The Realization of Inhumanity

Modeling the Threat of
Weapons of Mass Destruction

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I. INTRODUCTION

"We are not fighting so that the enemy recognizes us and offers us something. We are fighting to wipe out the enemy...what is demanded is not even negotiated surrender, but the enemy's total annihilation."

Amir Tahari, Holy Terror

As the National Guard becomes increasingly involved in Homeland Defense, the discussion of Weapons of Mass Destruction (WMD) terrorism has become a central issue. The weapons themselves, however, are generally not discussed. Indeed most of the writings on the subject fall into one of three categories: academic discussions of the nature of terrorism, technical studies of the effects of WMD, or threat discussions in which WMD are a "black box." None address the real questions: What differentiates between various types of WMD? Which can a non-state actor realistically be expected to make? And what forms will the weapon(s) take?[1]

In the usual process of developing a doctrinal response to a problem, a developer follows a logical pattern. From a statement and definition of the problem, analysis flows to assessment of the environment and the threat, followed by development of doctrine, and finally by development of specific tactics, techniques and procedures. Development of WMD terrorism responses thus far have not clearly assessed the nature of the threat.[2]

Much of the thought on WMD has been purely military with the exception of civil defense concepts developed for the most part in the 1950s. Military WMD response to WMD employed by state actors is, however, vastly different from civil response to WMD employment by non-state actors. WMD defense against a state actor deals with fairly well known and clearly defined enemy capabilities, intentions, and tactics. Further, state actor employment of WMD is constrained by mutual deterrence.

This difference must be reflected in the response systems developed. A host of response elements have been developed, along with techniques for their employment. But what is the threat? Are the response measures appropriate to the threat? Will they work if

needed? Ultimately, only by understanding the nature of this threat will the National Guard be able to engage in fully effective response analysis and development.

II. TERRORISM AND WMD

"I will have such revenges on you…I will do such things – What they are yet, I know not, but they shall be the Terrors of the Earth!"

William Shakespeare
King Lear, Act 2, Scene III

Hatred and mass murder are not new. Some things have changed, however. Man has learned to harness new tools and machines for realizing his ancient fears, hatreds, and aggressions. Also new is the way the world has seemingly grown smaller as populations blossom and improved transportation and communications make every place on earth accessible. As our world has changed, so also has the nature of violent acts perpetrated by man upon his fellows. But why?

WMD have traditionally been eschewed by the states and military organizations of the world. Generally, their use has been a last resort undertaken in conditions that not only demanded the most extreme actions by the employer but (frequently) also in conditions of technological imbalance that guaranteed reasonable freedom from retaliation in kind. Examples range from the employment of biological weapons in Northeastern America during the Seven Years War[3], the employment of chemical weapons during WWI, the employment of nuclear weapons in WWII, to the employment of chemical weapons during the Iran-Iraq War. In each case, the use of these weapons conveyed either a temporary superiority that ended when competitors acquired the technology (in the case of chemical and nuclear weapons in WWI and WWII) or a permanent superiority that led to the complete destruction of the enemy (in the case of biological weapons employment during the Seven Years War)[4].

The problem was that these weapons were actually poor weapons when used as such. They were too destructive for most battlefields, and frequently had the unintended effect of inflicting nearly as much havoc on the user as they did on the target. Further, when regarded in a strategic light by two or more states at relative technological parity, the result was what came to be known as Mutually Assured Destruction.

In conventional war the crucial struggle occurs in the mind of one's opponent, in an attempt to destroy his will to continue. In order to attain this psychological objective, the victor must cause the foe to regard himself as defeated. In most cases this psychological state comes about when the loser's capability to continue resistance is diminished. Giving up is thus presented as an acceptable, if undesirable option. While man alone among the higher animals seemingly has no surrender reflex, this doesn't make him innately suicidal either.

For a weapon to be considered a serious threat it must produce an effect contributing in some way to the desired psychological end-state without excessive concomitant cost. But most WMD are simply too effective, at least in causing casualties. How credible is a threat when it carries the promise of mutual annihilation, thus forcing the contest to become an endgame? Mutual annihilation is rarely credible as a tool of coercion, simply because of its extreme nature. WMD are poor weapons for states, bearing a resemblance, at the extreme end, to a battle with hand grenades held by two men in a lifeboat. But this hasn't stopped states from acquiring WMD, just the contrary in fact. Desire (demand) for WMD is determined by variables that are unique to each case, and which vary according to the individual state or group.

