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by

LOUIS RENÉ BERES

And what rough beast, its hour come round at last,
Slouches toward Bethlehem to be born?

—William Butler Yeats
The Second Coming

From the end of the 11th century, when a Muslim sect known as the Assassins (a translation from *Hashishaya*) willingly sacrificed their own lives in pursuit of what they termed righteousness and salvation, special difficulties have been involved in dealing with terrorists. Not until very recently, however, have these difficulties entailed the prospect of large-scale nuclear catastrophe. Today, the failure of counterterrorist strategies can give rise not only to locally destructive acts of rage and violence, but to genuinely apocalyptic events triggered by nuclear weapons. The nightmare that began with the Manhattan Project may end with megadeath, and the primary actors may not be governments, but terrorists.

How can this be possible? The answer lies largely in the fact that the ability to acquire and use nuclear weapons has now passed into the hands of private individuals and groups. Coupled with the orientation to violence of terrorists, their relative insensitivity to orthodox threats of deterrence, and the growth of interterrorist cooperation, this ability signals an inexorable drift toward nuclear destruction. This paper will explore the different components of the hazard of nuclear terrorism and will offer certain recommendations for understanding how to keep the problem within manageable limits.[1]

THE TERRORISTS

Who, exactly, are today's terrorists? Recognizing the extraordinary heterogeneity of purpose, power, and popular support which distinguish one group from another, they include such far-flung organizations as Japan's Red Army (*Sekigun*), which has mounted operations in Malaysia, Lebanon, Israel, Mexico, Cuba, West Germany, and Libya; West Germany's Baader-Meinhof Group, sometimes known as the Red Army Faction; Northern Ireland's Provisional Irish Republican Army; Italy's Red Brigades; and the various organizations that coexist uneasily under the loose umbrella of the Palestine Liberation Organization: Al Fatah, the Popular Front for the Liberation of Palestine (PFLP), the Popular Front for the Liberation of Palestine-General Command (PFLP-GC), and the Popular Democratic Front for the Liberation of Palestine (PDFLP).[2]

Ideologically, these groups are a tangled skein of variegated purpose and composition. Their intellectual and spiritual mentors include Bakunin, Marx, Lenin, Sorel, Marighella, Mao, Giap, Fanon, Marcuse, Guevara, Debray, Trotsky, and Guillen. And, insofar as all modern revolutionary terror has certain roots in the French Reign of Terror (1793-94), the names of Robespierre, Marat, Saint-Just, and Fouché must also be counted as fountainheads of current terrorist dogma.

With respect to the kinds of individuals who become engaged in terrorist activities, the literature is replete with motives and

explanations. Some scholars distinguish between genuine political actors and those persons who feign political concerns for purely private ends.[3] Others focus on the psychological dimension of involvement, emphasizing such dynamics as frustration-aggression theory[4] or psychoanalytic theory with special reference to psychopathology and madness.[5] Whatever the motives that give rise to terrorist activity, be they a deeply rooted commitment to specific political objectives or the need to escape from one form or another of private anguish,[6] virtually all of today's terrorist actors would offer obeisance to Clausewitz' remark: "The political object . . . will be the standard for determining both the aim of military force and the amount of effort to be made."[7]

TERRORIST ACCESS TO NUCLEAR WEAPONS

Terrorists can now gain access to nuclear weapons either by theft of assembled systems from military stockpiles and production facilities or by self-development from pilfered nuclear materials. To acquire an assembled weapon, terrorist operatives might direct their attention to any of the tens of thousands of nuclear weapons now deployed across the world in national arsenals. In the future, such terrorists are likely to have a significantly enlarged range of possibilities for stealing nuclear weapons. This is the case because the number of national members in the so-called "Nuclear Club" is growing steadily.

To fashion their own weapons from basic nuclear materials, terrorist groups would require both the materials and the expertise to create an explosive device or radiation dispersal implement. How difficult would it be for them to fulfill these requirements? Not very! As increasingly large amounts of fissionable materials are produced by the nuclear power industry in the years ahead, the opportunities for terrorists to exploit the manifestly catastrophic possibilities that lie dormant in nuclear fuel will skyrocket.

