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Norms and the Red God of War
-- Gospel for the King of Battle?

A Monograph
by

Major Gary J. McCarty
Field Artillery

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The monograph first examines the theory of developing and using norms and nomograms to quantify fire support planning, specifically their importance to both the Soviet socialist system and the Soviet military. It then examines the history of fire support planning in both the Soviet and US armies, including a comparison of past and current doctrines. Contemporary and future battlefield fire support planning requirements are discussed, with a look at how norms and nomograms apply to those environments.

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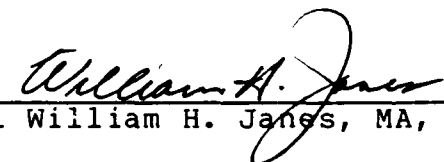
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ABSTRACT

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I. Introduction

Artillery kills. On major battlefields this century, more than any other weapon. Artillery shells inflicted over 58 percent of casualties on British troops on the western front in World War I, and in the North African desert in World War II the percentage rose to 75 percent. In Korea nearly 60 percent of Americans killed in action fell to blast or fragments from artillery or mortar shells - mainly Soviet made ... Artillery oppresses, jars, stuns and disorients the enemy and lifts the morale of its own troops. Artillery and rockets provide the greatest firepower and sear a path for infantry, mechanized forces and armor both physically and spiritually. Throughout the centuries, no army has understood this better than the Russian.'

Chris Bellamy's quotation, from his book Red God of War, sets the stage for an understanding of the Soviet artillery forces and doctrine. The Soviets have traditionally placed a high priority on their artillery, and still do today. Rocket Forces and Artillery, as the arm is formally called, now comprises from 15 to 25 percent of the Soviet Army's manpower, but would provide 80 percent of its firepower in any conflict.²

Soviet Artillery is a modern arm based upon armored and self-propelled weapons that are technologically equal to US and Western European systems.³ It is a formidable threat to NATO or any other opponent that might engage the Soviets on the future battlefield.

The Soviets expect the future battlefield to be very fluid and fast paced, with non-linear fronts and violent action throughout the depths of the battlefield. This

view is not unlike the battlefield described in the US Army's Field Manual 100-5, Operations. Targets in such a battlefield will be fast and fleeting, and will have to be engaged quickly to be defeated.

The Soviet doctrine to employ their artillery in such a fast moving battlefield is based almost entirely upon norms and nomograms. They believe that such a doctrine will allow them to engage targets very quickly. It will also enable them to plan their fire support in a standardized manner that will free the commander from concern over recurring tactical decisions.

US doctrine, on the other hand, stresses military judgment and commander's guidance based upon experience and a "feel" for the battle to determine artillery employment and planning. There will be many targets on the battlefield, and selective analysis is needed to discriminate between them. Only those deemed critical for success should be engaged.

Why don't we use a system more similar to the Soviet doctrine of norms and nomograms to plan and execute US artillery? I will attempt to answer this research question. To do so, I will discuss the theory of quantifying artillery support planning and execution, explore the history of the Soviet and US artillery doctrine, and briefly examine the two doctrines on the contemporary and future battlefield.

To simplify and focus my topic, I will limit my analysis to a Western European scenario that would involve NATO and Warsaw Pact forces. I will discuss only artillery planning and execution, and will not include other elements of fire support, such as tactical aircraft, attack helicopters, naval gunfire, or electronic warfare.

Additionally, to establish some criteria to use in evaluating the two doctrines, I will examine how each deals with what Clausewitz termed "friction" in war. Do they deal with friction differently, and, if so, which is more effective?

II. Theory

The theory of quantifying artillery planning and execution with norms is straightforward. To understand the importance of norms in the Soviet military forces, it is necessary to first appreciate the place that norms occupy in Soviet life. Virtually every Soviet activity is regulated by norms in one way or another.⁴

Norms are so fundamental that there is even a Russian noun "normirovanie" which means, literally, "norm-ing". Norms are used to establish the control and distribution of all forms of labor and material throughout the national economy. The establishment of norms as

the basis for quantifying standards of performance accords with the Soviet view of the essentially scientific nature of socialism. Since it is possible for everything to be scientifically determined, the Soviet view is that nothing in the USSR happens by chance.⁵

Norms govern the distribution of all forms of material and various aspects of Soviet life. They are used for the allotment and control of raw materials, finished products, fuel, and electrical energy. Norms of expenditure must be scientifically established, progressive, and dynamic, and they must be systematically reviewed at each level of production. Norms are created for the amount of work that a factory, any branch of the factory, or any individual in the factory must perform. There are norms for the five-year plan, annual norms, and current norms.⁵

Norms are used by the Soviet military just as extensively as they are in the rest of the Soviet society. The Soviet Military Encyclopedia defines norms (military) as:

(1) Operational-tactical numerical quantities used to characterize space and time factors for operational or tactical activities of forces and the areas in which they take place. Space factors include: depths of objectives, widths of sectors, dimensions for combat formations - widths, depths, etc. Time factors include: the time to fulfill every mission, complete marches, or maneuvers, etc. These are developed based upon the makeup of Soviet formations, their capabilities, enemy

capabilities, combat and exercise experience, level of training, results of special research studies, terrain, weather, and time of day. The basic operational-tactical norms are reflected in regulations and directives [emphasis added].