The traditional (state-based) threat of these weapons has been of greater utility than the weapon itself. The mere threat engendered by the existence of such weapons provides guarantees against any conventional endgame and limits their liability (except for that associated with mutual destruction) to the lesser losses associated with conventional war. The proliferation of these weapons has thus had the effect of pushing war below the "horizon" of WMD use, at least between the major states.[5]

The traditional group of players has given way to a set that encompasses individuals and groups who are free of the restrictions that bind state actors. The increasing inter-connection of the major world powers into a global economic unit and the burgeoning Information Revolution have generated waves of social dislocation. This dislocation resembles that of the previous agrarian and industrial revolutions in their displacement of previous socio-economic elites.

Those persons and groups who have been dispossessed or left behind in this process face a dilemma. In order to survive, they must give up who and what they are: but to give up their identity, to them, does not constitute survival. Many groups have chosen to resist, but often the overwhelming conventional strength wielded by major world powers makes conventional resistance a suicidal proposition. The only possible response for the dispossessed is to search for an asymmetrical means of challenging the status quo.

An asymmetrical challenge can take many forms, ranging from non-violent protest through guerrilla war to terrorism. The form of the response is dictated by the nature of the group and the means that the group can muster. Rooted in tactics and frustrations of the weak the tendency, when thwarted, is toward rage and hatred and thus toward maximization of violence. The dispossessed justify the employment of an extreme asymmetrical response by a psychological process that simultaneously dehumanizes the enemy and demonizes his beliefs, thereby sanctioning the use of virtually any means.

“Terrorists want a lot of people watching, not a lot of people dead.” This oft-cited quote by writer and thinker Brian Jenkins tells us much about the most common image of terrorism. This classic image is based on three assumptions, well summarized by Professor Gordon McCormick:[6]

a) Terrorists are political actors who have taken up terrorism as a result of failure of or inability to influence the normal political process.

b) These actors attempt to force their agenda by employment of carefully directed and scaled violence, designed to communicate a symbolic message, establish a bargaining position for specific demands, and/or create public recognition.
c) These actors mirror the normal political actors in their environment and understand that there are basic "rules" governing actions of both sides. Central to these are the rules regarding acceptable levels of destruction and casualties. A "too successful" attack would result in a globally coordinated counteraction.[7]

This asymmetrical pattern has changed, however, as the nature of non-state actors has changed. This changing dynamic has led to a change in the inputs of desire and capability as they affect production of WMD. These inputs may be seen in terms of a "supply and demand" model, similar to that which occurs in economic systems.[8] Capability, or "supply" factors have increased gradually, at roughly the same rate of technology. Desire, or "demand" variables, however, change with the nature of the groups that form the potential user population. This is especially true for those groups associated with apocalyptic or messianic beliefs, redemptive fanaticism, ethnic hatred, or similar extreme values.

As an example, religion is always an especially strong internal motivator, implying an otherworldly disregard for consequences such as casualties inflicted and for prosaic needs such as self-preservation. Religious belief systems may be apocalyptic or millenarian in character, which adds to the danger.[9] These groups can feel their acts justified and dictated by the highest authority: if their actions are commanded by God, "enemy" casualties are deserving of their fate and even the actors' own death(s) are merely a passage to higher reward. In this environment, WMD may be desirable precisely because of the mass casualties and disruption they can create. In the judgment of such a group, the target may "deserve" an attack of the most horrific nature and the means of attack may be desirable precisely because of its "apocalyptic" character.

Changes in these input variables are related both to the technological advances of recent history as well as the social changes that have accompanied them. The information revolution is only the most recent aspect of this phenomenon.[10] Access to information is a double-edged sword. While it liberalizes societies with the ideas of personal freedom, it may simultaneously foster a local backlash against ideas that may be anathema to local traditions or power structures. The irony is that this learning revolution provides the weapons that these reactionary groups may apply.[11]

Having chosen to fight in this fashion, a group faces a daunting challenge. Its goal must necessarily be to destroy the global society that is perceived as a threat. Merely defeating this society is inadequate; it must be destroyed utterly or forced to reform in a more acceptable image. This apocalyptic goal is significant, for it points to the apocalyptic means such a group will seek to employ.