How difficult would it be for terrorists to actually get their hands on fissionable materials?[8] According to Mason Willrich and Theodore Taylor, coauthors of a special report to the Energy Policy Project of the Ford Foundation, the extant system of safeguards in this country is so inadequate that it is only a matter of time before terrorists are able to surreptitiously remove the essential fissionable materials from nuclear power plants.[9] Although significant improvements in American safeguards have taken place since this appraisal was offered, parallel improvements have not always been implemented abroad. This situation has portentous overtones, since American safeguards do not secure us against nuclear weapons fashioned from materials stolen elsewhere. To be genuinely worthwhile, the protection of nuclear materials from terrorist groups must be global in scope.

Regrettably, the amount of fissionable materials present in other countries which might become the target of terrorists is likely to expand at an almost unbelievable rate. India's manufacture of a nuclear device with technology supplied by Canada, the West German-Brazilian and French-Pakistani deals involving pilot reprocessing plants to extract weapons-grade plutonium from spent reactor fuel rods, and the continuing

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development of fast-breeder reactor plants by Japan, the Soviet Union, France, and West Germany signal very dangerous conditions. Unless immediate and effective steps are taken to inhibit the spread of plutonium reprocessing and uranium enrichment facilities to other countries, terrorist opportunities to acquire fissionable materials for nuclear weapons will reach intolerable limits.

To fabricate its own nuclear weapons, a terrorist group would also require expertise. According to Willrich and Taylor:

> The design and manufacture of a crude nuclear explosive is no longer a difficult task technically, and a plutonium dispersal device which can cause widespread radioactive contamination is much simpler to make than an explosive.[10]

Since as early as 1954, declassification and public dissemination of information about the design of fission weapons has been extensive. As a result, such widely publicized cases as the one involving the 20-year-old MIT undergraduate who put together a devastatingly accurate technical design for a nuclear explosive—a case documented in the NOVA science series on public television, 9 March 1975—assume a high degree of credibility.[11]

The fact is that such cases are not really all that remarkable. According to Willrich and Taylor:

> Under conceivable circumstances, a few persons, possibly even one person working alone, who possessed about ten kilograms of plutonium oxide and a substantial amount of chemical high explosive could, within several weeks, design and build a crude fission bomb. By a 'crude fission bomb' we mean one that would have an excellent chance of exploding, and would probably explode with the power of at least 100 tons of chemical high explosive. This could be done using materials and equipment that could be purchased at a hardware store and from commercial suppliers of scientific equipment for student laboratories.[12]

What would happen if such a bomb were made and exploded? Since a nuclear explosion yields deadly penetrating radiations (gamma rays and neutrons) as well as blast wave and heat, even a "small" nuclear weapon could generate terrible destruction. Consider the following examples provided by Willrich and Taylor:

> A nuclear explosion with a yield of ten tons in the central courtyard of a large office building might expose to lethal radiation as many as 1000 people in the building. A comparable explosion in the center of a football stadium during a major game could lethally irradiate as many as 10,000 spectators. A nuclear explosion with a 100-ton yield in a typical suburban residential area might kill perhaps as many as 2000 people, primarily by exposure to fallout. The same explosion in a parking lot beneath a very large skyscraper might kill as many as 50,000 people and destroy the entire building.[13]

A terrorist group might also choose to use its plutonium in the form of a radiation dispersal device. In this case, the plutonium would be transformed into an aerosol of finely divided particles that could be distributed uniformly into the intake of a large office building's air conditioning system. According to Willrich and Taylor, only 3½ ounces of this extraordinarily toxic substance (its toxicity is at least 20,000 times that of cobra venom or potassium cyanide[14]) would pose a lethal hazard to everyone in such a building.[15]

How would such a weapon work? Consider the following scenario:

> The plutonium aerosol is distributed into the intake of a large downtown office building's air conditioning system by a criminal or terrorist group. Only three and one half ounces could prove a deadly risk for all of the occupants. Death by lung cancer would probably come to anyone inhaling between ten and one hundred *millionths* of a gram. Death due to fibrosis of the lung would be

the probable fate of those who retain a dose of about a dozen *thousandths* of a gram. [Emphasis added.][16]

What makes this scenario particularly macabre is that the building occupants who absorb lethal but not massive doses of plutonium might not know of their poisoning for weeks, or months, or perhaps even years. One can only imagine the reaction of thousands of office workers to the disclosure that they have been lethally irradiated. The concrete human implications, the social and economic dislocations, and—last but certainly not least—the political implications are staggering.