(2) Timeliness, quantitative, and qualitative factors for fulfillment by service-persons and small units [usually battalion and smaller] of specified tasks, methods or applications of weapons or technology in the course of combat preparation. Norms ensure a uniform and objective approach to the determination of times for the fulfillment of [combat] actions and for the evaluation of the level of training of service-persons and units [up to regiment] as a whole (Vol. 5, p. 636).⁷

Soviet artillery planning is determined almost entirely by norms.⁸ Figure 1 shows examples of Soviet artillery norms. Required target effects, firing deadlines, movement and position occupation, and mission time lengths are all examples of the types of planning considerations that are calculated and quantified using norms. To demonstrate a specific example of artillery planning using norms, I will focus on how the Soviets plan to achieve the effects desired when engaging targets.

Target engagement is determined according to the degree of destruction that is desired. Destruction includes fire for annihilation, which destroys the enemy's combat capability completely and requires a kill probability of 70 to 90 percent, or a 50 to 60 percent probability of destroying all of a group of targets; fire

Working norms for suppression of a battery of towed guns, ranges up to 10 km.

	Rifled Weapons			Mortars			Rocket Launchers	
Caliber, mm	122	130	152	120	160	240	Med	Hvy
No. of Rounds	220	200	180	200	120	100	400	170

Working norms for suppression of a battery of self-propelled guns, ranges up to 10 km.

	Rifled Weapons			Mortars			Rocket Launchers	
Caliber, mm	122	130	152	120	160	240	Med	Hvy
No. of Rounds	380	260	290	300	290	175	440	210

Figure 1. Soviet artillery firing norms for the suppression of a target. Note that approximately 50 percent more ammunition is required when engaging a battery of self-propelled guns versus a battery of towed guns. (From Red God of War: Soviet Artillery and Rocket Forces, by Chris Bellamy, page 183.)

for demolition, which involves the physical destruction of installations or works; and fire for suppression, which temporarily removes the enemy's ability to fight and inhibits his ability to maneuver, and requires 30 percent destruction of targets.⁹

The degree of destruction required often influences the decision of shell expenditure. Conversely, the amount of ammunition available and the time in which to fire it will often determine whether a target will be annihilated or merely suppressed. Soviet officers have tables of norms necessary to achieve a given level of damage. The all-arms commander does not want to worry about whether or not his artillery will be able to achieve its assigned task: he must be able to rely upon it totally. Norms practically guarantee the destruction of a target of a given size at a given range with a given type of weapon.¹⁰

The expenditure of shells necessary for the destruction of grouped targets depends on the task (i.e., the degree of destruction required), the dimensions of the grouped target (i.e., defensive position), the accuracy of the means of establishing the coordinates and the destructive action of the shells.¹¹ Formulas are derived to account for these variables and known errors. With these, the planner can calculate the numbers of rounds required to achieve a level of destruction of an area,

normally given in hectares (a hectare is 100 meters by 100 meters).

The formulas can also take into account two sets of errors: the accuracy with which the locations of the guns and targets can be plotted, and the variation in shell distribution inherent in the guns. This doctrine of norms is highly mechanistic, yet the Soviets place great emphasis on it and it works.¹²

Once planning factors are quantified with norms, they can be standardized throughout the force. Standardized factors result in a common doctrine and understanding, which the Soviets feel minimizes the friction of war.

Norms are integrated throughout the Soviet military and appear in service regulations and military writings at all levels. Norms reveal much about how the Soviet military operates. They are usually classified and are available only on a need-to-know basis.¹³

The Soviets have developed nomograms to complement their norms. A nomogram is simply a norm represented in graphical form. These save time and streamline the process. Nomograms can be easily entered to rapidly determine data, and can be developed for almost any norm. Figure 2 shows an example of a Soviet artillery nomogram.

