SHOCK AND AWE: A WIDELY MISUNDERSTOOD EFFECT

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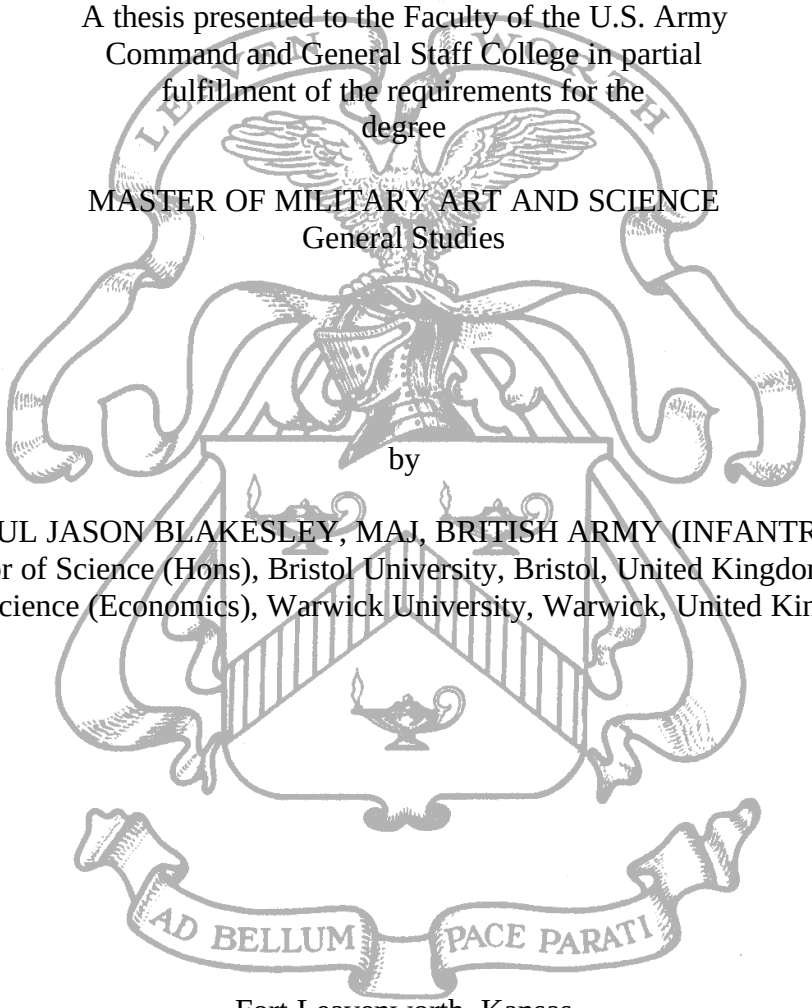

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Operation Iraqi Freedom introduced the phrase of šShock and AweŠ into the general lexicon of US officers and the press alike. As a term it is an undefined and as an effect poorly understood, especially within the realm of asymmetric warfare. This thesis examines the effect of shock at both the tactical and operational level as well as within the realms of the symmetrical and asymmetrical battle and defines the tactical term of shock. It investigates the imposition of shock from a distance in line with the United States Armed ForcesŸ expeditionary mindset and force projection capability. It utilizes several empirical studies and mathematical representation to describe shock and awe and attempts to represent a synthesis of medical and military studies through a graphic medium. The thesis shows that operational shock can be achieved, albeit it inefficiently, in a symmetrical environment through the cumulative effect of tactical shock whereas the traditional methods of imposing operational shock appear to fail in the asymmetrical case. Systems theory explains why the effect of shock is transient in nature at all levels. Resistance to shock at both the tactical and operational level is examined.

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ABSTRACT

SHOCK AND AWE: A WIDELY MISUNDERSTOOD EFFECT, by MAJ Paul J. Blakesley, 105 pages.

Operation Iraqi Freedom introduced the phrase of “Shock and Awe” into the general lexicon of US officers and the press alike. As a term it is undefined, and as an effect poorly understood, especially within the realm of asymmetric warfare. This thesis examines the effect of shock at both the tactical and operational level as well as within the realms of the symmetrical and asymmetrical battle, and defines the tactical term of shock. It investigates the imposition of shock from a distance in line with the United States Armed Forces’ expeditionary mindset and force projection capability. It utilizes several empirical studies and mathematical representation to describe shock and awe and attempts to represent a synthesis of medical and military studies through a graphic medium. The thesis shows that operational shock can be achieved, albeit it inefficiently, in a symmetrical environment through the cumulative effect of tactical shock whereas the traditional methods of imposing operational shock appear to fail in the asymmetrical case. Systems theory explains why the effect of shock is transient in nature at all levels. Resistance to shock at both the tactical and operational level is examined.

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I am indebted to a lot of people who have invested substantial time and effort into this. I would like to thank my committee, Dr. Jake Kipp, LTCs Charlie Guerry and Marian Vlasak for all of their tireless efforts, advice, coaching and cajoling, and my long-distance nonvoting committee member, Dr. Rebecca Goolsby from the Naval War College, who provided countless new avenues of approach for me. Second, the librarians who I am sure dread the appearance of the usual suspects at their front desk, desperate for some more papers to research, all required yesterday! Third, to all of those who work on the faculty of both the Master of Military Art and Science and the Command and General Staff Course for all of their help and guidance. Fourth, to LTC Jim Storr Ph.D. of the British Army for both his lecture and seminar that initially piqued my curiosity into this area and then his patience with being used as my link back into the UK academic world. Fourth, to my staff group who patiently allowed me to bounce good and not so good ideas off them when all they really wanted to do was go home! And last but by no means least, I am indebted to my lovely wife Karen, the one person who has always believed in me, even when I doubted myself. Without her saint like patience over lost weekends and late nights and her never-ending supply of coffee and treats this thesis would never have been produced. While writing this I kept looking to the words of Joseph Pulitzer for guidance who wrote, “Put it before them briefly so they will read it, clearly so they will appreciate it, picturesquely so they will remember it and, above all, accurately so they will be guided by its light.” I hope that I came close to achieving his guidance.

While acknowledging all who helped me throughout my endeavor, all mistakes within the thesis are the responsibility of the author alone.

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ACRONYMS

AI	Armored Infantry – this is synonymous with US Mechanized Infantry.
BF	Base Force
C^2	Command and Control
CONUS	Continental United States
CD	Collateral Damage
CGSC	Command and General Staff College
CI	Combat Ineffective
DGDP	Directorate of Graduate Degree Programs
EBO	Effects Based Operations
FU	Fighting Units
FM	Field Manual
GDP	Graduate Degree Programs
HNO	Host Nation Support
HUMINT	Human Intelligence
IO	Information Operations
JFCOM	Joint Forces Command
LU	Logistic Units
NSNW	Nonstrategic Nuclear Weapons
PTSD	Post-Traumatic Stress Disorder
RDO	Rapid Decisive Operations
RCT	Reflexive Control Theory
ROE	Rules of Engagement
S&A	Shock and Awe

SOF	Special Operations Forces
UK	United Kingdom
US	United States
USA	United States of America
USAF	United States Air Force
UVIED	Under Vehicle Improvised Explosive Device

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CHAPTER 1

INTRODUCTION

On the eve of Operation Iraqi Freedom, the Secretary of Defense of the United States (US) confidently stated that this would be a war waged using the techniques of the modern battlefield and the concept of "Shock and Awe." Although seized on by the media, this evolving concept was another step towards refining the doctrine of effects based operations (EBO), and was directed at affecting the enemy's will to fight.[1] Its aim, through inducing a feeling of helplessness, was to force the enemy to either decline battle or be rendered unable to act when faced with overwhelming competing demands on his forces, and therefore surrender. This concept, however, is based on several assumptions. First, it assumes a unified foe with a classical command and control system. Second, there must be rationality on the part of both sides. While this is generally the case with nation states, this can no longer be assumed in future operations against non-state actors. While an absence of the first assumption is not critical to successful and acceptable war fighting by the US, fighting an irrational actor could prove more problematic. The idea of rational players in a zero sum game is well documented in *The Strategy of Conflict* by Thomas C. Schelling, yet few authors have considered irrationality on behalf of one of the actors. Both of these issues will be considered in later chapters.

The pursuit of this concept is not new, and perception management has long been recognized as holding one of the keys to victory. Sun Tzu was the first to recognize that the greatest acumen of a general was to be able to influence the mind of his opposition, and that the least favorable was attacking armies and strong points. Despite this knowledge, early forms of twentieth-century warfare were manpower intensive, sought

an attritional and decisive battle, and were often fought to a decisive ending within a day. The loss on the battlefield would result in the defeat of that country and quite possibly it being annexed by the other.[2] However, there are few cases of this within modern history.

In the early twentieth century the German military historian Hans Delbrück, after studying warfare from 500 B.C. to the end of the Napoleonic Wars, concluded that there were in effect two types of warfare: the first he termed the "strategy of annihilation", and the other the "strategy of exhaustion."[3] The first idea was Clausewitzian in nature, where the destruction of an enemy's army would be achieved in one decisive battle. The other concept, that of exhaustion, was a precursor to what is now called the maneuverist approach, and involved bringing the enemy to defeat through a combination of battle, maneuver, and cognitive effects on both the soldier and his command. This idea was further developed by Aleksandr A. Svechin (a key Soviet strategist and theorist who rose to prominence in the 1920s and 1930s) who advocated planning for the strategy of exhaustion, as it offered the most chance of success coupled with the least chance of failure. In referring to the Germans in World War I Svechin proposes that "one sided emphasis on the conduct of decisive operations in the initial period of the war . . . [plant] the seeds of disaster in such short war illusions."[4]

This proposal should strike a chord today for Western military planners. Despite several updates and rewrites it appears that US modern, post AirLand Battle doctrine is still Clausewitzian (that is to say annihilationist at heart), seeking the decisive battle that will defeat the enemy as well as emphasizing the need for a rapid conclusion to any conflict. In addition, it also emphasizes the desire to overwhelm the enemy by applying combat power selectively throughout the enemy's depth as opposed to seeking a

completely maneuverist approach, striking at weak points and forcing the enemy to retire from the field of battle, demoralized, shocked, and unable to react in a coordinated way.

However, one must remember that several factors have changed since the days of Karl von Clausewitz. First, modern war is far more complicated than when Svechin wrote his book *Strategy*, due to both the nature of the present and future battlefield and the development of technology, but the general principles of war remain the same. Modern war has so developed that it is quite possible that the Iraq war in 2003 will be the last large armor-on-armor battle that will be fought by such gravely mismatched armies.[5] With the collapse of the Soviet Union, America is now the only super power, unequalled in terms of defense spending and technology. It is arguable that no sensible power will try to compete against the US in a "fair fight" in the next twenty or so years; therefore the US joint planners must anticipate asymmetric warfare as being the norm, not the exception.

Indeed, the closest military adversary that the US has at present is probably the Peoples' Republic of China, and any conventional war on the Asian mainland may well prove detrimental to the deployed US force. However, while China is currently downsizing (even if only marginally) in order to release money to transform her forces to be able to match the US, the continuance of diplomacy coupled with China's emergence into a first world status is probably sufficient to remove this meeting with destiny, at least in the short term.

It is worth noting here the current usage and overuse of the term "asymmetric." When used in its purest form, asymmetry refers to a step difference or marked difference between two opposing forces in terms of equipment (this includes technology) and

doctrine (usually in the context of conventional forces versus the irregular, though not necessarily). Therefore, to aid the discussion a section of chapter 2 will be devoted to exploring the concept of asymmetry. Before the analysis in chapter 3 a simple model of asymmetry will be developed to focus on the relevant issues.

Second, the post cold war environment has experienced a growth in terrorism, insurgency, and drug cartels. This, coupled with the disintegration of states who offer little resistance to the terrorist (thereby allowing them to operate with impunity, notably in Africa, Asia and to a certain extent South America) provides safe havens for those who wish to plot against the US or Western culture. Finally, one must consider the continuing trend of urbanization; an estimate is that 75 percent of the world's population will live in cities by the year 2010: an environment that all modern armies have typically avoided as potential battlefields and have recognized the difficulties and danger of mass casualties and collateral damage therein.[6]

Therefore, it is predicted that future wars are very likely to be fought in urban areas within failing states where the elected government can offer little or no host-nation support (HNS), against a non-state actor living within the community whose best method of attack will be based on asymmetrical weapons and doctrines, and whose aims are based around inflicting casualties and frustrating the US and her allies' goals of achieving a desirable end state, namely a stable and Western sympathetic democratic government. Indeed, this is recognized in the most recent Army *Objective Force White Paper* where it is stated that the future enemy, realizing his inability to win in a symmetric battle, will try and even the scales.

> In order to reduce its exposure to and complicate US targeting the adversary will disperse and operate from areas of physical and moral sanctuary often located in complex, urban terrain, shielded by civilians and culturally significant structures. The enemy will resort to decentralized small-unit operations when it perceives that we have the advantage and will exploit linked operational and tactical intelligence, surveillance, reconnaissance (ISR) capabilities to determine whether attack opportunities exist and when conditions are right for offensive action.[7]

What the paper fails to recognize is that there is likely to be a whole variety of enemy and antagonists operating within these areas as opposed to an easily recognizable one. Indeed, there is an interesting analogy between the US idea of the "three-block war" and a three-tiered enemy: namely, those members of the public who simply join in riots (dissidents or antisocial opportunists), those who engage in insurgency (guerrilla tactics), and those who revert to terrorism.[8] All of the above will result in restrictive rules of engagement (ROE) and constraints on collateral damage (CD) being imposed as no modern government will wish to commit its own tax payers' money to rebuilding another nation's economy or infrastructure. Nor indeed will they wish to risk alienating the general public of the state the US is fighting in as these may well be undecided at the start of the conflict on who to support. In her article "Combating Terrorist Networks: An Evolutionary Approach," Rebecca Goolsby highlights the problems of hardening of resolve, loss of indigenous population support, and the increase in volunteers that might be encountered if large amounts of collateral damage are imposed.[9] Within this environment and these constraints, it is hard to see how the ideas of information superiority and superior technical know-how will allow the US to achieve the upper hand as is required by current doctrine.

Despite this pessimistic view of the future, the US must also maintain a force that is capable of operating at the high intensity and heavy end of the spectrum of conflict.

One of the most pertinent lessons of the twentieth century is that the army who does not develop the capabilities to cater for all threats will be outthought eventually by the one enemy who does. France, Britain, and the Soviet Union suffered greatly at the hands of the Germans in 1940 and 1941 for this very reason, and were forced to employ radical solutions to the problem. The Soviets defeated Blitzkrieg with a combination of space (the Germans' logistics chains simply could not cope with the distances in question) and complete national mobilization, which in the eyes of the Russians produced a "quantity that had a quality all of its own." The US should consider this fact in detail. Future war concepts envisage wars fought to ensure quick decisive victory, occurring a long way from the US over extended and vulnerable lines of communications, and requiring a forced entry operation against an opponent who could conceivably outnumber the US forces several times over. This should be cause for concern.

Current events prove that this scenario exists; several states exist whose future alliance to the US is questionable (China is one example), and these states continue to modernize and mechanize their armies. Secondly, and perhaps more likely, the US may well be called in as a deterrent force between two warring countries that threaten a required resource (it is hard to imagine the US not intervening for example in the Caspian Sea region should oil or future pipelines be threatened). Therefore, there still exists a need to develop understanding and doctrine within the symmetric environment as well as the asymmetric. Furthermore the effect of the US's technical dominance over future adversaries may actually encourage the use of nonstrategic nuclear weapons (NSNW) as technically inferior, but nuclear capable, adversaries perceive the threshold for the use of NSNWs lowered as a solution to their inadequacies in what Jake Kipp refers to as "sixth

generation warfare."[10] As such there is a real risk that the US may well find itself drawn into a position of theater operational nuclear war if it cannot achieve the promised victory by the new "shock and awe" concept.

Since the First World War, modern statistical analysis has been applied to the battlefield as generals and academics alike searched for a "silver bullet" of success. These early studies (the works of Lancester and Osipov will be covered in the literature review) cited potential panaceas, although most importantly during the period of 1993 to 1995 Rowland, Speight and Keys (of the Roy al Military College of Science) conducted seminal studies into this topic. They examined from a statistical standpoint the factors considered to be critical in achieving success in the land battle at the operational level by concentrating on "stereotypical" symmetric and heavy forces operating within maneuverist constraints. The statistically significant samples highlighted four major factors required to win, namely those of shock, surprise, aggressive reconnaissance, and control of the air. It is worthy to note that "force ratios" were absent. Secondly, they noted that surprise (leading to the creation of shock) was the most prominent of all four. Figure 1 shows the effect on campaign success of incrementally adding these factors to the battle.

This early analysis may have unwittingly prophesized the move of the US and United Kingdom (UK) towards smaller, lighter, more deployable forces that would utilize informational superiority to achieve operational victories on battlefields, regardless of numerical supremacy, more often than not, at considerable distance from their home bases.

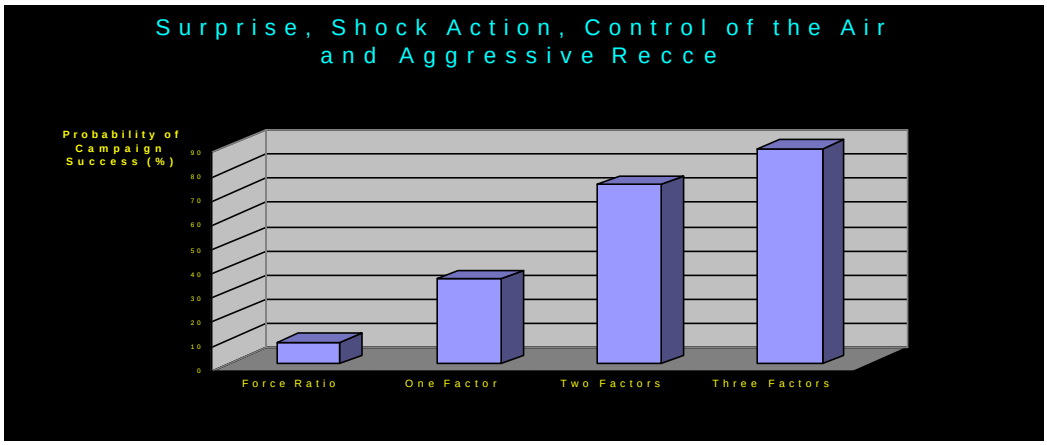

Figure 1. The Relationship between Probability of Campaign Success and the Number of Key Factors Aggregated

Source: Rowland et al., "Manoeuvre Warfare: Conditions for Success at the Operational Level" (thesis, West Byfleet, England: Centre for Defence Analysis, High Level Studies, n.d.), 8.

Figure 2 shows the probability of campaign success against that of the force ratio of the competing sides when no factors present are compared to when three of the four are present (surprise, shock, aggressive reconnaissance, and control of the air). The relative shallowness of the line clearly shows the statistical insignificance of the force ratio.

In the 1990s a desire to exploit the opportunities offered by technology, and a climate of increasing fiscal constraint, coupled with a lack of a real and widely perceived threat, pressured the US armed forces to achieve more with fewer forces. This led indirectly to the co development of both the idea of "rapid dominance" (attributed to Ullman and Wade and published in their book *Shock and Awe: Achieving Rapid Dominance*) and "effects based operations."