Plutonium might be dispersed in still other ways. One scenario that has been considered at the Nuclear Regulatory Commission office in Washington, D.C., is described as follows:

> During what appears to be a normal day at the Pacific Coast Stock Exchange a large beaker filled with boiling liquid is noticed in the window of a nearby hotel. Police investigate, but it is too late. The boiling acid in the beaker has been dissolving and dispersing half a pound of plutonium, enough to expose everyone within several city blocks to a high risk of lung cancer.[17]

Rather than use plutonium for nuclear explosives or radiation dispersal, terrorists might also find it agreeable to sabotage nuclear plant facilities. Such sabotage could yield extensive death and property damage via radiation release. Although the chances of accidental reactor meltdown are generally believed to be extremely small (a belief, however, that has been tempered somewhat by the recent events at Three Mile Island in Pennsylvania), the case is quite different with respect to deliberate reactor meltdown. Consider the following scenario, another in the collection of the Nuclear Regulatory Commission's Office of Nuclear Material Safety and Safeguards:

> Under the cover of night, a dozen men storm the gates of a nuclear power plant, killing the two guards and taking the operating staff hostage. After placing charges of high explosives next to the plant's critical cooling systems, they phone the mayor of a nearby large city. Send $5 million, they demand, or we will blow the plant, sending radioactive particles drifting over the city's neighborhoods.[18]

Such acts could pose monumental problems for the appropriate authorities. Although a great many steps have already been taken to diminish the vulnerability of nuclear power plants in this country, successful sabotage is certainly not out of the question. By penetrating the physical barriers between themselves and the fission material in the reactor, and by disabling the cooling systems to the reactor core, saboteurs could cause the reactor to melt through its protective shielding and release deadly radioactivity into the atmosphere. Alternatively, since today's nuclear plants are unable to withstand the impact of large aircraft, a kamikaze-type plane crash into a nuclear plant could create a calamitous reactor core meltdown. Comparatively speaking, however, it would be more difficult for terrorists to "pulse" a nuclear reactor core to destruction than to make a radiological weapon or a crude fission bomb.

TERRORIST ORIENTATIONS TO VIOLENCE

Today's terrorist groups typically share an orientation to violence that has been shaped largely by the preachings of Bakunin, Fanon, and Sorel.[19] All too frequently, these groups operate without a code of honor that distinguishes between combatants and noncombatants. As a result, the imperative to create limits to violence is ignored, and terrorist anger is vented almost randomly.[20] At the same time, the level of adopted violence is constrained only by the limits of available weaponry. These facts imply an unacceptably high probability of nuclear terrorism should access to weapons or power plants be realized.

To a certain extent, this orientation to violence stems from the conviction that the

absence of inhibitions to apply maximum force to virtually any segment of human population is expedient. Since war is still the *ultima ratio* between states, it is argued, so must internal war be the final arbiter within states. Such "gun-barrel" thinking is often taken as an adaptation from the aphoristic philosophy of Mao Tse-tung.

To another extent, this orientation derives from the romanticization of violent action exemplified by Bakunin's dictum that "the passion for destruction is a constructive passion." Fused with the categories of Sorel and Fanon, and the existential idea of Sartre that "irrepressible violence . . . is man recreating himself," such romanticization breeds a cathartic view of violence.

Finally, today's terrorist orientations to violence stem, in part, from the presence of psychopaths and sociopaths who enjoy carnage for its own sake. Here, the complete inversion of Judaeo-Christian notions of conscience and compassion flows not from any means-end calculation or from devotion to the "creativity" of violence, but from purely psychotic motive. Where such motive is present among terrorists who are suicidal schizophrenics, the problems of effective counterterrorist action are greatly exacerbated. This is the case because such terrorists—whose incentive is to use violence nihilistically rather than politically—are apt to regard the threat of death as a stimulus rather than as a deterrent.[21]

TERRORIST INSENSITIVITY TO THREATS OF DETERRENCE

As we have just seen, the viability of deterrent threats against terrorist actors may be undermined when these actors are impelled by psychotic motive. It must now be pointed out that the ability to deter violent behavior by terrorists is in doubt with *all* categories of terrorist, including those whose actions spring from purely political concerns. Since a great many modern terrorists place a higher value on the achievement of certain political and social objectives than they do upon their own lives, these groups are essentially insensitive to orthodox threats of retaliation. Faced with an international actor for whom the "deadly logic" of deterrence is immobilized, states bent upon an effective counterterrorist strategy are at a significant disadvantage.