Like the Soviets, the US Army has also quantified

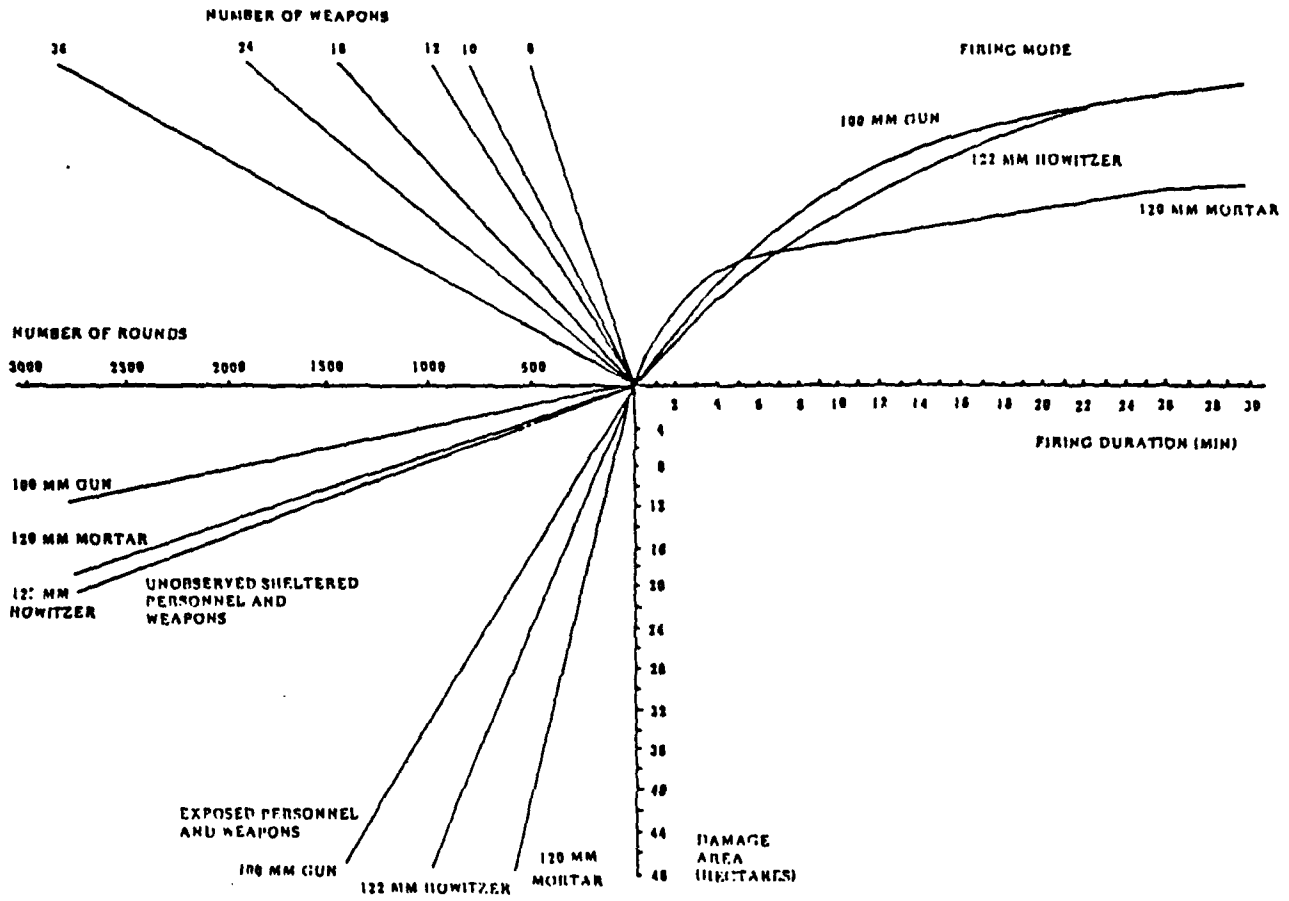


Figure 2. A Soviet Nomogram for calculating destruction of an enemy by artillery fire. (From Tactical Calculations, by A. Ya. Bayner, page 40.)

and to some degree standardized certain aspects of its artillery planning, specifically for target analysis.

Target analysis is described as:

... a military judgmental evaluation of an enemy target situation, based on both military factors and analytical factors, such as type enemy unit, friendly weapons and ammunition available, range, target priority, and probable amount of ammunition required to defeat, neutralize or otherwise disrupt activity of the target.¹⁴

US target engagement is also determined by the degree of effects desired. Target effects are grouped into three headings: suppression, which limits the ability of enemy personnel in the target area; neutralization, which results in 10 percent or more casualties to a unit; and destruction, which results in 30 percent or more casualties or material damage, inflicted during a short time period, and normally renders a unit permanently ineffective.¹⁵ (Note the difference in the degrees of damage required between the US and Soviet criteria.)

Target engagement effects criteria are calculated in Joint Munitions Effectiveness Manuals (JMEmS), the US equivalent of norms. JMEmS are a series of manuals, most of them classified, which address specific weapons systems and their effects on targets. They provide a guide to target analysis by indicating how many rounds

of a certain caliber are required to produce desired effects at a given range.