As a form of asymmetrical attack, ultra-violent terrorist acts *followed by silence* have increased in frequency. This is a symptom of three general trends:

a) Increased global awareness of terrorist acts has de-sensitized many audiences to high levels of violence. A mere aircraft hijacking carries little weight these days, compared to the death of all aboard.

b) Increased media coverage and global access to media have placed each attack on a global stage. What once generated worldwide news is now commonplace. This increases the natural tendency to compete for sustained access to media coverage.

c) The ability of the great (and often target) powers to project force with vast lethality and precision has driven two significant changes in terrorist tactics. In a Darwinian effect, moderate groups have often left the field (being destroyed or becoming “legitimate”) to be replaced by groups of fanatical

nature. Simultaneously these remaining groups have significantly improved their operational security out of sheer necessity. In this more dangerous operating environment, any terrorist is only too aware that each attack must count for as much as possible, for each attack may very well be his last.

These trends illustrate the tendency toward bigger and more violent acts committed for their own sake, by any type of terrorist group. The increase in acts followed by silence, however, is particularly significant; for the post-attack silence indicates an important change in the nature of these groups, as listed below:

a) Rather than attempting to gain publicity or sympathy, these terrorists specifically eschew sympathy and publicity for their cause.[12]

b) The tendency toward fundamentalist religion as a moral rudder in a world perceived as corrupt has created a trend toward redemptive beliefs.

c) Redemptive groups do not fear public notoriety: their intended audience is their own closed community and God.[13]

In addition to these changing demand-based trends, the information revolution has changed the supply-side means:

a) Improvements in technology and access to materials have improved the terrorists' reach by enabling more effective and cheaper attacks.[14]

b) Considered against the trend of de-sensitization toward terrorist violence, WMD are unique in that they retain at all levels an ability to create extreme fear and even panic, even in remote populations.[15]

c) WMD are particularly attractive to those desiring increasingly violent attacks. They offer mass casualty (and even contagion) effects that can easily

overwhelm most emergency services, which are designed for more easily isolated emergencies. This can add panic and paralysis as synergistic effects or as multipliers to WMD effectiveness.[16]

d) The technological threshold for development of WMD is lowered every year. As technological sophistication of terrorist groups increases, with simultaneous experience in planning and executing operations, uncertainty, the key mitigating-factor in selection of WMD as a method, becomes less of a determining factor.[17]

Given continuation of these trends, the question of WMD employment by terrorists becomes rather more "when," than "if."

III. THE MODELING PROCESS

"Nothing is more worthy of the attention of a good general than the endeavor to penetrate the designs of the enemy."

Niccolo Machiavelli
Discourses

The key determinant in the development of WMD by non-state actors will be the actors' own estimate of the feasibility and cost of weapon acquisition, development and assembly (supply side), balanced against their desire for that particular weapon (demand side). Each weapon/group relationship is thus distinct and unique, and must not be regarded merely as a "black box" labeled "WMD."[18]

In this analysis, the various challenges, costs, and difficulties associated with a particular weapon may form more of a determinant than that individual group's desire for that particular weapon; that is, the group will "take what they can get." The issue is not simply to demonstrate desire, but also capability, and the model is thus a cumulative

probability analysis. This problem is non-trivial for it answers the question of why WMD terrorism has not yet occurred on a large scale: the product of WMD desire and WMD capability has so far been low enough that it results in a small overall probability.

This product of supply and demand forms what may be termed "Effective Demand," a term most often used in economics. In this context, it is a measure of a particular group's likelihood to develop WMD options.

A. EFFECTIVE DEMAND MODEL

Demand Components x Supply Components = Effective Demand ~ External Influences

This is a cumulative probability in which the product of Demand and Supply produces an overall measure of Effective Demand. This model is significant, for it points at an essential truth: while many groups may desire to do harm, and many have the capability to do harm, real capability only comes from the product of the two. Neither supply nor demand stands alone.

The intelligence analyst must estimate actual components of this process in a subjective measurement. Components identified in whole or in part by analysts are used to form indicators of WMD Effective Demand as shown below.

(1) Examples of Demand Indicators:

(a) Group desires power (capability) to balance against an enemy.
(b) Group leader manifests sociopathic personality.
(c) Ideology advocates the use of ultra-violence.
(d) Group is cohesive and closed-cell.
(e) Group disregards (potential) backlash.
(f) Group is willing to take high risks.

(2) Examples of Supply Indicators:

(a) Group exhibits sophisticated technology or tactics.
(b) Group includes members knowledgeable of WMD technology.
(c) Group possesses financial resources sufficient to fund WMD program.
(d) Group has access to WMD materials and technology.