Consider the following examples of terrorist "rationality":

- Arab terrorists, in April 1974, seized an apartment building in Northern Israel, and ultimately accepted death rather than capture.
- SLA members, during the widely publicized California shootout in May 1974, preferred death to incarceration.
- Two Red Army terrorists, during their attack on Israel's Lod International Airport in May 1972, killed themselves.
- Holger Meins, of the Baader-Meinhof group, succumbed to self-inflicted starvation in 1974.

What are the implications of this particular behavioral characteristic of terrorist actors for the threat of nuclear terrorism? Quite plainly, the most significant implication is that should terrorists obtain access to nuclear explosives or radioactivity and calculate the prospective costs and benefits of use, the fear of retaliatory destruction might not figure importantly in this calculation. In effect, this means that traditional threats of deterrence might have little or no bearing on the terrorist decision concerning the use of nuclear force.

It follows that unless diplomatic or other forms of persuasion can prove successful, the only means left to prevent the threatened nuclear act would be a "surgical" or preemptive strike. In certain instances, of course, even this option might prove inappropriate or ineffectual.

COOPERATION AMONG TERRORIST GROUPS

Consider the following:

- Venezuelan terrorist Illich Remirzed Sanchez receives weapons training from the PFLP in Lebanon.
- Members of the Japanese Red Army terrorist group receive weapons training in Lebanon.
- Joint training programs and arms

transfers take place between the Turkish People's Army and Black September.

- Members of the American Weathermen, Northern Ireland's IRA, and Nicaragua's *Sandinista* movement are trained in Palestinian camps.
- Black September operatives demand the release of German insurgents who had been involved in the killing of German policemen.
- Liaison between PFLP and Japanese Red Army agents produces the Lydda Airport massacre; an attack on the American Embassy in Kuala Lumpur, Malaysia; the hijacking of a JAL flight; an assault on the Japanese Embassy in Kuwait; and a takeover of the French Embassy at The Hague.[22]

These are only a few of the most glaring examples of a new phenomenon in world politics—systematic cooperation and collaboration between terrorist groups. Terrorists have always formed alignments with sympathetic state actors, but they are now also beginning to cement patterns of alliance and partnership with each other.[23] The net effect of such behavior patterns is a mirror image of Trotsky's theory of "permanent revolution."

From the standpoint of nuclear terrorism, cooperation between terrorist groups is particularly ominous. Such cooperation greatly facilitates terrorist acquisition of nuclear weapons and their exchange between different groups. It also increases the prospect of shared expertise in the technology of nuclear destruction and enlarges the opportunity for reciprocal privileges which might be crucial to successful operations.

IN CONCLUSION

The subject of terrorism resembles the writing of Franz Kafka: It is easy to appreciate, but difficult to understand. A potpourri of actors, motives, and methods, terrorism presents a complex admixture of sources and styles that overshadows the great simplicity of its effects. This admixture is a phantasmagoria rather than a fixed pattern, a succession of shifting images of purpose and prospect that defies "capture" by even the most skillful social scientists. Complicated by the developing possibility of nuclear terrorism, these characteristics bode an inconceivably mad ending to the absurd drama of international political life.

What is to be done? What palliatives, if any, can be applied to alter the trajectory of our collective descent toward nuclear terrorism? What evidence, if any, exists to counter the impression that the long litany of increasingly destructive terrorist incidents will be interrupted before even greater (i.e., nuclear) violence is unleashed?

To answer these questions, our attention must be focused on two basic options: technological and behavioral. In an effort to halt the spread of nuclear technology and nuclear materials throughout the world, steps can be taken to discourage the theft of assembled weapons or fissionable materials and the sabotage of nuclear reactors. In fact, such steps—in the form of vaults, barriers, locks, alarms, remote surveillance, and armed guards—are already underway, spurred on by the awareness that calamitous possibilities exist and must be removed. Additionally, there is growing international concern for President Carter's aim to prevent nuclear exports to states which do not submit to International Atomic Energy Association (IAEA) safeguards and control.