JMEMs are available to artillery planners, but their use requires considerable time. Because of time constraints, the use of JMEMs at the battalion or battery fire direction center levels is not recommended.¹⁶

To overcome time constraints, the US Army has developed Graphical Munitions Effects Tables (GMETs), the US equivalent of nomograms. They are expendable slide rules that provide quick access to average comparative values of ammunition effects on selected targets. Average comparative values are not as accurate as the values in the JMEMs, but they provide the user a guideline that can be used in the target engagement decision. US doctrinal manuals "highly recommend" the use of GMETs.¹⁷

GMETs are also classified, and have been developed for the M102, M109A1 and M110 artillery systems. An unclassified training version is available, and will generally require slightly greater expenditures of ammunition than the M109A1 GMET in a given situation.¹⁸ Figure 3 shows an example of a training GMET.

The US has automated JMEM/GMET criteria into the US tactical fire direction system (TACFIRE). TACFIRE will automatically select units and ammunition type and the amount to fire at a selected target. The system will

follow JMEMs specific criteria, but can be modified to incorporate the commander's guidance and restraints in ammunition availability, units to fire, target priorities, or other factors deemed necessary.

TACFIRE has streamlined the US system of target analysis and engagement for those units equipped with the system. Units not equipped with TACFIRE must still rely upon JMEMs or GMETs for manual target attack guidance, as well as units whose TACFIRE is inoperable.

III. History

Soviet military doctrine is deeply rooted in the Marxist-Leninist ideology. The dialectic approach to problem solving¹⁹ permeates the Soviet culture and has resulted in the belief that any phenomena can be scientifically reduced to a single best solution. Norms represent the single best solution for problems and phenomena.

Soviet military norms were in use at least as early as 1929, when Marshal Tukhachevsky included them in one of the earliest sets of Soviet field service regulations. They have since become all-pervasive in Soviet military practice.²⁰

Norms arise out of a basic dialectic-materialistic understanding of war, and the Soviet military doctrine

has sought to reduce the battlefield to a series of comprehensive statistical calculations to enable Soviet generals to accurately plan any future campaign.²¹ The Great Patriotic War (the last Soviet involvement in a major military conflict) assumes great importance as an "experience base." It provides the foundation for establishing the framework of combat norms as they are presently constituted.²²

The Soviets have examined military actions in the Great Patriotic War in great detail. Soviet artillery played a major role throughout the war and current Soviet artillery norms continue to stress it as key in any future operation. Just how key is indicated in the following Soviet principles: "the artillery destroys and the infantry overruns," and "the artillery seizes and the infantry occupies."²³

Their use of artillery in the Great Patriotic War reflected these principles, and was used in tremendous volume to clear paths for the maneuver arms to exploit. Norms were developed to achieve these volumes. During the opening phase of the Vistula-Oder offensive in January 1945, Marshal Zhukov launched his attack with a 25-minute preparation from 7,600 artillery pieces along a 33 kilometer breakthrough frontage. He appraised his artillery preparation by stating that:

This method ... dependably assured the

breakthrough of the enemy defense. The enemy suffered heavy losses. Individual companies ... in the trenches of the first defensive zone were almost completely destroyed.²⁴

Such success with artillery doctrine and firing norms has carried forward to today's Soviet Army. The Soviets will still employ massive amounts of artillery and will attempt to fire the norms that proved so successful in the Great Patriotic War. Current Soviet doctrine states that artillery fire will "guarantee" maneuver, not "support" it.²⁵

Soviet artillery has not been involved in a major war with their current equipment, so norms for modern combat can only be calculated. It is safe to assume, however, that norms have been checked in Afghanistan and against client army combat activities in the Middle East, Angola, and other places to determine their accuracy.²⁵

Like the Soviet doctrine, US artillery doctrine also grew out of World War II experiences, and remained viable during involvement in both Korea and South Vietnam.²⁷ The cornerstone of US doctrine during World War II was the overwhelming use of firepower.

Ammunition and artillery pieces were abundant during World War II, and both were utilized extensively. Prior to the second attack on Schmidt on 2 November 1945, US artillery from V Corps, VII Corps and the 28th Division fired 11,313 rounds during the one hour preparation of

German positions.²⁸ (Compare this to the 7,600 artillery pieces used by the Soviets in Vistula-Oder discussed above.)

Abundant artillery, coupled with allied air superiority during the latter part of the war, resulted in an almost over-reliance on firepower. Maneuver units would simply halt whenever they made contact with an enemy force and request massive artillery support. The same tactics were evident in Korean and Vietnam conflicts.

A doctrine of massive artillery firepower worked in Europe during World War II for both the US and the Soviets. The German Army, tank heavy and artillery light, was unable to match the firepower of either the American or Soviet armies because of its deficiency in artillery.²⁹ The Germans, in spite of their credible and effective tactics and mobility, were effectively out-gunned on both the eastern and western fronts.

Such success in World War II has led to little change in our artillery doctrine, although there is an emerging realization that superior firepower is not always the best solution. We are also starting to realize that we cannot execute a doctrine of massive firepower when the artillery pieces and ammunition are no longer available in the quantities that they were in World War II, Korea and Vietnam.