B. THE SUPPLY SIDE PROBLEM

In order to make the Effective Demand measurement work properly, the process of weapon acquisition must be analyzed according to the specific agent and device or delivery system that makes it a weapon (Weaponization). Each actor must successfully complete this process. Each actor who does or attempts to do so will be a unique and individual case.

The Effective Demand Model demonstrates the relationship between demand and supply. To this I will add a framework for analysis of the Supply Side problem. Most WMD threat analysis does not adequately consider this process in terms of supply issues such as specific potential agents, types of weapons, and associated technological challenges.

Successful development of WMD is dependent upon solving a series of technological problems, which I will refer to as “components”. Each component is a set of sub-components, which define the specific challenges the developer will face. Success in solving the problems is dependent upon success of all the sub-components: failure of one sub-component means failure of the entire set.

Solving all the necessary components for a particular form of WMD produces a viable weapon. A group may, however, achieve some but not all components for a certain type of weapon. While this results in failure for that particular weapon, it does not necessarily mean complete failure. Components of a failed attempt at one type of weapon may contribute to development of another weapon of similar design.

Alternately, partial failure may channel the developers' efforts to construct a different, more feasible (or cruder) weapon: following a path of least resistance. Partial technology may also serve as currency for trade with other non-state actors or rogue-states. In this fashion, a frustrated group may acquire other hard-to-acquire components, raw materials, or technology. Thus this varying degree of weaponization success, unique to each weapon/group relationship, contributes greatly to the types of weapon a particular group pursues, possibly more so than the Demand Model alone might indicate.

C. CUMULATIVE PROBABILITY

The components are internally defined by the product of the probabilities of the sub-components: much the same as a series of coin tosses. Probability of one coin toss/heads (.5) x probability of a second coin toss/heads (.5) generates a cumulative probability of .25 (e.g. two consecutive heads results).

While it serves as a good start point, this is a simplification, of course, for development of a WMD capability is not quite so neat. The functioning of one supply side component may affect the functioning of another. This inter-relationship is extremely complex, and, indeed, forms the core of the intelligence analyst's problem, for each group will attempt to solve their Supply Problem in a unique way. The key point to remember is that an intelligence indicator that defines one group may not serve the same purpose for another, for the probabilities will change according to the ways in which they are affected by the peculiar circumstances of that group.

A hypothetical group might successfully develop all the components necessary to produce a gun-type fission device, but fail to acquire sufficient fissile material to make it a reality. It may, however, have obtained a quantity of fissionable material[19]. They might simply bide their time or even market their expertise to another group in exchange for material in a black-market knowledge-for-material exchange. Alternately, these efforts might lead to a conclusion that a Radiological Dispersal Device is more feasible. In order

to successfully model the Effective Demand for a particular group, the analyst must have a deep and detailed knowledge not only of the group and its goals, but also of the technology of the various types of WMD the group may pursue and how this process is affected by that particular group's unique nature.

Stage One of this cumulative probability is represented by the expression, in which the Cumulative Probability (CP) is a product of subordinate Probabilities (P):

$$\mathbf{(P_1) \times (P_2) = CP}$$

This illustrates how, within a particular component, success is dependent on the successful attainment or completion of each sub-component. Failure of one means failure of all. As an example, the postulated group desiring a nuclear WMD might have acquired sufficient PU239 to attempt to construct an implosion bomb. If, however, the group is unable to attain the necessary symmetrical machining that is necessary to create a viable device, then its other efforts are for naught. Failure of one sub-component negates that entire component (in this example, weaponization), thus denying the group its desired objective.

Failure to attain the desired objective need not equate to overall failure in the attempt to develop a WMD, however. Each component problem occurs parallel to the others. As noted above, failure of one component causes the group to fail in attempting that particular objective. As an example, imagine the hypothetical group successfully designing a fission bomb, but managing to obtain only non-explosive fissionable material. The group still has available options, however. In order to consider the entire range of options, we must consider the success or failure of all the component problems the group addressed. This is Stage Two[20] of the cumulative probability; which contains the component systems as subsets of the entire developmental process.

