for Defense Information, however, there is evidence of many other nuclear weapon accidents that have gone unreported or unconfirmed. In the words of *The Defense Monitor*:

Serious students of the problem estimate that an average of one US nuclear accident has occurred every year since 1945, with some estimating as many as thirty major nuclear accidents and 250 'minor' accidents during that time.<sup>17</sup>

Considering this record of "broken arrows" by the most sophisticated nuclear power, we should ponder the sort of record likely to develop in a world of proliferating nuclear powers, most if not all of which could be expected to have safeguards vastly inferior to our own.

► *The greater the number of nuclear powers, the greater the likelihood of nuclear weapons use by unauthorized personnel.* As in the case of accidental nuclear war, the problem of unauthorized nuclear weapons detonations in a proliferated milieu would

almost surely be exacerbated by the inevitable relaxation of prevailing controls. The possibility of weapons theft or usurpation within the volatile and unstable political atmosphere of many countries having the technical capability to produce nuclear weapons is a reality that cannot be blinked.

► *The greater the number of nuclear powers, the greater the probability of irrational national leaders with nuclear options.* Such leaders might initiate nuclear strikes against other nuclear states despite the enormously destructive or annihilating consequences. Since the "logic" of mutual deterrence which lies at the heart of a nuclear threat system is necessarily founded on the assumption of mutual rationality (i.e. the assumption that states consistently value self-preservation above all else), the appearance of irrational national leaders would signal the immobilization of that logic. It is sobering to realize that instances of irrationality at national leadership levels have ample precedent in recent history.

► *The possession of a credible deterrent posture offers no assurance of security from terrorist assaults.* No matter how well the requirements of a credible nuclear deterrent posture might be satisfied by new nuclear powers, prospective terrorist assaults would most likely be unaffected. This is so not only because terrorist actors do not typically conform to the conventional rules of conduct in world politics, but more importantly because of the difficulty in locating, identifying, and isolating terrorist actors so that reprisals could be mounted. Terrorists would almost always be immune to nuclear reprisal in any event.

#### **CONTROLLING NUCLEAR PROLIFERATION: THE IMPORTANCE OF SALT II**

The present nonproliferation "regime" is founded upon a scaffolding of multilateral agreements, statutes, and safeguards. The essential elements of this scaffolding are the Atomic Energy Act of 1954; the Statute of the International Atomic Energy Agency (1957); the Nuclear Test Ban Treaty (1963); the Outer

Space Treaty (1967); the Treaty Prohibiting Nuclear Weapons in Latin America (1968); the Seabeds Arms Control Treaty (1972); and, of course, the Treaty on the Non-Proliferation of Nuclear Weapons (NPT), which entered into force on 5 March 1970. Since certain provisions of the NPT, especially Article VI, call for a halt in the strategic arms race between the superpowers, the SALT II agreement now before the United States Senate must be appraised from a nonproliferation standpoint. In fact, SALT was originally conceived, in large part, as an essential incentive to nonnuclear powers to accept the NPT. According to Article VI of this treaty:

Each of the Parties to the Treaty undertakes to pursue negotiations in good faith on effective measures relating to cessation of the nuclear arms race at an early date and to nuclear disarmament, and on a treaty on general and complete disarmament under strict and effective international control.

Before the world's nonnuclear powers begin to take nonproliferation seriously, the SALT II Treaty will have to be ratified by the United States Senate. In the view of these powers, a bargain has been struck between the superpowers and themselves requiring progressive steps toward reciprocal arms restraint by the former in exchange for nonproliferation among the latter. Although it should be clear that proliferation is inimical to the security of every state, irrespective of superpower compliance with NPT obligations, the nonnuclear powers regard this bargain as the only prudential path to genuine security.

In the absence of Senate ratification of SALT II, it is difficult to imagine that the nonnuclear weapon states will accept their restricted condition indefinitely. Rather, they are likely to become increasingly sympathetic to the position of China, which has been to consider the NPT a thinly veiled trick by the superpowers to maintain their bilateral dominance of the world order. On the basis of such reasoning, China has assumed the "porcupine" position on nuclear

proliferation, treating it as a legitimate and necessary means for the developing world to protect itself from superpower hegemony. Should SALT II fail, developing countries would almost certainly come to the general understanding that nuclear weapons, like the six-gun in the American West, are indispensable equalizers in an otherwise unbalanced "struggle for existence."

All of this is not to suggest, however, that ratification of SALT II would completely satisfy superpower obligations to the nonproliferation objective. In the long run, the superpowers must go beyond SALT II to a more far-reaching upgrading of their central strategic relationship. This upgrading must embrace such features as a strategy of minimal deterrence, a comprehensive nuclear test ban, a joint renunciation of first-use of nuclear weapons, and a joint effort toward creating additional nuclear-weapon-free zones. The declaratory aspects of these steps must be supported by continuing reductions in strategic weapon systems, continuing restraints in the qualitative improvement of strategic weapon systems, improved patterns of verification, a moratorium on peaceful nuclear explosions, policy changes in the European theater to reduce reliance on tactical nuclear weapons, and further commitments to the Treaty Prohibiting Nuclear Weapons in Latin America (the Treaty of Tlatelolco).