IV. Contemporary and Future Battle

C.J. Dick, in his article, "Soviet Battle Drills: Vulnerability or Strength?", states that the Soviets believe that the typical battle of the next war (specifically in Western Europe) will be the meeting engagement, where the opposing forces clash while both are on the move. This will be the natural consequence of a high rate of advance. The enemy, given no time to establish a coherent, coordinated, engineer-prepared defense, will be forced to attack Soviet forces, themselves on the offensive, to stabilize the situation.³⁰

Dick continues to describe such a battle:

a) Both sides will be attacking from the line of march. The result will usually be a close-quarter battle in which numbers will tell.

b) There will be an intense struggle to seize the initiative, with each side trying to impose its will through offensive action.

c) The battle will be one of maneuver, with both sides having to accept open flanks, and probably gaps in their deployments as combat spreads over a wide area. Neither side will enjoy the advantage of having chosen and prepared the ground (this applies even if one decides at the last minute to go over to the defensive) and there is thus everything to be gained from bold maneuver.

d) For most, if not all the time, the situation will remain fluid and obscure. Intelligence will be limited and will date rapidly. The Soviets conclude from this that they should not wait until the situation is clarified before taking decisions, but that

they should attack vigorously into the gaps and flanks of the enemy deployment. Special anti-tank reserves will be kept to meet the expected unexpected, but only an uncompromising commitment to the offensive will ensure that most of the unpleasant surprises happen to the enemy; the gains of offensive action outweigh the risks.

e) There will be very limited time available for decision-making and deployment. Yet it is vital to win the battle for time if initiative is to be seized and maintained. Once the enemy is forced into a position where his moves are purely reactive, he is well on the road to defeat. As the tempo increases, his reactions will become increasingly belated and therefore ineffectual. He will be unable to exploit the opportunities with which he may be presented and he will be put under growing psychological pressure.

f) Meeting battles [engagements] are expected to be decisive. The defeated side, out-flanked and/or penetrated deeply from the front, with no prepared fall-back positions, and massive command and control problems, will find it very difficult to go over to the defensive or withdraw. His force will probably cease to exist as a coherent combat grouping.??

The Soviets have identified other problems that such a high-speed battlefield will present that were rarely or never encountered during the Great Patriotic War. Chris Donnelly, in his article, "The Wind of Change in Soviet Artillery," identifies some of these problems as "the high proportion of moving armored targets which are difficult to locate, hit and damage; the constant and rapid relocation of artillery sub-units necessary for a high-speed offensive; the high and also fluctuating speeds of the assault which the artillery is supporting;

the extreme effectiveness of enemy counter-bombardment, especially with advanced projectiles; the difficulty of locating enemy batteries in defensive positions; the need to locate and destroy weapons capable of delivering nuclear warheads; and the enormously increased frequency of encounter battles [meeting engagements]".³²

The Soviets believe that the doctrine that results in the most timely and accurate artillery fire will be successful. Moreover, the aim of their artillery is to guarantee the success of the high-speed offensive,³³ not just support it. The focus of Soviet artillery norms is on establishing and maintaining fire superiority over the enemy,³⁴ and artillery fire support is the keystone of Soviet operational planning.³⁵

The Soviets argue that norms will allow such guaranteed success. Their experiences in the Great Patriotic War justify (in their minds) their doctrine. They have maintained the assets required to execute artillery firing and planning norms.

Norms also help address other problems faced by Soviet artillery planners. Soviet officers are generally younger and less experienced than their western counterparts. Over 60 percent of Soviet motorized rifle battalion commanders are captains under the age of thirty.³⁶ A NATO battalion commander will normally take command in his late thirties as a lieutenant colonel.

He will be a skilled tactician who is able to produce an original plan and exercise considerable initiative and independence in executing it.³⁷ Norms make up for the weakness the Soviets have in experience and initiative, especially at the tactical level. It is not necessary for an officer to be innovative and act independently - he just has to follow the norm. In the event that he is unsuccessful, it is much easier to defend himself if he has followed the norm. Such a doctrine may work at the tactical level, especially when the Soviets demand tactical standardization to achieve operational success.