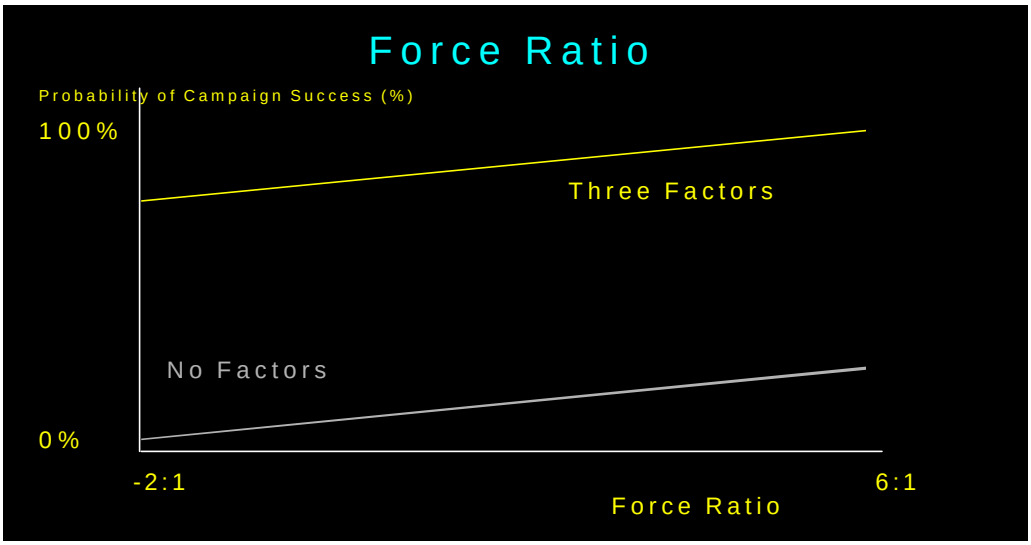

Figure 2. Probability of Campaign Success (as a percentage) Against Force Ratio When Either No Factors or Three of the Four Key Factors Identified Were Present.

Source: Rowland et al., Manoeuvre Warfare: Conditions for Success at the Operational Level (thesis, West Byfleet, England: Centre for Defence Analysis, High Level Studies, n.d.), 8.

This "new" concept recognized the importance of achieving measurable effects on the enemy, as well as the continuing importance of perception within modern warfare. Although Ullman and Wades' book goes into great detail on the theoretical adaptation of the concept, it offers little in terms of practical execution, presumably leaving that for the military practitioners to implement. It is important to note, however, that Ullman and Wade, while defining all of the other terms used, fail to define their concept of "shock," an indicator of confusion about the term within the field. The Joint Forces Command *Effects Based Operations* White Paper (JFCOM EBO) 2001 states:

> With the demise of a symmetric battlefield and the introduction of more mobile and lethal forces, the use of technology and doctrine now hinges on the idea of EBO. EBO seeks to achieve an effect on the enemy in accordance with the plan of the commander. If we can anticipate with any degree of certainty how an

> intelligent adversary should, can or could act and react to compensate for our actions; and if we can plan, execute, assess and adapt our actions in terms of the effects we desire, then we can identify and execute the most effective course of action in bringing about the desired change in the adversary's behavior.[11]

Each effect is designed, through its synergistic cumulative combination in time and space to cause the defeat of the enemy. Problems exist with the concept of EBO and these are rarely analyzed. They include the problems of causality (what is the best factor to employ to achieve the effect desired. Systems theory unfortunately states that this very hard to do), of measuring the result of actual effect achieved (a temporal displacement or time delay may be required) and the issue of unwanted or indeed wanted effects. In an environment where physical effects may be observed, but psychological ones may not, one runs the risk of reverting to the old doctrine of destruction as opposed to EBO (which may be more sublime and less physical, more demanding of time and less in providing visible and short term gains) in the search for results. A good example of this is the current situation in Afghanistan, where almost two years after defeating the symmetric enemy forces and claiming a victory, alliance troops employed on Operation Enduring Freedom are engaged in constant battles with reemerging Taliban fighters. In short the enemy is only beaten when the he believes he is, not when one wishes him to be!

Where does this all lead? First, there are several areas that are worthy of further examination and analysis for clarifying this evolutionary concept. EBO (within which the concept of shock is to be included) fall within this category. The effect must be measurable, the causality (along with any second and third order effects) must be known, and the leverage required (the level of input required to achieve a given output) clear. Without this it will not be possible to inflict more or less of the effect desired. Currently,

all armies struggle to address how to effectively assess the causality of its "planned effects" and how to measure them accurately. Perhaps ironically, the Russians throughout their development have leveled this accusation at the West. As Shimon Naveh states in his book, *In Pursuit of Military Excellence*, "The Russian Operational setting has an abundance of meticulous, specific terms, while the identical field in the West still suffers from a scarcity, which is reflected in the inability of Western theoreticians to delineate operational matters accurately."[12]

The second problem is that despite academic studies producing the concept of "shock and awe", there is no definition of "shock" within current US, UK, joint, or North Atlantic Treaty Organization (NATO) doctrine.[13] If one searches Field Manual (FM) 3-0 *Operations*, it becomes apparent that the term shock is used several times at various levels and appears to mean different things in each case. This is confusing. For example, in paragraph 4-4 it is stated that: "Maneuver is the means by which commanders concentrate combat power to achieve surprise, shock, momentum, and dominance," where as in paragraph 7-9 the FM states that: "Surprise delays enemy reactions, overloads and confuses his command and control (C2) systems, induces psychological shock in enemy soldiers and leaders, and reduces the coherence of the defense." Furthermore in paragraph 7-107 it is stated that: "Attacks unfold as simultaneous sets of blows that bewilder and shock enemy forces."[14]

This, therefore, raises a question on how this currently undefined military term has come to be incorporated so much within US current publications. Both Joint Publications and Army Field Manuals refers constantly to the need to impose shock on the enemy without any guidance on how to do so or on what exactly the effect of "shock"

is supposed to look. An examination of the dictionary will not shed much light onto the topic; the word shock is defined in several ways, none of which are particularly useful to the military planner in today's environment.

Since the current vision of future warfare is one being of dispersed interventions and battles, being fought at some distance from the continental US (CONUS), and being noncontiguous and asymmetric in nature, there is a real need to ensure that US doctrine is clear, current, and relevant to those who seek to practice it. The *Objective Force* White Paper claims that the future force will operate in such a manner that it will "forego massed formations in favor of smaller dispersed forces with lethal capabilities targeted against strategically significant symbols to generate confusion."[15]

This assertion coincides with a planned shift of geographical basing of forces, which will be CONUS based and utilize rapid deployment and information superiority to achieve dominance. The problem is that despite this planned realignment, there is still a danger that the doctrine will rely on achieving decision using armor heavy forces to achieve the desired "shock."

The third problem is that recent investigations on the effects of surprise appear to have delineated two factors within this effect; "surprise", the psychological effect caused by ones perceptions of the event being markedly different from the actual event, and "shock", the physical manifestation of the psychological effect of surprise. Medically, shock is usually defined as the system (the body) in question being numb and lifeless. As discussed earlier there is currently no military definition of shock, probably due to the problematic nature of the concept of achieving true EBO.

Fourth, the perceived future adversary is unlikely to fight at a time and place of one's choosing, nor, indeed, will he fight in a method where friendly strengths will be allowed to flourish – he will try to use an asymmetric method to ensure his success or perhaps simply encourage our failure. This may lead to current US doctrine being somewhat unhinged, and the US being the ones subjected to shock. As FM 1 *The Army* states,

> The goal of future Army operations will be to simultaneously attack critical targets throughout the area of operations by rapid maneuver and precision fires to break the adversary's will and compel him to surrender. The cumulative effect of simultaneous shaping operations and nearly simultaneous decisive operations will be to reduce an adversary's ability to synchronize his effort and will establish the military conditions for friendly victory-decisive victory.[16]

This requires that more thought be given to the definition of symmetry and asymmetry, as well as examining the impact of asymmetric warfare on US doctrine and war fighting, since the US's current dominance of forces and technology will involve a certain degree of asymmetry in every future conflict. Furthermore, the enemy's command and control (C2) structures will be disparate in nature, suited to survival even when commanders are destroyed (the idea of self-sustaining and repairing systems will be covered in chapter 2) and may not lend themselves to being dealt with simultaneously. A current doctrine and concept review suggests that there is a gap in the studies with regards to distinguishing between symmetric and asymmetric warfare and how one might try to achieve shock in the latter type. There also appears to be little study in the specific area of applying the doctrine to the dynamic covert (terrorist) network, in itself a specialist form of asymmetry.

Therefore, the proposed research question is: If achieving shock is really the key factor in winning future battles and campaigns, how advanced is current doctrine and

leadership training in exploiting this? Secondly, are the concept of future operations of the US Military (that is, the future army and transformation), against both a symmetric and an asymmetric enemy conducive to achieving shock? This will include the following questions:

1. What is a doctrinally accepted definition of shock at the operational and tactical level? Rowland, Speight and Keys define it as a "stunning paralysis or debilitating effect of enemy action on individuals or an organization" while stating the debilitating effect over time does not take into account the fact that shock is fleeting and transient in time and must be exploited. A good example is the destruction of the World Trade Center (WTC) which achieved complete shock at strategic, operational, and tactical levels, but was not exploited. Had the terrorists struck again with similarly scaled and perfectly executed operations on the following days then it is possible that the whole of America would have been hit with a stunning paralysis and that an economic crisis could have been induced. It is therefore essential that this transient nature of shock be understood.
2. How important is surprise to achieving shock?
3. How can one measure shock as an effect?
4. What exactly is shock when applied to military system?
5. Is there a need to reconsider the current definition and impact of symmetric and asymmetric warfare in order to recognize the variance of the types of players and the level of their equipment capabilities on the modern battlefield? It will be argued that there is a need to subcategorize it to include recognition of the type of equipment each military has, as well as the way in which it will fight.

6. How does one deliver shock from afar? This includes a consideration into delivering rapid deployment shock.

7. How does one achieve shock at both the tactical and operational levels and within symmetric and asymmetric operations?

8. How does one protect or defend oneself from being shocked at both the tactical level and the operational level?

The statistical analysis presented by Rowland, Speight and Keys or their predecessors will not be questioned in this thesis, but the studies will be briefly addressed in the literature review. It will also not consider the wider aspects of EBO, nor will it look at strategic shock, nor shock in a conflict with nuclear exchange. The results from these latest studies will be used as a basis to assess if current doctrine is developed sufficiently to allow commanders at both the tactical and operational levels to inflict shock on the enemy system, both in a symmetrical and asymmetrical battle. Finally a consideration of how one can prevent friendly systems from being shocked will be presented.

In chapter 2, the historical background of shock doctrine, starting with the psychological element of shock, will be examined. German and Soviet theories during the early and mid twentieth century will then be considered and explained before an examination of modern studies including the ideas of centers of gravity, systems theory and “cyber-shock”. The research methodology is at the end of chapter 2. Chapter 3 will examine the issues of how one achieves shock on military systems. It will concentrate on several areas including developing current doctrine so that it is best suited to achieving shock at the tactical and operational levels in both a symmetric and asymmetric environment and the problem of rational versus non-rational loss of will along with the

issues of intent and resolve. The chapter concludes looking at ways to increase one's resistance to shock

Chapter 4 concludes the thesis with recommendations for implementation and also includes areas for further research.

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[1]The US Army prosecutes war based on current doctrine. Concepts are tested thoroughly in battle laboratories, exercise areas and simulations and if found to be relevant and mature enough will be written into doctrine. It is important to note that there is a clear distinction between concepts and doctrine although the two are often confused and used interchangeably.

[2]Bruce W. Menning, "Operational Art's Origins," *Military Review,* (September/October 1997): 32-47. Isserson called this concept the strategy of a single point.

[3]Hans Delbrück, "*History of the Art of War within the Framework of Political History*" (n.d); trans. Walter J. Renfroe Jr (Lincoln: University of Nebraska Press, 1975); quoted in James J. Schneider, "A New Form of Warfare," *Military Review,* Vol. 80, No. 1 (January – February 2000): 56-61.

[4]Aleksandr A. Svechin, *Strategy*, 3d printing (Minneapolis, Minnesota: East View Publications, 1999), 45.

[5]Robert Kaplan floated this idea during his briefing to the Army Command and General Staff College in Fort Leavenworth, 6 February 2004.

[6]Michael C. Desch, *Soldiers in Cities: Military Operations on Urban Terrain,* (Carlisle, PA: Strategic Studies Institute, US Army War College, 2001), 4.

[7]United States Army, White Paper, "*Concepts for the Objective Force*", http://www.army.mil/features/WhitePaper/default.htm: 2. Accessed on 13 May 2003.

[8]Charles Krulak, "*The Strategic Corporal and the Three-Block War*", http://www.urbanoperations.com/strategiccorporal.htm: Accessed on 15 November 2003.

[9]Rebecca Goolsby, *Combating Terrorist Networks: An Evolutionary Approach.* (Arlington, VA: Office of Naval Research, Naval War College, 2003), 3.

[10]Jacob Kipp, "Russia's Nonstrategic Nuclear Weapons" *Military Review* 81, no. 3 (May/Jun 2001): 27-39.

[11]Joint Forces Command *Effects Based Operations* White Paper 2001: 1.

[12]Shimon Naveh, *In Pursuit of Military Excellence: The Evolution of Operational Theory*. (London: Frank Cass, 1997), 2-3.

[13]Despite it being mentioned several times with the Army Field Manual 3-0, *Operations*. Examples include paragraphs 4.4, 4-54, 5-50, 5-74, 6-57, 7-9 to mention but a few.

[14]FM 3-0, Operations. Washington, D.C.: Government Printing Office, June 2001. All references are from this.

[15]United [15]United States Army, White Paper, "*Concepts for the Objective Force*", http://www.army.mil/features/WhitePaper/default.htm: 2. (Accessed on 13 May 2003): 2.

[16]FM 1-0, The Army. Washington, D.C.: Government Printing Office, June 2001, 37.

CHAPTER 2

LITERATURE REVIEW AND METHODOLOGY

This chapter will be divided into eight subchapters: the medical analysis of shock; the development of studies into what wins at the tactical and operational level (this will include the literature on, and studies into shock, the linkage between medical and military shock, and the factors that lead to military shock); systems theory; the development of operational shock theory (which will include an introduction to the idea of cognitive dissonance); an analysis of the book *Shock and Awe*; the consideration of asymmetry and the problems therein; and the research methodology. It will conclude with a quick overview of the whole chapter and its relevance to the environment of today. The chapter is both long and somewhat eclectic in nature. This is due to the limited work on synthesizing the topics together in light of modern research.

The Medical Analysis of Shock

> This term [shock] is sometimes applied to an event of special force or significance that causes disruption or collapse of mental or physical functions of behaviour, and sometimes to the effects of such an event.[1]

The analysis of trauma (as opposed to the true physiological definition of shock, something which is brought about by a reduction in blood flow to the vital organs), while not essential to the study of military shock, is worthy of note. The full history of the study of trauma is well documented in *Trauma – a genealogy* by Ruth Leys.[2] As a brief synopsis, the study of trauma began in 1860 when the British physician John Erichsen studied victims from railway accidents who were suffering from what is now referred to as posttraumatic stress disorder (PTSD). He associated it with a shock being delivered to the spine causing concussion, and thus affecting the brain. Paul Oppenheim (a German

neurologist) further developed this idea into that of traumatic neurosis, recognizing it as an effect on the mind. The period 1860 to 1910 was dominated by a group including the two Americans George W. Crile and Walter B. Cannow, Ivan Pavlov (Russia), as well as the famous Sigmund Freud (Austria) whose work was focused on developing the idea of the wounding of the mind brought about by some unexpected emotional shock. Perhaps unsurprisingly, Freud did include reference to sexual repression. The Great War halted development of the theory until the advent of nonphysically wounded soldiers during World War I, where the concept of "shell shock" was born. With the majority of the victims being either classified as malingerers or cowards, the lack of understanding within this field was clearly apparent. The end of the war ensured that any interest in the field deteriorated. Interest was revived with the start of World War II, but despite several jumps within the field being made into the idea of "pseudo psychosis" (a temporary reaction which was caused by battle stress and related specifically to a combat reaction), the end of the war signaled a reduction in study. Even studies of victims of, and the effects of, the Holocaust failed to create much headway. Finally, with the war in Vietnam the interest in the psychology of shock was revamped and developed to the level it is at today.

Studies into Post Traumatic Stress Disorder (PTSD) by George S. Everly Jr and Jeffrey M. Latting have discovered that the effect on an individual is dependant on the "psychological filtering" system that it is unique to each individual. Everly and Latting claim that these filters operate as a form of "protective psychological immune system" and base their views on several previous studies that highlighted the effects of personality traits, culture, previous experience and coping mechanisms on being able to resist the

effects of shock.[3] Within this group of factors are the personal beliefs that each individual uses to reduce uncertainty and hence reduce anxiety. Military examples of this phenomenon include developing likely enemy courses of action. Yet by linking these theories to those of learned helplessness (where an individual is aware of his inability to control an outcome after observing an event), it is possible to see the danger of an enemy who does not comply with the believed courses of action; initial disbelief may be replaced by a constant questioning of the quality of the information being provided on the enemy, and then once the information quality is confirmed there will exist a desire to gain as much information as possible on the event (micromanaging).[4] While not achieving paralysis in its true form it can be seen how this mental state induces sluggishness into a sequence of events.

Recent psychological work on shock by Robert C. Carson and James N. Butcher has shown that there are typically three stages that an individual who has been exposed to a traumatic event goes through. They are the shock stage (where the victim is apathetic, sluggish and unresponsive); the suggestible stage (where the victim is passive but seeks and reacts to the advice given by those around); and finally, the recovery phase where the victim while still relatively unstable begins to regain psychological balance.[5] It will be shown that individual soldiers as well as operational level systems can be forced into experiencing these stages. Other work has shown that a rapidly approaching threat, even if expected, can induce an element of shock into an individual. T. G. R. Bower, J. M. Broughton, and M. K. Moore conducted the original work on this idea of "looming", and they showed that both animals and humans responded to looming (or rapidly approaching) information stimuli almost identically. An excellent discussion of the topic

can be found in Audrey L.H. van der Meer and Nanna S. Kayed's article.[6] This rapid approaching threat can be translated into the military term and concept of operational tempo, something already recognized within doctrine.