Without such a bolstering of their central strategic relationship to back up SALT II, the efforts of the superpowers would bring to mind a view expressed by Albert Einstein on the first disarmament conference of the League of Nations in 1926. As Einstein passed through Geneva during the conference, reporters asked for his appraisal of the progress being made. Said Einstein:

What would you think about a meeting of a town council which is convened because an increasing number of people are knifed to death each night in drunken brawls, and which proceeds to discuss just how long and how sharp shall be the knife that the inhabitants of the city may be permitted to carry.<sup>18</sup>

The 17th-century English philosopher Thomas Hobbes recognized that although international relations exist in a "state of nature" (anarchy), these relations are still more tolerable than the condition of individual men in this state. This is so, said Hobbes, because nations lack the capacity of individual men to utterly destroy one another. The proliferation of nuclear weapons, however, would reduce international relations to the conditions of nature as they exist at the interpersonal level. As more and more states came to share the "dreadful equality" of Hobbesian men (the capacity to render mortal destruction), the portent of irremediable nuclear calamity would become more and more plausible. It thus becomes clear why the argument which discovers international security in nuclear proliferation—the so-called "porcupine theory"—represents the *reductio ad absurdum* of strategic thinking.

#### NOTES

1. R. Robert Sandoval, "Consider the Porcupine: Another View of Nuclear Proliferation," *Bulletin of the Atomic Scientists*, 32 (May 1976), 19.
2. Cited in John Herz, *International Politics in the Atomic Age* (New York: Columbia Univ. Press, 1959), p. 212.
3. Arthur Lee Burns, "From Balance to Deterrence: A Theoretical Analysis," *World Politics*, 9 (July 1957), 494-529.
4. Morton A. Kaplan, *System and Process in International Politics* (New York: Wiley, 1957), p. 51. However, Kaplan wisely modifies some of his earlier conclusions in his "The Unit-Veto System Reconsidered," in *The Future of the International Strategic System*, ed. Richard Rosecrance (San Francisco: Chandler, 1972), pp. 49-55.
5. F. H. Hinsley, *Power and the Pursuit of Peace* (Cambridge: Cambridge Univ. Press, 1963), pp. 354-55.
6. Pierre M. Gallois, "Nuclear Strategy: A French View," in *Search for Peace*, ed. David Brook (New York: Dodd, Mead, 1970), p. 165. The article is reprinted from Eleanor Lansing Dulles and Robert Dickson Crane, eds., *Detente: Cold War Strategies in Transition* (New York: Praeger, 1965), pp. 215-20, 223-40.
7. Richard N. Rosecrance, *Action and Reaction in World Politics* (Boston: Little, Brown, 1963), p. 288.
8. Richard N. Rosecrance, ed., *The Dispersion of Nuclear Weapons* (New York: Columbia Univ. Press, 1964).
9. See Richard N. Rosecrance, *Problems of Nuclear Proliferation*, Security Studies Paper No. 7, University of California, Los Angeles (1966), pp. 45-62.
10. Richard N. Rosecrance, "Diplomacy in Security Systems," in *International Security Systems: Concepts and Models of World Order*, ed. Richard B. Gray (Itasca, Ill.: F. E. Peacock, 1969), p. 102.
11. *Ibid.*, p. 103. However, in a more recent work, Rosecrance raises some major questions about the viability of deterrence in multipolar settings and concludes that we must

begin to move "beyond deterrence" in order to produce stability. See his "Deterrence in Dyadic and Multipolar Environments," in *The Future of the International Strategic System*, pp. 125-40.

12. Sandoval, p. 19.

13. See *The Defense Monitor*, 4 (February 1975), 3.

14. The author received special briefings on this program from the Directorate of Nuclear Surety at Kirtland AFB, New Mexico on 11 May 1976 and from Strategic Air Command Headquarters at Offutt AFB, Nebraska on 13 May 1976. Each armed service is charged with the enforcement of a Human Reliability Program among its personnel having nuclear

weapons responsibilities, pursuant to DOD directives 5210-41 and 5210-42.

15. These are switches that respond to acceleration, deceleration, altitude, spin, gravity, and thermal forces. This information is based upon the author's briefings at the USAF Nuclear Surety Directorate described above.

16. From an undated press release sent to the author by LTG W. Y. Smith, USAF, Assistant to the Chairman, Joint Chiefs of Staff, on 16 June 1976.

17. *The Defense Monitor*, p. 9.

18. Cited by Leo Szilard, *The Voice of the Dolphins* (New York: Simon and Schuster, 1961), p. 54.