Recent improvements in Soviet artillery have seen a move to replace their predominantly towed systems with more mobile and protected mechanized ones, allowing an even greater capability to use norms on such a high-speed battlefield. Such efforts in their artillery arm, even under "perestroika" and the Correlation of Forces agreements, have resulted in a more capable force.³⁸

Much like the Soviet view, our view of the future European battlefield, as stated in Field Manual 100-5, Operations, agrees that the high- and mid-intensity battlefields will be chaotic, intense, highly destructive, and extended over a greater area in time and space than previously experienced. Campaigns will be ones of considerable movement, complemented by the use of advanced, highly lethal weapons throughout the battle

area.³⁹

Operations will rarely maintain a linear character, and the intermingling of opposing forces will be inevitable. Deep reconnaissance, air mobility, long-range fires, and special operations forces will blur the distinction between front and rear. Successful attack will require isolation of the battlefield in great depth and defeat of enemy forces in echeloned areas. Successful defense will require early detection, isolation and destruction of attacking forces in depth.⁴⁰

Throughout the battle area, attack and defense will often take place simultaneously as each combatant attempts to mass, economize locally, and maneuver against his opponent. It will be difficult to identify decisive points and to focus combat power there.⁴¹

How does our artillery doctrine cope with such a battlefield? We have not maintained our artillery assets in the numbers that were available in World War II, but have concentrated on the ability to mass and synchronize the systems available to achieve fire superiority at concentrated points in time and space. Nor do we emphasize norms. Our doctrine demands that its officers are mature and skilled leaders that can demonstrate initiative and the ability to act independently to achieve the commander's intent. The confused and chaotic battlefield described above lends itself to such a doctrine, provid-

ing the leaders can meet the challenge.

V. Conclusions

I have discussed the theory of norms and nomograms and the quantification of artillery planning and execution, briefly examined the history of the Soviet and US artillery doctrines, and taken a cursory look at the current and future battlefield. I will now return to my original research question. The Soviets, with possibly the largest and one of the best artillery arms in the world, rely on a doctrine of norms and nomograms. Why doesn't US artillery doctrine use them?

We do, in fact, have our own version of norms and nomograms, but we use them differently. I think there are at least three reasons for these differences. First, while the Soviets believe that judgment and experience are a supplement to norms and nomograms, the US believes that norms and nomograms are a supplement to judgment and experience.

Second, although the Soviets have maintained the artillery assets required to execute such a doctrine, we have not. We simply do not have enough artillery in our current inventory to execute a doctrine similar to the Soviet system of norms and nomograms.

Third, US doctrine and thought, along with Western

Europe's, stresses individual initiative and independence. Such a fundamental belief is basic to our culture and our way of life. A doctrine based upon norms, nomograms, and standardization simply does not fit our mind-set. This reason is tied to our emphasis on judgment and experience over norms, and runs deeply in the way that we are trained and think. Let me discuss each of these reasons in more detail.

Soviet norms and nomograms are regulatory in nature, and must be followed. The Soviets recognize that ammunition or other constraints may limit the degree to which a norm may be achieved. They will make all attempts to accomplish at least part of it. If they can only fire, say 70 percent of a norm, that is what they will do. The norm represents the single best solution, and there is no substitute.

Another reason behind these regulatory requirements is the Soviet emphasis on time and tempo. A. Ya. Bayner, a Soviet author, states this emphasis succinctly:

The arrival of new, more powerful combat weapons to the forces, the continuous growth in the equipment level of the forces and the development of the methods of modern combat operations make the battle for time gains the primary task. Therefore, an important demand made on force management is the high speed of the work of commanders and headquarters. Response speed, as the basic indicator of efficiency, must not result in damage to another, no less important indicator - the objective correctness of decisions and plans, which strictly conform to the assigned combat

mission and the combat situation which has taken place.⁴²

Bayner goes on to state:

The days when decisions in the command and control of forces could be made based on the individual experience and intuition of the commander are long since past. Today the requirement to command and control forces on a scientific basis is placed on his thinking and the operation of the headquarters. Now the extreme importance is the scientific justification of decisions, relying on the deep and comprehensive analysis of the data about the situation and on the precision of tactical calculations.⁴³

These comments leave little doubt that a Soviet commander should employ norms before judgment and experience. If he uses judgment at all, it should be to supplement the norms.

This Soviet concept of norms over judgment is not what is found in US doctrinal publications. The US has norms and nomograms in the form of JMEM and GMET target analysis data. How they should be used in planning is clearly stated. Field Manual 6-141-1, Field Artillery Target Analysis and Weapons Employment: Nonnuclear:

JMEM manuals ... provide guidance for determining the expected fraction of casualties to personnel targets or damage to material targets ... An analyst at the division fire support element or division tactical operations center may use JMEMs for guidance while the fire direction officer at battalion or battery level, may, because of time constraints, use a graphical method such as Graphical Munitions Effects Tables (GMET) or rely on experience

factors ... The fire direction officer may then accept, modify, or reject the recommended solution based upon his military judgment [emphasis added].⁴⁴

Training Circular 6-40, Field Artillery Manual

Cannon Gunnery:

All stages of target analysis are conducted within constraints established by the commander ... The battalion or battery fire direction officer determines attack data by referring to the appropriate JMEM, by using the GMET, or by relying on experience ... The use of GMETs to determine target attack data is highly recommended [but not required] [emphasis added].⁴⁵