Rooney, Speight and Keys have recently conducted studies into the physical and psychological effects of surprise and shock on both individuals and organizations in the UK, although the authors are keen to point out that their knowledge is still incomplete.[7] The main discovery was that the effect of paralysis previously attributed to surprise was in fact an aggregation of the psychological effect of surprise and a physical manifestation of it (that is shock). Second, while the effect known as surprise had been well documented it had not been broken down into its constituent parts. A review of the main points of Rooney, Keys, and Speights' work can be found in LTC J. Storr's article, which summarizes the results of as follows: "The effect of surprise on an individual leads to four main responses; increased physiological arousal, uncertainty, attentional blink and cessation of ongoing activity."[8]

The increased arousal is due to the release of hormones in reaction to the stimulus of surprise (a natural threat response). Uncertainty is as a result of the unexpected events impacting on the working memory of the brain as it considers how to react, and as the brain considers how to react it focuses its attention on the single event that has surprised it, leading to "attentional blink" (a good analogy is a computer slowing down as one asks it to open a large program which has not been run for some time; it takes all of its available memory and the other functions slow down accordingly, much to the annoyance of the user). This phenomenon explains why individuals who are surprised cannot remember what was happening immediately prior to the surprising event. This idea has

also been investigated with regards to the effect of a rapidly approaching threat. Studies have shown that a rapidly approaching threat forces the victim to adopt a myopic view, causing them to concentrate purely on the perceived threat at the expense of all other functions (example include why rabbits freeze in rapidly approaching headlights, why peoples' jaws drop and they adopt a vacant stare when surprised).[9] Again, note that this is the physical manifestation of psychological surprise.

As time progresses with a continuing stimulant, the individual in question will begin to suffer debilitating effects that will manifest themselves as stress. Normally stress is perceived as a lack of certainty, and so in an attempt to reduce the arousal, more information is demanded. This leads to information overload that further degrades the individual (or in the military context, the soldier, the commander, and the unit). Under these circumstances information can be of two kinds; either it is information on the uncertainty or it is correct, but ultimately useless, information on anything except the stressor. This later effect is known as cognitive dissonance and results in people "doing things that don't fit with what they know, or having opinions that don't fit with other opinions they hold."[10] It is an attempt to synchronize the actual events with the perceived events at all costs, even though the individual may realize that it is wrong! In addition to this stress, the collection of information and the concentration on events usually left to subordinates forces the brain to operate on more issues than it can effectively cope with thus denying space for effective decision making. The effect is poor decision-making, poor outcomes, and a feeling of hopelessness.

At the higher levels this leads to commanders and staffs suffering from what is termed "encoding specificity" or "big picture blindness" leading to commanders

concentrating on the events of the battle that are going according to plan and unfortunately ignoring the ones that are not; paradoxically these are the issues to which he should be giving his attention. This can manifest itself as micromanagement as those suffering from cognitive dissonance attempt to reduce the uncertainty by getting personally involved, something that leads to subordinates being less able to use initiative and is likely to result in more paralysis.[11] By imposing this cognitive state on the enemy command structure, the system turns in on itself and reduces its effectiveness. Effective surprise often leads to opportunities to create more surprise (which explains the statistical importance of subsequent surprise in the Rowland, Speight, and Keys studies) and also explains how surprise includes an element of shock, the physical manifestation of this surprise.

So what do the psychological studies recommend as the best way to impose shock on an individual (that is tactical level shock)? Obviously surprise is crucial though not sufficient in itself. They also claim that there is a need for some level of violence (although this is based purely on results from studies on civilians in traumatic incidents such as earthquakes, rape, train crashes, and the like), which induces a feeling of vulnerability into the individual or group. This last point is interesting because as through perception management a military may find a process of using information operations (IO) to persuade an enemy of its impending destruction by a vastly superior force.

What Wins at the Tactical and Operational Level of War?

Since the early 1900s students of the art of war sought for the elusive panacea, the "silver bullet" that would ensure success, or at least weight it in favor of oneself, and to lend credibility most of them have been statistical in nature. Early statistical studies

concentrated on the idea of force ratios and on linking attrition rates to the numerical strengths of the opposing forces (Osipov, 1915, and Lancester, 1916). After a period of inactivity the topic was revisited in the 1960s by Helmbold, Willard and Weiss. Yet, despite the attempt to correlate force ratio with success, it became apparent that victory in war appeared to be dependant on factors other than force ratios. In the 1980s William E. Dupuy attempted to build a theory of combat that used several other factors other than force ratios, although as Rowland states

> It was still force-centred: the additional factors were treated literally as force multipliers, affecting the expected balance of attrition. The final determinant of campaign success was seen as the balance of combat power: the sum of the killing power indices of the weapons of each side, times the product of the judged effectiveness indices for all other factors.[12]

Other studies, such as those by Speight, Rowland, and Keys have tried to analyze advance rates (within traditional symmetric constraints) but they have met with limited success.[13]

In 1993, in an attempt to reanalyze the effects required for successful offensive operations as well as in response to a need to update modeling software, D. Rowland and M. C. Keys from The Defence Operational Analysis Centre were tasked to examine the effects of shock and surprise on offensive actions. Their study examined what factors were statistically significant in achieving operational success in the land battle in a total of one hundred and fifty nine campaigns dating from World War I to 1991. These studies were continued through until 1997 although no additional battles were added to the sample. Their papers fall into two categories; the first searched through statistical analysis of the selected battles for those factors that influenced the outcome of the campaign in order to try and isolate the ones that lead to military success; the second then

built on this knowledge and drew conclusions from the results found in order to recommend possible future force structures and doctrine.

From an initial wide-ranging list of factors (thirty two to be precise) the team narrowed them down to seventeen significant ones. The results were very interesting. The significance levels of the factors broke down into three rough groupings, those of great statistical significance, those of moderate significance (although definitely less relevant that the first group), and those of almost no significance. The four that were the most significant were surprise (although while subsequent surprise was significant in both initial success and campaign success, initial surprise was not significant when considering campaign success on its own), shock, control of the air (from the land perspective) and aggressive reconnaissance. Surprise was the most significant; the results are shown in table 1 (as well as in figure 1).

As Storr notes within the military context, surprise is something brought on by one of four major occurrences. The first is through unexpected timing (usually early, but it is feasible for surprise through tardiness to be conceivable), which may be achieved at any stage throughout a campaign.[14] Second, surprise can be achieved by the direction of attack (either via the flanks or the rear - this becomes important when one considers the development of Soviet Deep Battle Theory). Third surprise can be generated by an unexpected method of attack (an example of this is implementing new tactics) or finally by an unexpected means of attack (the First World War abounds with examples of this including the German's first use of delivery of gas by artillery shells or the British introduction of the tank) with the latter inducing complete surprise in the victims which,

through the induced feeling of vulnerability and the rapid approach of the problem resulted in shock, and led in some cases to soldiers fleeing in panic.

Table 1. Joint Effect of Three Major Factors on Campaign Outcomes

Factors	Breakthrough	Rapid Breakthrough	Campaign Success
No Factors Present	19.6%	2.2%	20.8%
One Factor Present			
Surprise	72.7%	45.5%	75.0%
Aggressive Recon	75.0%	25.0%	66.7%
Air Superiority	61.3%	16.1%	63.2%
Two Factors Present			
Surprise + Aggressive Recon	80.0%	60.0%	80.0%
Surprise + Air Superiority	82.6%	52.2%	93.8%
Aggressive Recon + Air Superiority	66.7%	50.0%	55.6%
Three Factors Present	100%	82.1%	100%

Source: Rowland et al., *Manoeuvre Warfare: Conditions for Success at the Operational Level* (thesis, West Byfleet, England: Centre for Defence Analysis, High Level Studies, n.d.), 8.

Rowland, Speight, and Keys state that the effect of surprise is that soldiers have no time to reorient which results in some of them not carrying out their duties. Furthermore, they viewed shock as an effect where "soldiers could have performed their role but did not do so."[15] From this they defined shock as "the stunning paralysis or debilitating effect of enemy action on individuals or an organization."[16]

An association test of all of the factors showed that, with the exception shock, all factors were effectively independent (and therefore should be regarded as a factor in their own right) where as shock and surprise were interrelated. This is important because it

means that surprise and shock can be studied independently of the other factors if required without risk of pursuing a fallacy. The second group (which included command and control, the presence of reserves and logistical superiority) and the third group (including perhaps surprisingly, force ratio and the commander's prior experience, as well as the effect of terrain) were so far behind the first group in statistical significance as to render them almost irrelevant. Furthermore force ratio only became a major determining factor when the four primary factors were lacking.

At the operational level surprise was broken down into two sub components, that of initial surprise (that is, occurring within the first twenty four hours) and subsequent surprise (achieved after the first twenty four hours). While initial surprise was crucial in achieving breakthrough it was subsequent surprise that was instrumental on achieving campaign success. The analysis at the tactical level also highlighted that there was a close relationship between achieving shock and initial breakthrough to achieve subsequent campaign success as well as a high correlation between surprise and shock.

At the tactical level, the utility of surprise was most significant in the reduction of attacking forces' casualties especially at near even force ratios (by a factor of three at a 1:1 force ratio), although it decreases as the attacker increases in relative numerical advantage and became insignificant at a force ratio of 10:1.[17] Furthermore success at the tactical level within an armored battle was largely independent of force ratio when surprise was achieved, whereas without it the result was highly dependant on force ratio. The analysis of tactical level shock highlighted the requirement of two separate factors, surprise and a feeling of vulnerability in the defender. Without either, the probability of

achieving shock was very low while the addition of both increased it to a probability of 0.85.

As mentioned earlier the studies uncovered a high degree of correlation between the achievement of surprise and the imposition of shock. Thus, it would appear that the psychological effects of surprise somehow inflict shock, itself a physical manifestation of surprise. This agrees with the psychological studies to date. Thus surprise is necessary although not sufficient to achieve shock, something that up to this point had not been widely recognized or acknowledged except by the Russians. Subsequent analysis examined the probability of achieving shock against a "defensively weak" nation (defined by a criteria that looked at the historical performance of soldiers on the battlefield over the same period as the battles used). It found that the criteria of a defensively weak nation was not sufficient to inflict both operational and tactical level shock, but when surprise was coupled with this factor the chance of imposing shock was significantly (statistically speaking) increased. This fact will be invaluable in the future in trying to assess enemy vulnerability to shock as well as being crucial in not allowing ourselves to expect an easy fight where ever we go.

Within these studies the analysts also distinguished the battles that included mechanized forces and those which did not. The achievement of surprise, and its successful transformation into shock on several key occasions is shown in table 2.

Table 2. The Effects of Surprise and Shock in Armoured and Infantry Battles

Battles	Case	Outcome (comparisons, when done, are against battles in which surprise, or shock, was not achieved)
Armoured (Mech)	Attacker does not achieve surprise	Probability of success about 40-55%
	Attacker achieves surprise	Probability of success increased to about 75%.
Infantry	Attacker achieves surprise	Casualties reduced by average of 42%.
	Attacker inflicts shock	Casualties reduced by average of about 40%.
	Attacker gains both shock and surprise	Casualties reduced by average of about 60-65%.

Source: David Rowland, L. R. Speight and M. C. Keys (an un-named working paper for the British Army Review n.d.), 7.

Their studies also highlighted that while shock can be imposed through three different factors; rapid approach; surprise; and a feeling of vulnerability amongst the defenders, all three have a common component; they induce a feeling of helplessness in the defense either due to a perceived inability to respond over time or indeed an inability to respond at all. They also note that shock is transient and direct leadership is capable of dissipating the effect, thus any exploitation must be swift.

So, in short, what do the military statistical studies show? First, they agree with the psychological studies that proposed surprise as a psychological effect and shock being a physical manifestation therein. Second, that surprise is one of the key factors to achieving shock, both at the operational and tactical level. Third, that shock is transient and as such must be exploited rapidly if it is to have any benefit (this conclusion was drawn from the non-association between initial surprise and campaign success). Fourth, that at the tactical level, the achievement of surprise and the imposition of shock will increase casualties on the "shocked", decrease the numbers of casualties inflicted on the "shocker", and increase the shocker's chance of achieving success while simultaneously reducing the time taken to win. Fifth, as Storr points out, surprise is a force multiplier like

no-other, capable of achieving the same effect of a force ratio of 2000:1 in the breakthrough and 260:1 for campaign success.[18] Sixth, any force developed for the future must be capable of independent maneuver regardless of what may happen in the rear; the doctrine of the Soviet Operational Maneuver Groups is a prime example of this. Once an opportunity exists to put the enemy commander off balance it must be seized and exploited through rapid and bold moves aimed at achieving subsequent surprise. This, in theory, then leads to operational shock, something that then must be seized and exploited. This is the path to rapid victory.

Systems and Reflexive Control Theory

Classical Theory claimed that the theory of an event does not affect the behavior of the object (for example Newton's theory of gravity did not change the orbit of the planets), but Newtonian physics was found to be inadequate for describing actual world events. Systems theory developed as a way of explaining the complex interactions that occur between individuals and groups of systems that was not explained by Newtonian physics. Furthermore it recognizes that aggregating the individual parts does not always result in the same response to a stimulus as would be seen had the stimulus been applied to the individuals. Once this is recognized, the theory of these systems then becomes part of the system. In other words it recognizes the interdependence of relationships between interacting factors and analyzes behavior of a system as a whole as opposed to the sum of its parts (another example of this is how Marxist-Leninism eventually destroyed the Soviet Communist System).[19] Since an army is a complex, learning and adapting system made up of several discrete subsystems, this theory has applicability to this study of shock.

Systems theory is, in part, a restatement of the second law of thermodynamics, which states that there will, over time, be an increase in disorder as all things break down from complex composites to their constituent parts. For example, when one burns coal, a simple and singular item, it transforms into heat and light (both forms of energy), smoke, and charcoal or dust dependant on the temperatures involved. This single piece of coal has broken down into other forms of energy that have then been dissipated into the atmosphere. Furthermore one cannot take the products after burning and transform them back into coal; the process is irreversible. Thus over time all systems will breakdown into their constituent parts and the level of disorder will increase.

Within the systems school of thought there are two types of system, closed and open. Closed systems are like the process just described, and will break down irreversibly very rapidly. Open systems however take on board excess energy to replace that which is lost in order to continue operating; using the previous analogy the delivery of coal to the house ensures that heating and light can still be created within the system. However note that the larger system, that of the world's coal supply, is diminished and thus ultimately the large system will reduce as predicted.

As stated earlier, this theory has been applied to military systems, where the input is in the form of reinforcements (to enable formations to continue to fight) and information that enables staff to change plans accordingly to deliver the effect required. Their output is in the form of orders and plans for execution by sub units. Although with there being limits on resources and the time to receive them, process information etcetera, the best a military system can hope to be is a semi open system, destined to finally collapse in on itself, although the timing of this is delayed. This approach also helps

explain the benefits of mission command as a way of keeping the system open or at least partly so – units cut off from their Headquarters can still operate to a certain degree. It is also crucial to an understanding of operational shock and important to an understanding of tactical shock as the key is to attack the weak points of a system forcing it to become closed and thus encouraging its defeat. Second, systems theory recognizes that "the ability to survive is programmed into every system" and thus has utility in explaining resistance to shock and the temporal aspect of the effect.[20]

Why is systems theory so important? First, it recognizes that we cannot expect a threatened enemy system to acknowledge defeat without at first trying to adapt and change. It is analogous with a boxer, who after being almost knocked out in a round, comes out from his corner having changed his stance to protect his chin from his opponent's fists; thus his opponent should not anticipate being capable to deliver any single knock out blow using the same tactics as before. Therefore, the concept of standoff precision munitions being able, through their effects alone, to bring about the psychological collapse of an enemy is incorrect, unless the results are unequivocal and instantaneous.[21] It also explains why systems strive to continue to operate long after they should have been destroyed.

MAJ Madelfia Abb developed this idea in a monograph entitled *A Living Military System on the Verge of Annihilation*.[22] In this work, Abb highlights how living systems have the choice and the ability to change to ensure survival.[23] She also describes in detail that when a military system is in equilibrium (that is not learning, changing or anticipating) it is combat ineffective and therefore "dead."[24] Abb also claims that the more an organization is capable of self organizing and operating far from its equilibrium

(that is constantly learning and changing its tactics) the more it is likely to survive. This is a timely warning for units in Iraq at the moment; it is clear from the news that the enemy is learning and changing tactics where as it appears coalition forces are beginning to set patterns and operate in predictable ways. Abb cites examples from the Second World War where systems that could not adapt to fight their enemy were destroyed (the British Eight Army in North Africa is a case in point) as well as various battles within the Korean War.[25] At the end of the monograph Abb predicts how the theory can be used to help target enemy systems by highlighting three major areas for application:

> Isolating or disrupting the functional networks, military structures and cognitive decision making elements of an enemy system that enables living. Destroying or dominating an enemy's ability to self organize. Force the enemy system to operate toward an equilibrium, making his responses predictive, reactive and limited in number.[26]

Abb finally concludes with a recommendation that Warden's five concentric circle center of gravity theory (linked to the concept of EBO) be examined in more depth and that US intelligence doctrine be redesigned to stress the importance of systems theory.

Second, systems theory warns us that as war is a non-linear event, no single formula, methodology or capability can predict outcomes nor guarantee victory.[27] Systems theory also explains why certain inputs, or "shocks" to the system can have disproportionate and unexpected results that change the situation dramatically. In summary, war remains significantly an art, and the need for flexibility and resilience is required even more so today to keep our belief in our precision guided weaponry and technical superiority in balance.

Systems theory is currently being further refined. Reflexive Control Theory (RCT) advances systems theory into the military decision making process (MDMP). The

old mechanism of MDMP is viewed as being flawed as the decision maker is passive, not taking into account their ability to influence the future. Reflexive control presumes that not only can the decision maker predict the future but can partially influence it by one's own actions, which in turn influence the enemy's decision making process through influencing their perception of reality. In short, it builds on the idea of deception. Kramer and his team developed this idea in their presentation *From Prediction to Reflexive Control* in which they present a general Reflexive Control model by which a friendly force considers its actual (secret) deployment of forces versus what are its perceived (through public announcement) of forces.[28] The secret deployment is referred to as "the trick." The idea of "the trick" is to force the enemy into acting upon this as though it were true, and thus selecting a course of action that plays directly into the hands of the friendly plan.

This theory is very similar to the game theory concept of "signaling", used to induce one's opponents to act in a way beneficial to oneself. For a more in depth analysis of this see Blakesley's 1993 MSc dissertation on combating terrorism.[29] Both authors recognize that the system's outcomes can be risky; once the response options are above two in number there exists a chance that the enemy will choose a less than optimal response vis-à-vis the friendly plan. This chance, or risk of a non-optimal solution, rises alarmingly the more the response options available are, yet even so the payoff has to be theoretically greater than simply doing what has been publicly released, otherwise the strategy would not be adopted.

Philipp Djang (Ph.D. ARL/SLAD/IEPD) from New Mexico Sate University further developed this model in his presentation *Estimating Iraqi Military Morale with a*

Reflexive Control Model.[30] In this work he views morale as being the most important aspect of what makes a soldier fight, and group unity in being what makes a unit fight. He determines that morale is dependant on multiple yet conflicting factors, with some being clearly measurable and others having to be estimated. He develops Lefebvre's model to include the three inputs of self-perception (the internal factor, based on Maslow's hierarchy of needs and perception of the current situation), environmental pressures (loss of friends, perception of surviving peers, effect of propaganda and psychological operations and interpretation of one's professional standing), and the time expired since the start of the campaign. Furthermore he breaks down the Iraqi Army units into three sub groups; those of the regular army, the Republican Guard, and the Special Republican Guard.