While each component is dependent on the others in producing success for that overall problem, failure of one component may not necessarily mean overall inability to develop a WMD (of some type). As noted above, it may only change the form that WMD may take. For example, the aforementioned hypothetical group failed to develop a fission bomb. Success in other component areas, however, allows it to develop an improvised radiological device from the fissionable material. The type of weapon is thus dictated by the group's degree of success as much as desire. When at first it doesn't succeed, the group may fashion a cruder design based on what it has successfully solved, or simply try again.

This may be represented by the following expression in which Overall Probability (OP) is a sum of the subordinate Cumulative Probabilities (CP):

$$(CP_1) + (CP_2) + (CP_3) + (CP_4) = OP$$

D. COMPONENT SETS

I have identified nine component sets that define the various WMD processes. The process is represented by the expression below, in which Overall Probability of success (OP) is the sum of each of the nine component sets of Knowledge (K), Material (M), Equipment (E), Technician (T), Production (P), Weaponization (W), Storage (S), Concealment (C), and Delivery (D).

$$(K) + (M) + (E) + (T) + (P) + (W) + (S) + (C) + (D) = OP$$

Each component set is further subdivided into sets of sub-components: specific actions that must be successfully completed in order to complete that particular process. They are of great significance, for they identify and define the specific obstacles that the non-state actor must overcome in his developmental process.

Component Set #1: Knowledge

$$\mathbf{K = f(A)}$$

Knowledge (K)	Availability (A)	Is knowledge obtainable from local sources?
		Does the knowledge require extensive research?
		Is the knowledge classified or proprietary information?

Component Set #2: Material

$$\mathbf{M = f(C_1,H,R,C_2)}$$

Material (M)	Control (C_1)	Is the material commonly available?
		Is the material uncommon?
		Is the material individually tracked or accountable?
	Hazards in Handling (H)	Is the material benign?
		Is the material dangerous/toxic?
		Is the material highly hazardous/lethal?
	Necessary Refining or Processing Steps and Difficulty (R)	Is preparation a simple process (home brew chemistry) <72 hrs?
		Is preparation a complex process requiring undergrad-level training and <30 days?
		Is preparation extremely complex requiring extensive prep >30 days?
	Cost (C_2)	Does the material require only individual resources/ Middle class income?
		Does the material require group resources and/or collective financing?
		Does the material require organizational resources and/or supportive fund raising?

Component Set #3: Specialized Equipment

$$\mathbf{E = f(P,C_1,C_2)}$$

Specialized Equipment (E)	Purchase controls (P)	Is the equipment commonly available?
		Is the equipment uncommon?
		Is the equipment an individually tracked, accountable item?
	Complexity of operation (C_1)	Is operation of the equipment simple?
		Is operation of the equipment complex, requiring formal training?
		Is operation of the equipment very complex requiring highly skilled operators?
	Cost (C_2)	Is cost of the equipment low, requiring Individual resources and/or middle class income?
		Is cost of the equipment moderate, requiring group resources and/or collective financing?
		Is cost of the equipment high, requiring organizational resources and /or supportive fund raising?

Component Set #4: Specialized Technician Requirements

T = f(A,L,C)

Technicians (T)	Availability (A)	Can anyone do the work?
		Can technicians be found through local recruiting?
		Can technicians be found only through an extensive and/or international search?
	Necessary Level of Training (L)	Will undergrad/semi-skilled workers suffice?
		Are graduate/skilled technicians required?
		Do technicians require post-doc/professional training?
	Cost (C)	Are technicians available at low cost, requiring only individual resources and/or middle class income?
		Are technicians available at moderate cost, requiring group resources and/or collective financing?
		Are technicians available only at high cost, requiring organizational resources and/or supportive fund raising?

Component Set #5: Weapon Production

P = f(N,H,S)

Production (P)	Number of Steps (N)	Is it a simple process (home brew chemistry) <72 hrs?
		Is it a complex process/ <30 days?
		Is it an extremely complex requiring extensive preparation >30 days?
	Inherent Hazards (H)	Is the process safe?
		Is the process dangerous/toxic?
		Is the process highly hazardous/lethal?
	Signature (S)	Is the process unnoticeable?
		Is the process noticeable?
		Is the process obvious or flagrantly noticeable?

Component Set #6: Weaponization Process

$$W = f(S,C)$$

Weaponization (W)	Number of Steps (S)	Is this a simple process such as filling cans?
		Is this a complex process such as aerosolization?
		Is this an extremely complex process, such as assembly of bursting sub-munitions?
	Complexity (C)	Can the process be completed by anyone?
		Is the process complex, requiring formal training?
		Is the process very complex requiring highly skilled assembly and handling?