Field Manual 6-1, TACFIRE Operations:

TACFIRE, through its command and control functions, helps the force commander manage his resources. It provides more timely and accurate information and gives him parameters with which to influence computer solutions ... Commander's criteria refers to a wide range of parameters an operator can input into the computer so that commander's guidance and the tactical situation are considered during processing [emphasis added].⁴⁶

Field Manual 6-20-10, The Targeting Process:

As ... targets are developed, appropriate attack systems are tasked in accordance with the commander's guidance and requirements of the attack systems managers ... In cases where the commander's guidance (to that point in the planning process indicates a departure from the spreadsheet suggestion, the target should be prioritized based on the commander's guidance [emphasis added].⁴⁷

Finally, Training Circular 6-71, Fire Support Handbook for the Maneuver Commander, in giving artillery planning advice to the maneuver commander:

After you have given your fire support officer adequate guidance, trust him to make targeting decisions. TACFIRE collects and sorts data, but it cannot think. Only seconds are required to analyze targets. However, you still need someone with experience to make key judgments [emphasis added].⁴⁸

Such guidance makes it clear that US doctrine is based upon the commander's experience, judgment and intent. The norms contained in the JMEmS and GMETs are to be used as guides only, and are not intended to override the commander's guidance.

Aside from ideology, the main reason that the Soviets can make their norms and nomograms work is that they have the massive amounts of artillery assets required for executing their norms. Economic realities, however, are overtaking the Soviets. It is becoming more questionable whether or not they will be able to maintain this massive capability. Yet, they have shown little if any signs of slowing their artillery production. The reductions that they have made in their maneuver forces under the Correlation of Forces agreement could actually make them more efficient.⁴⁹

The US, on the other hand, has not maintained its massive artillery capability from World War II. We are

outgunned in artillery in Western Europe in range, rate of fire, and sheer numbers of tubes. We could not achieve the expenditures required by Soviet norms. Our answer has been to achieve temporary fire superiority at a specific point in time and space. One of the challenges to the US commander is to determine that critical point and synchronize his fires accordingly.

Finally, US doctrine has always stressed individual initiative and the ability to think and perform independently. Leaders are trained to be competent tacticians who can create plans that will be successful on the battlefield. Norms and nomograms can supplement this process, as I discussed above, but cannot replace it.

This philosophy goes deeper than simply relying on judgment and experience, but has determined how our army has fought and trained throughout its history. Our current AirLand Battle doctrine recognizes this philosophy and incorporates it into its tenets.

Do norms make the most efficient use of artillery in planning and execution? Clausewitz stated that the most critical element to an army in overcoming the friction of war was a commander who had experience and sound judgment. Such a commander realizes and accepts the idea of friction in war, and uses his experience to minimize it. Can norms also accomplish this? The Soviets argue that they do.

The high-speed, chaotic and fluid battlefield will be confusing and complicated, with little time available for detailed decision making. Norms and nomograms will allow rapid decisions to be made based upon what the Soviets consider to be the single best alternative. Commanders, specifically at the tactical level, will have a "text book solution" that will free them from the burden of recurring tactical decision making.

Such a doctrine is an approach to overcoming friction. Since tactical actions will be predictable, commanders at the operational level can rely on tactical commanders to achieve goals required by norms. Artillery planning can be especially predictable given the required artillery pieces, ammunition, and time. What happens, however, when norms cannot be achieved?

The US would argue that now the experience and judgment of the commander, at all levels, becomes critical. Friction causes events to follow unplanned sequences, or, as Clausewitz stated, "makes the apparently easy so difficult."⁵⁰ When the plan is executed and norms are followed, but for some reason are not working, experience and judgment may be the difference between success or failure. US artillery doctrine is based upon this concept. Soviet artillery doctrine is not.

I have left several questions unanswered that might warrant further study. One important question concerns

whether or not artillery really is the most important arm on the current and future battlefield. Even with their emphasis on armor operations, the Soviets certainly regard their artillery as critical. Their specific use of terminology dictates that their artillery will create the maneuver required for armor to exploit. Artillery could be termed their "tactical arm of decision," while armor is their "operational arm of decision."

Another question deserving further study is whether or not we can overcome the superiority of Soviet artillery and its firing norms on the European battlefield. We are seriously outgunned by the Soviets. Perhaps the greatest threat to NATO forces is Soviet artillery, not Soviet armor forces. The counterfire battle must be won by NATO, but our doctrine currently orients more on destroying or delaying Soviet armor, not neutralizing their artillery.⁵¹

Finally, how will future computer technology be best utilized in artillery fire support planning and execution? Should computers be more of an aid to determining and executing firing norms, or should they be used as decision support systems that will assist the commander in using his judgment and experience?