Creating his own stochastic model to find a solution he subjected each unit to five attritional events. His results were interesting though predictable; the regular units were unwilling to fight and combat ineffective (CI) by day nine; the Republican Guard were CI by day seventeen; the Special Republican Guard did not become CI until day thirty. The problem with these results is that they are based on an equal amount of attritional events being allocated to each unit, something that is not the case in war, since high value targets (such as reserve armored divisions) are targeted more. The study does, however, prove how important morale and the will to fight is within a unit and has application to both shock and systems theory.

The Development of Operational Shock Theory

Maneuver Warfare has always sought to defeat the enemy without having to destroy all of his forces. At the heart of it lies the idea of convincing the enemy that

resistance is useless, and the only sensible option is that of declining further battle. The initial idea of Operational Shock theory could, by a stretch of the imagination, be attributed to the ancient strategist Sun Tzu who recognized the importance of defeating the enemy through the least destruction possible, ideally by affecting the opposing General's will to fight. The German Military Thinkers brought about the revival of this concept at the turn of the nineteenth century. Hans Delbrück proposed a concept that was referred to as "operativ", although it was never developed to the extent that it became usable doctrine.[31]

Russian operational shock theory developed at the beginning of the 1920s due to several factors. First was the debate between officers about which was the better of the two methodologies of warfare that existed at the time, exhaustion or annihilation. Second, were the results of their experiences in the Russo-Japanese War and the Russian Civil War in 1917/18 combined with their recognition of an immature form of systems theory. Despite the breadth of these experiences it was accepted that all of them had highlighted the need for a level of command between the strategic and tactical level in order to ensure that tactical gains would translate into the achievement of the strategic goal and would not just be battles for the sake of fighting.

A. A. Svechin (who experienced three major conflicts within his years of service) in his lectures that formed the basis for his book *Strategy* stated that the Clausewitzian concept of the single decisive battle (the strategy of annihilation) was a flawed and dangerous concept in the modern era because viewing armies in a classical and linear manner was incorrect. By believing in Clausewitz's theory one was forced to fight a decisive battle against the enemy's strength and by doing so risk decisive loss. Second,

Svechin believed that the most important level of command was at the operational level, something that the other theorists had not considered in any depth up to this point. Put simply, politicians determined strategy and soldiers executed tactics, but while the two could exist without each other, failure loomed for those armies who lacked an intermediary who could turn ethereal concepts into a coherent and structured campaign plan to bring about the defeat of the enemy.

From this proposal Svechin made the mental leap that the most productive target of any enemy system would be the link between its strategic and tactical elements. Finally, he also realized that enemy armies were systems of systems, interlinked and interwoven to ensure an element of redundancy and survivability. With all of this in mind he proposed a strategy of destruction as opposed to that of annihilation and advocated a means of denying the enemy a way of coherently focusing his combat power to achieve the goals required to satisfy the strategic concepts. This led to the concept of operational shock being defined as a consequential state of a fighting system that can no longer accomplish its aims.[32]

V. K. Triandafillov further developed and widened the idea of operational shock by including the idea that one should aim to link several successive operations into one single continuous deep operation.[33] These were designed in theory to deal deep and crushing blows to put whole state organizations out of the game rapidly.[34] He claimed that these blows would lead to panic and if the system were shocked sufficiently then

> The work of the state began to collapse, panic erupted in locales situated even hundreds of kilometers from the front, the most dangerous internal front began to be organized.[35]

The result that Triandafillov predicts is that of civil war, which removed the state from the field of battle without having to further commit one's own troops, the ultimate imposition of shock.

Tukhavchevksy and the staff at the school of operational thought continued to develop these ideas by examining how one should seek to impose shock at the operational level. They concluded that

> The effectuation of operational shock implied, first and foremost, the neutralization of the rival's system rationale, that is its operational ability to attain the aim or objectives assigned to it by the strategic authority. This unique idea expressed the *raison d'être* for the operational theory and the concept of the strike manoeuvre.[36]

They also recognized the enemy as a system and thus realized if one could separate the purpose of the operational command from its subsequent sub units then the system would become "closed" at an operational level and hence would die. This encapsulates the whole purpose of "udar" (shock); the idea that through a combination of psychological and physical factors the operational level of command could be rendered unable to impose the level of control required to focus all the tactical battles towards achieving the strategic aim. At the center of this method was a maneuverist approach – it imposed an element of destruction by isolating the intermediate level of command, and forces the feeling of helplessness on not only the operational commanders but also at the strategic level as the politicians see their plans becoming unraveled, and simultaneously at the tactical level by forcing the tactical commanders to fight their own individual battles without support nor guidance.

The execution of the concept involved two elements, the horizontal and the vertical envelopment. The horizontal element ensured that individual units in the front

would be unable to support each other and hence be broken into small packets fighting for survival with no ability to focus on the larger concepts required of them by the operational level of command. This would be attritional although no decisive action would be sought from it. The vertical element ensured that friendly forces could be placed far enough into the rear of the enemy that the enemy commander is forced to react by the new threat, something that threatens his very force projection capability, though simultaneously he is still faced with a threat at his front. As such he is unable to maneuver his reserves into a position where they can be truly effective. It also separates the tactical forces from their operational command and control element and forces those at the front to fight for survival, in the end being denied help from even their flanking forces. The system becomes closed and the unit "dies". The end state sought is one where the enemy realizes that his system has been closed; that is his intent is defeated when he realizes that the original plan is no longer achievable or indeed relevant.

The Soviet approach also recognized that any operation would involve a contest of wills between two or more systems each striving to defeat its opposition while protecting its own weaknesses in order to prevent its rival inflicting defeat on it. Therefore every operational aim would have to have a positive and a negative aspect to it; the positive being where one sought to inflict one's will on the enemy, while the negative one was the denying the "knock out blow" to the enemy. Thus by separating the actions and denying the enemy his goals, led back to the purpose of "udar". It is important to note, however, that the concept is both offensive and defensive in nature; purely offensive strategies were seen as too risky. One must also recognize that a key element to

imposing shock within a system, however, is determining what the enemy's center of gravity is. This will be covered in the shock and awe sub chapter.

Unfortunately for the Russians, Stalin's Purges in 1937 were sufficient to bring to a halt the theoretical advancements in this field, and despite a brief resurgence between 1942 and 1945 Stalin's repression of the Armed Forces resulted in this topic not receiving a revival until after his death in 1953. The US began developing this concept in the mid 1970s as a response to the perceived Soviet threat in Europe and the result of the Vietnam War where it was recognized that there had not existed a linkage between strategic goals and tactical execution. It was further refined in the AirLand Battle doctrine and currently lies within the concepts of deep strike forces (in the form of Apache, Parachute Divisions, Multiple Launch Rocket Systems etcetera).

Current US Doctrine (both Joint and Army) states that there are four components required to achieve shock against an enemy system, yet do not define what shock is or why it should be imposed.[37] These components are maneuver (used to concentrate forces to achieve physical and psychological effects), force (applied against decisive points), integration of joint effects (to engage the enemy throughout his depth), and surprise (used to expand again on psychological effect). Indeed, the current degree of haphazardness of the current approach is summed up by Lieutenant Colonel Clayton who states in his article *What is Operational Art?* that

> From a curious mixture of modified Clausewitz and Jomini came the concepts of operational design, including center of gravity, lines of operation, decisive points and culmination.[38]

Is it any wonder that the doctrine appears confusing?

With the development of the information age, Dr. James J. Schneider, a professor at the School of Advanced Military Studies in Fort Leavenworth, Kansas developed the idea of operational shock as a concept compatible therein; claiming that with information warfare defeat through cybershock and paralysis could be achieved. His theory states that shock can be imposed on a system through manipulating the information provided to that system (essentially a novel and interesting combination of surprise and deception by providing enough information to ensure that the enemy is unable to see himself and see his assailant with enough granularity to be able to make effective decisions). It links back to the idea of creating "big picture blindness" or "encoding specificity" mentioned earlier. He does, however, note that there are cases where a system is aware of its own impending demise through shock and as such can continue to operate albeit at a substantially lower level (this links in with Abb's work and systems theory).[39]

This effect is achieved by ensuring that the enemy's belief of what is about to transpire is different from that which he receives via his information systems. This disconnect produces the element of surprise and induces shock. It also denies the enemy command situational awareness; the ability to see one's self, one's enemy, and the relationship in time and space between the two. When this is coupled with the traditional aspects of attrition (selective destruction) and maneuver (gaining an element of surprise and rapid approach) the enemy command begins to suffer from paralysis and ultimately degenerates, that is to say, is shocked. This concept is also applicable to systems which do not have the traditional echelons associated with soviet deep battle theory and, therefore, may well hold the key to inducing shock within asymmetric warfare. The concept can also be extended to include a rationale for instituting an operational pause.

Assuming that no commander retires from the field of battle based purely on reports of what is happening, there is a need for the commander to realize fully the untenable position he is in. The operational pause can, therefore, be used to ensure that the enemy commander can be made fully aware of what is happening to him.

Shock and Awe (S&A)

How does this all link into Ullman and Wade's book on *Shock and Awe*? Warfare has not changed, but the environment in which it operates has, as have the players, and the ideas of how the world operates have developed. As such new ideas or variations on themes are produced as a way of operating within this new system. Ullman and Wade further developed the theory of perception warfare and brought it in line with modern capabilities and have returned to the indirect approach (trumpeted by Sun Tzu, Liddell Hart and, to some degree, Fuller) as opposed to the Clausewitzian idea of a clash of armies. As with Sun Tzu, the objective is to influence the mind of the enemy commander (and indeed those who work for him), and through all relevant means possible convince him of the futility of fighting. In short it is the idea of perception management.

While it is clear why the idea of imposing shock at both the tactical and operational level is beneficial, the authors never define the term shock in their book. This is odd as they did introduce and define several other key terms, the major one being the idea of rapid dominance of a theater leading to rapid decisive operations (RDO), which are described as:

> A concept to achieve rapid victory by attacking the coherence of an enemy's ability to fight. It is the synchronous application of the full range of our national capabilities in timely and direct effects-based operations. RDO employ our asymmetric advantages in the knowledge, precision and mobility of the joint force against an adversary's critical functions to create maximum shock and disruption, defeating his ability and will to fight.[40]

Thus it can be seen that RDO is merely the effect of imposing shock throughout the enemy's entirety; it is the idea of imposing paralysis. Awe is the continuance of the imposition of shock, a way to ensure that the transient effects of shock are continued through time.

Shock and awe is thus intended to induce a feeling of helplessness in the mind of the enemy which forces him to decline battle even though he still has the means to resist. It attempts to reduce the physical destructive part of battle and increase the psychological, convincing him of the futility of continued resistance. As such it does allow for an element of selective destruction (which is in line with the earlier considerations of how to impose shock) and constantly refers to achieving surprise (again in line with earlier discussion). It also trumpets the need for decentralized command and control in order to allow fleeting opportunities to be seized.

Shock and awe can be applied to both the operational and tactical level of war. In World War II the Germans were initially victims of tactical shock and awe when the Russians counterattacked in November 1942, but the encirclement of von Paulus' army and its inevitable defeat led to operational shock and awe. The Battle of the Bulge in 1944 exhibited tactical shock and awe; where as both the invasion of France in 1940 and the Arab-Israeli war of 1967 were classic examples of shock and awe at the highest level.

Thus the concept of shock and awe is purely a strategy that aims to affect the mind of a commander early on, through precision attack against his headquarters, coupled with an overwhelming show of force to encourage him of the impending destruction of his forces. While requiring some destruction, it does not compel large-scale force-on-force battles with higher attrition rates, nor does it advocate destruction for destruction's

sake; it strives to achieve the purest form of maneuver, and to bring about paralysis. Paralysis is not a new idea; both Colonel John Boyd United States Air Force (USAF) and Colonel James Warden USAF advocated the imposition of paralysis, although they typically concentrated at the strategic level and employed different means to do this.[41] Nonetheless the concepts have applicability.

Boyd stressed the use of simultaneity and depth which would render the enemy powerless to react to the ever changing situation; by forcing the enemy to cope with a difference in perceived to actual reality, the system would be forced in on itself and eventually desist. Boyd believed that humans and organizations went through an iterative process of observing, orienting, deciding and acting (the OODA loop). He claimed that the side that could do this quickest would constantly keep the opposition off balance and thus eventually remove their will to fight and resist.

Warden, on the other hand, concentrated on the concept of a selected strike designed to decapitate the enemy's strategic leadership, going after what he viewed as the key center of gravity in any operation. He viewed the enemy's centers of gravity as being five concentric circles starting with the leadership in the center and then moving outwards with each one of lesser importance. In Warden's eyes the most return is brought about by a strike against the center ring, the leadership, although he realizes that this may not always be achievable for many reasons, and so states that attacks on the outer rings while able to impose pressure on the enemy leadership, will be of declining utility the further away from the center they are. Issues exist with both of these theories. The problem with Boyd's concept is that it was designed for aerial combat where if one got the cycle wrong there was rarely a chance for a second iteration. Similarly Warden's

theory does not allow for a center of gravity to change, nor, indeed, does it allow for the relative importance of each to vary over time. As such a better analogy would be to consider the representation of his theory with Venn diagrams. With interlinking circles whose overlap changes with time and the amount of this overlap determines the importance of any one element at that time. This implies a need to strike early and hard against the lynch pin of the system (something that requires a lot of intelligence), or by engaging a target across its breadth and depth to overload the enemy commander as per the Russian Operational Art.

One must also consider other effects within the shock and awe concept in a modern or future campaign within complex terrain. A lack of information may lead to wrong targets being struck (for example the Chinese Embassy being hit during the air campaign against the Serbs in Kosovo). There must also be a credible and capable force to launch should the enemy commander not capitulate (again as in Kosovo). Finally, there is a real risk that the enemy can become seasoned or immune to the effects of shock or simply not be affected at all (something considered by the West as irrational behavior, but in a war of perceived national survival there is little chance of surrender by the defender).

The key issue to be answered is whether or not the idea of RDO and the concept of shock and awe are, in their basic forms, revolutionary or are they simply an evolution of effects based planning on a symmetric battlefield? If it is the latter then Ullman and Wade have created a doctrine for fighting in a war that is unlikely to occur. If it is revolutionary then one must look hard for how the concepts apply to the asymmetric fight. The idea of being able, through information dominance, to conduct rapid and

simultaneous operations throughout the enemy's depth may no longer be applicable in most environments that the US Army could find itself in. Has the concept unfortunately come too late to be effective? This paper will examine if the idea of imposing Shock and Awe is possible at operational and tactical levels in asymmetric environments.

The Significance of Asymmetry

The issue of asymmetry must play a large part in any future conflict analysis, yet this is one of the most overused terms within the army lexicon of today, indeed it is claimed that even the Secretary of Defense is unhappy with the term.[42] Regardless of how one defines asymmetry the base idea is ultimately the same, it is the idea of a force that will fight in an inherently different way to that of one's forces, probably with inherently different aims. A good example at the moment is the guerrilla (or insurgency) campaign in Iraq. The US forces are attempting through patrolling and general force presence to bring about a period of stability and democracy. The guerillas on the other hand are utilizing bomb attacks against civilians, aid workers and soldiers to try and force the US out of the country.

Asymmetry is important, as it will probably define the majority of warfare for the foreseeable future, not in terms of capabilities, as most nations will be behind the US in acquisitions of modern equipment, but in terms of aims and objectives and the method of warfare chosen. Furthermore, it is unlikely (and indeed not recommended either) that US forces will be able to change tactics and fight fire with fire by planting under vehicle improvised explosive devices (UVIED) or conduct assassination attempts on key figures. The US will thus be denied an ability to mimic the operating procedures of the new threat and as such will be forced to fight in an asymmetrical way.

For ease of explanation this paper will define a simple model of asymmetry for the reader in chapter three. For a more detailed investigation the reader is directed to Stephen Blank's monograph on *Rethinking Asymmetric Threats*.[43]

A few individuals have considered the idea of asymmetric threats, either in terms of the adversary (for example Al Qaeda) or a symmetric enemy fighting in complex terrain (cities for example). In his book *The Lessons of Terror*, Carr cites several examples of where those who resort to terrorism as a means to achieve their ends doom themselves to failure. For Carr the difference between guerillas and terrorists is purely by the nature of their victims; guerillas strike against military targets, terrorists against civilians.[44] This thesis is good from the perspective of the current situation in Iraq as it would appear that there is evidence of a switch in targeting from purely military targets to civilian and Non-Governmental Organizations (NGOs), thus the system may be beginning to fold in on itself.

Indeed, through a game theoretical model Blakesley showed how it is only rational for a guerilla or terrorist organization to switch from targeting the military of a strong willed nation to the civilians in order to try and bring about a dynamic change, yet this is a suboptimal outcome which will lead to a lower payoff for the terrorist.[45] Carr also highlights a critical vulnerability of terrorist cells and primitive guerilla organizations, namely their reliance on one charismatic leader.[46] This idea thus gives credibility to the use of Warden's concentric circle analysis as a means of targeting the enemy and bringing about his defeat, yet the ability of Hamas to continue operating regardless of how many of their leaders are killed by Israel may disprove this theory.

In his book Carr also covers some negative aspects that may be encountered when trying to impose a level of shock and awe on a population as a whole. He notes that the strategic bombing campaign of the Second World War not only failed to significantly reduce production, but that it hardened the will to resist of the survivors. He also points out that despite its failures, the West (namely the US and NATO) continue to rely on the use of air power as a panacea (Bosnia and Kosovo are good examples). He also investigates the usual response of a force that views itself superior to its enemy when it experiences an attack for which it was not ready (for example Pearl Harbor and Afghanistan), and refers to this as a "strike back" mentality. He note that this is usually counter productive as it alienates the general populace. Indeed, a parallel can be drawn to today where the response to the increase in terrorist or guerrilla activity in Iraq has been met by an increase in shelling and air attacks by the coalition.

Many other authors have attempted to locate the centers of gravity of asymmetric adversaries. In his article on *Issues on the Center of Gravity in Counterinsurgency Operations*, Ralph D. Ghent clearly states that terrorist centers of gravity at the operational level are hard to find as the mere creation of them can lead to the terrorist's defeat.[47] He considers the inherent inability of the terrorist to match the US on a force-on-force basis as the sole driver of their actions and planning towards an asymmetric campaign plan, and cites Tito's failure to continue to win when in 1942 he formed his guerrilla movement (Partisans) into shock divisions (who were soundly defeated by the Germans in a conventional battle). Thus the guerrilla or terrorist organization may not have a system in place that is capable of being shocked at the operational level.

Others disagree. In his paper entitled *Influence Management: A Tool for the War on Terrorism*, Shawn Mateer, a student at the Army War College in 2002, claims that an operational center of gravity does exist, it is that of radicalism, and in his case, Islam, but states that due to the inability to strike directly against this ideology, an indirect approach should be applied. This sees the military as the stabilizing force that enables the other instruments of power (economic, information and diplomatic) to bring to bear elements that will win over the populace and thus isolate the guerrillas.