Component Set #7: Storage Factors

$$S = f(N,T)$$

Storage (S)	Specialized Nature of Storage (N)	Does the material or device require no special handling or storage container?
		Does the material or device require special handling or containers?
		Is the material or device extremely dangerous and/or radioactive in storage?
	Time sensitivity to decay/degraded effectiveness in storage (T)	Is the material stable in storage for an indefinite period?
		Is the material stable in storage for an intermediate period (months)?
		Is the material unstable and storable only for short periods (<30 days)?

Component Set #8: Concealment Characteristics

C = f(S,E,T)

Concealment (C)	Signature (S)	Does concealment require exacting search techniques or highly specialized equipment?
		Is concealment noticeable to trained observers?
		Is concealment obvious, including active emissions?
	Ease of concealment (E)	Is the device easily concealed?
		Does concealment require special arrangements or preparation?
		Is the device extremely difficult to conceal?
	Search Techniques (T)	Will discovery require an exacting search by highly specialized personnel and/or equipment?
		Will discovery require a specific search by trained personnel?
		Is accidental discovery likely and/or is the device detectable with cursory means?

Component Set #9: Delivery System Production

D = f(N,S,C)

Delivery System (D)	Specialized Nature (N)	Will common improvisation suffice?
		Will modification of improvised means suffice?
		Does the weapon require military or restricted means?
	System signature (S)	Does the delivery system have little or no signature?
		Does the delivery system have a discrete or short-lived signature?
		Is the delivery system signature obvious to all observers?
	System Cost (C)	Is the delivery system cost low, requiring only individual resources and/ or middle class income?
		Is the delivery system cost moderate, requiring group resources and/or collective financing?
		Is the delivery system cost high, requiring organizational resources and/or supportive fund raising?

IV. CONCLUSION

"War must be, while we defend our lives against a destroyer who would devour all; but I do not love the bright sword for its sharpness, nor the arrow for its swiftness, nor the warrior for his glory. I love only that which they defend…"

J. R. R. Tolkien
The Lord of the Rings: The Two Towers

We live in a world characterized by changes in technology so rapid that preceding millennia seem, by comparison, to be a blink in the story of human development. This change is accompanied by social upheaval as new inventions change the way we live and how we do things. The airplane shrank our world, and the radio and television brought instantaneous awareness of global events to our immediate attention; each simultaneously brought the potential for increased conflict as the people of the world saw, first hand, how "the other half lived." The automobile made us a mobile society, homogenizing the industrialized nations to an extent never before possible while simultaneously eroding local identity and parochialism. And the computer has multiplied the exchange, development, and processing of information, far beyond anything anyone had expected. Instantaneous access to communications has been both a blessing and a curse in this way, for, like Cadmus' teeth, the information that makes our society free and productive serves as both a threat to others and as the catalyst of potential destruction.

In this paper I have attempted to illustrate the WMD developmental process for non-state actors. State-based WMD development will generally seek a particular weapon to fill a strategic need. The development will be slow and cautious, marked by testing, for it must justify any funds expended. Since few states would wish to make only one device, they will seek as many as they feel they need to assure redundant survivability in the face of potential attack and enough to deter the potential of enemy attack, the plant investment will be considerable.

But a state's WMD development is curiously toothless, for, having produced WMD; the state discovers the strangely impotent world of mutual deterrence. The non-state actor, however, is not to be so deterred.

Having crossed the emotional barrier of desire for a WMD effect, the non-state actor's WMD development may be driven simply by the desire to cause death, for that is the common characteristic of all WMD. Unlike the state, his WMD need not be assured, supportable, or mass producible. It only has to work once. He may cut any and all corners as he develops his system. It may not even have to be deliverable, in the military sense, for it might be enough merely to set it off in the workshop in which it was constructed. All it has to do is kill, preferably in a big way.

This endows the non-state actor with a curious freedom, for he need not adhere to the constraints we might think normal and prudent. He might even accept self-immolation in the process, if the end justifies his means. And he is free to seek the path of least resistance. The non-state actor may simply seek whatever he can successfully acquire. No plutonium? Make a Radiological Dispersal Device out of nuclear fuel rods. No fissile or fissionable material? Cook up some *Yersina Pestis* in beer brewing equipment. The point is that he doesn't desire the weapon per se. Any weapon will do, and "good enough" is an acceptable option. He only desires the end result. And it is this very desire that makes him so very dangerous, for the knowledge and materials are present all around us.