All such steps, however, are bound to be inadequate when the underlying problem is one of "safeguarding nuclear materials in a world of malfunctioning people."[24] The prospect of nuclear terrorism will not be impaired by the application of a technological "fix."[25] Rather, what is required is a thoughtful behavioral strategy, one that is directed toward producing certain changes in the behavior of both terrorist and state actors.

The "core" of such a strategy must necessarily be based upon a sound understanding of the risk calculations of terrorists. Until we understand the unique terrorist stance (vis-à-vis that of states) on the balance of risks that can be taken in world politics, we will not be able to identify an appropriate system of sanctions. Faced with actors whose preference orderings often run counter to those of states, we must explore

their decisional calculi before we can know what threats to apply or rewards to promise.

Although terrorist actors are typically apt to tolerate substantially higher levels of death and injury than states, there *is* a threshold beyond which certain costs become intolerable. No less than states, terrorists choose between alternative courses of action by assessing the perceived consequences of each course in cost-benefit terms. While such assessments are bound to be rough and imprecise, their use suggests that counter-nuclear-terrorism measures can succeed once the threshold of unacceptable costs is understood.[26]

To understand this threshold, scholars must begin to address themselves to the following ten principal questions:

- Is there a particular ordering of preferences that is common to many or all terrorist groups, or is there significant variation from one group to another? If it can be determined that many or all terrorist groups actually share a basic hierarchy of wants, a general strategy of counter-nuclear-terrorist operations can begin to be shaped. Alternatively, if significant variation in preference orderings can be detected between terrorist groups, myriad strategies of an individually "tailored" nature will have to be identified.
- Are there particular preferences which tend to occupy the highest positions in the preference hierarchies of terrorist groups, and how might these preferences be effectively obstructed? In this connection, it is especially important to examine the widely held assumption that terrorists, like states, are most anxious to avoid negative physical sanctions. In fact, a great deal of sophisticated conceptual analysis and experimental evidence appears to indicate that such sanctions are apt to be ineffective in limiting aggression and may actually prove counterproductive.[27]
- To what extent, if any, would the obstruction of terrorist preferences prove offensive to some of the principal values of states? In this case, we must be concerned about the very real possibility that effective counter-nuclear-terrorist measures might be injurious to such values as social justice and human rights within particular states. Here, states must first decide whether the prospective benefits of proposed antiterrorist activity are great enough to outweigh the prospective costs to major segments of their own populations.
- To what extent, if any, are the risk calculations of terrorist actors affected by geographic dispersion and intermingling with state actors? Since terrorists do not occupy a piece of territory in the manner of states, they are not susceptible to orthodox threats of deterrence. How, then, might effective counter-nuclear-terrorist efforts be reconciled with the reality of geographic dispersion?
- To what extent, if any, might the decisional calculi of terrorist actors be receptive to positive cues or sanctions as opposed to negative ones, and exactly what rewards seem to warrant consideration? In this connection, special attention might be directed to studies of child rearing, which indicate with overwhelming regularity that positive sanctions (rewards) are generally far more effective than negative ones (punishment).
- To what extent would the implementation of effective counter-nuclear-terrorist measures require special patterns of international cooperation, and how might such patterns be created? In principle, the surest path to success in averting nuclear terrorism lies in a unified opposition to terrorist activity by states; yet, at least in the immediate future, this kind of opposition is assuredly not forthcoming. We must, therefore, ask ourselves what cooperative patterns between *particular* states can cope with the problem under discussion.
- To what extent, if any, are the risk calculations of terrorists affected by their relations with "host" states? Since terrorist actors necessarily operate within the framework of individual states, the character of the relationship between "visitor" and "host" may affect the viability of counter-nuclear-terrorist measures. How, therefore, might we exploit what is known about such relationships in curbing the threat of nuclear terrorism?

- To what extent, if any, are the risk calculations of terrorist actors affected by alignments with state actors or with other terrorist groups? And how, therefore, can we use what we know about such effects to devise an effective counter-nuclear-terrorist strategy?
- To what extent, if any, are the risk calculations of terrorist actors affected by the terrorist pattern of random and uninhibited violence? In asking this particular question, we treat terrorist orientation to violence as an independent variable in order to treat it more effectively as a dependent variable later on.
- To what extent, if any, are the risk calculations of terrorist actors affected by the degree to which their policies evoke sympathy and support from others? Since almost all acts of terror are essentially propagandistic, it is important to understand their desired effects on selected publics in order to prevent escalation to a nuclear option.