Michael Mallory, a student at the Naval War College, also claims that in the case of Al Qaeda the center of gravity is easy to identify, and more importantly can be attacked by the simple deployment of forces into a specific area as this forces the enemy to begin considering its own force protection measures as well as force projection. He further develops his ideas on centers of gravity to include sub adversarial centers of gravity, recognizing the nature of terrorist and guerrilla warfare cells. Again, however, he also advocates the full use of the instruments of power to remove the perceived legitimacy of the adversaries. He disputes the single leader theory and therefore refutes Warden's analysis; should one leader be killed, in line with a systems approach to survival another will simply step into his place. He identifies the main weaknesses as the reliance on command and control to focus the attacks as well as a reliance on effects based operations. Unfortunately, while Mallory congratulates himself on identifying Al Qaeda's center of gravity, he gives little to advice on how it should be attacked, leaving that to further researchers.

In line with Mallory, Stephen W. Davis, in a strategy research project at the Army War College, claims that the decentralized and amorphous nature of any terrorist

organization does not lend itself to being attacked. The ability of the independent nodes within the structure to coordinate and execute attacks results in the US being faced with several potential centers of gravity and an inability to focus its combat power for a decisive blow.[48] He concludes that the very nature of terrorist organizations is such that the current concepts of centers of gravity are not applicable and thus misleading. Goolsby agrees. In her 2003 article *Combating Terrorist Networks: An Evolutionary Approach* she states that most terrorist organizations use informal network organizations, which offer definite advantages over the more formalized and hierarchical ones found in military systems.[49] These systems are more capable of adapting and surviving. She also expands on how the central terrorist cell infiltrates other organizations that then do its bidding, providing distance from the true source of power in case of discovery or death. This model, if correct, means that the central ring of Warden's analysis (leadership) cannot be targeted.

In a School of Advanced Studies monograph investigating the creation of a joint urban operational concept, Lee K. Grubbs analyzed the effect of trying to impose operational shock within an urban environment but only concentrated on a symmetric enemy. He notes that the World War II approach of individual house clearing with its associated mass casualties is no longer an acceptable form of operations for first world armies (Grozny excepted), and that current doctrine, while advising planners to "avoid an attritional approach", does little to provide guidance. He also notes that Joint Publication 3-06, *Doctrine for Joint Urban Operations*, introduced the idea of the urban triad, the three characteristics present in any urban complex; physical terrain, population and infrastructure.[50] He examines the key functions required to bring about operational shock

and applies them to an urban environment, although recognizes that his study is only a theoretical investigation into what effects should be exploited as opposed to developing a new methodology. He concluded that while in theory it was possible for the Joint Force to impose shock while not inflicting unacceptable civilian casualties and collateral damage, the current lack of doctrine was a vulnerability that a future enemy can exploit. He concludes by stating that developing new methodologies for the urban fight without historical precedence will be difficult but is a challenge that cannot go unheeded.[51]

What Does This all Mean?

As can be seen from both the plethora of recent studies and the amount of doctrine and intellectual effort that as been expended on the topic over the last one hundred years, shock, surprise, and the concept of a rapid approaching threat are very important, perhaps more so than currently recognized. Statistical analysis has shown that where they appear within a symmetrically fought campaign, they are often the most significant factors in determining the outcome and by using a combination of these principle factors together we can produce a probability of campaign success percentage of almost 80 percent, regardless of force ratio. This is reassuring if one assumes that a symmetrical future awaits as it shows that the future concepts, which the Army's force development is based on, are sound. However, in order to be able to exploit this empirical knowledge needed to understand exactly what shock and surprise are, and how to bring them about in all forms of warfare. There is also a need to consider whether or not shock and surprise are concepts that are applicable at all levels of war in both symmetric and asymmetric situations. This will be analyzed in chapter 3.

Methodology

There is no definition of the term shock in any US doctrine manual, either single service or joint, a fact highlighted in chapter 1. As such the choosing of a methodology for this thesis has proven to be somewhat interesting. Because of this omission in the doctrine it is first necessary to define shock and then examine how it can be achieved. Only then can an assessment of current doctrine be made to see if it is amenable to the incorporation of shock. For this assessment the use of a mathematical approach, graphic to display curves and thus help define the difference between stable and unstable equilibriums is useful, because only a basic background in simple mathematics is required.

In conjunction with this definition, an analysis of current US doctrine, comparing the principles of war, the tenets of operations, and the concepts for the future force, will examine whether or not they fit what is required to inflict shock. This will be illustrated within a tabular format. Historical examples are also useful to emphasize a point though specific campaigns are not examined in great detail since it appears that the US has not fought a truly asymmetrical enemy. The closest to date may have been in the Korean War 1950-1953 where the Chinese Light Infantry were employed in an asymmetric way and during certain stages of the Vietnam War, although towards the end of this conflict the enemy coalesced into formed units.

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[1]Richard J. Gregory, *The Oxford Companion to the Mind*, (New York: Oxford University Press), 713.

[2]Ruth Leys, *Trauma – A Genealogy*, (Chicago: University of Chicago Press, 2000).

[3]George S. Everly and Jeffrey M. Lating, *Personality-Guided Therapy for Posttraumatic Stress Disorder*, (Washington DC: American Psychological Association, 2003), 35-36.

[4]Martin Seligman, Steven Maier, and J Geer, "The alleviation of learned helplessness in dogs," *Journal of Abnormal Psychology* 73, (1968): 256-262 and Martin Seligman and Steven Maier, "Failure to Escape Traumatic Shock," *Journal of Experimental Psychology* 74 (1) (1970): 1-8.

[5]Robert C. Carson and James N. Butcher, *Abnormal Psychology and Modern Life*, (9th ed. New York: Harper Collins, 1992): 25.

[6]Audrey L.H. van der Meer and Nanna S. Kayed, "*Timing Strategies Used in Defensive Blinking to Optical Collisions in Infants"*. Available at http:www.sv.ntnu.no/psy/Audrey.Meer/articles/looming.html. Accessed on 8 May 2004.

[7]Dermot Rooney, L. R. Speight and Michael Keys, *Digitization, Doctrine and System Implementation*, DERA/CHS/MID/CR990236 1.0, June 1999.

[8]David Rowland, Dermot Rooney and Jim Storr, *Shock and Surprise on the Battlefield* (unpublished article for the *British Army Review*, draft as of September 2003): 5.

[9]Audrey L.H. Van der Meer and Nanna S. Kayed, *Timing Strategies Used in Defensive Blinking to Optical Collisions in Infants*. http:www.sv.ntnu.no/psy/Audrey.Meer/articles/looming.htm. Accessed on 8 May 2004. The most controversial of these involved projecting very soft blue cubes at babies (who were protected behind clear glass screens, although obviously they did not know this) and measuring the reaction. There is still debate over the results and perhaps unsurprisingly the experiment has not been carried out since.

[10]Leon A. Festinger, *When Prophecies Fail* (Minneapolis: Lund Press, Inc., 1956). Festinger's study of cognitive dissonance in this book examines how members of a cult continue to believe ever after undeniable proof of a failure in their leaders' predictions is a fascinating read and explains how individuals and groups will continue to believe in something they have invested substantial effort, time, and money into. This has serious implications for commanders and staff who, despite receiving reports from those on the ground that the enemy is not doing as they predicted, refuse either to believe the reports or to modify the plans.

[11]Dermot Rooney and Michael C Keys, "Digitization, Doctrine and System Implementation", *DERA/CHS/MID/CR990236 1.0* (June 1999). Quoted in David Rowland, Dermot Rooney, and Jim Storr, "Shock and Surprise on the Battlefield" : 5.

[12]David Rowland, L.R. Speight and Michael C. Keys, *Manoeuvre Warfare: Conditions for Success at the Operational Level*. (Unpublished Thesis, Centre for Defence Analysis High Level Studies Department, West Byfleet, UK, n.d.) : 1.

[13]L. R. Speight, David Rowland, and Michael C. Key,. "Manoeuvre Warfare: Force Balance in Relation to Other Factors and to Operational Success," *Military Operations Research* Vol. 3 (1997) : 42.

[14]Rowland, Rooney and Storr 2003, 5.

[15]Rowland and Keys 1993, 3.

[16]Speight, Rowland and Keys 1997, 5.

[17]Rowland and Keys 1993, 5.

[18]Rowland, Rooney and Storr 2003, 3. Although this factor is irrelevant as historically one never observes force ratios in excess of 10:1, it gets the point across.

[19]Stephan Schmidt, "Philosophical Roots of Reflexive Control," (*Information Sciences Research*, NMSU/PSL (n.d.)).

[20], Ervin Laszlo, *The Systems View of the World – A Holistic Vision for Our Time*. (4th printing. Cresskill, New Jersey: Hampton Press, 1996), 74.

[21]Christopher D. Kolenda, "Transforming How We Fight: A Conceptual Approach," *Naval War College Review* Vol. 56, No. 2 (March 2003) : 108.

[22]Madelfia A. Abb, *A Living Military System on the Verge of Annihilation*. Monograph, School of Advanced Military Studies, US Army Command and General Staff College Fort Leavenworth, Kansas, AY 99-00.

[23]Ibid., 17.

[24]Ibid., 31.

[25]Ibid., 44-47.

[26]Ibid., 48.

[27]Kolenda 2003: 10.

[28]X. H. Kramer, T.B. Kaiser, S.E. Schmidt, J.E. Davidson and V.A. Lefebvre all work as the Reflexive Theory Research Team of the Rio Grande Research Corridor.

[29]Paul J. Blakesley, *Big Boy's Games, Big Boy's Rules: A Game Theoretical Approach to Modeling Terrorism.* (Masters of Science (Economics) Thesis, Warwick University, England, 1993).

[30]Phillip Djang, A presentation on *Estimating Iraqi Military Morale with a Reflexive Control Model*, Information Science Research New Mexico State University 2004. Not currently on wide circulation.

[31]Hans Delbrück, "*History of the Art of War within the Framework of Political History*" (n.d); trans. Walter J. Renfroe Jr (Lincoln: University of Nebraska Press, 1975); quoted in James J. Schneider, "A New Form of Warfare", *Military Review*, (January – February 2000): 56-57.

[32]Shimon Naveh, *In Pursuit of Military Excellence: The Evolution of Operational Theory*. (London: Frank Cass, 1997), 16.

[33]James J. Schneider, *Theoretical Implications of Operation Art*, Military Review Vol. 69, No. 1 (January-February 1990): 23.

[34]V. K. Triandafillov, *Nature of Operations of Modern Armies*. Translated by William A. Burhans (Woodbridge, Virginia: 1929), 187.

[35]Ibid., 187.

[36]Naveh, pxviii.

[37]FM 3-0, Operations, 4-4, 4-16, 5-12 and Joint Publication 3-0, IV-9.

[38]Clayton R. Newell. "What is Operational Art?," *Military Review* (September 1990) : 44.

[39]James J. Schneider, "Theoretical Implications of Operational Art," *Military Review* Vol. 69, No. 1 (January-February 1990) : 17-27.

[40]Joint Forces Command, Effects Based Operations White Paper 2001: 2.

[41]David S. Fadok, "*Air Powers Quest for Strategic Paralysis*." (Alabama, Faculty of the School of Advanced Air Power Studies Monograph, Maxwell Air Force Base February 1995).

[42]Stephen J Blank, *Rethinking Asymmetric Threats*. (Carlisle, US Army War College, Strategic Studies Institute Monograph September 2003) : v.

[43]Blank 2003.

[44]Caleb Carr, *The Lessons of Terror*. (New York: Random House Inc., 2002), 122.

[45]Blakesley, 1993. This thesis was developed and proven using several game theory models and included the concepts of limited resources, non zero sum games and iterative signaling models. Unfortunately it is no longer available from the University of Warwick, although the author of course has a copy.

[46]Carr 2002, 28.

[47]Ralph D. Ghent, *Issues on the Center of Gravity in Counterinsurgency Operations*. (Newport: Faculty of the Naval War College Paper RI, May 1997): 1.

[48]Stephen W. Davis, *Center of Gravity and The War on Terrorism.* (US Army War College, Pennsylvania, USAWC Strategy Research Project, 2003); 14.

[49]Rebecca Goolsby, *Combating Terrorist Networks: An Evolutionary Approach*" (Newport, RI: Unpublished paper Naval War College Paper, 2003).

[50]Lee K. Grubbs, *In Search of a Joint Urban Operational Concept*. (Fort Leavenworth, Kansas. Advanced School of Military Studies Monograph, US Army Command and General Staff College, AY 02-03); 9.

[51]Ibid., 57.

CHAPTER 3

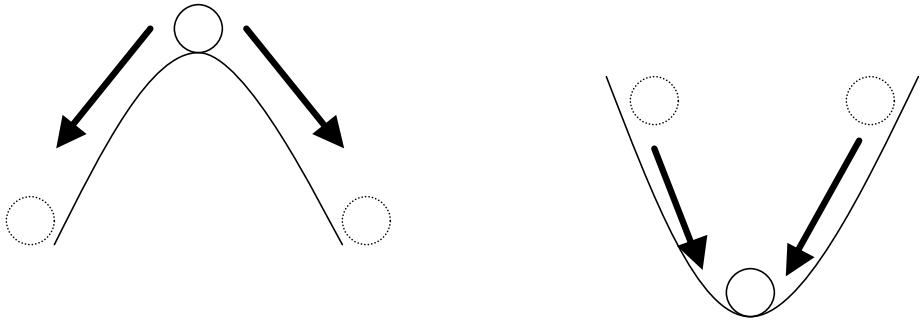
INFLICTING SHOCK

> If you're working on things that everyone accepts, you're not working on anything.
>
> Professor Alan Snyder

With shock (both operational and tactical) seeming to offer in conjunction with surprise (and an element of selective destruction), control of the air, and aggressive reconnaissance the key to winning, how does one set about imposing it? As stated earlier it is essential first to define what is meant by shock, and then to consider what level, and in what type of environment one intends to try and achieve this. After this the analysis of imposing shock will be considered. The chapter will be broken up into three sections. The first considers imposing shock in a symmetric environment and the second in an asymmetric environment. Both tactical and operational shock will be defined and considered within each. The third section analyzes the problem of resistance to shock. Throughout one must remember the concepts from both the Soviet idea of "udar" (and the importance therein of the need for depth) and Schneider's concept of cybershock as discussed in the literature review in chapter two.

Using the idea of a systems approach, and coupling it with the concept of mathematical differentiation to solve an equation, it is possible to visualize the idea of trying to achieve shock as follows. When a mathematical equation is solved through differentiation one finds maxima and minima of the equation, and classifies them as stable or unstable. These equilibriums are either peaks or troughs. The classification of the equilibriums as stable or unstable depends on what happens when it is disturbed or

shocked. It has two options, either it returns, over time, to its equilibrium (a trough), and is classified as stable, or it moves away from this equilibrium (a peak), and is classified as unstable. Both cases are shown in figure 3:



Type A
The Unstable System

Type B
The Stable System

Figure 3. The Effects of a Shock or Disturbance to the Two Types of System.

The system on the left is inherently unstable. If disturbed or shocked it will move away from its equilibrium, never to return. The system on the right however is stable; if shocked it will return, eventually, after some oscillation to a position of stability. The only ways to cause this system to break down is to either shock the ball so much that it physically leaves the confinement of the trough or through repeated shocking allow it to build up enough momentum to break out of the trough. Unfortunately the repeated shock approach relies on the shocks being coordinated to maximize the effects of each shock as opposed to creating conditions where each shock cancels the others out.

Ideally, for military purposes the type A analogy suggests that rapid military collapse is possible with the application of non-negating and hopefully amplifying

shocks. If the system faced is that of type B, however, then there exist three choices; either through the application of controlled violence shock is created in an attempt to prevent the system's natural return to equilibrium or the system has to be physically broken through the application of a large amount of force. The final option is a combination of both. Therefore the US hopes to face an enemy with a type A disposition while wishing to develop itself into a type B system as they are the most resistant to being shocked and will always return to their equilibrium after time.

This basic concept has been validated with combat psychiatry studies which have shown that psychological collapse occurs when a system (be it either organizations or individuals) does not have time to recover its equilibrium and is constantly subjected to shocks.[1] Yet modern combat and political control systems are rarely this simple (with the exception of very primitive armies). It is likely that a combination of the two would be encountered initially and then as the struggle of wills continues, the side that perceives it is losing will, in accordance with the Russian (systems) view of shock theory, try to adopt a new defensive position that will render its opponents blows less potent. This evasive possibility explains why certain systems are capable of absorbing a significant amount of pressure before being felled by a relatively insignificant blow. Thus, it may be that the system should be visualized as a roller coaster of equilibriums as shown in figure 4, with the aim being to force the system to the point of self-destruction as quickly as possible, that is pushing the ball to the right towards the long run off that cannot be rectified easily. The actions of the other system can be imagined as the forces that aim to push the ball back to a position of relative stability. Simultaneously the enemy system will be

attempting, through its own plans and actions, to force the friendly ball away from its equilibrium.

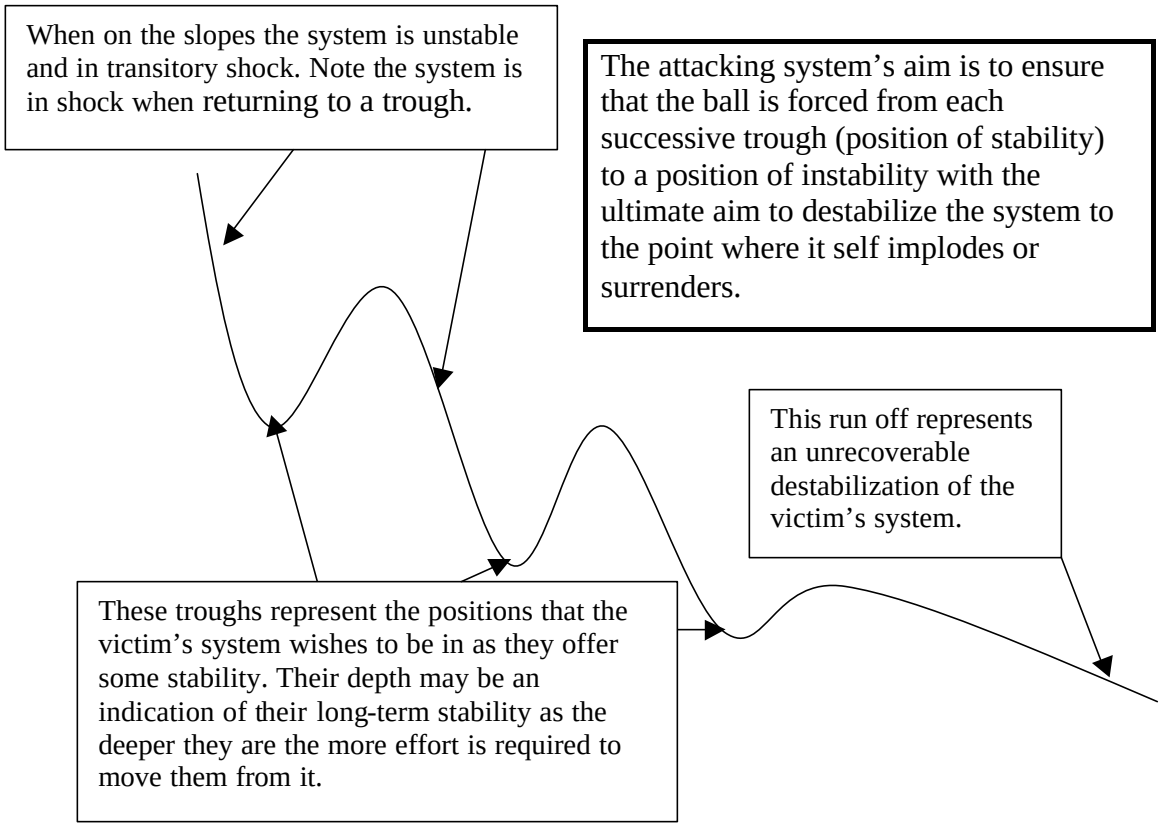


Figure 4. The More Realistic Representation of a System Facing Shock in a Symmetric Environment.