Ultimately a dynamic interrelationship between demand and supply will shape the nature of the threat. Each case will be unique. One group may have capability but not desire. Another might have desire but not capability. And a third might have desire and some capability, but be unable to realize this potential due to a critical failure of one or more of the necessary component sets.

A group assessed with capability but not desire may be treated as it has always been treated, although it may bear watching for signs of trading that knowledge for

something the members really want. A group with desire but not capability must be watched for the possibility of developing capability. This is very dangerous, for it shows how a group, having once crossed the psychological barrier of deciding to employ WMD, may simply divert from the unattainable and more difficult forms to the less sophisticated and easier (and nonetheless deadly) variants. The third group would bear the closest scrutiny, for it sits on the cusp of mass death. Its efforts may well become bold and reckless, especially if it senses the nearness of its goal and the closeness of its pursuers.

The problem for the analyst may be to identify not only a group's Effective Demand, but to identify the relevant supply components and mark the group's progression through the process. This is a non-trivial problem, for the answers the analyst derives should identify specific weapons under development and a group's relative success in attaining their goal.

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[1] In related thesis work at the Naval Postgraduate School, I addressed these questions in much greater detail, including classified appendices in which I designed weapons of mass destruction such as non-state actors might attempt to construct. These appendices provided the justification for the normative models discussed later.

[2] For an excellent discussion of doctrinal development, see FM 100-11, Department of the (US) Army, US GPO, Washington DC, 1997, specifically its discussion of the (Enhanced) Concepts Based Requirements System (ECBRS).

[3] It's important to keep in mind the component of ethnic warfare in this case. The Anglo-American forces, enraged at atrocities committed by the French-Indian forces against the settlers of the Ohio and Hudson River valleys, felt themselves released from the normal constraints of conventional warfare. The fact that the enemy was of a different, and alien, ethnic group enabled this in the form of dehumanizing and depersonalizing the targets of what was an equally horrific genocidal act. The Manichean lesson, of course, is that the most horrific of weapons become acceptable if, in the user's mind, the target "deserves" the result. This is also a factor in the employment of nuclear weapons against Japan in 1945 as well as Japanese employment of biological weapons against the Chinese in 1937 and their attempts at similar employment against North America in 1944.

[4] The British successfully weaponized smallpox in 1763, employing wool blankets and nosocomial transmission by human vector. This is also a good example of the anesthetizing effect the (ethnic) dehumanization of one's enemies can have on the attacker. The correspondence was chillingly matter-of-fact. Sir Geoffrey Amherst, British CINC North America, wrote in his instructions to Colonel Henry Bouquet, "Could it not be contrived to send the smallpox among those disaffected tribes of Indians? We must, on this occasion, use every stratagem in our power to reduce them." Colonel Bouquet responded, "I will try to inoculate the Indians with some blankets that may fall into their hands and take care not to get the disease myself." Cited by Oldstone, Michael; Viruses, Plagues, and History; Oxford University Press, New York, NY; 1998; page 33.

[5] The major states, of course, have the most to lose and the least (in terms relative to their already significant stature) to gain. This is significant, for it differs greatly from the standpoint of lesser states or non-state actors who, of course, have little if anything to lose and much to potentially gain, albeit in the face of a significant gamble.

[6] "International Terrorism" class notes, Naval Postgraduate School, Monterey, CA, 1997-1999.

[7] Success, in this sense, implies only enough increase in stature that the group in question becomes a threat that merits eradication by one or more states.

[8]"International Terrorism" notes, op cit.

[9] The resurgence of extreme Manichean religious imperatives, for example, coupled with the breakdown of traditional group constraints and the proliferation of millenarian and apocalyptic cultist sentiments contribute to this trend. Manichean groups adhere to the dualistic religious system of Manes, a common doctrine of Gnostic Christianity, Buddhism, Zoroastrianism, and various other elements, with a basic belief in a conflict between light and dark—with matter being regarded as dark or evil. This is an especially ominous concept in extremes, implying that the only "true" good is spiritual, and that all earthly existence is innately corrupt. On a slightly different note, apocalyptic and millenarian beliefs both concern themselves with a preordained event that will bring about the end of human history. They differ, however, on what will happen after this event. Millenarian doctrines promise their adherents that this cataclysmic episode will deliver them from a world of increasing evil and corruption to one of perfection and peace. Apocalyptic dogmas, on the other hand, focus on the imminent event and do not concern themselves with their believers' existence after that time.