The Soviet doctrine of norms and nomograms appears to work in artillery planning and execution, and they can probably execute it with at least some measure of

success.⁵² With current force and equipment levels, it remains to be seen if the US can execute the artillery planning and execution required to support AirLand Battle doctrine. Our artillery assets are limited and will probably remain so. Synchronization combined with an effective counterfire capability is critical to our success.

We should continue to use our norms in target analysis. We could make better use of them in other aspects of artillery planning, such as movement rates, displacement and occupation rates, shift times, and other areas where standardization would increase reaction time and ease planning requirements. Nomograms would be especially helpful in these areas. They are easy to use, take little time, and can be developed for just about any planning requirement where norms apply. The US Army and its artillery community should consider their use.

ENDNOTES

1. Chris Bellamy, Red God of War: Soviet Artillery and Rocket Forces, 1986, p. 1.
2. Ibid., p. 3.
3. US Department of Defense, Soviet Military Power: Prospects for Change 1989, 1989, p. 134.
4. John Erickson, Lynn Hansen and William Schneider, Soviet Ground Forces: An Operational Assessment, 1986, p. 141.
5. John Hemsley, Soviet Troop Control: The Role of Command Technology in the Soviet Military System, 1982, p. 89.
6. Erickson, Hansen and Schneider, Op. Cit., p. 141.
7. Ibid., p. 142.
8. Ibid., p. 169.
9. Bellamy, Op. Cit., p. 177.
10. Ibid., p. 177.
11. Ibid., p. 178.
12. Ibid., p. 177.
13. Erickson, Hansen and Schneider, Op. Cit., p. 142.
14. Field Manual 6-141-1, Field Artillery Target Analysis and Weapons Employment: Nonnuclear, 1978, p. 2-1.
15. Ibid., p. 4-9.
16. Training Circular 6-40, Field Artillery Manual Cannon Gunnery, 1988, p. C-5.
17. Ibid., p. C-5.
18. Ibid., p. C-5.
19. R. N. Carew Hunt, in his book, The Theory and Practice of Communism, defines the dialectical process as "one of thesis, antithesis, and synthesis. The thesis affirms a proposition. The antithesis denies, or in hegelian terminology, 'negates', it. The synthesis

embraces what is true in both the thesis and antithesis, and thus brings us one step nearer to reality. But as soon as the synthesis is subjected to a closer inspection, it, to, is found defective; and thus the whole process starts over again with a further thesis, negated in turn by its antithesis and reconciled by a new synthesis. In this triangular manner does thought proceed until at last we reach the absolute, which we can go on contemplating forever without discerning in it any contradiction."

20. Erickson, Hansen and Schneider, Op. Cit., p. 142.
21. C.N. Donnelly, "The Wind of Change in Soviet Artillery," International Defense Review, No.6, 1982, p.737.
22. Hemsley, Op. Cit., p. 90.
23. LTC Eddy Smith, Defeating Soviet Artillery, Masters Thesis, 8 June 1979, pp. 42-43.
24. Ibid., p. 35.
25. Bellamy, Op. Cit., p. 191.
26. Erickson, Hansen and Schneider, Op. Cit., p. 143.
27. Smith, Op. Cit., p. 49.
28. Charles B. MacDonald and Sidney T. Matthews, Three Battles: Arnaville, Altuzzo, and Schmidt, 1952, p. 259.
29. Smith, Op. Cit., p. 50.
30. C.J. Dick, "Soviet Battle Drills: Vulnerability or Strength?", International Defense Review, No.5, 1985, p. 663.
31. Ibid., p. 663.
32. C.N. Donnelly, Op. Cit., p. 737.
33. Bellamy, Op. Cit., p. 191.
34. Department of Defense Intelligence Document DDB-1130-8-82, Soviet Front Fire Support, 1982, p. 3.
35. Ibid., p. 7.
36. Dick, Op. Cit., p. 663.

37. Ibid., p. 663.
38. Soviet Military Power: Prospects for Change 1989, Op. Cit., p. 60.
39. Field Manual 100-5, Operations, 1986, p. 2.
40. Ibid., pp. 2-3.
41. Ibid., pp. 3-4.
42. A. Ya. Bayner, Tactical Calculations, 1982, p. 3.
43. Ibid., p. 4.
44. Field Manual 6-141-1, Op. Cit., pp. 4-11 through 4-12.
45. Training Circular 6-40, Op. Cit., pp. C-2 through C-5.
46. Field Manual 6-1, TACFIRE Operations, 1986, p. 1-3.
47. Field Manual 6-20-10, The Targeting Process, 1988, pp. 1-7 through 2-9.
48. Training Circular 6-71, Fire Support Handbook for the Maneuver Commander, 1988, p. 47.
49. Soviet Military Power: Prospects for Change 1989, Op. Cit., p. 60.
50. Carl von Clausewitz, On War, 1984 Edition, p. 121.
51. Smith, Op. Cit., p. 49.
52. Bellamy, Op. Cit., p. 177.

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