So how does one shock a system or an individual? In its simplest form there is an action (or a cause) that through some combination of filters results in an effect. It is therefore a question of identifying those factors in the action that lead to the desired effect. This process is shown in figure 5.

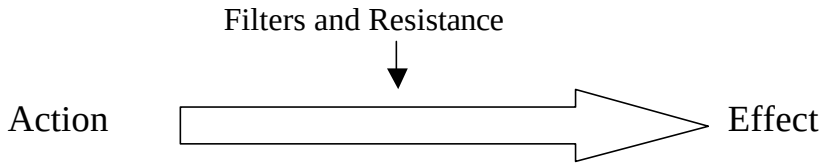


Figure 5. The Question of Cause and Effect.

In its purest form the filter that prevents the actions or causes being translated into the effect of shock can be characterized as the resistance to shock of the system or individual. In more complex models it also includes a system's actions to correct itself after being shocked. Both of these are covered in more detail at the end of this chapter. Initially for ease the issue of resistance to shock will be assumed away, therefore in the model we are examining we need to assess what is the optimum combination of the factors that will induce shock. As highlighted from the statistical studies the imposition of shock requires a combination of surprise, a feeling of vulnerability, the rapid approach of the threat, and an amount of selective destruction. The amount of each of these individually will vary but must reach a certain total to create shock. Therefore, if surprise is not possible then more of the other elements are necessary. Surprise however is the greatest force multiplier (200:1 factor). This is shown in figure 6.

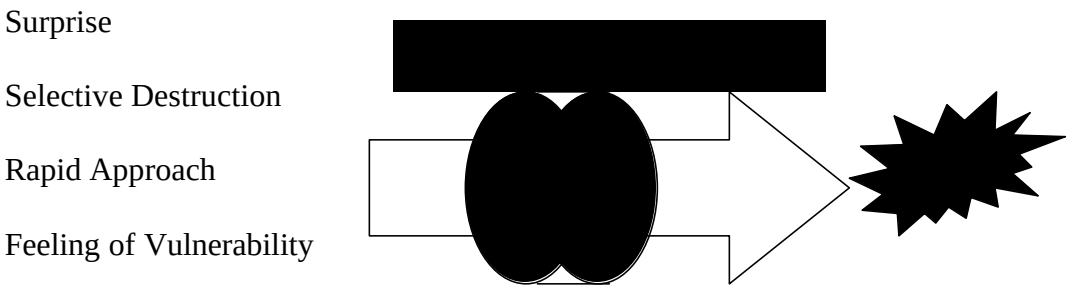


Figure 6. Breakdown of those Factors Considered Required to Impose a Shock Effect as well as the Mitigating Effect of a Resistance to Shock.

The link between the amount of destruction required to impose a feeling of vulnerability, and the level of surprise that may offset this has yet to be fully investigated. Yet it is theoretically possible to extrapolate the statistical results from Rowland, Speight and Keys, and assume that the more surprise that can be achieved the less destruction is required to impose a degree of shock. This relationship is shown in figure 7.

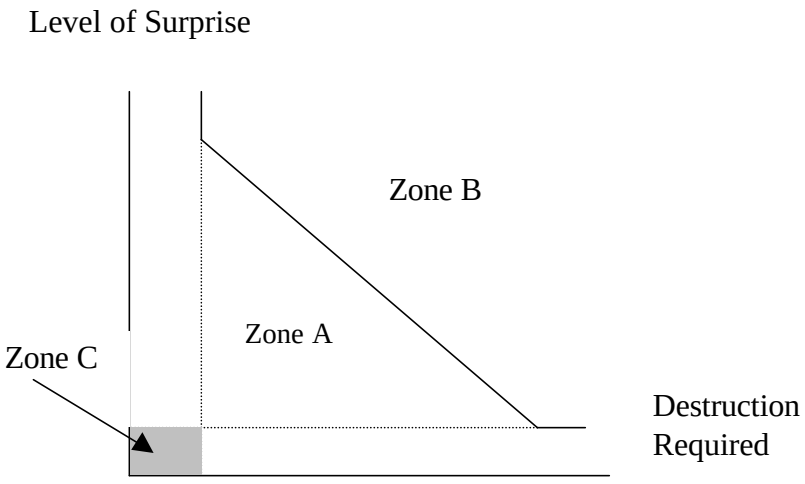


Figure 7. Tradeoff in the Symmetrical Environment Between Surprise and the Level of Destruction Required at the Tactical Level to Impose Shock.

The relationship shown is linear although it is possible that this relationship could be concave or convex in nature and will be dependant on several factors including culture, previous exposure to surprise, and the level and method of destruction imposed. To develop the true relationship of the linkage is beyond the scope of the thesis, although regardless of the shape of the relationship the zones will remain the same. The surprise factor on the y-axis is brought about by either the timing of the event or by its magnitude. Figure 7 shows, figuratively speaking, the minimum and maximum levels of surprise and destruction that combine to provide a feeling of vulnerability within an opponent. The zones represent the following:

Zone A. This area is under the requirement needed to impose vulnerabiltiy, but it is possible through increasing either surprise (ideal but hard to do), or destruction (more likely but this does have targeting issues) to theoretically achieve the effect of vulnerability and therefore impose a level of shock.

Zone B. This zone represents overkill. It is possible to reduce either the amount of surprise (not ideal) or the amount of destruction (ideal) and still achieve the feeling of vulnerability and thus help impose shock.

Zone C. This zone is where it is not possible to increase either of the factors to the extent where vulnerability or shock can be imposed. The size of this area depends on the standard of the opposition (few armies, fighting symmetrically or asymmetrically will suffer from a feeling of vulnerability if there is not an element of selective destruction) and the nationality's susceptibility to suffering from surprise.

The relative merits of the elements of a joint force can be compared to this figure. Air assets achieve surprise and have the potential to achieve a large amount of selective

destruction though they risk straying into Zone B. The problem of Zone B is with asymmetry. Here there is an increase of undesirable collateral damage, something that produces more negative than positive results in terms of alienating the population, and gaining negative media coverage. Second, although the air element achieves the elements of surprise and destruction, once it drops its payload there is no recall facility. However, infantry formations, while slower and less likely to achieve surprise, are capable of achieving selective destruction, including the ability to decide to shoot or not to shoot until the very last moment, should the need arise.

A feeling of vulnerability is, however, unlikely to be brought about through only one iteration of the selective application of destruction and surprise (few forces deploy into the field with a belief in their impending defeat), since most individuals and units will be able to deal with some initial set backs. Therefore, to impose shock it appears that there is a need to go through several iterations of the process that aims to create feelings of vulnerability within the individual, unit or system that can then be exploited to achieve shock. These initial factors include anything that can affect the perception of the victim whereas the secondary factors (which do include some duplication) build on the feeling of vulnerability to develop it into shock.

In order to impose feelings of vulnerability, ideally all of the factors should be exploited, including surprise, and the idea of rapid approach, which have been considered earlier. The use of overwhelming and yet selective destruction is currently the practice pursued by the US in all major operations wherever possible, as it is an easy to measure and relatively easy to achieve effect within conventional (symmetrical) warfare. The aim of Information Operations (IO) however is to try and change this mind set of those forces

deployed and their masters, and in what Sun Tzu refers to as the acme of skill, force surrender before battle is joined, and thus through perception make the enemy feel vulnerable. The problem with the latter course of action is that modern armies are still struggling with the idea of how to measure the effects of such a strategy and it is hard to imagine how an entire force could be affected in such a degree to feel sufficiently vulnerable for shock to be imposed by IO alone. This new iterative process is shown in figure 8.

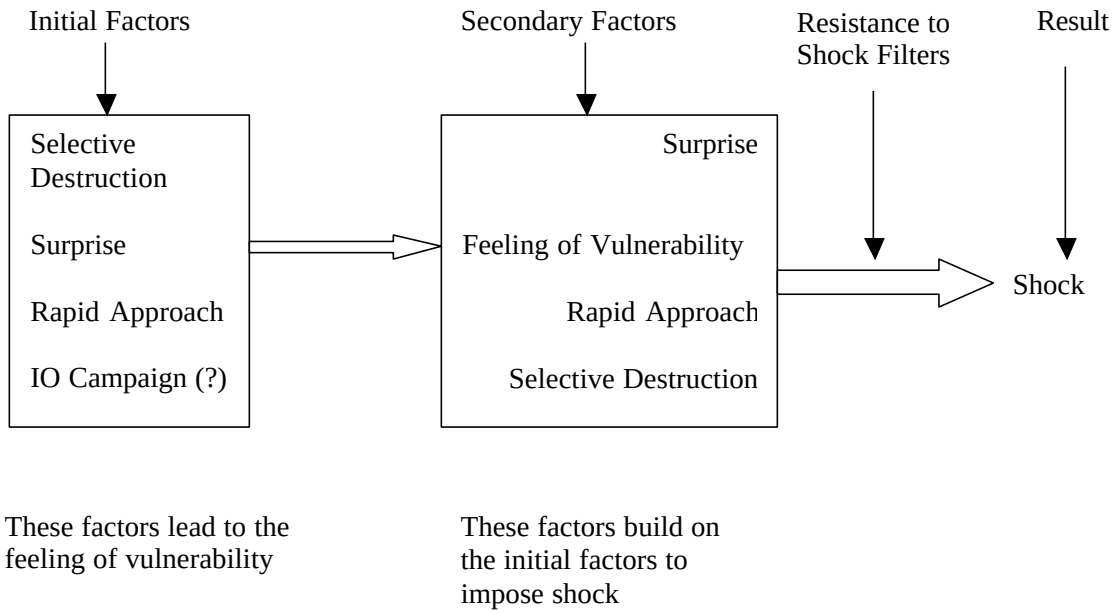


Figure 8. The Iterative Process Required to Impose Shock.

Therefore, in conclusion to this generic analysis of how to impose shock a need for a two stage iterative process has been identified which first concentrates on developing the feeling of vulnerability in the victim(s) and then exploiting this perception

to impose shock. The specific cases of the symmetric and asymmetric environments will now be considered.

The Symmetric Environment

Assuming that the US does not intend to use its Army in an asymmetric way (that is in the same way as terrorists with cells, operating in civilian clothes etcetera) this is arguable the easier of the two environments in which to achieve shock.

Tactical Shock

Based on the explanations above and the work described in chapter 2 it is proposed that the definition of tactical shock be:

> A transitory effect induced through a combination of surprise and physical destruction that debilitates (from marginally influencing to stunningly paralyzing) the ability of individuals and/or organizations to operate regardless of will.

This definition encompasses the importance of surprise (either through the simple components of an unexpected direction of attack, a new weapon system, time or method of attack or through the idea of rapid approach theory where the defender is unable to react to negate the surprise) as well as the need for selective physical destruction that brings about a feeling of vulnerability in the victim.

At the tactical level, despite the overwhelming technological advantage that the US will enjoy in future conflict, the human element will continue to remain the at the forefront of any interaction. As stated in the opening to this chapter, to impose shock within soldiers at the tactical level three main conditions need to be achieved; a rapidly approaching threat; selective destruction; and inducing a feeling of vulnerability in the victim. Currently US doctrine appears maximized towards achieving shock by its emphasis on surprise.

Yet with future concepts envisaging forced entry operations, it is hard to imagine how surprise could be achieved (especially at the operational level). With the apparent need for an iterative pattern of destruction in order to induce a feeling of vulnerability in the victim, it appears that destruction remains crucial in the early stages of a force entry operation. This destruction is probably best brought about from the air (either by plane or missile artillery weapon systems) as this buys time for the land force to build up and transition to readiness as well as robbing the victim from an ability to strike back, thus increasing the level of vulnerability felt.

Once the initial element of selective destruction has been achieved, the emphasis should switch to rapid approach and the achievement of surprise as this will further build on the initial shock imposed, and also allow for the enemy's operational level command to understand that it is being out-maneuvered. Again, this is something that the doctrine does emphasize. By examining the US principles of war and the tenets of US Army operations they should indicate a heavy weighting towards those factors required to impose tactical level shock. This comparison is shown in table 3. A tick in a box within this table denotes that the element of doctrine or concept is considered to contribute to one of the factors required for shock, where as a cross denotes that it is not.

The ranking shown is based on a subjective scale of 1 to 3 where 1 is a concept that is crucial to imposing shock and 3 is one that is not. From the tabular analysis, it appears that US doctrine focuses on achieving shock at the tactical level although causality is not explained or even noted. This omission needs to be addressed in future writing of doctrine to ensure that planners and field soldiers are aware of the relationship between the factors and shock.

Table 3. Comparison Between the Principles of War and the Tenets of Army Operations Versus those Factors Identified as being Crucial to Achieving Shock at the Tactical Level

Element of Doctrine / Factors required for Shock	Surprise	Rapid Approach	Selective Destruction	Feeling of Vulnerability	Ranking
Principles of War					
Objective	X	X	X	X	3
Mass	X	X	v (maybe)	v (if overwhelmed)	2
Maneuver	v	v	v	v (possibly)	1
Offensive	Possibly	v	v	v	1
Surprise	v	v (if achieved)	v (if planned to do this)	v (if achieved)	1
Economy of Force	X	X	X (but this does create the ability to achieve selective destruction)	v (but only if the economy of force leads to enough forces at the point of decision)	3
Unity of Command	Maybe	X	X	X	3
Simplicity	Maybe	X	X	X	3
Security	v	Maybe	X	v (because the enemy is kept unaware of the friendly force's movement	2
Tenets of Operations					
Agility	Maybe	v	X	Maybe	2
Initiative	v	X	X	Maybe	3
Depth	v	X	v If achieved)	v	1
Synchronization	v	v	v	Maybe	1
Versatility	v	Maybe	Maybe	v	2
Concepts for the Future Force					
See First	v	X	v	v	1
Understand First	X	v	X	v	2
Act First	v	v	v (maybe)	v	1 but must be iterative
Finish Decisively	X	Maybe	v	v	1 but must be iterative

Once again the iterative nature of the process must be stressed. One shot tactical actions or ones that allow a substantial time for recovery will usually result in the enemy

system recovering, even if only partially. Once this recovery has occurred then future operations will have to be conducted to further reduce the system and overcome the inertia. This is, therefore, not optimal, and will incur a greater cost above what is required. Thus to ensure that the enemy's systems are put into shock early on there is a weighting on the idea of simultaneity and continuity of operations. Finally one must also remember the importance of achieving selective destruction to be able to impose a feeling of vulnerability. Without this feeling, the amount of force that will have to be used later on will increase and thus lengthen the process before it can be brought to an end.

Operational Shock

The aim of operational shock, in a symmetrical environment, is that through military operations in depth which create a large, albeit temporally existent level of destruction, to remove the political rational for the war and thus force capitulation. This subject has, however, been extensively examined by many others so only a few points will be considered. In accordance with the studies into tactical level shock, one expects there to be some similarity between tactical and operational level shock and therefore their definitions should be similar. This is indeed correct. In a paper on transforming how the US Army should fight, Lee K. Grubbs examines the concept of operational shock and defines it as "a systemic effect against the enemy systems control mechanisms, which achieves paralysis, disorganization and disintegration."[2] This definition is sufficiently similar as to be used throughout. Note that it also includes the idea of a system at the operational level, something that Abb discusses at great length in her paper.

Traditionally, the optimal way to impose operational shock was through the application of deep maneuver and deep fires with the emphasis on maneuver as it was

able to target more effectively and, therefore, able to achieve a guaranteed degree of destruction. The problem with the maneuver unit, however, is that it can only operate for a certain length of time before it also culminates, either through enemy action or logistical collapse. It is a logical progression to state that there must be a minimum size of a deep maneuver force that is required to be able to produce a minimum level of shock (as determined by the planners), and that this requires a minimum level of logistical support to achieve its mission. This minimum will be called the base force (BF) and will be comprised simply of fighting units (FU) and logistical units (LU). Any increase in the mission requirement of the BF may be achieved by an increase in both FU and LU (as more tanks require more fuel and more soldiers require more food and ammunition) or by assuming risk and simply increasing the LU (hoping that the FU will not be destroyed earlier than planned).

Assuming that the larger the force, the more it is likely to be located and subsequently dealt with prior to achieving its mission, there will be a temptation to opt for the second course of action, namely to increase the LU element and multitask the FU. This is dangerous however, for if the FU is reduced to being combat ineffective the second phase of the mission (the additional shock required) will not be achieved and the enemy system will recover. Thus, in order to maximize the probability of success planners must either utilize separate shock forces or carefully phase their employment.

It must also be remembered that concepts are forced, as systems are, to operate within a framework of laws. Beyond this they begin to break down and operational shock theory is no exception. The framework it operates within is that of scale, namely time and space. This problem becomes more acute when one considers the issues of space and

time. Currently, it appears that US operational shock doctrine is maximized for operating in temporally and spatially limited environments such as Iraq. In addition, should the enemy also mobilize a people's army for an extended war, there is a question over the Western economy's ability to produce the required materiel as the Western political and economic systems are not optimized for either long or attritional wars. Thus planners must consider the opposing force and ground relative to our assumed operating norms and not follow some grand theory blindly. When areas as large as China or Russia are considered, the US Army lacks enough forces (both FU and LU) as well as the will to be able to operate throughout the enemy's depth. As such with these options denied it is doubtful that operational shock could be effectively employed.

One other point for consideration is that the current direction of US Armed Forces development is resulting in a dependence on technology to impose shock. Attack Helicopters, deep electronic warfare jamming and long rang missile systems are all aimed at imposing operational shock from a minimal risk-technology based viewpoint. Future operations in complex terrain and against enemies who are not massed and easily identifiable may well prove that this technological reliance is no panacea.