[10] Continuing a trend that began with innovations such as writing, the invention of moveable type, the general increase in global literacy and the advent of electronic communications media.

[11] It is precisely this "crest" of the Third Wave discussed by Heidi and Alvin Toffler that defines the period of instability in which we live. Much the same as the early 19th century, where troubles were manifest across Europe as the industrial revolution swept away social structures that dated to the Middle Ages, this period of trouble has no visible end and is limited only by the continued exponential growth in technology which widens the gap ever more between 1st, 2nd, and 3rd wave societies. Recent dismay in the US over violence by individuals and groups that communicate over, and obtain information from, the internet serves as a microcosm.

[12] These terrorists may see the "enemy," whatever its form, as inherently evil. This justifies any acts taken against it, as well as imbuing the attacker(s) and their methods with the imprimatur of the highest moral justification. They do not necessarily eschew publicity for their attacks, only the more traditional forms of publicity, for disruption and destruction of evil are their goal. If terror adds to their agenda, then it is welcomed, but no attempt is made at converting or appealing to the target as an audience. They have nothing to lose from employment of WMD.

[13] While I use religious groups as an example of redemptive behavior, this is not intended as a general definition of redemptive groups, but merely as a common and easily understood form. Some aspects of redemptive behavior can be seen in purely secular groups, for example in racist or extreme political ideologies. Other groups may be quasi-religious. The key point is the redemptive attitude, not the belief system from which it derives.

[14] The increased access to both technology and materials caused by political instability and the subsequent "kleptocracy" reigning in the former USSR exacerbate this trend, particularly given the emphasis the former Soviet Union placed on development and stockpiling of WMD and associated products.

[15] There are several contributing factors to this. Historical images of the devastation of Hiroshima and Nagasaki, the poison gas used on the Jews in Nazi Death Camps, gas casualties from WW I, and the memories of the 1918 Influenza are all extremely graphic and disturbing in nature. Another factor is their mysterious nature: bombs, guns, etc are easy to understand but a weapon which is silent and invisible awakens irrational fears of the unknown. Finally, there is the sheer scale of the effects of these weapons. Most people assume their own immunity to terrorism: bombs and guns, they assume, happen to someone else. But the anonymity and seemingly overwhelming effects of WMD make everyone a target, or so it seems.

[16] While this might be a deterrent to the "classical" terrorist, it is just this effect (among others) that makes it attractive to a redemptive actor. As a case in point, the 1999-2000 flu season produced a widespread epidemic across the US, overwhelming many medical providers. Southern California emergency rooms were swamped and pharmacies reported shortages of drugs and vaccines. As of 1999 some response programs are in place, such as the FEMA National Disaster Medical System (NDMS), which provides 60 disaster medical assistance teams from FEMA, DoD, and the VA. Of these, 21 are available within 6 hours

with on-hand equipment and supplies for 72 hours of unsupported operation. Their capability in the face of the kind of intense local disruption one may expect from WMD employment is, at present, limited. A 1999 test in Philadelphia in which a terrorist smallpox attack was postulated ended when none of the responders were able to correctly identify the agent from the symptoms of the infected population.

[17] Generally terrorists, under constant threat of discovery and capture or destruction, feel compelled to build as much certainty as possible into their planning. WMD agents, historically poorly understood, have always added an element of uncertainty: they might work too well, destroying more than the desired target (granted not a problem with redemptive terrorists) or it might simply not work at all (as Aum Shinrikyo found out in June 1993 when they attempted unsuccessfully to stage an anthrax attack on Tokyo.) This kind of "false start" could have disastrous effects for the group, in lost opportunity, lost resources, internal morale effects, and on the increased chances for discovery either by the signature of the failed attack or simply by the time-dependent increased likelihood of detection by police or intelligence services.

[18] The clandestine non-state production of crude chemical or biological weapons in some cases requires no more expertise and materials than that normally required by the production of methamphetamine or, for that matter, homemade/microbrew beer or yogurt production.

[19] Fissile material is employed in bomb production. Fissionable material is employed in power reactors.

[20] While I refer to the two examples as Stages One and Two, they are not sequential. In fact, Stage One exists as several subsets of the set that comprises Stage Two.