By considering these basic questions, students of nuclear terrorism can progress from their presently misconceived emphasis on a technological "fix" to a genuinely auspicious behavioral strategy. With such a strategy in hand, steps can be taken to create inhibitions in the use of violence by terrorists and to impede the growing cooperation of terrorist groups. In the absence of such a strategy, the threat of nuclear terrorism remains fraught with almost unimaginable peril.

In Skinnerian terms, we are describing the search for a "behavioral technology" that can reduce the probability of terrorist nuclear violence.[28] As with all other groups of human beings, terrorists acquire a repertoire of behavior under the particular contingencies of reinforcement to which they are exposed. The "trick" is to understand this repertoire and to use it to inform the differential reinforcement of alternative courses of action. Once this is done, the specter of nuclear terrorism can be confronted with countermeasures that are grounded in a systematic body of theory, and we can dispense with the notion that we are navigating in uncharted areas. No longer will the motto of medieval cartographers, *Hic sunt dracones*, serve any meaningful purpose.

NOTES

1. The notions of hazards and limits suggest the appropriateness of the phrase *Hic sunt dracones* in the title. *Hic sunt dracones*, meaning "Here are dragons," was the phrase which medieval cartographers used to mark uncharted areas on their maps. Also by way of definition, terrorism, as used in this article, refers to the violent activity of insurgents who wish to challenge existing centers of power rather than to the violent activity of incumbents seeking to maintain power. In the language adopted by Thomas Perry Thornton, we are concerned with "agitational terror" rather than with "enforcement terror." [See Thornton's "Terror as a Weapon of Political Agitation," in *Internal War*, ed. Harry Eckstein (New York: The Free Press, 1964), pp. 71-99.] This is not to suggest that terrorism practiced by governments against their own people is less reprehensible than "agitational terror" (it may, in fact, be much more reprehensible), but only that the threatened use of nuclear explosives or radioactivity is intrinsically unsuited to the tactics of "enforcement terror."

2. This paper makes no attempt to draw distinctions between different terrorist groups in terms of the legitimacy or reasonableness of their claims. Rather, it rests upon the assumptions that every terrorist group, however reasonable or unreasonable its rationale, has the potential to precipitate extraordinary levels of global instability and is acting wrongly and illegally when it engages in random killing and destruction.

3. Stephen Schafer, for example, distinguishes between the "convictional criminal," who has an altruistic-communal motivation, and the "pseudoconvictional criminal," whose motivation is egoistic. See Stephen Schafer, *The Political Criminal: The Problem of Morality and Crime* (New York: The Free Press, 1974), p. 147.

4. This theory is founded on Dollard's principle that "the occurrence of aggressive behavior always presupposes the existence of frustration and, contrariwise, that the existence of frustration always leads to some form of aggression." See John Dollard, et al., *Frustration and Aggression* (New Haven: Yale University Press, 1939), p. 1.

5. Psychoanalytic explanations draw sustenance from Harold Laswell's *Psychopathology and Politics* (Chicago: University of Chicago, 1930) and Eric Hoffer's *The True Believer* (New York: Harper and Brothers, 1951).

6. This need is perhaps best described by André Malraux in his characterization of the terrorist Ch'en in *La Condition humaine* (New York: French & European Publications, 1933).

7. Karl von Clausewitz, *On War*, ed. and trans. E. M. Collins (Chicago: Henry Regnery Co., 1962), p. 71.

8. While an enormous amount of plutonium is apt to be produced by the nuclear power industry in the years ahead, only some 11 to 20 pounds are needed to construct a crude explosive device. Moreover, only 3½ ounces are needed to make a radiation dispersal device capable of killing thousands.

9. See Mason Willrich and Theodore Taylor, *Nuclear Theft: Risks and Safeguards* (Cambridge, Mass.: Ballinger, 1974), p. 115.

10. Willrich and Taylor, p. 1. A crude nuclear explosive made from pilfered plutonium would probably have a yield in the range between several hundred and several thousand tons of high explosive. If such an explosive were detonated in a crowded metropolitan area, as many as 10,000 people might be killed directly while tens of thousands of others might suffer severe fallout problems.