The Asymmetric Environment

> The faction that resorts to warfare against civilians most quickly most often and most viciously is the nation or faction most likely to see its interests frustrated and, in many case, it existence terminated.
>
> Caleb Carr, *The Lessons of Terror*, 12

> The future is not the son of Desert Storm, but the stepchild of Somalia and Chechnya. [3]
>
> General Charles Krulak, USMC

Potentially the largest problem facing any commander in an asymmetric environment is twofold in nature; first there will be a lack of timely and accurate information, and second, the enemy is unlikely to present himself in a form that is easily recognizable. This dual problem will manifest itself in three ways. First, it is unlikely the commander will have a clear picture of the enemy, creating problems for attempting to impose surprise and shock on him. Second, this lack of information will conversely increase the friendly forces chances of being surprised and as such over time while not imposing shock, force the imposition of encoding specificity onto commanders and staff, which further reduces combat effectiveness. Third, the enemy, realizing how the US likes to fight, will be unlikely to coalesce into a recognizable fighting formation, easily neutralized from a distance with precision weapons.[4] It is this lack of a solid, easily recognizable enemy fighting in the open, with a vulnerable flank and an exploitable quality of depth that could render the classical idea of operational shock useless. Indeed, the potential of a truly asymmetric enemy to adopt a cell-like organizational structure may prove, through ensuring that any shock imposed will be transitory and indecisive, ideally suited to defeat current US Operational Shock doctrine. It has already noted that

problems with relative size of units and space of operations can negate the US forces' ability to impose shock, but ruling out the ability for most other nations to raise a fighting force superior in size to the US, a change in the enemy's modus operandi must be expected. Examples of an asymmetric threat that has been superior in terms of size include the Japanese invasion of Burma in 1941 and the Chinese intervention in Korea in 1951. So the challenge for the future is to find a way to inflict surprise and shock upon the enemy command structure in order to influence their perceptions, and force them to decline battle and admit defeat.

First, it is necessary to define what is meant by asymmetry. Within this thesis the variance in symmetry will be represented as three sub definitions within brackets. This will be shown as a function where the equation $?(M_x:D_y:T_z)$ denotes the type and level of asymmetry. Within the brackets the M denotes the military force, D denotes the type of doctrine used and T denotes the technology within the forces. The subscripts denote the relative superiority or inferiority vis-à-vis the US force. Therefore x = 0 if the opposition employs the similar type of military force and x = 1 if not. An x = -1 is not considered as it is not required. The y value denotes the comparison of doctrine uses; if y = 0 then the employment of the doctrine of these forces is symmetric and if y = 1 then he adopts a fundamentally different type of doctrine than you do (note not necessarily superior). Finally the z value considers the relative values of technology, thus if z=-1 then the opposition is fighting with technologically inferior equipment than the US, if z=0 it is comparable and if z=+1 then the enemy is more advanced than the US. While all of these permutations are possible given the current state of US dominance in so many areas the

prospect of a long term value of z=+1 is deemed unrealistic. This however is not necessary to denote asymmetry. Examples will help clarify the equation.

The first phase of Operation Iraqi Freedom was a symmetric fight in that both sides chose to fight the same type of battle (armored and fighting in the open), working with similar doctrine, and so could be represented by the function (M_0:D_0:T_{-1}). Now the coalition forces are involved in a guerilla war where the function should read (M_1:D_1:T_0), as the enemy is not using the same forces or indeed the same doctrine and the benefits of the complete change of operating procedure negates any technological advantage that the US has. This function allows also for the sixteen other cases although some of them are either very unlikely or impossible (it is left to the reader to consider the break down of all possible permutations). The ones considered in this thesis will be where the enemy force is used in an unconventional, non-military manner (therefore M_1) using a different doctrine (D_1). The technology issues will be assumed to be flexible, because with enough money the enemy can purchase near US capability for short periods as required.

Tactical Shock

The optimal method to impose shock at the tactical level when operating in concert with future concepts was thought to be through the initial use of selective destruction which would compensate for the loss of surprise (discussed in the sub chapter concentrating on tactical shock in the symmetrical environment). Yet it will be shown that these ideas are not necessarily compatible with the enemy and the environment that will be faced in the future. The enemy of the future is likely to seek refuge in complex terrain in an attempt to negate the benefit of precision munitions, and if they are used by the US, in the hope of collateral damage and civilian casualties. This practice of extreme

terrain masking will reduce the level of situational awareness that commanders will have and complicate targeting. Furthermore, aware of the risks of forming into identifiable formations, the enemy is more than likely to wear civilian attire and only come together for specific acts. The command structure may well be cell-like in nature to reduce the risk of information compromise and those executing the order may well be unaware of the command level two up.

The above organizational and doctrinal adaptations result in a reduced ability to inflict the initial selective destruction required to induce a feeling of vulnerability. If this feeling of vulnerability cannot be induced selectively, the option of indiscriminate application of force could be considered but this has problems as well. It could well backfire, turning more of the population or world media against the friendly force. Furthermore, the inability to achieve early successes from a distance (that is by bombing, cruise missiles etcetera) could conversely make the US soldiers the ones feeling more vulnerable as they realize that they will be committed to close quarter combat against an enemy who has not capitulated.

The type of enemy must also be examined. While first world societies recruit their soldiers on the whole from a civilized society with its rules and regulations, many of the armies of potential enemies have been developed through hardships and deprivation of day-to-day life, hardened and dehumanized, and thus less vulnerable to shock from selective destruction. This theory of hardening and decentralization links well with the idea of Reflexive Control Theory discussed in chapter two. In addition, if the enemy is from a different values system than our own, something that is very likely in future conflict, there is also the issue of their willingness to die for the cause. This is not so

unrealistic if one considers the fanaticism in which the Russians fought when their homeland was threatened, or the Germans, who despite realizing that they were beaten contested every bit of ground in 1945, or the Japanese acceptance of suicide as a means of attack and defense.

Thus, it transpires that the element of surprise is the factor best suited. Once the enemy is surprised he must be dealt with in a violent and destructive way. How this surprise is brought about is dependant on the assets available although should include both physical (actual troop deployments) and non physical (information operations) means. As suggested by RCT, the best way to achieve surprise is through a credible deception plan that actually alters the enemy's course of action to be that which is desired by blue forces; in other words a trick. Tricks are not without risk. Forces in foreign countries have to operate from bases that are relatively immobile; any public announcements are viewed as propaganda, and analyzed by the enemy in great detail. Yet regardless of this it must be through deception that the enemy is forced to plan his action, and then based on this that we attack him. This will lead to the greatest form of cognitive dissonance that we can impose with the least risk of alienating the general population and thus is probably the only real way to impose shock on the enemy.

Operational Shock

There have been very few truly asymmetrical battles fought by any army. We are currently experiencing a counter insurgency in Iraq which appears to be the effects of a group of fighters working in a loosely coordinated manner with a singular aim – to inflict as much suffering onto the coalition forces, both military and civilian. Despite winning

the symmetric ground war in a matter of weeks, US and coalition commanders now face a long battle of attrition where the usual measures of success are woefully inadequate.

Current operational shock theory aims to utilize the depth of the enemy force to threaten the commander with simultaneous and multiple threats in such a way as that he is unable to coordinate any worthwhile response. This will then render his forces useless in achieving their mission and, in turn, forces a military event into a political one as the country in question is forced to sue for peace. The concept of cyber shock further develops this idea by including unorthodox assets that could be used to widen the scope of the attack, including economics, the electro magnetic spectrum, etcetera. Yet an asymmetric enemy will have decided to fight asymmetrically in order to minimize any advantage of US capabilities. This raises one very important question; is current operational shock doctrine optimized for asymmetrical fights, given the predicted structure and form of the future enemy? Will the future enemy structure be as vulnerable to shock imposed via technical reliance or not?

Operational shock is aimed at creating a political capitulation from a military feeling of helplessness. The future enemy is unlikely to be operating necessarily with the consent of the state in which the battles are taking place. Iraq, while one can argue over the governing council, has a political structure, yet it is powerless to control the enemy inside its own borders. Thus the endstate of current operational shock doctrine may not be applicable to an asymmetric enemy. Second, traditional operational shock theory uses depth to overwhelm the enemy commander, yet in order to prevent his forces being destroyed en-masse it is likely that the enemy will not form into recognizable units for long periods of time. Through integration into the general population the enemy will deny

the US any real depth to be able to maneuver against. Third, by blending into the population any traditional targeting by the US becomes problematic and by spreading his operatives over the country, and indeed outside of the country of operation, the enemy effectively increases the size of operation to his advantage thereby diluting further his concentration, further reducing the US military options. This increase in theater size will affect the ability to achieve shock, unless more and more forces are brought in further limiting how deep any force can effectively maneuver in order to try and achieve shock. Fourth, in order to prevent compromise the enemy is far more likely to use a cell like structure for command and control coupled with a greater degree of horizontal control rather than using a vertical mechanism as found in military systems. When these asymmetric threats tend more towards the terrorism part of the spectrum should the leader be neutralized there are several others willing to take their place and so even a direct hit against the leader cannot guarantee any form of shock.

In order to deny the asymmetric threat an ability to exercise command and control one must look deeper than the conventional means of jamming radio transmissions. The internet and secure mobile ‘phones are now so widespread and advanced that information cannot be gathered, sorted through, analyzed and the results disseminated in a timely enough fashion to allow it to be used. The only way to deny these systems to the enemy will be to bring them down completely. Yet both the US Armed Forces and a whole host of other agencies who will be in theater will also require access to these and thus as a course of action this is not acceptable.

Is it, therefore, impossible to impose operational shock against an asymmetrical enemy? No, for it has been shown that operational shock can be brought about by a

combination of individual shocks (see tactical shock), but this is not the most efficient way to do so. Also it is possible for the enemy to eventually realize the futility of their position and seek to gain a peace through political means (witness the Northern Ireland peace process, the current striving for political recognition of the Palestinians etcetera). The key difference though is the time over which this shock will be imposed. There will be no lightening fast collapse of the enemy's systems, instead more of a gradual decline in capability and will as they realize that they are losing.

In terms of game theory this is modeled as a long and iterative case where both sides strive to persuade the other that they are of the type where they will continue fighting regardless (signaling), where as this will not be the case due to resource constraints, political will and the like. The player who can either bluff his opponent into believing that resistance is futile will probably win. This links into the theory of cognitive dissonance; the victim's perception of the events is significantly different from the reality. Initially the victim continues to believe that their perception is correct but eventually reality proves that their perception is incorrect and the victim suffers a degree of breakdown. Is this true operational shock? Not by the current definition but it is probably a useful correct representation of the new world in which we are living.

One final point to consider is that of being able to actually measure the effect if achieved. Assuming that imposing operational shock was possible in an asymmetric environment it is hard to imagine how it could be measured, as the current indicators may not be appropriate for asymmetrical battle. There would be no visible paralysis of the command chain, no disjointed response noted. Thus again it may be hard to measure the effect and as such the process of trying to inflict shock may be either terminated too early

allowing for a recovery to the system, or could continue beyond the ideal inflicting more damage and thus hardening resolve of the local population against the US.

In summary to this sub chapter it appears that the asymmetric enemy will, by design or chance, be structured to best be able to withstand operational shock as we currently understand it. While the employment of the other elements of national power (predominantly diplomatic and economic) may help in the long run, the traditional idea of a purely military action forcing a political solution is less and less likely. The time frame of involvement will lengthen and it will shift from a battle of annihilation to one of attrition (using the Russian concepts). Furthermore, it appears that there is no technological answer to inflicting and sustaining shock in the asymmetric battle, something that is at loggerheads to current doctrine's line of development.

Resistance to and Recovery From Shock

For there are no things good nor bad, but thinking makes them so.

William Shakespeare, *Hamlet*

Conflict is a two-way affair; as every staff is constantly reminded the enemy gets a vote as well. It is prudent to consider how one can go about ensuring that friendly systems are not vulnerable to being shocked, both at the tactical and operational level, and when operating in symmetrical and asymmetrical ways. In order to protect ourselves from shock we should first examine those factors that lead to shock and then develop ways to ensure we are not exposed to them. Once these factors that reduce vulnerability to shock are identified, they should be included in all levels of training. Once again the examination of tactical level resistance to shock and then operational level resistance is useful.

The US currently enjoys a huge technological advantage over its potential enemies and should continue to do so for some time.[5] This vision relies upon the extensive use of sensors for information gathering and, also in an attempt to reduce vulnerability to a single strike, foresees the future battlefield being less dense. This vision will result in the physical separation of soldiers from other soldiers for prolonged periods of time, and thus increased the amount of physiological and psychological pressure that small team leader and team members must be able to endure. In the sixteenth century, panic created by shock tactics (predominantly by use of the cannon and the cavalry) intimidated soldiers, and encouraged them to run away. Imposing this effect was made easier by the tightly packed formations used as they advanced, as well as the use of centralized command methods which aimed to control individual thought and action.[6] With the development of more potent weapons (such as the breech loading rifle, and rapid firing artillery) and professional armies, the battlefield became more dispersed and thus the effects of concentrated force less, and although larger headquarters had a better idea of what was going on, those in combat did not.

A graphic representation of the issue of resistance to shock is shown below. The steepness of the sides of the trough is indicative of the system's resistance to shock. The steeper the side the harder it is to dislodge the system from its position of equilibrium and also the quicker is its ability to return to stability. The shallower the trough, the less of a disturbance is required and the longer the system takes to return to its equilibrium. Both illustrations are shown in figure 9.

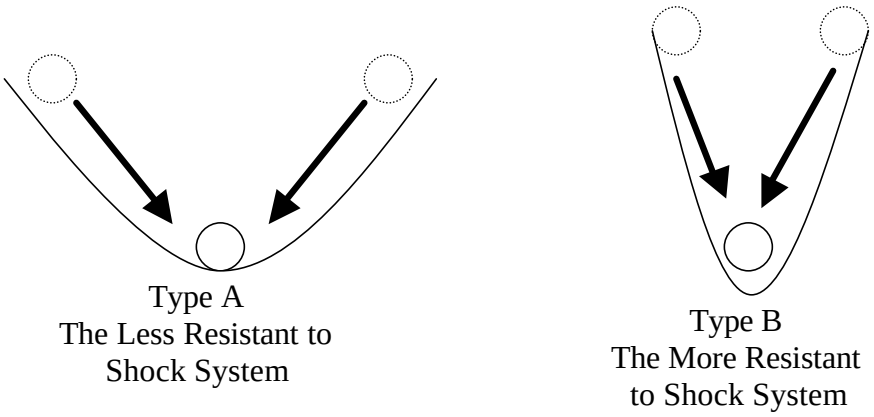


Figure 9. Representation of a System's Resistance to Shock

If one then introduces the temporal issue the representation is as shown in figure 10. Initially the steepness of the troughs is great as a system has a certain degree of resistance to shock in built. But with each attack on it the system is weakened. This may result in either the system moving to the next best equilibrium (in this case the one to the right) or in returning its position of equilibrium in the bottom of the trough. Most systems will eventually be forced to move from one point of equilibrium to another. When this occurs it is natural to assume that the system will have suffered a degree of trauma and as such will be less able to resist future "shocking" events. Thus it has become more vulnerable and hence is easier to "shock." This iterative process continues until the run off point is reached and the system heads into catastrophic shock as is shown in figure 10.

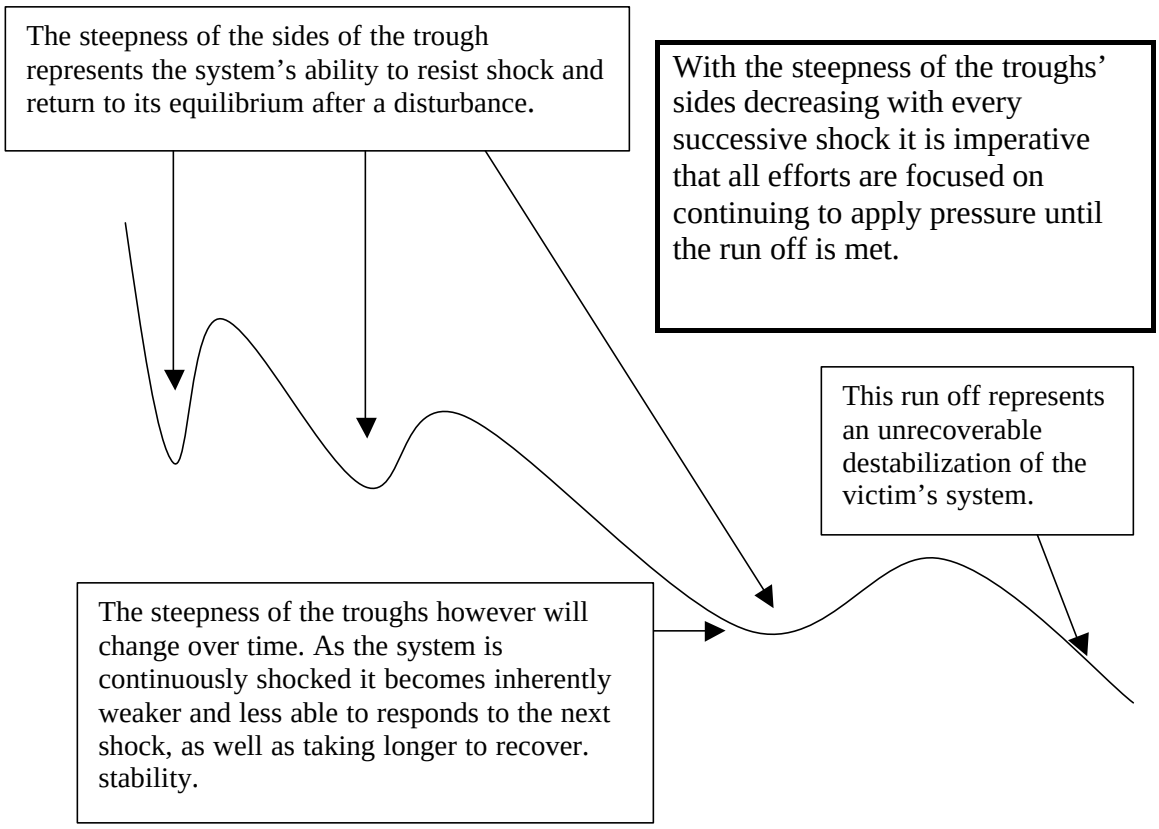


Figure 10. Representation of the Temporal Aspect of Shocking a System.

The recovery from this shock depends where on the roller coaster one is, and the amount of time when the system is not being shocked. Even after a system has hit the run off point it can, if given enough respite, sort itself out and become stable again. This can be imagined as the moving ball succumbs to friction on the curve (and can be explained by any system's in-built desire to continue to survive), slows down, and eventually its weight is sufficient to cause it to sink into the curve and thus begin to form another trough. There will be, of course, a limit to the depth of this trough, although theoretically if the system learns from the previous events it could be deeper than the original

equilibrium trough. The time taken to create this trough is the time where the system is not being exposed to any “shocks” by the other side, and the depth of the trough will be proportional to this time although not necessarily in a linear fashion (it is possible that there will be a quick recovery into a shallow trough, followed by a longer period to consolidate this). This is shown in figure 11.

Within this analogy the concept of awe (the extension of shock over time) can be shown as a system’s inability to either develop a new trough within an expected time frame or return to a trough of original depth. The longer the time a system requires to create a trough or for a trough to return to a depth offering some stability, the greater the level of awe.

Given that imposing shock in an enemy system is desirable for degrading their offensive and defensive capability, it must be assumed that the enemy will try and do the same to us. Thus no study of shock would be complete without analyzing resistance to shock. At the tactical level it was shown that shock relied on four factors; surprise, a rapidly approaching threat; a feeling of vulnerability; and selective destruction. Using these as a benchmark, resistance to shock can be inculcated in several ways. Protection against selective destruction will not be considered as it is felt that current low level tactics, techniques and procedures are adequate and the development of personal protection equipment is beyond the scope of this thesis.