11. More recently, there is the case of a 21-year-old undergraduate physics major at Princeton, John A. Phillips, who designed an atomic bomb in four months with information obtained entirely from public documents. The point of his design, said Phillips, "was to show that any undergraduate with a physics background can do it, and therefore that it is reasonable to assume that terrorists could do it, too." See *The Princeton Alumni Weekly*, 25 October 1976, p. 6. Most recently, of course, is the controversy over the article written by Howard Morland which was to be published in the May issue of *The Progressive*.

12. Willrich and Taylor, pp. 20-21.

13. *Ibid.*, p. 22.

14. It should be pointed out that despite its extraordinary toxicity, a prospective plutonium thief would be safe as long as the metal did not come into contact with an open wound or reach his lungs.

15. Willrich and Taylor, p. 25. It is interesting to point out that the companies involved in the nuclear energy industry take issue with this conclusion. In a "position paper" advertisement appearing in *Fortune* magazine, John W. Simpson, Director-Officer of the Westinghouse Electric Corporation and Chairman of the Energy Committee, states the following:

> The release of plutonium in an enclosed area—as say in a building's ventilating system—would have a limited effect from a terrorist point of view. The filters and ducts would prevent a substantial amount from being circulated in the system. Hence use of plutonium as a radiological weapon would be effective only in the immediate vicinity of the point of release and that area can be decontaminated.

See the advertisement "Nuclear Energy and the Future, Position Paper #5, Managing and Safeguarding Wastes and Fissionable Material," *Fortune*, 91 (May 1975), 138.

16. Willrich and Taylor, pp. 24-25.

17. See Robert R. Jones, "Nuclear Reactor Risks—Some Frightening Scenarios," *Chicago Sun-Times*, 30 April 1976, p. 12.

18. *Ibid.*

19. Sorel, in turn, speaks of his own *Reflections on Violence* (1914; rpt. New York: AMS Press, 1975) as "Proudhonian in inspiration."

20. This imperative to create limits to violence is discussed by Camus in his work, *Les Justes* (New York: French & European Publications, 1950).

21. One is reminded, in this case, of Sergei Nechayev, portrayed by Dostoyevsky as "possessed," who states in *Revolutionary Catechism*: "Our task is terrible, total, universal, and merciless destruction." Quoted in Walter Laqueur, ed., *The Terrorism Reader: A Historical Anthology* (New York: New American Library, 1978), p. 69.

22. See Robert Fisk, "The World's Terrorists Sometimes Are United," *The New York Times*, 17 August 1975, Section 4, p. 3; Yonah Alexander, "Some Perspectives on International Terrorism," *International Problems*, 14 (Fall 1975), 27; and John B. Wolf, "Black September: Militant Palestinianism," *Current History*, 64 (January 1973), 37.

23. With regard to sympathetic states, today's most obvious "sponsors" are Libya, Uganda, Algeria, Syria, Vietnam, Iraq, Somalia, and the People's Democratic Republic of Yemen.

24. See Mason Willrich, "Terrorists Keep Out: The Problem of Safeguarding Nuclear Materials in a World of Malfunctioning People," *The Bulletin of the Atomic Scientists*, 31 (May 1975), 12.

25. Quite simply, a technological "fix" will not work. Even if the United States succeeds in developing new and elaborate protection systems for nuclear weapons, special nuclear materials, and nuclear reactors, such systems would have to be replicated internationally. And, even if this highly improbable replication were to take place, techniques could always be figured out to circumvent vaults, locks, armed guards, etc. Moreover, at the time of this writing there is no evidence that major national suppliers of nuclear technology will agree to a general moratorium on sales of plants or materials, or that the major national developers of plutonium-fueled reactors will drop plans for fast-breeder plants.

26. Of course, as in the case of states, terrorists are subject to acting irrationally. Here, the problem of preventing nuclear violence is especially severe, since it is impossible to know in advance what contingencies of reinforcement are appropriate.

27. See, for example, Ted Robert Gurr, *Why Men Rebel* (Princeton: Princeton University Press, 1970), especially pp. 241-42, 259, and 274; Arnold H. Buss, *The Psychology of Aggression* (New York: Wiley, 1961), p. 58; and Leonard Berkowitz, *Aggression: A Social Psychological Analysis* (New York: McGraw- Hill, 1962), p. 96.

28. See B. F. Skinner, *Beyond Freedom and Dignity* (New York: Knopf, 1971).