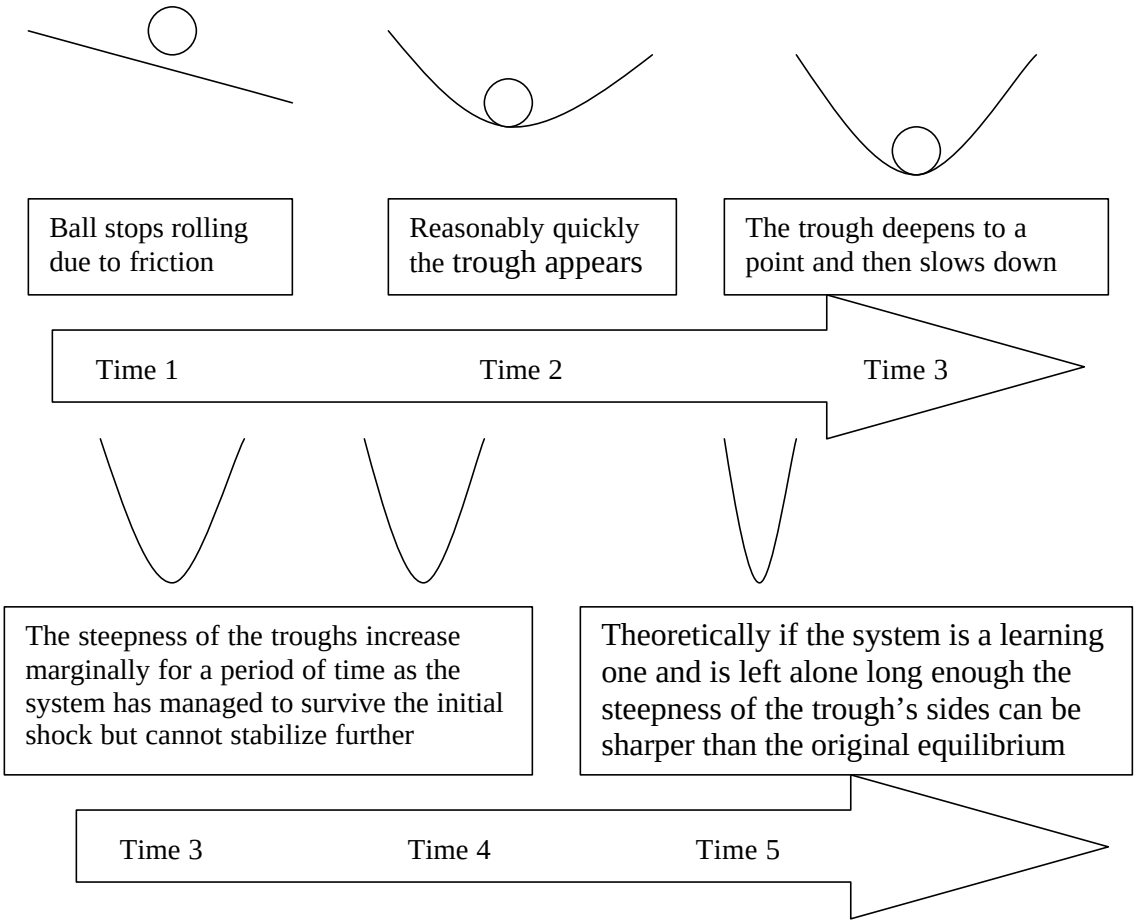


Figure 11. Representation a System's Recovery from Shock

First, the elements of surprise and a rapidly approaching threat may be considered together. Current doctrine envisages the US being in a position of information dominance and this, theoretically, should lead to the reduction of surprise. Should one sub-unit be surprised, through quick transmission of this incident through the battlespace there is a reduced risk of others suffering the same fate. While not helping those involved in the first attack from being vulnerable to shock it certainly will minimize the shock effect on the others. Second, as Meigs points out in his article, information dominance reduces the

threat from asymmetric and idiosyncratic use of weapons, but this is a temporary advantage, as once it is common knowledge that a counter to a specific weapon or type of attack has been successfully developed the enemy will adapt accordingly. Meigs' article considers this in depth by analyzing the inability of the Allies in 1917 to achieve repeated shock through the use of the tank.[7] In addition surprise can be reduced through the greater fidelity of information dominance that one has over the enemy. In the absolute, if the enemy picture is one hundred percent correct, surprise cannot be imposed on the US forces. While accepting that this is unlikely to be realistically achieved any knowledge of the enemy can reduce or negate surprise and one's feeling of invulnerability thus minimizing any shock imposed.

The idea above explains where current thinking with regards to technology is progressing. Yet this is a double-edged weapon for several reasons. Over reliance on a technology that despite the plaudits is still in its infancy, and is not capable of achieving dominance now may well lead soldiers to being more surprised when the system does not warn them of an impending event. Second, knowing where the enemy is does not equate to knowing what his next action will be, and thus information dominance may only partially negate the ability to be surprised. Also when one considers the issue of asymmetry, it is hard to imagine how current technology will allow cellular structures (such as terrorist cells) to be vulnerable to these concepts. It is conceivable that one is more vulnerable to being shocked when facing the unexpected use of unexpected weapons![8] Therefore, the concept of information dominance may prove to be more of a liability if its limitations are not fully appreciated.

Third, the actual issue of achieving information dominance is doubtful given encryption technology available to the enemy now, especially on the Internet.[9] In complex urban terrain, traditional space based and air based assets are of limited use. Under these conditions the lengthier and less reliable process of human intelligence (HUMINT) is required. Yet HUMINT can be notoriously unreliable, and the need to protect one's sources may well prevent the information being distributed in a timely manner. Thus while preaching a doctrine of information dominance (and thus affecting people's view of the system) there is a real risk that militarily useful information dominance will not be achieved and as such the soldier will be more vulnerable to being surprised. This may then result in the individuals being shocked due to the cognitive dissonance they face, either from the type of attack or the attack itself.[10]

The US Army Blue Force Tracking system is currently capable of tracking individual vehicles on the battlefield with each vehicle represented by an icon on a computer screen. A user can query this icon to find out the status of the vehicle vis-à-vis its fuel situation, armament reports, etcetera. This enables each command center to see the location of its soldiers and for each soldier to see the locations of suspected enemy locations. This information dominance aims to ensure that the individual has a situational awareness that prevents surprise. Conversely it could help the enemy impose a feeling of vulnerability on soldiers using the system. For instance a standing patrol suddenly sees that another platoon has been attacked directly to their front, and within the space of a few minutes was wiped out. Couple this with the final inputs from the unfortunate patrol stating that the enemy strength is over a battalion in size and is moving directly towards the hapless standing patrol. Under such circumstances and one can imagine the sense of

vulnerability felt by these soldiers. Finally there is the problem of maintaining constant connectivity in urban terrain. This in itself is no mean feat, and if the ability to constantly update soldiers' monitors etcetera is not achieved then they operate with less than real time information, and can quickly begin to distrust data sent and received, resulting in a feeling of vulnerability. Similar challenges apply to trying to counter rapid approach. The pursuit of real time situational awareness may help prevent being caught unaware of rapid approaches as presumably the soldier can act more quickly to counter the event. Despite this the old adage of "ignorance is bliss" applies and that knowing what is coming towards oneself is actually the last thing one needs!

The second major factor to be considered is that of vulnerability and how one reduces one's susceptibility to vulnerability. Each soldier is currently reasonably familiar with conventional battle; he or she has experienced a reasonable facsimile of it in training and on countless exercises. The process of hardening through gradual exposure over a period of time to loud noises, sleep deprivation etcetera is part of every soldier's training. Yet there is currently very little exposure to these more psychological and perception driven elements of training.

However there are other issues at play. Studies into Post Traumatic Stress Disorder (PTSD) have shown that not everyone who is exposed to a shocking event develops PTSD. Indeed it would appear that a person's mental constitution determines the impact of an event on them. This has implications for the future. At the individual level it could mean some form of psychometric testing to see if an individual is mentally able to handle certain events without suffering unduly, and the prevalence of susceptible individuals in a given military population. At a larger level it may suggest that the current

drive to “thin out” headquarters should be reversed. Currently headquarters, while somewhat large and potentially unwieldy, do ensure a mix of individuals who will all have different levels of tolerance to the effect of shock thus maximizing the ability to continue through events.

The drive to minimize the size of these headquarters could conceivably place three or four key individuals, all of whom are susceptible to shock, in one headquarters, thus rendering it very vulnerable. Furthermore, unless tested for propensity to being shocked, this will not be discovered until the event has taken place. Another point, although not directly linked to shock, is that the smaller the headquarters become the greater the risk of cognitive dissonance coming to the fore as those who invest the most into plans are the ones least able to distance themselves from it and hence the most likely to be surprised. Within this, despite being presented with information contrary to what they expected, the individuals may choose to ignore the facts and continue with the chosen course of action, something that when they finally realize that their plan has been affected in a way they did not expect contributes to a feeling of vulnerability and thus shock.

Other options available to commanders to prevent or reduce tactical shock include training both of the soldier and of the leadership structure. This is sometimes referred to as battle inoculation. The more a soldier is exposed to “shocking” events, the greater the level of resilience that can be created. This will mean that the individual’s system will be able to withstand more shocks before it is forced out of stable equilibrium. This is achieved through exposing more soldiers to events that they will be likely to experience in battle, be it symmetrical or asymmetrical. Another option is the more the soldier

studies his adversary, the less likely he is to be surprised by the enemy. As the battlefield continues to become more dispersed (either through the killing capability of weapons or the dispersal of troops in an area being high to reduce targets or as an economy of force effort) there may be a need to increase the numbers of leaders to led as a way of ensuring that each small group is capable of predicting likely events and withstanding an onslaught.[11] Finally on the issue of leadership there is a continued need to demand that people think "outside of the box", especially when trying to judge an enemy's course of action; this will reduce surprise and speed up reaction time, thus enabling the soldiers to turn the tables on the attackers and hopefully impose a degree of shock in their system.

Recovering from being shocked appears to be dependant on two major factors; firstly how much the first shock disturbed the equilibrium; and on the time elapsed between the shock being imposed including any follow on action being conducted. It is possible that the level of the first shock would be so sufficient that the enemy's will to fight is undermined so much that victory is achieved there and then. This is unlikely in the asymmetric case where even if the command elements were to decide to capitulate there would be rogue elements who continue to fight (there is evidence that shows that in this case more leaders appear and the remaining un-shocked fighters gravitate towards them).[12] Thus assuming that this situation is unlikely, the main factor is that of time between the original event and subsequent ones.

The longer a system is allowed to recover after a shock the more it will gravitate back to its equilibrium. It is possible that if a system were shocked enough it will never be able to return to its best or most stable equilibrium. Regardless of this however, the only way to allow a system to recover is to remove it from the stressor for a period of

time that allows it time to sort itself out. Therefore, even those systems that are operating smoothly should be taken out of any combat to allow time to reset and become more resistant to shock the next time around.

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[1]Christopher D. Kolenda, "Transforming How We Fight: A Conceptual Approach," *Naval War College Review* Vol. 56, No. 2 (March 2003): 20.

[2]Lee K. Grubbs, *In Search of a Joint Urban Operational Concept*. (Fort Leavenworth, Kansas, Advanced School of Military Studies Monograph, US Army Command and General Staff College AY 02-03):17.

[3]Ibid., 22.

[4]During the Second World War Marshall Tito ordered his guerrilla units to form into shock armies and was subsequently soundly defeated by the Germans. As a result he was forced to re-adopt his original methodology of separate units and achieved more success.

[5]This may not be true at the local level, nor indeed in every specific case where it is conceivable that an enemy could gain access to equivalent or better weapons, but over the long run and in the mean it is a plausible assumption.

[6]For more discussion of this see the writings on the Early Modern Revolution in Military Affairs by Cliff Rodgers.

[7]Montgomery C. Meigs, "Unorthodox Thoughts About Asymmetric Warfare," *Parameters,* (Summer 2003): 23.

[8]Ibid., 13.

[9]Ibid., 8-11.

[10]Ibid., 13.

[11]Ibid., 16.

[12]Phillip Djang, A presentation on *Estimating Iraqi Military Morale with a Reflexive Control Model*, Information Science Research New Mexico State University 2004. Not currently on wide circulation. This is explained in greater detail within this presentation (available from author on request).

CHAPTER 4

CONCLUSIONS

> Combat is complex, dynamic, lethal, uncertain, adversarial, evolutionary and, fundamentally, human.[1]

Shock will play a major part in any conflict as long as the human aspect is maintained as the critical part of it. Yet the trend away from force-on-force symmetrical battles should drive a review of current operational shock doctrine with a view to applications to asymmetric battles, as well as enhancing our understanding of tactical shock. Current US doctrine appears to recognize the benefits of shocking an enemy system at the tactical level in order to bring about its organizational collapse without resorting to wholesale destruction. Yet it is, as an effect, poorly explained, and the causality between actions and desired effects has remained under-investigated, and as such is widely misunderstood. Systems theory, currently the closest approximation to a representation of the nature of competing wills in wartime, is not incorporated into doctrine at all. While it appears that Ullman and Wade's book is a suitable doctrine for the old style symmetric warfare, it is unsuitable in its current form for the most likely form of future warfare. This future warfare is more than likely to be messy, drawn-out, and conducted in complex noncontiguous and nonlinear terrain, against enemies who adopt cell-like structures to maximize their survivability and to utilize what is considered defunct technology to gain an advantage over the US.

This thesis stated that it would analyze six primary questions. The answers are condensed and repeated now:

1. The proposed doctrinally accepted definition of shock at the tactical level is:

> A transitory effect induced through a combination of surprise and physical destruction that debilitates (from marginally influencing to stunningly paralyzing) the ability of individuals and/or organizations to operate regardless of will.

The definition for the operational level is left unchanged from the current US army definition. Rowland's definition fails to identify the transient nature of shock as well as the concept that once imposed shock must be continuously exploited in order to be successful. It is essential that this transient nature be understood. Furthermore shock was shown to be a cumulative effect of two composite factors; the first set events must be designed to induce a feeling of vulnerability; while the second set events must be structured to amplify the first effect and thus to create shock. The success of this shock is dependant on the level of success in each of the contributing factors as well as the system in question built-in resistance to shock. Should the system's resistance to shock be large enough it may be impossible to shock the system at all.

2. Surprise is necessary and almost sufficient in achieving shock. Of all of the four factors (rapid approach, surprise, selective destruction, and a feeling of vulnerability), surprise is the key one. Without achieving surprise, shock is still achievable but it will require more destruction and will take longer to achieve.

3. Measuring shock as an effect is not easy. At the tactical level the refusal of a soldier to fight can be attributed to shock, but whether this is a direct result of being shocked or a rational choice made in the face of overwhelming odds may not be clear until after the event. At the operational level, the type of warfare is important.

4. Operational shock theory is unhinged when one considers asymmetrical warfare. Accepting that the current definition of asymmetry is too vague, asymmetry does play a major role at the operational level as both the current definitions and doctrine do

not appear to have applicability. There is a need to reconsider current definition of operational shock and impact of symmetric and asymmetric warfare in order to recognize the variance of the types of players and the level of their equipment capabilities on the modern battlefield.

5. Future concepts for the US Army include increased home basing and reliance on forced entry implying a need to impose shock from afar as a means of creating conditions for successful entry. At present it appears that the only way for this to be imposed is via long range precision strikes to create the feeling of vulnerability, surprise and selective destruction, yet this would have to be quickly followed up by ground troops in order to take advantage of the selective destruction. The idea of shock being exclusively delivered from the air is problematic.

6. Several methods can contribute to resistance to shock, both at the individual and organizational levels, but the current trend to reduce size of headquarters and increase the reliance on technology may have a negative effect in certain circumstances when information dominance could impose a feeling of vulnerability and thus lead to shock. This is in line with Festinger's theory of Cognitive Dissonance.

With all of this in mind it is crucial that during the process of transformation the Army does not solely focus on information technology in an attempt to strive for Holy Grail of information dominance at the expense of diverse thinking personnel. This information dominance concept may well not be possible to achieve, but as a precautionary measure the US Army should ensure that all low level leaders are aware of how best to wrong foot the enemy through a combination of surprise, shock and selective destruction where possible. Second, all planners must be aware of the complex nature of

future warfare and the futility of searching for the linear Clausewitzian center of gravity that will enable them to deal the decisive blow. Third the basic tenant of leadership of rotating one's forces and giving them time off in between operations is crucial. Yet this is most at risk of being forgotten when there is a perceived need to keep one's best units in a position to influence the campaign, regardless of what they have been through. Graceful degradation may be a term suitable for technology, but with soldiers the failure to fight when it occurs will be sudden and catastrophic. As a result the following recommendations are made:

1. The definition of shock at the tactical level must be expanded and entered in the next generation of doctrine publications complete with explanations.

2. All officers must be trained in the benefits of achieving surprise, not for its own sake but for the part it plays in achieving shock at both the tactical and operational level, as well as the importance of shocking a system.

3. All must understand that in the asymmetric environment opportunities will be fleeting, which means that initiative and mental flexibility of all commanders will be critical. Leadership training must therefore concentrate on developing mind sets unfazed in uncertain or unfamiliar situations so they do not become victims of tactical shock.

4. Command and General Staff College (CGSC) students should receive a grounding in systems theory to ensure that they do not simply revert to a linear center of gravity analysis which is a relic of the Clausewitzian single decisive battle concept.

Shock and surprise are possible from the lowest to the highest levels and are something that every commander must seek to achieve in every operation. However, wherever they occur, they are transient and must be exploited to ensure that the victim is

not able to recover. As stated in the introduction, victory is only achieved when the enemy believes he is beaten, not when friendly force planners think he is. This will be crucial to planners as well as politicians in the next century as the enemy realizes that a long and protracted war fought in an asymmetric way will be the only way to neutralize the US technological and financial asymmetric advantage. Victory for the US may be inevitable, but to quote Storr, "That point is reached most surely when he is shocked and surprised en route."[2]

Recommendations for Future Research

The recommendations for future research are as follows:

1. The further integration of Reflexive Control Theory into an operational art system that can be employed by deployed army units.

2. How to achieve operational shock in asymmetric warfare against dispersed non-linear enemies in complex terrain.

3. The linkage between selective destruction versus surprise when considered as joint factors required to impose tactical level shock.

4. Developing a game theoretical model to incorporate shock theory and systems theory.

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[1]Jim P. Storr, *The Nature of Military Thought*. (Cranfield University, Shrivenham: England. May 2002), 77.

[2]David Rowland, Dermot Rooney and Jim Storr, *Shock and Surprise on the Battlefield* (unpublished article for the *British Army Review*, draft as of September 2003): 9.

GLOSSARY

Armoured Infantry. A British Army term synonymous with US Mechanized Infantry.

Cavalry. Again a British Army term used to aggregate the Arm of Service of the Royal Armoured Corps, which includes Armored Reconnaissance Units (typically employed at the Brigade level and above and responsible for gaining information and intelligence on the enemy and the environment) as well as typical Armored Formations.

Tactical Shock. A transitory effect induced through a combination of surprise and physical destruction that debilitates (from marginally influencing to stunningly paralyzing) the ability of individuals and/or organizations to operate regardless of will. The definition for the operational level is left unchanged from the current US army definition

Operational Shock. A consequential state of a fighting system which can no longer accomplish its aims.

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